ANOMALIES OCCURRING DURING THE POLLEN GERMINATION PROCESS AT SOME *VITACEAE*

ANOMALII APĂRUTE ÎN PROCESUL DE GERMINARE A POLENULUI LA UNELE *VITACEAE*

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Abstract*: The paper presents some aspects regarding the anomalies which occurred during the pollen germination process at three taxons from Vitaceae family: Vitis vinifera L., Ampelopsis aconitifolia Bge., Ampelopsis brevipedunculata (Maxim.) Trautv. The appearance of some malformations of the pollen tubes, malformations specific to each taxon under study, have been observed in the course of pollen tube building. The occurring anomalies have been correlated with some genetic and physiological aspects of the taxons under study.*

Rezumat: *Lucrarea prezintă aspecte referitoare la anomaliile apărute în timpul procesului de gerrminare a polenului la anumiţi taxoni din familia Vitaceae: Vitis vinifera L., Ampelopsis aconitifolia Bge. şi Ampelopsis brevipedunculata (Maxim.) Trautv. În cursul edificării tuburilor polinice s-a constatat apariţia unor malformaţii ale acestora, malformaţii specifice fiecărui taxon studiat. Anomaliile apărute în cursul procesului de germinare a polenului sunt corelate cu importante aspecte de ordin genetic şi fiziologic ale respectivilor taxoni.*

The presence of numerous peculiarities of the pollen germination process, from different systematic units belonging to *Vitaceae* family, allow the possibility of their identification, and even of some cultured varieties of *Vitis vinifera*.

The factors influencing pollen germination are as follows: temperature, the germination medium resulted from stgmatic secretion and pollen viability.

Even if these parameters present optimum values, there are cases when germination process shows atypical peculiarities for the systematic unity to which pollen belongs. This atypical behaviour of the pollen during the germination process may be influenced by genetic factors.

MATERIAL AND METHODS

The biological material was represented by three taxons belonging to *Viataceae* family as follows: *Vitis vinifera* L., *Fetească neagră* cv., *Ampelopsis aconitifolia* Bge., *Ampelopsis brevipedunculata* (Maxim.) Trautv.

The grape vine variety *Fetească neagră* was cultivated in a plantation from the Didactic Experimental Station “V. Adamachi” belonging to the University of Agricultural Sciences and Veterinary Medicinal in Iassy. The plantation was set up in 1972. As a result of the investigations concerning the phenotypical variability of this grape variety, for the use of clonal selection five biotypes composing the population variety have been identified, and 15 elites have been sewlected from the valuable

biotype taking into account the viticultural and oenological aspect. The five biotype have been marked with the symbols: B1, B2, B3, B4, B5. The valuable biotype is B3.

Ampelopsis aconitfolia Bge. has been cultivated in the Botanical Garden from Iassy, in the Taxonomic Sector since 1965.

Ampelopsis brevipedunculata (Maxim.) Trautv. has been also cultivated in Botanical Garden from Iassy, in the Taxonomic Sector since 1965.

In order to study the pollen from *Fetească neagră* variety, 100 anthers in anthese phase from 10 inflorescences/clonal elites/year of study and 50 000 anthers/biotype/year were sampled in the period 1991-1998.

In the case of *Ampelopsis aconitifolia* and *Ampelopsis brevipedunculata* taxons, 500 anthers in anthese phasae from 500 inflorescences/taxon/year of study were sampled in the period 1998-2000.

The study of the pollen coming from the three vitacee focussed on the following aspects: the relief of the sporodermis surface, variability of the two diameters, the number of germinative pores/pollen grains, germination capacity, cytological variability of the germination [1, 2, 3, 4, 5, 6].

The investigations pointed out some deviations from the normal pattern of the germination process development. In our research, these deviations were designated as anomalies of the pollen germination process.

In order to point out the variability of the phenomenon under study, artificial nutritive media were used [7], different as for as the glucide concentration is concerned.

RESULTS AND DISCUSSIONS

1. Anomalies occurring in the process of pollen germination at *VItis vinifera* L., *Fetească neagră* variety

During the germination of the pollen grains abnormal forms of the pollen tubes were noticed on media presenting more than 20% sacchasose. The frequency of these anomalies is different depending on the biotype. Thus, at biotypes B1, B2, B3, B4 and all clonal elites there were recorded 10-12% cases when the pollen grains have formed abnormal tubes. At biotype B5 there were 33% of such anomalies.

The abnormal form of the pollen tubes was ascribed to some dilatations localized either at the tube basis or at its top or alongit (fig. 1).

At the same time, the anomalies may be caused by the tube ramifications which are produced either at the basis or at the top of the tube. When the pollen tubes presented ramifications, the two spermatia were localized only in a single ramification of the tube (fig. 2).

These anomalies of the pollen tubes are all in all the disfunctionalities of the male gametophyte, which contribute to the fertility decrease of the male gametes.

In correlation with the results of the pollen grain analyses it was noticed that in all biotypes and clonal elites of this variety, 82% from the flowers are normal hermaphrodites on type 5, and 18% from the flowers present deviations from the normal type, as it follows: 15% are on type 6, and 3% are on type 4.

Besides these deviations, there were cases when the anthers were abnormally developed: concrescences with stigma or corolla, having a much widened filament, fascicled anthers. The cases are in abundance especially at biotype B5.

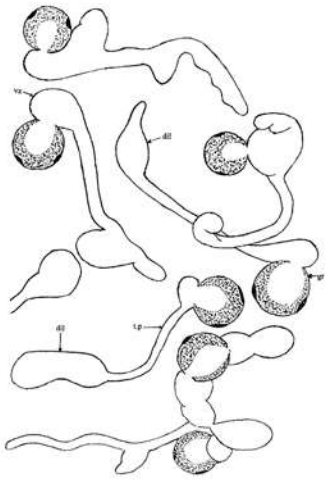

Fig. 1 - Pollen tubes with dilatations at *Vitis vinifera*
Vitis vifera, *Fetească neagră* cv.: dil-dilatation; gr-pollen grain; t.p-pollen tube; vz-vesicle (600X) (Original)

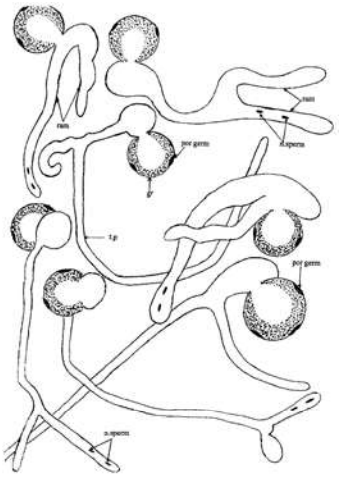

Fig. 2 - Ramification pollen tubes at *Vitis Fetească neagră* cv.: gr.-pollen grain; n.sperm -spermatia nucleus; por germ- germinative pore ram-ramification; t.p-pollen tube (600X) (Original)

2. Anomalies occurring in the process of pollen germination at *Ampelopsis aconitifolia* Bge.

During pollen germination there were noticed 19% cases when the pollen grains have formed on a medium with 25% saccharose abnormal tubes, terminally ramified (fig. 3, 4). In such situations, the two spermatia are situated on a single ramification of the pollen tube.

On a media with 5%, 10% and 15% saccharose there were noticed interesting cases, when the pollen content has separated completely from exyne. Then, on intine surface, a mammilla is formed and it later develops into a pollen tube (fig. 5).

The recorded anomalies may be correlated with mixoploidy phenomenon, which affects the taxon under study. The anomalies which appeared during the pollen germination may be considered proves of the deficitary functioning of the pollen grains, contributing to the fertility decrease of male gametophyte.

3. Anomalies occurring in the process of pollen germination at *Ampelopsis brevipedunculata* (Maxim.) Trautv.

During the process of pollen germination several special cases were noticed, when the pollen tubes presented abnormal dilatations (on media with 15% saccharose) or ramifications at the top (on media with 20% saccharose).

At a reduced number of grains, the tendency to form two pollen tubes was observed. As in the case of the taxon previously mentioned, at *Ampelopsis brevipedunculata* were also noticed sporadic cases specific for media with 5%, 10% and 15% saccharose, when the exyne completely separated from the intine and from it a mammilla is formed which becomes a short pollen tube (fig. 6).

The abnormal cases observed in the germination process of the pollen samples at the taxon, do not exced 12%.

Fig. 3 - Pollen tube with three ramifications at the top, on a medium with 25% saccharose at *Ampelopsis aconitifolia* (100X) (Original); b = 200X)

Fig. 4 - Pollen tube with three ramifications at the top, on a medium with 25% saccharose at *Ampelopsis aconitifolia* (200X) (Original)

Fig. 5 - Pollen germination on a medium with 5% saccharose at *Ampelopsis aconitifolia* (200X) (Original)

Fig. 6 - Pollen germination on a medium with 5% saccharose at *Ampelopsis brevipedunculata* (200X) (Original)

CONCLUSIONS

1. During the process of pollen germination at *Vitaceae* anomalies appear with different frequencies depending on the genotype.

2. The types of anomalies occuring in the process of pollen germination differ depending on the genus.

3. Thus, at *Vitis vinifera* L., *Fetească neagră* variety, the anomalies were represented by dilatations and ramifications of the pollen tubes, while at the two taxons from *Ampelopsis*, the anomalies consisted in exyne separation from intine, followed by a mammilla formation, which becomes a short pollen tube. Seldom, at the two taxons from *Ampelopsis* genus cases of dilatations and ramifications of the pollen tubes were noticed.

4. The presence of anomalies in the process of pollen germination from *Vitaceae* may be explained on the basis of the chromosomial number variation (mixoploidy phenomenon).

5. The anomalies occuring in the process of pollen germination from *Vitaceae* represent an indicator of the male gametophyte disfunctioning, determining a low fertility and fructification.

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CYTOLOGICAL VARIABILITY OF POLLEN GERMINATION AT *AMPELOPSIS BREVIPEDUNCULATA* (MAXIM.) TRAUTV.

CITOLOGIA GERMINĂRII POLENULUI DE *AMPELOPSIS BREVIPEDUNCULATA* (MAXIM.) TRAUTV.

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Abstract*: The paper presents the cytological characteristics of pollen germination process at Ampelopsis brevipedunculata (Maxim.) Trautv. The author analysed the phases of pollen tube building under different conditions of glucide composition from nutritive medium. The results obtained offer information regarding the ecophysiological and genetical characteristics of taxon under study.*

Rezumat: *În lucrare se prezintă caracteristicile citologice ale procesului de germinare a polenului de Ampelopsis brevipedunculata (Maxim.) Trautv. S-au urmărit stadiile de edificare ale tubului polinic în diferite condiţii ale compoziţiei glucidice din mediul nutritiv. Rezultatele obţinute oferă informaţii privind caracteristicile ecofiziologice şi genetice ale taxonului luat în studiu.*

The specialised literature hasn't presented concrete data regarding the cytology of pollen germination at *Ampelopsis brevipedunculata* (Maxim.) Trautv., species which belongs to *Vitaceae* family. The pollen of this species has been studied from morphological point of view [4, 3] and germination capacity point view. In order to complete the studies regarding *Ampelopsis brevipedunculata* pollen, we consider necessary to analyse the cytological characteristics of germination process.

MATERIAL AND METHODS

The biological material used for the study of the cytological traits of the pollen germination was represented by four individuals of *Ampelopsis brevipedunculata* (Maxim.) Trautv., *Vitaceae* family. This taxone were cultivated in Botanical Garden from Iassy, Taxonomic Sector. The taxone were planted in 1965.

In order to study the pollen, 500 anthers in anthesis phase were sampled from 500 inflorescences/year under study, in the period 1998-2000. The values from the tables represent the arithmetical means of the yearly values during the research period.

The pollen grains were inoculated on nutritive media artificially agarised, to which saccharose, in different concentrations, ranging from 0 to 45%, were added. The quantity of the pollen inoculated on these mediu was the same in all the cases. In order to maintain a wet medium, which is vital for the viability of the polllen grains, the so called „wet rooms van Tieghem" [5].

The cytological aspects of the pollen germination were studied by microscopic measurements of the pollen tubes at 5, 24, 48 and 72 hours after pollen inoculation on the media, using the optical microscope IOR MC_1. The same microscope was used to take micropictures to mark the development stages of the male gametophyte under study.

RESULTS AND DISCUSSIONS

We have noticed at variants where glucide concentration from the medium allowed pollen germination, that the building of pollen tube was preceded by a vesicle formation. This finding was also confirmed by specialised literature [1, 2] according to which the development of male gametophyte makes its appearance by a vesicle formation.

In the first stage, the vegetative cell passes into the formed vesicle and in the next phase, when the pollen tube becomes differentiated, the generative cell gets into it (fig. 1, 2).

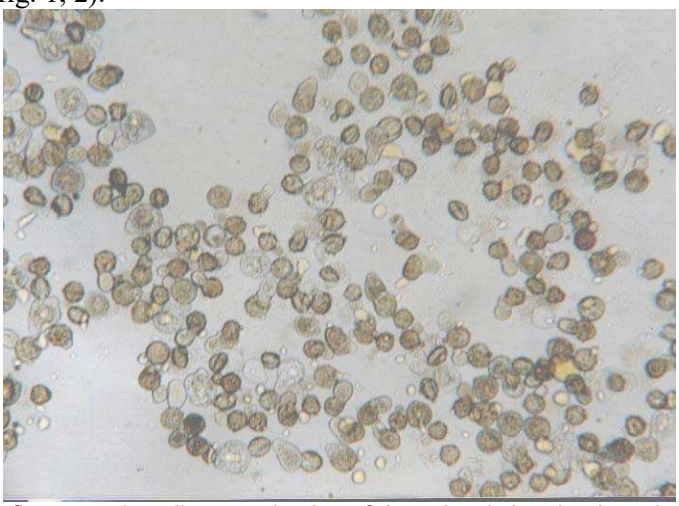

Fig. 1 -The first stage in pollen germination of *Ampelopsis brevipedunculata* (Maxim.) Trautv. on a medium with 15% saccharose, 5 hours after inoculation: vesicle formation (100X) (Original)

Fig. 2 - The beginning of pollen tube evidence at *Ampelopsis brevipedunculata* (Maxim.) Trautv. on a medium with 15% saccharose, 5 hours after inoculation (200X) (Original)

Five hours after inoculation, the average length of the pollen tubes recorded values ranging between 78 and 191 μm (fig. 3, tab. 1).

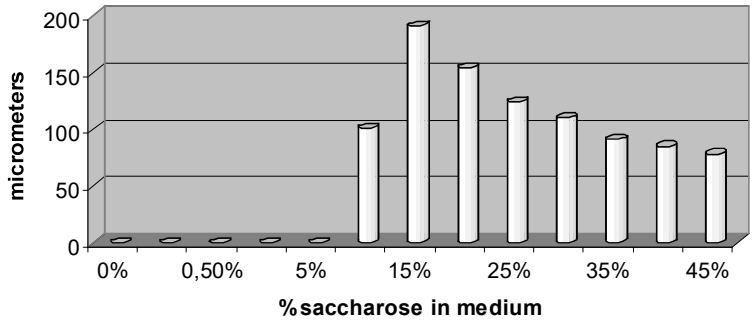

Fig. 3 The average lenght on the pollen tube at *Ampelopsis brevipedunculata* , 5 hours after inoculation

Twenty-four hours after inoculation, the pollen tubes lengthened up to 490 μm (fig. 4, tab. 1).

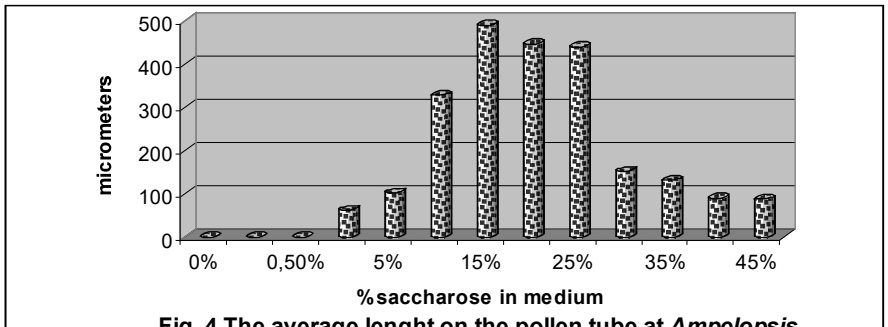

Fig. 4 The average lenght on the pollen tube at *Ampelopsis brevipedunculata* , 24 hours after inoculation

Forty-eight hours after inoculation the pollen tubes reached 970 μm (fig. 5, tab. 1).

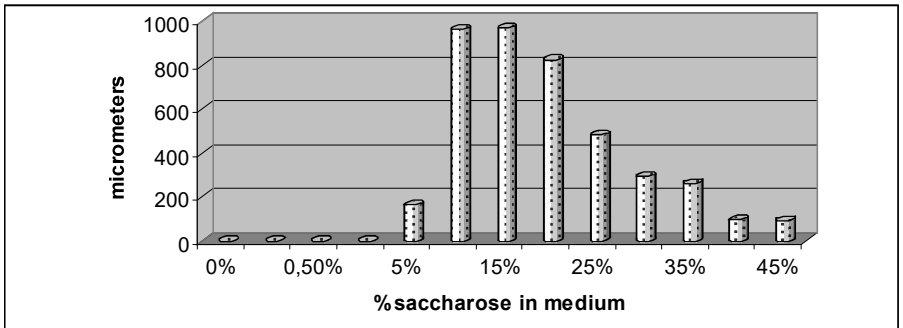

Fig. 5 The average lenght on the pollen tube at *Ampelopsis brevipedunculata* , 48 hours after inoculation

Seventy-two hours after inoculation, the tubes formed on a medium with 5% saccharose degenerated on the whole and on hyperglucide media (more than 25% saccharose) the resorption affected only several pollen tubes. The length of the viable tubes ranged between 137 and 1313 μm (fig. 6, tab. 1).

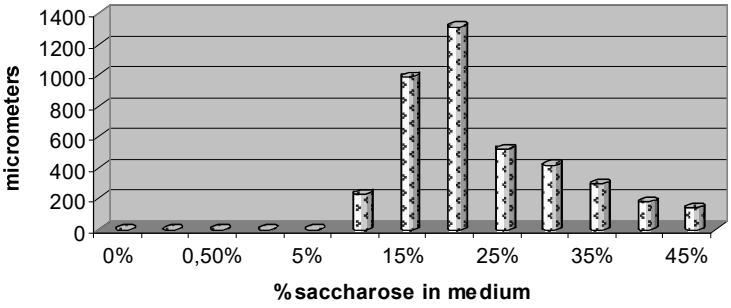

Fig. 6 The average lenght on the pollen tube at *Ampelopsis brevipedunculata* , 72 hours after inoculation

Table 1

The average length of the pollen tube at *Ampelopsis brevipedunculata* during the germination

hours after inoculation	saccharose concentration (%) in germination media												
	0	0.2	0.5	2	5	10	15	20	25	30	35	40	45
5	0	0	0	0	0	101	191	154	124	110	91	85	78
24	0	0	0	62	102	328	490	447	440	152	131	90	87
48	0	0	0	0	164	963	970	824	483	292	261	97	91
72	0	0	0	0	0	231	990	1313	520	417	295	177	137

The dynamic analysis of length growth for pollen tubes has shown that this parameter was much influenced by glucide concentration of nutritive mediums (fig. 7).

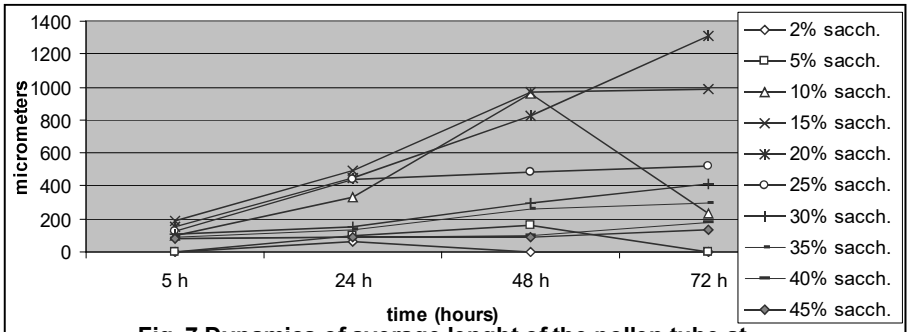

Fig. 7 Dynamics of average lenght of the pollen tube at *Ampelopsis brevipedunculata*

The longest pollen tubes were formed on media with 15%, 20% and 25% saccharose, where they appeared thick like felt.

If we take into account that the average length of the flower style at the taxon under study is about 0.42 mm, we may estimate that the growth speed of the pollen tubes during the first 24 hours after pollination is sufficient to ensure fecundation and fructification, under normal meteorological conditions, when the glucide concentration of the stigmatic liquid may be about 5 – 25%.

In droughty periods the stigmatic secretion may reach a glucide concentration higher than 25% with negative effects on speed penetration of the pollen tubes in style.

The laboratory results have proved that on hyperconcentrated media (more than 25% saccharose) the pollen tubes may reach lengths ranging between 91 and 292 μm, 48 hours after inoculation, and between 137 and 417 μm, 72 hours after inoculation on a nutritive medium. We may conclude that if *Ampelopsis brevipedunculata* is affected by lasting droughts during the flowering period, it may not ensure the fructification.

Media without glucide content induced the death of pollen grains.

On media with a minimum saccharose content (0.2%, 0.5%, 2%) mammillas formation was resorbed.

On media with 5% saccharose numerous mammillas were formed, but only part of them became pollen tubes, whose length would not allow the penetration into the embryonal sac.

Due to the fact that the annual results obtained during the research period are very similar, we may conclude that the algorithm of the germination process has a high genetic stability.

CONCLUSIONS

1. The development of the male gametophyte at *Ampelopsis brevipedunculata* (Maxim.) Trautv. bigins with a vesicle formation.

2. The vegetative cell is established close to the top of the pollen tube, being followed by the generative cell, which divides mitotic in pollen tube.

3. There is a close positive correlation between pollen germination capacity and the length of the pollen tubes.

4. The sequence of the development stages of the male gametophyte, being the same in all the cases under study and in years with different meteorological conditions, proves that this cytological process is the expression of the major genes.

5. Most favourable nutritive media for the development of the stages at normal speed of the pollen tube at *Ampelopsis brevipedunculata* (Maxim.) Trautv. are those with a glucide composition of 15 – 25%.

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CITOGENETIC EFFECTS INDUCED BY TREATMENT WITH CITRIC ACID ON PICEA ABIES L.

EFECTE CITOGENETICE ALE TRATAMENTULUI CU ACID CITRIC ASUPRA SPECIEI *PICEA ABIES* L.

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Abstract. *The stranger compounds who gain insight into the live organism by different ways, brings about changes or structural and functional deterioration, could by considered the toxically substances, having the mutagen effect on the organism. Making part fro the additives utilized in alimentary industry, citric acid have numerous negative effects. In function with the dose in witch is consumed can be more or little toxically. In consequently, we proposed to evidence the cytogenetically effects of this product, managed in different doses and at different times at Picea abies L. In idea of study the chromosomal frequency aberrations in ana - telophases it can be observed the frequency of division cell and was counted the ana – thelophases witch presents the chromosomal aberrations. After the examination of preparations it was observed the appearances of chromosomal aberrations in ana – thelophases, like: expelled chromosomes, retardate's chromosomes, tripolars ana – telophases, bridges, fragments.*

Rezumat. *Acidul citric (E330) face parte din aditivii utilizaţi în industria alimentară. În funcţie de doza în care este consumat poate fi mai mult sau mai puţin toxic. Lucrarea îşi propune evidenţierea efectelor citogenetice ale acestui produs, administrat în doze diferite, dar şi la timpi diferiţi la indivizi ai speciilor Picea abies L. S-a lucrat cu 10 probe, dintre care 1 reprezintă martorul speciei, restul reprezentând probele obţinute în urma tratamentului cu trei concentraţii diferite de acid citric pe trei perioade diferite 0,1%, 0,3% şi 0,5%. În vederea studiului frecvenţei aberaţiilor cromosomiale în ana-telofază s-a observat frecvenţa celulelor în diviziune şi s-au numărat ana-telofazele care prezentau aberaţii cromosomiale. În urma examinării preparatelor s-a observat apariţia unor aberaţii cromosomiale în ana-telofază, cum ar fi: cromosomi expulzaţi, cromosomi retardatari, ana-telofaze tripolare, punţi, fragmente.*

MATERIAL AND METHOD

For the experiences I used healthy seeds proceed from Picea abies species. The seeds were placed in Petri box hanged with filter paper and moisten in distillate water. The boxes were introduced in the thermostat. The first seeds were germinated after 5 days. The roots it was drawing at the time when touched the length between the 0.8 – 1.5 cm.

For roots treatment I used the citric acid solutions in different concentration: 0.1%, 0.3%, and 0.5 %.

The material it was hold in fixing fluid 3:1, 24h in the fridge, and after that it was putting in ethyl alcohol 70%. The coloring was maddened with Carr dye, 1-2 days.

It was studied 5 microscopically fields and was counted the cells from each field, the cells in different phases of division, these frequency and all ana – telophases witch presents the chromosomal aberration.

RESULTS AND DISCUSSIONS

At 0.1% concentration of citric acid administrated for 4 hours is notice the most big percent with aberrations cells, 0.47%, unlike the 2 h and 6 h treatment, where the aberration represent 0.20% and 0.31%, and where can be establish a deficiency of cells frequency with chromosomal aberrations (table 1). Comparing these results with witness is observing an increasing of cells frequency with 6.7X aberration in 4h treatment (0.47% given the 0.07%) and only 4.4X at 6h and 2.8X at 2h. At 0.3% citric acid the situation is similar with the 0.1%. Thus, the bigger percent of cells with aberrations in division it was remarked after the 4h treatment (0.46%), unlike the 0.27% at 2h and 0.43% at 6h (table 2).

In the case it used the two first concentrations the bigger percent of aberration it is registered after the 4h treatment and in case of 0.5% in the same period of time it can be observed the smaller percent of aberrations (0.16% given the 0.46% at 0.3% and 0.47% at 0.1%). And, in case of first two concentrations, suddenly with increase of treatment time, the aberrations percent continue to decrease more or less, suddenly with time increasing, between 4h and 6h it can be observed an increasing of most 3X of aberration percent (table 3).

In comparison with witness, where the aberration frequency is 0.07% in case of 0.5% treatment is observed a percent increasing of 3.2X for a 2h treatment (0.23%), of 2.2% in case of 4f treatment and higher 8X (0.61%) at 6h (table 4).

As for the type of chromosomal aberration at witness meet the ana – telophases with bridges. After the different concentration treatment (0.1%, 0.3%, 0.5%), and in different period of time it can be remark an increasing of chromosomal aberration, increasing also the types of these.

Analyzing the tables 1, 2 and 3, the numerous aberration and with the biggest percent is meet in case of 0.5% citric acid, at 6h. the most numerous multiple bridges: 54.5% at 6h and 0.1%; 21.5% at 4h, 47% at 6h for 0.3%; 28.5% at 6h and 0.5%. In smaller percents are predominating the simple bridges: 18.1% at 6h and 0.1%; 11.7% at 6h and 0.3%; 19% at 6h and 0.5%; expelled chromosomes 27.2% at 6h and 0,1%; 29.4% at 6h and 0.3%; 14,2% at 6h and 0.5%; and sporadic appear fragments (4.7% at 6h and 0.5%) and tripolar ana – telophases.

In a treatment with 0.1% citric acid it can be observed a percent increasing of mitotic index suddenly with the increasing of exhibit time: 11.3% at 2h, 15.9% at 4h, 17.8% at 6h. In case of 0.3% the variation is the same because the mitotic index is increasing suddenly with the treatment time increasing 9% at 2h, 10% at 4h and 19.8% at 6h. In case of 0.5%, suddenly with treatment time increasing it is increase the mitotic index, between 13.8% at 2h to 21.2% at 4h, and further on, increase the exhibit time, the mitotic index decrease, catch at 16,9% at 6h. These demonstrate the presence of a smaller number of cellular divisions, in proportional reverse with the exhibit time (table 4)

Tabel 1

The freqvency and types of division aberrations induced by 0,1% citric acid treatment, administrated on different periods of time, at Picea abies

No. prep	No. tot. Cells	No. Interph.	No. cell. in div.	Nr.	No. cells with aberrations %			Aberrations In A-T												Time
								Crs.expulsations/cell				Crs.retardatars		Crs.inelars		bridges				
								1		2		1		1		simple		multiple		
					From tot.	From div.	In A-T	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
1	630	547	83	1	0,15	1,20	100	1	100	-	-	-	-	-	-	-	-	-	-	2 h
2	825	776	49	2	0,24	4,08	100	-	-	-	-	-	-	-	-	-	-	2	100	
3	415	357	58	2	0,48	3,44	100	-	-	-	-	1	50	-	-	1	50	-	-	
4	555	462	93	2	0,36	2,15	100	1	50	-	-	-	-	-	-	-	-	1	50	
5	912	807	105	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	3337	2949	388	7	0,20	1,80	100	2	28,5	-	-	1	14,2	-	-	1	14,2	3	42,8	
1	490	298	192	3	0,61	1,56	100	2	66,7	-	-	-	-	-	-	1	33,3	-	-	4 h
2	456	311	145	3	0,66	2,07	100	1	33,3	-	-	-	-	-	-	2	66,7	-	-	
3	654	433	221	5	0,76	2,26	100	2	33,3	-	-	2	33,3	1	16,6	1	16,6	-	-	
4	645	453	192	-	-	-	-	-	-	-	-	-	-	-	-	1	100	-	-	
5	710	514	196	3	0,42	1,53	100	1	33,3	1	33,3	-	-	-	-	1	33,3	-	-	
Total	2955	2009	946	14	0,47	1,48	100	6	40	1	6,7	2	13,3	1	6,7	5	33,3	-	-	
1	460	340	120	4	0,86	3,33	100	1	25	-	-	-	-	-	-	1	25	2	50	6 h
2	840	710	130	1	0,11	0,76	100	-	-	-	-	-	-	-	-	-	-	1	100	
3	1100	1005	95	3	0,27	3,15	100	1	33,3	-	-	-	-	-	-	1	33,3	1	33,3	
4	665	554	111	2	0,30	1,80	100	1	50	-	-	-	-	-	-	-	-	1	50	
5	435	290	145	1	0,22	0,68	100	-	-	-	-	-	-	-	-	-	-	1	100	
Total	3500	2899	601	11	0,31	1,83	100	3	27,2	-	-	-	-	-	-	2	18,1	6	54,5	

Tabel 2

The freqvency and types of division aberrations induced by 0,3% citric acid treatment, administrated on different periods of time, at Picea abies

No. prep	No. tot. Cells	No. Interph.	No. cels in div.	No. Cells with aberrations				Aberrations In A-T												Time
				No.	%			Crs.expulsation/cell 1		2		Crs.retardatars 1		2		bridges simple		multiple		
					From tot.	From div.	In A-T	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
1	630	462	168	4	0,63	2,38	100	1	20	1	20	2	40	1	20	-	-	-	-	2h
2	605	404	201	3	0,50	1,49	100	3	100	-	-	-	-	-	-	-	-	-	-	
3	572	417	155	1	0,17	0,65	100	1	100	-	-	-	-	-	-	-	-	-	-	
4	868	477	391	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
5	667	433	234	1	0,15	0,43	100	1	100	-	-	-	-	-	-	-	-	-	-	
Total	3342	2193	1149	9	0,27	0,78	100	6	60	1	10	2	20	1	10	-	-	-	-	
1	454	359	95	8	1,76	8,42	100	2	25	3	37,5	-	-	-	-	-	-	2	25	4h
2	629	520	109	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3	588	412	176	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4	627	476	151	3	0,48	1,99	100	1	25	1	25	-	-	-	-	-	-	1	25	
5	545	430	115	2	0,37	1,74	100	1	50	1	50	-	-	-	-	-	-	-	-	
Total	2843	2197	646	13	0,46	2,01	100	4	28,6	5	35,7	-	-	-	-	-	-	3	21,5	
1	761	606	155	2	0,26	1,29	100	-	-	-	-	-	-	-	-	-	-	2	-	6h
2	775	627	148	5	0,64	3,37	100	1	20	-	-	1	20	-	-	1	20	2	40	
3	797	605	192	1	0,12	0,52	100	-	-	-	-	-	-	-	-	-	-	1	-	
4	770	594	176	4	0,51	2,27	100	2	50	-	-	-	-	-	-	1	25	1	25	
5	781	618	163	5	0,64	3,06	100	2	40	-	-	-	-	-	-	-	-	2	40	
Total	3884	3050	834	17	0,43	2,03	100	5	29,4	-	-	1	5,8	-	-	2	11,7	8	47	

Tabel 3

The freqvency and types of division aberrations induced by 0,5% citric acid treatment, administrated on different periods of time, at Picea abies

No. prep	No. tot. Cells	No. Inter ph.	No. cells in div.	No. Cells with aberrations				Aberrations In A-T												Time
				Nr.	%			Crs.expulsation/cell				Crs.retardatars		A-T tripolar		bridges				
								1		2		1				simple		multiple		
					Din tot.	Din div.	In A-T	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
1	595	512	83	2	0,33	2,40	100	-	-	-	-	-	-	-	-	-	-	2	100	2h
2	805	706	99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3	775	679	96	2	0,25	2,08	100	-	-	-	-	-	-	-	-	1	50	1	50	
4	925	834	91	3	0,32	3,29	100	1	33,3	-	-	-	-	-	-	1	33,3	1	33,3	
5	1100	1012	88	3	0,27	3,40	100	1	33,3	-	-	-	-	-	-	-	-	2	66,6	
Total	4200	3743	457	10	0,23	2,18	100	2	20	-	-	-	-	-	-	2	20	6	60	
1	642	399	243	2	0,31	0,82	100	-	-	-	-	-	-	-	-	-	-	-	-	4h
2	606	412	194	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3	626	462	164	1	0,16	0,61	100	-	-	-	-	1	100	-	-	-	-	-	-	
4	778	615	163	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
5	556	405	151	2	0,36	1,32	100	1	50	1	50	-	-	-	-	-	-	-	-	
Total	3208	2295	915	5	0,16	0,55	100	1	20	1	20	1	20	-	-	-	-	-	-	
1	663	553	110	3	0,45	2,72	100	1	33,3	1	33,3	-	-	1	33,3	-	-	-	-	6h
2	630	510	120	9	1,42	7,50	100	1	9,1	2	18,2	-	-	1	9,1	2	18,2	2	18,2	
3	738	614	124	2	0,27	1,61	100	-	-	-	-	-	-	-	-	-	-	2	100	
4	659	519	140	4	0,60	2,85	100	-	-	2	50	-	-	-	-	1	25	1	25	
5	744	591	153	3	0,40	1,96	100	1	33,3	-	-	-	-	-	-	1	33,3	1	33,3	
Total	3434	2787	647	21	0,61	3,24	100	3	14,2	5	23,8	-	-	1	4,7	4	19	6	28,5	

Tabel 4

Mitotical index at Picea abies after the citric acid treatment

	Timp	0,1%	0,3%	0,5%
MI	2h	11,3	9	13,8
	4h	15,9	10	21,2
	6h	17,8	19,8	16,9

As for the percentage of division phases, predominant are prophases, which represent more than 50% from the total cells in divisions in case of 0.1%, and 0.5% concentrations, and almost 50% in case of 0.3%. Also, in big percent are the telophases, almost 20%.

CONCLUSIONS

The citric acid it is a toxically compound which sue like a mutagen agent on Picea abies, determinations of the chromosomal aberrations appearance and in the same time it was influenced the frequency of cell divisions and the report between the frequency of phases divisions.

Thus, was observed that the frequency aberration cells it is between 0.16% and 0.61%. The citric acid have the mutagen action most strong in case of maxim concentration (0.5%) and in longer exhibit time (6h) of a treatment, in the both situations are register the biggest percent value of division aberration (0.61%).

It was obtained interesting results as far of percent fluctuations of chromosomal aberrations in case of use the same concentrations, but in different times. Thus, it's appearing the next deviations: increasing the aberration percent from 0.20% to 0.47% and after that increasing at 0.61% in case of 0.5%. Thus, the minimum and maximal percent of aberrations was registered in case of 5%, difference being made by the exhibit time: 0.16% at 4h and 0.61% at 6h.

In case of 5% is registered the biggest percent value of mitotic index, 21.2%, close of the witness, 21.8%.

As far of division phases, the prophases register the biggest percent, this represents over 50% from the total cells in division.

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STUDIES CONCERNING SOME FRENCH BEAN CULTIVARS (*PHASEOLUS VULGARIS* L.) TOLERANCE TO THE BEAN WEEVIL (*ACANTHOSCELIDES OBTECTUS* SAY) ATTACK IN STORAGE CONDITION

STUDII PRIVIND TOLERANȚA UNOR CULTIVARE DE FASOLE DE GRĂDINĂ (*PHASEOLUS VULGARIS* L.) LA ATACUL GĂRGĂRIȚEI FASOLEI (*ACANTHOSCELIDES OBTECTUS* SAY), ÎN CONDIȚII DE DEPOZIT

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Abstract. *The research was made for finding some resistant cultivars of french bean (Phaseolus vulgaris L.) to the attack of bean weevil, in storage condition. The infestaion was made artifically in the laboratory condition. The study was completed using 6 certified varieties and 4 local populations of french bean. All the studied cultivars were attacked but the attack was significantly different. The second scope of the experiment is the hibridation of resistant varieties and populations to the attack of bean weevil, for amelioration purposes, in the same time with other important quantitative proprieties.*

Rezumat. *Cercetările au urmărit găsirea unor cultivare de fasole de grădină (Phaseolus vulgaris L.) tolerante la atacul gărgăriței fasolei (Acanthoscelides obtectus Say), în condiții de depozit. Infestarea loturilor de semințe s-a făcut artificial, în condiții de laborator. S-au studiat 6 soiuri omologate şi 4 provenienţe locale. Toate provenienţele luate în studiu au fost atacate, dar atacul a fost diferit de la o proveniență la alta. Următorul obiectiv urmărit este hibridarea cultivarelor cu rezistență crescută la acest dăunător, în vederea ameliorării acestei specii atât pentru rezistență față de gărgărița fasolei cât şi pentru alte caracteristici productive importante.*

The *Acanthoscelides obtectus Say.* Species is an extremely dangerous pest with 2 – 3 generations / year in cultivation conditions and there have been 3 – 4 generations / year recorded in storage condition. When pest control lacks it can produce 100% damages in stocked seeds (A. Odagiu, M. Porca, 2003).

In order to limit the attack of bean weevil (*A. obtectus*) besides complying with the quarantine measures, it is recommended to use the tolerant cultivars. Research aimed to establish the injurious effect of the bean weevil (*A. obtectus*) to the 6 certified varieties and 4 local populations of french bean, in artificial infestation condition and storage condition.

MATERIAL AND METHODS

The study was made regarding the response of 10 french bean (*Phaseolus vulgaris L.*) cultivars – 6 certified varieties and 4 local collected populations from different villages of Braila county – to the attack of weevil *(A. obtectus*) under the conditions of infestation in the laboratory in storage conditions for 3 months (T = 15 – 18^{o}C; RH = 75 – 80%). In the laboratory we determined the protein content in beans (%) of different origin (D. Trifan, 2006).

The experiment consisted on 10 varieties in 4 repetitions, being organized according to the method of randomized blocks. The results of which were statistically

correlated using the variant analysis method. The beans have been distributed 100 beans / sample, they have been weighed by an precision balance and moistured with 1 ml water. This samples have been kept in growing rooms for 3 months, at a relative air humidity of 70% and a temerature of 25°C.

After 3 months, the following were observed:

- the frequency of weevil (*A. obtectus*) attack (%);
- the intensity of attack;
- the total loss of biomass / bean.

Investigations made 3 months after storage pursued the determination of some correlations between the biochemical characteristics of the seed and the importance (frequency, intensity) of the pest attack.

RESULTS AND DISCUSSIONS

The experiments pursued the frequency of weevil bean (*A. obtectus)* attack (%) on different bean derivations (tables 1), the intensity of attack (tables 2), the total loss of biomass/bean caused by the weevil attack on the bean cultivars (tabels 3). Two references have been chosen: Jutta variety (Mt_1) and the average of the attack on all cultivars (Mt_2). The analysis of the data in table 1 shows that the least frequency of the attack was recorded at Jutta variety (15.25%) followed, in increasing order, by Lacu Sarat cultivar (20.50%); Unidor variety (22.25%); Carson (24.50%); Narbbonne (25.00%). The highest frequency of attack was recorded at Tichilesti cultivars (47.00%) followed, in decreasing order, by Lingua di Fuoco variety (45.50%), Movila Miresii cultivars (43.75%), Vadeni (38.25%), Inka (35.75%). By comparing the differences between the frequencies of the attack recorded at different varieties and Mt1 (Jutta variety), it can be noticed that the varieties have been more intensely attacked (from +31.75 to +5.25) the differences being very significantly positive.

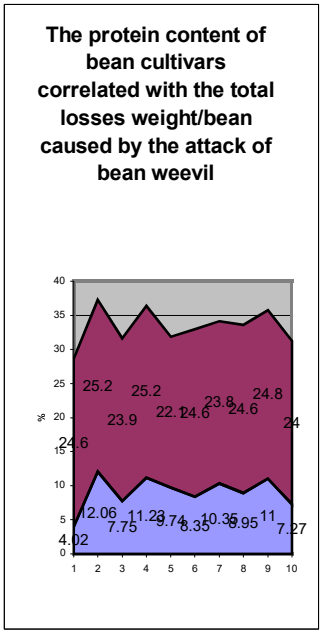
By comparing the differences between the frequencies of the attack recorded at different derivations and Mt_2 (average of varieties), it can be noticed that the following varieties were less intensely attacked, these statistically assured differences being very significant negative: Jutta (48.00%, -16.52), Lacu Sarat (64.52%, -11.27), Unidor (70.03%, -9.52), Carson (77.11%, -7.27). The following varieties have been more intensely attacked, these statistically assured differences being very significan positive: Tichilesti (147.93%, +15.23), Lingua di Fuoco (143.21%, +13.73), Movila Miresii (137.70%, +11.98), Vadeni (120.39%, +6.48).

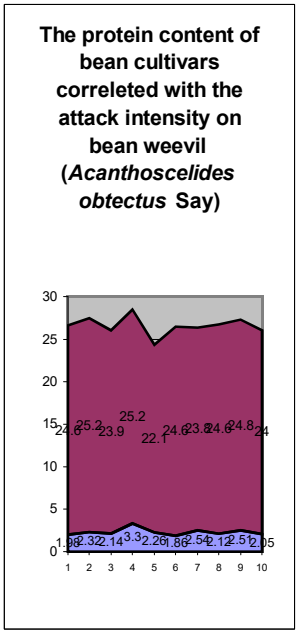
The analysis of the data in table 2 it can be noticed that the most intensely attacked variety is Lingua di Fuoco variety (I = 3.30 opercula/bean), followed, in decreasing order, by Movila Miresii (2.54), Tichilesti (2.51), Carson (2.32) and Inka (2.14). The least intensely attacked was Narbbonne variety with I = 1.86 opercula/bean, followed, in increasing order, by Jutta (1.98) and Lacu Sarat cultivars (2.05). By comparing the differences between the intensities of the attack recorded at different varieties and the average of varieties (Mt_2), it can be noticed that the less intensely attacked were, in deacresing order: Narbbonne (-0.44), Jutta (-0.32), Lacu Sarat (-0.25) and Vadeni (-0.18).

The data regarding the total losses of weight/bean caused by the attack of bean weevil (*A. obtectus*) are presented in table 3. It can be noticed that the lowest

loss/bean has been recorded at Jutta variety (4.02), followed, in increasing order, by: Lacu Sarat variety (7.27%), Inka (7.75%), Narbbonne (8.35%) and Vadeni (8.95).

The protein content was obtained through biochemical analyses using the Kjeldahl method, determining first the nitrogen content at technical maturity and then the nitrogen content at physiologic maturity. The results were multiplied by the 6.25 coefficient to determine the total protein content in the analyzed samples. The results assessment was performed using the statistical row of observations method and the variance analysis. Table 4 show the crude protein of the studied beans varieties. The observation during this research corroborated with the protein content of studied cultivars were statistically correlated and proved that the attack of bean weevil is a positive nonlinear correlation with the protein content.





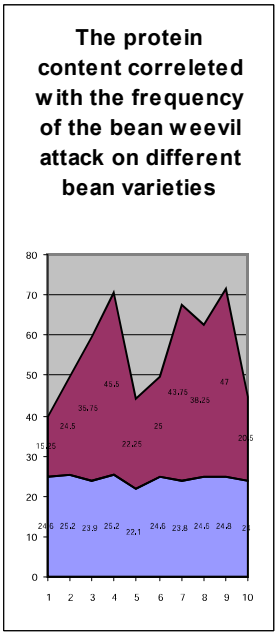


Table 1: **The frequency of the bean weevil *(Acanthoscelides obtectus Say)* attack on different bean cultivars**

Variants	Attack freqency (%) in control Mt_1		± d	Signifiance of difference in control Mt_1	Attack freqency (%) in control Mt_2		± d	Signifiance of difference in control Mt_2
	Absolute values	Relative values			Absolute values	Relative values		
1. Jutta (Mt1)	15.25	100.00	+0.00	-	15.25	48.00	-16.52	000
2. Carson	24.50	160.65	+9.25	***	24.50	77.11	-7.27	000
3. Inka	35.75	234.42	+20.50	***	35.75	112.52	+3.98	***
4. Lingua di Fuoco	45.50	298.36	+30.25	***	45.50	143.21	+13.73	***
5. Unidor	22.25	145.90	+7.00	***	22.25	70.03	-9.52	000
6. Narbbonne	25.00	163.93	+9.75	***	25.00	78.69	-6.77	000
7. Movila Miresii	43.75	286.88	+28.50	***	43.75	137.70	+11.98	***
8. Vadeni	38.25	250.81	+23.00	***	38.25	120.39	+6.48	***
9. Tichilesti	47.00	308.19	+31.75	***	47.00	147.93	+15.23	***
10. Lacu Sarat	20.50	134.42	+5.25	***	20.50	64.52	-11.27	000
11. Varians means Mt_2					31.77	100.00	+0.00	-

$DL_{5\%} = 1.70$ $DL_{1\%} = 2.44$ $DL_{0.1\%} = 3.45$

Table 2: ***The attack intensity on the bean weevil* (Acanthoscelides obtectus Say) *of different bean cultivars***

Variants	The attack intensity(%) in control Mt_1		± d	Signifiance of difference in control Mt_1	The attack intensity(%) in control Mt_2		± d	Signifiance of difference in control Mt_2
	Absolute values	Relative values			Absolute values	Relative values		
1. Jutta (Mt1)	1.98	100.00	+0.00	-	1.98	86.08	-0.32	000
2. Carson	2.32	117.17	+0.54	***	2.32	100.86	+0.02	***
3. Inka	2.14	108.08	+0.16	***	2.14	93.04	-0.16	000
4. Lingua di Fuoco	3.30	166.66	+1.32	***	3.30	143.47	+1.00	***
5. Unidor	2.26	114.14	+0.28	***	2.26	98.26	-0.04	000
6. Narbbonne	1.86	93.93	-0.12	000	1.86	80.86	-0.44	000
7. Movila Miresii	2.54	128.28	+0.56	***	2.54	110.43	+0.24	***
8. Vadeni	2.12	107.07	+0.14	***	2.12	92.17	-0.18	000
9. Tichilesti	2.51	126.76	+0.53	***	2.51	109.13	+0.21	***
10. Lacu Sarat	2.05	103.53	+0.07	***	2.05	89.13	-0.25	000
11. Varians means Mt_2					2.30	100.00	+0.00	-

$DL_{5\%} = 0.043$ $DL_{1\%} = 0.061$ $DL_{0.1\%} = 0.086$

Table 3: ***The total losses of weight/bean caused by the attack of bean weevil*** **(Acanthoscelides obtectus Say)** ***of different bean cultivars***

Variants	Total losses (%) in control Mt_1		± d	Signifiance of difference in control Mt_1	Total losses (%) in control Mt_2		± d	Signifiance of difference in control Mt_2
	Absolute values	Relative values			Absolute values	Relative values		
1. Jutta (Mt_1)	4.02	100.00	+0.00	-	4.02	44.32	-5.05	000
2. Carson	12.06	300.00	+8.04	***	12.06	132.96	+2.99	***
3. Inka	7.75	192.78	+3.73	***	7.75	85.44	-1.32	000
4. Lingua di Fuoco	11.23	279.35	+7.21	***	11.23	123.81	+2.16	***
5. Unidor	9.74	242.28	+5.72	***	9.74	107.38	+0.67	***
6. Narbbonne	8.35	207.71	+4.33	***	8.35	92.06	-0.72	000
7. Movila Miresii	10.35	257.46	+6.33	***	10.35	114.11	+1.28	***
8. Vadeni	8.95	222.63	+4.93	***	8.95	98.67	-0.12	000
9. Tichilesti	11.00	273.63	+6.98	***	11.00	121.27	+1.93	***
10. Lacu Sarat	7.27	180.84	+3.25	***	7.27	80.15	-1.80	000
11. Varians means Mt_2					9.07	100.00	+0.00	-

$DL_{5\%} = 0.41$ $DL_{1\%} = 0.58$ $DL_{0.1\%} = 0.82$

Table 4: **Content in crude protein of french bean (*Phaseolus vulgaris* L.) of different origin (D. Trifan, 2006)**

No.	Variants	Crude protein (%) as compared to Mt_1			
		Absolute value	Relative value	± d	Semnificatie
1	Jutta (Mt_1)	24,6	100.00	+0.00	-
2	Carson	25,2	102.43	+0.60	***
3	Inka	23,9	97.15	-0.7	0
4	Lingua di Fuoco	25,2	102.43	+0.60	***
5	Unidor	22,1	89.83	-2.50	000
6	Narbonne	24,6	100.00	+0.00	-
7	Movila Miresii	23,8	96.74	-0.80	00
8	Vadeni	24,6	100.00	+0.00	-
9	Tichilesti	24,8	100.81	+0.20	**
10	Lacu Sarat	24,0	97.56	-0.60	0

$DL_{5\%} = 0.021$ $DL_{1\%} = 0.029$ $DL_{0.1\%} = 0.040$

CONCLUSIONS

1. All the studied cultivars were attacked but the attack was significantly different. The lowest frequence of the attack has been recorded at Jutta variety (F = 15.25%), followed, in increased order, by Lacu Sarat (20.5%), Unidor (22.25%), Carson (24.5%), Narbbonne (25%). The most violently attacked was Tichilesti cultivar (47.00%), followed, in decreasing order, by Lingua di Fuoco variety (45.5%), Movila Miresii (43.75%), Vadeni (38.25%) and Inka (35.75%).

2. The lowest intensity of attack has been recorded at Narbbonne variety (I = 1.86 opercula / bean) followed by Jutta (1.98), Lacu Sarat (2.05), Vadeni (2.12), Inka (2.14), Unidor (2.26), Carson (2.32), Tichilesti (2.51), Movila Miresii (2.54) and the most intensely attack was recorded at the Lingua di Fuoco variety (3.30).

3. The lowest loss of total biomass / bean has been recorded at Jutta variety (4.02%), followed, in ascending order, by Lacu Sarat (7.27), Inka (7.75), Narbbonne (8.35), Vadeni (8.95), Unidor (9.74), Movila Miresii (10.35), Tichilesti (11.00), Lingua di Fuoco (11.23) and the most significant loss of biomass / bean has been recorded at Carson variety (12.06%).

4. A positive nonlinear correlation was obtained between the protein content of bean cultivars and the attack of bean weevil (*Acanthoscelides obtectus* Say.).

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ASPECTS CONCERNING THE ACHIEVEMENT OF SOME ADHESIVE SYSTEMS BY MEANS OF THE FURFURYL ALCOHOL AND SOME FURAN RESINS

ASPECTE PRIVIND REALIZAREA UNOR SISTEME ADEZIVE CU AJUTORUL ALCOOLULUI FURFURILIC ŞI A RĂŞINILOR FURANICE

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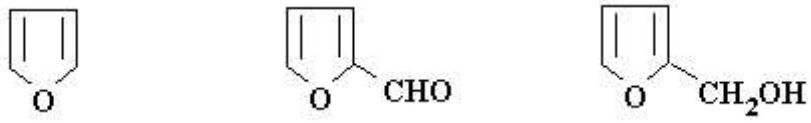
Abstract. *This work is meant to emphasizethe influence of some furan products, namely the influence of the furan resins and the furfuryl alcohol on the cellulose fibers existing in the structure of paper. The main goal is to study the interaction of the individual compounds with the cellulose fibers from the filter paper in the process of immersion bath followed by a thermic treatment. The adhesiveness growth was established as a consequence of the mass increase of the impregnated samples and the level of retention established after the thermic treatment and after the water extractionduring the process of boiling. There has also been studied the power of absorption of the resulting adhesive systems.*

Key words: *adhesive systems, furan resins, furfurylalcohol, filter paper, impregnation, extraction, power of absorbtion.*

Rezumat. *Utilizarea produselor furanice (alcool furfurilic şi răşini furanice), alături de fibrele celulozice din structura hârtiei şi implicit a lemnului, contribuie la realizarea de noi sisteme adezive cu proprietăţi superioare şi cu posibile aplicaţii în domenii diverse. Opţiunea pentru utilizarea prin impregnare a unor benzi de hârtie de filtru în cazul metodei pentru evaluarea capacităţii adezive a structurilor compozite creat are ca justificare necesitatea evidenţierii capacităţii de interacţiune a adezivilor utilizaţi cu fibrele celulozice din structura lemnului. Din datele prezentate, se desprinde ideea că tratamentul termic nu influenţează semnificativ interacţiunea între componentele sistemului adeziv, ceea ce impune utilizarea unor agenţi de reticulare, paralel cu creşterea temperaturii şi implicit realizarea unor „structuri compozite complexe".*

The furan resins represent an important class of synthetic resins which have as a starting point chemical substances having a furan type structure. Among the basic chemical products used for the synthesis of such synthetic resins there can be mentioned: the furan, the furfuryl aldehyde and the furfuryl alcohol (fig. 1) [2].

According to the three types of raw material from where it starts, there can result in synthesis the following furan resins: furan resins of formaldehyde phenol type; furan resins of furfuryl-formaldehyde phenol type; furan resins of simple furfuryl type; furan resins of mixed or modified furfuryl type.



The furan (C_4H_4O) The furfuryl aldehyde ($C_6H_4O_2$) The furfuryl alcohol ($C_5H_6O_2$)

Figure 1 - **Furan chemical products used in the synthesis of synthetic resins**

With respect to the furfuryl alcohol, it is known the fact that it, can be obtained in industry by the hydrogenation of furfuryl in the presence of the selective nikel Ramy catalysers, platinum oxyde, which favours the hydrogenation of the aldehyde functional group and of the furan nucleus.

Here are some of the basic physical-chemical characteristics of the furfuryl alcohol: aspect – oily liqhid; colour – yellowish colourless; density, g/cm^3 – 1,1296; boiling point, ^{0}C/mmHg – 171,750; solubility, g/100 mL solution in water, alcohol, ether - ∞; refraction index, $n^{20}s$ – 1,4845; toxicity – 50 cm^3/m^3 aer.

The largest quantity of furfuryl alcohol is being used at the moment to produce furan resins, commonly named furfuryl resins, for the purpose of creating new adhesive systems and implicitly new composite structures with polyvalent feasability [5]. Assessing the adhesive characteristics of the furfuryl alcohol and of various furan resins, by impregnating support materials followed by the development of some reticular reactions is not a recent technique but rather a permanently developed perfected and up-to-date technique [1, 3, 4].

Choosing to use the impregnation of some slips of filter paper in the case of the method for assessing the adhesive capacity of the resulted composite structures is justified by the necessity of pointing aut the power of interaction of the utilized adhesives with the cellulose fibres from the structure of the wood. In order to dispose of the dificullty concerning the interaction of the substrate with the utilized reagents there have been used in all the cases reference samples of the substrate which have undergone identical treatments excepting the utilized adhesive.

MATERIAL AND METHOD

There have been used:

- furfuryl alcohol 100% concentration;
- Biorez furan resins (Trans Furan Chemicals) of the following types:
  - Biorez 0312019 – 1B x x x, 5,7% humidity } marked R_1
  - Biorez 91 He RZ 0440, 36% humidity } marked R_2
- test-pieces made of filter paper having the size 180 x 80 mm;
- ammonium nitrate;
- distilled water.

The test-pieces made of filter paper have undergone the immersion impregnation in the hydrophilic (R_2) and hydrophobic (R_1) furan resins and in furfuryl alcohol, the boiling water extraction and the preparation for determining the power of absorbtion.

RESULTS AND DISCUSSIONS

The filter paper slips having the size 180 x 80 mm, have undergone the process of impregnation through immersion in an adhesive bath which contains hydrophobic resin (R_1) having the humidtiy 5,7%, hydrophilic resin (R_2) having the humidity 36%, dissolved in distilled water and furfuryl alcohol, for 60 seconds at room temperature. The samples have been weighed before and after impregnation using the analytic scales in order to determine the mass growth (figure 2).

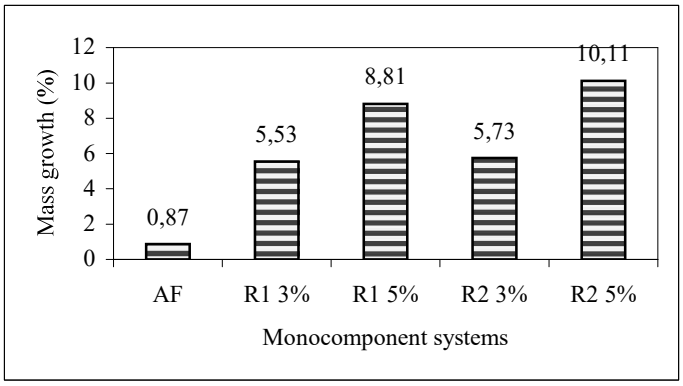


Figure 2 - The influence of the concentration of the immersion bath on the mass growth of the filter paper impregnated with R_1, R_2 and AF
R_1 – hydrophobic resin with U = 5,7%
R_2 – hydrophilic resin with U = 36%
FA – furfuryl alcohol

Figure 2 shows that, as the concentration of the substance in the immersion bath grows, the quantity of retained/fixed product is larger, therefore the level of impregnation is higher.

The retention of the adhesive system by the impregnated slips of flter paper was determined through extracting them in boiling water over a span of 5 minutes. The samples were weighed before and after the extraction just to determine the registered mass loss. The quantity of extracted product was related to the initial mass of the sample (figure 3). There can be noticed shat the loss of mass is higher in the case of the composite structures shat have a higher concentration in the adhesive. Also, as in the case of determining the mass growth (the level of impregnation), there can be noticed that the hydrophilic resin R_2 favours the largest loss of water from the produced adhesive system. From the obtained information it follows that the cellulose fibers from the structure of paper retain enough quantities of adhesive product.

There was also determined the power of absorption of the resulted adhesive system having as standard unimpregnated slips of filter paper. The samples were prepared in an airtight drying stove, for 28 hours, at a temperature of 20^0C and 65% equilibrium humidity achieved by means of a buffer system, oversaturated ammonium nitrate solution respectively (figure 4). From the analysis of the experimental data there can be noticed a uniformity of the value of the power of absorption in the case of all the impregnated samples, value which is not much different from that one registered in the case of the paper which has not undergone any treatment.

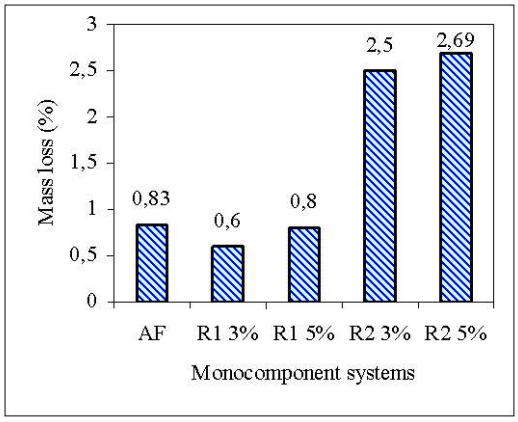


Figure 3 - The quantity of substance extracted from the achieverd adhesive systems

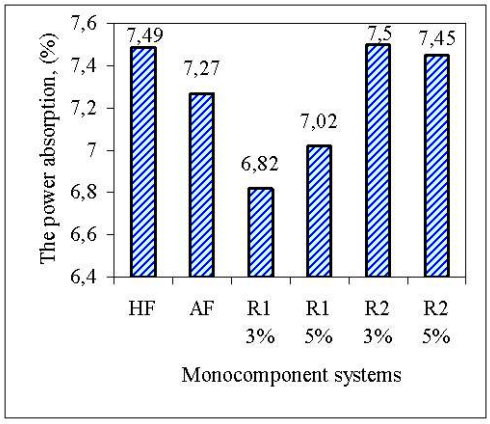


Figure 4 - The variation of the power of absorption of the filter paper impregnated with R_1, R_2 and FA compared to the untreated filter paper

CONCLUSIONS

The use of furan products (furfuryl alcohol and furan resins), together with the cellulose fibers from the structure of paper and implicitly of wood contributes to the achievement of new adhesive system having superior proprieties and which are likely to be applied in various domains.

On the one hand, as the concentraton in the adhesive grows, the level of impregnation improves and on the other hand the level of retention lowers.

The power of absorption of the filter paper treated with various adhesives having various concentrations is not significantly different from the untreated filter paper.

From the information presented, it results that the thermic treatment does not influence significantly the interaction among the components of the adhesive system, this imposing the use of some reticular agents at the same time with the rise of the temperature and implicitly the achievement of some „complex composite structures".

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ASPECTS CONCERNING THE EVOLUTION OF THE BEAN PLANTS UNDER THE INFLUENCE OF SOME COMPOSITE STRUCTURES INCORPORATED INTO THE SOIL

ASPECTE PRIVIND EVOLUȚIA PLANTELOR DE FASOLE SUB INFLUENȚA UNOR STRUCTURI COMPOSITE INCORPORATE ÎN SOL

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Abstract. *Once introduced in the soil, the natural composite materals treated with chemical agents undergo the effect of microorganisms which gather up differently depending on the concentration of used substance. The composite structures undergo different changes being decomposed into simple organic compounds which modify the metabolism of the plant, this leading to the modification of the plant structure. The quantity of nitrogen from the roots and stalks of the plant varies both according to the type of used product and its addition.*

Key words: *composite structures, soil, bioacids, impregnation, fertility, bean plants.*

Rezumat. *Intervenția compuşilor cu structură aromatică în fiziologia plantelor, cunoaşte un spectru relativ redus de cercetare, deşi literatura de specialitate prezintă o serie de funcții importante ale acestora în metabolismul celular. Din datele obținute se desprinde ideea că prezența ligninei din paie nemodificată, a clorurii de cupru (II), răşinilor furanice şi a soluției cuproamoniacale în structurile compozite încorporate în sol, generează o acțiune stimulatorie a evoluției plantelor. Lignina din paie modificată prin tratare cu aldehidă formică, manifestă o acțiune inhibitorie asupra creşterii şi dezvoltării plantei, dat fiind şi gradul de toxicitate asociat cu efectul cancerigen al acestei substanțe. Folosite în cantități judicios alese, substanțele chimice mai sus menționate, cu excepția ligninei modificate, prezintă un efect pozitiv în creşterea şi dezvoltarea plantelor, contribuind în esență la mărirea fertilității solului şi implicit la bioremedierea acestuia.*

The interference of the aromatic composite structures in the physiology of plants occupies a relatively reduced area of research, through the specialised literature presents a series of their important functions in the cellular metabolism [6].

At the present moment, the notion of „ growth regulator" is becoming more and more familiar, this representing an endogenous ar synthetic substance which regulates most of the processes of growth, development and metabolism at plants. Therefore, the composite structures, either natural, for example the wood, or realsed by main through different methods, in the presence of some chemical agents, can stimulase, inhibit or modify the phisiological processes in plants [3].

Synthesizing the existing knowledge about such regulator substances, they can be classified in:

- Stimulating substances
- Retardatory substances
- Inhibiting substances

Through the intervention of bioregulators, an effort is made to change the hormonic equilibrium and thus a whole chain of physiological phenomena is changed. These complex influences are shown in figure 1 [4].

The fact that the composite structures undergo changes at the level of the cultivated soil can also be emphasized through the analysis of plants resulted on such soil [5].

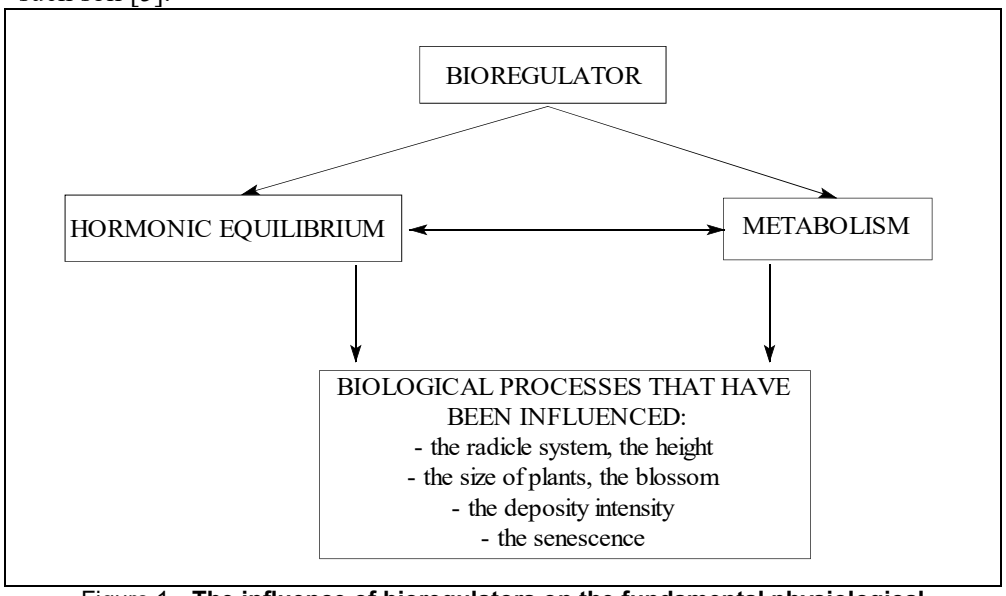


Figure 1 - **The influence of bioregulators on the fundamental physiological processes.**

In the agricultural soil, the chemical substances respond to the cultivated plants in the rhiyosphere zone which is characterized by a larger biomass and microbial activity, a higher level of oxygen and organic carbon than the nerisospheric soil [2].

MATERIAL AND METHOD

- Composite materials represented by wooden test-samples with the size 7x3x1 cm;
- Unmodified and modified straw lignin ;
- Hidrophilic furan resin (36% water);
- Copper chloride (II);
- Ammonia solution 0,1 N;
- Copperammonia solution 5%;
- Distilled water;
- *Phaseolus vulgaris sp.*, *Vera* breed from the Reseach Station Podu Iloaie [1];
- Soil.

The wooden test-samples were impregnated through painting with modified and unmodified straw lignin, rendered soluble in ammonia solution with the concentration 0,1N, copper chloride (II) and hydrophilic furan resin, disolved in distilled water and with copperammonia solution and they were incorporated into soil.

Around each composite structure there were soron five bean seed from each of the mentioned breeds.

RESULTS AND DISCUSSIONS

During the growing of the culture there was monitored the evolution of the height of the plants, in the absence and in the presence of the used biocids, also taking into account the three types of concentration in which they were used, 1, 3 and 5% foreach type respectively.

Chart 1 shows the evolution of the plants, 15 days after they have been sown, in the absence of the bocid (the reference plant) and in its presence depending on the type and the concentration used.

Table 1

The average height of the plants according to the concentration and the type of the bocid

The average height of the plant, (cm)						
Biocid type	Concentration (%)	Time span since the sowing				
		15	20	25	30	35
Reference plant	-	21	26	28	29	30
Unmodified lignin solution	1	22	27	29	31	31
	3	23	28	30	33	34
	5	24	28	31	34	34
Modified lignin solution	1	22	23	24	27	28
	3	21	22	23	25	26
	5	18	21	21	24	24
Furan resin solution	1	26	27	29	32	32
	3	28	30	32	34	35
	5	29	31	33	35	35
Copper chloride solution (II)	1	21	26	29	31	31
	3	24	31	33	34	34
	5	26	33	34	35	35
Copperammonia solution	1	21	27	29	32	33
	3	24	29	31	33	34
	5	25	31	33	35	35

From the analysis of the experimental data, there can be noticed the fact that the presence of the chemical agents modifies the growing and the development of the plants.

Having as reference point the evolution of the reference plants, there can be noticed that the used chemical agents have a different effect on plants, namely: some of them stimulate the growth and the development of the plant while some

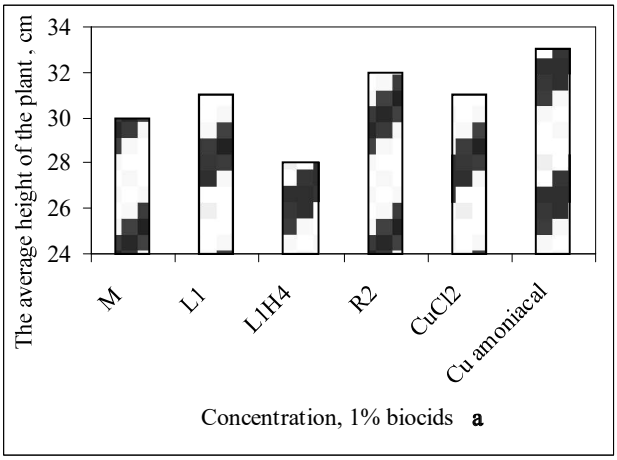
others inhibit their evolution.

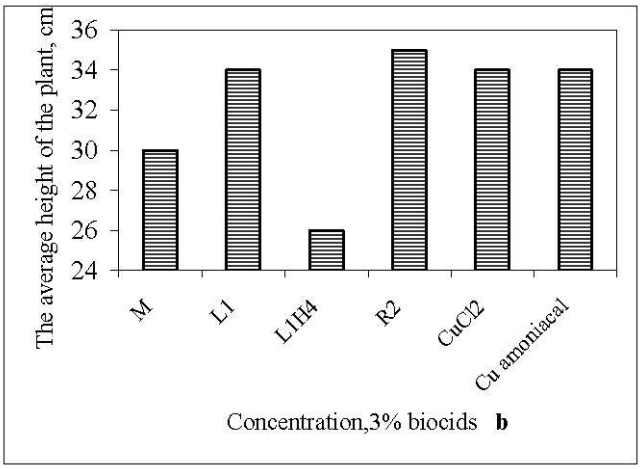
Therefore, there can be noticed that the modified traw lignin, obtained as a result of the reaction of hydroxymetilation of the unmodified straw lignin which took place in the presence of the formic aldehyde, triggers a stagnation in the evolution of the plant. This fact is in agreement with the information in the specialiyed literature, being known the fact that the formic aldehyde is a cancerigenic substance, with a high level of toxicity and consequently it has a harmful effect on the living body.

On the other hand, there has been found that the evolution of plants reaches the highest level in the case of the composite structure treated with copperammonia solution, thing that strengthens even more the fact that nitrogen and some of the nitrogen composite structures are above all elements of the growth, having in fact the specific function of stimulating the growth and development of the plant.

Another contribution to the evolution of plants is also brought by furan resins, copper chloride (II), followed by the unmodified lignin solution which, coming into contact with the surface of the composite structure incorporated into soil and under the action of microorganisms, undergoes a process of decay, in other words, it is initiated the biodegradation of the composite structure, there coming out organic substances. These organic substances provide a „harmonious stability" both between soil and plants and between these and the other components of the biosphere as a livng mcroorganism, they practically contribute to the achievement of the fertility, which represents the overall characteristic of soil, that of providing the growing and the development of the plant.

There also has to be mentioned the fact that a very important role in the evolution of plants is represented by the concentration of the used substance.





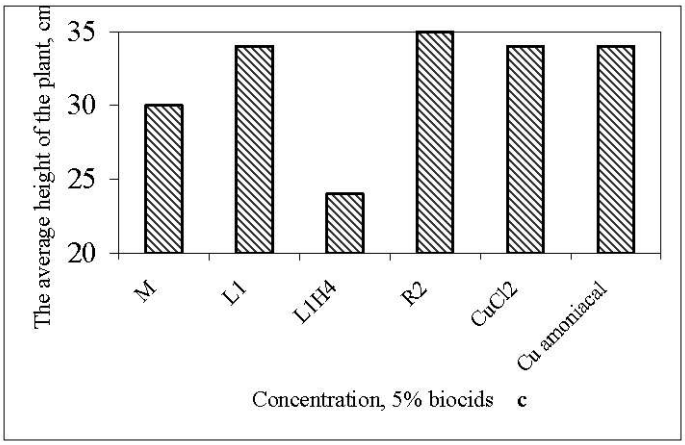


Figure 2 - **The role of some chemical agents on the evolution of the plant**
(the influence of the concentration on the average height of the plant)

Thus, in the case of stimulating chemical substances (unmodified lignin, furan resin, copper chloride (II) and copperammonia solution), there can be noticed that, the higher the concentration of substance is, the quicker the growing and the development of the plant is, whereas in the case of the chemical substances which inhibit the development of the plant, in the given case the solution of modified lignin, the effect is opposed, namely, the higher, the concentration of substance is, the slower the growing and the development of the plant is (figure 2 – a, b, c).

It can be estimated that the mentioned composite structures, excepting the one treated with modified lignin in quantities judiciously chosen, pozitively influence the growing and the development of plants, this way encouraging the fertilization of the soil and implicitly its bioremedy.

CONCLUSIONS

It is known the fact that bean plants grow well on a neutral to basic soil, and the presence of some chemical substances can influence them either in a positive or negative way.

From the obtained information it results that the presence of unmodified straw lignin, of copper chloride (II), of furan resins and of the copperammonia solution in the composite structures incorporated into soil generates a stimulating action of the evolution of plants.

The straw lignin modified through treatment with formic aldehyde inhibits the growing and the development of the plant, also considering the level of toxicity associated with the cancerigenic effect of this substance.

The concentration of the chemical substances influence significantly the evolution of plants in the following way:

- the substances stimulating the growing, used in high concentration accelerate the growing and the development of the plant;
- the substances inhibiting the evolution of the plant, used in high concentration stagnate the process of growing and development of the vegetal organism.

Used in judiciously chosen quantities, the chemical substances mentioned above, excepting the modified lignin, show a positive effect in the growing and the development of plants, essentially contributing to the increase of the fertilization of soil and implicitly to its bioremedy.

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THE LEAST SQARES METHOD APPLIED TO THE LIFE SCIENCE MODELS

ESTIMAREA PARAMETRILOR IMPLICAȚI ÎN MODELE DE CREŞTERE

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Abstract: *When we model a phenomenon is important to find an analytical expression. Usually this expression involve several parameters that can be determined using least squares method or category of its. In this paper we focus on application of this method in cases when direct implementation do not work. For that we use liberalization or Levenberg-Marquardt algorithm.*

Rezumat: *In ştiinţele vieţii explicarea diverselor fenomene se bazează pe elaborarea unor modele matematice. Acestea sunt rezultatul transpunerii analitice a legilor fizice, chimice sau biologice care guverneaza fenomenele respective. Practic, există posibilitatea achiziţiei unor date experimentale pe baza cărora se vor determina parametrii care definesc modelul matematic. Metoda celor mai mici pătrate se bazează pe distribuţia Gauss de verosimilitate a datelor experimentale. Această funcţie îşi atinge maximul atunci când suma pătratelor diferenţelor dintre valorile experimentale şi valorile funcţiei date de modelul matematic este minimă. Se prezintă două metode de determinare a parametrilor din model.*

INTRODUCTION

In applied science the mathematical model of studied phenomenon plays an important role. Mathematical model is important because offers the possibility to save time and money and gives appropriate information about the studied phenomenon. Such model, in general, contains a number of parameters. A parameter is identified by the fact that it takes the same fixed value. Often, there is some initial information about the parameters values based on scientific experience and/or the values reported in the scientific literature. Even for the measurable parameters one is often confronted with a range of possible values due to the measurements errors or due to real difference for different circumstances. One of the frequent methods to determine the parameters involve in different mathematical model is the least squares method and its category.

MATERIAL AND METHOD

If we use a set of N experimental points $a_i, i = 1,..., N$ in order to determine N quantities $y_i, i = 1,..., N$ than each observational error is given by

$\varepsilon_i = a_i - y_i, i = 1,..., N$ and satisfy Gauss distribution [1]. The differential of observational errors are $d\varepsilon_i = da_i, i = 1,..., N$ and the function

$$\varphi(a_i - y_i) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{1}{2}\left(\frac{a_i - y_i}{\sigma}\right)^2} da_i \quad (i = 1,..., N) \tag{1}$$

represents the probability that experimental values are between a_i and $a_i + da_i$. In other words function (1) gives the probabilities with that we obtain value a_i when we measure y_i. The precision of each measurement is given by the dispersion $\sigma_i, i = 1,..., N$. The probability *P* is given by

$$P = \frac{1}{\left(\sqrt{2\pi}\right)^N} \frac{1}{\sigma_1} \frac{1}{\sigma_2} \cdots \frac{1}{\sigma_N} e^{-\frac{1}{2}\left[\left(\frac{a_1 - y_1}{\sigma_1}\right)^2 + \left(\frac{a_2 - y_2}{\sigma_2}\right)^2 + \cdots + \left(\frac{a_N - y_N}{\sigma_N}\right)^2\right]} da_1 da_2 \cdots da_N \tag{2}$$

it represent the probability as simultaneous for each quantities y_i to obtain a_i value. Analysing relation (2) we have that probability *P* is maximized when

$$S = \sum_{i=1}^{N} \frac{(a_i - y_i)^2}{\sigma^2} \quad \rightarrow \quad \min \tag{3}$$

The minimum of (3) is obtained in point that the partial derivatives of S respect to $a_i, i = 1,..., N$ vanish. We consider that mathematical model depends of parameters $\alpha, \beta, \gamma, ...$ that must be determined using experimental points $a_i, i = 1,..., N$. In literature there are distinguish tow different cases due to minimization of (3). The common case when we have a linear and nonhomogenous system with unknown $\alpha, \beta, \gamma, ...$ and the most delicate case when the system is nonlinear. For the second situation there are three different methods to determine the parameters of interest [2]. Each methods use the assumption that we have a trial solution.

The first method used the Taylor series expansion of function *S* in the neighbourhood of trail solution in order to linearize *S*. At the end we obtained a solution $\alpha+\Delta\alpha, \beta+\Delta\beta, \ldots \gamma+\Delta\gamma$. Using an iterative procedure is possible to determine an acceptable solution if *S* reaches its minimum.

The second method to obtain the values $\alpha, \beta, \gamma, ...$ such that S reaches its minimum was developed by Nelder and Mead [3] named simplex (but has nothing in common with simplex algorithm from linear programming).

The last method is based on previous tow and was developed by Levenberg and Marquardt [5]

RESULTS AND DISCUSSIONS

In this section we discuses two examples that will illustrate the least squares method in the case when the model will be linearlized such that the least squares method can be applied (Application 1) and the other example uses a functional

that cannot be linearlized and will be used the Levenberg-Marquard algorithm (Application 2).

Application 1 The decreasing in time of a number of biological cells is given by

$$N(t) = N_0 e^{-\lambda t} \tag{4}$$

where N_0 is the initial number of cells and λ gives the death probability for cells. Using the least squares method we find out N_0 and λ parameters. Linearizing the relation (4) we obtain

$$\ln N(t) = -\lambda t + \ln N_0 \tag{5}$$

and denoting $Y(t) = \ln N(t)$, $\ln N_0 = \gamma$ we have

$$Y(t) = -\lambda t + \gamma \tag{6}$$

In Fig. 1 are given the experimental values and theirs approximation with the best values for parameters, N_0=35.45 cells and $\lambda = 0.029$ 1/hour.

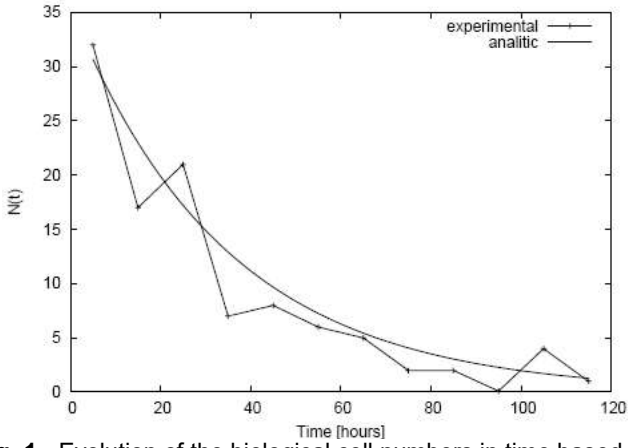

Fig. 1 - Evolution of the biological cell numbers in time based on N(t)=35.45exp(-35.45 t) relation

The results from Fig. 1 are based on following considerations [3]. For the initial set of data (t_i, y_i), $i=1, \ldots, N$ was accepted that the errors are described by the normal distribution. After liniarization the set of experimental points are not described by Gauss distribution such that least square method cannot find the best parameters for the model. This problem can be avoided using global weights.
When we apply the least squares method we have:

$$\sum_{i=1}^{N} \left(\underbrace{N_0 e^{-\lambda t_i} - y_i^{\exp}}_{\Delta N_i} \right)^2 \rightarrow \sum_{i=1}^{N} w_i \left(\underbrace{\ln N(t_i) - \ln y_i^{\exp}}_{\Delta Y_i} \right)^2 \tag{7}$$

By taking into account $\frac{\Delta Y_i}{\Delta N_i} \cong \left.\frac{dY}{dN}\right|_{t=t_i} = \frac{1}{y_i^{\exp}}$ that means weights is given by $w_i = \left(y_i^{\exp}\right)^2$.

The importance of these considerations is illustrated in the next example. Let consider another set of experimental data $(x_i, y_i), \quad i = 1,2,\cdots,N$ that can be approximated by Gauss distribution. In this case the weights are the same as in previous application. Fig. 2 represents the least squares method with weights and without.

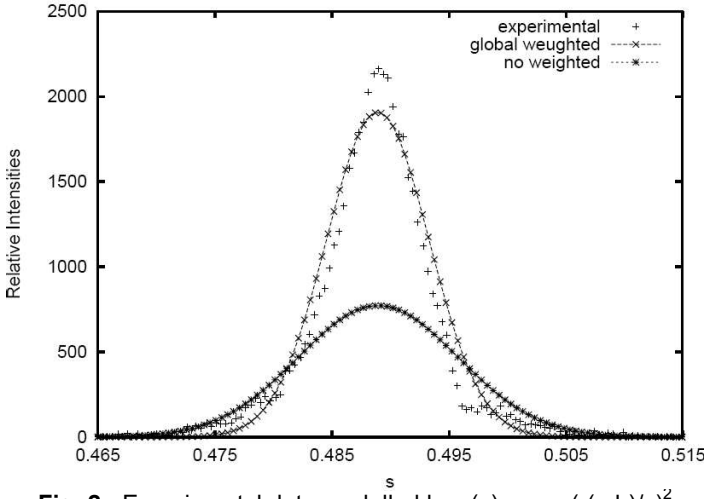

Fig. 2 - Experimental data modelled by $y(s)=a \exp(-(s-b)/c)^2$

Application 2. We consider the experimental set of points $(x_i, y_i, z_i), i = 1,...,N$, The mathematical model that we consider is given by

$$h(x,y) = \sqrt{r^2 - (x-x_0)^{2.2} - (y-y_0)^{1.8}} + z_0 \qquad (5)$$

The interest parameters are x_0, y_0, z_0 and r. We want to determine the best values for the parameters but we cannot use direct least squares method because we cannot linearized. In this case we used the Levenberg Marquardt algorithm that is implemented in ***Gnuplot*** software.

For this application we have implemented the following code sequence:

```
print "\n The demonstration of 3d fitting by using Lavemberg Marquard algorithm."
print "hemisphr.dat contains experimental data on a hemisphere "print "It takes many iterations, so we limit FIT_MAXITER to 50."
#: Analytical model is given by relation
h(x,y) = sqrt(r*r - (abs(x-x0))**2.2 - (abs(y-y0))**1.8) + z0
```

```
# Trial (initial) solution of the model
x0 = 0.1
y0 = 0.2
z0 = 0.3
r=0.5
FIT_MAXITER=50
set xlabel "x"
set ylabel "y"
set zlabel "z"
set xtics -1,0.5
set ytics -1,0.5
set ztics -1,0.5
```

#Initial solution of the model' splot 'hemisphr.dat' using 1:2:3, h(x,y) pause -1 "(-> return)" fit h(x,y) 'hemisphr.dat' using 1:2:3:(1) via r, x0, y0, z0 #Final solution of the model and its 3D reprezentation' splot 'hemisphr.dat' using 1:2:3, h(x,y) pause -1 "(This is an exemple of Levemberg Marquardt algorithm). (-> return)"

After we have executed the set of commands we obtain the parameter: x_0=-0.00031, y_0=0.000599, z_0=0.002538, and r=1.00193. In Fig. 3 are given the initial set of points and the result after global approximation is given in Fig. 4

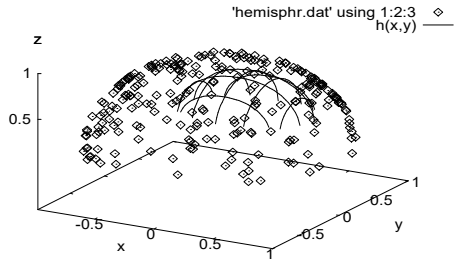

Fig. 3 - Experimental data and trial solution of the mathematical model

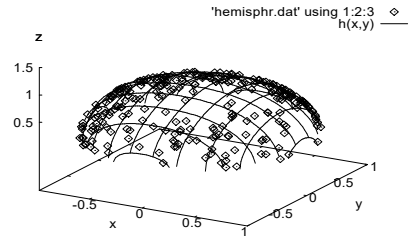

Fig. 4 - Experimental data and the best solution of the mathematical model based on Levenberg and Marquardt algorithm

CONCLUSIONS

In case that mathematical model is linear there are no problems to apply direct the least square method. In the other cases our conclusions are:

- There are several software products that make easier this problem and we mention Maple software. In the cases when the model can be linearized is important to use weights because other way after liniarization the experimental set of point do not respect normal distribution otherwise are obtained irrelevant results.
- If the model cannot be linearized is mandatory to use some methods to find parameters. Is possible to use in Taylor series expansion if the trail solution is not to far from the best solution.
- The Levenberg Marquardt algorithm can be used with good results even the trail solution is far from solution. Many scientists use this algorithm due to its remarkable results

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INTEGRATING MULTI-DISCIPLINARY RESEARCH THROUGH ACADEMIC GRID COMPUTING

INTEGRAREA CERCETĂRII ŞTIINŢIFICE MULTIDISCIPLINARE PRIN GRID COMPUTING ACADEMIC

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Abstract. *Grid Computing technologies have the potential of dramatically changing the use of computers in solving problems. Complex Grid Computing projects are under development worldwide. The paper presents the mainlines of the concept and mentions a number of such systems that had impact on different branches of agriculture. An academic Grid computing project that joins forces of four universities and one research institute of Iasi, Romania, is also described.*

Rezumat. *Tehnologiile Grid Computing au potențialul de a schimba în mod dramatic utilizarea calculatoarelor în rezolvarea celor mai diverse probleme. Pe plan mondial sunt în diferite faze de dezvoltare proiecte complexe de tip Grid Computing. În lucrare sunt prezentate caracteristicile principale ale conceptului şi sunt menționate câteva astfel de sisteme în care agricultura are un rol important. Este prezentat, de asemenea, un proiect dezvoltat în colaborare de patru universități şi un institut de cercetare din Iaşi. Printre parteneri se numără şi USAMV Iaşi.*

INTRODUCTION

Grid Computing is a modern concept that emerged in the last decade. It denominates an advanced infrastructural proposal for parallel/distributed computing that implies using component organized software that runs on a large number of computers [1]. The practical situations that led to this approach were linked to a series of issues that appeared more and more frequently in using computers in problem solving. Some of them are enumerated further on:

- the need for increasing computational power and storing capacities;
- the need to access databases being stored on different computers, maintained by different organizations and having different data structures;
- the need to access software applications that run on remote computers and to use their outputs on a synergic manner;
- the need for efficient and secure multi-disciplinary cooperation within research programs.

By its nature, agriculture is a field in which research and production require large scale coordination of efforts both at a geographical level as well as from a multi-disciplinary point of view. In this respect, the benefits that Grid computing can bring were accounted and powerful Grid projects were developed worldwide to integrate different agricultural branches with other fields of activity. Some relevant achievements in this direction are subsequently pointed out.

In the USA, two relevant examples can be pointed out. One of them is the Colorado State University project for a national animal identification system that will rely on Grid computing technology to process massive amounts of animal tracking data [5]. Another example of Grid system with agricultural purpose is the partnership between the US Cornell Theory Center (CTC) and Cornell's College of Agriculture and Life Sciences that focuses on using CTC's computational infrastructure and expertise to develop science-based technologies support of farmers [2].

In Japan, the National Agriculture Research Center, Tsukuba, is developing a project named *GRID for Agricultural Decision Support* [3]. The basic premise for starting this project was that in agriculture one must combine data from various different databases such as weather data, soil data, crop data and market data. This data is available on geographically widespread computers.

As genetic research [4] has an important impact on agricultural sciences, a European Grid Computing initiative in this field must be mentioned. The project is developed by the European Bioinformatics Institute (EBI), a non-profit academic organization that ensures that the growing body of information from molecular biology and genome research is placed in the public domain and is accessible freely. The EBI serves researchers in molecular biology, genetics, medicine and agriculture from academia, and the agricultural biotechnology.

THE GRAI PROJECT

In 2006, four faculties and a research institute in Iasi, Romania started the research project named *Academic Grid for Complex Applications*. The acronym of the project is GRAI and it runs under a CEEX grant (the excellence research framework created by the Romanian Ministry of Education and Research following the EU FD7 model). The five participants in the project are:

- The Technical University of Iasi, Faculty of Automatic Control and Computer Engineering (code name UTI-CE), which also holds the leadership of the GRAI project;
- Institute for Computer Science, Romanian Academy, in the location of the Faculty of Electronics and Telecommunication (code name AR-IIT);
- The “Al. I. Cuza” University of Iasi, Faculty of Computer Science (code name UAIC-I);
- The University of Medicine and Pharmacy Iasi, Faculty of Biomedical Engineering(code name UMF-B);
- The University of Agricultural Sciences and Veterinary Medicine of Iasi, Faculty of Horticulture (code name USAMV-H).

The GRAI project aims to develop a grid computing structure for research and for other academic purposes. To achieve them, two main directions must be followed:

1. Development of a grid computing system that would interconnect the scientific and computational resources of the five partners.
2. Development of grid services and specific applications based on them.

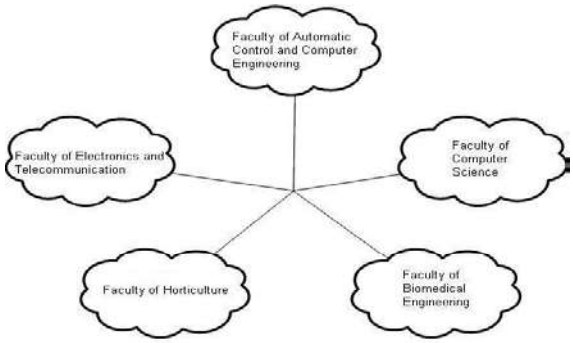

Figure 1 - The GRAI network

The computational resource of the grid will be geographically situated (figure 1) in the five locations of the project partners:

Each of the five locations will have a grid node that includes a high performance server and a group of workstations (figure 2). These workstations will be used both as computing support within the grid and in developing grid services and applications.

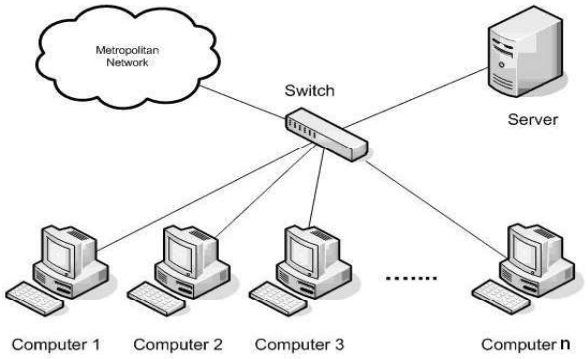

Figure 2 - Node structure

The University of Agricultural Sciences and Veterinary Medicine of Iasi (partner USAMV-H) participates in the project not only with computational power, but also with research in developing multi-disciplinary applications based on the grid services that will intensively use the GRAI Grid resources. Some directions are enumerated further on.

Decision Support. This activity is a natural continuation of previous multi-disciplinary research programs approached the domain of Decision Support Systems (DSS) at USAMV-H. New algorithms for different situations are currently under study. These algorithms are meant to be useful in practical applications. The

project partner USAMV-H will design and implement a DSS whose goal is to support decisions regarding the durable exploitation of pedoclimatic resources in horticulture.

E-learning. In the domain of e-learning there are many things to be done in agricultural higher education, as the potential of this approach is not yet used in appropriate way. USAMV-H can benefit of the research expertise that the partner UAIC-I has in the domain to develop e-learning modules.

Data mining. This modern domain emerged at first as a profit oriented economic research activity, but subsequent studies showed its potential to solve decision problems in different areas. USAMV-H can cooperate with the partners UTI-CE and UAIC-I to develop agricultural applications of data mining algorithms.

As one can see, the development of the GRAI academic grid will bring benefits on all of the directions that were pointed out in the introductory section as demands that led to the success of the Grid Computing concept. All partners will have their parts of contribution and benefit, but only the ones specific to the agricultural research were emphasized here.

Grid computing networks are long term projects which finally bring undoubted benefits that can be measured through financial effect, scientific and social impact. However, they have an initial costly investment phase and the discussed worldwide examples reveal that both government agencies and private companies participated with money and equipments software in building an appropriate infrastructure.

CONCLUSIONS

The Grid Computing is a long-term, complex, but cost effective approach.

In several American, European and Asian countries, the usefulness of Grid computing for agricultural research and production was already proved.

The perspective of integration with the European Community demands the development of such entities that are already active in many European Countries.

The development of the GRAI project by several academic institutions of Iasi, Romania, follows this line of action.

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DATA SECURITY

SECURITATEA DATELOR

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Abstract. *Security is fundamentally about protecting assets and it represents a continuous process not a destination. In this paper we identify the basic elements of security and using It security principles we give possible solutions for secure applications.*

Rezumat. *Prezentul articol isi propune sa identifice problemele care apar in securizarea datelor si sa ofere solutii de securizare a acestora. Datorita progresului stiintific asigurarea securitatii datelor reprezinta un proces continuu si de aceea principiile avute in vedere prezinta un mare caracter de adaptabilitate a solutiilor prezentate.*

INTRODUCTION

Security is fundamentally about protecting assets. In our case, assets may be tangible items, such as a Web page, your customer database or credit card information, or they may be less tangible, such as your company's reputation. Security is a continuous process, not a destination. As you analyze your infrastructure and applications, you identify potential threats and understand that each threat presents a degree of risk.

IT security is a critical element in the system life-cycle. Security must be incorporated and addressed from the initial planning and design phases to disposal of the system, because in time, the threats are changing and evolving.

Security is many times costly and rigid so we have to identify potential trade-offs between reducing risk on one side, increased costs and decrease in other aspects of operational effectiveness on the other side. The objective is to reduce risk to an acceptable level. In other words, security is about risk management and implementing effective countermeasures.

Security is also a question of discipline and training. From simple users to system administrators and program managers, everyone should have a basic understanding of the security principles governing the system they are using

BASIC ELEMENTS OF SECURITY

Security relies on the following elements:

- **Authentication:** Authentication addresses the question: who are you? It is the process of uniquely identifying who is trying to use the computing resources such as files, services, disk space, databases, network connections, devices, etc. These might be end-users, other services, processes, or computers. In security terms, authenticated clients are referred to as *principals*.

- **Authorization** addresses the question: what can you do? It is the process that governs the resources and operations that the authenticated client is permitted to access. This process is checking if the principal has the right to use a certain resource or operation and also the allowed access rights (read-only, read-write, execute, append, shared-mode or exclusive-mode, etc.). The access rights can be defined at high-level, such as a database, but also al low-lever such as a table row or system-level resources (registry keys and configuration data). Operations include performing transactions or accessing a program option, such as setting or changing customer data. Authorization is also including licensing issues, copyright protection, special behavior or functional limitations of illegal copies, concurrent access limitations.
- **Auditing** Effective auditing and logging is about keeping a track of the resource accessing and operations performing. This mechanism guarantees that a user cannot deny performing an operation, accessing a file or database, etc. For example, in an e-commerce system, this mechanism is required to make sure that a consumer cannot deny the order. It can also be used to be able to undo database changes, or other operations.
- **Confidentiality** also referred to as *privacy*, is the process of making sure that data remains private and confidential, and that it cannot be viewed by unauthorized users that are trying to access data directly or by network monitoring applications that are intercepting data packets crossing the network. Encryption is frequently used to enforce confidentiality. Access control lists (ACLs) are another means of enforcing confidentiality.
- **Integrity** is the guarantee that data is protected from accidental or deliberate (malicious) modification. Like privacy, integrity is a key concern, particularly for data passed across networks. Using hashing techniques, checksums or other message authentication codes typically provides integrity for data in transit. Auditing and journaling file-systems are also helpful to recovery the lost data.
- **Availability** From a security perspective, availability means that systems remain available for legitimate users. The goal for many attackers with denial of service (DoS) attacks is to crash an application or to make sure that it is sufficiently overwhelmed so that other users cannot access the application.

THREATS, VULNERABILITIES, AND ATTACKS

A threat is any potential occurrence, malicious or otherwise, that could harm an asset. In other words, a threat is any bad thing that can happen to your assets.

Vulnerability is a weakness that makes a threat possible. This may be because of poor design, configuration mistakes, or inappropriate and insecure coding techniques. Weak input validation is an example of an application layer vulnerability, which can result in input attacks.

An attack is an action that exploits vulnerability or enacts a threat. Examples of attacks include sending malicious input to an application or flooding a network, a computer or a process in an attempt to deny service.

To summarize, a threat is a potential event that can adversely affect an asset, whereas a successful attack exploits vulnerabilities in your system.

BUILDING SECURE APPLICATIONS

It is not possible to design and build a secure application until you know your threats. An increasingly important discipline and a recommended part of the application's design phase is threat modeling. The purpose of threat modeling is to analyze the application's architecture and design and identify potentially vulnerable areas that may allow a user, mistakenly or not, or an attacker with malicious intent, to compromise your system's security.

After you know the threats, you have to design the application by applying timeworn and proven security principles. Developers must follow secure coding techniques to obtain secure, robust, and hack-resilient solutions. A secure network, host, and application configuration must follow the design and development of secured application on the servers where the application software is to be deployed.

1. **User and Code Security** Modern operating systems and software development environments such as .NET Framework, supports two complementary forms of security: User security and Code security. User security refers to who is the user and what can the user do, while code security answers the questions "where is the code from, which wrote the code, and what can the code do?" Code security involves authorizing the application (not the user) to access system-level resources, including the file system, registry, network, and databases. For example, some web pages include small executables (scripting code, ActiveX controls, Java modules, etc) that are launched in the web-browser when that page is loaded. In this case, it does not matter who the end user is, or which user account runs the code, but it does matter what the code is and is not allowed to do, if a certain company authenticated that code, is scripting-safe etc.

2. **Common Criteria** The Common Criteria (CC) is a repeatable methodology for documenting IT security requirements, documenting and validating product security capabilities, and promoting international cooperation in the area of IT security. Use of Common Criteria "protection profiles" and "security targets" greatly aids the development of products or systems that have IT security functions. The rigor and repeatability of the Common Criteria methodology provides for thorough definition of user security needs. Validated security targets provide system integrators with key information needed in the procurement of security components and implementation of secure IT. The approach of this document meshes with the Common Criteria methodology.

The principles described here do not apply to all systems at all times. Yet each principle should be carefully considered throughout the life-cycle of every

system. Moreover, because of the constantly changing information system security environment, the principles identified are not considered to be an inclusive list. Instead, this document is an attempt to present in a logical fashion fundamental security principle that can be used in today's operational environments. As technology improves and security techniques are refined, additions, deletions, and refinement of these security principles will be required.

3. IT Security Principles

- Establish a sound security policy as the "foundation" for design.
- Treat security as an integral part of the overall system design.
- Clearly delineate the physical and logical security boundaries governed by associated security policies.
- Reduce risk to an acceptable level.
- Assume that external systems are insecure.
- Identify potential trade-offs between reducing risk and increased costs and decrease in other aspects of operational effectiveness.
- Implement layered security (Ensure no single point of vulnerability).
- Implement tailored system security measures to meet organizational security goals.
- Strive for simplicity.
- Design and operate an IT system to limit vulnerability and to be resilient in response.
- Implement security through a combination of measures distributed physically and logically.
- Provide assurance that the system is, and continues to be, resilient in the face of expected threats.
- Formulate security measures to address multiple overlapping information domains.
- Isolate public access systems from mission critical resources
- Use boundary mechanisms to separate computing systems and network infrastructures.
- Base security on open standards for portability and interoperability.
- Use common language in developing security requirements.

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ABOUT A COMPETITION-COLONIZATION MATHEMATICAL MODEL

MODELUL MATEMATIC DE TIP COMPETIȚIE - COLONIZARE

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Abstract. *The well known competition-colonization mathematical model, ob-tainned by extending Levins' model, is analyzed. It is a two-parameter model for which some results on dynamics and bifurcation are deduced. The nature of the equilibria is found. Finally, a biological interpretation for the results is given.*

Rezumat. *Se analizează modelul bine-cunoscut al interacțiunii de tip competiție-colonizare obținut extinzând modelul lui Levins. Acesta este un model cu doi parametri pentru care se deduc rezultate de dinamică şi biburcație. Se stabileşte natura punctelor de echilibru. În sfârşit, se dă interpretarea biologică a rezulta-telor obținute.*

A BRIEF HYSTORY

This paper deals with a particular family of planar vector fields which models the dynamics of two populations which are in a competition-colonization interaction.

The study of population change has a very long history. It begins, probably, with the book by Leonardo Pisano (1202), continues with the papers by A. J. Lotka and V. Volterra, and it is even today of a great actuality. Maybe, the first important model, which had intrigued the whole scientific world, was the population model due to T. R. Malthus (1798); unfortunately, it was very soon proved that it is fairly unrealistic. Some defects of Malthus' model were corrected by Pierre-François Verhulst, in 1835, which proposed the following mathematical model:

$$\frac{dN}{dt} = rN\left(1 - \frac{N}{K}\right). \tag{1}$$

Here **N(t)** denotes the population volume at time **t**, **r** is the *intrinsic rate of growth* (i.e., it is the maximum per capita growth rate), **K** is the *carrying capacity* of the environment (which is determined by the available sustaining resources and it is the nonzero equilibrium population size); **r** and **K** are positive constants. This model was named, by Verhulst, the *logistic growth* in a population. The easiest way to include space in the logistic model is to use the *metapopulation framework* in which an infinite number of sites are linked by migration. The analogue of the logistic model in the metapopulation framework is the Levins' model. The evolutionary process consisting in the colonization of a territory by a single species is described by the following differential equation

(2) $$\frac{du}{dt} = \lambda u(1-u) - u\,,$$

where **u(t)** denotes the fraction of the occupied sites at time **t**. In this model, the *colonization rate* is equal to the parameter λ times the product of the fraction of occupied sites and the fraction of vacant sites. Deterministic models with global dispersal, originated in physics, are usually called *mean-field models*. The idea is to replace complicated local interactions by an "effective field" produced by all other particles and to use the *mass-action law* to describe the dynamics.

Multispecies models can be built from single species models by incorporating interactions between species.

As it is well known, there exist three main types of interaction:

(i) if the growth rate of one population is decreased and the other increased the populations are in a *predator-prey* situation,

(ii) if the growth rate of each population is decreased, then the interaction is a *competition*,

(iii) if each population's growth rate is enhanced then the interaction is called *mutualism* or *symbiosis.*

Recall that the classical two-species Lotka-Volterra competition model, is given by

(3) $$\begin{cases} \dfrac{dN_1}{dt} = r_1 N_1\left(1 - \dfrac{N_1}{K_1} - \alpha_{12}\dfrac{N_2}{K_1}\right) \\ \dfrac{dN_2}{dt} = r_2 N_2\left(1 - \dfrac{N_2}{K_2} - \alpha_{21}\dfrac{N_1}{K_2}\right), \end{cases}$$

where $N_i(t)$ is the abundance of species **i** at time **t,** r_1, K_1, r_2, K_2, α_{12} and α_{21}. are all positive constants; **r**'s are the linear birth rates, **K**'s are the carrying capacities, and α_{12} and α_{21} measure the competitive effect of N_2 on N_1 and of N_1 on N_2, respectively. The three types of interaction are reflected in the specific ranges for the parameters in (3). In the particular case when one of the species is not affected by the presence of the other, i.e., one of the parameters α_{12} and α_{21} is zero, one obtains a *competition-colonization interaction*. This time, the Lotka-Volterra model becomes improper; it will be replaced by a specific model that will be presented in the next section.

MATHEMATICAL MODEL FOR A COMPETITION-COLONIZATION INTERACTION

We shall present and study the mathematical model for competition-colonization interaction described by C. Neuhauser in [7], and Tilman&Kareiva in [9]. The competition-colonization interaction is a mechanism that is frequently invoked to explain plant coexistence in the mountain grasslands. Some grass species allocate more biomass to their roots, which makes them better *competitors* for nitrogen, while others allocate more to seeds, which makes them better *colonizers*. Often, such species coexist. Their interaction can be well illustrated in

a model in which the species are hierarchically ordered. This model is usually known as the *grass-bushes-trees* model. In the two-species mean-field version, the mathematical model is given by the following system of ordinary differential equations:

$$(4)\qquad \begin{cases} \dfrac{du_1}{dt} = \lambda_1 u_1(1-u_1) - u_1 \\ \dfrac{du_2}{dt} = \lambda_2 u_2(1-u_1-u_2) - u_2 - \lambda_1 u_1 u_2, \end{cases}$$

where $\mathbf{u_i(t)}$ is the density of species **i** at time **t** and λ_1, λ_2 is are positive parameters which take parts in the so-called the colonization rates. Biological reasons impose to consider the phase space be the first quadrant in the plane (u_1, u_2) together the positive half-axes. The two populations coexist when (u_1, u_2) is an equilibrium point of (4) laying in the first quadrant of the (u_1, u_2)-plane. The system (4) has the following four equilibrium points:

$$O(0,0),\ A\left(\frac{\lambda_1-1}{\lambda_1}, 0\right),\ B\left(0, \frac{\lambda_2-1}{\lambda_2}\right),\ C\left(\frac{\lambda_1-1}{\lambda_1}, \frac{\lambda_2-\lambda_1^2}{\lambda_1\lambda_2}\right).$$

All (together) these equilibrium points have a biological interpretation if and only if $\lambda_1 > 1$, $\lambda_2 > 1$ and $\lambda_2 > \lambda_1^2$. More exactly, both species become extinct in **O,** species 1 survives and species 2 becomes extinct in **A**, species 1 becomes extinct and species 2 survives in **B**, and the two species coexist in **C**. In the particular case when $\lambda_1 = \lambda_2 = 1$ the four equillibria coincide, i.e., the only (geometric) equilibrium point is **O**, i.e., both species extinct in long time. Another particular important case is when $\lambda_1 > 1$ and $\lambda_2 = \lambda_1^2$; this time **A** is a double equilibrium.

In order to study the nature of an equilibrium point $E(u_1, u_2)$ we consider the Jacobian matrix of the right hands in (4), namely

$$J_E(u_1,u_2) = \begin{bmatrix} \lambda_1 - 1 - 2\lambda_1 u_1 & 0 \\ -(\lambda_1+\lambda_2)u_2 & \lambda_2 - 1 - 2\lambda_2 u_2 - (\lambda_1+\lambda_2)u_1 \end{bmatrix}.$$

$J_O(0, 0)$ has the characteristic values $s_1 = \lambda_1 - 1$, $s_2 = \lambda_2 - 1$, and, consequently, when $\lambda_1 > 1$, $\lambda_2 > 1$, **O** is a hyperbolic equilibrium for the system; more exactly **O** is a repulsive (unstable) node. Since $J_A\left((\lambda_1 - 1)/\lambda_1, 0\right)$ has the eigenvalues $s_1 = 1 - \lambda_1 < 0$ and $s_2 = = \dfrac{\lambda_2 - \lambda_1^2}{\lambda_1} > 0$, then **A** is a saddle point. For the equilibrium point **B** the Jacobian matrix is $J_B\left(0, \dfrac{\lambda_2 - 1}{\lambda_2}\right)$, it has the eigenvalues $s_1 = \lambda_1 - 1 > 0$ and $s_2 = 1 - \lambda_2 < 0$, so that it results **B** is also a saddle point. Finally, $J_C\left(\dfrac{\lambda_1 - 1}{\lambda_1}, \dfrac{\lambda_2 - \lambda_1^2}{\lambda_2}\right)$ has the eigenvalues $s_1 = 1 - \lambda_1 < 0$ and $s_2 = -\dfrac{\lambda_2 - \lambda_1^2}{\lambda_1} < 0$,

i.e., **C** is an attractive (stable) node. Consequently, if $\lambda_1 > 1$ and $\lambda_2 > \lambda_1^2$ the two species coexist in long time.

SKETCHING A QUANTITATIVE ANALYSIS

Obviously, the equation (4_1) can be solved and, for $\lambda_1 \neq 1$, one gets

$$u_1(t) = \frac{\lambda_1 - 1}{\lambda_1 + C_1(\lambda_1 - 1)e^{-(\lambda_1 - 1)t}}; \tag{5}$$

in case $\lambda_1 = 1$ it results

$$u_1(t) = \frac{1}{t + C}. \tag{6}$$

Consequently, if $\lambda_1 > 1$ for $t \to \infty$ it results

$$u_1(\infty) = \lim_{t \to \infty} u_1(t) = \frac{\lambda_1 - 1}{\lambda_1}$$

while, if $\lambda_1 \leq 1$ then $u_1(\infty) = \lim_{t \to \infty} u_1(t) = 0$. This means that the species 1 can survive only in the case $\lambda_1 > 1$. That is why, in the followings, we are interested in the case $\lambda_1 > 1$, only. This time, if the initial state of species 1 is $u_1(0) = a$, then $C_1 = \frac{\lambda_1 - 1 - a\lambda_1}{a(\lambda_1 - 1)}$ what implies that $C_1 > 0$ whenever $\lambda_1 > 1$ and $0 < a < \frac{\lambda_1 - 1}{\lambda_1}$. In Fig.1 is represented the function u_1 corresponding to $\lambda_1 = 2$ and $C_1 \in \{-0.8, -0.6, -0.4, -0.2, 0, 0.2, 0.4, 0.6, 0.8\}$ (i.e., for the initial values $a \in \{0.83, 0.71, 0.63, 0.55, 0.5, 0.45, 0.41, 0.38, 0.36\}$, respectively).

For any $\lambda_1 > 1$ the graphic representations of $u_1(t)$ in dependence with the values of the parameter C_1 look like in the Fig. 1, except the fact that the separatrix $u_1(t) = 0.5$ is replaced by the separatrix $u_1(t) = (\lambda_1 - 1)/\lambda_1$.

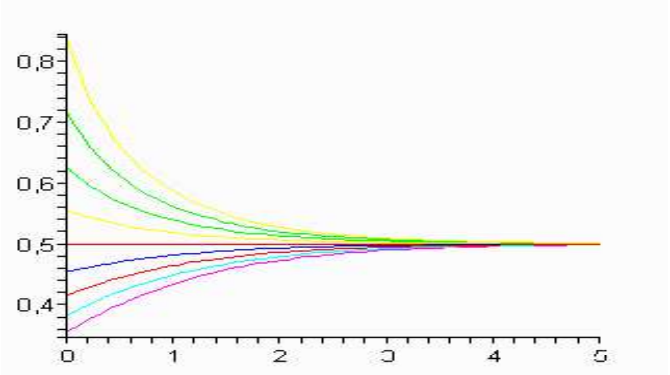

Fig. 1 - The graph of u_1 for $\lambda_1 = 2$ and $a \in \{0.83, 0.71, 0.63, 0.55, 0.5, 0.45, 0.41, 0.38, 0.36\}$

If $\lambda_1 < 1$ the graphic representation of $\mathbf{u_1(t)}$ is similar to that in Fig.2.

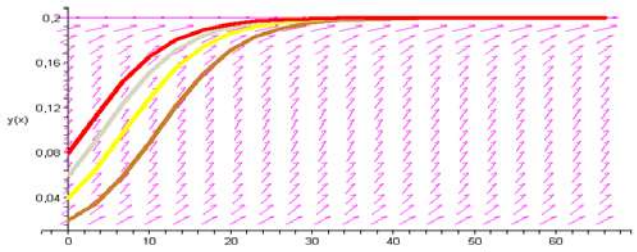

Figure 2 - The phase portrait for (4_1) and the graph of $\mathbf{u_1}$ for $\lambda_1 = 0.2$ and $a \in \{0.02, 0.04, 0.08\}$

$$u_2(t) = \frac{e^{(\lambda_2-1)t}\left(\lambda_1 e^{(\lambda_1-1)t} + C_1(\lambda_1-1)\right)^{-\frac{\lambda_1+\lambda_2}{\lambda_1}}}{\lambda_2 \int e^{(\lambda_2-1)t}\left(\lambda_1 e^{(\lambda_1-1)t} + C_1(\lambda_1-1)\right)^{-\frac{\lambda_1+\lambda_2}{\lambda_1}} dt + C_2}$$

In order to determine the value of the integral

$$I = \int e^{(\lambda_2-1)t}\left(\lambda_1 e^{(\lambda_1-1)t} + C_1(\lambda_1-1)\right)^{-\frac{\lambda_1+\lambda_2}{\lambda_1}} dt$$

we denote $a = \lambda_2 - 1$, $b = \lambda_1 - 1$, $p = 1 + \lambda_2/\lambda_1$, $q = C_1(\lambda_1 - 1)$. After using the substitution $t = \ln x$ I becomes $I_1 = \int x^{a-1}(\lambda_1 x^b + q)^{-\frac{\lambda_1+\lambda_2}{\lambda_1}} dx$. According with the well known Tchebychev result the indefinite integral in $\mathbf{u_2}$ is a linear combination of elementary functions if and only if λ_1, λ_2 are rational numbers and satisfy to one (at least) of the following three conditions:

$$1°.\ \lambda_2/\lambda_1 \in N^*, \qquad 2°.\ \frac{\lambda_2-1}{\lambda_1-1} \in N^*, \qquad 3°.\ \frac{\lambda_2-1}{\lambda_1-1} + \frac{\lambda_2}{\lambda_1} \in N^*.$$

CONCLUDING REMARKS

In the first quadrant of the (λ_1, λ_2) – plan, we have to distinguish nine zones (corresponding to topologically equivalent dynamical systems), namely:

I. $\lambda_1 < 1, \lambda_2 < 1, \lambda_2 < \lambda_1^2$,
II. $\lambda_1 > 1, \lambda_2 < 1, \lambda_2 < \lambda_1^2$,
III. $\lambda_1 > 1, \lambda_2 > 1, \lambda_2 < \lambda_1^2$,
IV. $\lambda_1 > 1, \lambda_2 > 1, \lambda_2 > \lambda_1^2$,
V. $\lambda_1 < 1, \lambda_2 > 1, \lambda_2 > \lambda_1^2$.
VI. $\lambda_1 < 1, \lambda_2 < 1, \lambda_2 > \lambda_1^2$,
VII. $\lambda_1 = 1$,
VIII. $\lambda_2 = 1$,
IX. $\lambda_2 = \lambda_1^2$.

According with the position of (λ_1, λ_2) in the one or other zone, we get:

I. O is the only equilibrium point, which is a stable node; this time both species extinct in long time,

II. the dynamical system has two equilibria: **O** - a saddle point and **A** - a stable node; this time, corresponding to **A**, species 1 survives while the species 2 becomes extinct,

III. the dynamical system has three equilibria: **O** - an unstable node, **A** - a stable node and **B** - a saddle point,

IV. the dynamical system has four equilibria: **O** - an unstable node, **A** - a saddle point, **B** a saddle point and **C** a stable node, i.e., the two species can coexist (the inferior competitor- species 2- can coexists with the superior competitor – species 1 – if and only if its birth rate exceeds the square of the birth rate of species 1),

V. the dynamical system has two equilibria: **O** an unstable node and **B** a stable node,

VI. the dynamical system has two equilibria: **O** an unstable node and **C** a saddle point.

The cases VII, VIII, IX imply one-parameter models which can be easily studied one by one.

All these assertions are confirmed by the corresponding phase portrait. For example, the case I has the phase portrait presented in Fig. 3.

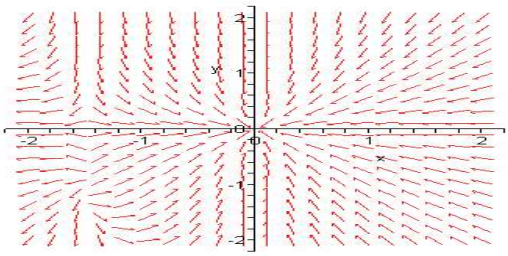

Figure 3 -The phase portrait of (4) for $\lambda_1 = 0.4$, $\lambda_2 = 0.2$

In this case, it must be remarked that even if the equilibria **A, B, C** have no biological interpretation they necessarily have an important contribution in the structure of the phase portrait.

The cases $\lambda_1 = 1$, $\lambda_2 = 1$ or $\lambda_2 = \lambda_1^2$ can be analyzed one by one; they lead to one-parameter dynamical systems.

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POPULATIONS IN COMPETITION

POPULAȚII ÎN COMPETIȚIE

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Abstract. *The Lotka-Volterra model for competition is analyzed by an algebraic procedure. Biological interpretation of the obtained results is given. The stability of critical points of the analyzed mathematical model is also established by means of an algebraic procedure.*

Rezumat. *Se analizează modelul Lotka-Volterra pentru populații în competiție folosindu-se o procedură pur algebrică. Se dă interpretarea bilogică pentru rezultatele obținute. Stabilitatea punctelor critice ale modelului mathematic analizat se stabileşte tot printr-o procedură algebrică.*

PRELIMINARY CONSIDERATIONS

The number of distinct species of plants, animals and fungi (eukaryotes) named and recorded up today was estimated to range from 1.4 million to 1.8 million. But R. May estimated that the real total number of species present on Earth today range from a low of around 3 million to a high of 30 million. Unfortunately, we have even less idea of the rates at which species may going extinct as a result of habitat destruction, introduced aliens, overexploitation and other consequences of human population growth. Besides the human less controlled intervention in the nature, there exists another source for extinction of certain species, namely the action of the so-called principle of *competitive exclusion*. This is a longstanding concept in population biology and it is defined (see F. Begon et all) as "an interaction in which one organism consumes a resource that would have been available to, and might have been consumed by another; one organism deprives another, and as a consequence, the other organism growths more slowly, leaves fewer progeny or is at risk of death". Although an important kind of competition is about food, however the competition may be about territories, nesting sites, mating partners, etc.. Any object for a competition will be generically referred as a *resource*. For example, common resources for plants are light, mineral nutrients, water, pollinators, seed dispersal agents and so on. Recall that competition may be between individuals of the same species, in which case it is called *intraspecific competition*, or of different species, in which case it is called an *interspecific competition*. On another hand, a competition may be *direct* or *indirect*. A *direct* or *interference competition* is when two individuals fight for the same piece of food. The *indirect* or *exploitation competition* does not involve direct contact among the competitors. Actually, the competitive exclusion is the elimination from an area of habitat of one species by another through interspecific competition. The principle of competitive exclusion works when two or more species lives in proximity and share the same basic requirements; they usually compete for resources, habitat, or territory. According with principle of competitive exclusion, only the strongest prevails driving the weaker competitor to extinction.

There exist several mathematical models for (interspecific) competition, but the most well-known model has been proposed by A. J. Lotka and V. Volterra (1925-1927) and has been studied intensively by G. F. Gause (1934). Once a model has been formulated, mathematics offers the appropriate tools to analyze its consequences. Mathematics can be viewed as a language that is most appropriate for logical reasoning and logical analysis of problems.

LOTKA - VOLTERRA COMPETITION MODEL

The ecosystems are very complex and intricate and usually nonlinear mechanistic interactions. A nonlinear mathematical model for species competition is the well-known Lotka-Volterra model. The Lotka-Volterra model describes a large class of species interaction such as predator-prey situation, mutualism or symbiosis, competition, consumer-resources interaction, etc.. The competition is located by the condition that the growth rate of each population is decreased. We remark, as a special trait, that the competition model of two species is depicted without direct reference to the resources they share. It is merely assumed that the presence of each population leads to a depression of its competitor's growth rate. The phase-plane analysis of this model was already carried out in [7], [8], [10] and so on. We shall propose here an algebraic approach, based on the idea of associating a binary commutative algebra with the Lotka-Volterra model (consisting in a quadratic dynamical system).

The mathematical expression of the Lotka-Volterra model is

$$\begin{cases} \dfrac{dN_1}{dt} = r_1 N_1 \left(1 - \dfrac{N_1}{K_1} - \alpha_{12} \dfrac{N_2}{K_1} \right) \\ \dfrac{dN_2}{dt} = r_2 N_2 \left(1 - \dfrac{N_2}{K_2} - \alpha_{21} \dfrac{N_1}{K_2} \right), \end{cases} \tag{1}$$

where $N_i(t)$ is the abundance of species i at time t, r_1, K_1, r_2, K_2, α_{12} and α_{21}. are all positive constants; r's are the *linear birth rates*, K's are the *carrying capacities*, and α_{12} and α_{21} measure the competitive effect of N_2 on N_1 and N_1 on N_2, respectively. In general, the entities α_{12} and α_{21} are different each other, i.e., $\alpha_{12} \neq \alpha_{21}$. In the absence of a competitor, one of the equations of the model reduces to the logistic equation; the similar situation in a competition-colonization interaction implies that one of the equations reduces to the Levins equation.

After applying the usual non-dimensionalizing procedure, consisting in considering the new adimensionalized functions

$$u_1 = \frac{N_1}{K_1}, \quad u_2 = \frac{N_2}{K_2}, \quad \tau = r_1 t, \quad \rho = \frac{r_2}{r_1},$$

$$a_{12} = \alpha_{12} \frac{K_2}{K_1}, \quad a_{21} = \alpha_{21} \frac{K_1}{K_2},$$

the system (1) becomes

(2)
$$\begin{cases} \dfrac{du_1}{d\tau} = u_1(1 - u_1 - a_{12}u_2) \\ \dfrac{du_2}{d\tau} = \rho u_2(1 - u_2 - a_{21}u_1)\,. \end{cases}$$

In order to approach algebraically the system (2) we must apply to it the usual technique of homogenization and we get

(3)
$$\begin{cases} \dfrac{du_1}{d\tau} = u_1(z - u_1 - a_{12}u_2) \\ \dfrac{du_2}{d\tau} = \rho u_2(z - u_2 - a_{21}u_1) \\ \dfrac{dz}{d\tau} = 0\,. \end{cases}$$

Obviously, we are interested in the solutions of (3) having **z(0)=1**. A binary commutative algebra **A(·)**, with the ground space $\mathbf{A} = \mathbf{P^3}$, is associated with (3), by means of a fixed basis $\mathbf{B} = (\mathbf{e_1}, \mathbf{e_2}, \mathbf{e_3}) \subset \mathbf{P^3}$, namely

$$\mathbf{e_1^2 = -e_1} \qquad \mathbf{e_1 \cdot e_2 = e_2 \cdot e_1 = -\frac{1}{2}a_{12}e_1 - \frac{1}{2}\rho a_{21}e_2} \qquad \mathbf{e_1 \cdot e_3 = e_3 \cdot e_1 = \frac{1}{2}e_1}$$

$$\mathbf{e_2^2 = -\rho e_2} \qquad \mathbf{e_3^2 = 0} \qquad \mathbf{e_2 \cdot e_3 = e_3 \cdot e_2 = \frac{1}{2}\rho e_2}\,.$$

By changing the basis **B** with basis $\mathbf{B'} = (\mathbf{f_1} = -\mathbf{e_1},\ \mathbf{f_2} = -\frac{1}{\rho}\mathbf{e_2},\ \mathbf{f_3} = \mathbf{e_3})$ the multiplication table of **A(·)** becomes:

$$\mathbf{f_1^2 = f_1} \qquad \mathbf{f_1 \cdot f_2 = f_2 \cdot f_1 = \frac{1}{2\rho}a_{12}f_1 + \frac{1}{2}\rho a_{21}f_2} \qquad \mathbf{f_1 \cdot f_3 = f_3 \cdot f_1 = \frac{1}{2}f_1}$$

$$\mathbf{f_2^2 = f_2} \qquad \mathbf{f_2 \cdot f_3 = f_3 \cdot f_2 = \frac{1}{2}\rho f_2} \qquad \mathbf{f_3^2 = 0}\,.$$

It results that $\mathbf{Span}_P\{\mathbf{f_1}, \mathbf{f_2}\} = \mathbf{Span}_P\{\mathbf{e_1}, \mathbf{e_2}\}$ is a simple ideal of **A(·)**. If $\mathbf{w} = \mathbf{v_1 f_1} + \mathbf{v_2 f_2} + \mathbf{z f_3} = \mathbf{u_1 e_1} + \mathbf{u_2 e_2} + \mathbf{z e_3}$, (3) becomes

(4)
$$\begin{cases} \dfrac{dv_1}{d\tau} = v_1(z + v_1 + \dfrac{1}{\rho}a_{12}v_2) \\ \dfrac{dv_2}{d\tau} = \rho v_2(z + \dfrac{1}{\rho}v_2 + a_{21}v_1) \\ \dfrac{dz}{d\tau} = 0\,. \end{cases}$$

Algebra **A(·)** has three idempotent elements, namely:

$$\mathbf{E_1 = f_1,\ E_2 = f_2} \text{ and } \mathbf{E_3} = \frac{\rho - \mathbf{a_{12}}}{\rho(1 - \mathbf{a_{12}a_{21}})}\mathbf{f_1} + \frac{1 - \rho\mathbf{a_{21}}}{1 - \mathbf{a_{12}a_{21}}}\mathbf{f_2}$$

if $\mathbf{1 - a_{12}a_{21} \neq 0}$; in the case $\mathbf{1 - a_{12}a_{21} = 0}$, i.e., $1 - \alpha_{12}\alpha_{21}\frac{K_2^2}{K_1^2} = 0$, then either the elements $\mathbf{E_1 = f_1}$ and $\mathbf{E_2 = f_2}$ are the only idempotent elements of $\mathbf{A(\cdot)}$ or $\mathbf{E_1 = f_1}$, $\mathbf{E_2 = f_2}$ and $\mathbf{E_3} = \mathbf{v_2}\left(-\frac{1}{\rho}\mathbf{a_{12}f_1 + f_2}\right)$, $\mathbf{v_2} \in \mathbf{P}$ is the set of all idempotent elements of $\mathbf{A(\cdot)}$. Consequently, the Cauchy problems for (4) corresponding to the initial conditions

$$\mathbf{w(t_0) = E_1,\ w(t_0) = E_2,\ w(t_0) = E_3}$$

have, respectively, the solutions

$$\mathbf{w_1(t)} = \frac{1}{1 - (t - t_0)}\mathbf{E_1}, \quad \mathbf{w_2(t)} = \frac{1}{1 - (t - t_0)}\mathbf{E_2}, \quad \mathbf{w_3(t)} = \frac{1}{1 - (t - t_0)}\mathbf{E_3}$$

i.e., (1) have the solutions

$$\begin{cases} \mathbf{N_1 = K_1}\dfrac{1}{t - t_0 - 1} \\ \mathbf{N_2 = 0}, \end{cases} \quad \begin{cases} \mathbf{N_1 = 0} \\ \mathbf{N_2} = \dfrac{1}{\rho}\mathbf{K_2}\dfrac{1}{t - t_0 - 1}, \end{cases} \quad \begin{cases} \mathbf{N_1 = K_1} \cdot \dfrac{\rho - \mathbf{a_{21}}}{\rho(1 - \mathbf{a_{12}a_{21}})} \cdot \dfrac{1}{t - t_0 - 1} \\ \mathbf{N_2 = K_2} \cdot \dfrac{1 - \rho\mathbf{a_{21}}}{\rho(1 - \mathbf{a_{12}a_{21}})} \cdot \dfrac{1}{t - t_0 - 1}. \end{cases}$$

Unfortunately, these solutions have no biological interpretation; they are separatrices in the set of all solution of (2). On another hand, if $\mathbf{1 - a_{12}a_{21} \neq 0}$, the algebra $\mathbf{A(\cdot)}$ have four nilpotent elements, namely

$$\mathbf{n_0 = f_3,\ n_1 = -f_1 + f_3,\ n_2 = -\rho f_2 + f_3,\ n_3} = \frac{1 - \mathbf{a_{12}}}{\mathbf{a_{12}\ a_{21}} - 1}\mathbf{f_1} + \rho\frac{1 - \mathbf{a_{21}}}{\mathbf{a_{12}\ a_{21}} - 1}\mathbf{f_2 + f_3},$$

i.e.,

$$\mathbf{n_0 = e_3,\ n_1 = e_1 + e_3,\ n_2 = e_2 + e_3,\ n_3} = \frac{1 - \mathbf{a_{12}}}{1 - \mathbf{a_{12}\ a_{21}}}\mathbf{e_1} + \frac{1 - \mathbf{a_{21}}}{1 - \mathbf{a_{12}\ a_{21}}}\mathbf{e_2 + e_3}.$$

By projecting $\mathbf{n_0}$, $\mathbf{n_1}$, $\mathbf{n_2}$, $\mathbf{n_3}$ on $\mathbf{Span}_P\{e_1, e_2\}$, the critical points for (2) are obtained:

$$\mathbf{O(0,0),\ C_1(1,\ 0),\ C_2(0,\ 1),\ C_3}\left(\frac{1 - \mathbf{a_{12}}}{1 - \mathbf{a_{12}\ a_{21}}}, \frac{1 - \mathbf{a_{21}}}{1 - \mathbf{a_{12}\ a_{21}}}\right).$$

Certainly, $\mathbf{O(0,\ 0)}$ is also a critical point for (2). $\mathbf{O}$ is an unstable steady state, because the linear mapping $\tilde{\mathbf{L}}_{\mathbf{n_0}}$ induced by the left multiplication $\mathbf{L}_{\mathbf{n_0}}$ on $\mathbf{Span}_P\{e_1, e_2\}$ has the matrix

$$\left[\tilde{\mathbf{L}}_{\mathbf{n}_0}\right]=\begin{bmatrix}\frac{1}{2} & 0\\ 0 & \frac{1}{2}\rho\end{bmatrix},$$

which has the positive eigenvalues $\mathbf{s}_1=\frac{1}{2},\mathbf{s}_2=\frac{1}{2}\rho$. Since

$$\left[\tilde{\mathbf{L}}_{\mathbf{n}_1}\right]=\begin{bmatrix}-\frac{1}{2} & -\frac{1}{2}\mathbf{a}_{12}\\ 0 & \frac{1}{2}\rho(1-\mathbf{a}_{21})\end{bmatrix}$$

has the eigenvalues $\mathbf{s}_1=-\frac{1}{2},\mathbf{s}_2=\frac{1}{2}\rho(1-\mathbf{a}_{21})$, $\mathbf{C}_1$ is a stable steady state if $\mathbf{a_{21}} > \mathbf{1}$ and an unstable steady state (more exactly, it is a saddle point) if $\mathbf{a_{21}} < \mathbf{1}$. For the third critical point $\mathbf{C}_2$, the matrix

$$\left[\tilde{\mathbf{L}}_{\mathbf{n}_2}\right]=\begin{bmatrix}\frac{1}{2}(1-\mathbf{a}_{12}) & 0\\ -\frac{1}{2}\rho\mathbf{a}_{21} & -\frac{1}{2}\rho\end{bmatrix}$$

has the eigenvalues $\mathbf{s}_1=-\frac{1}{2}\rho,\mathbf{s}_2=\frac{1}{2}(1-\mathbf{a}_{12})$, $\mathbf{C}_2$ is a stable steady state if $\mathbf{a_{12}} > \mathbf{1}$ and an unstable steady state (more exactly, it is a saddle point) if $\mathbf{a_{12}} < \mathbf{1}$. Finally, the last steady state for (2), when it is lying in the positive quadrant, is or not stable depending on the values of ρ, $\mathbf{a}_{12}$ and $\mathbf{a}_{21}$. Indeed, the matrix

$$\left[\tilde{\mathbf{L}}_{\mathbf{n}_3}\right]=\begin{bmatrix}-\frac{1-\mathbf{a}_{12}}{2(1-\mathbf{a}_{12}\mathbf{a}_{21})} & -\frac{1-\mathbf{a}_{12}}{2(1-\mathbf{a}_{12}\mathbf{a}_{21})}\mathbf{a}_{12}\\ -\frac{1-\mathbf{a}_{21}}{2(1-\mathbf{a}_{12}\mathbf{a}_{21})}\rho\mathbf{a}_{21} & -\frac{\rho}{2(1-\mathbf{a}_{12}\mathbf{a}_{21})}(1-\mathbf{a}_{21})\end{bmatrix}=$$

$$=\frac{1}{2(1-\mathbf{a}_{12}\mathbf{a}_{21})}\begin{bmatrix}-(1-\mathbf{a}_{12}) & -(1-\mathbf{a}_{12})\mathbf{a}_{12}\\ -\rho\mathbf{a}_{21}(1-\mathbf{a}_{21}) & -\rho(1-\mathbf{a}_{21})\end{bmatrix}.$$

has the eigenvalues

$$\mathbf{s}_1,\mathbf{s}_2=\frac{1}{4(1-\mathbf{a}_{12}\mathbf{a}_{21})}\Big[(\mathbf{a}_{12}-1)+\rho(\mathbf{a}_{21}-1)\pm$$

$$\pm\Big\{\big[(\mathbf{a}_{12}-1)+\rho(\mathbf{a}_{21}-1)\big]^2-4\rho(1-\mathbf{a}_{12}\mathbf{a}_{21})(\mathbf{a}_{12}-1)(\mathbf{a}_{21}-1)\Big\}^{\frac{1}{2}}\Big].$$

We have to consider the following four cases:

(i) $\mathbf{a}_{12}$ <1, $\mathbf{a}_{21}$ <1, (ii) $\mathbf{a}_{12}$ >1, $\mathbf{a}_{21}$ >1, (iii) $\mathbf{a}_{12}$ <1, $\mathbf{a}_{21}$ >1, (iv) $\mathbf{a}_{12}$ >1, $\mathbf{a}_{21}$ <1.

Taking into account the signs of the eigenvalues $\mathbf{s_1}$, $\mathbf{s_2}$, in correspondence with (i)-(iv), we get the following results.

• **Case (i)**. Only the positive steady state $\mathbf{C_3}$ is stable and all trajectories tend to it; this is the case when the two species coexist.

• **Case (ii)**. $\mathbf{C_1}$ and $\mathbf{C_2}$ are stable steady states, each of which has a domain of attraction separated by a separatrix which passes through $\mathbf{C_3}$. $\mathbf{C_3}$ is a saddle point. Species 1 can outcompete species 2, but species 2 can also compete species 1; the outcome depends on the initial condition.

• **Case (iii)**. $\mathbf{C_1}$ is the only stable steady state, having the whole positive quadrant as its domain of attraction. Species 1 outcompetes species 2.

• **Case (iv)**. $\mathbf{C_2}$ is the only stable steady state, having the whole positive quadrant as its domain of attraction. Species 2 outcompetes species 1.

CONCLUDING REMARKS

Competition is an interaction between two organisms or populations where the growth rates of both are inhibited.

- In the case (i) the two species coexist. The conditions $\mathbf{a_{12} < 1}$, $\mathbf{a_{21} < 1}$ assuring the coexistence indicate that the competition is less intense. The population levels are below the normal carrying capacities.

- The cases (ii)-(iv) correspond to the competitive exclusion principle; the competition will lead necessarily to the extinction of one species.

- It must be especially remarked that the stability of critical points was established by algebraic procedure (determining the signs of the eigenvalues for some linear transformations).

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INFLUENCE OF INVESTMENTS ON THE GROSS DOMESTIC PRODUCT FROM AGRARIAN AND FOOD SECTOR OF REPUBLIC OF MOLDOVA

INFLUENȚA INVESTIȚIILOR ASUPRA PIB-ULUI DIN SECTORUL AGROALIMENTAR AL R. MOLDOVA

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Abstract. *Methods on statistical processing data the received in agrarian and industrial sector of Republic Moldova during the analyzed period 1995-2006 have been analyzed. Have established a level of influence of the investments enclosed both in agriculture, and in the food-processing industry in relation to the Total Internal Product of agrarian and industrial sector of Republic Moldova.*

Rezumat. *Au fost analizate metodele de prelucrare statistică a datelor obținute în sectorul agroalimentar al Republicii Moldova în perioada anilor 1995-2006. S-a stabilit nivelul de influență a investițiilor alocate, atât în agricultură, cât şi cele din industria alimentară asupra produsului intern brut din sectorul agroalimentar al Republicii Moldova.*

For economy of Republic Moldova the investment of the investment into all of branch of the country is very important, but the special attention needs to be given an agriculture which gives raw material for the food-processing industry and fresh production for realization in the markets of republic, and the food-processing industry giving production which is in great demand at the population of republic and is exported.

MATERIALS AND METHODS

Data of the National Bureau of Statistics of Republic Moldova (the Statistical year-book for 2002 - 2006) and annual reports of National Bank of Moldova for 2006 have been used. Data on the Total Internal Product and under investments on agriculture and the food-processing industry of national economy were processed by means of computer program Excel.

RESULTS AND DISCUSSIONS

In the international practice recently it is very often used quantitative and quality standard of investment process at use to statistical data processing of the various mathematical formulas received at use.

Those attributes which can be characterized quantitatively concern to quantitative estimations. After studying the sample represents a number of the varying values which have been written down in that sequence in what they have been received. As to agrarian and industrial sector of Republic Moldova mathematical

formulas for statistical data processing which application will allow to concern to specificity of manufacture of agricultural production and its processing adequately have been used.

On the basis of official data for 11 years it is possible to analyze connection between the Total Internal Product from agrarian and industrial sector and the investments enclosed both in agriculture, and into the food-processing industry of national economy. For performance of calculations on influence of investments on the Total Internal Product the statistical formulas presented in table 1 were used.

On the basis of above brought formulas using computer program Excel have made calculations of influence of investments enclosed both in an agriculture, and in the food-processing industry in relation to the Total Internal Product of agrarian and industrial sector of Republic Moldova.

Table 1

Methods of statistical data processing received in agrarian and industrial sector of national economy

Parameters	Settlement formulas
Average arithmetic	$\overline{X} = \frac{\Sigma X}{n}$
Dispersion	$S^2 = \frac{\sum (x - \overline{x})^2}{n-1}$
Standard deviation	$S = \sqrt{S^2}$
Factor of a variation	$V = \frac{\pm S}{\overline{x}} * 100\%$
Error of average size	$S_{\overline{x}} = \frac{S}{\sqrt{n}}$
Relative error, %	$S_{\overline{x}}\% = \frac{S_{\overline{x}}}{\overline{x}} * 100$
Factor of correlation	$r^* = \frac{\sum (x - \overline{x}) * (y - \overline{y})}{\sqrt{\sum (x - \overline{x})^2 * \sum (y - \overline{y})^2}}$
Factor of determination	$d_{xy} = r^2$
Standard error of factor of correlation	$S_r = \sqrt{\frac{1 - r^2}{n-2}}$
Criterion of importance of factor of correlation	$t_r = \frac{r}{S_r}$

Specification: * r receives value between 0 and 1;

$r = 0$ - correlation connection between X and Y is absent;

$0 < r < 0.3$ - correlation connection between X and Y weak;

$0.3 < r < 0.7$ - correlation connection between X and Y average;

$0.7 < r < 1$ - correlation connection between X and Y strong.

Results of statistical processing of influence of the enclosed investments on the Total Internal Product (table 2) received in agrarian and industrial sector shows a role of their investments, both in agriculture, and in the food-processing industry. It would be desirable to note, that special influence on the Total Internal Product received from agrarian and industrial sector, have rendered the investments enclosed in the food-processing industry.

Using statistical relations it is possible to determine a direction of growth of investment streams in the certain branch or another proceeding from statistical processing the received results for the previous period of activity. It is necessary to note, that for reception enough probable results, for statistical data processing it is necessary to take the results received for 10 years. Thus, it is possible to avoid the sharp variations received in one year which confirm increase in an average error of a deviation and influence of given or other factor on dependence.

Table 2

Influence of investments on the Total Internal Product from agrarian and industrial sector of Republic Moldova for the period 1995-2006

	X1	X2	Y	Y Adjusted	Deviation
	91,1	117,4	2830,2	2990,115	-159,915
	97,9	220,7	3192,9	3793,008	-600,108
	118,4	225,7	3405,1	3787,589	-382,489
	81,7	239,2	3187,6	3975,036	-787,436
	56,7	145,8	4033,3	3290,475	742,825
	60,2	160	5407,4	3395,212	2012,188
	113,7	400,6	6113,5	5182,582	930,918
	159,9	445,4	6858,5	5435,838	1422,662
	186,7	753,1	7897,2	7813,049	84,151
	308,2	648	8811,9	6714,247	2097,653
	425,1	928,6	9003	8679,111	323,889
	487,2	1125,3	9845,4	10100,047	-254,647
Average arithmetic	182,233	450,817	5429,692		
Standard deviation	145,6402	337,5313	2570,5354		
Factor of a variation	79,9196	74,8711	47,3422		
Error of average size	42,043	97,437	742,050		
Relative error, %	23,07081	21,61342	13,66651		
Pair correlation					
	X1X2	**X2Y**	**X1Y**		
Factor of correlation	0,944446	0,922086	0,857425		
Standard error of factor	0,103934	0,122375	0,162734		

of correlation					
Criterion of importance of factor of correlation	9,087019	7,534905	5,268879		
Factor of determination	0,8919782	0,8502429	0,7351771		
Influence of the factor of %		95,8561602	-10,6647526		
Plural correlation					
Ryx1x2			0,922992		
Standard error			0,12169056		
Criterion of importance of factor of correlation			7,5847454		
Factor of determination			0,85191408		
Regress					
Factor of regress B0			2260,65785		
Factor of regress B1			-2,195316		
Factor of regress B2			7,9170		
Factor of standard regress BS1			-0,1243812		
Factor of standard regress BS2			1,03955751		

The note: X1 - investments into agriculture; X2 - investments into the food-processing industry; Y - the Total Internal Product from agrarian and industrial sector.

CONCLUSIONS

On the basis of above told it is possible to draw a conclusion, that statistical processing of influence of investments enclosed both in an agriculture, and in the food-processing industry on the Total Internal Product received from agrarian and industrial sector, should become the necessary method at a direction of a monetary stream of means in the future. Using yielded results it is possible to determine, in what branch the investment of investments will lead to substantial growth of the Total Internal Product. During too time it is possible to avoid errors at a direction of investment process and in reception of the maximal result of the Total Internal Product with the moderate investment effort.

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THE PRESENCE OF HORTICULTURAL PRODUCTS IN THE ROMANIAN SUPERMARKETS

PREZENȚA PRODUSELOR HORTICOLE ÎN SUPERMAKETURILE DIN ROMÂNIA

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Abstract. *This paper radiographies the presence of the horticultural products in the big stores chains, which entered in the last years on the Romanian market. Especially it is observed the victualling and the commercialization.*

In Romania, after the liquidation of the state firms and specialized fruit and vegetables stores called "aprozar", the fruits and vegetables commerce is almost entirely a street commerce. Exception was made by the big supermarket chains, which import the majority of fruits and vegetables.

Actually, the agricultural fields are challenged by the supremacy of the supermarkets stores, which own a share of 70-90% from the retail market in United Kingdom, France, Germany, Netherlands and the Nordic countries. On the fruits and vegetables market, this influence is felt in a bigger measure and it has some consequences analyzed in this paper.

Rezumat. *Lucrarea face o radiografie a prezenței produselor horticole în marile lanțuri de magazine, care au intrat în ultimi ani pe piața românească, fiind tratat in special modul de aprovizionare si de comercializare.*

În România comerțul organizat de legume şi fructe după desființarea intreprinderilor de stat şi a magazinelor aprozar, a rămas aproape în totalitate la forma de tarabă. Excepție fac doar raioanele din supermarketuri, care se aprovizionează, de regulă, din import.

În prezent, sectoarele agricole sunt provocate de dominația lanțurilor de supermarketuri, care dețin 70-90% din piața de retail din Marea Britanie, Franța, Germania, Olanda şi țările nordice. Pe piața de legume şi fructe, această influență se face simțită într-o mai mare măsură cu o serie de consecinte ce sunt analizate in lucrare.

MATERIAL AND METHOD

Before 1989, when all was in the state propriety, the fruits and vegetables were sold, principally, in some stores called "aprozar". The name "aprozar" comes from the combination of the words of the expression "to supply with green goods". Here were sold only season fruits and vegetables and the exotic fruits and vegetables lacked. After 1989, almost all "aprozar" stores disappeared, making place to small groceries.

Nowadays, in every small grocery or big store, it can be found any kind of fruits and vegetables, fresh or canned, from any corners of the world, but the biggest variety is found in the new big wholesale and retail chain of stores which entered on the Romanian market after 1990. Now these big stores, with their variety, are a strong threat for the small groceries.

Now, we have the possibility to try and to choose among a big variety of horticultural products. It is interesting to see exactly what kind of vegetables, with what origin are sold in the Romanian supermarkets and which is the presentation of our local vegetables productions.

RESULTS AND DISCUSSIONS

In the last seven years, the Romanian consumption market was "invaded" by many retail stores, mainly international brands. These stores are characterized by the fact that they have big surfaces, hundred and thousands of articles, of course horticultural products too; almost all you need is in one place.

But, the agricultural fields are challenged by the supremacy of these supermarket stores, which own a share of 70-90% from the retail market from United Kingdom, France, Germany, Netherlands and the Nordic countries. On the fruits and vegetables market, this influence is felt in a bigger measure. In these countries, the chains of stores have monopoly on prices.

Regarding on the Romanian retail market, the trend is the same, the supermarket stores own every year a bigger market share, estimating that in the year 2010, this stores will own more than 80% from the retail market.

In Romania approximately 95 percent of all fruits and vegetables are produced by private households and only 5 percent by commercial farmers and companies. Not only are the yields of these products far below the EU average (20 percent to 50 percent less), the quality itself does not meet international standards. This is one of the reasons why in any big retail store with a fruits and vegetables department, the number of Romanian products is still small.

Other minus on the Romanian horticultural products market is that the processing or canned industry disappears. If in 1989 were 15 state big processing plants and 40 middle ones, plus other 50 cans departments of the cooperatives, which were processing more than 360,000 tones of vegetables, in 2004, were just 40 this kind of units, only 15 important with a production of 14,391 tones, which covered only 40% from the market.

After 1989 the plants from the can industry sector were the first sold to the private investors, but, in majority, they abandoned quickly.

The can industry is tied up by the fruits and vegetables production. In the conditions where we have subsistence agriculture with significant smaller yields than in other European countries, it is normal that this industry is in dissolution.

Also, a problem is the lack of financing possibilities, to change the technology lines and the marketing. Even if the import cans are much more expensive, more than double, the Romanians prefer to buy them, instead of the Romanian ones, which are tastier, but with a less sophisticated design.

The solution, from this year, for the Romanian can industry is the possibility to attract European structural founds which could revitalize this sector, but in correlation with the agriculture reorganization.

Another reason why the Romanian fruits and vegetables are not well represented in the big retailers chain from the Romanian market, is that, usually,

these chains keep the same suppliers in the countries where open new big stores as in the other countries where they have stores.

As result, in the international stores chains, the imported fruits and vegetables, fresh or canned, are dominant. For example, in Cluj Napoca, if we enter in two well known stores Plus and Cora, at a simple observation on the fresh fruits and vegetables sector, it can be observed the followings:

Table 1

The Origin Of The Fresh Fruits And Vegetables From Cluj Napoca

Store	*Type*	*Product*	*The Origin*
Plus	*Discount store*	*Peas*	*Hungary*
		Apples	*Hungary*
		Bean	*Italy*
		Onion	*Austria*
		Green salad	*Turkey*
		Garlic	*Turkey*
		Egg plants	*Spain*
		Carrots	*Poland*
		Green onion	*Romania*
		Potatoes	*Romania*
		Parsley	*Romania*
		Onion	*Romania*
		Marrow	*Romania*
Cora	*Hypermarket*	*Bean*	*Romania*
		Kohlrabi	*Romania*
		Potatoes	*Romania*
		Mushrooms	*Romania*
		Onion	*Poland, Italy, Romania*
		Radish	*Romania, Italy*
		Celery	*Netherlands*
		Carrots	*Netherlands*
		Marrow	*Turkey*
		Plums	*China*
		Garlic	*China*
		Pears	*Italy, China*
		Green salad	*Spain*
		Egg plants	*Spain*
		Pepper	*Spain, Turkey*
		Cucumbers	*Turkey*
		Tomatoes	*Turkey*

In the stores taken into observation, in the first place the variety of the horticultural products is different, because the type of store is different: Plus is a discount store and Cora is a hypermarket with a bigger surface. But, in both stores the number of Romanian products is much smaller than the number of imported ones. Only a few seasonal products, which do not need special conditions, as green onion, celery and parsley, can be found on the shelves.

CONCLUSIONS

In any store you go in Romania, the fruits and vegetables from the shelves are in big proportion imported from other countries, and we do not refer here at the exotic fruits and vegetables, which are not taken into consideration.

If in some European countries, the big chains of supermarkets are a threat for the farmers because their power on the market; in Romania, the national horticultural products are ignored for many reasons: the low quality and the small quantities of the products.

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POSSIBILITIES OF CARRYING OUT ECOLOGICAL EDUCATION IN PITEŞTI CITY

POSIBILITĂȚI DE REALIZARE A EDUCAȚIEI ECOLOGICE ÎN MUNICIPIUL PITEŞTI

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Abstract. *The activities of teaching-learning carried out in class, by which is assured the transmission of knowledge in ecology, can be combined with visits and outside activities of observation and protection of nature. Visiting the "Environment protection on ecological bases" exhibition, within the Argeş Districtual Museum, is contributing to the enrichment of active vocabulary with terms from the field of ecology. By organizing some activities on ecology subjects within the natural (Trivale forest, Argeş river) and artificial (parks) ecosystems, respectively, it is intended the formation to the schoolchildren and students of an ecological conduct, towards the environment protection and preservation of its quality.*

Rezumat. *Activitățile de predare-învățare prin care se asigură transmiterea cunoştinţelor de ecologie realizate în clasă pot fi îmbinate cu vizite şi activităţi de observare şi de protecţie a naturii, realizate în aer liber. Vizitarea expoziției „Protecția mediului înconjurător pe baze ecologice", din cadrul Muzeului județean Argeş, contribuie la îmbogățirea vocabularului activ cu cuvinte din domeniul ecologiei. Prin organizarea unor activităţi pe teme de ecologie în ecosistemele naturale (pădurea Trivale, râul Argeş) şi artificiale (parcuri) din Piteşti se urmăreşte formarea unei conduite ecologice, în direcția protejării mediului ambiant şi a conservării calității acestuia.*

Concurrently with the progress of human civilization, due to the development of science and technique, the relation of humans with the environment has deteriorated, as they action most often negatively on it, producing imbalances, sometimes irreversible, within the ecological systems. "*The disastrous consequeces of imbalance between environment and development*", "*irrational industrialization, which has pollution and even distruction of environment as effect*", as well as "*occurrence of some disorders generated by the degradation of the natural environment (air, water, and soil pollution)*" there are factors which generated the need for ecological education (Cucoş, C., 2006). Education concerning the environment is addressed to all ages, having to be "*an active and continuous process, carried out at global level and in all media and social classes*", "*an education about the environment, through environment and within the environment*" (Cristea, V. *et al*., 1996; Barna, A. and Pop, I., 2006). "*The people has to feel that they belongs to the nature and, as a consequence, to develop themselves the sense of responsability*" (REC Moldova, 2003) and to exhibit an precautionary conduct towards the environment. Someone

who will be protecting the nature is supposed to do this because is understanding the importance of its preservation, is instructed and educated in this spirit.

It cannot be said that there is an certain age to which the ecological education of the people it should be started, but is considered that as earlier it will be done, as better the results. The ecological education begins within the family, "*firstly by the power of example and then of words*" (Barna, A., Pop, I., 2006).

The parent is an example for child in respect of attitudes and conduct towards the environment. In the open, recreation places, parks, street, the parent should to keep an eye on the child behavior and to show an disapproval attitude towards his or her tendency to throw away papers, wrappings, plastic bottles wherever, to tear off flowers, shoots from blooming trees or shrubs, to catch insects (e.g. butterflies) just "because they are beautiful", or to beat animals (crows, jackdaws, dogs, cats, etc.) on the grounds of their "unusefulness" or "lack of a master". From his infancy, to the child should be developed the feeling of carring for nature, explaining him that each living being, more or less beautiful prom the human's point of view, has its role in nature. The child behavior, sometimes aggressive towards the environment, because of the parent's lack of concern or ecological "ignorance", will be hard to correct by education activities organized during the years of study in kindergarden and school, as it is an already well known fact that the effort of teachers should be supported also by the family and community to which the child belongs.

In the primary, secondary and hugh school, ecological education can be carried aut by any type of school activity (lessons, scientific, literary, artistic, art, and sport activities), aut of school activities (trips, visits, debating sessions), activities organized by the school or other institutions (conferences, presentations of slides and video films, exhibitions and contests on ecology themes), in frames of which is studied the influence of human's activities on the environment, either natural or artificial. The school has the mission "*to offer, gradually and in accordance with the age particularities, scientific knowledge which motivate the conduct and ecological-civic duties, to create and organize educational activities and actions concerning the environment*" (Barna, A. and Pop, I., 2006). At the present, there are many schools in Piteşti having the statute of eco-schools, in which is organized and carried out a sustained movement of ecological education and environment protection, the students participating as true defenders of the nature to the realization of activities and projects in the field of ecology. It is considered as necessary to extend this movement into the universities, such as to be involved both the students in ecology and other study programs.

The first step towards formation of an ecological conduct is information. In any season, whatever the weather, the doors of the Argeş Districtual Museum in Piteşti are opened to every age visitors, either for children before school age, schoolchildren or students. Within the Museum there is an permanent exhibition entitled "Environment protection on ecological bases", in which are presented the basic principles in organization of life and establishing the relation between the living beings. The whole material is grouped within three sections: 1) Origin of life and living beings evolution

on the Earth (Evolutionism); 2) Organization of living matter and relations within ecosystems (Principles of ecology); 3) Relation human-nature and protection of the environment. The aspectes related to the theme of living matter organization and relation between living beings are presented hierarchically as follows: a) Structural organization of the living matter, levels of organization; b) Functional organization of the biosphere, whose functional unit is the ecosystem, with its two components: the biotope (non-living) and biocenosis (living); c) The circuit of matter and energy flow within the ecosystem, from the soil non-living matter into the body of plants, animals, and through decomposers again into the soil; d) The trophic pyramids and scheme of a trophic net in an forest ecosystem, which explain ecologically the relations between producers and consumers, relations which are maintained in a relatively stable equilibrium; e) The adaptative modifications in the world of living beings, as answer to the influences of the environmental factors.

Within the exhibition there are presented, dioramic, ecosystem models (swamp, steppe, mountain forest, cave), in which can be observed the differentiation of living beings depending of the biotope conditions, interdependence between the living beings from biocenosis, and between them and the components of the abiotic environment. By the help of illuminated panels, it is presented the division into zones of vegetation depending of altitude, from the plane to the mountains, from the Danube until the Moldoveanu peak, each zone being characterized by a certain type of woody and herbaceous vegetation. The last part of the exhibition presents the relation human-nature, the transforming action, either conscious or unconscious, of humans over their life environment, which lead to the deterioration of some balances between different components of the biosphere, disappearance of some plant and animal species, as well as the evolution of actions towards the preservation of environment in Romania. During the visit, the schoolchildren or students improves their active vocabulary with terms from the field of ecology, many of them specific, such as: biotic and abiotic environmental factors, biological system, biotope, biocenosis, natural and anthropized environment, as well as intra- and interspecific relation into the ecosystems. Also, there is stimulated the motivation for environment protection, making them aware of the need of saving all the natural resources. Following the visit, might be realized, individually or within groups, essays on some human's activities negatively influencing the flora, offering in the same time solutions for the plant protection. Essays can be also elaborated on animals protected by law in our country, offering in the same time suggestions towards the limitation of the negative influence of humans over fauna. The diseases caused by environment pollution by noise, dust, and toxic compounds, could be also subjects of essays. Debates can be organized, aiming at emphasizing the relation which exist between environmental factors and animal diversity. Also, can be debated the differences between the flora of natural and artificial (parks, cereal crops, etc) ecosystems, respectively, or the possibility of environment protection inside the city or area where the schoolchildren or students are living.. The most appropriate solutions can be noted into the "Locality green book" and presented with the occasions of meetings organized by some non-governmental organizations, which are dealing with the environment protection. The activities of teaching-learning by which is assured the transmission of ecology knowledge must not be realized exclusively with class, within the

lessons of biology, but rather must be combined with activities of observation, research, exploration, investigation and nature protection, carried out in open air. In Piteşti, can be organized field applications, in parks (artificial ecosystems) or Trivale forest (natural ecosystem), where can be analyzed the abiotic conditions (air temperature, soil temperature, light, wind), can be observed and identified the trophic categories in the analized ecosystem, can be prepared drafts of trophic chains, can be emphasized the effects of some polluting agents on the density within some populations, and can be realized predictions on the dynamics of that ecosystem. There are numerous parks in Piteşti, so that the schoolchildren of every school or the students can choose one of them in order to study and take care of it. Among these parks can be mentioned the following: Prundu, Depou, Tineretului, Central Craiovei, Podul Viilor, Fortuna, 1907 Park, Expo-Parc, Lumina, Bălcescu, Trivale (67.900 m^2), Ştrand (131.000 m^2), Valea cu Tei, Războieni, Oncologie şi Capelei (Stănescu, Gh., 1999). Alongside the terrestrial ecosystems, aquatic ecosystems can be observed and analyzed in Piteşti – the Argeş river (natural ecosystem) and the lake from Ştrand Park (artificial ecosystem), located nearby the Argeş river. These can be subjects of observations on the water temperature and quality, pollution with different wastes, as well as observations on the plant and animal species characteristics for these ecosystems (Petruța, G., 2003). Within both aquatic and terrestrial ecosystems can be carried out phenological observations, making evident the modification caused on them by global warming.

The teacher shouldn't limit only to the stocking of knowledge by the schoolchildren, but to determine a certain conduct of the child or student, towards the protection of environment and preservation of its quality. They could be involved in tree planting actions within Trivale forest, mounting of artificial nests for wild birds, collectiong of wastes on certain areas of Trivale forest and valley of Argeş river, carrying of the green spaces, recycling the paper, action which can be realized in schools by exhibitions of drawings on ecology subjects, etc. For making them to adopt an ecological behavior, the emphasis should be on individual involvement and assumation of responsibility by each participant, being necessary that the schoolchildren or students to learn how to organize themselves actions for protection of nature.

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METHODICAL ASPECTS OF THE USE OF COMBINED EMPIRIO-SOCIOCENTRIC AND EMPIRIO-PSYCHOCENTRIC MODELS OF EDUCATION WITHIN THE BIOLOGY LESSONS

ASPECTE METODICE PRIVIND FOLOSIREA MODELELOR COMBINATE EMPIRIO-SOCIOCENTRIC ŞI EMPIRIO - PSIHOCENTRIC DE INSTRUIRE, LA LECȚIILE DE BIOLOGIE

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Abstract. *For teaching biology, within the preuniversitary education, not exclusively a single model of education is used, but rather a combination of models, such being valorized the positive aspects of each of them. Both in gymnasium and high school, for teaching biology, the empiriocentric model can be correlated with the sociocentric model, but also with the psychocentric model, in both cases being stimulated the student's research activity, who is therefore directly participating to the knowledge of scientific truth. If in the first case of correlation, the activity carried out within groups of students is promoting development of interaction between them, in the second case, the autonomous work of the student is stimulated, in accordance with the individual particularities of each one.*

Rezumat. *În predarea biologiei, în învățământul preuniversitar, nu se foloseşte exclusiv un singur model de instruire, ci o combinare a acestora, valorificându-se aspectele pozitive ale fiecăruia în parte. În predarea biologiei, atât la gimnaziu cât şi la liceu, modelul empiriocentric poate fi corelat cu modelul sociocentric, dar şi cu modelul psihocentric de instruire, în ambele cazuri fiind stimulată activitatea de cercetare a elevului, care participă direct la cunoaşterea adevărului ştiinţific. Dacă în primul caz de corelare, activitatea desfăşurată pe grupe contribuie la dezvoltarea interacțiunilor între elevi, a cooperării, a spiritului de echipă şi competitivității, în cel de-al doilea este stimulată munca autonomă a elevului, avându-se în vedere particularitățile individuale ale acestuia.*

The lesson, as the basic form of organizing the education process, allows the leading role of the teacher as planner, organizer and coordinator of this school activity. Depending of the content of theme which should be teached within a lesson, the abstraction level of the new knowledge, but also considering the need of active participation of the students in learning, for planning and carrying out the lesson, the teacher can choose one of the education models (Cerghit, I., 1983, 2002; Ciobanu, M., 2006), corresponding to the main directions of approaching the didactical process: 1) the logocentric model, either explanatory-reproducible or explanatory-responsive; 2) empiriocentric model; 3) technocentric model; 4) sociocentric model; 5) psychocentric model.

Most often, in teaching the notions of plant, animal and human anatomy and physiology, as well as botany and ecology, within gymnasium and high school, due to the fact that rediscovery of the scientific truth can be achieved by observation and experimentation with natural biologic material, the teacher is choosing either the empiriocentric model or a combination of the empirio-sociocentric and empirio-psychocentric models.

When the empiriocentric model is used, the emphasis is laid on the student's learning activity, who is stimulated by the teacher to research, findings, attempts, and own experiments, to the rediscovery of the surrounding world, to which comes in direct contact, by its own effort. This education model is based on the idea of student's effort, promoting "*learning by direct action, experimental-investigative, on the reality's objects and phenomena, a learning which is, in the same time, knowledge and action*" (Cerghit, I., 1983).

By choosing for the combined empirio-psychocentric model, the teacher is considering both the use of heuristical, active-participative methods, within the lesson (Cerghit, I., 1980; Ciurchea, M., et *al*.,1983; Iordache, I., et *al*., 2004), and focussing the activity on the student, being given priority to the individualized education and independent work. By the individualized education, an differentiated treatment of the students is realized, according to their individual particularities, working rhytm, and aptitudes. The teacher is guiding at minimum the activity of the student, who is thus transformed from an object to an subject of the education.

To exemplify the use of the empirio-psychocentric model we have choose the planning of the theme "The river crayfish", from the chapter "Arthropods" (Biology, 6th class), aiming the formation to the students of the concept of shell fish and understanding the general characters of an crustacean.

During the first part of the lesson, the didactical activity will be foccussed on the student, being used an individual working sheet, containing three items of the type "incomplete phrases" and an item of the type "mute drawing".

The first working task is to rediscover the crayfish's life environment, size and color, making evident their role for animal living. This task is achieved by independent macroscopic observation on preserved crayfishes, drawing representing the crayfish in its life environment, and picture within the zoology atlas.

Based on putting up-to-date the knowledge acquired about the mollusca shell during the previous lessons, the students will work out the second task, inductively rediscovering the substances which form the shell of the crayfish (limestone and chitin), realizing the link between the shell and name of crustacean.

Each student's activity is continued with the macroscopic observation of preserved crayfishes and crabs, drawing from the manual presenting the dorsal of a crayfish body, as well as that presenting the dorsal of an cross-spider body. Following the analysis made, by analogy the students will discover the

component parts of the river crayfish body (cefalotorax and abdomen) and will note them on the "mute drawing", solving in this way the third working task.

The last working task, that of establishing the phylogenetic relationship between arthropods and annelids, will be solved by making actual again the knowledge acquired previously about the external and internal structure of annelids, as well as by the macroscopic observation of the crayfish abdomen, formed from many rings, as the worm's body.

Further on, the teacher is realizing an feed-back, by which the corect answers are established, along with the lesson's scheme on the blackboard.

During the next stage of the lesson, the teacher is presenting an overhead transparency showing the dorsal and ventral side of the river crayfish. The students will observe and rediscover inductively other elements of the river crayfish body, such as antenna, composed eyes, buccal apparatus, the five pairs of articulate legs, thus being established the membership of crustaceans to the class of arthropods, the seven segments of the abdomen and the telson (back swimmer), the last segment of the abdomen. The students coordinated by the teacher are establishing the meaning of the concept of crustacean: an animal having the body composed by the cefalotorax and abdomen, protected by an chitinous mail, impregnated with limestone, and which presents five pairs of articulated legs. The teacher is notating this in the lesson's scheme.

In the following stage, there are treated the relationship, nutrition and reproduction functions. If during the first part of the lesson predominated the independent, individual activity, during the second part the activity will be carried out frontal.

By heuristical conversation and macroscopic observation, the students will rediscover the organs involved in sensitivity of this animal predator – the antenna (for touching and smelling) and composed eyes (for seeing). The teacher will explain the structure of the composed eyes.

Further on, also by heuristical conversation, based on the knowledge about the external structure and life environment, using the plate showing the river crayfish in the environment and the picture from the zoology atlas, the students will rediscover the mode of movement and feeding of this animal. This is then noted in the lesson's scheme.

Also by heuristical conversation, using an overhead transparency, the students are rediscovering the placement of branchiae, the mode in which the respiration and reproduction is made, after which the teacher is explaining the mode in which the growing, shedding, and regeneration of crayfishes is realized.

At the end of the lesson, for the fixation of knowledge, each student will fill in an working sheet, including an item of type "at will" for establishing of the animals related with the river crayfish, and an item of type "incomplete sentences", for establishing the general characters of crustaceans. For their documentation, the students will use the pictures in the zoology atlas and the notes taken during the lesson, on the characterization of the animal type for crustaceans, respectively the river crayfish. The corect answers are established

following the discussion between teacher and students, the last having to self-correct the eventual mistakes or to complete their own knowledge, this assuring a better understanding and acquiring of it.

In carrying out the lesson, predominate the student's activity, rediscovery of the knowledge of biology being semiconducted by the teacher. The lesson's scheme is not exclusively realized by the teacher, but rather in cooperation with the students, the final conclusions being established by questions addressed to them.

Another combined model used currently for teaching biology is the empirio-sociocentric one. In this case, according to the sociocentric model, foccussed on the activity within a group, and also on the social organization of learning (in small groups or teams), the emphasis is put on the interdependent, rather than independent learning, on interactive rather than active learning, and on learning by cooperation rather than solitary learning. Working in teams during the lesson allows the confrontation of the initiatives and development of some interpersonal, social-affective relationships.

For the presentation of the theme "Influence of the environment factors on the photosynthesis intensity ans their practical importance. The influence of light and carbon dioxide", the teacher can choose for such an education model. The lesson begins by making actual again the knowledge about the mode by which the photosynthesizing plants realize the autotrophic nutrition. Bringing up to date the knowledge is carried out both by questions to which the students are asked by the teacher to answer, and by using didactic material, represented by a plate showing the exchanges of matter and energy between a green plant and its environment.

Further on, for studying the influence of ligth and CO_2 on the photosynthesis intensity, the teacher is organizing the activity within three groups (1, 2, and 3), having different working tasks. Each group will be divided in two subgroups (a and b), these having the same working task.

The first group will study the correlation existing between the photosynthesis intensity and the intensity of light, using the working sheet 1, the second group will study the correlation between the photosyntesis intensity and the type of light radiation, using the working sheet 2, while the third group will study the correlation between the intensity of photosynthesis and concentration of CO_2. The results obtained following setting up and carrying out the experiments mentioned in the working sheets will be noted by the students in a table, realizing then the graph corresponding to the observations made.

<u>The activity of subgroups 1a and 1b</u>

The students from these subgroups shall be working out the following tasks:

1. Obliquely cut off the *Elodea canadensis* shoot at the basal part.
2. Introduce the shoot with its tip down into the test tube filled with water, so that the surface of the cut off not to touch the test tube's wall.

3. Place the test tube on the stand at 10 cm distance from the light source and count the oxygen bubbles given off per minute, until their number becomes constant. Write down in a table what they observed.
4. Place the stand at successive distances of 20 cm, 40 cm, 60 cm, and 80 cm respectively, from the light source and, for each of this they count the oxygen bubbles given off per minute until their number becomes constant. Write down in the table what they observed.
5. Write down in the table what they observed.
6. Based on the data from the table, they draw the corresponding graph.

Activity of the subgroups 2a and 2b

The students from these subgroups shall be working out the following tasks:

1. Obliquely cut off the *Elodea canadensis* shoot at the basal part and introduce the shoot with its tip down into the test tube filled with water, so that the surface of the cut off not to touch the test tube's wall.
2. Place the test tube on the stand at 10 cm distance from the light source and count the oxygen bubbles given off per minute by the shoot, until their number becomes constant.
3. Place a blue color filter between the stand and light source, at 5 cm distance, and count the oxygen bubbles given off per minute, until their number becomes constant. Write down the results of their observation in a table.
4. remove the filter between the stand and the light source and count the oxygen bubbles given off by the shoot over a minute, untill their number becomes constant and identical with that determined initially.
5. Place an green color filter between the stand and the light, at 5 cm distance and, as in the case with the blue color filter, count the number of bubbles given off per minute. The results of observation are written down in the table.
6. Based on the data from the table, they draw the corresponding graph.

Activity of the subgroups 3a and 3b

The students from these subgroups shall be working out the following tasks:

1. Obliquely cut off the *Elodea canadensis* shoot at the basal part and introduce the shoot with its tip down into the test tube filled with a solution 0.1% of $NaHCO_3$.
2. Place the test tube on the stand at 20 cm distance from the light source and count the oxygen bubbles given off per minute by the shoot, until their number becomes constant The results of observation are written down in the table.
3. Remove the shoot from the test tube filled with water and introduce it into another test tube containing a solution 0.5% of $NaHCO_3$, then into a test tube containing a solution 1% of $NaHCO_3$, following the

same procedure as with the solution 0.1% of $NaHCO_3$. The results of observation are written down in the table.

4. Based on the data from the table, it is drawn the corresponding graph.

In the following sequence of didactic activity, each group shall present by an representative the obtained results. Since the working tasks required by the same working sheet have been solved by two subgroups, the teacher will nominate a student from the first subgroup to establish and write in the table on the blackboard the mean values obtained from the data recorded by the both groups, and a student from the second group to draw the corresponding graph. The students will have to write down the overall results in their booknotes. After discussing the results from each working sheet, with the help from students, the teacher will establish the conclusions and note them in the lesson's scheme.

At the end of lesson, by heurystic conversation, the teacher and students are establishing together the importance of plant cultivation in greenhouses, where the man can assure for them optimal conditions of growing, which are essential for increasing the yields.

The correlation of empiriocentric model of education with the sociocentric one, contributes to the development of interactions between students, cooperation, team spirit and competitiveness. The combined use of these education models, by selecting and joining the most efficient methods, procedures, education means, and forms of activity for treating the lesson's theme, contributes to the increase of activization level of students within the biology lesson.

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THE COLLEGIATE CURRICULUM DESIGNING CENTRED ON COMPETENCES

PROIECTAREA CURRICULUMULUI UNIVERSITAR CENTRAT PE COMPETENȚE

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Abstract *By continuing the older preoccupations (1999, 2003), the communication has as a hypothesis the systemic-holistic paradigm of school curriculum. The systemic approach consists of the analysis of the objectives, processes and phenomena as a whole; they are composed of interdependent subsystems in the process of their formation and manifestation as functional structures and systems.*

From a systemic view, the school curriculum signifies the experience which the school reveals it to pupils and students (objectives, contents, teaching-learning strategies, aspects and ways of organizing the learning, assessment methods and techniques). In the present article we tried to offer psychopedagogic suggestions to the collegiate teachers in order to help them designing the curriculum from the perspective of ARACIS standards.

Rezumat *Continuând preocupări mai vechi (1999, 2003), în comunicarea de față am plecat de la paradigma sistemico-holistică asupra curriculumului şcolar. Abordarea sistemică constă în analiza obiectelor, proceselor şi fenomenelor privite ca un tot, ca un întreg, formate din subsisteme interdependente, în procesul de formare şi de manifestare a lor ca sisteme şi structuri funcționale.*

Din perspectivă sistemică, curriculumul şcolar semnifică experiența pe care şcoala o pune la dispoziția elevilor şi studenților (obiective, conținuturi, strategii de predare-învățare, forme şi moduri de organizare a învățării, metode şi tehnici de evaluare). Am încercat în comunicarea prezentă să oferim sugestii de ordin psihopedagogic cadrelor didactice universitare în proiectarea curriculumului din perspectiva standardelor ARACIS.

MATERIEL ET METHODE

Le curricuum universitaire: considérations générales

Le curriculum est un concepte-clé de la pédagogie contemporaine (J.C. van Bruggen), consacré en pédagogie par les contributions des Américains J. Dewey, F.Bobbitt et R.W. Tyler. Notre communication tente de clarifier les fondements psychopédagogiques de la projection du curriculum universitaire dans la perspective du management de la qualité (les critères ARACIS).

RESULTATS ET DISCUSSIONS

La perspective systémique holistique sur le curriculum

L'approche systémique consiste dans une méthode d'analyse des objets, des procès et des phénomènes comme un tout, composés de sous-systèmes interdépendants, dans le processus de formation et de manifestation comme des systèmes et des structures fonctionnelles.

D'autres auteurs (dont nous mentionnons Tyler, D'Hainaut, Văideanu et Rassekh, V. De Landsheere) envisagent la multitude des composantes des processus d'apprentissage, leur articulation en vue de la réalisation des finalités éducationnelles. La théorie du curriculum-souligne-t-on dans un ouvrage publié par UNESCO-„prend en considération le procèssus éducatif, les événements qui se passent en classe", „elle accorde une attention particulière à l'étude et à la mise en valeur des interactions entre les composantes de ce processus: objectifs, contenus, méthodes d'apprentissage, moyens didactiques, formes d`organisation de l`apprentissage, méthodes et techniques d'évaluation." (Rassekh S., Văideanu G., 1987, p. 136).

La théorie et la méthodologie du curriculum suppose une vision globale sur le procès d'enseignement, vu comme un ensemble de composantes (sous-systèmes) rationnellement organisées, par lesquelles est assurée la réalisation des objectifs éducationnels anticipés.

L'approche systémique holistique du curriculum comporte plusieurs avantages: elle permet une vue d'ensemble sur le processus d'enseignement, tout en rendant possible la connaissance approfondie du fonctionnement du système, et, à partir de là, sa transformation; elle permet une analyse théorique, ainsi que pratique-actionnelle de réalisation de la réforme du système; c'est un instrument de gestion rationnelle et créative des activités d'enseignement-apprentissage et d'évaluation (par l'intermédiaire du management stratégique); elle assure le contrôle des variables, surtout de celles indépendantes (par exemple, la qualité de l'instruction); elle aide l'enseignant dans la projection et la réalisation de la démarche didactique (comme un reflet *in micro* du macrosystème) etc.

La transposition didactique - de la science savante au curriculum évalué

Le milieu universitaire est créateur de science avancée, ainsi que de curriculum formel, qui est enseigné aux étudiants dans l'effort de formation initiale, dans la perspective des exigences de la société postmoderne. Cette démarche de sélection et de réalisation du curriculum universitaire s'appelle transposition didactique (tab.1)

Table 1

Typologie de la transposition didactique

Types de TD	Résultats	Caractéristiques
TD externe	*La connaissance savante*	• Un objet de recherche distinct ; • Une logique distincte ; • Résultat de l'université et/ou de la recherche;
	Curriculum formel	• Résultat d'une démarche interdisciplinaire sur la connaissance savante; • Critères de sélection(comme des filtres axiologiques) ; • documents officiels (plan d'enseignement, programmes scolaires, etc.) ; • assurance de la cohérence de la démarche éducative; • une partie est obligatoire (tronc commun) et une partie du curriculum est au libre choix des étudiants ;
TD interne	*Curriculum réel (enseigné)*	• la manière dont le curriculum formel prend vie; • l'enseignant propose aux étudiants des démarches différenciées;
	Curriculum assimilé (appris)	• l'effort actif des étudiants afin d'assimiler les contenus, afin de se former des compétences et des aptitudes;
	Curriculum évalué	• l'objectif des différentes évaluations (internes et externes); • ont pour but de régler la qualité du curriculum ;

La compétence ou la métaphore de la mobilisation des ressources du sujet

La définition des compétences peut être réalisée aussi d'une manière métaphorique (le transfert des connaissances ou la mobilisation des ressources du sujet à un moment donné) (Perrenoud Ph., 2002, *in* Dolz J., Ollagnier E., Éds , p. 45). La métaphore de la mobilisation met l'accent sur l'activité du sujet, qui implique „un *ensemble d'opérations mentales complexes*, qui en les connectant aux situations, *transformant* les connaissances plutôt qu`elles ne les déplacent." (*ib.*, p. 46) La métaphore de la mobilisation suggère une „orchestration, une coordination des ressources multiples et hétérogènes" du sujet, une recombinaison permanente de ces ressources (Perrenoud Ph., 2002, *op.cit.*, p. 56). Allal a proposé un réseau de composantes (dimensions) qui interviennent dans une compétence: cognitives, affectives, sociales et sensorielles-motrices. (*ib.*, p. 13, 80-82)

Table 2

Les composantes d'une compétence (Allal)

Les composantes d'une compétence
Composantes cognitives: • *Connaissances* ➢ Déclaratives- règles, faits, lois, principes (connaissances) ; ➢ Procédurales (aptitudes- savoir-faire) ; ➢ Conditionnelles (contextuelles), qui permettent au sujet de choisir à un moment donné une certaine stratégie, une certaine démarche, de s'engager dans une certaine action. Ces connaissances sont responsables du transfert de l'apprentissage (Tardif, 1992). • *Métaconnaissances et règlements métacognitifs*.
Composantes affectives: Attitudes, motivations …
Composantes sociales : Interactions, concertations…
Composantes sensorielles-motrices : Coordinations gestuelles…

Une compétence „se construit toujours par l'intermédiaire d'un apprentissage en situation ce qui implique le rapprochement non seulement des connaissances et du *savoir-faire, mais aussi des modes d'interaction et des instruments valorisés dans le contexte du problème."* (Allal, pp. 81-82)

Compétences générales et spécifiques-le fondement du curriculum universitaire

Selon le degré de généralité, V. et G. De Landsheere classifient les objectifs en: objectifs généraux (les finalités et les buts de l'éducation); objectifs à niveau intermédiaire d'abstraction (spécifiques); objectifs concrets (objectifs opérationnels) (1979, pp. 25-26). De notre point de vue, les objectifs généraux devraient se retrouver dans les documents de programmation stratégique du Ministère de l'Education et de la Recherche, ainsi que dans ceux des universités.

Les objectifs intermédiaires (spécifiques) représentent un pont entre les objectifs généraux et les objectifs concrets (opérationnels), entre les premiers et l'action quotidienne. Les objectifs intermédiaires sont spécifiques à chaque discipline d'enseignement, à l'intérieur de chacune d'elles, à chaque unité d'apprentissage. Le Curriculum National a introduit dans les programmes scolaire les objectifs cadre/les compétences générales et les objectifs de référence/les compétences spécifiques. Le curriculum universitaire doit préciser les compétences générales d'un programme d'étude, ainsi que les compétences spécifiques d'une certaine discipline d'un programme d'étude. Nous donnons ensuite quelques exemples de compétences de la pédagogie (du I^{er} module de formation initiale):

Table 3

Exemples de compétences de la discipline pédagogie

Compétences générales	Compétences spécifiques
Initiation des étudiants aux fondements de la problématique de la formation initiale comme enseignants du préuniversitaire	1. Explication du rôle du facteur éducationnel dans la constitution de l'individu dans la société 2. Explication, dans une perspective systémique, de la structure et de la fonctionnalité du procès d'enseignement, en mettant en évidence la place et le rôle des principales composantes dans le fonctionnement efficace du processus d'enseignement; 3.Formation de compétences du type actionnel concernant le déroulement de situations didactiques spécifiques aux disciplines de spécialité.

Les objectifs opérationnels ont un caractère concret et ils sont réalisés dans différentes situations d'apprentissage (la classe ou en dehors d'elle). Exprimer un objectif d'une manière comportementale suggère à l'enseignant, ainsi qu'à l'apprenant, la voie à suivre, tout en lui fournissant aussi des critères concrets d'évaluation de l'efficacité de la démarche éducative. Les objectifs concrets aident l'enseignant à concevoir un projet éducatif adéquat à une certaine situation concrète.

A partir du critère comportemental, on a élaboré plusieurs techniques d'opérationalisation, les plus connues étant celles de Mager, D`Hainaut, De Landsheere).

Table 4

Technique de Mager d'opérationalisation des objectifs

Comportement	Conditions	Critère de performance
L'étudiant doit expliquer le caractère systémique du processus d'enseignement,	à l'aide du schéma donné,	En notant dans la fiche-outil les avantages de l'approche systémique , en 10 min.

D'autre côté, tous les objectifs ne peuvent pas être opérationalisés. C'est pourquoi, en dehors du critère de performance (comportemental), il faut en utiliser un autre: le critère de la **compétence**.

CONCLUSIONS

(1) En valorifiant les éléments de la méthodologie de la science contemporaine, ainsi que les contributions de spécialistes renommés de la pédagogie (Tyler, D`Hainaut, George Văideanu), nous avons proposé le paradigme systémique-cibernétique sur l'education, que nous avons particularisé dans la présentations des fondements du curriculum.

(2) Dans ce paradigme, le curriculum scolaire est compris comme un ensemble de sous-systèmes indépendants (Văideanu, 1988; Stanciu, 1999, 2003) qui envisagent la focalisation de la démarche éducative sur les besoins et les intérêts de l'apprenant (J. Dewey, 1902, trad. rom., 1977).

(3) Les implications de cette perspective systémique sur le curriculum scolaire peuvent être mises en évidence dans l'effort de projection de la réforme curriculaire, dans sa mise en œuvre, ainsi que dans le processus de réglement de la fonctionnalité de chaque composante séparément, et du procès dans son ensemble.

(4) Nous considérons que ce paradigme systémique-cibernétique doit représenter le fondement du processus complexe de formation initiale et contunue des professeurs des écoles et de tous les autres enseignants.

(5) De même, nous considérons que les universités devraient organiser des cours de formation continue destinés aux enseignants du système universitaire, afin de les familiariser avec la problématique de la pédagogie universitaire. Il ne faut pas oublier que l'AIPU organise chaque année un congrès consacré à la formation continue. (Montreal, 2007).

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THE LIMITATION OF THE BUDGETARY BONDS

PRESCRIPȚIA OBLIGAȚIILOR BUGETARE

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Abstract. *The extinctive limitation represents a sanction that involves the extinction of the right of a suit, that has not been exercised within the term of the limitation that law stipulates. It is against the passivity of the one who has the subjective right and its aim is to remove the uncertainty in the juridical relations and to ensure the stability of them. The Romanian Constitution stipulates the same juridical protection for the public and the private property, that's why the legislative measures should converge to this equality in treatement. The Code of fiscal procedure stipulates a longer term of limitation of 5 years then the common one (3 years), expanding in this way the interval for the protection of the budgetary rights of the state.*

In the matter of the budgetary bonds, the Code of fiscal procedure stipulates a longer term of limitation- of 5 years-than the one from the common right (3 years), expanding in this way the perioud for the protection of the budgetary rights of the state.

The subjective civil rights are protected in principle through the law suit, but using this way to protect a civil right is up to some conditions and it is limited by the law.

The perioud of time when a natural person or a corporate body can capitalize a civil right through coercion by practicing a law suit is confined by the extinctive limitation.

Therefore, the extinction of the right to a law suit, which is not exerted in the perioud established by law reflects the notion of *extinctive limitation.*

The lack of protection for the right which is not exerted in the perioud established by the law is reflected in a sanction for the owner of that right, caused by his guilt of being passive.

The extinctive limitation is a civil sanction that contributes to the protection and the reinforcement of the legislation, having in the same time a role to punish the inactive creditor. We will see that this "negligence" is protected in a different way when we speak about the public or the private property.

The Romanian Constitution stipulates in art.44 (1) that "The right of property, as well as all the debts on the state are guaranteed" and in the second paragraph "The private property is guaranteed and protected in an equal way, no matter the holder". Art.136 in the second paragraph sais the same thing about the public property, but in the next paragraphs the protection is expanded through its "inalienable" and "inviolable" character.

Considering that we are speaking about budgetary bonds, the budget being a public one, that means that the budgetary rights are also public and protected through a extinctive term, a perioud of time when these can be gathered through a constrained execution.

After the year 1989 there were endorsed some normative papers, usualy decisions, that established different terms of extinction than those from Decree nr.167/1958 concerning the extinctive limitation, and also different between them, terms of extinctive limitation that were longer than those from the common right.

In the Code of fiscal procedure-OG.nr.92/2003-art.128 paragraph one stipulates: "the term for the constrained execution of the fiscal bonds is banned by limitation in 5 years, starting from 1.01 in the next year after this right has been born".

We can see that Decree ar.167/1958 established different terms of limitation: for the juridical relations between socialist association the term is of 18 months, for the juridical relations concerning the ensurance, the term is of 2 years, and there are some other terms that are less than 18 months or 2 years.

If the Code of fiscal procedure stipulates a term of 5 years for the constrained execution of the budgetary bonds, we come to the conclusion that the sanction of the limitation follows the debtor a longer perioud of time and also allows a prolongation of "the negligence" for the authorities that control the finances.

We consider that the legislator has granted a longer term of limitation for the public property, and as a result, a better juridical protection to it.

The Code of fiscal procedure, along with the longer term of limitation for the public property, also grants more cases of suspension or interruption of the limitation, probable for the same reason.

So, the suspension of the limitation's course can happen in other cases too, different from those stipulated by Decree nr.167/1958:

- everytime the instance orders so;
- during the perioud of advantageous conditions given by the law;
- if the debtor hides his goods from the constrained execution.

Concerning the effects of the extinctive limitation for the fiscal bonds, The Code of fiscal procedure stipulates in art.131 that „if the authority of execution finds that the term of extinctive limitation of the right to ask for constrained execution is completed, then it will stop all the measures of accomplishment and will deduct those from the analytic evidence held for the debtors".

The Code of fiscal procedure does not stipulate provisions concerning a problem of the restoring in the term of extinctive limitation, when there are wellgrounded reasons to do so.

Although Decree nr.167/1958 stipulates specifically in art.22 that the bonds owed to the state are under special laws, we say that as long as the Constitution „protects and guarantees" the property in the same manner, the protection measures should be the same.

For a future reglementation there should be an unitary sistem concerning the term of extinctive limitation, considering The Constitution which is the fundamental law of the country. Only in this way there can be avoided arbitrary, confused or damaging interpretations.

CONCLUSIONS

The extinctive limitation is an important institution that helps in removing the uncertainty in juridical relations and also protects the civil rights. The terms of extinctive limitation are stipulated in Decree 167/1958 concerning the extinctive limitation, but also in other special normative papers.

The Code of fiscal procedure stipulates a longer term of extinctive limitation(5 years instead of 3) in the relation with the state, concerning the budgetary bonds, expanding the right of the state through coercion to achieve his fiscal rights. This is a violation of the Constitution that should protect both private and public property in the same way. A future reglementation should take into consideration this aspect and settle a unitary sistem for the both forms of property.

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THE MONTHLY SUPPORT STIPULATED BY LAW NO.578/2004-A LEGAL BENEFIT FOR THE SURVIVOR SPOUSE

AJUTORUL LUNAR PREVAZUT DE LEGEA NR.578/2004 -BENEFICIU LEGAL ACORDAT SOȚULUI SUPRAVIEȚUITOR

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Abstract. *Our legislation stipulated along the time some successional rights and also benefits for the survivor spouse, taking into consideration the idea that after the death of one spouse, the other one should have almost the same living as he/she had before. The Law nr.578/2004 concerning a monthly payment for the survivor spouse, although is not yet operative has raised already arguments and discriminations between different categories of pensioners, being more a social measure, a help from the state, because the right to a pension is and should remain in person*

The length of service, in the sense of general seniority in activity is an important source of rights for each person who is appointed. The right for a pension is the principal form of material ensurance in case of invalidity, old age, or loss of the upholder.

For the survivor spouse the legislator dedicates some successional rights through Law nr.319/1944 (a right to inherit when he/she competes with any class of the legal heirs, and a special right to inherit all the mobile goods that belong to the domestic household, the wedding gifts and a temporary right to occupancy, all this when there is no relative from any class of heirs) but also other benefits and legal rights stipulated in legislation.

Law nr.19/2000 concerning the public sistem of pensions and other rights of social ensurances stipulates in the art.67 the right to the pension for the successor-the survivor spouse for the rest of his/her life, when he/she has the age to be pensioned off, only if the perioud of the marriage is at least 15 years, but also in case of invalidity-rank I or II while it lasts, no matter the age, if the perioud of the marriage is minimum 1 year. The establishing of the rank of invalidity for the survivor spouse in order to get the pension as a successor can be made no matter her/his age. The survivor spouse is being examined and a medical revison is being made from time to time, and he/she has the obligation to follow all the programs for a good recovery, respecting the same rules as for the pension of invalidity. The pension as a succcessor for the survivor spouse is granted no matter the age

and the perioud of marriage if the demise of the upholder spouse happened because of an accident at work or a professional illness and he/she does not have monthly incomes from a professional activity for which the ensurance is compulsory or these are lower then ¼ from the average gross salary on the economy. In the case these conditions are not accomplished, the survivor spouse has however the right at the pension as a successor, but only temporary, for a 6 month perioud, in case he/she does not have monthly incomes from a professional activity for which the ensurance is compulsory or these are lower then ¼ from the average gross salary on the economy.

The Law nr.578/2004 concerning the monthly support for the survivor spouse has raised some arguments, allthough the provisions from this law will be valid starting from 2008, on a date established by the government. Art.1(1) from this law stipulates: "The survivor spouse of a person who had at the time of the demise, the position of a pensioner in the public sistem of pensions and other rights of social ensurances, in the former sistem of the social ensurances from the state, or in the former sistem of the social ensurances for the farmers, can benefit at his/her request, according to this law, of a monthly support of 25% from the pension of the spouse who passed away".

This monthly support can be granted to the survivor spouse only if he/she has the standard age to get retired stipulated in Law nr.19/2000 and the perioud of marriage has been at least of 15 years. In the case when the marriage lasted less then 10 years, the survivor spouse can not benefit from this support, but if the perioud of marriage has been between 10 and 15 years, the amount of the support will be decreased proportionally.

The right to a pension is a personal one, which is earned after completing a length of service and after paying the dues. The amount of the pension is established by taking into consideration some parameters: the years of effective work, the job eyeryone has after specialization and improvement classes, the difficult conditions that need to be endured when working, and so on.

As a benefit for all the work during the years, everyone has a private right to a pension, which is a personal and an unnegociable one. The support stipulated by Law nr.578/2004 is a legal benefit for the survivor spouse, in order to have at least a part of the living posibilities he/she had over the years with his/her spouse that died. This way we belive this law creates some discriminations between the posibilities given to different categories of pensioners, while same law remains lacunary about some other aspects too: what happens with the survivor spouse if the perioud of

the marriage was about 10 years, not 10 years completed, or after 10 years of marriage the couple got a divorce, and after that one of them dies?

There is a draft law that is about to change Law nr.578/2004, which stipulates that this monthly support should have a fixed amount of 34 RON or 90 RON (depending on the modality to establish the pension- according to Law nr.19/2000 concerning the public sistem of pensions and other rights of social ensurances or established in the former sistem of the social ensurances from the state, and also in the former sistem of the social ensurances for the farmers, or a pension established only in the former sistem of the social ensurances for the farmers).

This provision has a fair effect: all the pensioners can benefit in an equal
way from the legal support and there can be no discriminations when granting this support by the state. In this case, the pension remains a reflection of all the efforts endured during all the years of working, and this financial support increases equaly the posibilities of living of all the categories of pensioners.

CONCLUSIONS

In our legislation the survivor spouse has a privileged position and a definite condition. He/she has some legal rights and benefits that are stipulated in few normative documents: Civil Code, Law nr.319/2944, Law nr.578/2004.

The pension is a reflection of personal efforts in all the years of working and should remain the same about its personal carácter. This right should be an unnegotiable one and granted as long as every person lives. His/her survivor spouse as a succesor should not benefit of it, because this is a provision that can stirr discrimination among all the categories of pensioners.

The survivor spouse can have a monthly payment as a support from the state through different laws, to improve the posibilities of living, but this should not be related to enyone'pension.

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THE ACCEPTANCE AND THE REPUDIATION OF THE LEGACIS

ACCEPTAREA SI REPUDIEREA LEGATELOR

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Abstract. *The Civil Code stipulates that no one can be forced to accept an inheritance, but in the matter of the legacy there is no special disposal concerning the acceptance or the renunciation at the legacy. In this case the common right will be applied. In the juridical literature there are arguments concerning the application of the art.701 from The Civil Code (about the change of mindeover the renunciation at the inheritance) in the matter of the legacy, and as well about the possibility to accept the legacy "pro parte".*

The institution of the representation that we find in the matter of the legal inheritance has no application in the matter of the will. Because of that it couldn't be avoided the cases of the caducity of the will.

The Civil Code stipulates no special provision concerning the acceptance or the renunciation of the heir concerning the legacy left in his favor. Thus, where the law does not stipulate special rules, the common right will be carried out. The rules concerning the acceptance or the renunciation of the inheritance will be carried out for the legacy only when the rules are according to the common right. When they will be an exception from the common right they will not be applied anymore for the acceptance or the repudiation of the legacy**.**

As in art. 686 Civil Code is being stipulated "Nobody is obliged to accept the inheritance that is right for him". This way the heir can not be obliged to accept his legacy against his will either. Hei s free to make his option only after the death of the testator, when the will is going to be opened, before that his option having only the significance of an agreement concerning a future inheritance, which is specifically prohibited by law.

Art. 689 which stipulates the way the specific acceptance of succession (in written) will be carried out is not applied to legacies being derogated from the common right. The acceptance of the legacies can take place under any circumstance thought, even orally. This way the demand of the heir concerning the handing of the legacy from the other heirs or the fact that he makes final actions as an owner, involves the heir's unspoken

consent. Until the heir finds out about the legacy we can't talk about unspoken consent, because the intention of accepting can not exist without knowing the right of acceptance.

To renounce at the legacy is not related with a certain ceremony, therefore the renunciation can itself be expressed or unspoken. The renounciation at the legacy is an unilateral act, that is why it will have *erga omnes* effects; if this is made through a convention, it will only have an effect between the both sides.

In practice a question was raised: whether a legacy under condition can be accepted or given up, before the condition left by the testator is fullfield. Considering that the legacy affected by such a modality can be the subject of a convention, so that the heir can yield it, this implies first the acceptance, which is as well affected by the condition.

Concerning art 701 ("While the limitation of the right to accept is not obtained against the heirs who renounced to it, they still have the capacity to accept the inheritance, if it is not accepted by other heirs. The right of other people who obtained on inherited goods can't be damaged, or by limitation, or by other acts, that were made by the trustee of the vacant inheritance".) there was a controversy in the juridical -literature about whether this provision is applied or not to the testamentary heirs as well. Some writers consider that this provision can not be applied to testamentary heirs so they don't permit them to have them changing their minds upon the renunciation of the legacy.

Others (who's opinion we sustain as well) consider that the testamentary heir as well as the legal heir can reconsider his renunciation, as long as the legacy was not accepted by other heirs or by other subsidiary heirs, the rule stipulated in art 701 being an equal one. If there were no heirs to get the inheritance through the accretion right by the renunciation of the heir, the inheritance will still be vacant this if we don't apply, through resemblance, the provision of art.701 Civil Code. The heir that reconsiders his renunciation has to subdue to the limitation term of the successional option.

Differently of the renunciation, the acceptance is irrevocable and the heir can not renounce once he has accepted the legacy, except the case when his consent has been corrupted through error, cunning or violence or he didn't have the capacity required by law to accept it. We have to keep in mind that each time the will has not been made freely and consciously the acceptance will have no juridical value.

Both the acceptance and the renunciation to the legacy can't be made "*pro parte*" meaning it can't be accepted or denied only parts of the legacy. Some authors admit this possibility, but only when the legacy is

divisible. If the same person has received more then one legacy, the heir has the freedom to accept some and renounce to others, except the case when the testator has specifically considered the many legacies as one.

A difference between the acceptance of legal inheritance and the legacy is the representation institution. The legal inheritance allows this possibility while in the testamentary matter the heir can not be represented. If he dies before the testator, the legacy will become flimsy and it will not be given to his successors anymore. For this situation for future settlement, the legislator could reconsider the provisions considering the matter of the representation, and apply this institution in the testamentary matter as well, to avoid this way a case of the caducity of the legacy and even the vacancy of the inheritance.

There can be cases when the heir can decline a legacy and this by damaging his debtors. In this case the provisions of art 699 Civil Code will apply to this. "The creditors of someone who renounce in their damage can take an authorization from the justice in order to accept the succesion for their debtor, in his place. In this case, the renunciation is canceled only in favor of the creditors and only in the behalf of their debt.

The acceptance is not being made in behalf of the heir who renounced". Art.699 represents an application of a general principle-the revoking action-which must be taken into consideration in the case of the creditors of the testamentary heir too, who may have a successional option to defraud them. They can accept the legacy in heir's name in case he renounces in their detriment, only if this renunciation was not made from purely personal reasons.

Some discussions were stirred also by art. 897 Civil Code, which specifies that the universal heir or the heir of a fraction of the inheritance, can not get the legal goods he inherited unless he makes a previous inventory of them.

The heir who does not this inventory will be obliged to pay the debts of the inheritance *ultra vires hereditatis.* D Alexandresco considers that the intention of the testator was in this meaning to assimilate the heirs(legal or testamentary) in the same procedure, even if it was not repeated in the art 897. As others have agreed, we ourselves consider that the heir's obligation is limited *intra vires emolumenti* only if an inventory is made, as stipulated in art. 897, without any declaration as it is required in the case of the legal heir.

CONCLUSIONS

In the matter of the legacy there are no special disposals concerning the acceptance or the renunciation at the legacy, so in this case the common right will be applied. Both the acceptance and the renunciation at the legacy do not involve a special solemnity and there are some resemblances and differences between acceptance and renunciation at the legal inheritance and the testamentary one

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THE PRACTICING OF A SUIT CONCERNING THE NULLITY OF THE WILL AND THE ELIMINATION OF THE NEGATIVE EFFECTS OF THIS SANCTION

EXERCITAREA ACȚIUNII ÎN NULITATEA TESTAMENTULUI ȘI ÎNLĂTURAREA EFECTELOR NEGATIVE ALE ACESTEI SANCȚIUNI

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Abstract. *The nullity causes of the legacy are those from the common right and some that are specific to the testamentary matter. Concerning the legacy we exceptionaly find here the application of the art.1167 Civil Code from the donation contract, that allows the confirmation, the ratification and the voluntary performing from the heirs of a will that is null because of some form vices. We can see that in this cases the wish of the testator and the heirs is even above the legal provisions.*

The juridical system of relative and absolute nullity of the legacy is the one from the common right. If the will contains more disposals and if one or only few of them are null, then the rest of the will is considered valid and will be carried out as it is.

After testator's death the nullity of the legacy can be covered through confirmation, ratification or voluntary implementation, made with self knowing (according to art 1190 Civil Code), by those who might get some benefit through the inefficacy of the legacy (legal heirs, universal heirs and heirs with universal title).For legacies are also applied the provisions of art. 1167 Civil Code concerning donations which sais: "the confirmation or the ratification or the voluntary implementation of a donation, made by the heirs or the people representing the donor, after his death, takes place for the renunciation concerning the form vices, as well as for any other exceptions".

The heirs can carry out the legacy from a null will for form vices, verbally worked out or by conjunctive will. If there are more heirs, the act confirming the nullity of a legacy will affect only those who have consent the confirmation, and the person benefiting from the confirmation will capitalize only the right that the heir who confirmed the legacy has.

The heirs can confirm through exception a null will for the lack of form in two cases: when they know the nullity, the deficiencies of a will, but they let it be carried out, and when by ignorance they do not know the deficiencies of the will, and this is being carried out.

They can not attach the imperfect will if they have allready carried it out, or they have expressly or unspoken approved it and they have known the deficiency which would have motivated its repealing. As we can see in this situation the acts and the will of a person are in some cases stronger then the rules and the provisions of law. In spite of this, the ratification or the confirmation of a will doesn't cover the nullity that derives from the inclusion of a prohibit part in that will.

Considering the possibility of confirmation or ratification of a will that is considered null we believe that the act of confirmation from the heirs who are justified to carry out the nullity looks more like an act born into their own person and not a benefit from the testator himself, which has not followed the validity provisions required by the valid existence of the will.

There is another problem to solve: which is the time limit of silence or lack of action from the heirs that equals to the free willingly and unspoken renunciation? When the heir alone carries out the will, this is equl with renunciation. If the legacy is owned by the heir, some authors apply the general prescription term of 30 years related to the confirmation from the legal heirs.

But as the legacies are creating an effect starting the moment of opening the inheritance, the limitation 18 months term, stipulated in art.9(2) from The Decree nr.167/1958 concerning the extinctive limitation, will begin since the opening of the inheritance and not since the will was worked out.

The testator himself can not confirm a will that is considered null. An eventual confirmation from his part does not equals with the validity of the will but with a new will. From this we understand that the testator can avoid the nullity of the first will just by remaking it and this time by following all the validity prescriptions. We can not apply to it by resemblance the stipulations of art 1167 Civil Code.

According to the common right, concerning the prove in this matter, the one who sues the nullity will have to prove a current and inborn interest. For example it will not be accepted the law suit of the legal heir or of the universal heir or of the one with universal title, if by repealing the legacy they will not receive more anyway.

Those who have been excluded from the will, or those who can ask the recognition of the legacy's caducity may be interested by the nullity law suit. But if there are two wills by which the heirs are removed from the inheritance, in a case of the nullity law suit, this could be rejected by the instance for lack of interest, because the testator has proven by the two wills that he does not want them to benefit from his goods.

We can also ask ourselves if concerning the nullity of the will the testamentary heir can invoke any interest. Generally, he is the one benefiting from the will and has a pure passive defensive position. His interest is to obtain the goods left to him by the testator in his favor, not to invoke the lack of validity of the will. But there are cases, when the testamentary heir can be troubled in the use of the goods he received from the testator, and this situation must be changed, usually by using the possessory actions. This way the legal heirs are forced to pronounce themselves over the validity of the will.

CONCLUSIONS

In the testamentary matter the cases of nullity are those from the common right, but there are some specific for the will, which must be made according to his nature and form, like: the lack of the form, the incapacity to make a will or to receive the goods from the inheritance, the conjunctive will, and so on.

There are cases when the law suit concerning the nullity of the will can remain without any effect, when the legislator allows the wish of the testator and his heirs to be above any legal stipulations in the testamentary matter. The legislator can not be more cautious then the heirs themselves; if they want to respect the will of the testator although it didn't follow all the legal rules to express it, then the law can not do anything about it.

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COMPTES DE PATRIMOINE – PART INTÉGRANTE DU SCN

CONTUL DE PATRIMONIU – PARTE INTEGRANTĂ A SCN

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Abstract. *The System of National Accounts consists of an integrated set of macroeconomic accounts, balance sheets and tables based on internationally agreed concepts, definitions, classifications and accounting rules. Together, these principles provide a comprehensive accounting framework within which economic data can be compiled and presented in a format that is designed for purposes of economic analysis, decision-taking and policy-making. For an institutional unit or sector, the balance sheet provides an indicator of economic status - i.e., the financial and non-financial resources at its disposal that are summarized in the balancing item net worth. For the economy as a whole, the balance sheet shows what is often referred to as national wealth - the sum of non-financial assets and net claims on the rest of the world. Balance sheets measure the values of stocks of assets or liabilities and are typically compiled at the beginning and end of the accounting period. The total value of the assets owned by an institutional unit or sector minus the total value of its liabilities is described as its net worth.*

La comptabilité nationale est une technique statistique donnant une vision synthétique et macro-économique de l'économie nationale. En tant que technique statistique, la comptabilité nationale recueille non sans complexité, des données sur l'activité économique du pays à partir de sources statistiques plus ou moins identifiées ou fiables. En outre, elle résume en quelques chiffres toute une multitude de transactions élémentaires effectuées entre les acteurs microéconomiques, en regroupant : en grandes catégories, appelées secteurs institutionnels ou branches, les acteurs et produits; en opérations, les transactions élémentaires réalisées, d'où la vision synthétique et macroéconomique de l'économie nationale, que la comptabilité nationale est susceptible de refléter.

La comptabilité nationale joue un rôle central pour les décideurs de tous pays, quel que soit son niveau de développement, dans la mesure où elle contribue d'une manière indéniable à présenter des informations et analyses sur l'état présent de l'économie et de ces tendances, nécessaires à la prise de décisions appropriées (politiques économiques, budgets, investissements, négociations syndicales ou patronales).

Cet objectif s'est élargi, en ce sens que la comptabilité nationale est devenue l'instrument usuel des travaux structurels sur l'économie, des analyses comparatives entre pays et des travaux de prévision à court, moyen et long terme. Par ailleurs, les cadres de la comptabilité nationale constituent un instrument d'évolution et de coordination du système statistique.

La comptabilité nationale rassemble les données statistiques dans un cadre général, logique, au sein duquel il est possible de retrouver les principales données économiques, cohérentes, comparables et reliées entre elles, grâce à des définitions et des nomenclatures communes.

Son intérêt se fonde d'autant plus que les statistiques établies sur une base administrative (déclarations fiscales, balance commerciale, budget de l'Etat, prix administrés, immatriculations de véhicules) sont de qualité très variable, présentées suivant des nomenclatures différentes, des formes diverses, dans des publications dispersées.

La comptabilité nationale a développé son propre langage; elle a forgé ses propres définitions exactes, consistantes et cohérentes de tous les concepts afin de pouvoir arriver à tirer ces résultats de l'importante masse de données caractérisant les activités économiques d'une nation. De ce fait elle a une influence théorique considérable sur le domaine économique. Le système de comptabilité nationale a pour but de décrire un circuit économique car la représentation que se donne la comptabilité nationale de la réalité économique est celle du circuit. Le circuit économique le plus simple décrit comment les entreprises créent simultanément des biens et des services (flux réels) et des revenus (flux monétaires). Ces revenus sont perçus par les ménages en échange des facteurs de production (travail, terre ou capital) qu'ils ont fournis aux entreprises et qui constituent un flux réel. Les ménages dépensent leurs revenus et achètent sur le marché des biens et services, produits par les entreprises.

Tout individu accomplit chaque année des milliers d'actes économiques. Etant impossible de traduire l'activité économique diversifiée des milliers de résidents d'une nation, la comptabilité nationale a regroupé tous ces actes en grandes catégories selon la fonction économique principale accomplie; ces centres de décision ainsi regroupés sont dits "**secteurs institutionnels**":

- entreprises: elles produisent des biens et services vendus sur le marché
- ménages: ils consomment les biens et services achetés sur le marché
- les administrations publiques: elles fournissent des services collectifs gratuits et redistribuent le revenu national
- les institutions financières et société d'assurances
- les institutions privées sans but lucratif (IPSBL)
- le reste du monde

Il existe trois grandes rubriques d'opérations qui regroupent les innombrables actes économiques accomplis chaque année :

- opérations sur biens et services
- opérations de répartition
- opérations financières

L'introduction dans le SCN 1993/SEC 1995 de **comptes de patrimoine** (patrimoine économique) autrement que pour mémoire n'est pas liée directement au développement et aux transformations du monde financier. C'est l'aboutissement d'un long processus de maturation jalonné par l'introduction

progressive de tels comptes dans la plupart des grands pays développés et, plus généralement, par l'extension des comptes nationaux à travers le monde. Cependant le développement de l'épargne et de la financiarisation des économies et ses conséquences sur les niveaux et les structures des patrimoines ont poussé fortement dans le même sens. Beaucoup de pays s'étaient contentés jusqu'alors du calcul de stocks de capital fixe destinés, notamment, aux études de productivité.

D'une manière générale, la comptabilité nationale, vue du côté de ses producteurs comme de ses utilisateurs, avait reposé pendant les décennies précédentes sur une séquence de comptes tronquée n'allant pas plus loin que le compte des opérations financières. Le nouveau système lui substitue une séquence complète.

L'introduction des comptes de patrimoine a rendu nécessaire un approfondissement de la structure et du contenu des comptes. Cette structure comprend à partir de ce moment les comptes courants, se terminant par l'épargne, les comptes d'accumulation et les comptes de patrimoine (bilans). L'innovation la plus intéressante a été la création de deux comptes d'accumulation supplémentaires, par rapport aux traditionnels comptes de capital [non financier] et compte financier. Il s'agit, d'une part, d'un compte de réévaluation, destiné à enregistrer les gains ou pertes de détention résultant des variations de prix des actifs et des passifs existants. On a, d'autre part, un compte, dénommé faute de mieux „compte des autres changements de volume des actifs", qui reprend, entre autres, les conséquences économiques d'événements politiques (par exemple les saisies sans contrepartie) ou de catastrophes naturelles ou technologiques, ou encore les effets de phénomènes économiques non anticipés comme l'obsolescence imprévue. Le point essentiel à noter est que les flux enregistrés dans ces deux nouveaux comptes d'accumulation n'entrent pas dans la détermination des résultats des comptes courants tels que la valeur ajoutée, le résultat d'exploitation, le revenu disponible ou l'épargne. Leur existence va enrichir et faciliter nombre de discussions ultérieures, mais aussi faire apparaître beaucoup de difficultés.

Les comptes de patrimoine font partie intégrante du Système de Comptabilité Nationale. Ce système permet en effet de décrire, dans un cadre complet, les flux économiques, mais aussi la constitution de stocks (encours). Les comptes de patrimoine et de variations de patrimoine permettent de rendre compte de l'état des encours d'actifs et de passifs détenus par l'économie nationale à un moment donné, ainsi que leur modification chaque année par les flux économiques.

Les comptes de patrimoine, plus qu'un simple ajout aux comptes de flux, constituent une dimension essentielle d'un système de comptabilité nationale. Ils permettent d'en renforcer la cohérence d'ensemble en rassemblant et en appliquant des traitements homogènes à des estimations jusque-là dispersées, ceci grâce à un cadre complet, équilibré et homogène du fait de l'utilisation des mêmes définitions conceptuelles, des mêmes méthodes de valorisation, des mêmes nomenclatures de secteurs et d'opérations que dans les comptes de flux. Ils

permettent également d'élargir et d'enrichir la représentation des phénomènes économiques.

Ainsi, ils offrent la possibilité de tester ou vérifier les théories économiques qui établissent des liens entre les variables patrimoniales et des comportements de consommation et d'épargne en incluant la prise en compte d'„effets de stocks".

L'introduction des comptes de patrimoine rend l'ensemble du cadre centrale d'autant plus cohérent qu'elle implique l'établissement de liens forts entre les flux et les encours successifs de périodes consécutives : les valeurs de la fin d'une période donnent en effet le point de départ de la période suivante, fixant ainsi des contraintes aux flux de la période qui débute. Cette cohérence temporelle supplémentaire permet de construire une série d'propriété ; il se définit comme l'état des avoirs détenus et des dettes contractées par une unité institutionnelle, un secteur institutionnel ou par l'ensemble de l'économie à un instant donne. A ce principe très général se combinent des notions à caractère économique qui permettent de préciser la frontière des actifs (au sens large du terme) retenue dans les comptes de patrimoine.

En effet, selon la définition du SEC-95 (paragraphe 7.10), les actifs enregistrés dans les comptes de patrimoine sont des actifs économiques, c'est-à-dire des biens corporels ou incorporels servant de réserve de valeur sur lesquels des droits de propriété peuvent être exercés, individuellement ou collectivement, par des unités institutionnelles et dont la détention ou l'utilisation au cours d'une période déterminée peut procurer des avantages économiques à leurs propriétaires.

Par avantages économiques, on entend, d'une part, les revenus primaires (excédent d'exploitation en cas d'utilisation propre, revenus de la propriété en cas d'utilisation par des tiers) tirés de l'utilisation de l'actif et, d'autre part, le montant qui pourrait être obtenu en cas de cession ou de liquidation, montant qui inclut les éventuels gains ou pertes de détention. En particulier les comptes présentés ici s'appliquent à des valeurs marchandes accumulées. L'ensemble des éléments composant le patrimoine ne comprend donc que des actifs ayant fait - ou susceptibles de faire - l'objet de transactions.

La restriction à une conception marchande du patrimoine conduit à exclure des éléments que l'on pourrait s'attendre à trouver ou souhaiterait voir figurer dans les comptes (le capital humain, le patrimoine naturel, le domaine public naturel, les biens durables des ménages, les droits à la retraite liés au système de répartition, etc.). Cependant, un raccord simple avec les comptes de flux impose l'adoption de conventions analogues pour ceux-ci et pour les comptes de patrimoine. Il en résulte que ne doivent figurer en principe dans le patrimoine que des éléments susceptibles d'apparaître dans le compte de capital et le compte financier.

Patrimoine et valeur nette

Le solde du compte de patrimoine d'une entité quelconque, à une date donnée, est la valeur nette, qui se définit comme la différence entre la valeur de tous les actifs de cette entité et la valeur de tous ses passifs à la date considérée.

L'enregistrement se fait en effet dans les comptes de patrimoine en terme d'actifs et de passifs, alors que dans le reste du système de comptabilité nationale il se fait le plus souvent en terme de ressources et d'emplois. Les éléments constitutifs du compte de patrimoine (et du compte de variations de patrimoine) sont, à une date donnée et pour une entité donnée, les actifs non financiers ou financiers, qui correspondent aux avoirs de l'entité considérée, les passifs financiers, qui représentent les dettes de cette entité, et la valeur nette. Les actifs et passifs financiers sont issus des TOF en encours.

Parmi les éléments qui composent l'actif d'une unité, certains ne représentent aucun droit sur le patrimoine d'une autre unité (actifs non financiers), alors que d'autres en expriment un (actifs financiers). Pour que les relations entre les patrimoines des diverses unités (caractère réciproque des créances et des dettes) apparaissent dans les comptes, il est nécessaire de procéder à un enregistrement symétrique des éléments financiers. Ainsi chaque créance, au sens de la comptabilité nationale, est inscrite simultanément et pour le même montant à l'actif de l'unité créditrice et au passif de l'unité débitrice, à l'exception de l'or et des droits de tirages spéciaux. Ces deux actifs financiers sont en effet les seuls actifs à n'être la contrepartie d'aucun passif: ces deux éléments ne constituent pas réellement une dette de leurs émetteurs.

Pour l'ensemble des secteurs institutionnels résidents (S11 à S15), le total des actifs financiers n'est pas égal en général, en économie ouverte, au total des passifs financiers. Pour que l'ensemble soit complet et équilibré, il est nécessaire de considérer les opérations avec le reste du monde : une vision globale du patrimoine national est ainsi obtenue en prenant en compte les actifs financiers du reste du monde, c'est-à-dire les créances sur les résidents et les actions émises par des unités résidentes détenues par des non-résidents, et les passifs financiers du reste du monde, soit les créances sur des non-résidents et les actions émises par des non-résidents détenues par les résidents.

Le patrimoine national peut ainsi être vu comme la somme des actifs non financiers de l'ensemble des unités résidentes, majorée des actifs financiers détenus par les unités résidentes vis-à-vis des unités non résidentes et diminuée des passifs (financiers) contractés par les unités résidentes auprès des unités non résidentes. Cet agrégat correspond également à la somme des valeurs nettes des secteurs résidents.

Patrimoines et variations de patrimoine

A un compte de patrimoine, bilan à une date donnée et pour une entité donnée, sont liés les comptes de variations de patrimoine qui lui correspondent. Ces derniers ont un rôle aussi central que le compte de patrimoine lui-même puisqu'ils constituent l'articulation entre les bilans successifs de l'entité concernée. De fait, ils explicitent les différentes opérations détaillant le passage entre le bilan précédent et le bilan considéré, et entre ce dernier et le bilan à la date suivante. En effet, entre le début et la fin d'une période comptable, le patrimoine se modifie dans sa composition et en valeur. Ces modifications proviennent des opérations effectuées au cours de la période (acquisitions -

cessions d'actifs corporels et incorporels, naissance - extinction de créances et de dettes), et des variations de valeur des éléments patrimoniaux. La liaison entre le patrimoine d'ouverture et le patrimoine de clôture s'effectue au moyen du compte de capital, du compte financier, du compte des autres changements de volume d'actifs et du compte de réévaluation, qui retracent l'accumulation de la période, la consommation de capital fixe ainsi que les mouvements non liés à la production ; ces derniers retracent aussi bien les modifications patrimoniales liées aux découvertes, inventions, disparitions, transformations, transferts et autres événements imprévus (compte des autres changements de volume d'actifs) qu'aux mouvements des prix (compte de réévaluation). Ce sont ces composantes qui permettent l'articulation avec les comptes de flux. De manière plus précise, les comptes de patrimoine d'ouverture et de clôture d'un actif sont reliés par l'identité comptable fondamentale suivante:

la valeur du stock d'un actif donné dans le compte de patrimoine d'ouverture.

plus la valeur totale des actifs acquis moins la valeur totale des actifs cédés au cours de la période comptable (les opérations sur actifs non financiers étant comptabilisées dans le compte de capital et celles sur actifs financiers dans le compte financier)

moins la consommation de capital fixe

plus la valeur des autres changements de volume - positifs ou négatifs - des actifs détenus, ces variations étant comptabilisées dans le compte des autres changements de volume d'actifs

plus la valeur des gains nominaux de détention - positifs ou négatifs - enregistrés au cours de la période dans le compte de réévaluation, à la suite de la variation du prix des actifs comptabilisés

est égale à la valeur du stock de cet actif dans le compte de patrimoine de clôture.

Ainsi, pour chaque actif (ou passif) ou chaque groupe d'actifs (de passifs), la variation entre le compte de patrimoine d'ouverture et le compte de patrimoine de clôture est le résultat de tous les enregistrements effectués dans les comptes d'accumulation. La variation de la valeur nette est égale à la différence entre la variation totale des actifs et la variation totale des passifs.

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SOME ASPECTS REGARDING THE LEGISLATION AND MANAGEMENT OF ECOLOGICAL FARMS IN AGRICULTURE

UNELE ASPECTE PRIVIND LEGISLAȚIA ŞI MANAGEMENTUL FERMELOR ECOLOGICE ÎN AGRICULTURĂ

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Abstract. *The judicial settlements concerning the ecologic agriculture in Romania are based on some Romanian normative documents, such as emergency ordinances and decisions of the government, Orders of MAAP, laws and Settlement of the Europe Council no. 2092/1991- related to vegetal production, the supplemented by the Regulation no. 1804/1999- related to animal production.*

Moreover than judicial standards concerning creating and operating of the ecologic farms, the authors proposed to emphasize some aspects regarding the classification and the management of the ecologic farms.

Rezumat. *Reglementările juridice privind agricultura ecologică în România se bazează pe mai multe acte normative româneşti (Ordonanțe, Ordine, Legi, Hotărâri) şi europene (Reglementarea C.E. nr. 2092/1991 – privind producția vegetală, completată prin Regulamentul nr. 1804/1999 – privind producția animală etc.).*

Autorii şi-au propus să evidențieze, pe lângă normele juridice de înființare şi funcționare a fermelor ecologice şi unele aspecte legate de clasificarea şi manmagementul fermelor ecologice.

MATERIAL AND METHOD

The Paper is based on a bibliographic study regarding the juridical regulations in the field of ecologic agriculture from Romania.

The legal aspects regarding the types of ecological farms and their management are presented.

RESULTS AND DISCUSSIONS

The technical and organizational framework where they produce, process, import, export and commercialize ecological agro alimentary products in Romania is regulated from the juridical point of view, through a series of normative documents among which we mention the following:

- The **emergency ordinance of the Government no. 34/2000**, regarding the ecological agro alimentary products;

- **Law no. 38/7 March 2001,** for the approval of the Emergency Ordinance no. 34/2000, regarding the ecological agro alimentary products;
- **The Government decision no. 917/13 September 2001,** for the approval of the Methodological Norms for the appliance of the Provisions of the Government emergency ordinance no. 34/2000 concerning the ecological agro alimentary products
- **The Order of the Ministry of Agriculture, Alimentation and Forests no 70/2002,** regarding the constitution of the Commission for the development of ecological agriculture in Romania;
- **Common orders (no. 417/13.09.2002 and no. 110/07.10.2002) of the Ministry of Agriculture, Alimentation and Forests and of the President of National Authority for the Consumers Protection,** for the approval of the Specific Regulations regarding the labeling;
- **The MAPAM Order no. 527/29.08.2003**- Rules regarding the system of inspection and certification in the ecological agriculture;
- **The Order of the Ministry of Agriculture , Alimentation and Forests no. 186/2002** concerning the approval of the inspection requirements and measures of precaution within the inspection program and the registration of operators on the market of ecological agro alimentary products,;
- **The Order of the Ministry of Agriculture, Alimentation and Forests no. 527/2003** regarding the approval of rules concerning the System of Inspection and certification and the conditions for the accreditation of the inspection organisms and certification in the ecological agriculture
- **The Regulation of CEE Council no. 2092/91** (consolidated) regarding the manner of ecological production of the agricultural products and its presentation on the agricultural products and aliments;
- **The Law of Agricultural exploitations no. 166/2002** regarding the facilities for the ecological agriculture through the product subvention.

The Emergency Ordinance of the Government no. 34/2000 regarding the ecological agro alimentary products, approved through Law no. 38/2001 (M.O. no. 172/21.04.2000) comprises the following provisions:

- *application field*
- *the authority responsible for the ecological agriculture*
- *general rules and principles of ecological production;*
- *the length of the conversion period*
- *the system of inspection and certification;*
- *sanctions.*

The ecological farm can be defined in the following manner:

- *functional unit of the biosphere created by man, dependent on him, under his direction and management, represented on a ground surface, either as property, or rented, that includes all existent organisms in biotope (plant formation, zoocenosis, micro-biocenosis) and that interacts with the physical environment and economics, in such a manner that the flux of energy creates a certain trophic structure and a substance circuit, that*

have as a result the obtaining of a biomass and a benefit resulting from the vegetal cultures, the animal growth and eventually the industrialization of the respective products;

- *an assembly from the category of agro ecosystems in which, besides the biological and technical aspects, the juridical and economic elements necessary for their managerial piloting are emphasized;*
- *autocatalytic unit represented by an agricultural and zoo productive ecosystem , including designed biotypes (vegetal cultures, animal breeding, and fodder cultures, forest arrangements) produce a biomass useful to the humans.*

The ecological farms that focus especially on the animal breeding have a longer trophic chain and are superior regarding the quality of the obtained biomass.

The majority of zoo productive ecosystems are strongly anthropized, and this factor directly influences the degree of self-regulation.

The current organizational structure from which is the baseline in the future optimizations is based on a zoo technical farm, the vegetal farm or the mixed farm.

In the zoo technical farm we distinguish a series of operational (worker teams), biological (the populations of farm animals), physico-mechanical (installations for preparing and distributing fodder, water, milking etc.) subsystems.

The zootechnical farms represent incomplete ecosystems, that is why it is necessary, for the correct establishment of the ecosystem flux, to take into consideration the trophic level desired by the primary and secondary producers.

The arranged ecosystems require a complex control. The circular mechanism or the feed-back concept offer for the zooproductive ecosystems the necessary support for the control achievement.

The human factor is a regulator indispensable to the production optimization, starting from the improvement of the animal breeds and the plant types, until the obtaining of the anticipated biomass.

The "regulating" action, as a managerial element, has two functions that are more important: *the correction of the unfavorable effects of the natural components and the optimization of biomass production.*

As any ecosystem, the ecofarm comprises a live component, the biocenosis, unitary and complex community of animals, plants, microorganisms, and also the human factor and an abiotic component, the biotope, the necessary sublayer of the biocenosis.

The exploited animal population constitutes the "gravitation center" of the ecofarm, thus providing the anticipated biomass, respectively the desired zooproductions. The rest of the components are represented by environment and growth factors for the farm animals, constituting elements of system entrance, exist elements and elements for the regulation of the piloting, related to the anthropic factor. Their interaction ensures the ecosystem functioning.

The zooproductive ecosystem cannot be separated by the economic, administrative-organizational and also aspects.

The same type forms can be united in an enterprises, a horizontal integration, but they can be integrated on the vertical when the farms are united with units involved in the production or processing of the same product.

In the case of the vertical integration the input in the given ecosystem is achieved from the farms with reproduction material, combined fodder factories, vegetal farms, specific gear industry, and the output is achieved towards the alimentary industry (milk, meat etc.), the light industry (wool, leather, feathers etc), stations of sorting and marketing (eggs), agricultural farms (garbage) etc.

The ecological farms from Romania are differentiated according to several criteria.

Thus, the agricultural exploitation of family type is a production unit that has as objective the achievement of incomes meant to ensure totally or partially the satisfaction of the family needs.

They are considered agro cultural exploitations of subsistence when they are of reduced dimensions (1-5 ha), compared to the family ones that dispose of a surface of about 10 hectares.

Another type of farm- considered as a primary economic unit in agriculture, is a middle size (about 110 ha), uses the working force of the family members or can employ employees. The farm can ensure the political and social stability; it has the necessary economic potential for the competition on the market and can achieve the integration based on orders and contracts.

Also, the farm can organize some activities of processing and commercialization of products, being able to become an economic and integrated unit

The ecological commercial farm-production economic unit disposes of resources and administers a patrimony, has juridical authority and specific internal organization, administered the resources and production, so that it can obtain a maximum profit under the conditions of competition market.

The farm management is defined as being the process of allotting the limited resources in view of maximizing the incomes necessary to the family.

The management is practically “divided” by the property and has a scientific rigorous character, becoming a technology in itself, comprising numerous scientific basic elements, such as: objectives, principles, functions, means, responsibilities, relationships, particularities etc.

For this complex administration and management, knowledge is necessary, ensuring the competence of managers in the relations with the providers and clients, in using the facilities created by the agricultural governmental politics.

The management has a crucial importance, considered the 4th factor of production, together with land, work and capital.

The characteristics and the manner of application of management are different according to the size of the agricultural exploitations and their specific.

The technical and economical training represents the foundation of managerial capacity of those administering the ecological farms.

The competence of agricultural managers constitutes the chance to obtain a profit, together with the natural conditions and the market conjuncture (free prices, competition, quality etc)

The main functions of the agricultural management are:

prevision, planning, organization function, coordination-training function, evaluation- control function.

The main functions of the agricultural management are: *prevision, planning, organization function, coordination-training function, evaluation-control function.*

The decisional process in this field is complex and imposes, besides the decisional decentralization and certain coordination at the level of agricultural branch.

The management through objectives belongs to the decisional instruments and techniques, comprising action programs, the calendar of the deployment of activities, orders, contracts, instructions, incomes and expenses budget of the farm etc.

The strategies and politics of development for the planning of agricultural management are based on the short, middle, and long term objectives; the modalities to achieve them; the necessary resources (natural, human, economic), the financing sources, the terms for the achievement of objectives.

CONCLUSIONS

1. The determinant stage in the official recognition of biological agriculture at the European and world level is represented by the Regulation of the Europe Council no. 2092/97. The official recognition of the ecologic agriculture allowed its fast extension in several European countries and was followed by other initiatives at the world level.

2. In Romania this system of production was regulated by the Government Emergency Ordinance no. 34/2000 regarding the ecological agro alimentary products, meant for the creation of an ecological agricultural system according to the European standards.

3. The breeding of animals in the ecologic system supposes the tying of animals to the ground, the obligatory free access to the exterior , field or the administration of green fodders , ensuring the comfort and welfare of animals, the control of animal densities, the observance of the growth rhythm, the extensive and significant provision with fodders. The technological process of comprising the abattoir, the processing, the distribution and commercialization must comply with the HACCP system (the analysis of risks and critical hygiene points).

4. The most important ecological units from agriculture are the agricultural exploitation of family type and the ecological commercial farm. The

human factor represents also the essential element for the differentiation compared to the natural elements.

5. The ecological farm management firstly depends on the degree in which the man controls, synchronizes, closes the trophic chains within the farm.

The trophic chains represent the main manner through which energy, substance and information circulate through the system, the ecological farm being itself a unit producing organic substance.

6. In the design of ecofarms a series of principal elements will be taken into account: radiant energy, water resources, water resources, plants, vegetation period, culture structures, trophic chains and cycles.

7. The organic production must harmonize the regional practices, traditional culture, household practices in order to reach a natural equilibrium.

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THE PRINCIPLES OF MODERNIZING PUBLIC ADMINISTRATION IN FRANCE AND THEIR EFFICIENCY

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Abstract: *This originality of France public reform is due to manager understanding of the decentralizing necessity with a view to solving management problems and to implementing public policies. This process is focused on giving chances to information regarding the public institutions both for politicians and citizens.*

Keywords: *administrative system, public services, autonomy, decentralization*

Preliminaries. The French approach to public government modernizing, initiated by Michel Rocard on February 29, 1989, is part of the general framework of the public government reform in OECD countries. French administration modernizing is based on admitting that the only ones responsible for running the public services are their performers who are at the same time capable to define their general acting objective.

Principles of modernizing French administration. To reform the French public services, the following principles were conceived:

- implementation of an objective-based management manner;
- judicial settlement of the administrative measures after going through an experimental phase that will allow a better estimate of their effect;
- passing through unilateral decisions made exclusively by state to a partnership based on local community consulting for finding out its interests;
- increasing the autonomy degree of public services by creating responsibility centers within the public institutions e.g. certain functional units charged with the management of the material, human and financial resources;
- the need to associate the public servants to change process

Estimates in the field. The first estimates of the new measures, applied in the

French public administration, were carried out in 1992. Their conclusion shows that:

1. The ministries estimated that the modernizing process lead to the improvement of the public services, and the created responsibility centers contributed to the improvement of managing control, because:

- granting budget credits to central public administration has better responded to the needs (Ministry of Agriculture);
- public services have unit costs (Ministry of Industry);
- certain credits for investments in informatics and equipment were granted for a three year period (Ministry of Agriculture and Ministry of Justice);
- the possibility of carrying forward the budget credits makes more reasonably the managing process (Ministry of Equipment and Ministry of National Education);

2. The procedure of making the responsibilities centers increased the decentralizing degree and mobilized and motivated the public servants within the administrative body.

In the same way, is the finding that the ministries got flexibility and suppleness in their entire activity.

Fragility factors showed up in the modernizing process of public administration. The application in practice of the mentioned principles cannot omit that there appear certain disturbances connected to the existence of some fragility factors. In this respect we may mention the following categories of such factors:

a) Fragility in strategic terms[1]

- *Incomplete diagnoses.* The quality of a strategy of change is based mostly on the quality of the preliminary analyses. However, not often it is the case that, within the public government, the diagnostic phases are rapidly expelled; sometimes the solution is selected before identifying completely the problem.

Often this approach determines a focusing rather on solving the symptoms and not on the removing of the causes and the basic problems. This makes the initial change not to produce the expected effects which will lead, finally, to its abandonment.

[1] See also *Strategia guvernamentala privind accelerarea reformei in administratia publica (Government Strategy regarding Reform Acceleration in Public Administration)*, Bucuresti, 2006, pp. 35 and the following (www.gov.ro/strategie). In case of Romania it would consider another two factors: • *Lack of perspective (planned) in time* (absence of strategic reflection and of time planning, that would be necessary in preparing the phases coming after the putting in practice of the changes, makes up one of the frequent causes of failure in the long run. The change conceiving is set around its power in practice, which leads to forced mobilizing at the same time with its launching, but neglecting the management of watching and updating the operated changes); • *Lack of balances and estimates* (Romanian public government remained apart for a long time from concerns of estimating its actions impact. The same has happened also in the case of changes: formal rigorous balances are rare).

- *Centering on content to the prejudice of the process.* The strategic piloting of a change implies a managing of the "process-content" couple. The public government has the habit of centralizing interferences of technocratic directives, of circulars containing the reforms that have to put into practice.

As a consequence of this, often the process is neglected: the involved actors are not consulted, the adopting to the context does not exist and the real possibility of anchoring the change in time is extremely reduced.

b) Fragility in cultural terms

- *The reflex of resorting to hierarchical assistance.* It is about a frequent tendency of the public government like that of the habit to execute directives or that of a general behavior of waiting. In all these cases, the reflex to resort to hierarchical assistance seems to be firmly anchored.
- *Tendencies towards concert.* It is a reality by now that the public government is not ceasing to organize concerting reunions, to make up study commissions, to launch reflex seminaries. Thus, the concert became a permanent risk that leads to mixing and debating the ideas without concretizing them yet and which could lead to their failure even of the most attractive projects.

At the national level (the government and senior state servants), as well as at the territorial level (locally elected persons and the territory-administrative boards), excessive resort to reunions or working groups, enforced by compulsory consulting devices, could place a question mark to already operated change initiatives.

Within the same category of factors, we can introduce in the debate also the fragility in behavioral terms. More frequently, in practice, it is about the powerful personalizing of the projects, concretely, it is about the reality that in spite of the fact that in decision making participates more persons, the equations "a change = a person" stands powerful in public medium.[2]

We additionally mention the fact that due to this personalizing, when the respective individual is discouraged or leaves the working place, the initial change is destined to failure. However, in the last period, it was imposed the idea that for the success of certain changes it is necessary of the reunited energy of more individuals to use their personal margins of handle.

[2] The fact is also revealed by orders issued by the minister who promoted them.

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EUROPEAN PERSPECTIVES ON THE PUBLIC OFFICE

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Abstract: *The public office is the most important link between citizens and the public institutions in a democratic state[1]. The democracy can exist only in an efficient public administration in a democratic Governmental service. In every country, citizens want the public officials to pursue the achievement of the public issues, to be fair and to provide a good public resource management.*
Keywords: *public official, national government, public office*

Short History

The regulation of the public office in Romania has a long tradition, our country being among the first states in Europe that consecrated a special regulation to public officials by adopting the articles of 1923.

Actually, a special regulation of the rules that govern the activity of public officials was a concern of the governments and legislative bodies starting with the second half of the 19th century. The notion of articles occurred in Romania for the first time as name of a normative document in the Developing Articles of the Paris Convention (August 7, 1858).

With regard to the public official, the term was first used in the Constitution of 1923[2]. Therefore, on June 19, 1923 the Law on the Public Official Articles was adopted under art.8 comma 4 of the Constitutuon of 1923.

By the Decree no.5506 of November 19, 1923, the Regulations for the enforcement of the Law of Public Officials Articles was adopted. Then, the Public Officials Articles were abrogated and replaced with the Public Officials Code that came into force on June 8, 1940 that, at its turn, was abrogated and replaced by the Law 746/1946 for the Public Officials Articles abrogated by Decree no. 418/1949.

The Labor Code, adopted on June 8, 1950, determined the work relations for all employees, including for the public officials, no distinction being made between these categories of public officials and the other employees of the Romanian public sector.

[1]The public office is an important element of the state and any democratic state depends, among others, on the existence and the materialization of a democratic public office that is stable, professional and neutral from a political viewpoint.
[2]According to www.anfp.ro

Recent National Regulations

Considering the drafting of a special law for the organization and the operation of the public officials' work - Law no. 188 of December 8, 1999[3] with its subsequent amendments, called the Law on Public Officials Articles.

To fill a public position or to become a public official, there have always been some conditions, their fulfillment being tightly connected to the fact that the public official is the first person the citizen meets, which means that he should have a correct behavior and to be effectively at the citizen's disposal for solving and clarifying his legitimate requirements.

The current Constitution consecrates some provisions of the central and local governments and the aforesaid assignments are not fulfilled by institutions but by individuals vested with the quality of public officials, that is they should implement the constitutional provisions, should contribute with other bodies to the observance of citizens' rights and liberties.

Public Office Regulation in the Community

In the member countries of the European Union, there are two categories of public offices, that is: officials that work in Community institutions (that may be called European Officials) and the body of officials that work in the administration of every state[4].

Every member state regulates[5] the body of officials in agreement with the requirements of the autochtonous legislative system and with regard to European officials, we are showing that the regulation of their office is the assignment of the Community institutions.

Against the background of the Community law, the laws regarding the public office were influenced by the adoption by the European Commission of the White Book regarding the administrative reform in March 2000. This document showed the principles of the public government at an European level, focusing on the quality of the afferent services, the independence of the official, the engagement of his responsibility for all the deeds committed, the efficiency and the transparency of the public services provided to the European citizens.

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[3]Published in the Official Gazette issue 1600/1999.

[4]In this area the general principle of the subsidiarity of the Community legislation is reconfirmed.

[5]As to the regulation of the public office, in the European Union there is a dispute between the concept of the legal office (like in the Romanian system) and the concept of the contractual office.

To appreciate the regulation of the public office in the countries of the European Union, we have to analyze the categories of clerks that are under state incidence, that is the unilateral legal status (of public right) and the covering rate of the rules comprised in the articles.

In most of the countries (Belgium, Greece, Spain, France, Ireland, Netherlands, Portugal) the articles are enforceable to all permanent employees of the government - that is employees of the state, territorial governments and autonomous institutions[6].

A second group comprises Germany and Luxembourg, where tradition requires a clear-cut distinction between the officials subject to the unilateral public law on the one hand and the employees and the workers subject to the contractual regimen on the other hand. The distinction is based on the intrinsic difference between functions, the German law establishing this the hierarchy in the local government staff.

According to the German doctrine, only the officials may perform public activities or activities related to the defense of the general interest when holding a permanent office, while the other two staffing categories perform simply administrative or technical activities.

In the United Kingdom, the distinction between the common law and the statutary status of the Public Office is made. Furthermore, in Denmark we see a special case, the largest majority of the officials are subject to the statutory status, although in 1969 a contractual reform to this respect took place.

Access to the Public Office and Statement of the Human Rights

In essence, recruiting public officials, impartial and with high skills, is one of the essential roles of the state, the recruiting being mainly made on the basis of two principles: equality to access and public competition.

The principle of equality to access is in the Statement of Human Rights and Citizens' Rights since 1789, being reconfirmed in art.21 of the Universal Statement of Human Rights, with the following wording: "all the persons are entitled to have access under conditions of equality to public offices in their country". In this way, restrrictions and discriminations based on sex, religion, race, opinions are forbidden, the only limitations accepted being those regarding nationality, morality, age conditions and psychical aptitudes.

[6]The rule of enforcing the status to all agencies becomes nuanced when the territorial agents are at stake, that shall not be mistaken for the part-time ones.

The principle of public competition is applied in France[7], Spain and Italy[8], countries that proceed to such a method of recruiting for almost all positions of the public government, except for some that are subject to political appointment.

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[7]In France there is the famous training school of the public officials "Ecole Nationale d'Administration" that provides for the selection of the elites and then their solid training for being later employed in key official positions. The admission to this institution and their subsequent selection for filling the highest positions in the French Administration are very tough. Via competitive examinations, two major objectives are fulfilled: the fair assessment of the candidate's capacity and the guarantee of the independence of the authority that is in charge with the selection.

[8]Italy admits this principle, but it is applied to a low number of fields, among which diplomacy and magistrates office.

TRENDS OF THE ROMANIAN ECONOMIC GROWTH IN THE EU ENVIRONMENT

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Abstract: *Given its economy, which is open and strongly integrated into the European Union economy, Romania is sensitive to external economic environment changes and especially to the economic evolution of the main trade partner countries in the European Union. A macroeconomic approach must especially consider, for the external sector, the European Commission plans, namely those of the Autumn 2006 Forecast, meaning that in the reference period, the economic growth stands strong, despite the estimation of a moderation as compared to the achievements of 2006.*
Keywords: economic growth, forecast, development, inflation.

European prospects

Economic growth in the European Union countries is determined by the significant increase of the domestic demand, which is a positive prospect, important for the economic development of Romania.

In 2007 and 2008, the European Union economy is expected to grow close to its potential. The autumn forecast of the European Commission stated that in 2006 – the best year after 2000 – the economic growth reached 2.8% on the whole of the European Union (2.6% in the Euro area), being estimated at 2.4% in 2007 and 2008 (about 2.2% in the Euro area).

These estimations are based on a positive prospect on the global economy, even if, as far as the USA are concerned, a lower growth is anticipated (from 3.4% in 2006 to 2.3% in 2007 and 2.8% in 2008)[1]. Moreover, other recent estimations of certain specialized international institutions state that the optimistic economic growth prospects in the main trade partner countries and even in the whole Euro area in 2007 are well-grounded[2].

An important support of the Romanian economy development is the fact that the European economy is influenced by the domestic demand. The

1 Another item considered by the macroeconomic scenario is the expected negative impact on the economic growth of the VAT increase in Germany in 2007. This is the more important as Germany is the second largest trade partner (after Italy) of Romania, with a percentage of 15% of the overall exports (in and outside the EU). As for Italy, which has a percentage of almost 20% in the Romanian exports, an annual increase of 1.4% of the economic growth is estimated.

2 Thus, the "Consensus Forecast" publication reviewed its forecast on the GDP increase in the Euro area from 2.5% in September 2006 to 2.7% in December (for Italy, from 1.6% to 1.7%; Germany, from 2.2% to 2.5%; Austria, from 2.8% to 3.1%; France is an exception, where the forecast decreased from 2.3% to 2.1%).

annual investment increase is considerably higher than the one of the previous cycles and, moreover, the investment conditions remain positive: significant profits, improving capacity use rates.

On the whole of the European Union, investments are expected to grow by 3.6% in 2007 and 3.3% in 2008. Also, consumers' confidence remains high, which grounded an estimation of an annual consumption growth estimation of over 2%.

The estimations of the macroeconomic scenario rely, in addition to the significant increase of the European economy and positive global economic and financial conditions, on other assumptions like: stability of the international goods prices, moderate oil price increase (about 1% in 2007 and 2.5% in 2008), gradual improvement of the labor market (decrease of the actual labor and unemployment unit cost) and diminution of budget deficits.

Romanian economy: growth, expectations, scenarios

After 2005, Romania has experienced a slowing down of the economic growth rhythm of 4.1%, given the extremely difficult international and domestic conditions, in 2006 an increase of the gross domestic product over its potential occurred. The 7% gross domestic product increase is the highest in the last few years.

An important characteristic of the economic growth is the well-balanced contribution of the components of aggregated demand, with an accelerated increase of the gross fixed capital formation and of the goods and services exports, as compared to those of 2005.

In the same line with this trend, the gross domestic product increased further to superior dynamics of the gross fixed capital formation and of the improvement of the negative contribution of the net exports, as a consequence of an accelerated goods and services export.

These evolutions led to increase of the gross fixed capital formation by more than 13%, as compared to about 10% in 2005 and to the decrease of the contribution of the net export to the actual increase of the gross domestic product from 5.7% in 2005 to 4.6% in 2006.

Positive effects of the economic growth, especially further to the investment increase, were noticed both in the improvement of the employment structure in various business sectors, and in most of the employed population by 2.4% in 2006 as compared to 2005. The highest increases were noticed in the constructions and services sectors.

The population employed in agriculture decreased to 30.8% of the whole employed population. The employment rate of the population fit to work (15 to 64 years of age) has had an increasing trend as of 2005, being 59% in 2006.

The unemployment rate according to the International Labor Office has continuously decreased, each quarter, reaching 7.0%. Romania's achievements related to inflation decrease, although more modest as compared to other countries in the center and East of Europe, have been obvious even since 2000.

The inflation rate calculated as annual mean value, is also considered by the European Commission, reached for the first time in 2005 after the revolution a one digit level, namely 9.0%.

At the end of 2006, the inflation rate decreased to a historic level of 4.87%, inflation deceleration being more pregnant in April due to a basic effect, but also in July and September, when the quarterly inflation rate clearly showed a deceleration of the price increase rhythm.

The strong disinflation process is firstly due to the positive effects of the combination of monetary and fiscal policies that were implemented, to the improvement of the market expectations regarding the disinflation trend sustainability and the increased competition in the retail sector.

Moreover, the administrated price increase was more moderate, and the volatile prices of the agricultural sector were additionally adjusted by the deflation of the food group[3].

As concerns demand, the inflation potential created by the consumption increase, which was rather the effect of credit expansion than of population wages income increase, was moderated by the positive import price evolution, determined by the continuous strengthening of the national currency.

Medium-term development process and cyclic evolutions

According to the estimations of the Cobb-Douglas functional form of production, the mean increase rate of the potential gross domestic product calculated for the period 2006-2009 is 6.08%.

Due to certain significant investment increase rates, the capital stock will increase on the average by 2.4% each year, at a depreciation rate of 5%. This evolution will lead to the increase of the capital contribution to the increase of the potential gross domestic product. The employment rate of the population fit to work (15 to 64 years of age) will have an increasing trend, of about 0.1% per year. We should point out that the evolution of the employed population is expected to change beginning with 2007, which will lead to a positive contribution to the increase of the potential gross domestic product.

3 In fact, in August 2006, for the first time in 1990, the monthly inflation decreased by 0.07%. As compared to the mean value of 2005, consumption prices increased by 6.56%, being by 2.44% below the level of the similar period of the previous year.

Total factor productivity (TFP) will continue to have the most significant contribution, due to the qualitative technological improvements associated with direct foreign investments, as well as with an improved business environment.

The output gap remains positive but decreasing in the near future, as inflation presure reduction and disinflation process continuation are expected. This will diminish by 0.66% as compared to 2006, reaching 1.33% of the potential gross domestic product in 2009.

Finally, the economic growth estimated for 2006-2009 is on the average similar to that of the potential gross domestic product. Its evolution grounds the expectations concerning the acceleration of the actual convergence process to the economic level of the member states of the European Union.

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ENTERPRISE IN HARDNESS AND THE ERRORS LEADING TO THE BANKRUPTCY

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Abstract: *The concept of the enterprise in hardness was defined also in juridical, economical, socio-political as well as in financial sense. From the juridical point of view the enterprise is in hardness when it is in the state to cease the payments. Statistically, at least 50 % of the new enterprises strand in the first 5 years of activity, and especially the small enterprises with poor management.*

Rezumat: *Conceptul de întreprindere în dificultate a fost definit atât sub aspectul juridic, economic, social-politic şi financiar. Din punct de vedere juridic întreprinderea este în dificultate atunci când se află în stare de încetare de plăți. Statistic, cel puțin 50% din noile întreprinderi eşuează în primii cinci ani de activitate şi asta în special la întreprinderile mici care sunt slab gestionate.*

The concept of the *enterprise in hardness* was defined also in juridical, economical, socio-political as well as in financial sense. From the point of view of the economical theory, the hardness state was defined as being a permanent situation of financial crisis through the activity restriction, credits' decreasing, lack of cash, etc.

From the juridical point of view the enterprise is in hardness when it is in the state to cease the payments, that is when is not able to get through its exigible debts with the available amounts of money. The development of the juridical procedure[1] starts on the basis of an asking of a debtor toward the court, of the creditors or of the Territorial Chamber of Commerce and Industry. The debtor asking is accompanied by:

- the balance sheet and copies of the running accounting register;
- the profit and loss account from the year previous to the handing in the asking;
- the state of the enterprise debts;
- the declaration of the debtor containing the intention of the reorganization of the activity.

The court will decide if the enterprise is in the state of the payments' cessation as well as on the procedure through the notification of the credits, the debtors and the Office of the Commerce Register. The court will appoint a judge who would conduct, through the length of the procedure, the actions aiming the juridical reorganization or liquidation, as well as an administrator who would supervise the management of the activity throughout the procedure. The procedure foresees the proposal of a plan for reorganization and carrying on the debtor activity or for the selling of the debtor goods and liquidation, respectively.

The plan for the reorganization compulsory might include:

- the financial perspectives, especially the modalities to adjust the passive;
- the economical perspectives on the new enterprise structures and activities;
- the social objectives- the perspective of the work places, social conditions, professional reorientation, etc.

Statistically, at least 50 % of the new enterprises strand in the first 5 years of activity, and especially the small enterprises with poor management. On activity domains the smallest rate of surviving is found in the domain of textiles and ready-made clothes, commercial intermediaries and of en-detail commerce.

The most frequent errors leading to the bankruptcy are represented by:
- the wrong evaluation of the market;
- the careless of the legislation in force;
- the underestimation of the financial necessities;
- the impossibility of the prices' increase. The price increase of the raw materials might bring to the bankruptcy if the private enterprising could not raise the price for the own products;
- the wrong price policy;
- the inadequate location (in commerce, the success is dependent in proportion of 80 % on location)[2].

The main cause of an enterprise bankruptcy is represented by the cash lack in a critical moment. This situation is due, as a rule, to the defective financial management on short term and also on the impossibility to finance the investments on long term.

Sometimes, the bankruptcy might be determined artificially as a result of the action of some factors less distinguishable:
- the extent of financial blocking toward the viable enterprises which are not able to cash up the debts;
- the removal of the competition by the buyers, especially foreign, in the case of some enterprises which are not legally protected against closing;
- the setting up of the bankruptcy procedure, without the resorting to financial rehabilitation measurements and temporary financial relaxation[3].

One main objective of financial administration is that of the assurance of a level of cash able to cover every moment the payment of enterprise debts[4]. The manager is motivated by three aspects: the risk planning, the organizing and control of the bankruptcy risk. These aspects are based on the anticipation of financial fluxes on short and long terms, so that might be possible to action just in time to their adjustment, before the banking capital mobilization. Thus, it appears the systematic organization of prevision under the form of financial programs. This program is named budget in Romanian economy, through which are traced out the trajectories in the view of touching the proposed aims.

The lack of available amounts of money necessary to pay the commercial debts of the enterprise induces the bankruptcy risk. The general aspects linked to risk are evident at the level of management, of dynamic conduction through the identification and operative control of bankruptcy risk.

The keeping of equilibrium between the maximization of profitableness and the minimization of risk is an important condition of enterprise financial management. The actions leading to high gain are generally risky ones, done under the aspect of bankruptcy[5]; the highest gain presumes the most risky actions and, thus, if the risk is increasing the probability of failures, loss and bankruptcy of the enterprise is increasing.

THE RISK PLANNING

The pertinent planning of the payment impossibility risk is realized on the basis of global diagnostic. The global diagnostic presumes:

- A presume on treasury (budget treasury or cash-flow), since each aspect of an enterprise conduction has bearings on cash flow;
- The verifying of the health state of the financial structure.

The ***presume*** of the treasury evolution of one enterprise constitutes a very important aspect of financial state, since the insufficiency of funds might generate difficulties in its activity with critical effects, the finality being represented by the bankruptcy.

The enterprise might arrive to a lack of financial equilibrium in the case of the increase of raw materials stocks over the necessary, as well as in the case of the increase of unfinished production. From the analysis of current or presumed cash flow during a budgetary year it appears an indicator that is the ***cash-flow of the interval***. To be able to presume the payment incapability for a given moment it is not sufficiently relevant the level of reserves, might being analyzed the general resources on short time from the active of the enterprise (with high level of liquidity).

The treasury budget allows the formulation of some conclusions on the financial state and the adjustment of cash flows and of the factors which generate them in the view of the assurance of the existent debts payment capacity.

RISK ORGANIZATION

The realizing of this function take into account the clear definition of the elements with determine the organizational statement in the view of applying the taken financing decision: the involved compartments, informational system, the delegation of authority on different hierarchical levels of the enterprise and the decentralization of its activity.

RISK CONTROL

In the specialized literature there is a distinction between the managers who avoid, those who assume and those who rule the risks. To control the risk is very difficult and it presumes to permanently and completely verify the manner in which the activities are running, comparatively to the standards and programs.

Thus, the control presumes either the permanently and completely verifying of the manner in which the activities are running, comparatively to the standards and programs, as well as the manner in which there are measured the deviations

from these standards and programs and the mentioning of the causes and corrective measures.

The events which are not expressed through numerals but might announce the bankruptcy are represented by:

- the incapacity to draw up in time financial reports and the situation of accounts;
- the accountant standards and practices, other than the standard ones, comparative to those of competition and to the existent ones in that domain;
- the rapid extension of the selling volumes, of the engaged capital;
- the combination of the functions of president and executive director, especially when they have associated a large parcel of own shares;
- the frequent resignations from the leading council;
- the share selling, belonging to the director of the enterprise, especially just before the "closing" (6 weeks before the announcement of the financial results of the firm);
- the passing from the acquisition of the actives to leasing;
- the inexplicable transactions between the branches of one firm;
- the quality of financial expertise.

The classical investigation of the risk of bankruptcy through functional analysis, the instalment method, the dynamic analysis and the analysis of liquidity-exigibility allow to render evident the past performances of the enterprise, its capacity to presume being limited.

The risk of bankruptcy existed and exists into the attention of fund owners and managers. The lasts are interested in the well going of production cycle and the investors into the recover of credits and associated interest. Many researchers and financial organisms were preoccupied on the elaboration of presuming methods of bankruptcy risk. The used procedure is represented by the statistical analysis of financial features of the enterprises with normal functioning and of those with difficulties in economical and financial administration.

All the analysis models of the bankruptcy risk are based on a score function which approximately determines if the enterprise will enter the bankruptcy or will have notable economical results in the nearest future of the analysis.

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LA CONTRIBUTION DE CONSTANTIN NEGRUZZI AU PROCESSUS DE NEOLOGISATION DU ROUMAIN (LA TERMINOLOGIE BOTANIQUE)

CONTRIBUȚIA LUI CONSTANTIN NEGRUZZI LA NEOLOGIZAREA LIMBII ROMÂNE (TERMINOLOGIA BOTANICĂ)

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Abstract. *This paper intends to study the neologic lexical elements from the botanical domain with first attestation in Constantin Negruzzi's writings and to highlight the decisive part of the Moldavian writer in the modernisation of the romanian literary language and in forming of specialized languages. Our analysis shows C.Negruzzi's preoccupation for the foundation of the modern romanian language, also that some general aspects concerning the neologic loan in romanian language in 19th century.*

Rezumat. *Comunicarea noastră îşi propune să studieze elementele lexicale neologice din domeniul botanicii cu prima atestare în textele lui C.Negruzzi şi să scoată în evidenţă rolul determinant al scriitorului moldovean în modernizarea limbii române literare şi în constituirea limbajelor de specialitate. Analiza ilustrează preocuparea lui C.Negruzzi pentru constituirea limbii române literare moderne şi pune în lumină o serie de aspecte generale ale împrumutului neologic în limba română în secolul al XIX-lea.*

Parmi les aspects du processus d'évolution du roumain littéraire qui ont fait l'objet des préoccupations des écrivains du XIX^e^ siècle, une place de choix est occupée par la modernisation du vocabulaire par l'intermédiaire de l'emprunt de mots aux langues romanes, dans le contexte de l'insuffisance des termes nécessaires à l'expression des nouvelles réalités. L'appel au mot d'origine latino-romane supposait non seulement le remplacement des « turcismes » et des « grécismes », qui avaient envahi le lexique du roumain, mais surtout, la transformation de celui-ci dans une langue flexible, capable d'exprimer les plus variées nuances de la pensée et de l'affect. Ayant eu lieu en même temps que le processus de découverte des richesses pas encore exploitées de la langue populaire, le phénomène de la néologisation s'est posé comme un complément du premier, dans une démarche soutenue des pionniers philologues.

En tant que personnalité emblème de son temps, C.Negruzzi s'est activement impliqué dans les actions de renouvellement de la langue roumaine littéraire, en cherchant toujours à compléter les prises de position théoriques par la mise en pratique des points de vue par le truchement de ses écrits. Il nous apparaît alors comme un « écrivain moderne » de par « la réponse qu'il donne aux principaux problèmes liés au développement du roumain littéraire autour des années 1840-1848: unification de la prononciation et des normes grammaticales,

modernisation du lexique par les emprunts d'origine latino-romane. » [2, 39, notre traduction]

La vision moderne que C.Negruzzi a sur la langue littéraire est due à « la culture classique solide qu'il avait assimilée, aux contacts avec les plus grands savants de l'époque et au respect manifesté à l'égard des traditions culturelles roumaines. »[1,19; notre traduction] Les nombreux études et articles consacrés aux conceptions de l'écrivain moldave concernant la langue littéraire soulignent tous l'attitude modérée, sans pourtant en exclure les contradictions inhérentes à l'époque, dont C.Negruzzi a fait preuve dans ses rapports avec le problème de l'enrichissement du roumain littéraire; qu'il s'agisse des traductions ou bien des créations originales, on y trouve constamment le même effort de cisèlement et de perfectionnement de la langue roumaine.

MATERIEL ET METHODE

Les affirmations ci-dessus nous permettent de considérer l'œuvre de Negruzzi comme un document de son époque. Dans cet article, nous nous sommes penchée sur la problématique de la terminologie scientifique (botanique) d'origine latino-romane ayant la première attestation dans les écrits de Constantin Negruzzi. Notre démarche est issue du désir d'approfondir nos recherches antérieures consacrées au processus de néologisation du roumain dans les textes de Negruzzi. [5]

Des quelque 400 néologismes identifiés à l'aide des grands dictionnaires de la langue roumaine (DA, DLR, MDA), ainsi que des grands dictionnaires de la langue française (Robert, Larousse, Hachette), nous avons compté 16 néologismes d'origine latino-romane du domaine botanique avec la première attestation dans l'œuvre de C.Negruzzi. Aux exemples cités par le Dictionnaire de la Langue Roumaine (DLR), nous avons ajouté des exemples propres, identifiés dans l'œuvre (ceux-ci sont précédés d'astérisque).

La plus grande part de ces termes spécialisés (13) ont été introduits par le texte ***Flora română*** (La Flore roumaine), publié dans *Convorbiri literare*, n° 7-8/1867. Cet écrit a résulté du désir de Negruzzi de donner cours à la sollicitation de V.Alecsandri de remplir le cahier blanc que ce dernier lui avait apporté. Une lettre de Negruzzi à Alecsandri, publiée dans *Convorbiri literare*, témoigne de la genèse de la ***Flore roumaine*** : « Et écrire quoi ? …à Iaşi il n'y a plus ni contes ; il ne reste plus que des pavés détériorés et des Juifs, il n'a plus ni poésie ni fleurs. Et puis ? S'il ne reste plus de fleurs en ville, pourquoi ne pas en mettre sur la feuille! Alecsandri est poète, il aime les fleurs…partout où il les trouve. Je vais lui rédiger une flore roumaine. Aussitôt me mis-je au travail. J'ai feuilleté beaucoup de catalogues…et j'en ai ressorti environ quatre cents plantes que j'ai notées dans ton cahier, en les classant comme dans un herbier. » („ Dar ce să scriu ? …în Iaşi nu mai sunt nici poveşti ; au rămas numai pavele stricate şi jidani, nu mai are nici poezie, nici flori. Ei ş'apoi ? Dacă nu-s flori în târg de ce să nu fie pe hârtie ! Alecsandri e poet, el iubeşte florile…oriunde le găseşte. Să-i fac dar o floră română. Îndată m-am apucat de treabă. Am răsfoit feluri de izvoade…ş-am scos vreo patru sute de plante pe care le-am scris în caietul tău, aşezandu-le ca într-un erbar (Herbier)").[6, 366, notre traduction]

Parmi les «textes » étudiés par l'écrivain moldave il y avait des catalogues de fleurs, des ouvrages spécialisés sur les jardins, toute une littérature avec des thèmes de la nature très prisée à l'époque romantique.[6, 371] Certains chercheurs ont identifié l'influence des *Lettres de J.J.Rousseau sur la botanique* (E.Lovinescu),

d'autres ont contredit cette filiation: « L'idée de décrire dans une suite de lettres les fleurs du jardin, lui est donnée par Karr [Alphonse Karr, *Voyage autour de mon jardin* (1845)], dont l'œuvre est rédigée sous cette forme. » [6, 368; notre traduction] L'auteur de cette citation s'intéresse dans son article aux possibles parallèles entre les deux œuvres, en insistant sur la légende du myosotis, dans laquelle des éléments authentiques nationaux (que Negruzzi avait empruntés à Neculce, à son œuvre *O samă de cuvinte*) sont mêlés avec des échos du modèle français.

Dans la première partie de notre étude, la terminologie botanique attestée pour la première fois chez Negruzzi et identifiée dans son œuvre est classifiée du point de vue étymologique et morphologique. Dans la deuxième partie, on a essayé, à partir du matériel présenté, de souligner quelques conclusions concernant la pénétration, l'adaptation et la circulation de ces emprunts néologiques. Cette analyse a pour but de mettre en évidence des aspects importants du rôle joué par Constantin Negruzzi dans le processus d'enrichissement du roumain par des néologismes romans.

RESULTATS ET DISCUSSIONS

En ce qui concerne l'origine des néologismes, des 16 néologismes de la sphère de la botanique introduits en roumain par les écrits de Negruzzi:

-la plupart sont d'origine française: 12

-il suit les néologismes à étymologie multiple, qu'on explique par les influences diverses qui se sont exercées sur le roumain dans une période très courte de temps: 4

L'influence des langues romanes et particulièrement du français a été largement abordée par la littérature de spécialité, on a étudié les voies d'entrée de cette influence et les modalités d'adaptation des néologismes en roumain.

En classifiant les néologismes du point de vue morphologique, on peut observer que tous ces termes sont soit des noms soit des adjectifs, à une exception près, un seul et même terme remplissant les deux valeurs, selon le contexte. Le poids significatif des noms et des adjectifs par rapport aux autres catégories morphologiques est une constante des écrits de Negruzzi et s'explique par le caractère éminemment descriptif de ceux-ci.

Du point de vue sémantique, puisque nous avons uniquement des termes spécialisés, il y a une dominance nette des ***termes monosémantiques*** :

AZALEE (E: fr. *azalée*): Îți trămit şi eu un buchet de fuchsii, azalee, camelii, pelargonii. S I, 99 [4] (Je t'envoie un bouquet de fuchsias, azalées, camélias, pélargonies)

Le néologisme est introduit par l'auteur par nécessité de dénommer une nouvelle réalité, c'est pourquoi il est utilisé avec son sens fondamental: « arbuste ornemental (famille éricacées) cultivé pour ses fleurs colorées (*Azalea*) ».

BOTANICĂ (E: fr. *botanique*): Nu întrerupe corispondința noastră botanică. S I, 99 (N'interromps pas notre correspondance botanique)

*...învăță puțină botanică. S I, 206 (...il apprit un peu de botanique)

C.Negruzzi introduit aussi l'adjectif (« qui concerne les végétaux, l'étude des végétaux ») et le nom (« science qui traite des végétaux »).

CARPELĂ (E: fr. *carpelle*): Carpele numeroase dispuse în vârf pe un receptaclu convecsu. S I, 103 (De nombreuses carpelles disposées au sommet sur un receptacle convexe)

Le terme spécialisé (« chacune des pièces florales dont la réunion constitue le pistil, chez les angiospermes ») est attesté aussi plus tard au courant du XIX^{e} siècle par le DLR dans l'ouvrage de D.Grecescu „Conspectul florei României. Plantele vasculare indigene şi cele naturalizate ce de găsesc pe teritoriul României, considerate sub punct de vedere sistematic şi geografic" (Panorama de la flore de Roumanie. Plantes vasculaires indigènes et naturalisées qu'on trouve sur le territoire de la Roumanie, envisagées du point de vue systématique et géographique), Bucureşti, Dreptatea, 1898: „Organele femele sunt carpelele." (p.3) (Les organes femelles sont les carpelles).

COROLĂ (E: fr. *corolle*, lat. *corolla*): Corola cu cinci petale. S I, 102 (La corolle à cinq pétales). Le terme apparaît ici avec son sens fondamental, celui de « partie du périanthe d'une fleur constitué par l'ensemble des pétales ».

DALIE (E: fr. *dahlia*): Daliile îmbrăcate în bogatele lor rochii colorate şi gingaşii tamarini... S I, 223 (Les dahlias enveloppés de leurs riches tenues et les frêles tamariniers). Le terme apparaît ici avec son sens fondamental, celui de « plante ornementale de la famille des composées, à racines tubéreuses et à grandes fleurs vivement colorées, originaire d'Amérique du Sud ».

DRIADEE (E: fr. *dryades*): Neamul driadeelor S I, 103 (La famille des dryades). Le terme apparaît ici avec son sens fondamental, celui de « plante dicotylédone, vivace, à racine pivitante, hermaphrodite (chênette) ».

UMBELĂ: (E: lat. *umbella*, fr. *ombelle*): Flori dispuse în ombele simple sau compuse. S I, 102 (Des fleurs disposées en ombelles simples ou composées).

Negruzzi a employé ce mot avec la graphie *om*-, aujourd'hui vieillie, sous l'influence de l'etymon français. Semantiquement, ce terme est utilisé avec son sens fondamental: « type d'inflorescence formée d'axes secondaires qui partent tous en rayonnant du même point de l'axe principal ».

UMBELIFERĂ: (E: fr. *ombellifère*): Deschid o carte şi cetesc: familia ombeliferilor. S I, 102 (J'ouvre un livre et je lis: la famille des ombellifères)

La graphie de ce mot subit, chez Negruzzi, la même influence de l'étymon français, *om*- sera par la suite remplacé par *um*- par analogie avec *umbelă.*

VOLCAMERIE (E: fr. *volkamérie*): Iată un balcon împodobit cu flori aristocrate: camelii, fucții, volgamerii şi felurite roze. S I, 323. (Voil à un balcon décoré de fleurs aristocrates: camélias, fuchsias, volkaméries et différentes roses)

Dans le cas des ***néologismes polysémantiques***, Negruzzi emploie le sens lié à la botanique:

ALTERN, Ă (E: fr. *alterne*): „Frunze alterne, rareori întregi..." S I, 102. (Feuilles alternes, rarement complètes)

Constantin Negruzzi emploie ce terme, qui développera par la suite sa polysémie, uniquement par référence au domaine botanique: « *feuilles alternes*: insérées sur une tige, à raison d'une seule par nœud ». Une preuve du fait que le terme a été

immédiatement assimilé par la langue et qu'il a été correctement employé dans les contextes est son occurrence dans l'ouvrage de D.Grecescu déjà cité (p.22)

FLORĂ (E: fr. *flore*): Aşa e că...am cuvânt să iubesc flora română? S I, 98 (N'ai-je pas raison d'aimer la flore roumaine?). Le terme apparaît ici avec le sens d'« ensemble des espèces végétales d'une région, d'un pays ».

INVOLUCRU (E: fr. *involucre*, lat. *involucrum*): Flori acompaniate de involucre. S I, 102 (Feuilles accompagnées d'involucres)

Si le Dictionnaire Robert nous donne un seul sens de ce mot (« ensemble de bractées groupées à la base de certaines inflorescences), MDA (Micul Dicționar Academic) rajoute un deuxième sens: « lame qui enveloppe le chapeau d'un champignon, avant que celui-ci ne sorte de sous la terre »; il est évident que Negruzzi envisage le premier sens.

PLATBANDĂ (E: fr. *plate-bande*): Toată grădinița mea...încape într-o singură plat-bandă a grădinei d-voastre. S I, 96 (Tout mon jardinet ...tient une seule plate-bande de votre jardin). Mot polysémique, utilisé aussi en architecture et en technique, *plate-bande* est introduit par Negruzzi en rapport avec la botanique: « bande de terre, entourant un carré de jardin, plantée de fleurs, d'arbustes ».

ROZACEE (E: fr. *rosacées*): * Familia Rozaceelor, S I, 103 (Famille des rosacées) = « famille de plantes dicotylédones dialypétales, comprenant 3500 espèces »

Il faut mentionner ici trois autres termes néologiques polysémantiques, attestés pour la première fois dans le texte ***Flora română*** dans le domaine botanique:
aristocrat, ă (E: fr. *aristocrate*): « avec une attitude et une tenue exquises »: „Eram îngrijit gândind la bietele mele flori plebee, cum o să se simtă de umilite, când vor primi vizita acestor aristocrate". S I, 99 (J'étais préoccupé en pensant à mes pauvres fleurs plébéiennes, comment elles se sentiront humiliées quand elles recevront la visite de ces aristocrates). Le terme réapparaît, toujours avec un sens figuré, dans la *Lettre XXIX*: „Iată un balcon împodobit cu flori aristocrate: camelii, fucții...şi felurite roze." S I, 323 (Voilà un balcon décoré de fleurs aristocrates: camélias, fuchsias, volkaméries et différentes roses)

bază (E: fr. *base*): « partie inférieure d'un élément » :„Frunze alterne...cu peţiolul dilatat la bază." S I, 102 (Feuilles alternes, à pétiole dilaté à la base)

inserat (E: <*insera* < fr. *insérer*): « attaché »: „Corola cu cinci petale distinse (=distincte) inserate în vârful potirului" S I, 102 (La corolle à cinq pétales distinctes insérés au sommet de la coupe)

Des termes à sens vieilli, qui ne sont plus employés aujourd'hui:

FLORIST, Ă (E: fr. *fleuriste*): Şi eu sunt florist. S II, 37 (Moi aussi je suis fleuriste).
«personne qui cultive les fleurs pour les vendre ; personne qui fait le commerce des fleurs ; personne qui confectionne des fleurs artificielles ou en fait le commerce »

Negruzzi envisage certainement ce terme avec le troisième sens attesté par le MDA, sous l'influence de l'étymon français.

L'un des aspects les plus intéressants que le chercheur peut étudier quand il s'intéresse à l'action de modernisation du lexique du roumain littéraire, telle que Negruzzi l'a faite, de manière systématique et consciente, est celui des ***calques***. Notre terminologie botanique contient un calque:

PREFLORIRE (E: *cf*. fr. *préfloraison*): Corola cu cinci petale...cu preflorire valvară. S I, 102 (La corolle à cinq pétales...avec préfloraison valvaire)

est un calque linguistique partiel (la première partie est empruntée, la deuxième traduit le mot floraison du modèle étranger imité) [3, 13]. En roumain, le sens de ce néologisme rare est de „preflorație" (at: Grecescu): « type de disposition des sépales dans le bouton floral ».

CONCLUSIONS

L'étude des éléments lexicaux néologiques du domaine botanique qui sont attestés pour la première fois chez Constantin Negruzzi nous a permis de mettre en évidence, dans une nouvelle approche, l'importance du rôle joué par l'écrivain roumain dans le processus de modernisation de la langue roumaine littéraire. Les néologismes que nous avons identifiés comme étant introduits en roumain particulièrement par le texte ***La Flore roumaine*** viennent confirmer le sens de la langue dont Negruzzi a toujours fait preuve. L'activité de Constantin Negruzzi ne représente pas un acte singulier, bien au contraire, elle s'inscrit dans une longue lignée qui comprend de grands savants et philologues qui ont mis leur esprit et leurs forces au service de la langue roumaine.

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HISTO-ANATOMICAL PECULIARITIES OF VEGETATIVE ORGANS OF *PHLOMIS TUBEROSA* FROM DAVID'S VALLEY RESERVATION IASI

PARTICULARITĂȚI HISTO-ANATOMICE ALE ORGANELOR VEGETATIVE DE LA PLANTELE DE *PHLOMIS TUBEROSA,* DIN REZERVAȚIA VALEA LUI DAVID, IAȘI

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Abstract: *In this paper the authors followed the structure of the vegetative organs of a Lamiaceae specie sometime cultured as ornamental plant. The type and distribution of the tector and secretory hairs (on the stem and on the leaves), the number, the frequency and location of the stomata, the structure of the mechanical and conducting tissues was followed. In the leaf, the palisade parenchyma is well developed, consist from very long and slim cells. The mesophyll is compact; the tector hairs are numerousness, multicellular and ramified, located in the lower epidermis. The primary xylem has vessels with strong lignified walls; in the secondary xylem fibers with very thick walls are predominant. The air spaces like lacunas are reduced or absent. All these features show the xeromorphic character of the species. In the stem structure, in all developmental stages, a typical primary endodermis could be observed. In the secondary phloem, especially at the stem basis, rare fibers could be observed.*

Rezumat: *In aceasta lucrare autorii au urmarit structura organelor vegetative de la o specie din familia Lamiaceae uneori cultivata ca planta ornamentala. Au fost urmarite tipul si distributia perilor tectori si secretori, atat pe frunze cat si pe tulpini, numarul, frecventa si localizarea stomatelor, structura tesuturilor mecanice si conducatoare. La nivelul frunzei tesutul asimilator palisadic este foarte bine dezvoltat, fiind alcatuit din celule foarte lungi si inguste. In general mezofilul este compact, iar perii tectori sunt foarte numerosi, pluricelulari ramificati localizati in epiderma inferioara. Tesutul conducator lemnos este format din vase cu peretii puternic lignificati iar in cazul tesutului lemnos secundar predomina fibrele lemnoase, de asemenea cu peretii ingrosati si lignificati. Spatiile cu aer de tipul lacunelor sunt reduse sau chiar absente. Toate aceste caractere expirma trasaturile xeromorfice ale acestei specii. La nivelul tulpinii se observa, in toate stadiile de dezvoltare, endoderma primara tipica. La nivelul liberului, mai ales spre baza tulpinii am observat rare fibre liberiene.*

INTRODUCTION

Phlomis tuberosa is an herbaceous perennial plant; roots are thick ropey, with tuberous thickenings. Stem are solitary or several, branched to apex, 25-70 cm long. Radical leaves are glabrous, or slightly pubescent, with long hairy petiole, blades tri-angular ovate, its base heart-shaped, crenate at margin, beneath simple or tunicate hairy, sometimes mixed with stellate hairs, very rarely stellate. The flowers appear as pompoms around the flower-stalk, in a multi-tiered effect

that's different from just about any other flower you'll encounter in the garden. Corolla is pink, 15-20 mm long, stellate, or long, tunicate hairy. After the flower stalks are cut back, the bold foliage makes an attractive mound to carry the plant through the season.

Concerning the definitive primary structure of the vegetative organs of some Labiatae species, summary information could be found both in various older publications and more or less new papers (Metcalfe and Chalk, 1979, Napp-Zinn, 1974). Ours attention is focused on: the protective and secretory formations, the general structure planes of axial organs, assimilating parenchyma structure, histogenesis of foliar lamina.

We don't find histo-anatomical data about *Phlomis tuberosa* in consulted literature. An extensive study related to *P. fruticosa* was made by Christodulakis in 1989 (leaf structure) and Psaras et al. (2004) (wood structure). Bech (1963) publish a paper concerning hair structure in *P. pungens* and Mosquero et al. (2005) investigate the nutlets of some *Phlomis* species from morphological and anatomical point of view.

MATERIAL AND METHODS

The vegetal material was collected from David's Valley reservation in July 2006 (anthesis phase). The vegetal material were fixed and conserved in ethanol 70%. The sections were made with free hand using a razor blade and colored with red-ruthen and methyl-blue. The photos were made after the obtained permanent preparates using an Olympus microscope with a C 330 photo camera.

RESULTS AND DISCUSSIONS

The adventitious rot

In the primary structure is tetrarch. It achieves early a secondary structure. The secondary xylem and phloem have ring shapes. In the external part multiple thin peridermis could be observed (consisting in one layer of suber and one layer of phelloderm) (photo 1).

The stem

In the top (under the inflorescence) (photo 2) the structure is already secondary. The contour has square shaped. The epidermis presents relative large cells, with a thin and cutinised external wall. In the stem corners four collenchyma bundles (angular type) could be observed. The cortex is thin, with 2-4 cells layers. The endodermis is from primary type, with large cells. The phloem has sieve tubes, sieve cells and parenchyma cells. The primary xylem presents vessels with thick and strongly lignified cells. The secondary xylem has a small number of vessels; the fibres a preponderant.

In the middle (photo 3) of the stem some modifications occurred. The collenchyma bundles become tangential. The cambium produced small vascular bundles (only with secondary structure) between the initial one.

At the stem basis, cambium produced ring shaped secondary tissues

(xylem and phloem). The secondary xylem has a lot of fibres with very thick walls. In the secondary phloem some fibres, with thick and lignified walls could be observed (photo 4). The pith is compact during all stem long.

The leaf (photo 5,6)

The petiole has V shape. In the middle 2 large, rounded vascular bundles could be observed; in the lateral parts 2 or 3 small vascular bundles are visible. In both epidermis tector hairs are presents and abundant.

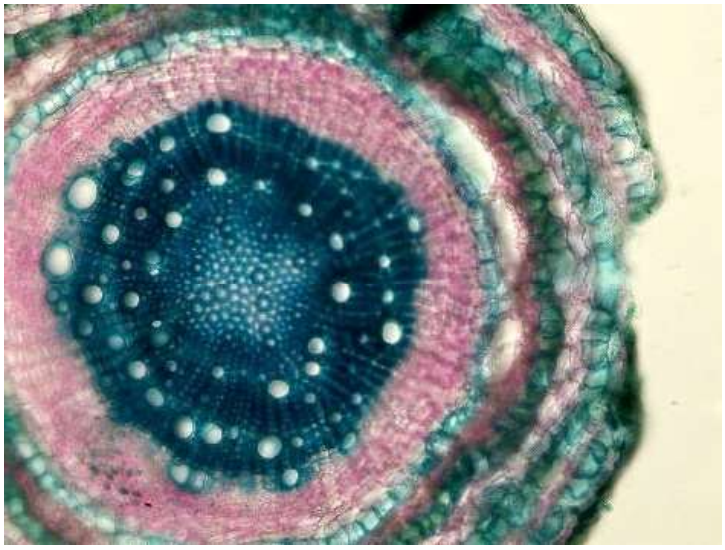

Photo 1 – Cross section through adventitious rot (x200)

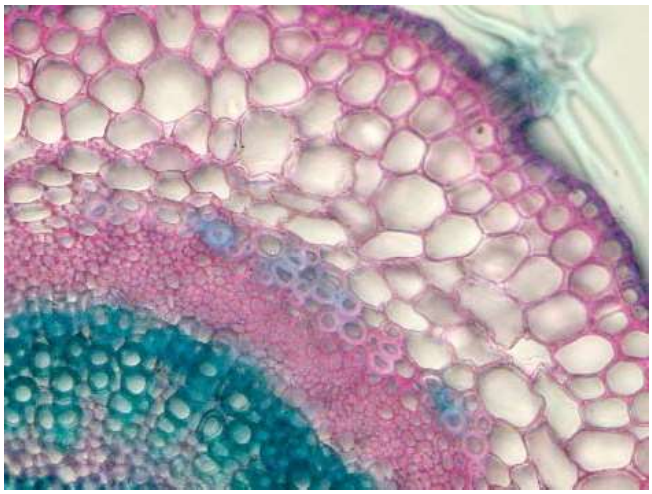

Photo 2 – Cross section through top of the stem (x400)

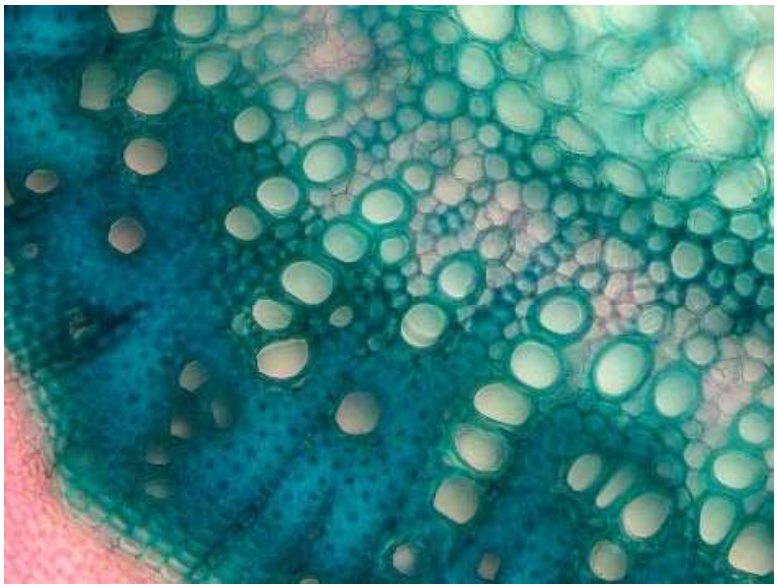

Photo 3 – Cross section through the stem (middle part) – details from primary and secondary xylem (x400)

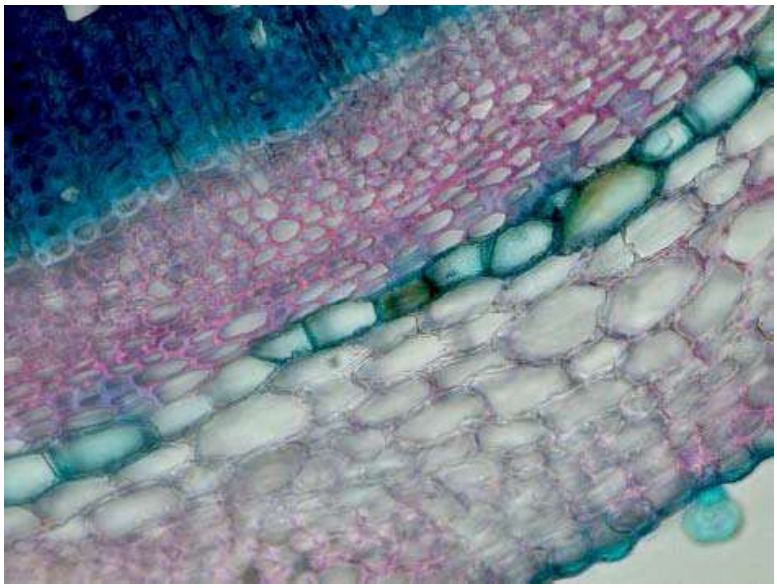

Photo 4 – Cross section through the stem (basal part) – phloemic fibres could be observed (x400)

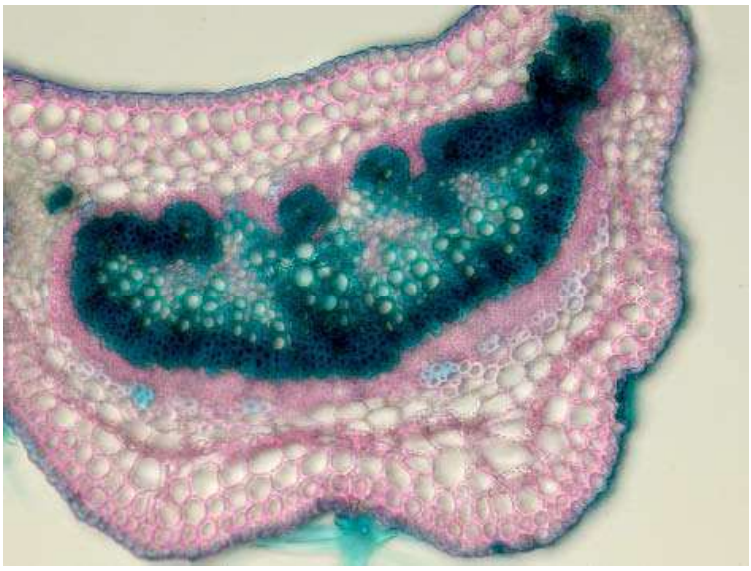

Photo 5 – Cross section through the leaf – the middvein zone (x200)

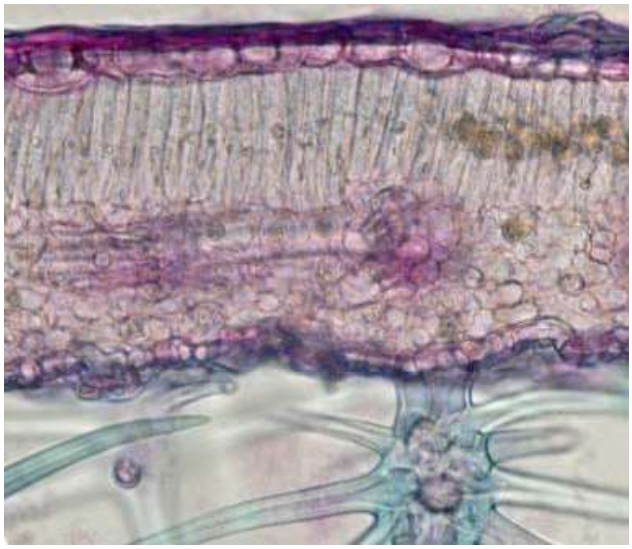

Photo 6 – Cross section through the leaf (x400)

The stomata are present only in lower epidermis. Tector and secretory hairs are numerousness in lower epidermis.

The upper palisade parenchyma ordinarily consisted of one layer of elongated cells, whereas the lower one of one layer of short cells. The spongy parenchyma contained small intercellular spaces, variously sized vascular bundles.

CONCLUSIONS

The general structure of the aerial vegetative organs is in concordance with the *Lamiaceae* pattern as it appears in the scientific literature. As a peculiarity, we signalled the presence of the fibres in the secondary xylem (which is quite unusual for the *Lamiaceae* species). The abundance of lignified cells (especially in secondary xylem), the small aeriferous spaces in all vegetative organs is markers for the xerophytism of this plant.

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CONSIDERATIONS UPON SOME TAXA FROM *POACEAE* FAMILY

CONSIDERAȚII ASUPRA UNOR TAXONI DIN FAMILIA *POACEAE*

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Abstract. *The anatomical features from three Poaceae taxa are discussed in relation with their ecological adaptation. For each of the axial organs studied are presented the more peculiar characteristics. Structural tipe of the leaf are interpredet correlated with new Clayton and Renvoize ideas.*

Rezumat. *Caracteristicile anatimice ale trei staxoni din familia Poaceae sunt analizate în corelație cu adaptările ecologice. Pentru fiecare dn organelle axiale studiate sunt prezentate caracteristicile mai representative. Tipul de structură al frunzei este interpretat în corelației cu părerile mai noi emise de Clayton şi Renvoize.*

Numerous morphological-anatomic studies have been conducted on representatives of the POACEAE family due to their economic importance. Many of these studies concentrated on the leaves of the gramineae and their annexes. Metcalfe [4] distinguishes between two types of leave structure: "festucoid" and "panicoid". Avdulov [1] also mentions two basic types of the leave anatomy in the Poaceae family, types that are similar to those described by Prat [6]. Based on the characteristics of the parenchyma sheath, Brown [2] proposes six types of leaves while Nikolaevski [5] shows that only three types of structures are present in poacee.

A more realistic view is given by Clayton and Renvoize [3] who highlight several subtypes of leave structure, also introducing the new crown (krantz) type of structure.

The structures of the species presented here are following the general plan of the *Poaceae* family. For each of the axial organs studied we will make obvious the more peculiar characteristics that are relevant for the ecologic adaptation.

MATERIAL AND METHOD

The vegetal material is represented by the three taxa: *Oplismenus hirtellus* (L.) P.Beauv., *Phalaris arundinacea* L. ssp. *picta* Janch. and *Stenotaphrum secundatum* (Walt.) Kuntze *'Variegatus'* (*Poaceae* family). All taxa were cultivated in Botanical Garden of Iaşi.

The fixation and processing of the material was done according to the usual protocol of the Vegetal Morphology and Anatomy Laboratory belonging to the Biology Department of the University "Al. I. Cuza" of Iaşi [7].

There were made cross sections at the middle level of the root, of the stem and of the leaves. As well there were made superficial sections at the leaf level. The

permanent preparations obtained were analyzed and photographed with the optical microscope type Novex.

RESULTS AND DISSCUTIONS

Adventitious root (fig. 1, 2). The exodermis is either one-layered (e.g. *Oplismenus hirtellus and Stenotaphrum secundatum 'Variegatus'*) or very thick (3-4 layers for *Phalaris arundinacea* ssp. *picta*) with cells having slightly suberified walls. The mechanical tissue is missing in *Phalaris arundinacea* ssp. *picta*.

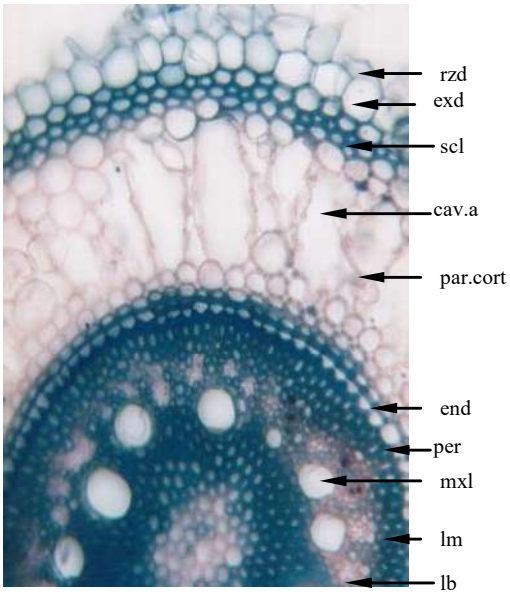


Fig. 1. *Stenotaphrum secundatum 'Variegatus'* – details of root

In the case of *Oplismenus hirtellus* and *Stenotaphrum secundatum 'Variegatus'* the last layer of the parenchyma contains cells with slightly lignified lateral and internal walls. Many of the cells in the middle layer of the parenchyma disintegrate, resulting in a multitude of aeriferous cavities.

In the central cylinder the vascular system is represented by 15 (or 10-12 for *Stenotaphrum secundatum 'Variegatus'*) xylem areas separated by the same number of phloem areas, the latter being significantly smaller than the former. In addition, large metaxylem central vessels, independent of the xylemic bundles, are present.

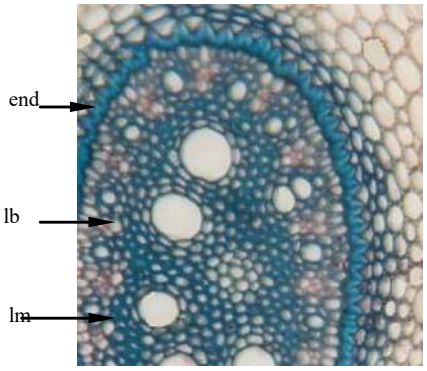


Fig. 2 *Phalaris arundinacea* ssp. *picta* - details of root

The pith is parenchyma-cellulose like (in *Oplismenus hirtellus*) while is slightly sclerified and lignified for the other two taxas.

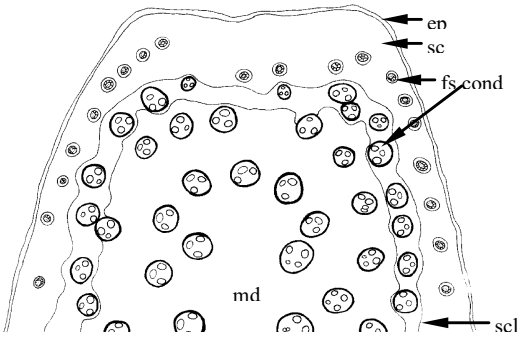


Fig. 3. *Stenotaphrum secundatum 'Variegatus'* – schema of stem

The stem: base internode (fig. 3, 4, 5)

In cross-section it has either circular or rounded rectangle (for

Stenotaphrum secundatum 'Variegatus') shape.

The epidermis is covered by a thick cuticle in the case of *Oplismenus*

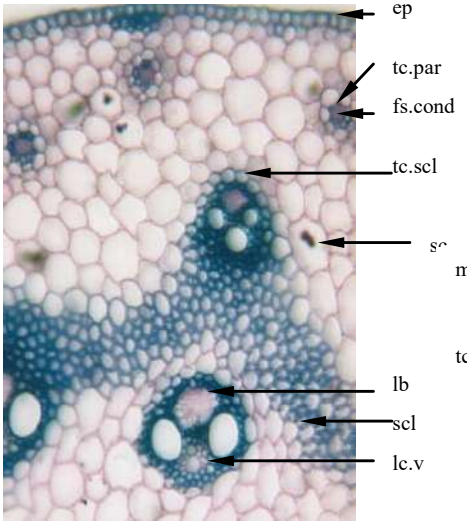
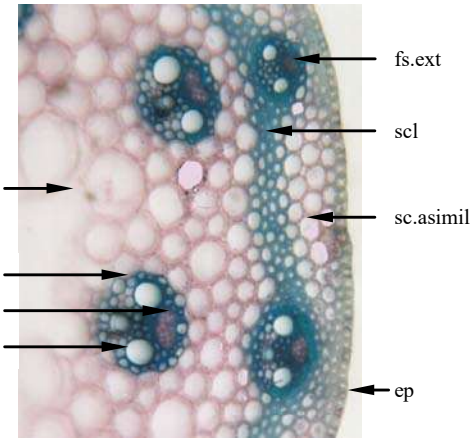


Fig. 4. *Stenotaphrum secundatum 'Variegatus'* – details of stem

Fig. 5. *Oplismenus hirtellus* – details of stem



hirtellus and *Phalaris arundinacea* ssp. *picta* and thin in the case of *Stenotaphrum secundatum 'Variegatus'*. Only for *Oplismenus hirtellus* and *Stenotaphrum secundatum 'Variegatus'* the hypodermic layer is sclerified, something that is never seen in *Phalaris arundinacea* ssp. *picta*. The cork is either totally assimilating (for *Stenotaphrum secundatum 'Variegatus'*), or it has the last layers consisting of a mechanical area pierced by closed collateral bundles.

The conducting tissues make up a large number of vascular bundles arranged in two almost concentric circles (less obvious in *Stenotaphrum secundatum 'Variegatus'*). These big bundles generally have aquiferous cavity

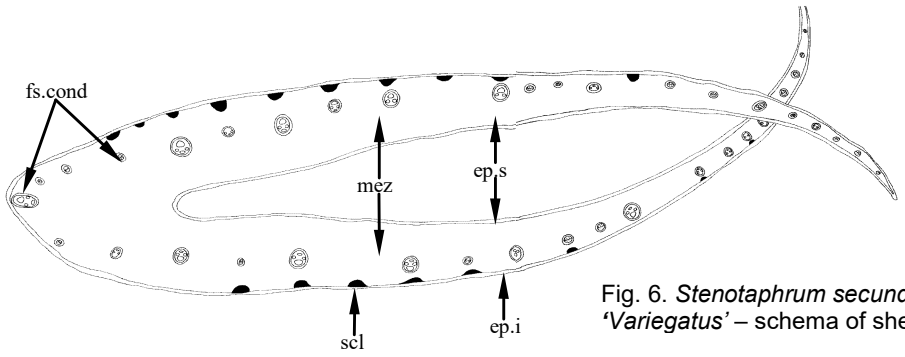


Fig. 6. *Stenotaphrum secundatum 'Variegatus'* – schema of sheath

and sclerenchymatous sheath.

The fundamental cellulose parenchyma, containing vascular bundles in three concentric circles (in the case of *Oplismenus hirtellus* şi *Phalaris*

arundinacea ssp. *picta*) is replaced in the centre of the stem by a large aeriferous cavity (in *Stenotaphrum secundatum 'Variegatus'*).

The leaf. The sheath (fig. 6,7). In cross-section it has the shape of an incomplete circle (for *Oplismenus hirtellus* and *Phalaris arundinacea* ssp. *picta*) and that of the letter **"U"** for *Stenotaphrum secundatum 'Variegatus'*.

The vascular system is made up by numerous phloem-xylemic bundles with collateral closed tips, some of them large, separated by much smaller ones.. The latter are represented only by the phloem (for *Oplismenus hirtellus*).

In between veins, the mesophyll is homogenous, parenchymatous; Relatively large aeriferous cavities are scattered in the central area of *Oplismenus hirtellus* and *Phalaris arundinacea* ssp. *picta*.

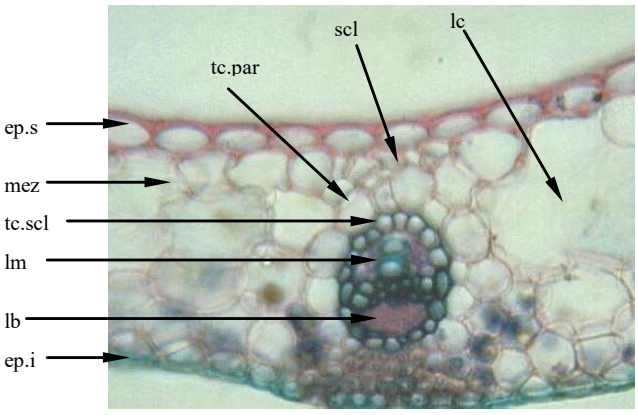


Fig. 7 *Oplismenus hirtellus* - details of sheath

The lamina (fig. 8, 9, 10, 11).

The epidermis, as seen from the front, displays elongated polygonal cells in parallel strings, amongst which halteriform stomata can be seen. Many of the epidermis short cells are turned into aculescent trichomes. They can be uni- (in *Phalaris arundinacea* subsp. *picta*) or bicellular. The stomata are present in the both epidermis.

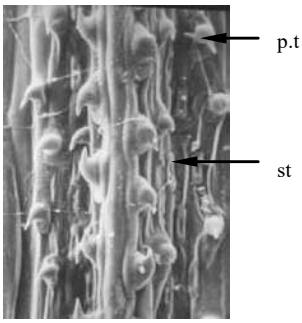


Fig. 8 -*Phalaris arundinacea* ssp. *picta* - details of lower epidermis

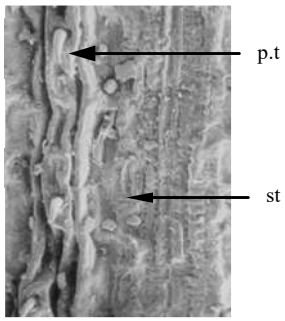


Fig. 9- *Oplismenus hirtellus* - details of upper epidermis

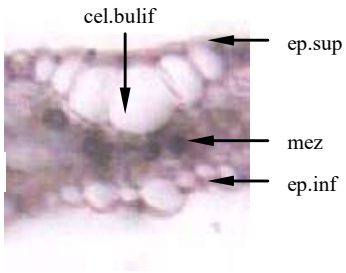


Fig. 10 -*Phalaris arundinacea* ssp. *picta* - details of bulliform cells

The upper epidermis shows numerous groups of bulliform cells: 5-7 very large cells (for *Oplismenus hirtellus*) or 2-4 cells (for *Phalaris arundinacea* ssp. *picta*). In the case of *Stenotaphrum secundatum 'Variegatus'* the upper face of the epidermis - hypodermis has very long cells which look like bulliform cells. The stomata are situated in the case of *Stenotaphrum secundatum 'Variegatus'* in the

upper epidermis, below the level of the epidermis cells, thus forming suprastomatal chambers.

The conducting tissues form large vascular bundles in the midvein and small ones between the lateral veins. The large bundles have a parenchymatous sheath and a sclerenchymatous sheat. The latter is present at *Stenotaphrum secundatum 'Variegatus'* only around phloem, cut off in the middle part. The mechanical tissue is constituted of groups of sclerenchymatic fibres placed next to the conducting bundles, always (for *Phalaris arundinacea* ssp. *picta*) or seldom (for *Oplismenus hirtellus*) coming in direct contact with these, but always in contact with the two epidermes.

For *Stenotaphrum secundatum 'Variegatus'* the small bundles are in a circular shape and they only have parenchymatous sheat; they are made up by

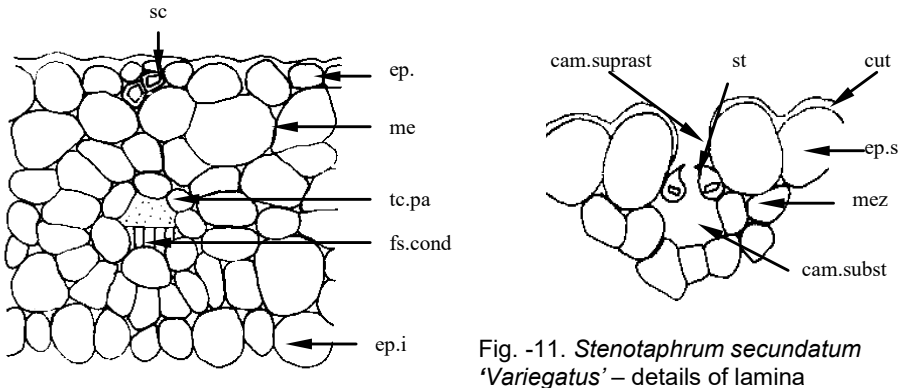


Fig. -11. *Stenotaphrum secundatum 'Variegatus'* – details of lamina

phloem elements, seldom accompanied by 1-2 small xylem vessels.

For *Oplismenus hirtellus* the mesophyll is clearly separated in unstratified

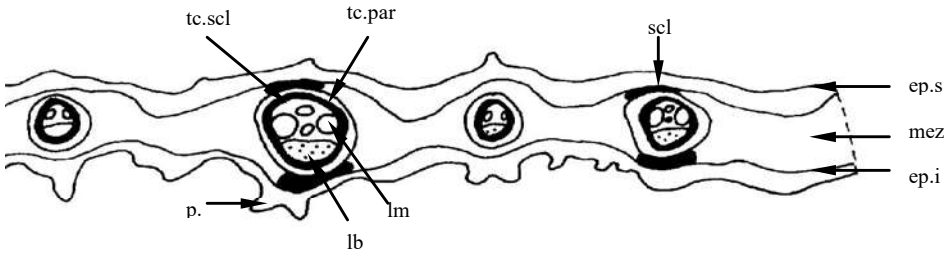


Fig. 12 -*Phalaris arundinacea* ssp. *picta* - schema of lamina

palisadic tissue and spongy parenchyma bi or tri-layered, thus the lamina has dorsiventral structure. The palisadic tissue takes up around 75% of the mesophyll's thickness. The palisadic cells in the vicinity of the conducting bundles are either oblique or perpendicular to them.

For the other two taxa the mesophyll is homogeneous, parenchymatic, with elongated cells placed tangential to *(Phalaris arundinacea* ssp. *picta*) or radial around the bundles *(Stenotaphrum secundatum 'Variegatus')*; the cells in the green areas contain chloroplast.

CONCLUSIONS

- Anatomical peculiarities of root are related with moist and dry habitats.

- Related with Clayton and Renvoize subtype, the leaf from *Oplismenus hirtellus* is non-krantz type, but with character from radial clorenchima subtype and palisade cells subtype.

- The leaf from *Phalaris arundinacea* ssp. *picta* is non-krantz type.

- The leaf from *Stenotaphrum secundatum 'Variegatus'* is krantz (crown) type, mestome sheath subtype.

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SUGARS METABOLISM UNDER PESTICIDES TREATMENTS AND PEST ATTACKS IN GRAPEVINE VARIETIES AT COTNARI VINEYARD

METABOLISMUL GLUCIDIC LA SOIURI DE VIȚĂ DE VIE DIN PODGORIA COTNARI, SUB EFECTUL TRATAMENTELOR CU PESTICIDE ŞI ATACUL DĂUNĂTORILOR

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Biological Research Institute Iasi

Abstract. *Plants have in generally, mechanism of degradation and store of the most commercial pesticides, even if the compositions of these products are unknown for them. Plants store the pesticides and metabolic products for a long time (Ferre, 1998). Our researches concentrated upon the behaviour of the some varieties of grapes and their physiological response at influence of pesticides, as well as attack of pest and phytopatogens. This work is concerning about the modifications of the parameters of sugars metabolism.*

Rezumat. *Plantele au in general, mechanisme de degradare si de depozitare ale celor mai multe din pesticidele comerciale folosite in combaterea bolilor si daunatorilor. Plantele descompun si depoziteaza produsii metabolici ai ale acestora, desi nu aceste produse nu sunt recunoscute de plante(Ferre, 1998). Cercetarile noastre s-au axat pe studiul raspunsului fiziologic a unor soiuri de vita de vie supuse actiunii bolilor si daunatorilor, in formula de combatere efectuata asupra podgoriei Cotnari.*

Plant metabolism could divide in three phases: transformation, conjugation and storing of some metabolic products. The first metabolic pathway known as enzymes of cytochrome P 450 catalyze the phase one reactions, decomposing pesticides through different mechanisms of transformations. Plants absorb systemic insecticides through phloemic flow when these are sprinkled over the leaves surface and the aphides die when they feed with the sap plant. The problems of pesticides are bioaccumulation and biomagnifications *(6, 8).*

MATERIAL AND METHODS

Physiological researches have taken the four varieties of grapevine from two farms in Cotnari vineyard. The varieties are: Feteasca alba, Tamaioasa Romaneasca, Grasa de Cotnari and Francusa (farm 4) and Feteasca alba and Francusa(farm 7).Sugars dosing in dry material were made by combined Bertrand with Borel methods. The investigations were performed in all important phenophases such as: blossoming, grapes growing and ripening.

RESULTS AND DISCUSSIONS

Monosaccharides

The greatest quantity of monosaccharides are observed in the phenophase of growing in Francusa, with 7.4 g % variety of grapes from farm 4 and the all the analyzed varieties of farm 7, probably because the intensive metabolism of the younger vineyard. In 2005, during the grapes growing are observed the decreasing of the monosugars, especially in Tamaioasa Romaneasca, as it is shown in fig. 2.

The same behaviour are observed next year during the phenophesis of fruit growing and ripening (fig. 4 -5).

Disaccharides

The most frequently in vineyard metabolism is sucrose. Some authors (Stoev, 1979) are the most important soluble carbohydrate contented in leaves and concluding, even the sucrose would be the first assimilate in photosynthesis(8). Sucrose is the transport form of the assimilated to the consumptions organs.

Our researches on the leaves content in disaccharides have shown that this parameter has a large register. Analyses performed on July, 2005 at Grasa de Cotnari-Paraclis (farm 4) cultivar, has the great concentration in disaccharides, which was of 10 g %. All others varieties leaves have not practically the disaccharides, composed mostly in sucrose in this phenophase of growth grapes. This phenomenon could be explained because the attack of the *Phylloxera* at leaves level. In this period when the leaves in chloroplasts synthesized in dark phase of Calvin Cycle the highest quantity of monosaccharides, Grasa de Cotnari cultivar concentrated the great amount of disaccharides, but the monosaccharides not decreasing considerable, in comparison with the others varieties(fig.2).

In 2006,the great quantity of disaccharides are observed in Feteasca alba variety (farm 4)-10.256 g %, followed by the Francusa and Feteasca alba varieties –appreciatively 7 g %(farm 4). All those highest values observed in blossoming phenophasis. At the following period, in grapes growing the disaccharides have a smaller variation, between 3.4 g % (Grasa-farm 4, Francusa-farm 7) until 5.167 g % (Tamaioasa-farm 4), as is showed in fig.4-5.

Insoluble polysaccharides

Insoluble polysaccharides are insoluble in water and in this category are the starch, celluloses, hemicelluloses and other. Insoluble sugars have a variation between 4.55 g % (Tamaioasa-farm4) until 2.06 g %(Grasa-farm 4). The greatest values are obtained in blossoming values. In grapes ripening, quantity of insoluble sugars registered the variations, relatively constant, between 1.683 g %(Feteasca alba-farm 7) descending to the 1.05 g % (Francusa-farm 4), as is shown in fig 5. Insoluble polysaccharides decreased in 2006, at fruit ripening, comparatively with 2005 (fig.3, 5).

In 2006 **soluble polysaccharides** varied to the 4.68 g % (Francusa-farm 4) to the 9.91 g %(Tamaioasa-farm 4) to 5.433 g % (Feteasca alba-farm 4), in blossoming phenophasis. The greatest values are around 9 g % found it in the

sweet varieties (Feteasca alba and Tamaioasa romaneasca). In phenophasis of grapes growing, the soluble sugars have a little variation. If the insoluble polysaccharides decreased, the soluble one increased in 2006, comparatively with the values registered in 2005(fig.3, 5).

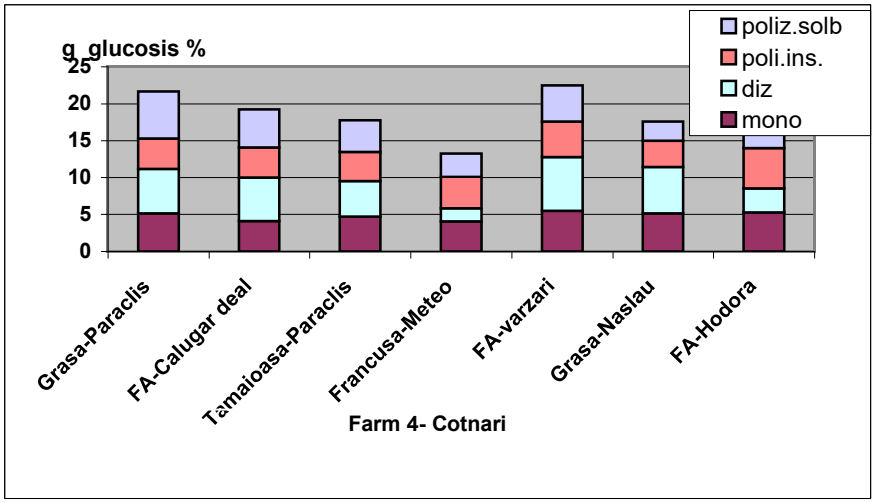

Fig.1 - Sugars metabolism on 2005.at different varieties of grapevine at blossoming phenophase after pesticides treatments

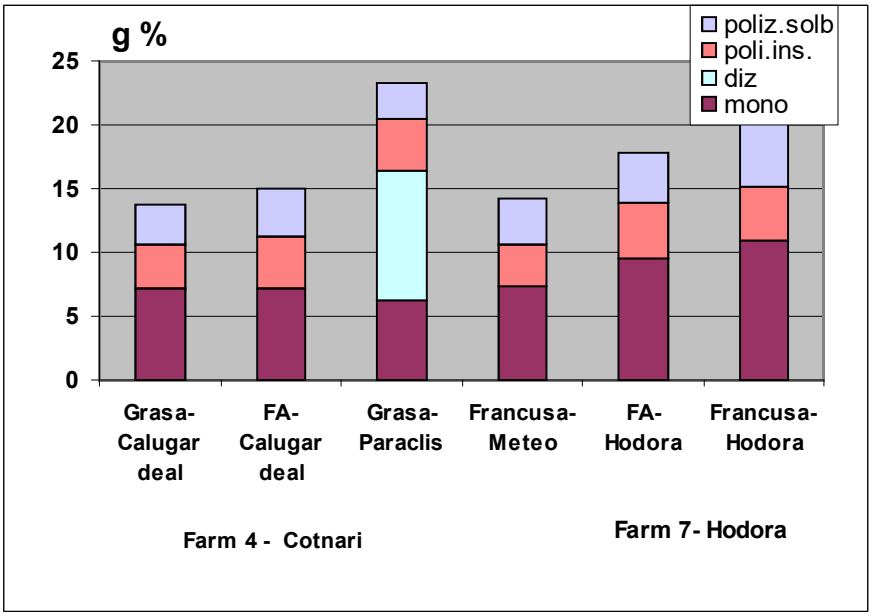

Fig.2 - Sugars metabolism on 2005 at different varieties of grapevine at growing grapes phenophase after pesticides treatments

Total sugars

The greatest values observed just before and during blossoming. Total quantity of sugars varied between 28.987 g %(Feteasca alba-farm 4) until 17 g % (Feteasca alba-farm 7and Francusa –farm 4). Great values are observed in varieties of Tamaioasa -23.76 g %, Grasa-20 g %, both from the farm 4, and in Francusa- 20 g %, farm7. The values are comparable with the following phenophasis, grapes growing.

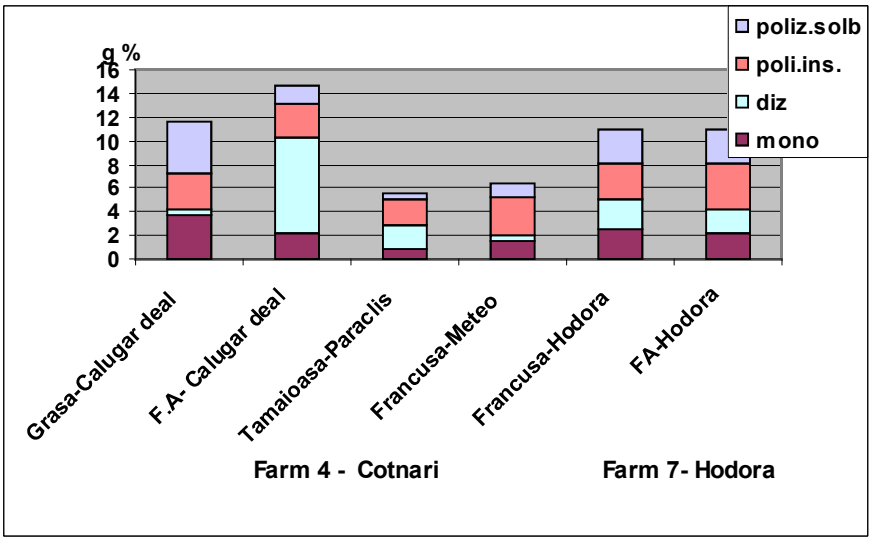

Fig.3 - Sugars metabolism on 2005 at different varieties of grapevine at ripening phenophase after pesticides treatments

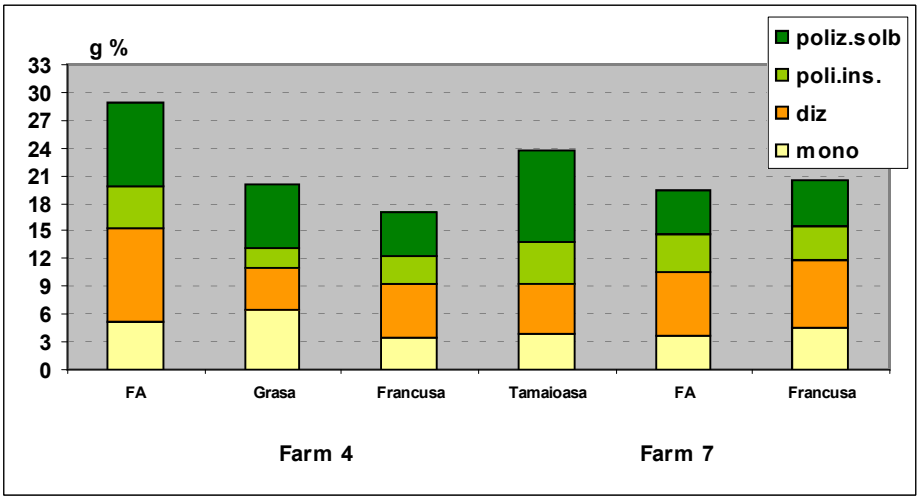

Fig.4 - Sugars metabolism at different varieties of grapevine at growing grapes phenophase after pesticides treatments on 2006

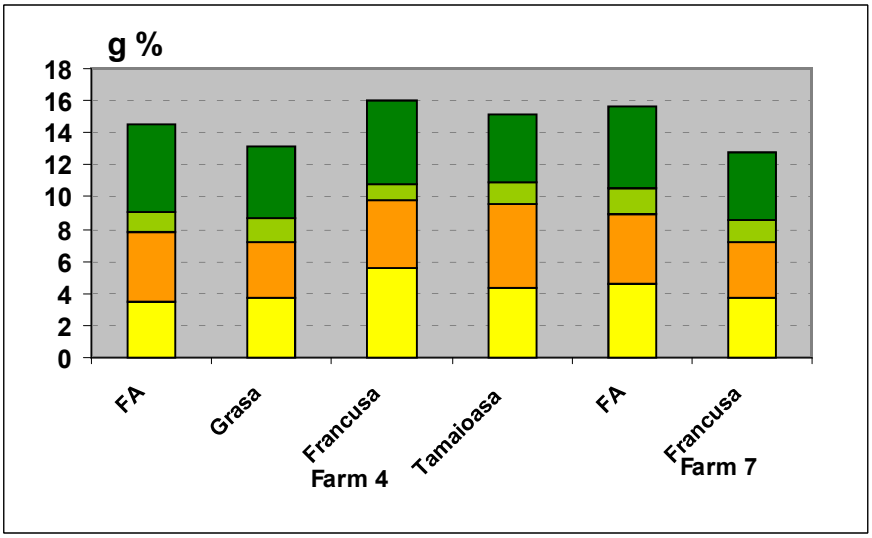

Fig.5 - Sugars metabolism at different varieties of grapevine at ripening phenophase after pesticides treatments on 2006

During year 2006, has observed the increasing total contents in sugars of leaves in blossom of vineyard, comparatively with last year, 2005. The greatest growing has observed in Feteasca alba variety-farm 4 which have 28 g %, with 10 times higher than last year(18 g %). This phenomenon happened because the increasing of the quantity of disaccharides and polysaccharides. In grapes growing, in 2006, the variety of Grasa de Cotnari has with 10 % more less total sugars in leaves. The total content of sugars in leaves has grown in this phenophasis in Francusa-farm 4 and Feteasca alba-farm 7 varieties.

The other varieties observed have the closed values of the total sugars during the two years of vegetations. In year 2006 we remarked the changing rapport between polysaccharides soluble and insoluble an increasing the quantity of those soluble in both phenophase. Our research have shown that after blossoming the sugars biosynthesis decreased until after grapes growth, as it is described in scientific literature (Stoev,1979).

CONCLUSIONS

The physiological researches have observed the behavior of the four parameters of sugars metabolism (mono-, di and polysaccharides) of some varieties of grapes.

Anlyses performed showed that in 2005, Grasa de Cotnari - Paraclis variety, have the great concentrations of disaccharides, in values of 10 g percentage

glucosis, because of some consumptions of plants (attacks of pests, such as *Phylloxera* in leaf level).

In the 2006, are observed the increasing the total amount of sugars during the flowering. The spectacular growth takes place in leaves of Feteasca alba (28 g %), with 10 times higher than last year (18 g %).

Physiological responses are given by the modifications of sugars, especially disaccharides amount is an important parameter of evaluation of stress plants, in case of attacks of pests.

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THE HARDENING INFLUENCE OF *Triticum aestivum* L. PLANTS ON THE MESOSTRUCTURE OF PHOTOSYNTHETIC APPARATUS

INFLUENȚA CĂLIRII ASUPRA MEZOSTRUCTURII APARATULUI FOTOSINTETIC LA PLANTELE DE *Triticum aestivum* L.

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Abstract. *The changes of the mesostructure of photosynthetic apparatus induced by hardening of common winter wheat (Tr. aestivum L.) plants have been studied in relation to the producing capacity level. The plants of four wheat cultivars (Balada, Belchianca 7, Dana and Beliztkaia 32) were grown in Mitcherlich pots in conditions of a vegetative house. The samples to study leaf mesostructure were collected at the three leaf stage before initiating the hardening process and in 14 days after the beginning of the lowered temperature action i.e. the conditions that ensure plant hardening. The findings have demonstrated that the productivity level is accompanied by certain changes in the leaf mesostructure - plant producing capacity increase results in a higher number of cells per surface unit, chloroplasts in a cell and leaf surface unit together with a higher volume of chloroplasts per surface unit. Against the background of these characters, the plant hardening has resulted in a higher number of cells per surface unit, a higher volume of a single chloroplast, a lower chloroplast volume per surface unit. The chloroplast number in a cell and the chloroplast number per surface unit have remained unchanged.*

Rezumat. *Au fost cercetate schimbările mezostructurii aparatului fotosintetic induse de procesul de călire a plantelor de grâu comun de toamnă (Tr. aestivum L.) în dependență cu nivelul de productivitate. Plantele a 4 soiuri de grâu (Balada, Belichanca, Dana şi Beliztkaia 32) au fost crescute în vasele Mitcerlih în condițiile casei de vegetație. Mostrele pentru studierea mezostructurii frunzei sau colectat în faza de 3 frunze până la inițierea procesului de călire şi peste 14 zile după începutul acțiunii temperaturilor scăzute – condiții care asigură călirea plantelor. Rezultatele obținute au demonstrat că nivelul de productivitate este însoțit de anumite schimbări privind mezostructura frunzei: cu majorarea productivității plantelor se măreşte numărul de celule intr-o unitate de suprafață, numărul de cloroplaste în celulă şi într-o unitate de suprafață a frunzei, concomitent majorându-se volumul cloroplastelor într-o unitate de suprafață. Pe fundalul acestor caractere legice, călirea plantelor a condus la majorarea numărului de celule într-o unitate de suprafață, la micşorarea volumului cloroplastelor într-o unitate de suprafață. Au rămas neschimbate numărul de cloroplaste într-o celulă şi numărul cloroplastelor într-o unitate de suprafață.*

INTRODUCTION

The resistance of common winter wheat to lowered and negative temperatures is well known to be related to the plant hardening process that leads to photosynthesis intensification (CO_2 assimilation), accumulation of sugars, proteins, starch and other organic substances ensuring plant protection. It is unclear whether these processes are associated with the mesostructure of photosynthetic apparatus, the changes of which are considered to be manifestations of photosynthesis regulation at the morphogenetic level ensuring optimization and adaptation of photosynthetic apparatus in different ecological conditions (5). It is just known that there is a close relationship leaf mesophyll indices and physiological process intensity.

The interconnection between the total surface of mesophyll cells and the foliar surface has a positive correlation with the CO_2 assimilation level (1,4,10). On the other hand, it has been shown that the photosynthetic apparatus structure is a result of a longterm species adaptation to the environmental conditions and displays plant functional particular features (2,3, 7-9).

This investigation has been carried ont as a part of morphophysiological studies performed at the Bioenergetics Laboratory of the Institute of Genetics and Plan Physiology, Academy of Sciences of the Republic of Moldova, aimed at revealing the changes in the mesostructure of photosynthetic apparatus of common winter wheat cultivars (*Tr. aestivum* L.) differing in productivity level, under the influence of hardening.

MATERIALS AND METHODS

The plants of common winter wheat (*Tr aestivum* L.) cultivars differing in productivity level (centner/ha) - *Balada* (41,7), *Belchianca* 7 (29,4), *Dana (* 27,3) and *Beliztkaia* 32 (20,0) provided by the Research Institute of Field Crops (Belzti, Republic of Moldova) were studied .

The plants of those cultivars were grown in Mitcherlich pots in conditions of a vegetative house. The soil humidity in the pots was maintained at the level of 70% FWC. The samples to study the leaf mesostructure were collected at the three -leaf – stage before initiating the hardening process and in 14 days after the beginning of the lowered temperature action, i.e. the conditions that ensure plant hardening.

The mesostructure of the photosynthetic apparatus was studied an leaf transverse sections using a BIOLAM microscope and A.T. Mocronosovs techniques (5, 6).

RESULTS AND DISSCUSIONS

The studies on the mesostructure of photosynthetic apparatus leaf thickness, the cell number per leaf surface unit, the chloroplast number per cell, chloroplast number per surface unit, volume of a chloroplast, and chloroplast volume per surface unit have revealed (table 1 a) that the

productivity level of common winter wheat (*Tr. aestivum* L.) cultivars is accompanied by certain changes in the leaf mesostructure – plant producing capacity increase results in a higher number of cells per leaf surface unit, a higher number of chloroplasts per cell and, surface unit, thought the volume of a single chloroplast on the contrary, is higher in the plants with a lower productivity level. Thus, 218 x 10^3 cells/cm^2 were calculated in the samples of productive cultivar- *Balada* (41.7 centner/ha), while that number made 175 x 10 cells/cm^2 in the cultivar with a lower productivity (*Beliztkaia* 32 – 20.0 centner/ha), and 827 x 10^4 and 506 x 10^4 chloroplast/cm^2, and a chloroplast volume of 382.7 x 10^6 and 267.9 x 10^6 mkm^3 per leaf surface unit were calculated in the above varieties, respectively.

Against the background of these characters, the plant hardening has resulted in a higher number of cells per surface unit in the *Balada* cultivars (218 x 10^3 cells before hardening and 224 x 10^3 cells after hardening*; Beliztkaia* 32 - 175 x 10^3 cells before hardening, 185 x 10^3 cells after hardening), and a volume of a single chloroplast has felled from 46,2 mkm^3 to 35,1 mkm^3 for the most productive cultivar (Balada) and from 52,8 mkm^3 to 414 mkm^3 for the least productive cultivar (*Beliztkaia* 32).

These essential modifications in the photosynthetic apparatus mesostructure induced by hardening are likely to be plant adaptation response that is manifested through the decrease of water content under the influence of lowered temperatures in the course of plant hardening.

Table 2 demonstrates that the water content in leaves decreased by an average of 5%, that was insufficient to have an influence on the leaf thickness; i.e. it did not result in an eventual wilt of plants, yet, the calculations showed it was suffice to result in a decrease of the volume of a single chloroplast by an average of 22,9% for the plants of the cultivars studied – *Balada* by 24,02%; *Belichanca 7* by 23,1%, *Dana* by 22,94%, and *Beliztkaia* 32 by 21,95%.

Thus, the same 5% decrease of the water content in leaves of all the cultivars studied had a different impact on the chloroplast volume in relation to the level of plant productivity - the highest decrease in the volume of a single chloroplast was observed in the most productive cultivar (*Balada*) and the lowest decrease in the volume of a chloroplast was observed in the least productive cultivar (*Beliztkaia* 32).

Table 1

The leaf mesostructure of common winter wheat (Tr. aestivum L.) cultivars differing in producing capacity

Cultivars	Productivity, centner/ha	Leaf thickness, mkm	Cells per cm^2	Chloroplasts per cell	Chloroplasts per cm^2	Volume of 1 chloro-plast,mkm	Chloroplast volume per cm^2
a) before hardening							
Balada	41,7	161± 1,2	218 x 10^3	38±1,0	827x10^4	46,2±1,2	382,7x10^6
Belichianca 7	20,4	167 ± 1,5	197x10^3	34 ± 1,0	668 x 10^4	48,9 ±1,0	327,5 x 10^6
Dana	27,3	160±1,2	190 x 10^3	32 ±1,0	608 x 10^4	49,7±1,3	302,1 x 10^6
Beliztkaia 32	20,0	164±1,0	175 x 10^3	29±1,0	506 x 10^4	52,8±1,2	267,9 x 10^6
b) after hardening							
Balada	41,7	162± 1,0	224 x 10^3	36±2,0	806x10^4	35,1±1,4	283,0x10^6
Belichianca 7	20,4	166 ± 1,6	205x10^3	33 ± 2,0	677 x 10^4	37,6 ±1,2	254,3 x 10^6
Dana	27,3	161±1,2	199 x 10^3	30 ±2,0	597 x 10^4	38,3±1,3	228,7 x 10^6
Beliztkaia 32	20,0	165±0,9	185 x 10^3	28±1,0	518 x 10^4	41,4±1,2	214,5 x 10^6

Table 2

The influence of common winter wheat (*Tr. aestivum* L.) hardening on the water content in leaves

№, differences	Water content %			
	Cultivars			
	Balada	***Belchianca 7***	***Dana***	***Beliztkaia 32***
	before hardening			
1	85,27 ±0,05	85,52 ±0,12	83,72±0,08	84,65 ±0,09
	after hardening			
2	80,16±0,12	79,79± 0,23	79,85±0,21	79,15±0,25
Δ (1-2), %	5,11	5,73	3,87	5,50

CONCLUSIONS

The studies on the photosynthetic apparatus mesostructure of common winter wheat cultivars differing in productivity level in relation to plant hardening have demonstrated the following:

1. The transition of the productivity level from the lowest to the highest one is accompanied by the increase of the cell number per surface unit, chloroplast number in cells, the chloroplast number per leaf surface unit, the chloroplast volume per leaf surface unit, the volume of single chloroplast being higher in the cultivars with a lower productivity level.

2. The hardening processes of plants have induced specific changes in the photosynthetic apparatus mesostructure i.e. the cell number per surface unit has increased, the volume of a single chloroplast has decreased; the chloroplast volume per surface unit has decreased.

The highest decrease in the chloroplast volume is characteristic of the most productive cultivar and the lowest one for least productive cultivar.

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PHOTORESPIRATION OF C-3 PLANTS IN RELATION TO SOIL HUMIDITY AND PRODUCTIVITY LEVEL

FOTORESPIRAȚIA C-3 A PLANTELOR ÎN RELAȚIE CU UMIDITATEA SOLULUI ŞI NIVELUL PRODUCTIVITĂȚII

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Abstract. *In this work new results are presented on relationship between photorespiration, level of productivity and plant resistance (species, varieties, cultivars with C_3 - metabolism) to hydric stress. It has been established that the plants of more productive genotypes are assisted by a lower level of photorespiration (CO_2 elimination and glycolate oxidase activity). The resistant genotypes to edaphic drought are characterized by a higher level of photorespiration compared to unresistant genotypes. The action of hydric stress on plants of unresistant genotypes to edaphic drought is manifested by a substantial deceasing of the both dry organic matter accumulation process and photorespiration. It is shown that the influence of steroidical biological active substance (BAS) - "Ecostim" on plants of unresistant genotypes to edaphic drought is manifested in modification of consequences, induced by edaphic drought and it is characterized by an increased dry organic matter accumulation process and much more reduced photorespiration level.*

Rezumat. *În lucrarea dată se aduc rezultate noi privind legătura dintre fotorespirație, nivelul de productivitate şi rezistența plantelor (specii, varietăți, soiuri cu C_3 - metabolism) la stresul hidric. Se demonstrează că genotipurile cu un nivel mai ridicat al productivității plantelor sunt asistate de un nivel mai scăzut al fotorespirației (eliminarea de CO_2 şi activitatea glicolatoxidazei). Genotipurile mai rezistente la secetă se caracterizează printr-un nivel mai înalt al fotorespirației față de genotipurile mai puțin rezistente. Acțiunea stresului hidric asupra plantelor genotipurilor nerezistente la seceta edafică se manifestă prin diminuarea substanțială a procesului de acumulare a substanței organice şi a nivelului de fotorespirație. S-a evidențiat că influența SBA de natură steroidică "Ecostim" asupra genotipurilor nerezistente la seceta edafică, se manifestă prin modificarea consecințelor, induse de seceta edafică şi se caracterizează prin sporirea procesului de acumulare a substanței organice uscate şi reducerea şi mai aprofundată a nivelului de fotorespirație.*

Gas exchanges (CO_2, O_2) at the plant level determines the intensity of productivity process and it is concomitantly developed in framework of three processes as photosynthesis, respiration and photorespiration.

The role of photorespiration is not elucidated definitivly yet. But it is well known that during photorespiration up to 50% of photosynthesis products are consumed. Photorespiration is not accompanied by oxidative phosphorilation of ADP and the reduction force of $NADPH_2$ accumulated in photosynthesis is used for the reduction of molecular oxygen and through this the energetic function of

photorespiration becomes zero and lead to the energy loss. In this context it was supposed that the productivity of C_3 plants could be doubled if the energetic losses and photosynthesis products might be decreased. The attempts in this direction (2) have been done for 30 years to find out plants with lower photorespiration level by application of some specific photorespiration inhibitors, by obtaining of mutant forms and more detail investigations on biochemistry of photorespiration process have shown that this problem (the increasing of plant productivity by reducing of photorespiration level) has not a positive resolve. But during these studies it was established that photorespiration represents a component of production process. Analysis of these data permitted us to state that there are not so many investigations on photorespiration level and its role in formation of plant productivity in relation to the level of plant productivity and resistance

The aim of this study consisted in elucidation of photorespiration level for different C_3 plant genotypes differing in their productivity level and resistance to edaphic drought.

MATERIALS AND METHODS

To elucidate the photorespiration level and glycolate oxidase (GO) activity in relation to plant productivity level the following C_3 - crop plants were used: Soybean cultivars (centner/ha) – *Timpurie* (18.5), *Belisztkaia* 82 (22,5), *Bucuria* (23,8), *Aura* (30,7). Pea cultivars (centner/ha) – *Moldavskii usatii* (19,2), *Renata* (26,4), *Vomo* (28,5), *Gloria* (32,2). Sugar beet cultivars (centner/ha) – *Vilia* (300), *Victoria* (400).

In studies on photorespiration level in relation to resistance level of plants to edaphic drought the following soybean cultivars (*Bucuria* – resistant to edaphic drought; *Ghiza* – unresistant to drought) and been cultivars (*Fetanisia* – resistant and *Aluna* – unresistant to edaphic drought) were used. The experiments were effectuated in a greenhouse under controlled environmental conditions especially with respect to soil moisture. Two levels of soil moisture was used in experiments; 60% - optimal conditions and 25-30% of water content in the soil from total water soil capacity, which provided the edaphic drought conditions. Photorespiration was determined on the base of CO_2 eliminated in the assimilation chamber of the Installation for studying of respiration, photorespiration and photosynthesis (1) after switching off the light for the first 10 minutes.Glycolate oxidase activity was determined according to the method (3).

RESULTS AND DISCUSSIONS

The balance of CO_2 exchange in leaves under the light action consists of two processes – photosynthesis and photorespiration. The both processes have the beginning in the chloroplasts, but photorespiration continues in peroxisomes, then in mitochondria, where CO_2 is eliminated. In peroxisomes the oxidation of glycolate takes place in the reaction catalyzed by glycolate oxidase (GO) with glyoxilate formation, followed by the series reactions that lead to CO_2 elimination. It means that the elimination level of CO_2 in peroxisomes depends on the GO activity. The obtained results on determination of GO activity show that investigated crop species differ by the enzyme activity level in leaves (Fig.1). The highest GO activity is observed in sugar beet leaves, followed by decreasing enzyme activity in soybean and pea cultivars (fig.1 a, b, c)

The comparative analyze of GO activity in relation to productivity level demonstrates that there is a tendency of correlation between these two indices for eacg species. An increased GO activity is demonstrated in cultivars with lower level of productivity and inverse in cultivars with the highest level of productivity the GO activity is decreased (fig.1 a, b, c). So, the GO activity correlates with productivity level. This correlation is confirmed by the elimination level of CO_2 in photorespiration process of the same cultivar plants.

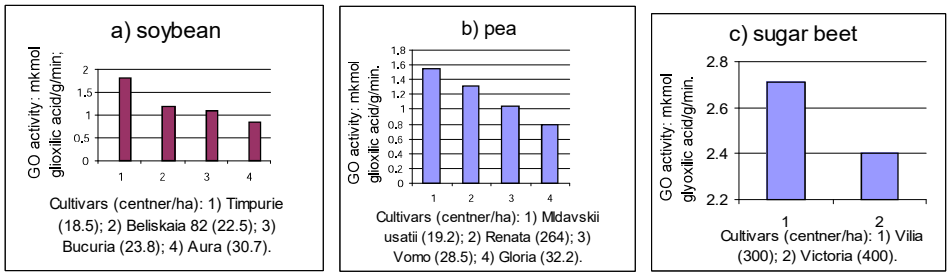

Fig.1. - Glycolate oxidase (GO) activity in crop leaves differing in productivity level.

Soybean cultivar with a lower productivity level (*Timpurie* – 18,5 centner/ha) has the highest respiration level – 3,27 µmoli CO_2 /sec/m^2, while the cultivar plants with the highest productivity level demonstrates the less level of photorespiration – 1,19 µmoli CO_2 /sec/m^2. The soybean cultivars *Beliztkaia* 82 and *Bucuria* which have approximately the same productivity level (22,5 and 23,8 centner/ha corresponding) showed approximately the same photorespiration level –2,29 and 2,68 µmoli CO_2 /sec/m^2 correspondingly. So, obtained results demonstrate that the increasing of productivity level for different plant species and cultivars is accompanied by the decreasing of plant photorespiration level. In such away a question appear: what are the processes, that provide the protective mechanisms of respiration – through the decreasing of photorespiration level or its amplification? In table 1 the data is presented on studying of photorespiration level for various species and cultivars differing in plant resistant level.

Table 1

Photorespiration for soybean and been plants under optimal conditions of growth

Specie cultivars	Year of experiments	Plant resistance	Soil humidity, % from total soil water capacity	Photorespiration, µmoli CO_2 /sec/m^2
Soybean				
Bucuria	2004	resistant	60	2.82 ± 0.4
Ghiza	2004	unresistant	60	1.83 ± 0.3
Bucuria	2005	resistant	60	1.46 ± 0.14
Ghiza	2005	unresistant	60	1.17 ± 0.01
bean				
Fetanisa	2002	resistant	60	0.44 ± 0.02
Aluna	2002	unresistant	60	0.34 ± 0.03
Fetanisa	2005	resistant	60	1.08 ± 0.16
Aluna	2005	unresistant	60	0.84 ± 0.01

The results demonstrate that plants of more resistant genotypes (soybean cultivar - *Bucuria* and bean –cultivar *Fetanisa*) have a higher photorespiration level

than plants of unresistant genotypes (soybean cultivar- *Ghiza* and bean cultivar – *Aluna*). These differences were observed for the period of two years (table 1) and also at different time intervals during the period of 27 days of plant growth under optimal conditions of soil humidity (60%) (table 2). The accumulation process of plant dry organic matter as total plant productivity characterizes the intensity of production process. The evidence of changes in this process under stress conditions comparative to changes in photorespiration process could more or less demonstrate the role of photorespiration in plant resistance to abiotic unfavorable factors. Analysis of the data presented in table 3 demonstrates that the action of water deficit in soil (30%) diminishes the accumulation process of plant dry organic matter approximately by 18% after one week of edaphic drought, by 29% after 2 weeks of edaphic drought and by 55% in 27 days of plant growth under permanent conditions of edaphic drought (30%).

The utilization of steroidal biological active substance "Ecostim" not only diminished essentially the consequence of edaphic drought action on the accumulation process of dry organic matter, but also led to the amplification of this process under the conditions of soil humidity insufficiency (table 3).

In the same experiments, which lasted for three years, the photorespiration level was studied and in relation to climate conditions of respective years. It was found out that the photorespiration level varied for the same cultivars (table 4) under optimal conditions of plant development.

But it is clearly observed the "phenomena" of considerably photorespiration diminishing in both soybean and bean cultivars grown under the edaphic conditions (table 4). This "phenomena" is much more evident in soybean and bean plants grown from seeds treated by BAS "Ecostim" water solutions before sowing.

The comparative analyzes of 2004 year data on concomitantly studies of accumulation dry matter process (table 3) for soybean plants (*Ghiza* cultivar – unresistant to drought) and photorespiration level (table 4) demonstrates an decreasing for 30 % in accumulation dry matter process of plants grown and subjected to edapfic drought conditions (soil humidity - 30 %) for two weeks comparing to plants of optimal conditions (soil humidity - 60%). In plants grown in the same conditions, but the seeds of which were treated with BAS "Ecostim" water solutions before sowing the intensity of accumulation dry matter process was diminished only by 15%. The photorespiration level in these plants decreased approximately by 38 %, while in plants of optimal conditions (soil humidity - 60%) and subjected only to drought action (without "Ecostim" application) photorespiration level decreased only by 7 %.

So, phenomenological the photorespiration level of C_3 – plants demonstrates a genotypic character. This character of photorespiration is changed under the action of exogenous factors (insufficient of soil humidity, biological active substance "Ecostim"). Both edaphic drought and BAS "Ecostim" induce processes that decrease considerably the level of plant photorespiration.

Table 2

Photorespiration of soybean plants under optimal conditions of growth at different time intervals

Soybean cultivars	Year of experiments	Plant resistance	Soil humidity, % from total soil water capacity	Photorespiration, μmoli CO_2 /sec/m^2				
				06.07	13.07	19.07	26.07	12.08
Bucuria	2004	resistant	60	3.13 ± 0.19	3.10 ± 0.002	2.82 ± 0.11	3.17± 0.3	1.83 ±0.03
Ghiza	2004	unresistant	60	1.76 ± 0.04	1.69 ±0.03	1.83 ±0.3	1.62 ±0.15	1.27 ±0.12

Table 3

The influence of humidity deficit in soil on the process of dry matter accumulation

Specie cultivars, BAS treatment	Soil humidity, % from total soil water capacity	The dynamics of dry matter accumulation (g/plant)				
		06.07.2004	13.07.2004	19.07.2004	26.07.2004	02.08.2004
Ghiza	60	1.31 ± 0.17	3.03 ± 0.25	4.61 ± 0.71	8.95 ± 1.58	13.09 ± 0.88
Ghiza	30	1.31 ± 0.17	2.54 ± 0.30	3.30 ± 0.13	4.50 ± 0.78	5.90 ± 0.13
Ghiza +Ecostim*	30	1.71 ± 0.13	3.31 ± 0.15	4.02 ± 0.06	5.00 ± 0.31	7.32 ± 0.79

* biological active substance (BAS).

Table 4

The influence of edaphic drought and biological active substance "Ecostim" on the soybean and bean photorespiration level

Specie cultivars, BAS treatment	Year of experiments	Plant resistance	Photorespiration, μmoli CO_2 /sec/m^2 Soil humidity, % from total soil water capacity	
			60 %	30 %
Aluna (bean)	2002	unresistant	0.34 ± 0.02	0.34 ± 0.03
Aluna (bean) + Ecostim	2002	unresistant	0.34 ± 0.03	0.10 ± 0.02
Ghiza (soybean)	2004	unresistant	1.83 ± 0.03	1.69 ± 0.01
Ghiza (soybean) + Ecostim	2004	unresistant	1.83 ± 0.01	1.13 ± 0.01
Ghiza (soybean)	2005	unresistant	1.28 ± 0.01	0.30 ± 0.01
Ghiza (soybean) + Ecostim	2005	unresistant	0.89 ± 0.01	0.23 ± 0.04
Aluna (bean)	2005	unresistant	0.84 ± 0.01	0.37 ± 0.04
Aluna (bean) + Ecostim	2005	unresistant	0.70 ± 0.01	0.0 ± 0.0

For the bean plants (*Aluna* cultivar) in the hydric stress conditions, application of BAS "Ecostim" reduced photorespiration up to zero. It means that the plants with C_3 – metabolism, which are characterized by the presence of photorespiration, become like plants with C_4 – photosynthesis type, in which the photorespiration is not evidenced and the elimination of CO_2 takes no place. Our results permit to conclude that the decreasing level of photorespiration level under the action of edaphic drought and BAS "Ecostim" is axed on different vectors of plant growth and development. In the case of edaphic drought action the decreasing of photorespiration level takes place concomitantly with the diminishing of plant dry matter accumulation process. These data represent an indicator of disturbances of plant metabolism. While at the application of BAS "Ecostim" the diminishing level of photorespiration is accompanied by an intensification of dry organic matter accumulation process. These data and results mentioned above, which demonstrate that the highest productivity level is assisted by a lower level of photorespiration conduct to a suggestion that the literature conclusions (2) on increasing plant productivity by the reduction of photorespiration level could not have perspective, at least they are contradictory.

CONCLUSIONS

1. The plants of more productive genotypes are assisted by a lower level of photorespiration (CO_2 elimination and glycolate oxidase activity).

2. More resistant genotypes to edaphic drought are characterized by a higher level of photorespiration compared to less resistant genotypes.

3. The action of hydric stress conditions on plants of unresistant genotypes to edaphic drought is manifested by a substantial decreasing of the both dry matter accumulation process and photorespiration level.

4. The influence of steroidal BAS "Ecostim" on plants of unresistant genotypes to edaphic drought grown up under hydric stress conditions is manifested by modification of consequences, induced by edaphic drought and is characterized by an increasing accumulation process of dry organic matter and much more reduced photorespiration level.

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TWO CONSECUTIVE PHASES OF WATER STATUS MODIFICATION IN PLANTS LEAVES UNDER ACTION OF LOW TEMPERATURES

DOUĂ FAZE CONSECUTIVE DE MODIFICARE A STATUSULUI HIDRIC AL FRUNZELOR PLANTELOR SUB ACȚIUNEA TEMPERATURILOR SCĂZUTE

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Abstract. *Under controlled conditions, which imitate late-spring cold weather and frosts, there has been investigated water status of the grapes leaves on the initial stage of sprouts intensive growth. There have been found two phases of water status modification under low-temperature stress. Within the plants tolerance limits low temperature action leads to the increase of water contents in tissues due to the free water, situated in apoplast and vacuoles, at the water contents decrease in cytoplasm. At temperatures, which cause deteriorations, there takes place the total water decrease, as well of free water in symplast, conditioned probably by the cell membranes integrity deterioration. There are discussed the peculiarities of leaves water status in regard of their genotypic and phenotypic resistance to low-temperature stress.*

Rezumat. *În condiții modelate ce imitau temperaturile scăzute şi îngheţurile târzii de primăvară s-a studiat statusul hidric al frunzelor plantelor de viță de vie la începutul fazei de creştere intensivă a lăstarilor. Au fost evidențiate două faze consecutive în modificarea statusului hidric al frunzelor condiționată de stresul termic. În diapazonul toleranței plantelor acțiunea temperaturilor scăzute provoacă sporirea hidratării țesuturilor, apei libere localizată în apoplast şi vacuole pe fondalul diminuării hidratării citoplasmei; în diapazonul temperaturilor deterioratoare se atestă o diminuare evidentă a conținutului de apă totală, inclusiv în simplast, condiționată de deteriorarea sistemului membranar. Se discută particularitățile statusului hidric al frunzelor în funcție de rezistența genotipică şi fenotipică a plantelor la acțiunea temperaturilor scăzute.*

Low temperatures and late frosts during spring time represent an important and specific factor in regard of plants cryoresistance problem. In contrast to the mode of frost bear during winter time the surviving of perennial plants under conditions of low temperatures and late spring frosts could be ensured by their capacity to maintain stability of metabolic processes integration and coordination and structural-functional integrity. At the temperature modification plants react through modification of membrane structure and composition, flux of ions and metabolites between cellular compartments, enzymes functioning *(Daniel Come, 1992; Shizuo Ioshida, 1994; Milon F.George and M.J.Burke, 1977)*, cytoplasm acidity *(Sing J., Laroche A, 1988)*, structure and function of photosynthetic apparatus *(Denis P. Maxwell, Stefan G. Trick, Huner N.P.A., 1994)*, water exchange *(Dument Vincent, 1992)*. Traditionally water state in

cells is determined by estimation of its retention capacity using solutions with different water potential (the dehydration force). Extension of investigations upon mechanisms of water retention, the barrier function of cellular membranes, deterioration of water conductibility of the complexes plasmolemma – cell wall, appreciated as a non-specific effect caused by the action upon plants of different unfavorable factors *(Ionenco I.F., Goleadina L.V., 1999*), demonstrates that information about water state in plants supposed to the low temperatures action on the molecular level is insufficient. On the base of special literature analysis and own experimental results we assume that the main integrated deterioration factors conditioned by the action of low temperatures and late spring frosts could be divided in functional disorders of the organisms and derangements of cellular and subcellular structures as the result of water freezing; plants tolerance under present conditions is mainly determined by the thermal gradient of the main parts of metabolism, their capacity for reparation as well as by the limits of the supercooling temperature of water in tissues, which exceeding leads to freezing. Coming from these premises there have been studied the peculiarities of water state in grape plants under conditions of hypothermal stress.

MATERIALS AND METHODS

Investigations have been realized at the beginning of the sprouts' intensive growth phase of different varieties of vine according to their ecologico-geographical origin, grown in phytotron under conditions, which imitated low temperatures and late spring frosts. The temperature has been gradually decreased by 2-5 °C/hour, from 18-25 °C down to 2, 0, -2, -3, -5 °C after that the temperature was gradually brought to the initial gradation (fig.1). Via regulation of the plants' exposition duration at the different gradations of the low temperatures there have been imitated different situations of the hypothermal stress and after that the samples for analyses were collected.

For more detailed studying of the water compartmentalization modification aspects in leaves' tissues there has been carried out model experiment with cultivation of two soy varieties: Mida and Soier 3, plants of which were supposed to the action of low temperature of 2°C during 48 hours.

The components of water statuse have been detemined by the method of NMR-relaxation of water protons *(Carr H.Y., Purcell E.M., 1954; Harciuc O., Aksionov S., Chirilov A., Toma S., 2003).* Water fractions content has been calculated using the range of echo-signals registration of 30-80 msec and 3-8 msec..

RESULTS AND DISCUSSIONS

In the model experiment with soy plants there has been revealed that low temperatures action leads to the redistribution of water between different fractions (according to its localization). Within plants' tolerance low temperatures action conditions increase of water quantity in apoplast and vacuoles (free water) and simultaneous decrease of water in cytoplasm, although the total water content in tissues remains almost on the same level or even slightly higher. In plants supposed to the action of temperatures that provoke deteriorations the tissue dehydration takes place as well as the considerable decrease of free water (fig.2, tab.1). In our experiments there has been proved that temperature of 2^0C was tolerant for soy plants

cv. Soier (with higher resistance) and deteriorative for those of cv. Mida. Increase of free water content, as primary reaction of plants could have an indirect protective character, because additional water quantity containing more thermal energy needs a longer period of time for leaves temperature decreaseto the deterioration level. Infiltration of soy plants' leaves (non-resistant cv. Mida), supposed to the low temperatures action with paramagnetic solutions during long time leads to the considerable modifications of the NMR-relaxation of water protons curves: delay in echo-signals attenuation simultaneously with their amplitude decrease. The analysis of these modifications demonstrates that after action of cold in leaves' cells with reduced content of free water, mainly vacuolar, vacuoles maintain the reparation capacity but not at the same level with control plants that have not been stressed. The increase of protons relaxation time of water remained in symplast indicates on two possible effects: fusion of undamaged vacuoles in bigger vacuole formations or diminution of water permeability in complexes plasmalemma – cell wall.

Table 1

Modification of some water status parameters in soy plants leaves under low temperatures action

Temperature	Total water		Free water
	mg/mg m.u (NMR)	% m.v	mg/mg m.u (NMR)
cv. Mida			
	1,95	66,10	1,25
2 °C	1,32	56,90	0,68
cv. Soier 3			
15 °C	1,83	64,76	0,97
2 °C	1,92	65,75	1,07

The character of NMR-relaxation of water protons curves at cv. Soier 3 (resistant) soy plants leaves infiltrated with paramagnetic solution after action of cold reveals the increase of permeability of the complexes plasmalemma – cell wall for water; these plants demonstrate higher capacity to retain water in leaves' tissues that permits them not only to maintain water homeostasis but to increase their watering.

On the base of comparative analysis of these peculiarities of water protons NMR-relaxation curves as indexes of primary deterioration provoked by cold accompanied by the major loss of symplast water there could be assumed the fusion of vacuolar compartments during the reparation process by infiltration of water status in the leaves' tissues. Using the NMR-relaxation method in study of interrelation of water state and functional characteristics of membranes in roots of wheat plants *Şvaleova A.L. (2001)* has established that high permeability of cellular membranes towards water has positive role in maintenance of plants tolerance to the low temperatures action.

It is necessary to mention that increase in free water content at the low temperatures action is more pronounced during darkness period that has an adaptive character that has been demonstrated by us in experiments with vine plants supposed to the action of frost (fig.3). During night frosts (-2^0C), in special repeated ones repeated ones increases leaves' hydration but on the cellular level takes place the increase of vacuoles' dimensions and sharply decreases water quantity with extremely rapid relaxation of water protons echo spin. Under this experiment condition the

biologic result of the extended action of cold on the vine plants becomes apparent through deterioration of sprouts' tops at some plants that leads to the division of lot in phenotypes with higher and lower (more sensitive) resistance.

During the cold season there takes place the increase of dry substance per unit of foliar surface. At first this phenomenon occurs at sensitive phenotype achieving the maximal values after 22 hours of experiment at temperature of 0^0C, while at the resistant phenotype the maximum of compression occurs on 44th hour of the experiment at temperature of -2^0C.

After reestablishment of the initial temperature conditions the diminution of the leaf's density takes place, although at non-resistant phenotype to a lesser degree that indicates more significant deteriorations of the water status provoked by the low temperatures action. The further decrease of temperature till -5^0C, imitating of the heavy frosts, causes in both investigated varieties Muscat Iantarnyi and Cardinal, sharp loss of the essential free water (mainly vacuolar) quantity during a rather short period of time (fig.4). We assume that such dynamics of free water (mainly vacuolar) loss in leaves is provoked by the irreversible deterioration of the restrictive cells' membranes.

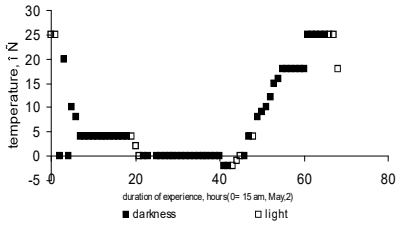

Fig 1 -Temperature conditions during an experiment

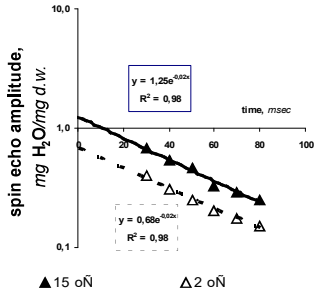

Fig.2 - Character of NMR-relaxation of water protons from soy plants' leaves supposed to the hypothermal stress action. cv.Mida (free water content)

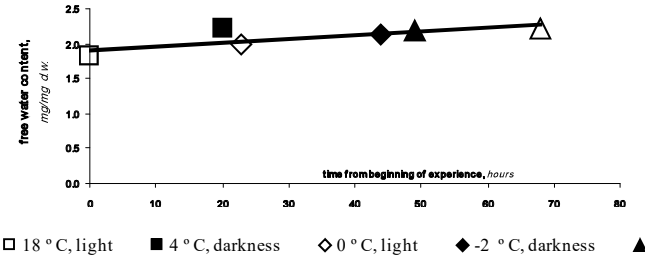

Fig.3 - Free water content dynamics in vine plants' leaves supposed to the low temperatures action. S. Cardinal.

As we observe at fig.4, after this stage of deterioration the recovery of optimal temperature conditions for the leaves' water status doesn't occur anymore. In

the previous work *[13]* in order to identify physiologic consequences provoked by the disorganization of metabolic processes and mechanic deteriorations during water crystallization there has been determined tissues freezing temperature with usage of sensors specially elaborated for that (fig.5). The obtained data demonstrate that at the beginning of vegetation young leaves of vine could remain in state of supercooling till -3, -4^{0}C *[13]*. There could occur just some differences according to variety but they are not essential. Temperatures of leaves' tissues freezing are situated in limits of -2,7 ÷ -3,5^{0}C. After general biological reaction at -3^{0}C the withering of sprouts tops and young leaves takes place, but at -5^{0}C plants are completely frozen in special in the upper part and young leaves and only completely formed leaves remain non-frozen. After this phase of the frost action the deceased water potential of leaves brought back to the initial temperature (-2,2 Mpa against -0,6 Mpa at leaves before frost action) reflects water binding by the denaturized biological structures because the free water is completely absent.

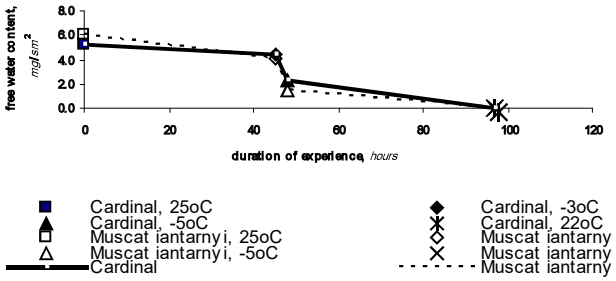

Fig. 4 - Modification of the free water content in leaves of the vine plants var.Cardinal şi Muscat iantarnyi) under the action of deteriorative temperatures (-5^{o}C).

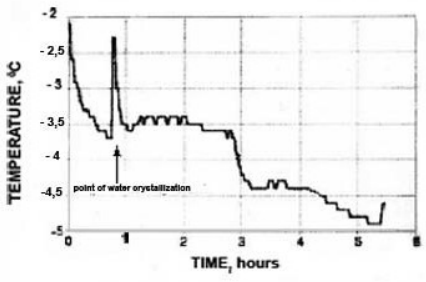

Fig.5 -Temperature of sprouts tissues freezing in vine plants. var. Cardinal

CONCLUSIONS

1. At the action of low temperatures on the growing plants the modifications of the water state are characterized by 2 phases: a) action of low temperature within plants tolerance limit leads to the increase of leaves watering, in special of the free water situated in apoplast and vacuoles, while the cytoplasm watering decreases; b) in range of the deteriorative temperatures the diminution of the total water content takes place including in symplast.
2. Unlike to the plants that enter the repose period late in the autumn when water loss is positive factor that favors adaptation against winter frosts, for plants that actively vegetate during the late spring period loss of free water by leaves represents a negative factor and characterizes by deteriorative action of low temperatures that finally leads to the total drying and loss of leaf.

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RESEARCH ABOUT ASSIMILATION SURFACE FOR SOME MAIZE HYBRIDS

CERCETĂRI PRIVIND SUPRAFAŢA DE ASIMILAŢIE A UNOR HIBRIZI DE PORUMB

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Abstract. *In 3 years of study we had in view behaviors of 10 maize hybrids for assimilation surface in soil-climatic conditions for north zone of Romanian Plain. We observed an evolution for maize leaf surface with a sigmoid curved shape. At the beginning of vegetation, leaf surface is reduced then it grow breathtaking at 35 days from risen, by forming new leaves and increasing of leaves with maximum after blossoming. After this phase of vegetation surface of leaves decreasing because leaves from inferior third of maize stem are out order.*

Rezumat. *Pe parcursul a trei ani de studiu s-a urmărit comportarea a 10 hibrizi de porumb în ceea ce priveşte suprafaţa de asimilaţie, în condiţiile pedoclimatice ale zonei de nord a Cîmpiei Române. S-a observat o evoluţie a suprafeţei foliare a porumbului de forma unei curbe sigmoide adică, suprafaţa foliară la începutul vegetaţiei este redusă, apoi aceasta creşte vertiginos la circa 35 zile de la răsărit prin formarea de noi frunze şi dezvoltarea acestora, atingând un maximum după înflorire. După această fază de vegetaţie urmează descreşterea suprafeţei foliare prin ieşirea din funcţiune a frunzelor din treimea inferioară a tulpinii de porumb.*

In agriculture, all plants must have for a long period, a big and sound assimilation surface for obtaining high yields per hectare.

There are differences at maize about the size of assimilation surface in accordance with culture conditions and with hybrids.

MATERIALS AND METHOD

We made experiments in years 2003, 2005 and 2006 in experimental field from Testing Centre for varieties Targoviste.

We made study in ten variants each of them was sowed in 4 repetitions, each repetition with 4 rows.

The 10 variants were represented by next hybrids of maize: Olt, Olimp, Campion, Milcov, Fundulea 376,Turda 165, Turda Mold 188, Turda Super, Turda 201, Turda Favorit .

The length of row was 7,5 m, distance between rows was 0.7 m resulting a plot of laud with 21 m^2 surface.

The hybrids: Olt, Olimp, Campion, Milcov, Fundulea 376 were sowed at 28 cm distance between plants on row with 50000 plants/he density, hybrids Turda 165, Turda Mold 188, Turda Super, Turda 201, Turda Favorit at 23 cm between plants an row with 60000 plants/he density.

The experiment was situated in field by method of randomized blocks with 4 repetitions.

Establishing of assimilation was made in 2 phases of vegetation for maize:

- the first in phase of 8 complete formed leave, when maize pass from vegetative stage to generative stage;
- the second in ear stage when surface of leaves is maximum without new leaves (without irrigation).

We had measure the length and breadth for all green leaves from one plant in these phases of vegetation. Determinations were made for three plants from each variant, all these were selected for represent the average for all plants from plot of land, situated in interior of rows.

The assimilations surface was established by formula:

Assimilation surface = $\frac{3xLxl}{4}$ (by Montgomery)

L = length of leaf
l = breadth of leaf

RESULTS OBTAINED

From number 1 table we observe that in year 2003 (a droughty year) were not favorable conditions for leaves growing and increasing and maximum value for ISF was at F 376 hybrid (1,88 m^2/m^2) and minimum value for ISF was at Turda 201 and Turda Favorit (0,88 m^2/m^2) at ear complete.

Table 1

Assimilation surface in the year 2003

Nr. Crt.	Hybrids	Assimilation surface (m^2), 8 leaves, 8 phase	ISF (Adequate index of leaves surface)	Assimilation surface ear phase	ISF (Adequate index of leaves surface)
1	Olt	0,172	0,86	0,331	1,65
2	Olimp	0,271	1,35	0,325	1,62
3	Campion	0,238	1,19	0,305	1,52
4	Milcov	0,248	1,24	0,286	1,43
5	F 376	0,279	1,39	0,377	1,88
6	Turda 165	0,08	0,48	0,127	1,3
7	Turda Mold 188	0,125	0,75	0,167	1,07
8	Turda super	0,125	0,75	0,22	1,3
9	Turda 201	0,145	0,87	0,146	0,88
10	Turda favorit	0,120	0,71	0,148	0,88

En 2005 the highest value for ISF was at Olimp hybrid (2,7 m^2/m^2) and the minimum value for Turda 201 hybrid (1,94 m^2/m^2).

Table 2

Assimilation surface in the year 2005

Nr. Crt.	Hybrids	Assimilation surface (m^2), 8 leaves, 8 phase	ISF (Adequate index of leaves surface)	Assimilation surface ear phase	ISF (Adequate index of leaves surface)
1	Olt	0,274	1,37	0,481	2,4
2	Olimp	0,257	1,28	0,540	2,7
3	Campion	0,229	1,14	0,509	2,54
4	Milcov	0,288	1,44	0,528	2,64
5	F 376	0,267	1,33	0,477	2,4
6	Turda 165	0,216	1,3	0,377	2,3
7	Turda Mold 188	0,167	1,0	0,412	2,47
8	Turda super	0,156	0,93	0,345	2,07
9	Turda 201	0,169	1,01	0,324	1,94
10	Turda favorit	0,144	0,86	0,410	2,46

Table 3

Assimilation surface in the year 2006

Nr. Crt.	Hybrids	Assimilation surface (m^2), 8 leaves, 8 phase	ISF (Adequate index of leaves surface)	Assimilation surface ear phase	ISF (Adequate index of leaves surface)
1	Olt	0,255	1,28	0,498	2,49
2	Olimp	0,270	1,35	0,550	2,75
3	Campion	0,222	1,11	0,500	2,5
4	Milcov	0,299	1,5	0,586	2,93
5	F 376	0,298	1,49	0,577	2,89
6	Turda 165	0,200	1,2	0,417	2,51
7	Turda Mold 188	0,177	1,07	0,445	2,67
8	Turda super	0,166	1,0	0,344	2,07
9	Turda 201	0,188	1,13	0,339	2,04
10	Turda favorit	0,144	0,86	0,422	2,54

From table 3 we observed a great uniformity for ISF values in 2006 year, exceeding in each case 2 value.

The maximum value was at Milcov hybrid (2,93 m^2/m^2) and the minimum value at Turda 201 hybrid (20,4 m^2/m^2).

From phase of 8 leaves, the rhythm of growing for leaves surface was increases by appearance of new leaves and increasing of them.

CONCLUSIONS

1. Assimilation surface shows very well the effect of all environmental factors on plant in all vegetation period.
2. Leaves surface in ear phase has an important role in forming of grains production. If this production reach an optimum level (about 3 – 4 value) maize obtain very big yields per hectare.
3. None of 3 years experiments index of leaves surface hasn't an optimum value, this one was varied in accordance with climatic conditions from studied years of study.
4. In studied conditions of culture (north zone of Romanian Plain, unirrigated, plane surface) without other intervention for adjusting of light conditions of plants, assimilation surface is dependent on environmental factors. Olimp hybrid has an amply and a relative constant leaves from one year to another, and this thing is an important premise for obtaining reach harvest.
5. In three years of study, Turda 201 hybrid presented the smallest values for index of leaves surface comparatively with others hybrids.
6. Maintaining of assimilation surface in activity for a long period is a sure way for touching of high performances at maize culture.

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CLONES SELECTION OF AUTOCHTHON SELECTED VINE VARIETIES

SELECȚIA CLONALĂ A SOIURILOR AUTOHTONE DE STRUGURI

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Abstract. *Viti-winemaking complex is the main agricultural branch of the Republic of Moldova. During many decades at NIVW there were elaborated more than 80 new vine varieties with increased resistance to biotic and abiotic environmental factors, from which more than 30 varieties of everyday use and wine grapes are entered in the Register of plant varieties of the Republic of Moldova.*

In this research the following autochthon selected varieties have been observed: varieties of everyday use grapes: Moldova, Muscat de Bugeac, Guzun; varieties of wine grapes: Viorica, Riton, Muscat de Ialoveni, Legenda (The Legend) and Negru de Ialoveni (Black from Ialoveni).

Rezumat. *Selecția clonală a soiurilor de selecție autohtonă. În decursul unei perioade îndelungate la Institutul Național de Viticultură şi Vinificație au fost elaborate peste 80 de soiuri de vin noi cu rezistență sporită la factorii de mediu nefavorabili, din care peste 30 de soiuri sunt omologate în Republica Moldova. La momentul actual se efectuează cercetări pentru obținerea clonelor acestor soiuri care vor avea însuşiri agrobiologice specifice mai valoroase, productivitate stabilă şi o calitate înaltă de producție, fără maladii virotice şi cancer bacterian.*

Viti-winemaking complex is the main agricultural branch of the Republic of Moldova. During many decades at NIVW there were elaborated more than 80 new vine varieties with increased resistance to biotic and abiotic environmental factors, from which more than 30 varieties of everyday use and wine grapes are entered in the Register of plant varieties of the Republic of Moldova. Nowadays the majority of autochthon selected varieties do not have clones with valuable agrobiological features.

The structural improvement of national viticultural varieties is supported by the increase of their biologic value permanently using clones selection, because under the influence of genetic erosion, ecology factors, the presence or absence of chronic diseases and other factors, vine varieties are gradually losing their biologic potential, concerning both, the production and the quality. In countries with an advanced viticulture, clones selection is given the first degree importance (in France, Italy,

Germany, etc.), this fact gives the opportunity to obtain a stable, qualitative production and viticultural plantations of a high phyto-sanitary level for a long period of exploitation.

THE OBJECT AND RESEARCH METHODS

In this research the following autochthon selected varieties have been observed: varieties of everyday use grapes: *Moldova, Muscat de Bugeac, Guzun*; varieties of wine grapes: *Viorica, Riton, Muscat de Ialoveni, Legenda (The Legend)* and *Negru de Ialoveni (Black from Ialoveni).*

Researches are being developed in NIVW experimental plantations, which were planted during the 1988-1991 years, the plantation draft is of 3,0X1,5 meters with bilateral cord as vine conduct form at the height of 1,0 meters.

Phenophases existence, together with development, fertility elements, physical and chemical analysis, harvest quality appreciation, resistance at hibernation and diseases, phytosanitary level of mother vines were done according to present-day methods.

OBTAINED RESULTS

The preliminary sorting of biotypes was done by following high productivity and quality levels, as: the harvest for one vine, the form, size and weight of grapes, the sugar content, the exterior image (good development of plants).

In the following years of study, some plants have demonstrated a relatively high stability of those characteristics, but a part of studied vines have shown an important variation in the majority of their features, this fact demonstrates the low presence of these conditions in the analysed plants.

While studying first plants, some symptoms of chronic diseases of virus, microplasmatic or bacterin origin were found; this allowed us to remove these plants from the study curriculum (Table 1).

It is known, that while the harvest is growing (the harvest for 1 vine), there are often observed decreased levels of grapes quality, and fist of all concerning the content in sugar, increased acidity, less felt aroma; in consequence – a lower mark for tasting.

The obtained result (Table2) demonstrates the fact, that the majority of varieties have different variations of these characteristics. Thus, if in *Viorica* variety the difference of sugar concentration in the must of researched plants was only of 24g/dm³, in *Legenda* variety - 22g/dm³, in *Negru de Ialoveni* variety -

30g/dm³, then in *Muscat de Ialoveni* varieties this difference constituted 42g/dm³, and in *Riton* variety - 48g/dm³.

A similar variation was observed while determining the total grape juice acidity, fact which imposed itself when coming to tasting younger wines.

Table 1

Phytosanitary selection of mother vines

No.	Varieties	Total of mother vines	Selections without symptoms	% of vines visually healthy
1	*Viorica*	47	35	74,0
2	*Riton*	22	20	90,0
3	*Muscat de Ialoveni*	15	13	86,6
4	*Negru de Ialoveni*	70	19	27,1
5	*Legenda*	16	14	87,5
6	*Guzun*	13	12	92,3
7	*Muscat de Bugeac*	13	8	61,5
8	*Moldova*	75	18	24,0

Table 2

The quality of production at mother varieties

No.	Variety	Total of mother vines	Harvest date	Grape juice content		The tasting mark for young wine ……..
				Sugar g/l	Acidity g/l	
1	*Viorica*	22	20.09.05	172 - 196	9,4 – 11,6	7,6 – 7,9
2	*Riton*	14	30.09.05	162 - 210	8,7 – 10,9	7,6 – 7,8
3	*Muscat de Ialoveni*	9	03.10.05	170 - 212	9,9 – 10,7	7,6 – 7,8
4	*Legenda*	11	30.09.05	178 - 210	7,7 – 10,4	7,6 – 7,8
4	*Negru de Ialoveni*	19	20.09.05	196 - 226	9,0 – 11,0	7,6 – 7,9

Mother vines of mentioned varieties were analysed taking into account their agrobiologic data, phytosanitary state, productivity and quality of production. The best were selected, their cords were taken and trasmitted to the Laboratory of Phytosanitary Control and Virusology in order to be tested for the presence of viruses in latent state and for bacterian cancer.

CONCLUSIONS

The results of developed researches have demonstrated that:

1. For the studied varieties a different variation was found, mainly concerning the quantity and quality of first plants harvest.
2. Ecological factors, agrotechnical measures that were applied, a lack of permanent selection among the population, all of them determined this strong variability resulting with the necessity of clones selection for such varieties of autochton selection like: *Viorica, Riton, Muscat de Ialoveni, Legenda, Negru de Ialoveni, Guzun, Muscat de Bugeac, Moldova.*

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STUDIES ON INFLUENCE OF SOME MUTAGEN AGENTS ON THE GERMINATION OF SEEDS AND PLANTULE GROWTH WITH THE *CALENDULA OFFICINALIS* L. SPECIES

STUDII PRIVIND INFLUENȚA UNOR AGENȚI MUTAGENI ASUPRA GERMINĂRII SEMINȚELOR ŞI CREŞTERII PLANTULELOR LA SPECIA *CALENDULA OFFICINALIS* L.

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Abstract. *It is well-known that mutagen agents act on the chromosomal set of cell that may influence at its turn anatomically, morphologically and physiologicaly, the treated species. The application of various doses of mutagen substances may cause a series of metabolic troubles resulting in the decrease or the increase of the tissue formation and differențiations processes. The work notes the changes occuring in the stage of Calendula officinalis L. seed germinație and in the stages of the plantules under the influience of the plantules under the influence of the mutagen agents.*

Rezumat. *Se cunoaşte că agenții mutageni acționează asupra garniturii cromozomice a celulelor care poate influența la rândul ei anatomic, morfologic şi fiziologic speciile tratate. Aplicarea dozelor diferite de substanțe mutagene pot provoca o serie de tulburări metabolice având ca rezultat diminuarea sau intensificrea proceselor de formare şi diferențiere a țesuturilor. Lucrarea urmăreşte observații privind modificările apărute în etapa germinării semințelor de Calendula officinalis L. şi a primelor faze de creştere a plantulelor sub influența unor agenți mutageni.*

The germination is the test that establishes the maximum potential seeds germination, from the seeds lot, that can be used for comparing the quality of these and also to appreciate the value of insemination from the field. The germinal energy is the test through which the seeds germination speed can be determined and it is expressed through the germinated seeds rate, in a period equal to a third–half from the established period for the germinal power determination.

MATERIALS AND METHODS

The biological material used is represented by *Calendula officinalis L.* seeds, at which the establishment of the germinal energy, the germinal power and also the influence that mutagen substances have on the little roots and stalks growing were followed.(1,2,5)

The used mutagen substances were: Ethidium bromide, Dichlorphenoxyacetic acid (2-4 D acid), colchicine (3,4) and nicotinic acid.(6)

The ethidium bromide, the dichlorphenoxyacetic acid (2-4 D acid) and the colchicine were used in concentrations of 0,01; 0,02; 0,03 and 0,04 %, and the nicotinic acid had concentrations of 0,50; 0,75; 1 and 1,5%.

The experiment was carried out in the same conditions for all the used substances, in order to analyze comparatively the obtained results.

For each test, the seeds were put to germinate in Petri dishes, 20 seeds in each plate/slate, having as a substratum filter paper, over which the substances in the specified doses were administered.

The established number of days for the determination of germinal energy was of 3 and that for the establishing of germinal power was of 10 days.

The germination temperature was of 20°C. (degrees)

After 3 days, the germinated seeds were counted and removed from the samples and the percentage value of the germinal energy was calculated.

The rest of germinated seeds were also counted after 10 days. At the second reading it was also added for each variant the number of seeds from the first reading, thus being obtained the percentage value of the germinal power.

In order, to make evident the modifications appeared in the growing process of little roots and also the influence of the used substances on the growing process intensity, linear measurements were made at an interval of 3, 6 and 10 days.

RESULTS AND DISCUSSIONS

Analyzing the evolution of *Calendula Officinalis L.* seeds that were put to germinate, it was seen that in the same experimental conditions, their behaviour concerning the parameters taken into study is different.

From the analysis of the obtained results, differences between variants were noticed not only in terms of the used substance kind but also, from its concentration.

In the case of the seeds treated with colchicine, ethidium bromide (excepting the concentration of 0,03 %) and 2.4-D acid, the germination process was launched beginning with the first treatment day.

It was noticed a growth of the germinated seeds process at the treatment of seeds with colchicine, unlike the witness sample and, it was also noticed that, together with the concentration growth, the percentage of germinated seeds also grows.

The values of germinal energy are equal in the case of solutions with 0.01, 0.03, and 0.04% with a slight growth in the case of 0.02% concentration solution.

In case of applying the treatment with ethidium bromide, the same phenomenon was noticed that is of germinated seeds number growing, directly proportional to the growing of the substance concentration.

It was remarked on the other hand, that at the concentration of 0,03% the germinal process was inhibited.

Analyzing the presented data in table nr.1, it is observed that in the case of 2,4D acid, the seeds germinal energy is increased (95%) at 0,01% concentration, and it decreases at approximately 50% in the case of 0,02%, and 0,03% concentration, after that it is registered a slight growth at 0,04% concentration.

The nicotinic acid has totally blocked the germinal process.

Tabelul 1

The influence of the substances on the seeds germinal energy and the germinal power

Substanța	3 zile	10 zile	Total germ	Total neg	E.G (%)	F.G (%)
witness	6	9	15	5	30%	75%
colc 0.01%	15	1	16	4	75%	80%
colc 0.02%	16	2	18	2	80%	90%
colc 0.03%	16	0	16	4	80%	80%
colc 0.04%	16	0	16	4	80%	80%
ethidium bromide 0.01%	11	3	14	6	55%	65%
ethidium bromide 0.02%	13	3	16	4	65%	80%
ethidium bromide 0.03%	0	0	0	-	-	-
ethidium bromide 0.04%	10	6	16	4	50%	80%
2,4 D acid 0.01 %	19	1	20	-	95%	100%
2,4 D acid 0.02 %	10	1	11	9	50%	55%
2,4 D acid 0.03 %	9	-	9	11	45%	45%
2,4 D acid 0.04 %	12	-	12	8	60%	60%
Nicotinic acid 0.50%	0	0	0	-	-	-
Nicotinic acid 0.75 %	0	0	0	-	-	-
Nicotinic acid 1%	0	0	0	-	-	-
Nicotinic acid 1.5 %	0	0	0	-	-	-

EG= germinal energy; FG= germinal power.

From the analysis of the presented data in table 2, it results that the used substances had both stimulating action and a slowing action of the growing process both on the little roots and also on the stalks. In this way in the case of colchicine, it was noticed the fact that, at 0,01% concentration, the growth is faster and it decreases slowly as the concentration increases.

A stimulating effect was observed on the growing of both the little roots and also the stalks. Concerning the samples treated with ethidium bromide and 2,4D acid, it has been noticed a pretty slow growth of both the little roots and also the stems.

After only three days in the ethidium bromide case, a certain growth was noticed and in 2,4D acid case, the process was only launched starting with the sixth day.

The growth process was also slowed down in the case of little roots. What was noticed, was a growth in thickness of the little roots, at the samples treated with ethidium bromide and 2,4D acid, probably due to the modifications appeared at the cellular level (the multiplication of the cells number) as a result of mutagen agent action.

Table 2

The influence of the substance on the growth of the little roots and stalks at *Calendula Officinalis L.*

Substanța	roots			stalks		
	3 zile (cm)	6 zile (cm)	10 zile (cm)	3 zile (cm)	6 zile (cm)	10 zile (cm)
witness	3,5	5.5	7.5	1	4	6
colc 0.01%	2.5	7.6	10.5	0.5	5.5	9.5
colc 0.02%	2	6.6	10.5	1	4.7	8
colc 0.03%	1.5	5.1	9.7	1	5.5	10
colc 0.04%	1.2	4.8	7.5	1	5	8.5
ethidium bromide 0.01%	0.5	1.5	2.5	1	1.1	2.5
ethidium bromide 0.02%	0.5	1.5	2.5	0.7	1	1.5
ethidium bromide 0.03%	-	-	-	-	-	-
ethidium bromide 0.04%	0.7	1.5	2.5	0.5	1.5	2.5
2,4 D acid 0.01 %	-	1	1.5	0.6	1.2	1.7
2,4 D acid 0.02 %	-	0.2	0.7	0.5	0.5	0.7
2,4 D acid 0.03 %	-	0.1	0.6	0.5	0.8	1
2,4 D acid 0.04 %	-	0.1	0.7	0.5	1	1.5
Nicotinic acid 0.50%	-	-	-	-	-	-
Nicotinic acid 0.75 %	-	-	-	-	-	-
Nicotinic acid 1%	-	-	-	-	-	-
Nicotinic acid 1.5 %	-	-	-	-	-	-

CONCLUSIONS

1. The chemical substances used in this experiment acted in different ways.

2. The colchicine had a strong stimulating effect, not only on the germinal process but also on the growth.

3. In the ethidium bromide and 2,4D acid case, even though the germination started fast, modifications appeared at the little roots level, thus being created a thickness of them, the lengthening process is very reduced, and in the case of 0,03% concentration, the germinal process was totally inhibited.

4. Regarding the nicotinic acid action, this totally had a negative character , inhibiting the germination process totally.

5. The greatest values of the germinal power were registered in the case of the colchicine and ethidium bromide treated seeds, followed by 2,4D acid.

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IDENTIFICATION OF GRAPEVINE CULTIVARS USING MICROSATTELITE MARKERS

IDENTIFICAREA CULTIVARELOR DE VIȚĂ DE VIE CU AJUTORUL MARKERILOR MOLECULARI

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Abstract. *Molecular markers provide an alternative means of distinguishing cultivars and could, also, be used for investigating taxonomically relationships between species, as well as for genome mapping. Here we describe how this method is applied to distinguish between Vitis vinifera cultivars using as selection criteria the allele polymorphism for the UCH 40 locus. The applied procedure comprising DNA extraction, PCR amplification, electrophoresis and sizing of PCR products is extensively described.*

Rezumat. *Markerii moleculari sunt larg folositit astazi in vederea identificarii unor cultivare, clasificarii taxonomice a unor specii cat si alcatuirii de harti genetice. In aceasta lucrare este prezentat modul in care pot fi identificate unele cultivare de vita de vie folosind drept criteriu de selectie polimorfismul alelelor la locusul UCH 40. Pentru a analiza secventele de ADN repetitiv (microsatelitii) la un anumit locus sunt necesare extractia ADN-ului, amplificares fragmentelor respective de ADN (PCR), electroforeza si analiza fragmentelor amplificate. Aceste etape de lucru cat si rezultatele obtinute sunt descrise in detaliu in prezenta lucrare.*

INTRODUCTION

The increasing international trade of grapevine and rootstock plant material as well as of wine necessitates a reliable identification of genotypes. Molecular markers provide an alternative means of distinguishing grapevine cultivars that is independent of the phenotypic characters used in ampelography and could, also, be used for investigating taxonomically relationships between *Vitis* species, as well as for genome mapping at *Vitis vinifera*. They can be easily scored and used for cultivar identification, parentage determination, population genetics, physical and genetic mapping. Among these markers, microsatellites or simple sequence repeats (SSRs) are recommended for grapevine genotyping.

Microsatellite are highly mutable loci which may be present at many sites in an eukariote genome, consisting of stretches of tandemly repeated nucleotide motifs which can be as short as 4, 3, 2 and even 1 nucleotide. The sequence knowledge of these regions is used for designing specific amplifying primers, which then define a sequence – tagged microsatellite site (STMS)(1). There are several important advantages of STMSs:

-they are (usually) a single locus, which because of the high mutation rate is often multiallelic;
-they are codominant markers and can be detected by a PCR assay, using a pair of flanking unique oligonucleotides as primers and so, allele frequencies can be determined directly;
-they show extensive polymorphism due to site – specific length variation as a consequence of the occurrence of different number of repeat units;
-they are very robust tools that can be exchanged between laboratories and their data are highly informative (1).

The usefulness of these markers has been assessed in samples of grapevine varieties cultivated in different regions of Europe, Australia, California etc. (2). However, due to the predominance of certain alleles or the occurrence of null alleles in some populations, the information content of a given marker may vary between the cultivars from these regions, but the consistency of the results obtained in many laboratories supports the establishment of a common electronic database for identification of grapevine cultivars (1-2). In this study set of grapevine cultivars was genotyped at the UCH 40 locus in order to identify them.

MATERIAL AND METHODS

DNA extraction

Plant material used for nucleic acid extraction was obtained from a collection of *Vitis vinifera* cultivars. Leaf samples (100 mg) from individual plants were frozen in liquid nitrogen, ground to a fine powder and resuspended in 1-ml DNA extraction solution and 10 ml 2-mercaptoethanol. After 15 min incubation in 65^{o}C (water bath), 0,5 ml volume of chloroform / isoamyl alcohol (24: 1) was added and mixed (no by vortex) and the phases were separated by centrifugation at 14000 rpm for 1 min. 0,8 ml of supernatant was collected and an equal volume of isopropanol was added to precipitate the DNA. DNA precipitation was improved by ice incubation for 15 min. After 1min centrifugation at 14000 rpm, the supernatant was removed and 1 ml ethanol 70 % was added to the pellet. Ethanol was removed after centrifugation at 14000 rpm for 1 min and the pellet was resuspended in 100 µl TE.

Determining DNA concentration

DNA concentration was estimated in each sample, spectrophotometrically, by measuring A_{260}. 5 µl of DNA of each sample was added to 995 µl of distillated water and the optical density of the diluted DNA was measured at 260 nm and DNA concentration was calculated with the following formulas:

DNA concentration (µg / µl) = (A_{260}) x OD of 1.0 x 200 / 1000 µl

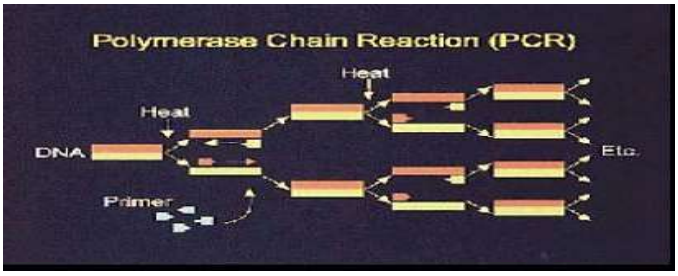

Fig. 1 *Polymerase chain reaction for the amplification of miscrosatellite locus*

PCR amplification of microsatellite locus

1 µl (50 ng) of DNA was added to 19 µl of the PCR reaction mix containing 0,5µl Taq polymerase, 2µl PCR 1xbuffer, 0,6µl $MgCl_2$, 1µl dNTPs, 0,87 µl Forward primer, 0,26 µl Reverse primer and deionized water to reach the final volume of 19 µl. The following thermal cycling protocol was applied for the UCH40 locus amplification: 9^0C for 10 min,62^0C for 30 s,95^0C for 30 s,72^oC for 15 s,29 cycles of 30 s at 62^0C,72^0C for 5 min and immediately terminated at 4^0C (**Fig. 1**).

Electrophoresis and sizing of PCR products

Before loading on sequencing gel, PCR products were checked by electrophoresis through agarose gel (2%, TBE 5x containing 54 g Tris base, 27,5 g boric acid, 20 ml 0,5 M EDTA, pH 8,0) and ethidium bromide staining to verify quality and specificity of amplification. DNA samples were prepared for standard sequencing gel as followed: denaturation for 2 min at 75*C and, immediately, chilling on ice.

Polyacrylamide gel (3, 75 %) was prepared from 6 ml TBE buffer (5x), 12,6 g urea and 4,5 ml of 50% acrylamide solution. The volume was adjusted to 30 ml using deionized water. In this solution, mixed and filtered well, 200 µl of 10% APS and 20 µl TEMED were added and the gel was poured on the plate and let to polymerize for 1 ½ hrs. After polymerization, the gel was mount onto the sequencing apparatus, in TBE buffer tank and prerun for 10 min before loading. DNA samples were loaded and the gel was run for 5 hrs in a LI-COR DNA Sequencer. The Data Collection program was used to control the electrophoresis parameters.The GENEIMAGER software sized microsatellite allele length.

RESULTS AND DISCUSSIONS

The DNA typing procedure using STMS markers detected Mendelian inherited co-dominant alleles at a single locus in the grapevine genome (10). Allele polymorphism is observed as different lengths of the microsatellite when separated on polyacrylamide gels (**Fig. 2**).

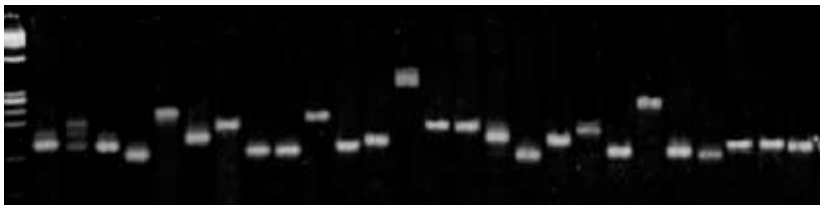

Fig. 2 - *Allele polymorphism for the UCH40 locus in grapevine cultivars*

Typically, PCR amplification yields two bands corresponding to one allele from the maternal ancestor and two bands corresponding to the other paternal ancestor, if the individual is heterozygous at the analyzed locus, one band if it is homozygous. Some rootstocks had no allele for the analyzed locus and were given a null – null genotype. A null allele could occur when DNA representing the locus is present but its amplification by PCR is prevented by DNA mutations (point mutations DNA, deletions or insertions) at or between the priming sites or the DNA representing the locus is not present in the cultivar genome. The microsatellite profile at UCH 40 locus was polymorphic. The

cultivars shown different genotypes and a high level of heterozygosity could be observed (**Fig. 2**).

The highly heterozygosity observed at this locus (**Fig. 2**) is, probably, a consequence of both natural and human selection against homozigosity in grape plants. Prior to domestication, vine plants were dioecious and outbreeding and therefore attained a high level of homozygosity. As a side effect, deleterious recessive traits accumulated in the genome and, in consequence, a certain level of heterozygosity has become a vital condition for the plants. The selection for highly heterozygous plants was intensified in the course of domestication and cultivation of grapevines, when the genotypes were selected, according to their agronomic performance (1-2).

For the analyzed locus, the microsatellite profile of each cultivar is unique and this can be used, in combination with data provided by other loci analysis, for an accurate identification of grapevine cultivars. Microsatellite, as molecular marker, prove to be a useful tool for genome mapping, population and phylogenic studies, parentage analysis, individual identification, cancer diagnostic etc. The methods for microsatellite detection are easy, quickly and feasible for these studies (3).

CONCLUSIONS

1. The microsatellite profile at UCH 40 locus in grape cultivars is polymorphic.
2. The highly heterozygosity observed at UCH 40 locus is, probably, a consequence of both natural and human selection against homozigosity in grape plants.
3. The microsatellite profile of each cultivar at UCH 40 locus is unique and this can be used, in combination with data provided by other loci analysis, for an accurate identification of grapevine cultivars.

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THE ASSESSMENT OF TOTAL POLYPHENOLS AND FLAVONOIDS CONTENT IN PROPOLIS EXTRACT (AQUEOUS AND ETHANOLIC)

EVALUAREA CONȚINUTULUI TOTAL ÎN POLIFENOLI ŞI FLAVONOIDE DIN EXTRACT DE PROPOLIS (APOS ŞI ETANOLIC)

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Abstract. *Propolis is a heterogeneous resinaceous mass of a solid consistence, sometimes compact, cerous with soft and adherent particles, sometimes granular, friable, with powder aspect and variable hardness at ambient temperature. Propolis usually contains a variety of chemical compounds, such as poliphenols (flavonoids, phenolic acids and their esters), terpenoids, steroids and amino acids. Propolis composition depends on vegetation from harvesting area. There are a few comparative studies regarding the total content of poliphenols and flavonoids of watery and ethanol extracts of propolis from different areas of Banat (Timiş and Caraş-Severin). The total content of poliphenols and flavonoids was accomplished with Folin-Ciocalteu reactive and Na_2CO_3 10%, after that it was evaluated the maximum of absorption of obtained coloration, related to calibration curve. The poliphenols are expressed with mg/g gallic acid correspondents at a final set concentration of 20 μg/mL. The total content in flavonoids was accomplished with ethanol solution of $AlCl_3$ 3%, after that it was evaluated the maximum of absorption of obtained coloration, related to calibration curve. The total content of flavonoids is expressed in mg/g (quercetin correspondents) related to a final set concentration of 20 μg/mL.*

Rezumat. *Propolisul este o masă heterogenă răşinoasă de consistenţă solidă, uneori compactă, ceroasă cu particule maleabile şi aderente, alteori granuloasă, friabilă, cu aspect de pulverulent, cu duritate variabilă la temperatura ambiantă. Propolisul conţine în mod obişnuit o varietate de compuşi chimici, cum ar fi polifenolii (flavonoide, acizi fenolici şi esterii acestora), terpenoizi, steroizi şi aminoacizi. Compoziţia propolisului depinde de vegetaţia din zonele de colectare. Există puţine studii comparative privind conţinutul total în polifenoli şi flavonoide ale extractelor apoase şi etanolice a propolisului din diferite localităţi din Banat (Timiş şi Caraş-Severin). Conţinutul total în polifenoli s-a realizat cu reactiv Folin-Ciocalteu şi Na_2CO_3 10%, ulterior se evaluează maximul de absorbţie al coloraţiei obţinute, raportat la curba de etalonare (calibrare). Polifenolii se exprimă în mg/g echivalenţi acid galic raportat la o concentraţie finală impusă de 20 μg/mL. Conţinutul total în flavonoide s-a realizat cu soluţie etanolică $AlCl_3$ 3%, ulterior se evaluează maximul de absorbţie al coloraţiei obţinute, raportat la curba de etalonare (calibrare). Conţinutul total în flavonoide se exprimă în mg/g (echivalenţi quercetină) raportat la o concentraţie finală impusă de 20 μg/mL.*

INTRODUCTION

The propolis is a natural substance collected by bees from buds and exudates of some plans and used in beehive as protective bar against enemies. Propolis was used in traditional medicine all over the world and there ware reported many biological activities of propolis such as: antibacterial, anti-inflammatory and anticancer activities. Therefore propolis is widely use in food and beverage industry for better natural qualities of food and beverage and to prevent some diseases such as: inflammations, cardiovascular diseases, diabetes and cancer. [1,2,7]

Due to geographical differences, propolis from Europe, South America and Asia have different compositions. European propolis and propolis from China contain many types of flavonoids and phenolic acid esters. In exchange, the major compounds of propolis from Brazil are terpenoids and prenilated derivates of p-cumarinic acids. Because of chemical composition difference, the biological activities of propolis are also different. For example, it was observed that the Brazilian propolis is different from the Chinese propolis by different action for inhibition of hialurinidaza and histamine release from peritoneal mastocites of rat.

MATERIAL AND METHODS

Total flavonoid content [4,6,7]

Total flavonoid content in EEP it is determined with Woisky and Salatino method (1998) [7]. At 0.5 mL solution of EEP it is added 0.5 mL ethanol solution of $AlCl_3$ 2%. After one hour of room temperature incubation, the absorbance it is measured at 420 nm. The EEP samples are evaluated at a final concentration of 20 μm/mL. Total content of flavonoids is calculated for quercetin (mg/g) from a calibration curve. (figure 6, a and b)

Total content of phenolic compounds determination

Total poliphenols content in EEP it is determined with calorimetric method with Folin-Ciocalteu reactive.

EEP solution (0.5 mL) it is mixed with 0.5 mL Folin-Ciocalteu reactive and with 0.5 mL Na_2CO_3 10% and the absorbance it is measured at 760 nm after one hour incubation at room temperature. EEP it is evaluated at a final concentration of 20 μg/mL. Total poliphenols content it is expressed in mg/g (gallic acid correspondent).

Total content of phenolic compounds it is measured with a spectrophotometer at 760 nm.

RESULTS AND DISCUSSIONS

Propolis it is commercialized as tinctures, tabloids EEP and EAP. Propolis has a nice smell and color from light yellow to dark brown [deeper for Tirol propolis (Caraş –Severin)]. Tirol propolis color it was brown and it had a stronger smell.

The absorbance, as a physical-chemical parameter, it is correlated frequently with pharmacological activity of propolis, content of phenols, flavonoids, caffeic acids. The values are similar to those from literature, anyway,

the absorbance for EEP and for EAP Lugoj 1 and Margina 2 presented inferior values comparatively with the rest of the samples, regarding EEP and EAP from Tirol, Doclin (Caraş –Severin) with maximum values (table 1, figure 1). [4,6,7]

Table 1

Specific absorbance evolution (nm) for EEP and EAP samples depending on region -

Nr. crt.	Region	Specific absorbance (nm) (EAP)	Specific absorbance (nm) (EAP)
1	Lugoj 1	213	224
2	Lugoj 2	203	215
3	Margina 1	196	230
4	Margina 2	203	193
5	Margina 3	189	201
6	Tirol	345	361
7	Doclin	305	313
8	Făget	299	309

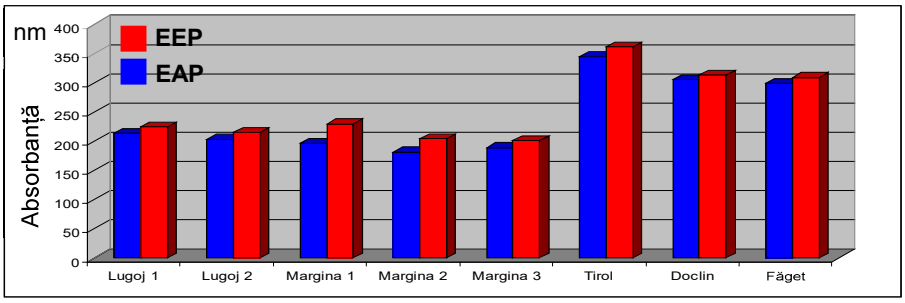


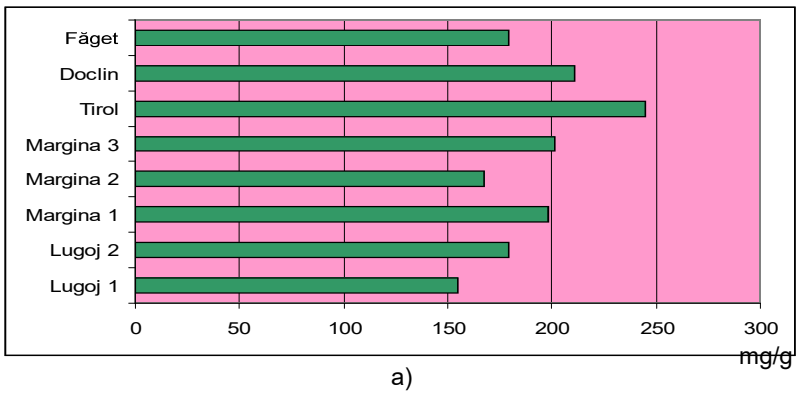
Figure 1 - Specific absorbance evolution (nm) for EEP and EAP samples depending on region

Total poliphenols content for Lugoj, Margina and Făget (Timiş) was inferior to similar values reported for EAP (136 – 199 mg/g) and for EEP (155 – 201 mg/g). Tirol and Doclin (Caraş – Severin) reported values higher than 200 mg/g (figure 2 a and b, table 2). Flavonoid compounds of propolis collected from the west area of România (prenilated derivates of p-cumaric acid) were not signalized in similar samples from Hungary, Ukraine and Bulgaria. [1,5]

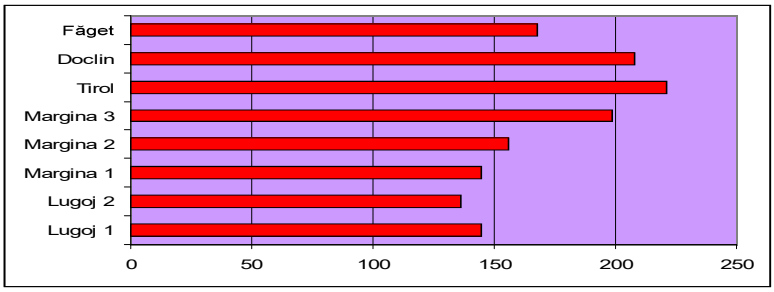
Table 2

The dependence of polyphenol and flavonoid contents for EAP and EEP of region

Nr. Crt.	Region	Total polyphenol content for EAP (mg/g)	Total polyphenol content for EEP (mg/g)	Total flavonoid content for EAP (mg/g)	Total flavonoid content for EEP (mg/g)
1	Lugoj 1	145	155	63	87
2	Lugoj 2	136	179	86	91
3	Margina 1	145	198	105	113
4	Margina 2	156	167	120	124
5	Margina 3	199	201	87	99
6	Tirol	221	245	109	147
7	Doclin	208	211	131	132
8	Făget	168	179	105	123



a)



b)

Figure 2 (a, b) - The dependence of polyphenol content for EAP and EEP of region.

mg/g

It was observed that in EEP total content of poliphenols is superior to that EAP (figure 3). These differences cat be related with the quantity of compounds with antioxidant activity in EEP. [1]

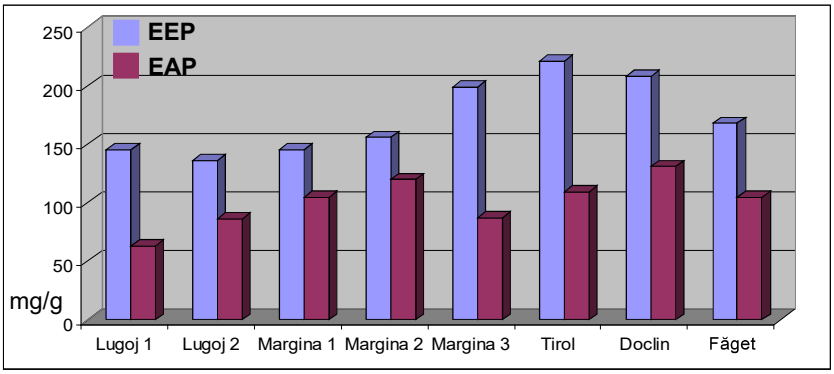
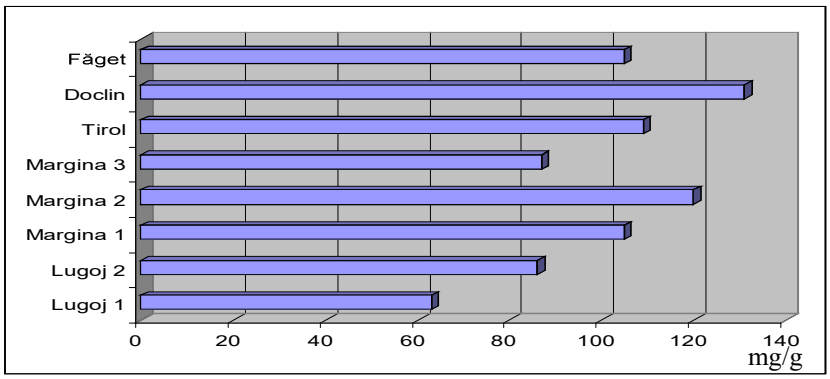


Figure 3 - The dependence of total polyphenol content (mg/g) in EAP and EEP of region.

Total flavonoid content (figure 5) for EAP (63 – 131 mg/g) was maximum for Doclin area (Caraş – Severin), respectively EEP (87 – 147 mg/g) Tirol (Caraş – Severin) (figure 4 a and b) [1, 2, 3].



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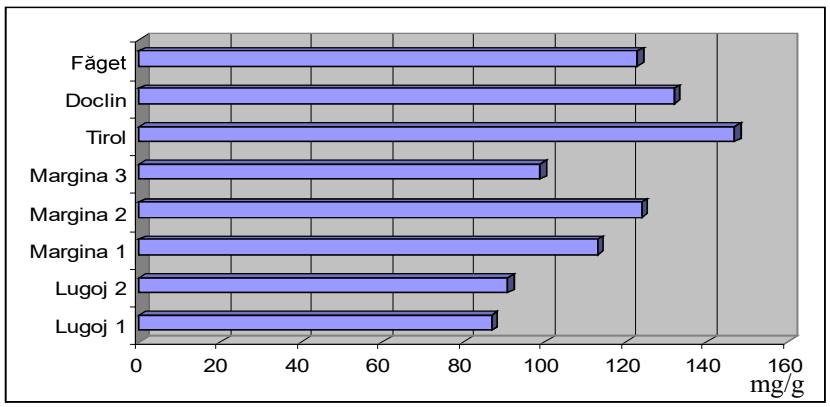

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Figure 4 (a, b) - The dependence of flavonoid content (mg/g) in EEP (a) and EAP (b) of region

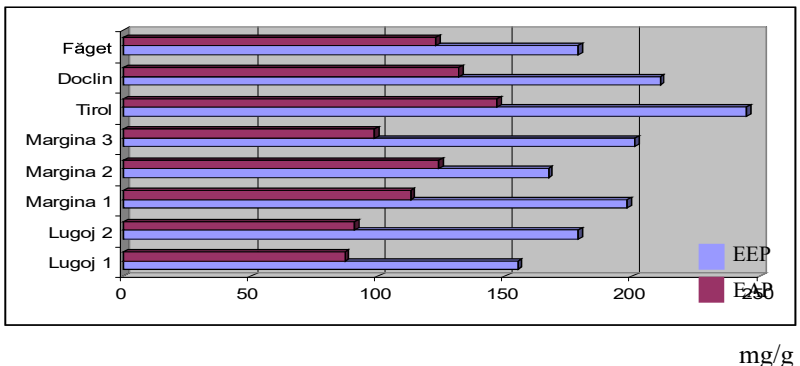
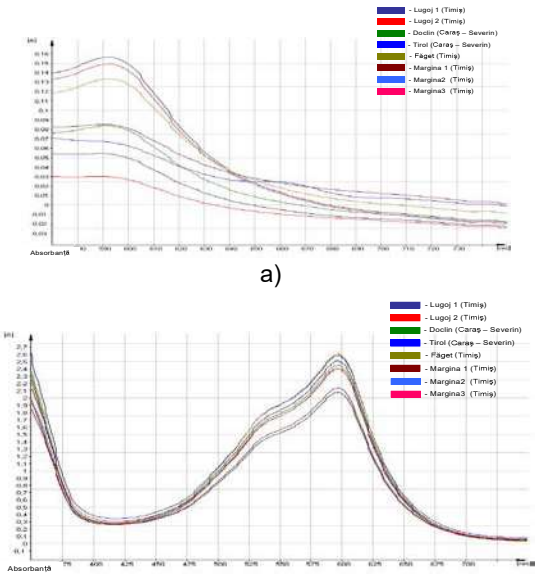


Figure 5 - The dependence of total flavonoid content (mg/g) in EAP and EEP of region



a)

b)

Figure 6 (a, b) - Comparative antioxidant activity of ethanol propolis extracts (EEP) (a) and watery propolis extracts (EAP) (b) in different regions from Timiş and Caraş-Severin) [1]

CONCLUSIONS

Total poliphenol and flavonoid content in EEP and EAP Tirol, Doclin (Caraş – Severin) and Făget (Timiş) have incentive values (201 – 245 mg/g poliphenols), respectively (109 – 147 mg/g flavonoids), total quantity of poliphenols and flavonoids is higher in EEP than EAP. [1]

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PCA STATISTICAL ANALYSIS IN THE GEOCHEMICAL STUDIES IN DANUBE DELTA

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Abstract: *Sediment samples were collected as two sample cores from Furtuna and, respectively, Lungu lakes in Danube Delta in order to estimate the influence of anthropogenic activity in the Danube Basin. The samples were analyzed by neutron activation analysis. The data were subjected to factor analysis by SPSS 10 package. This paper describes the basic factors present in sediment data for each studied lake and surveys the elements with respect to possible sources. In order to generate the factors from correlation matrices, several computer runs with principal component analysis (PCA) were carried out separately for each lake and also for overall set of data. The factors obtained were subjected to orthogonal rotation by the varimax method. The optimum run established for each set of data and for the overall data set shows that about 75% of the total variance in the data could be explained by the 4 factors, namely industry, agriculture, sea and geology. Factor scores were used to eliminate the outliers in the data set subjected to principal component analysis.*

The present study based on PCA factor analysis of sediment geochemical data on sample cores collected from two lakes in Danube Delta offers a valuable tool in identifying the pollution sources of Danube waters.

The Danube Basin is shared by 11 countries, connecting them as a large transcontinental highway. Five major rivers and more than 160 million people in 17 countries pour pollution into the Danube River. The river absorbs waste from industrial plants, raw sewage from cities, pesticides and chemicals from farmer's fields, and bilge oil from ships.

Our research included locating and characterizing the polluted sediments which could threaten the ecosystem. The measurement of heavy metals could be used to study the sediment transport, accumulation and circulation in the last few decades.

Here we described the method of PCA factor analysis used in sediment reconnaissance and assessment. Factor analysis is employed to reducing the dimensionality of the data and to sorting the observed variables into meaningful groups.

MATERIAL AND METHODS

Location of the sampling sites

The Danube Delta evolved due to the continuous interaction between Danube River and the Black Sea together with its four arms through which the river flows into

the sea, namely Chilia, Tulcea, Sulina and Sfintu Gheorghe. The secondary hydrographic network of delta is composed by channels, creeks, backwaters and periboinas. The other depression-lacustrine formations are marshes, estuaries, lagoons, swamps, japsas and lakes.

The area of the Danube Delta is 4.152 sq. km, including 3.446 sq. km of the Romanian territory. It is a plain in formation, relatively flat, with an inclination of 0.0006% from west to east, and is 70-80% permanently or temporarily covered by water. The average water temperature in summer is 21^0C. The composition of the river solid flow varies, including a mixture of natural erosional detritals as clay, sand, dolomite, feldspar, quartz, silt, calcite, shell debris, etc.

The two lakes selected for sampling, Furtuna and Lung, present quite different conditions induced by sedimentation rate that will be described further (Fig.1.).

Chilia is the northern and most active arm, with two groups of branches and own micro-delta. Sulina is the shortest, straightest and best developed branch. The main characteristics of the two arms are presented in Table 1.

Lung Lake is situated in the eastern side of Danube Delta, near the Lung channel mouth, at practically equal distances between Sulina and Chilia arms, in a lacustrine depression. Since the lake is relatively isolated related to the main branches, all the rivulets of channels connected have a meandered pattern. Then a considerable quantity of aquatic sediments does not accumulate in the lake. It is characterized by a low sedimentation rate. The microelements input in water lake sediments it is supposed to release both from atmospheric deposition and alluvial transport. The sampling point was chosen in the middle region of the lake, where the bottom sediments are not disturbed.

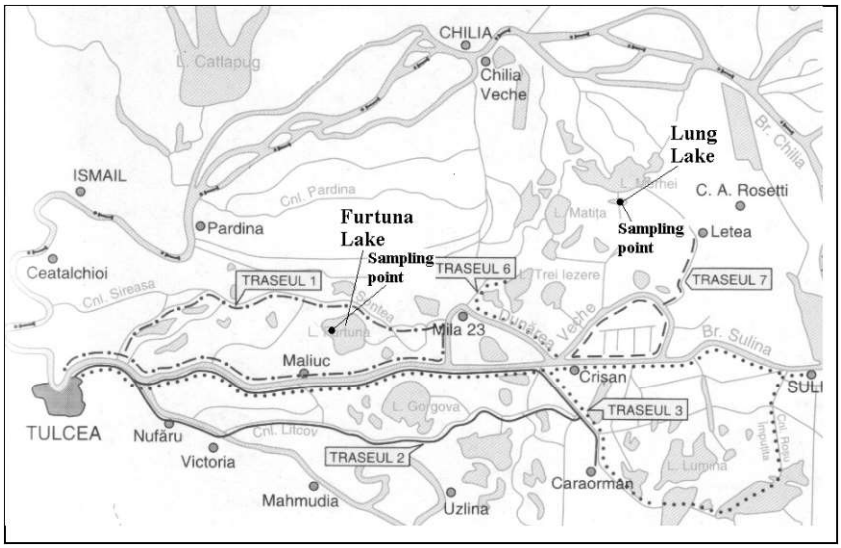

Fig. 1. – The map of a part of Danube Delta representing the sampling locations

Furtuna Lake is located near the Sulina arm, near the Mitchina channel mouth. The sampling point was located in the western side of the lake. The Furtuna Lake is characterized by a high sedimentation rate, the sediments are more denser. The position of the sampling locations was established by GPS with accuracies of ±2 m.

Table 1

The main characteristics of the Chilia and Sulina lakes

Arm	*Length (km)*	*Maximum width (km)*	*Maximum depth (m)*	*% Danube's water*	*Sinuousness coefficient*
Chilia	105	1,000	39	60	1.56
Sulina	64	250	18	18	1.03

Sampling and analysis

From a 5 m boat we collected 5 cm diameter cores in polystyrene tubes with a hand corer. Prior to analysis, after sealing inside and storing at 20^0C, the cores are sectioned at 1-2 cm thickness cm slices. The samples were dried at 105^0 C for two hours, then were desegregated and weighed. The mineral composition of the core is presented in Table 2. Aliquots of 250-300 mg from each slice were prepared for analysis. The samples were analyzed by neutron activation analysis (NAA). Blanks, replicates and reference material SDM-sediment (IAEA, Vienna) were used for quality assurance and control of the NAA.

Table 2

The mineral composition of the core

Layer	*Depth(cm)*	Mineralogical composition
I	0-10	calcite, clay, quartz
II	10-20	calcite, clay, quartz
III	20-30	quartz,, clay, feldspar, calcite
IV	3-45	clay, quartz, calcite, feldspar

Statistical analysis

The factor analysis is derived in a four-step process:

1. The preparation of covariance matrix;
2. The extraction of the factors;
3. The rotation of the factors until their full independence;
4. The calculation of scores for each factor.

The chemical elements can occur in various mixtures in sediment and they may be highly correlated, depending on the sources. In the present study, with data from different sources, the aim is to develop a method to explore the relationships among the variables and PCA factor analysis is the most appropriate.

The data were normalized to assure to all elements subjected to analysis an equal weight. After performing PCA analysis the factors were supposed to an orthogonal VARIMAX rotation method and the final factors obtained contain few large loadings, very few intermediate ones and many small.

RESULTS AND DISCUSSIONS

PCA analysis of the data concentrations from the Furtuna and Lung lakes surveyed identified four factors that account for about 71% from the total variance of the data set (Figs. 2-5).

The first factor is loaded mostly with the elements Na, Mg, Mn, K, Ni, Ca, in that order. It described 31% from the total variance. It is related mainly to seawater and less to agricultural activities, suggested by manganese loadings.

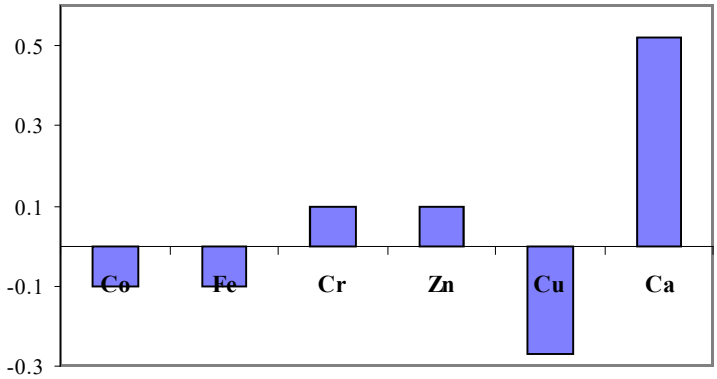

Fig. 2. – The first factor most significant loadings

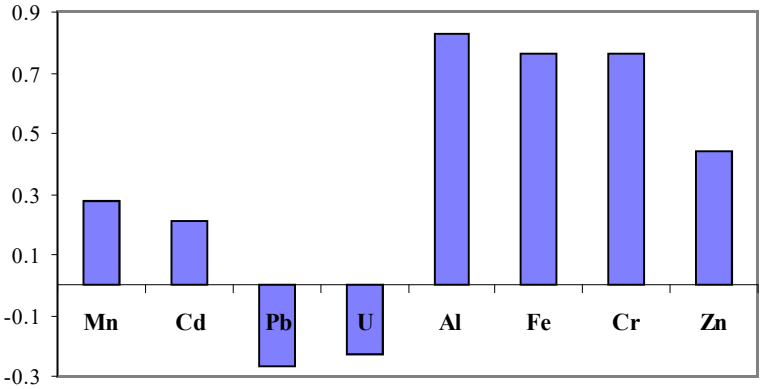

Fig. 3. – The second factor most significant loadings

Al, Fe, Cr, Zn (in that order) loads the second factor. It describes 17% from the variance and reflects the local geochemical environment. The presence of zinc can be related with anthropogenic inputs in lakes waters.

The third factor, describing 16% of the variance, with very high loadings for Cd, Co, Pb, U, Al and Fe (in that order) can be associated with general heavy metal pollution due to anthropogenic activities and evolution of the region.

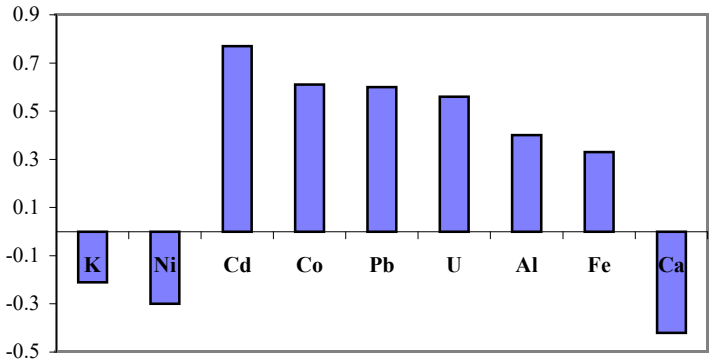

Fig. 4. – The third factor most significant loadings

The fourth factor (Cu, Ca, Th) describing 7% of the variance is a geological factor. The copper loadings suggest the agriculture influence.

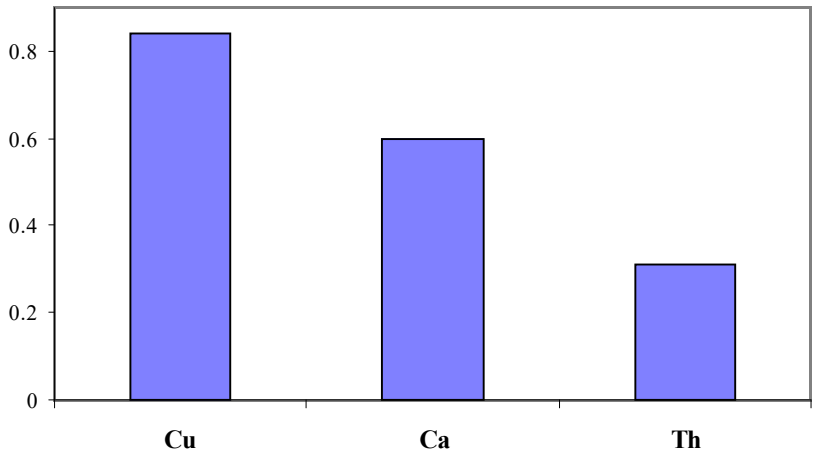

Fig. 5. – The fourth factor most significant loadings

CONCLUSIONS

The concentrations of the microelements are well correlated with the mineralogical structure of the core.

The vertical distribution of pollutant microelements in the Danube Delta sediments reflected in factor loadings are generally reflecting the historic pollution inputs into the river:

1. The increased concentration values of these pollutants till 1987 might be due to industrialization in central and eastern European countries before 1987.
2. The decrease of pollutants content after 1990 could be explained by the recent failure of industrial production, due to political exchanges in Eastern Europe.

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COMPARATIVE STUDY REGARDING THE EFFECT OF TWO GROWTH STIMULATORS ON PRODUCTION AND SOME BIOCHEMICAL PARAMETERS AT TOMATO FRUITS

STUDIU COMPARATIV PRIVIND EFECTUL UNOR BIOSTIMULATORI ASUPRA PRODUCȚIEI SI VALORILOR UNOR PARAMETRI BIOCHIMICI LA FRUCTELE DE TOMATE

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Abstract. *The paperwork presents comparative aspects of the obtained production values, as average data of two consecutive years, at Buzău 1600 tomato breed. The applied treatments included two growth stimulators from the synthetic auxins' class, subclass phenoxy-alkyl-carboxylic acids, from group IV of toxicity applied in two dilutions, selected after preliminary tests. There was also observed the aspect of fruit quality, by determining some parameters for the treated variants compared to the control. The obtained results show a significant production increase for all the treated variants compared to the control, even if one of the observation years had severe climate conditions during the vegetation period. There were observed clear positive differences in the fruits' aspect and structure, without significant differences of the biochemical parameters' values for the treated fruits in detriment of quality.*

Rezumat. *Lucrarea prezinta aspecte comparative asupra valorilor producției obținute , ca medie a doi ani consecutivi, la tomate din soiul Buzău 1600. Tratamentele efectuate au inclus doi biostimulatori din clasa auxinelor sintetice, subclasa acizilor fenoxialchil carboxilici, din grupa a IV-a de toxicitate, aplicați în două diluții selectate în urma unor teste preliminare. S-a urmărit deasemeni şi aspectul calității fructelor obținute, prin determinarea unor parametri biochimici la variantele tratate față de martor. Rezultatele obținute arată creşterea semnificativă a producției la toate variantele tratate față de martor, chiar daca unul din anii de observații a avut condiții climatice deosebite în perioada de vegetație. S-au observat diferențe pozitive clare în aspectul şi structura fructelor, fără ca parametrii biochimici măsurați să difere la fructele tratate în detrimentul calității.*

The experimental data presented here are part of a more extended study on the effects of two growth stimulators (2-chloro, 4-amido-sulphonic phenoxy acetic acid, sodium salt – substance A - and 4-chloro, 2-amido-sulphonic phenoxy acetic acid, sodium salt – substance B) on tomato plants, from the rooting process to fruit production. Even if the positive effects were observed in all stages of development, the most evident results consist in the productivity and fruit quality parameters.

MATERIAL AND METHOD

The tomato breed used in this study was Buzău 1600, created in 1972 at Buzău Center for Vegetables Research. The fruits obtained from this breed are spherical, light red when reaching maturity and of 190 – 260 g. The maturation is gradual, uniform distributed in the interval August-September and there can be obtained 70 – 90 t fruits /ha in multi-belt culture, for a density of 40,000 plants per ha.

The fruits are fleshly, with a pleasant, well-balanced taste and a dry matter content of 5.6 – 6.1%. This breed can be cultivated in all favorable and very favorable zones for tomato cultures.

The treatment variants were chosen after a preliminary dilution test which determined the first two growth stimulator's concentrations for each of the two substances. These four dilutions were compared to a control variant. For both substances (2-chloro, 4-amido-sulphonic phenoxy acetic acid, sodium salt and 4-chloro, 2-amido-sulphonic phenoxy acetic acid, sodium salt) there were chosen the dilutions of 20 and 25 ppm in leaf application and for the control, distillated water was used. The treatment was applied twice, the first time before the flowers blossomed and second time before fruit apparition. Sodium salts were used for both acids in order to increase solubility and absorption rate.

Besides measuring the fruit production as average value for two consecutive years, in t fruits/ha, there were also determined some biochemical parameters for the tomato fruits: humidity and dry matter content, ash content, reductive and total sugar content and ascorbic acid content. The methods used for determining these parameters are briefly listed below.

1**. Humidity and dry matter content.** Measuring the water quantity contained by tomatoes is indispensable for any further analysis; the usual expression of the chemical composition is always based on dry matter or on the substance with a precise humidity. We measure the weight loss when heating the sample up to 105°C.

The weight loss is expressed in percentages and it is considered as the sample's humidity:

$$\%\,U = \frac{G - G_1}{G} \times 100$$ where:

U - humidity (%);
G – sample weight (g);
G_1 - dry sample weight (g).

The difference (100 – U) represents dry matter at 105^0C, expressed in percentages, compared to the wet sample ( ).

2. Ash content. By heating in air at over 400^0C, dry vegetal matter is oxidized and transformed in mineral volatile substances (CO_2, H_2O, N_2) and in mineral fix substances – vegetal ash. The vegetal matter is incinerated until the constant weight of the obtained ash. The ash content is expressed in percentages compared to air dried matter or compared to matter dried at 105^0C.

The relation for calculating the ash content is:

$$\%\,A = \frac{m_1}{m} \times 100$$ where:

A – ash content (%);
m – ash weight (g)
m_1- dry sample weight (g).

3. Reductive and total sugars content. A) Reductive sugars. In order to determine the reductive sugars content the following operations are required: - sugars extraction; - the separation of the proteins, vegetal pigments, organic acids etc. from the sugar solution; - the actual determination. Schoorl method was used for all these steps. The reductive sugars reduce, at temperature, Cu $(OH)_2$ to Cu_2O. The excess of copper (II) oxidizes KI to I_2, which reactions with $Na_2S_2O_3$. The quantity of $Na_2S_2O_3$ for each sample is in fact a difference between the quantity of $Na_2S_2O_3$ consumed by a control sample and the quantity of $Na_2S_2O_3$ consumed by the analyzed sample.

In accordance with the consumed quantity of $Na_2S_2O_3$ we determine the quantity of reduced copper and after that, from the tables, the quantity of reductive sugar, expressed in glucose, fructose etc.

B) Total sugars. To determine the total sugar content we have to hydrolyze the non-reductive sugars from the sample extract, for example by treating it with hydrochloric acid. After that, the actual sugar determination can be made by gravimetrical, volumetrical, refract-metrical or polar-metrical methods.

The relation for calculating the reductive and total sugars content is:

$$\text{Glucose\%} = 100 \cdot B/M \quad , \quad \text{where}$$

B – the quantity (in mg) of sugar corresponding with the reduced copper (in mg), from the tables:

M – the quantity of solid vegetal material corresponding to analyzed sample volume.

The percentage of the non-reductive sugars is represented by the difference between the total sugars content and the reductive sugars one.

4. Ascorbic acid content. The chemical quantitative methods for determining the ascorbic acid content are based on its reductive action. In the method used for these analyses, the ascorbic acid has the property to reduce 2,6-dichlorophenol-indophenol (Tillmans reactive) to its hydrogenated derivative.

The extract obtained from the fresh vegetal material is treated with Tillmans reactive and the results are compared to a control sample. The ascorbic acid content, expressed in mg per 100 g vegetal material is calculated with the following expression:

$$\text{Vit.C} = \frac{V_0 - (V_1 + V_2) \times V_3 \times C}{V_4 \times m_0} \times 100 \quad \text{(mg/100g), where:}$$

m_0 = the quantity of the solid analyzed sample (g);

C = the mg of ascorbic acid corresponding to 1 ml solution of Tillmans reactive;

V_0 = the volume of Tillmans reactive solution used for sample treatment (ml);

V_1 = the volume of Tillmans reactive solution used for control sample treatment (ml);

V_2 = the volume of Tillmans reactive solution used for reductive substances treatment (ml);

V_3 = total volume of the sample extract (ml);

V_4 = the volume of the sample's acid extract (ml).

RESULTS AND DISCUSSIONS

In what regards the average values of the production for two consecutive years of experiments, expressed in tones/ha, the obtained results in the comparative calculus show differences of 13.7 – 47.3 t/ha for the treated variants compared to the control.

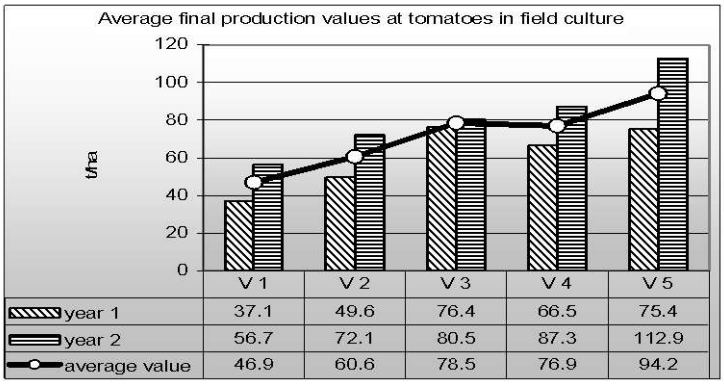

Fig.1 - Average final production values related to the treatment variant

Table 1.

The influence of the applied treatment on the final average production value

Variant	Average production	% compared to the control	Differences	Significance
5	94.2	200.85	47.3	xx
3	78.5	167.38	31.6	x
4	76.9	163.97	30.0	x
2	60.9	129.85	14.0	
1	46.9	100.00	0.0	Control
DL 5% : 23.3 t/ha DL 1% : 38.6 t/ha DL 0.1 % : 72.2 t/ha				

Analyzing the data regarding the production for tomatoes in field culture in the first experimental year, for 40,000 plants/ha, there were observed significant production increases compared to the control and to the breed's productive potential. The variant V_5 treated with substance B (20 ppm) had a constant better evolution and over passed the breed's potential with 24,44 %.

In the second experimental year, there were obtained better results for the treatment with substance A (20 ppm) – 76,4 t/ha (V_3). Although the production did not over passed the breed's potential, still, considering the unfavorable climate conditions of that year, there was observed that at this variant a double production was obtained, compared to the control (37,1 t/ha).

As average value for both experimental years regarding production for a surface cultivated with 40,000 plants/ha, the final production varied between 46,8 t/ha for the control and 94,2 t/ha for the variant treated with substance B (20 ppm) that gave the best results.

In what concerns the influence of the applied treatment on the studied biochemical parameters, there were no significant differences between the samples. The dry matter content had the biggest value for the variant V_4, treated with substance B (25 ppm) and the smallest value was obtained at variant V_3, treated with substance A (20 ppm), smaller even that the **control's.**

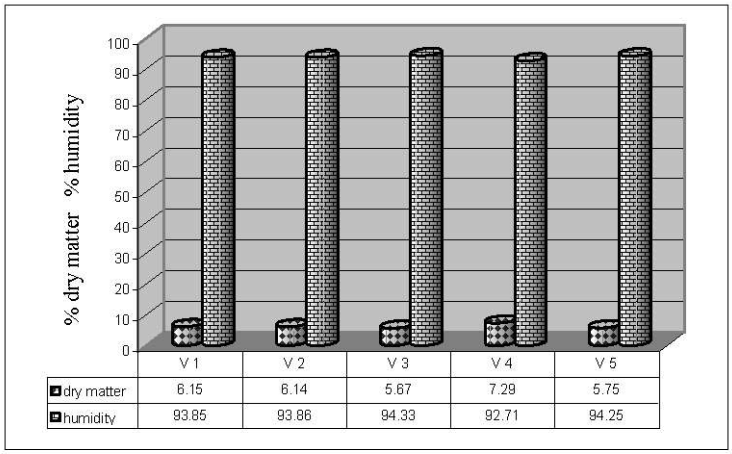

Fig. 2 - Dry matter and humidity values for tomatoes related to applied treatment

The reductive and total sugars' content was tested with standard Schoorl method. The obtained results showed slightly increases for the variants V_3 (substance A – 20 ppm) and V_5 (substance B – 20 ppm) compared to the control. The biggest value was registered at both categories for variant V_2 (substance A – 25 ppm) – 7.92 g glucose/100 g for reductive sugars and respectively 10.56 g glucose/100 g for total sugars. Even if no significant increases were noticed, yet the values were no smaller than the control's. Only one variant had the same values for both sugar types determined in the analysis.

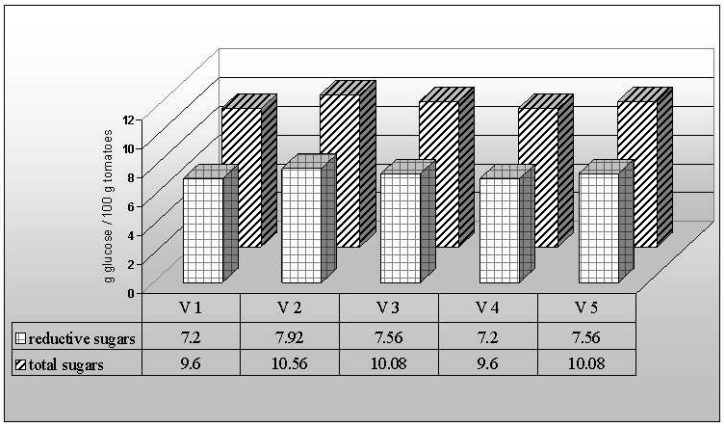

Fig. 3 - Reductive and total sugars' values for tomatoes related to applied treatment

For the ascorbic acid's content, all variants had smaller values than the control, but still no significant decreases were registered. From all four variants, V_4 (substance B – 25 ppm) had the biggest value and variant V_2 (substance A – 25 ppm) had the smallest one.

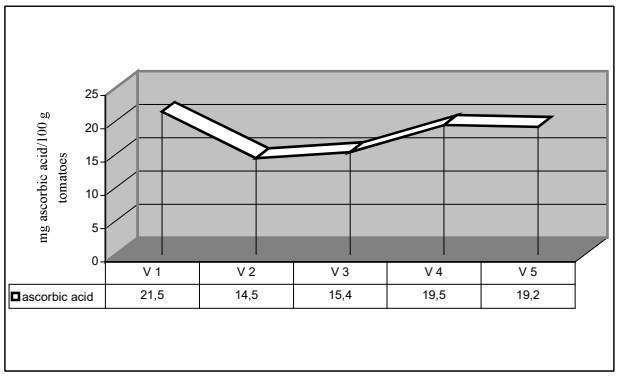

Fig. 4 - Ascorbic acid contents for tomatoes related to applied treatment

CONCLUSIONS

1. There are significant differences between untreated tomato plants and the ones treated with the two growth stimulating substances. Both in optimal or critical climate conditions, the treatments with these two substances in dilutions of 20 and 25 ppm lead to remarkable increases of the production at tomatoes in field culture, with differences of 13,7 – 47,3 t/ha compared to the control variant.

2. From direct observations on tomato fruits harvested from the treated variants, these are bigger, in larger numbers on each plant and have a wrinkled aspect in the attach point area. Also, there was noticed an increase of the pulp ratio, very important for the industrial conditioning of these fruits.

3. From the analyzed biochemical parameters' study, a slightly increase of the reductive and total sugars content is noticed for the tomatoes harvested from the treated variants compared to the control, as well as a small decrease for the ascorbic acid content with 2 – 7 mg/100 g tomatoes.

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THE MORPHOLOGICAL CHARACTERISTICS OF MERLOT PLANTLETS TREATED LASER

CARACTERISTICI MORFOLOGICE ALE PLANTULELOR DE MERLOT OBȚINUTE DIN MERISTEME TRATATE LASER

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Abstract*: The using of laser radiation as a mutagen physical factor allowed obtaining new genotypes, with morpho-physiological modifications. These mutations could lead to the creation of new forms, with valuable features: high productivity, resistant to many diseases or to environmental unfavorable conditions.*

The research was made on "Merlot" grapevine variety, known as a sensitive one to drought and especially to frost. The meristems culture is preferred as an initial material for in vitro method due to its high ability of cell division. Besides, the use of meristems guarantees genetic stability to the descendants. The explants were laser irradiated evenly, for 30 sec, 180 sec, 300 sec and 600 sec. The purpose of this work is to achieve a study concerning the action of laser radiation on the evolution of grapevine meristems, having in view the morpho-physiological variations of plantlets regenerated from these radiated meristems.

Widespread laser utilization- as mutagen physical agents –is especially conditioned by its own emission of radiation characteristics (pronounced mono-chromaticity, coherence and orientation). Explants of "Merlot" have been radiated using a Ne-He laser (power source P=6mW and λ = 632,8 nm), for 30 sec, 180 sec, 300 sec, 600 sec. The meristems reaction was compared with a standard group of plantlets not radiated.

One can see that radiation bring phenotypic changes: asymmetrical disposition of leaves on the sprouts, unequal knot junctions, double sprouts, forked sprouts and dwarf-ness. It also has been observed the apparition of albino plantlets. The behavior of this modified plants cultivated "in situ" remained stable.

INTRODUCTION

The laser radiation is one of the very used mutagen physical factors, because they have a good mono-chromaticity and are coherent. Due to its mono-chromaticity, the laser radiation action with a specific wavelength is absorbed by certain cellular tissues (Corneanu C.G. şi Stoicescu C.G., 1987).

The obtained mutations by using laser treatment could lead to the creation of new forms, with valuable features: high productivity, resistant to many diseases or to environmental unfavorable conditions (Budagovsky A.V., Evseyeva R.P , 1993 , Svetlana D., Aladjadjian A, 1996).

The purpose of this work is to achieve a study concerning the action of laser radiation on the evolution of grapevine meristems, having in view the morpho-

physiological variations of plantlets regenerated from these irrradiated meristems

MATERIAL AND METHOD

The research was made on "Merlot" grapevine variety, known as a sensitive one to drought and especially to frost. The meristems culture is preferred as an initial material for in vitro method due to its high ability of cell division. Besides, the use of meristems guarantees genetic stability to the descendants.(Raicu P., Badea Marcela ,1983)

The explants were laser radiated evenly, for 30 sec, 180 sec, 300 sec and 600 sec with a He – Ne laser (P = 6 mW şi λ = 632,8 nm).

RESULTS AND DISCUSSIONS

The rhysogenesis: All the experimental variants had a rooting percentage of up to 90%, the maxim value – 96.75% - was noted for 600 sec. radiation (see fig.1)

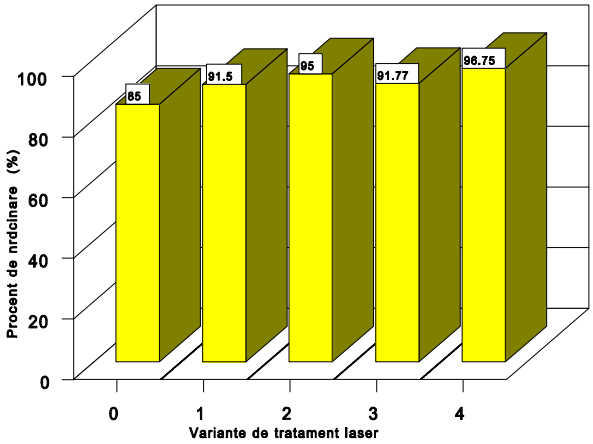

Fig.1 - The dependence of the rooting percentage by the laser treatment variant

The very high percent of rooting allowed the acclimatization of plants, with a good radicular system, under specific conditions of humidity (60-70 %) and temperature (24-25 %), over a period of 35 - 40 days.

Growth values during springtime are listed in the table 1:

Table1

Interdependence of some parameters (height and number of leaves/sprout) during the acclimatization and the variant of laser treatment.

Variant Time of exposure (sec)	Control	30	180	300	600
Average value Height (cm)	27,200	36,500*	30,650	30,587	24,350
Average value Leaves number/sprout	6,750	8,000	7,250	7,000	6,250

*Note: * -significant differences for DL > 5 %*

Similar to the gamma irradiation treatment, using the laser radiation left no significant differences between the experimental samples regarding the morphological characteristics of the plants (height and number of leaves/sprout). Nevertheless one can see a stimulation of the plant growth during the 30 sec. exposure compared with the 600 sec. (36,5 cm compared with 24,35 cm and 8 leaves/sprout against an average of only 6,25 leaves/sprout respectively).

Fig.2 - Laser radiated sprout (180 sec), during acclimatization

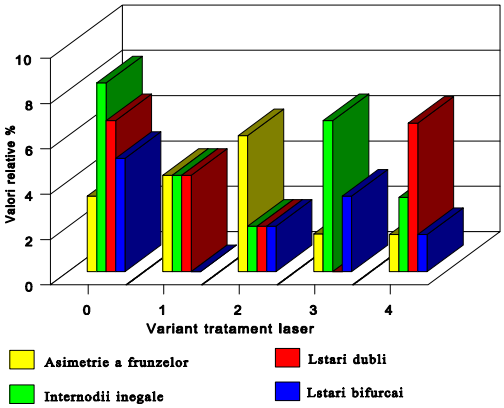

Fig.3 - Variation in the number of dwarf plants (relative values) laser tratment variant, for Merlot sort

During laser radiation of the "Merlot" grapevine plants have been observed changes in the plants morphology as: asymmetrical disposition of leaves on the sprouts, unequal knot junctions, double sprouts, forked sprouts and dwarf -ness.

Morphological changes are comprehensive during the "in vitro" cultivation for all the grapevine plants regardless of provenience, either standards or experimental variants.

Forked sprouts phenomenon is diminishing with the increment of time exposure at radiation, except the 30 sec exposure where forked sprouts are absent.

Double sprouts occure in maximum percentage (6,66 %) in the standard lot as well in the variant of the maximum raqdiation exposure of 600 sec. (6,55 %). Opposite ,the phenomenon is absent to the plants belonging to the experimental lot of 300 sec radiation exposure , but at this particular lot we observe a 1,66%

percentage of albino plants, a phenomenon that does not occurred during the experiments with gamma irradiation.

Fig. 4. Sprout with double knot, consequence of laser radiation for 600 sec; pronounced phenomenon of rhysogenesis

The analysis and experiments of the morphological changes in the regenerated plants from the meristems cultures in regards of the evaluation of genetically variability.

CONCLUSIONS

- In the treatment with laser radiation the rhysogenesis process is very pronounced over all the radiated variants with a rooting percentage above 90%.This allowed a better acclimatization of the regenerated plants.
- Laser radiation bring phenotypical changes: asymmetrical disposition of the leaves on the sprouts, unequal knot junctions, double sprouts, forked sprouts, as well as the occurrence of albino plants. Cultivating this regenerated plants „in situ" the modifications suffered were stable.
- Gamma irradiation and laser radiation of the explants produced a sort of dwarf grapevine plants of outstanding interest in practice.
- The experimental results shows evidence of the relevant action of the physical factors over the „in vitro" evolution in the grapevine cultures.

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EFFECTS OF LEAD ON THE PLANT GROWTH AND PHOTOSYNTHETIC ACTIVITY

EFECTUL PLUMBULUI ASUPRA CREŞTERII ŞI ACTIVITĂȚII FOTOSINTETICE A PLANTELOR

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Abstract. *Heavy metals disrupt the metabolic processes of living organisms. The presence of Pb^{2+} and other heavy metals in the environment has become a major threat to plant, animal and human life due to their bioaccumulation tendency and toxicity. Treatment of plants with lead nitrate showed inhibition in growth parameters. In order to understand the effects of Pb on the plant growth, we decided to perform experiments on Capsicum anuum plant which were irrigated with a solution containing lead nitrate. Our measurements showed that lead nitrate increases the content of photosynthetic pigments; no modifications were observations on height of plants and their biomass.*

Key words: lead nitrate, pepper plant, photosynthetic pigments

INTRODUCTION

Lead is a toxic element, which is conservative and has cumulative characteristics [4] .The majority of lead discharged into the environment comes from atmospheric and particulate sources. In addition, there are a range of industries which generate waste waters containing significant concentrations of lead. Soils are a major sink for lead, which might be absorbed and bioaccumulated by plants and animals eventually becoming available for human consumption. According to the literature, there is a positive correlation between lead in soil and blood lead concentration1. Excessive amounts of lead in the human body can cause hypertension and brain damage. Naturally occurring lead in soils is usually found atless than 50 mg/ kg. Nevertheless, contaminated surface soils may contain more than11, 000 mg /kg.

The presence of Pb^{2+} and other heavy metals in the environment has become a major threat to plant, animal and human life due to their bioaccumulation tendency and toxicity. It is therefore necessary that there are technologies for controlling the concentrations of these metals in aqueous discharges/effluents. To study the effects of heavy metals on plants and mechanisms of resistance, one must select crop cultivars and/or plants for removing heavy metals from soil and water. More highly resistant plants can be selected especially for a remediation of the pollution site. Understanding the bioavailability of heavy metals is advantageous for plant cultivation and phytoremediation. Decrease in the bioavailability to farmlands would reduce the

accumulation of heavy metals in food. Alternatively, one could increase the bioavailability of plants to extract more heavy metals [2]. Current techniques for removing contaminants from soils are generally expensive and labor intensive. In addition, these techniques are frequently appropriate for small areas and may affect biological activity, soil structure and fertility as well.

Heavy metals have direct physiological toxic effects were reported by many authors [5], [6], [7].

In [3] authors studied the plants growth cultivated in mine wastes and in waste-amended soils that contain lead, cadmium, arsenic, and zinc. Lettuce had 100% survival in the 100% mine waste treatments compared to 0% for tomatoes. Metal concentrations were determined in plant tissues to determine uptake and distribution of metals in the edible plant parts. Tomato and bean plants contained the four metals mainly in the roots, and little was translocated to the fruits. Radish roots accumulated less metals compared to the leaves, whereas lettuce roots and leaves accumulated similar concentrations of the four metals. Lettuce leaves and radish roots accumulated significantly more metals than bean and tomato fruits. This accumulation pattern suggests that consumption of lettuce leaves or radish roots from plants grown in mine wastes would pose greater risks to humans and wildlife than would consumption of beans or tomatoes grown in the same area.

Heavy metals disrupt the metabolic processes of living organisms; they induce anatomical changes in primary leaves. N.Y.Chaudhry and Qurat-ul-Ain [1] indicated that applied lead nitrate showed inhibition in growth parameters. Pb binds the essential enzymes and cellular components and inactivates them. The number of stomata/mm registered increase with the application of growth hormones individually and in mixed doses, while a decrease in the number of epidermal cells/mm was observed at Pb treatments. Although hormones and having metal Pb nitrate showed their clear effects with individual applications, no generalized pattern was observed with the combination of hormones and heavy metal.

In order to better understand the effects of Pb on the plant growth, we decided to perform experiments on *Capsicum anuum* plant which were irrigated with a solution containing lead nitrate. At the end of the experimental period, the growth of the plants and the concentration of total chlorophyll, chlorophyll a (chla), chlorophyll b (chlb) and carotenoids in the leaves of the developing plants were monitored.

MATERIAL AND METHOD

Pepper seeds were planted in the University of Agronomy and Veterinary Medicine Iasi greenhouse and they were grown in pots. The seeds planted in the greenhouse were grown in optimal conditions.

After 10 weeks the pepper plants were treated with a solution of lead nitrate.

In order to accomplish the goal of this experiment 20ml solution were poured into the soil at the root of each plant. The procedure was performed for three times in a row.

A week after the end of the treatment the analysis of the growth and the photosynthetic activity was performed.

For pigment analysis were measured 1 g of fresh leaf tissue and were cut the leaves into small pieces (about 1 mm wide). The pigments were extracted by grinding in a mortar and pestle for 5 minutes. Afterwards the extract was filtrated and transferred to 100 ml acetone.

The pigment analysis was performed with a spectrophotometer SPECORD 200 from Analytik Jena, immediately after the solutions were prepared. The content of the photosynthetic pigments was calculated with the formula:

Chl a = (9.784 * E662 - 0.99 * E644) * V* 100 / m

Chl b = (21.462 * E644 - 4.65 * E662) * V*100/ m

Car = (4.695 * E440 - 0.268 * (5.134 *E662 + 20.436 * E644) * V *100 /m

where:

-E662, E644, E440 is the absorbance,

-V is the volume of the solvent,

- m is the mass tissue.

RESULTS AND DISCUSSIONS

The spectrum of the acetonic extract from photosynthetic pigments is presented in Fig.1

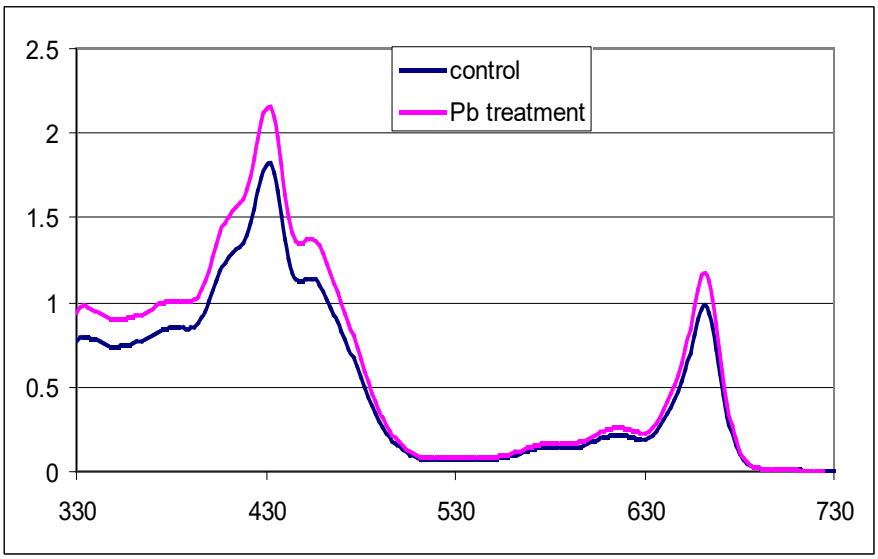

Figure 1. **Spectrum of pigments from control and treated with Pb pepper plants**

The content of photosynthetic pigments from the control plants and the treated ones with lead nitrate are presented in the Fig.2

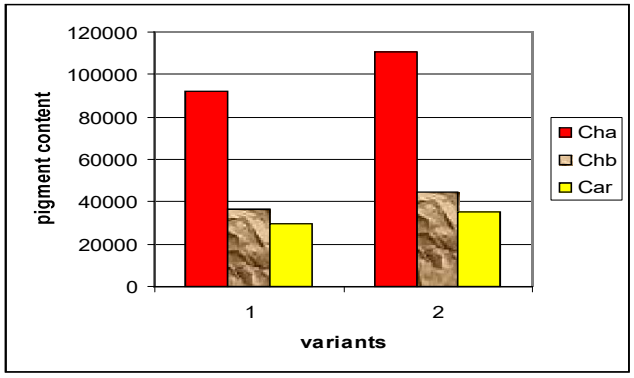

Figure 2. **Content of pigments from control and treated with Pb pepper plants**

CONCLUSIONS

The effects of lead nitrate on plants resulted in change of biochemical activities as well as of the function of plants. We can see from figures 1 and 2 that lead nitrate increases the content of photosynthetic pigments but no modifications were observations on height of plants and their biomass (figures not shown). Despite the fact that the heavy metals are toxic to people, in this phase of the research there have been no measurements taken about the transmission of this heavy metal to the leaves and the fruits of the plants

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COMPARATIVE EFFECTS OF FE^{2+} AND FE^{3+} ON THE PLANT GROWTH

EFECTE COMPARATIVE ALE FE^{2+} SI FE^{3+} ASUPRA DEZVOLTĂRII PLANTELOR

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Abstract. *The vegetables contain iron, the highest level of Fe being in plant leaves. The plants absorb iron more as Fe^{2+} than ferric compounds. Iron is an essential element required for respiration, photosynthesis, and many other cellular functions such as DNA synthesis, nitrogen fixation, and hormone production. In this work the effects of Fe^{2+} and Fe^{3+} cations on tomato plant growth.*
Key words: cations, tomato plant, germination, height of plant

Rezumat. *Plantele horticole contin fier, frunzele fiind in cea mai mare parte purtatoarele acestui element. Plantele absorb fierul mai mult sub forma de Fe^{2+} din combinatii feroase decat ca Fe^{3+} din combinatii ferice. Fierul este un component al unor enzime si transportori de ioni cu functii in sistemul redox al celulei, tocmai datorita capacitatii sale de a-si schimba valenta. Noi am studiat efectul tratamentului cu Fe^{2+} si Fe^{3+} asupra dezvoltarii plantelor de tomate. In acest scop semintele de tomate au fost mentinute timp de o saptamana in solutii ale unor saruri ce contin acesti cationi, dupa care au fost plantate in ghivece in laboratorul de Biofizica unde s-au dezvoltat la temperaturi de 18-20^{0}C. Studiul nostru a permis evidentierea unor diferente privind efectele celor doua stari ale fierului asupra dezvoltarii plantelor de tomate.*

INTRODUCTION

Iron is an essential element for all living organisms. Although iron is also the most abundant transition metal in the earth's crust, its chemical properties hinder its availability to plants and animals. In the presence of oxygen, iron is essentially under the oxidized form $Fe^{3+,}$ whereas in the organism it is required in the reduced form Fe^{2+}, highlighting the need for a reduction step. In addition, because Fe^{3+} has a very low solubility at neutral pH in oxygenated fluids, the transport of iron under physiological conditions requires a preliminary step that consists of chelation of Fe^{3+} or acidification of the rhizosphere [2]. Anaerobic conditions in acidic soils can lead to cellular iron overload, which causes serious damage to plants because free iron catalyzes the formation of reactive oxygen species. Thus plants need mechanisms to both solubilize and take up Fe^{3+} from their environment, and to store it in a soluble form for later use. n nature, many redox reactions are dependent on iron-containing enzymes whereby electron

transport is facilitated by changes in the oxidation state of the metal. Nitrogen fixation and photosynthesis are examples of processes in which iron-containing enzymes play vital roles.

The vegetables contain iron, the highest level of Fe being in plant leaves. The plants absorb iron more as Fe^{2+} than ferric compounds. In all living organism iron is an element of many proteins that participates in metabolic processes. Iron is an essential element required for respiration, photosynthesis, and many other cellular functions such as DNA synthesis, nitrogen fixation, and hormone production. Iron is essential for the production of chlorophyll so symptoms take the form of chlorosis of the youngest leaves, sometimes to the extent of turning white, while the veins stay green, followed by shoot die back. The redox potential of Fe^{2+}/Fe^{3+} enables its use, in the form of iron - sulfur clusters, in a number of protein complexes, especially those involved in electron transfer.

Although abundant in nature, iron often is unavailable because it forms insoluble ferric hydroxide complexes in the presence of oxygen at neutral or basic pH [6]. The transport of iron from the environment, iron distribution to various tissues and organs and intracellular compartmentalization are essential for physiological processes. Iron deficiency chlorosis is a major nutritional problem affecting cultivated plants, characterized by yellowing of young leaves that contrast with the green color frequently observed in the more mature leaves. Cultivated plants differ in their susceptibility to Fe deficiency depending on their mechanisms of Fe acquisition, particularly in their ability to release Fe-chelating compound. In sensitive plants, severe Fe deficiency results in high economic losses, particularly in perennial crops. Iron deficiency occurs mainly on high pH soils or where irrigating with hard water has eventually caused the pH to increase. Although Fe chlorosis has traditionally been related to the carbonate content of soil, other properties such as the types of Fe oxide present and their content, organic matter, water content, redox potential, carbonate mineralogy, and nutrient competition may also influence Fe availability to plants. The effects of iron deficiency on the composition of the xylem sap and leaf apoplastic fluid have been characterized in sugar beet by Lopez et al [5]. Larbi and coworkers [4] have been investigated the characteristics of the Fe-chelate reductase activity in mesophyll disks of Fe-sufficient and Fe-deficient sugar beet leaves.

Iron toxicity is another phenomenon which affects the plants. Fe content in affected plants is usually high (300-2,000 mg Fe kg^{-1}), but the critical Fe content depends on plant age and general nutritional status. The critical threshold is lower in poor soils where nutrition is not properly balanced. The principal causes of Fe toxicity are large Fe^{2+} concentration in soil solution because of strongly reducing conditions in the soil and/or low pH, low and unbalanced crop nutrient status, poor root oxidation and Fe^{2+} exclusion power because of P, Ca, Mg, or K deficiency (K deficiency is often associated with low soil base content and low soil pH, which result in a large concentration of Fe in the soil solution, accumulation of substances that inhibit respiration (e.g., H_2S, FeS, organic acids,), application of large amounts of undecomposed organic matter, application of urban or industrial sewage with a high Fe content [7]. ynalem and Righetti [1] developed a digital-image evaluation system to study in wire-stored plantlets. Image analysis was compared to visual observations in an experiment designed to determine if the improved vigor of growthroom plantlets on medium with sequestrene iron would be maintained during cold storage and

whether the mean storage duration would change with changes in the iron content of the medium. The authors concluded that changes in the health of the plantlets could be observed both visually and through digital image analysis. Recent years we studied the effects of other cations on tomato plant development [3].
In this work we studied the effects of Fe^{2+} and Fe^{3+} cations on tomato plant growth.

MATERIAL AND METHOD

In order to study the effects of Fe^{2+} and Fe^{3+} cations on tomato plant growth, we putted 20 seedlings of tomato (Buzau variety) in Petri dishes containing water and solutions of 5% concentrations from two salts which contain iron. We sorted the following variants
1-control
2- treatment with K4[Fe(CN)6] (Fe^{2+})
3- treatment with [Fe(CN)]K3 (Fe^{3+})
and we maintained them there, during a week. First we monitored the dynamics of germination and after a week only the control seedlings were germinated. Then we planted the tomato seedlings in pots. After that we monitored the plant growth during four weeks.

RESULTS AND DISCUSSIONS

The dynamics of plant germination is presented in figure 1. Figure 2 presents the height of tomato plants after two weeks.

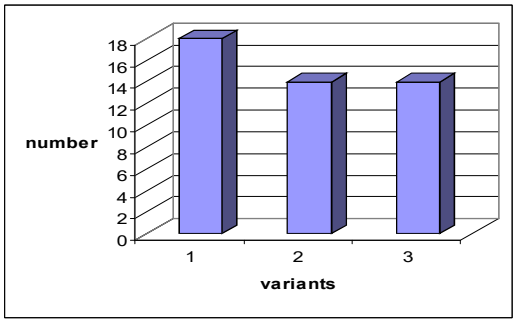

Figure 1 **The number of plant after two weeks**

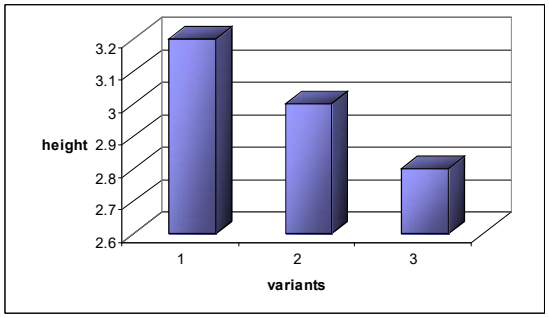

Figure 2 - **The height of plant after two weeks**

From figure 1 we can see that iron produces an inhibition of germination by comparison with the control but no difference exist between the treatments with the two salts which contain iron. From figures 2 we can see that the height of treated plants is smaller that the control ones; this means that these treatments are toxic for studied plants. The toxicity is higher for treated plants with Fe^{3+}. These differences are attenuated after 24 days (the height of plants after 24 days is presented in figure 3).

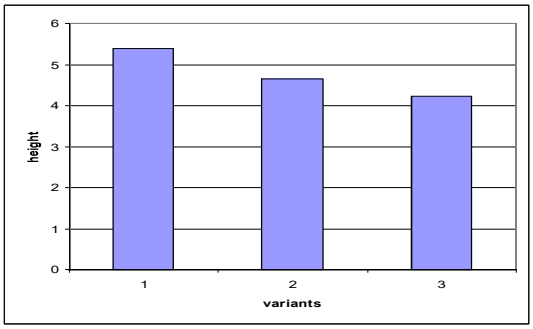

Figure 3 - **The height of plant after 24 days**

CONCLUSIONS

Our measurements showed that iron salts produce an inhibition of germination and a decrease of the height of plants by comparison with the control ones and the effect is higher for salt which contain Fe^{3+}.

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ÉTUDE SOCIOLOGIQUE CONCERNANT L'ANALYSE DE LA CONDUITE DES CONSOMMATEURS DU VIN DU DISTRICT DE VASLUI

STUDIU SOCIOLOGIC PRIVIND ANALIZA COMPORTAMENTULUI CONSUMATORILOR DE VIN DIN JUDETUL VASLUI

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Abstract. *In view to estimate the consumers' behavior on purchasing of certain wine, the authors, used the methos of statistic investigation based on a written questionnaire. The people inquired consisted in wine consumers with residence and place of work within Vaslui district. The sample investigation was represented by the consumer, regardless of sex, social-professional category and age, excepting persons under 21 years old. The questionnaire comprised 9 questions with 14 variables, aimiyng of establisshing of the wine consumers' preferences and position on the market of the wine producers within the analysed area. The processing of information was realized by a specialized programme for social statistics - SPSS, version 12.*

Rezumat. *Pasteur defineşte vinul ca "Cea mai sănătoasă şi mai nobliă dintre băuturi". Specialiştii în domeniu din S.U.A., Europa Occidentală, Japonia şi China (unde cancerul determină mult mai multe decese faţă de maladiile cardiovasculare=, au demosntrat faptul că, consumul de alcool este asociat scăderii mortalităţii de orice natură. În general, cea mai mare reducere a mortalităţii este observată la persoanele cu un consum moderat (1-2 pahare de vin pe zi). Toate rezultatele studiilor efectuate scot în evidenţă două fapte majore şi anume: în primul rând, persoanele care s-au declarat consumatori slabi sau moderaţi de alcool au înregistrat un nivel al mortalităţii mult mai scăzut, comparativ cu nonconsumatorii, având şi o durată de viaţă mai mare decât restul populaţiei; în al doilea rând, persoanele care consumă mari cantităţi de alcool au un nivel al mortalităţii mult mai ridicat faţă de nonconsumatori şi o durată de viaţă mai redusă. Din struguri se pot obţine o serie de produse secundare valoroase, folosite în industria alimentară şi în alte ramuri, cum ar fi: alcool etilic, acid tartric, ulei.*

MATÉRIEL ET MÉTHODE

Pour évaluer l'attitude des consommateurs à l'acquisition du vin, pour connaître la conccurence et la position sur le marché, pour améliorer l'image de marque de la production vinicole et la pénétration sur des nouveaux segments de marché, les auteaurs ont utilisé le sondage statistique basé sur le questionnaire écrit. Le sondage a été réalisé sur un échantillon constitué par 161 personnes, ayant le domicile de résidence et le lieu de travail dans le district de Vaslui. L'analyse des informations a été réalisée par l'intermédiaire du Programme **SPSS- variante 12,** qui est compatible au système informatique Windows**.**

L'unité **de sondage** a été représenté par le consommateur, sans tenir compte de sexe, catégorie socio-professionnelle et âge (à l'exception des personnes âgés de moins de 21 ans).

Le questionnaire a contenu 9 questions avec 14 variables et a eu le but de collecter des informations liées à l'objectif proposé : la détermination des préférences des consommateurs concernant le cepage du vin et la position sur le marché des producteurs des vins dans la région analysée.

Pour la rédaction du questionnaire, les auteurs ont tenu compte du fait que pour être valable, il doit conduire aux reponses attendues, vraies et utilisables.

Le questionnaire a respecté toutes les normes d'éthique professionnelle et a été gérée en conformité à la loi en vigueur.

En vue d'obtenir des reponses édifiantes, les personnes impliquées dans la collecte des informations ont été instruites avant, en leurs précisant le nombre des sujets de l'échantillon, leur structure par catégories socio-professionnelles, la durée de reponse (le temps attribué), le confidentiellement du questionnaire, le lieu de déroulement de l'enquête.

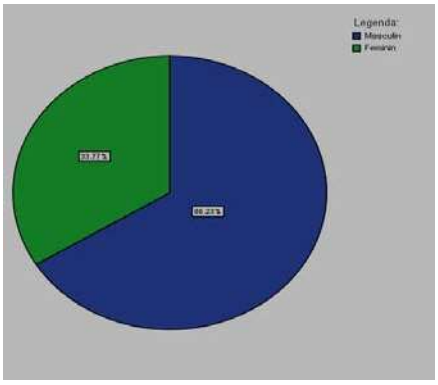
Pour l'élaboration du questionnaire, les auteurs ont respecté les régles de rédaction (l'entête, questions peécises etc.), ainsi qu'il soit attractif et stimulant pour les sujets intérrogés. La collecte des informations a été réalisée par la méthede du sondage et dans la même forme de communication, tous les sujets de l'échantillon reçevant le même questionnaire.

La validation des reponses a représenté une étape très importante, parce que du total de 161 questionnaires, un nombre de 151 questionnaires ont été retenus suite au processus de validation (ceux qui ont eu des reponses completes et adequates aux questions posées).

L'analyse de la fréquence des reponses a été déterminée pour chaque variable et cas séparement, en valeur absolue et en valeur relative.

RÉSULTATS ET DISCUSSIONS

L'analyse des consommateurs en fonction de sexe et par groupes d'âge a mis en évidence les aspects suivants (***fig.1 , fig.2):***



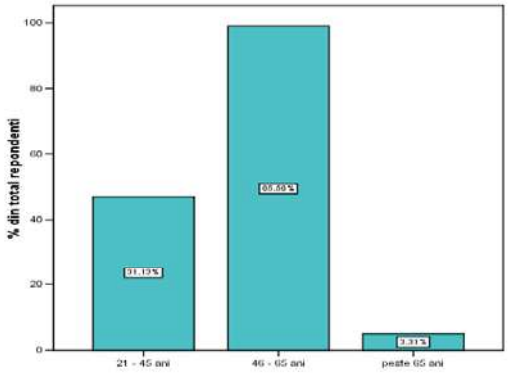


Fig.1 **-** Structure de l'échantillon par sexes ***Fig.2*** – Structure de l'échantillon par groupes d'âges

- du nombre de 151 sujets validés, un pourcentage de 66,23 % a été représenté par les personnes de sexe masculin et 33,77 % par les personnes de sexe féminin;

- en fonction d'âge, la plurpart des sujets font partie de la groupe d'âge „46 – 65 ans" (65,6 %), suivie par ceux de la catégorie „21 – 45 ans" (31,13 %), et ceux de la catégorie „plus de 65 ans" (3,31 %);

En fonction de la profession (***fig.3***), la plupart des sujets a été detenue par les ingénieurs (56,95 %), suivie par les fonctionnaires (19,21 %). Les autres catégories socio-professionnelles ont représenté entre 9,93 % (les économistes), 6,62 % (les retraités) et 7,29 % (des autres professions).

En fonction du mileu de résidence (***fig.4*** **),** la plupart des sujets a été detenue par ceux qui habitent dans les villes (68,87 %) et la différence de 31,13 % par ceux qui habitent dans les villages, certains d'entre eux travaillant comme emplyés dans les villes.

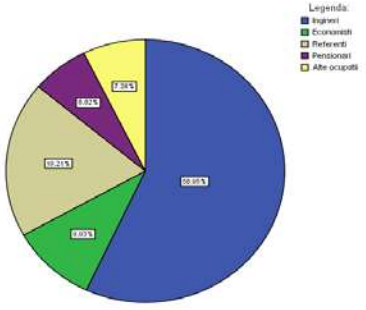


Fig. 3 – Structure de l'échantillon analysée en fonction de la profession

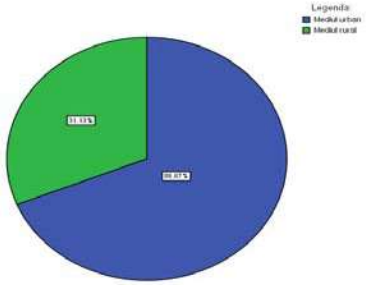


Fig. 4 – Structure de l'échantillon analysé en fonction du milieu de résidence

À la question „*Combien d'importance a-t-il pour vous le cepage à l'acquisition du vin ?*", 39,07 % des sujets ont précisé que le cepage représente un critère „important", 17,88 % ont repondu que le cepage est „ très important" et 4,64 % ont apprecié le cepage comme un élément „extrêmement important" (***fig. 5*****).**

Analysant les reponses des sujets, il résulte que presque $^{2}/_{3}$ d'entre ceux intérrogés accordent une certaine importance au cepage du vin à l'acquisition, provant des bonnes connaissances concernant les cepages et les caractéristiques des vins. En même temps, pour 38,41 % d'entre sujets, le cepage a „peu d'importance" ou même „n'importe du tout", fait que demontre des connaissances faibles dans le domaine, surtout concernant certaines caractéristiques, comme par exemple: le goût, le bouquet, la couleur, la quantité de sucre, le vieillissement du vin etc.

Concernant „*l'importance de la qualité sensorielle perçue par les conssomateurs à l'acquisition du vin*", 33,77 % d'entre les sujets intérrogés considérent la qualité sensorielle „importante", 17,88 % „très importante" et 7,28 % „extrêmement importante". Pourtant, 22,52 % d'entre les sujets intérrogés considérent la qualité „peu importante" et 18,54 % „sans importance" ***(fig. 6).***

À la question „*Combien d'importance représent le vieillissement à l'acquisition du vin ?*", 82,78 % ont repondu que „le vieillissement est sans importance" ou „peu important" (13,91 %), d'où on peut conclure que les sujets ont des connaissances faibles dans le domaine (***fig. 7*** **).**

À la question „*Combien d'importance re*présente *la couleur du vin au moment de l'acquisition?*", 69,54 % d'entre sujets ont repondu qu'elle „n'a aucune

importance" ou qu'elle est „ peu importante" (25,17 %), en rvsultant que la couleur du vin n'est pas une caractéristique très important pour l'achat du vin (***fig.8***).

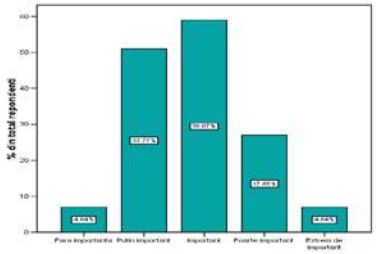


Fig.5– Importance du cepage à l'acquisition du vin

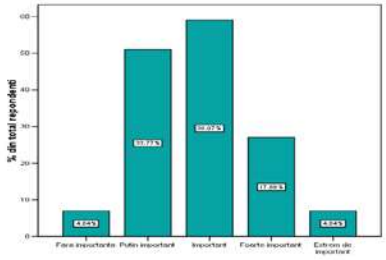


Fig. 6 – Importance de la qualité perçue par le consommateurs

Pourtant, si on a en vue que la couleur du vin s/associe aux plats culinaires, on apprécie que la couleur et la limpidité du vin sont très importantes.

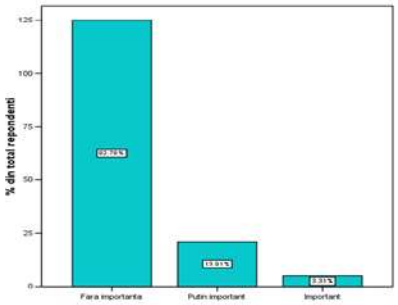


Fig. 7 – Importance du vieiliissement du vin

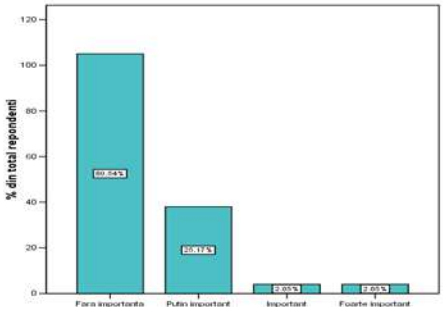


Fig. 8 – Importance de la couleur du vin

À la question „*Combien d'importance présente le prix pour l'achat du vin?*", 60,26 % d'entre les sujets intérrogés ont repondu que „le prix n'a aucune importance" ou que „le prix est peu important" (13,25 %), d'où on peut conclure que pour les grands consommateurs le prix n'est pas un obstacle dans l'acquisition d'un bon vin, de qualité supérieure (***fig.9***).

À la question „*Combien d'importance a pour les consommateurs la façon de présentation et l'emballage du vin pour être acheté?*", seulement 7,95 % d'entre ceux soumis à l'interview considérent ce critère „important" ou „très important" (0,66 %) (***fig.10***). Il résulte que les préférences des certains consommateurs sont orientées vers l'achat du vin en vrac, en demontrant un pouvoir réduit d'achat.

En même temps, 72,85 % d'entre les sujets de l'échantillon apprécient que le prestiqge du producteur ou de l'offertant est „sans importance" pour l'acquisition du vin, fait qui demontre un niveau bas de connaissances dans ce domaine ***(fig.11).***

À la question „*Quel est le cepage du vin préféré à l'acquisition du vin pour la consommation?*", 30,46 % d'entre ceux intérrogés préférent le cepage „Busuioacă de Bohotin", 27,81 % - le cepage „Fetească regală", 15,89 % - „Zghihară de Huşi" etc. ***(fig.12).*** Les résultats du sondage statistique réalisé montre que les préférences des roumains sont orintées vers les vins doux jusqu'aux vins secs et demi-secs, ainsi qu'il résulte aussi des différents études de spécialité publiés

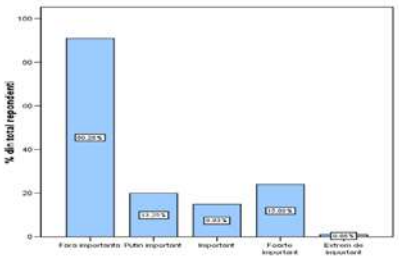


Fig.9 – Importance du prix pour l'achat du vin

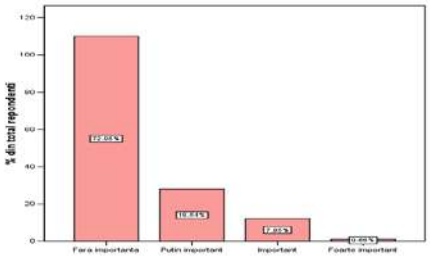


Fig.10– Importance de la façon de présentation et emballage du vin acheté

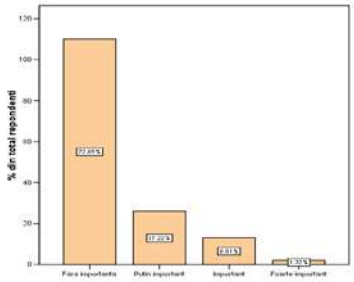


Fig. 11 **-** Importance du prestige du producteur pour l'acaht du vin

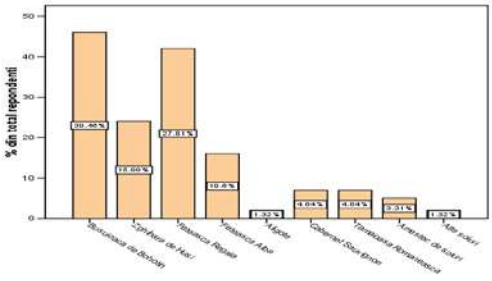


Fig.12 **–** Classement hiérarchique des cepages en fonction de la préférence des consommateur

En fonction de la préférence des consommateurs pour un certain producteur ou offertant des vins, S.C.Vidişamp S.A. Huşi occupe la première position sur le marché du district de Vaslui, detenant 57,62 % du total, suivie par S.C. Vinicola Avereşti 2000 S.A. avec 25,83 %, S.C. Speed S.R.L. Huşi avec 11,92 % etc. (***fig.13).***

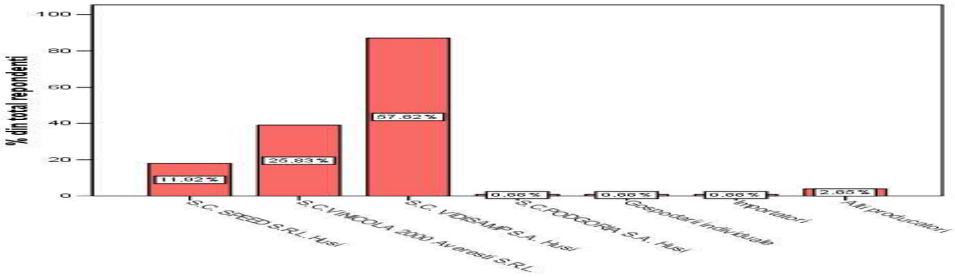


Fig. 13 **–** Position des producteurs des vins sur le marché en fonction des préférences des consommateurs

CONCLUSIONS

1. La recherche sociologique a eu le but d'evaluer l'attitude des consommateurs à l'asquisition du vin, a été basée sur la méthode du sondage statistique par l'intermediaire du qeustionnaire écrit et a été appliquée sur un échantillon de 161 sujts, desquels ont été validés 151 sujts, ayant le domicile de résidence et le lieu de travail dans le district de Vaslui.

2. Pour l'acquisition du vin, 61,6 % d'entre les sujets intérrogés ont précisés que le cepage du vin est un critère important, très important ou extrêmement important. Poutant, 38,4 % d'entre eux apprécient que le cepage du vin est peu important ou n'a pas

d'importance, d'où il resulte que pour ces consommateurs le vin n'est pas considéré un aliment et aussi qu'ils n'ont pas de connaissances solides concernant les cepages des vins offerts par les producteurs.

3. Concernant l'importance de la qualité sensorielle perçue par les consommateurs à l'acquisition du vin, 58,93 % d'entre eux considérent la qualité sensorielle importante, très importante ou extrêmement importante. Aussi, 82,78 % du nombre total des sujets ont repondu que le vieillissement du vin est sans importance ou peu important, fait qui explique les différents changements d'attitude des consommateurs du vin

4. Concernant la couleur du vin (blanc, rouge ou rosé), la majorité des sujets (94,71 %) considérent qu'elle n'a pas d'importance ou est peu importante, fait qui montre des connaissances faibles liées à l'association entre la couleur du vin et différents plats culinaires ou des recommandations à l'occasion des événements festives ou des fêtes réligieuses.

5. Le prix du vin acheté n'est pas important pour 73,51 % du nombre des sujets intérrogés, d'où on peut conclure que pour une partie des consommateurs le prix ne représente pas un obstacle dans l'action d'acquisition..

6. Pour la majorité de ceux intérrogés (91,39 %), la façon de présentation et l'emballage du vin ne présentent pas beaucoup d'importance. Par conséquence, la majorité des consommateurs intérrogés préférent acheter le vin en vrac

7. Dans la région analysée, le cepage du vin préféré pour la consommation est „Busuioaca de Bohotin", suivi par „Fetească regală" et „Zghihară de Huşi". Il résulte que les roumains préférent les vins doux, mais aussi les vins demi-secs et secs.

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DANISH FISCAL SYSTEM

SISTEMUL FISCAL DANEZ

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Abstract. *The tax and levy system is characterizing by suppleness and modernity. Here we make an approach from a fiscal business perspective.*
Keywords: *Income tax, VAT, societies register, fiscal administration.*

Rezumat*: Sistemul de impozite şi taxe al Danemarcei este caracterizat de suplețe şi modernitate. Aici, noi recurgem la o abordare din perspectiva, mai ales, a fiscalizării (impunerii şi taxării) business-ului.*
Cuvinte cheie: *Impozit pe profit, taxa pe valoarea adăugată, registrul societăților, administrație fiscală.*

Generalities regarding the Danish economy. Denmark is part of the group of the most developed countries, OCDE members. This fact is reflected also in the distribution of the production between the various economical sectors. Traditionally, Denmark has been considered an agriculture based country, with big exports on manufactured aliments (food). The agro-alimentary exports are still very important (high), but the agriculture balance became lower than 5% from GDP. The industrial production represents about 20%, constructions about 5%. But, the most dominant sector is the third sector, of the services, with about 46%. We underline the fact that the Danish industry is most of all based on the SMSEs: over 80% from the manufacturing companies have under 20 employees. Just 1000 companies have more than 100 employees, but more than half of the labor from the industrial domain is part of these companies.

The business frame. In Denmark, the Central Business Register (Det Centrale Virksomheds Register – CVR) is the centre for the legal registration of the businesses, in coordination with the Central Register of the Population that administrate the system of the personal numbers and also keeps the information about the population/persons, and also with the Central Register of the Building and Accommodation, in the construction and locative space administration domain.

CVR is the central register of the commercial companies from Denmark, and the information from the register is the basis of the contact between the companies and the public in solving various fiscal, administrative, statistical and other demands/aspects, regarding the companies. Beside that, the information from the register is used by many commercial companies in their business practice.

The inputs from this register are reported also to other public authorities, such as: The Tariffs and Fiscal Central Administration (Told og Skat), that is under the ferule of the Ministry of Contribution/taxes (Skatteministeriet), The Danish agency for Commerce and Companies and the Danish Centre for Statistics, that becomes, also data suppliers for others. The public authority obligation to use the number of CVR makes this number to be mentioned on the heather of the letters or other materials addressed in a business purpose in

Denmark. The allocation of the CVR number had as the base the SE number, which is accorded in fiscal purposes, by the Tariffs and Fiscal.

The public taxation. The net profit of the companies is the basis of the 28% taxation level. These taxes are identical for any kind of company A/S, ApS and branches/subsidiaries. A Danish - resident company is forced by law to this taxation for its profits from all over the world. A company is considered to be resident in Denmark for fiscal reasons if it is legal registered in Denmark and it has the legal headquarter in Denmark. But even a company that is registered outside of the Denmark is considered resident (in Denmark), for fiscal reasons, if its own management is located in this country. The effective management is determined on the basis of the place where the businesses decisions are daily taken.

Some payments for non-residents make, also, the object for a taxation, which can be reduced, in accordance with different external treaty regarding the taxation. The dividends from the Danish subsidiaries can be distributed without taxation, under the condition that the mother-company to detain 25% or more from that subsidiary company, during a period of at least one year, and the dividends are regarding that period.

In accordance with the Danish law/regulation, taxes are caught for the royalty from the right of using patents/licences, trade brand, drawings or models, plans, formulas or secret procedures and information regarding the industrial, commercial or scientific procedures. The payments for the intangible goods acquisition, with connection with some material goods, are not usually under taxation. Even so, the payment for the know-how access can be regarded as an object of taxation.

To mention the fact that between Romania and Denmark there is a "Treaty regarding the avoidance of double tax payment on the income and wealth taxation", signed in December 1976. In accordance with this convention, there are presented taxation levels of 15% for persons and companies, 0% for dividends from the companies and 10% for royalties. Also in accordance with the convention, once the taxation has been established and received in one of the countries, there will not be any other taxation in the other country. In Denmark there is an VAT (MOMS) of 25%. Some businesses are excepted from the payment of the MOMS. Between these, the most important are: the hospital, medical and dental care, the bank services and some financial activities and also the tourism agents' services. The Danish legal created companies must register for payment of the MOMS.

We conclude underlining the fact that a company registered in a foreign country, that does its businesses in Denmark, can be asked for submitting fin order to pay the at a specialised agent. The MOMS recover can be made only for the foreign companies, not registered for MOMS in Denmark.

Note: *Denmark implements the EU directives in the national legislation as laws or regulations. For many economical, fiscal, situations, the specific demands are those from the European norms and standards (http://www.ds.dk/). To be consulted the economical information from the Romanian Embassy in Denmark.*

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GOVERNMENTAL DEBT MANAGEMENT AND BUDGET DEFICIT FINANCING

MANAGEMENTUL DATORIEI GUVERNAMENTALE ŞI FINANŢAREA DEFICITULUI BUGETAR

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Abstract. *Since 2005 the legal frame for governmental public debt is focus on the Public debt law nr 313/2004. According to this law, MFP is responsible for contracting and administrating the public debt. This paper deals with few dynamics and structure elements.*
Keywords: *public debt, budget deficit, state loan, guarantee, expiration.*

Rezumat. *Începând din 2005 cadrul legal pentru managementul datoriei publice este reprezentat de Legea datoriei publice nr.313/2004. Conform acestei legi, Ministerul Finanţelor Publice are responsabilitatea de a contracta şi gestiona datoria guvernamentală. Asupra unor elemente de dinamică şi de structură ne oprim în rândurile de faţă.*
Cuvinte cheie: *Datorie publică, deficit bugetar, împrumut de stat, garanţii, scadenţe.*

Nowadays, the rate of Romanian public debt is less than 20% from GDP. We underline that this level is much lower than the 60% limit established by the Maastricht Settlement. For example, at the end of 2005, the governmental debt, determinate by EU (ESA95) methodology, has represented 15,9% from GDP, from which, about 3,2% is the internal debt and about 12,7% is the external debt.

For the end of 2006 the level of this indicator tends to be approximately 13 % from GDP. Governmental debt recouped on types of instruments show us that at the end of 2005, government stock was represented 31,2% from the total debt, the rest being loans.

Regarding to the initial expiration of the governmental debt, 6,4% is a short term debt, while 93,6% is a medium and long term debt, the medium expiration being about 5,6 years. In the same time, it's has to be mentioned that the public debt recouped on types of instruments show us that 39,2% from the total is a debt with variable rate.

Still, the debt in national currency has represented 19,1% from the total debt, while the debt in EURO was about 51,5% from the total of debt in circulating medium.

Dynamic of the governmental debt

The approaching of recent dynamic (by the end of 2006) of the elements regarding to public debt requires a series of elucidations. As we shown previously, the internal public governmental debt is define by the public debt Law no. 313/2004 as a part of the public debt of state that represents the amount of the financial internal obligations of state resulted from directly contracted or guaranteed by Government loans, through Ministry of Public Finance, in the name of Romania, from the internal financial market.

The increase of internal public debt is accomplishing by strictly framing in the limits for internal public debt, approved by the Romanian Parliament. Thus, for 2006 the limit for internal public debt was established at the amount of 9.600,0 mil. Lei (3 billions Euro). The margin with internal credits of this limit was 29.32% at 31st December 2006.

Public debt structure

From the internal governmental public debt structure point of view, we shown that, as a part of governmental public debt, it summarizes 25.149,8 mil. lei at the 31st December 2006, and, according with the public debt Law no. 313/2004 it's presenting as it follows:

1. the direct internal governmental public debt - generated by the consolidated budgetary deficit and by the nonperforming assets undertaken by the state to public debt on the base of a special laws: 23.684,8 mil. lei;

2. the guaranteed internal governmental public debt – generated by the guarantees for internal credits contracted in lei/Romanian currency and in foreign currency: 1.465,0 mil. lei.

The internal governmental public debt is financed by contracting of state loans in lei / Romanian currency and foreign currency directly from the internal market, hereupon is adding the loans with temporary character from the resources of the governmental accounts collected in the general account of the state treasury: special social assurance fund for health, special fund for the payment of unemployment benefits, available assets in lei of the commercial debts and the incomes from privatisation, available assets in lei of the incomes from privatisation.

The direct internal public duty in sum of 23.684,8 mil. lei represents 94,2% from the total internal public debt and it's composed by government stock with a 3,21 years medium term of expiration.

In this context, the most important bench-marks are:

a) The structure on debt instruments:

• Certificates of treasury and certificates of deposit issued and sold to the population in lei in amount of 1.086,0 mil. lei – 4,6% from the total of direct internal public debt;

• Government stock - financing the deficit in lei in amount of 3.119,1 mil. lei – 13,2 % from the total of direct internal public debt;

• Government stock - special laws in amount of 20,6% mil. lei – 0,1% from the total of direct internal public debt;

• Temporary financing from the general account of state treasury in amount of 19.459,0 mil. lei (operative date) – 82,2% from the total of internal public debt;

b) Structure on the expirations:

• Government stock on the short term ($T \leq 1$ year) in amount of 1.086,0 mil. lei – 4,6% from the total of direct internal public debt;

• Loans from the general account of state treasury ($T \leq 1$ year) in amount of 19.459,0 mil. lei – 82,2% from the total of direct internal public debt;

• Government stock on the medium term ($1<T<5$) in amount of 2.608.9mil. lei – 11,0% from the total of direct internal public debt;

• Government stock on the long term ($T>5$ years) in amount of 530,8 mil. lei – 2,2% from the total of direct internal public debt.

c) Structure on debt holders:

• banking sector in amount of 1.928.5 mil. lei – 8,14% from the total of direct internal public debt;

• No banking sector in amount of 2.297,3 mil. lei – 9,7% from the total of direct internal public debt;

• Another holders (governmental accounts) in amount of 19.459,0 mil. lei – 82,16% from the total of direct internal public debt.

d) Structure on currency issue:

• Government stock evaluated in lei in amount of 14.854,5 mil. lei – 99,9% from the total of direct internal public debt;

• Government stock evaluated in US dollars in amount of 14,2 mil. lei – 0,1% from the total of direct internal public debt, the equivalent of 5,4 mil. USD, calculated at the course LEI / USD from the report date.

e) Structure on types of interests:

• Government stock with fixed interest in amount of 23.548,6 mil. lei – 99,0% from the total of direct internal public debt;

• Government stock with variable interest in amount of 136,2 mil. lei – 1,0% from the total of direct internal public debt.

Costs, guarantees, sold

According to official sources (PFM), the cost of the internal public governmental debt, materialized in expenses with interests afferent to the direct internal public governmental debt, Public Finance Ministry course differences and payment in the account of the state guaranties issued for internal credits is about 597,8 mil. lei representing 1,49% from the state

budget total expenditures made until 31st December 2006 and 0,18% from GDP.

According with the public internal debt Low no. 313/2004, the payment for the service of internal debt is benefiting by the permanent budgetary authorization.

Regarding to the government stock secondary market we underline that the transactions made on the secondary market are taking place accordingly with the Regulation related to operations with the government stock issued in dematerialized form approved through the Order of public finance minister no. 1408 from 22nd September 2005.

The guaranteed internal governmental public debt is connected with stipulations of the public internal debt Low no. 313/2004. Public Finance Ministry is authorized to issue state guaranties for internal loans which are contracted by a legal entity from a credit institution, for financing the projects or activities that have the highest importance for Romania or for some other destinations named and approved by the Government.

The state guaranty for an internal loan represent an indirect obligation of Romanian state, which is executed in the situation that the beneficiary of the loan doesn't have the capacity to pay, totally or partially, the loan, the interest and the other costs established accordingly with the conditions of the guaranteed loan.

In the structure of the guaranteed internal governmental public debt remains extremely important the balance account of the state guaranties for the internal loans at 30.11.2006, which is about 1.465,0 mil. lei (compounded by 66,0 mil. RON and the equivalent of: 542,1 mil. USD, 2,1 mil. EUR and 65,9 thousands RUBLE, transformed at the exchange rate from the end of the reported period in sum of 1.399,0 mil. RON) and it is constituted from the balance account of the state guaranties based on special laws, from the balance account of the state guaranties for internal credits contracted in lei and foreign currency and the balance account of the state guaranties for internal loans contracted by local public administration authorities.

The balance account of the state guaranties based on special laws totals 1.416,2 mil. lei and are constituted from guaranties in lei in amount of 24,4 mil. lei plus the equivalent in lei of 539,3 mil. USD , 2.1 mil. EUR and 65.9 thousands RUBLE in amount of 1.391,8 mil. lei.

In accordance with the special laws that had generated the grant of the guaranties, these are structured like that:

- guaranties granted based on the O.G. no. 39/1999 in favour of Romanian Commercial Banks S.A. by Guaranty letter no.22738/10.12.1999

hereby are guaranteed extra-balance sheet engagements staying in store and which totals 61,5 mil. USD.

- guaranties granted based on the H.G. no. 909/2000 for application of O.U.G. no. 131/2000 regarding the settlement of the patrimonial situation of BCR S.A. in litigation result from the activity unfolded by BANCOREX S.A. until its radiation date from the Trade Register, summarising 0,19 mil. lei and 14,0 mil. USD.
- guaranties granted based on the H.G. no. 833/27.05.2004 regarding the limit increasing of the extra-balance sheet engagements which for is granted the state guarantee under the condition of the art. 17, O.G.39/1999, by Guaranty letter no. 19860/02.06.2004 and which totals 425,6 mil. USD.
- guaranties granted based on the H.G. no. 832/27.05.2004 for modification of H.G. no. 909/2000 approved in O.U.G. no.131/2000 application, by Guaranty letters no. 19851/A1/1-35/2004, no. 19852/A2/1-3/2004, no. 19853/A3/1-3/2004, no. 19854/A4/1-15/2004 and which for are guaranteed the amounts that are the litigations object under the role of judicial instance in which is part as respondent Romanian External Trade Bank BANCOREX S.A. until the radiation date of this from the Trade Register and at 30.11.2006 totals 24,2 mil. lei, 38,2 mil. USD, 2,1 mil. EURO and 65,9 thousands RUBLE.

The balance account of the state guaranties for the internal credits contracted by economic agents and central public administration authorities contracted in lei/Romanian currency and foreign currency was about 20,4 mil. lei, which from:

- for the credits in lei is amounting to 0.6 mil. lei, and represent the credits granted in previous years by the RAIFFEISEN BANK S.A., BCR SA, BANC POST S.A. and BANKCOOP S.A., being considered overdue credits;
- the balance account for the RAIFFEISEN BANK S.A. credit in amount of 12,4 mil. lei in S.R.I. favour through Logistic Import;
- the balance account for internal credits in foreign currency is amounting to 7,2 mil. lei (2,8 mil. USD, at the 2,5676 lei exchange rate LEU / USD), the beneficiary of this credit being TAROM S.A.

The balance account of the state guaranties for internal loans contracted by the local public administration authorities' aiming to finance the investments on the Measure 2.1. in the SAPARD Program was summarising 28,6 mil. lei at 31.12.2006.

Finally, we underline that the structure of the internal public debt guaranteed on currency issue is presenting like following: 66,0 mil. lei, 542,1 mil. USD, 2,1 mil. EURO and 65,9 thousands RUBLE.

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STUDIES REGARDING THE VEGETAL PRODUCTION IN THE ZELETIN BASIN, THE COUNTY OF BACĂU

STUDII PRIVIND PRODUCȚIA VEGETALĂ ÎN BAZINUL ZELETIN, JUDEȚUL BACĂU

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Abstract. *Agriculture, as a branch of economy, uses as a main means of production, the land. The level of agricultural production depends on the size of the surface of land and on the productive qualities (fertility) of the soil. Using land as a means of production in agriculture should also take into consideration its particularities, among which the most important are the limited character, the discontinuity of the relief, the physical and chemical configuration, the degree of fertility. Therefore, although the level and structure of agricultural production are influenced by the needs of consumption (on the market), the realisation of different products, on the conditions of economic efficiency, also takes into consideration the zoning of each species of plant.*

Rezumat. *Cercetarea s-a efectuat în cele 7 comune care aparțin de Bazinul Zeletin, analizându-se pe fiecare comună structura fondului funciar pe categorii de folosință, structura suprafeşelor cultivate în arabil, folosirea fondului funciar, şi producțiile medii la principalele culturi. Bazinul Zeletin reprezintă, prin excelență, un teritoriu cu pronunțat caracter agrar. Astfel, în timp ce agricolul reprezintă peste 70,0% din totalul fondului funciar în zona cercetată, la nivel de județ această categorie reprezintă mai puțin de jumătate. Diferența este dată de suprafața redusă a pădurilor în Bazinul Zeletin, în timp ce la nivel de județ această categorie este dominantă în zona de munte.*

MATERIAL AND METHOD

The research was done in the 7 rural regions belonging to the Zeletin Basin, analysing for each region the structuring of the land stock on categories of uses, the structuring of cultivated top soils into arable land, the use of the land stock and the average productions for the main cultures. In what follows, we present the main aspects characterising the use of land as a basic means of production in agriculture, in the Zeletin Basin, compared to the average of the county of Bacău.

RESULTS AND DISCUSSIONS

A first aspect that characterises land (the land stock) as a means of production is represented by its structuring into categories of use, knowing that each category is destined to a certain target, and the relation between these will determine the overall economic configuration of a given territory. The structuring into categories of uses of the land stock influences directly the degree of employing the labour force, the level of professional training and of its

specialisation. In Table 1 we present the structure of the land stock on categories of uses, in the Zeletin Basin, for the year 2006.

Although not to the same extent as in the case of the comparison between the county and the studied area, there are, however, differences, obvious enough, among the rural regions that are part of the Zeletin Basin. Thus, compared to almost 30.0 % that represents the non-agricultural land in the area, the figure decreases almost to 20.0% in Podu-Turcului and rises up to 46.3% in Răchitoasa, regions where the figure of agricultural land will be the highest (Podu-Turcului), respectively the lowest (Răchitoasa).

As regards the importance of the categories belonging to the agricultural land, the situation presents itself as more homogeneous. The arable land, for example, ranges between the maximum limit of 73.8% (Stănişeşti) and the minimum one of 62.8% (Glăvăneşti), compared to the average of the area of 70.0%. Therefore, from the point of view of the basis for practising agriculture, we find ourselves on a rather homogeneous territory. The same aspect characterizes as well the categories of pastures and hay fields. Compared to the average of the area of 23.4% belonging to pastures, the addition is of 9.3% (Coloneşti) and the minus is of 6.1% (Podu-Turcului). For hay fields the differences are insignificant. Compared to the average of the area of 1.1%, the maximum represents 2.3% (Izvorul Berheciului) and the minimum 0.03 % (Coloneşti).

Table 1

Region	Overall surface Ha	Non-agricultural		Agricultural		out of which:									
		ha	%	ha	%	Arable		Pastures		Hay fields		Vineyards		Orchards	
						ha	%agr	ha	%agr	ha	%agr	ha	%agr	ha	%agr.
Izvoru Berheciului	5723	1297	22,7	4426	77,3	2936	66,3	1313	29,7	101	2,3	44	1,0	32	0,7
Colonesti	4468	1388	31,1	3080	68,9	2041	67,2	1008	32,7	8	0,03	23	0,07	-	-
Stanisesti	8108	1877	23,1	6231	76,9	4484	72,2	1218	19,5	59	0,9	161	2,4	309	5,0
Rachitoasa	11723	5431	46,3	6292	53,7	4945	73,8	1517	24,1	39	0,6	62	1,0	29	0,5
Motoseni	10452	2850	27,3	7602	72,7	5435	71,5	1870	24,6	67	0,9	200	2,6	30	0,4
Glavanesti	6721	1999	29,7	4722	70,3	2966	62,8	1072	22,7	75	1,6	578	12,2	31	0,7
Podu Turcului	8947	1856	20,7	7091	79,3	5099	71,9	1229	17,3	75	1,1	643	9,1	45	0,6
Area	56142	16698	29,7	39444	70,3	27606	70,0	9227	23,4	424	1,1	1711	4,3	476	1,2
% compared to the county	8,5	4,5	-	12,3	-	14,8	-	10,9	-	1,1	-	22,6	-	13,7	-
County	662.052	341.463	51,6	320.589	48,4	186.541	58,1	84625	26,4	38.391	12,0	7561	2,4	3471	1,1

Source: D. A. D. R. Bacău. Processed data

Significant differences are to be noticed for the categories of use of plantations: for wine growing plantations the figures range between 12.2% (Glăvăneşti) and 0.07% (Coloneşti), compared to the average of the area of 4.3%, and for fruit growing plantations the maximum is represented by 5.0% (Stănişeşti), the minimum being 0.0% (Coloneşti). Regarding this category of

plantations, we mention the fact that the wine growing ones are concentrated in the southern part of the area (over 1/5 in Glăvăneşti and Podu-Turcului), while the fruit growing ones, in the same proportion, in the northern part of the area, in Izvorul Berheciului and Stănişeşti, respectively.

Another indicator characterising the use of land as a basic means of production in agriculture is the structure of the cultivated surfaces within the arable land (table 2).

We have previously mentioned that the Zeletin Basin represents an agricultural territory by excellence. From the analysis of the structures of cultivated surfaces within the arable land, it results that the agriculture practiced on this territory has, on the whole, a pronounced extensive character which is due, mainly, to the configuration of the land, most of it inclined, improper in itself for the category of arable land. The statement is sustained by the presence of cereals on almost 2/3 of the arable land, a figure that, except Stănileşti (44.9%), does not lower under 60.0%. just like in the entire country, the dominant cereal is corn (cultivated on large areas, on highly inclined slopes) that occupies half of the arable land in the area and lowers under 40.0% only in Coloneşti and Stănişeşti, while in the other regions of Izvorul Berheciului, Răchitoasa, Glăvăneşti it rises above 60.0%.

The other groups of cultures are spread discontinuously throughout the area and the surfaces cultivated with different plants are contained between large limits. The bean vegetables, for example, are absent in the northern regions of the area (Izvorul Berheciului and Coloneşti), they occupy only 5 Ha (0.2% of the arable land) in Glăvăneşti and 150 Ha (3.3% of the arable land) in Stănişeşti. These cultures (bean prevails) detain under 1.0% of the arable land at the level of the area. Technical plants are cultivated on a surface of almost 1.1 thousand Ha (3.9% of the arable land) at the level of the area, out of which the sun-flower on 1040 Ha. Inside the area, the surfaces cultivated with technical plants occupy over 5.0% of the arable land in Motoşeni (6.1%), Glăvăneşti (5.1%) and podu-Turcului (8.2%), but only 0.3% in Izvoru Berheciului and 0.6% in Răchitoasa.

Nourishing plants (vegetables and potatoes) are present in all regions, occupying a surface of 1268 Ha (4.5% of the arable land, 3.2% out of which vegetables and 1.3% potatoes). Within the area, this group is cultivated on only 1.9% of the arable land (Motoşeni) and reaches 9.6% (Coloneşti).

Fully justifiable, taking into consideration the configuration of the land, is the relatively large surface cultivated with fodder plants, 6430 Ha respectively, almost a quarter of the arable land. In some regions the weight of the surface cultivated with fodder plants is lower, under 1/5 (Coloneşti – 17.3%, Răchitoasa – 16.5% and even 12,5% - Glăvăneşti). In return, these cultures occupy over 40.0% of the arable land in Stănişeşti

Table 2

The structure of cultivated surfaces in arable land

Region	FU	CULTURES														
		Arable	Cereals (Total)	Wheat and rye	Corn	Vegeta-bles (Total)	Bean	Pea	Industrial plants	Sun-flower	Sugar beet	Nouri shing plants	Vegeta-bles	Potatoes	Fodder	Other cultures
Izvoru	ha	2936	1923	70	1800	-	-	-	10	10	-	175	105	70	768	60
Berheciului	%	100,0	65,5	2,4	61,3	-	-	-	0,3	0,3	-	6,0	3,6	2,4	26,2	2,0
Colonesti	ha	2041	1442	410	787	10	10	-	40	30	10	195	135	60	354	-
	%	100,0	70,6	20,1	38,6	0,5	0,5	-	2,0	1,5	0,5	9,6	6,7	2,9	17,3	-
Stanisesti	ha	4484	2014	355	1439	150	100	50	100	100	-	348	238	110	1798	74
	%	100,0	44,9	7,9	32,1	3,3	2,2	1,1	2,2	2,2	-	7,8	5,3	2,5	40,1	1,7
Rachitoas a	ha	4645	3682	550	3070	10	10	-	30	30	-	155	135	20	768	-
	%	100,0	79,4	11,8	66,1	0,2	0,2	-	0,6	0,6	-	3,3	2,9	0,4	16,5	-
Motoseni	ha	5435	3350	425	2501	20	10	10	330	330	-	105	65	40	1368	262
	%	100,0	61,6	7,8	46,0	0,4	0,2	0,2	6,1	6,1	-	1,9	1,2	0,7	25,2	4,8
Glavanesti	ha	2966	2316	411	1795	5	5	-	150	140	10	110	90	20	370	15
	%	100,0	78,0	13,9	60,5	0,2	0,2	-	5,1	4,8	0,3	3,7	3,1	0,6	12,5	0,5
Podu Turcului	ha	5099	3251	946	2285	20	20	-	420	400	20	160	110	50	1010	238
	%	100,0	63,7	18,6	44,8	0,4	0,4	-	8,2	7,8	0,4	3,1	2,9	1,0	19,8	4,7
Area	ha	27606	17958	3167	13777	215	155	60	1080	1040	40	1248	878	370	6430	669
	%	100,0	65,1	11,5	49,9	0,8	0,6	0,2	3,9	3,8	0,1	4,5	3,2	1,3	23,3	2,4
% compared to the county			15,3	17,0	14,7	53,8	48,6	74,1	18,6	21,3	8,6	9,2	12,2	6,1	14,3	13,9
County	ha	186541	117162	18646	93487	400	319	81	5787	4879	463	13516	7226	6085	44866	4810
	%	100,0	62,8	10,0	50,1	0,2	0,17	0,03	3,1	2,6	0,2	7,2	3,9	3,3	24,1	2,6

By comparing the structure of the cultures in the studied area with that in the county, we mark no significant differences. Cereals and fodder plants, for example, detain together 68.4% of the arable land in the area and 86.3% in the county. Differences in favour of the Zeletin Basin, although insignificant, are observed for bean vegetables (0.8%, 0.2% respectively) and for industrial plants (3.9% and 3.1%).

From the analysis of the structure of the land stock on categories of uses and of the structure of surfaces cultivated in arable land, we estimate that there are significant reserves for improving these structures, in the sense of balancing the relation between the categories of use of agricultural land and especially of cultures in the arable land.

Without avoiding the standard, we appreciate that the most favourable situation, the more rational one as far as using land as a basic means of production in agriculture is concerned, is realised in the rural region of Stănişeşti. In this region, the relation between the different categories of use is closest to the average of the area, is even more favourable to superior categories (agricultural out of total land stock and arable and plantations out of total arable land, intensive cultures out of total arable land), compared to other regions, as results from the example presented in table 3.

Table 3

The use of land stock (%)

	Agricul-tural	Arable	Natural pastu res	Planta-tions	Cereals	Vegeta-bles	Indus-trial plants	Nouri-shing plants	Fod-der
Area	70,3	70,0	24,5	5,5	65,1	0,8	3,9	4,5	23,3
Stanisesti	76,9	72,2	20,4	7,5	44,2	3,3	2,2	7,8	40,1
Rachitoasa	53,7	73,8	24,7	1,5	79,4	0,2	0,6	3,3	16,5

Source: The Statistic Year-Book. Processed data.

The data in Table 3 are fully enlightening in confirming the superiority of Stănişeşti, compared to the average of the area and especially to the neighbouring rural region of Răchitoasa. Thus, from the entire surface, in Stănişeşti, agriculture spreads on ¾ compared to something over half in Răchitoasa and 70.0% the average of the area; natural grazing lands spread on ¼ of the agricultural land in Răchitoasa and in the area and only on 1/5 in Stănişeşti: plantations spread on over 7.0% of the agricultural land in Stănişeşti and only on 1.5% in Răchitoasa (5.5% being the average of the area); extensive cultures, represented by cereals, are cultivated on less than half the arable land in Stănişeşti and on about 80.0% (almost double proportions) in Răchitoasa, while intensive cultures represented by bean vegetables, industrial and nourishing plants detain 13.3% in Stănişeşti and only 4.1 in Răchitoasa; fodder plants which ensure live stock breeding (intensive branches) are cultivated on surfaces that represent a more than double proportion (40.1%) in Stănişeşti, compared to Răchitoasa (16.5%) and 28.3%) the average of the area.

CONCLUSIONS

The significant oscillations of average production rates are due mainly to the natural conditions but also to the zoning of each culture. The phenomenon is confirmed by the fact that for cultures that spread on small areas it is possible to allot terrains with maximum favourability, thus determining greater efficiency rates, an aspect that is not possible for cultures which are cultivated on large areas, for example corn which occupies about 50.0% of the arable land.

The main conclusion drawn from the comparative analysis of average production in the vegetal branch is that the average level realised within the county, the area and the region is influenced by numerous factors, each of them influencing each product in a different way. It is thus explained why the order in which the regions are hierarchically placed according to their average production differs for each product.

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THE FINANCIAL ACCOUNTANT MANAGEMENT OF THE AGRO-ALIMENTARY ENTREPRISES

MANAGEMENTUL FINANCIAR – CONTABIL AL ÎNTREPRINDERILOR AGROALIMENTARE

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Abstract. *The financial management is related to the approach of the goals and the roles of the general management, to the features of the financial activity which takes place in every business (private company, trading company, self-governing administration etc.).*

The management process concerns the ensemble of the (material, human, financial, informational etc.) resources which are necessary to achieve some established goals, while the management functions refer to those activities that are specific to the decision-making process.

Rezumat. *Managementul financiar se raportează la abordarea obiectivelor şi funcţiilor managementului general la specificul activităţii financiare care se derulează în cadrul oricărei afaceri (societate privată cu răspundere limitată, familială, societate comercială, regie autonomă etc.).*

Procesul de management vizează ansamblul resurselor (materiale, umane, financiare, informaţionale etc.) necesare atingerii unor obiective stabilite, în timp ce funcţiile managementului se referă la activităţile specifice actului decizional (planificare, organizare, conducere şi control).

De o importanţă primordială pentru orice obiectiv economic (afacere) este activitatea de finanţare, începând cu sursele de constituire, modul de folosire a capitalului bănesc şi încheind cu stabilirea rezultatelor financiare şi plasamentele viitoare.

În acest context, managementul financiar, în măsură, se substituie funcţiei financiare a întreprinderii în care decizia de finanţare ocupă un loc central.

The financial management refers to the approach of the objectives and the functions of the general management to the specific of the financial activity which takes place in every business (private society with limited responsibility, commercial society, self-governing management etc.).

The management process aims at the amount of resources (material, human, financial, informational etc.) which are necessary to achieve established goals, while the management functions refer to the activities that are specific to the decisional process (planning, organizing, leading, control).

For any economic objective (business), the activity of financing has an essential importance, starting with the constitution sources, the way that the funds are used, and concluding with the establishment of the financial results and the future investments.

In this context, the financial management takes the place of the financial function of the enterprise in which the financing decision has a central position.

There are some reference questions for any businessman and, especially for the financial management:

- Where do I get the necessary money from in order to promote a business?
- How much can I obtain at a reasonable cost?
- How must these resources (which are so different as nature and expense) be combined in order to properly serve the owners' purposes?
- How will I refund the future credits?
- Can I take advantage of the relative liberality of the capital market and the fiscal economy that accompanies it?

Most of the financial theoreticians and analysts place at the foundation of the financial management the financial analysis activity, and its elaboration is made depending on the used methodology:

- statistical or external analysis (indicators method);
- dynamic analysis (flows);

The financial analysis has as a result the financial diagnosis which can serve the tactical and strategic decisions of the business management.

In order to simplify and better understand the necessity of the financial diagnosis, the explanatory approach is oriented to the accountant notes' interpretation.

This determines us to adopt an analysis methodology of the financial states.

Three methods of analysis must be considered:

a) the financial weight method – able to detect effective problems of the financial structure, liquidations and profitableness;
b) the ratio method (indicators);
c) the flows method – complex enough, but the most accurate, as it emphasizes the significant evolutions and it explains the controversy between the accountant profit and the treasury crisis;

Beforehand any financial analysis it is necessary to work out the accountant information.

It means that there has to be found an instrument that allows the building of the funds and the financial means of the enterprise from a functional point of view (production cycle – exploitations, investment cycle and treasury cycle), as well as the determination of the liquidity, advantageousness and profitableness.

The financial balance sheet is such an instrument. The financial balance is a reconsidered situation of the accountant balance (which is an essential document). From its analysis we can easily identify the three cycles of operations that correspond to the way that the enterprise's activity takes place:

1. the investment operations cycle (net corporal immobilizations + financial immobilizations);
2. exploitation operations cycle: supply, production, sale (stock, advances for orders, claims, clients and assimilates, bookkeeping expenses in advance);
3. treasury operations cycle or current financing (movable investment values, availability in cash and bank accounts).

On the other hand, there can be identified the financing cycles (financial resources depending on the exigibility degree, pointed out in passive, as well as the arranging of the passives after the patrimonial criterion (personal and borrowed):

- the permanent financing cycle (strengthened financings), reflected through net non-corporal immobilizations (installation expenses, research and development expenses, licenses, patents, brands etc.) and the long and medium-term loans (convertible loan, other necessary loans, bank loans, other financial debts – TLM);
- exploitation cycle or the current operations financing (advances and payment on account on received orders, purveyor debts, fiscal and social debts, incomes recorded in advance);
- treasury cycle (current bank credits);

The account of result

With the help of this instrument the incomes and expenses of a business are grouped, for a determined period of time (usually a year) and the accountant result is established.

It can take two forms:

- "in account" – incomes on credit and expenses on retail;
- "in list" – as a table where there are the incomes and the expenses. The financial results are established by making the difference between these two.

The incomes are structured in three categories:

1. incomes from exploitations (coming from the current activity which develops on the business' profile):

- the sold production (Pv);
- reselling the wares (Rm);
- stored production (Ps = final sold – initial sold);
- immobilized production (Pi);

The business profit (CA) and the financial exercise production (PEF) can be determined depending on the elements that compose the exploitation incomes:

$CA = Pv + Pm$; $PEF = CA \pm \Delta Ps - Pi$

2. financial incomes:

- incomes from participations;
- incomes from investments;
- cashed interests;
- positive differences in currency exchange;

3. extraordinary incomes:

- incomes from management operations;
- incomes from liquidation of fixed funds;
- incomes from supplies and expenses transfers;

The expenses are also structured in three categories:

a) exploitation expenses:

- materials;
- warrants;
- various services;
- taxes, duties and assimilated payments;
- salary expenses;
- social expense;
- endowments;
- various expenses;

b) financial expenses:

- assimilated interests and expenses;
- negative differences in currency exchange;
- expenses from placement values transfer;

c) extraordinary expenses:

- expenses for management operations;
- expenses for fixed funds liquidation;
- endowments in paying offs and supplies;

The financial result determined on the three levels corresponds to the notion of profit. The gross financial result is particularly interesting because it is used in the analysis of the financial profitability and structure.

In common language, the terms advantageousness and profitability are used with the same signification.

The advantageousness refers to the result of the invested capital and it is obtained from the relation between profit and invested capital. Thus, it is groundless to speak of a commercial advantageousness, relating the profit to the sold production, which actually represents the profitability.

As a result, some observations are necessary:

a) the economic advantageousness = $\frac{\text{global obtained profit (net profit + interests)}}{\text{the sum of invested capital (total actives or passives)}}$

b) financial advantageousness = $\frac{\text{net profit}}{\text{own capital (net active)}}$

c) The profitability represents an indicator that allows assessing the effectiveness of sales and it is obtained as a relation between exploitation activity profit and business profit (CA).

It is necessary to understand that the net profit reflected in the result account (profit and loss account) does not necessarily designate the liquidity.

The profit represents a difference between registered incomes and expenses (effectively cashed incomes + counted incomes – effectively paid expenses – counted expenses) while the liquidity, usually estimated through the net liquidity or treasury flows, represents a result of cashing and payments.

The financial theory has substantiated and the financial analysis practice has assigned a liquidity typology, related to the reference object. Thus, if we refer to an organized form of business we can distinguish: the liquidity of the enterprise, the bank liquidity, the international liquidity.

The liquidity of an enterprise represents its capacity to economically and conveniently face the actives that they dispose of at the payment exigible obligations on short term. In the enterprises financial activity a distinction is frequently made between liquidity and solvency.

The solvency expresses the enterprise's potential to honor its payment obligations in certain period of time. In other words, the solvency is a potential liquidity and it is assessed through the self-financing capacity, while the liquidity represents the real payment capacity of exigible obligations and it is assessed through "cash – flow".

CONCLUSIONS

The financial management of the enterprise must aim at a maintenance of the financial equilibrium and a good liquidity. This objective must not affect the production activity and the investment programs. In other words, the conservation of the equilibrium between the input and output monetary flows must not affect the advantageousness.

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PROCEDURES REGARDING THE CONTROL OF THE EUROPEAN COMMUNITARY FUNDS

PROCEDURI PRIVIND CONTROLUL FONDURILOR COMUNITARE EUROPENE

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Abstract. *In order to make the European Union obtain a real legitimacy in its citizens' eyes, its politics must be effectively implemented and its resources have to be efficiently administrated.*

The anticipation and the approval of the available incomes with the help of which the E.U. will be able to achieve its common politics and its afferent expenses is accomplished through the European budget. In 2007, the E.U. budget totals up 126,8 billion €, the significant weight of the expenses chapters being held by those having as a goal the increase of the cohesion and the competitiveness in the E.U. and those regarding the supporting of the agriculture and the rural development.

The establishment of the common politics and the theoretical allocation of some resources are not enough to achieve the suggested goals. What it takes is a control of the way that the European funds are administrated, because, although the capitalist culture is deeply established in most of the member states, there are always temptations and ingenious solutions to misappropriate the funds.

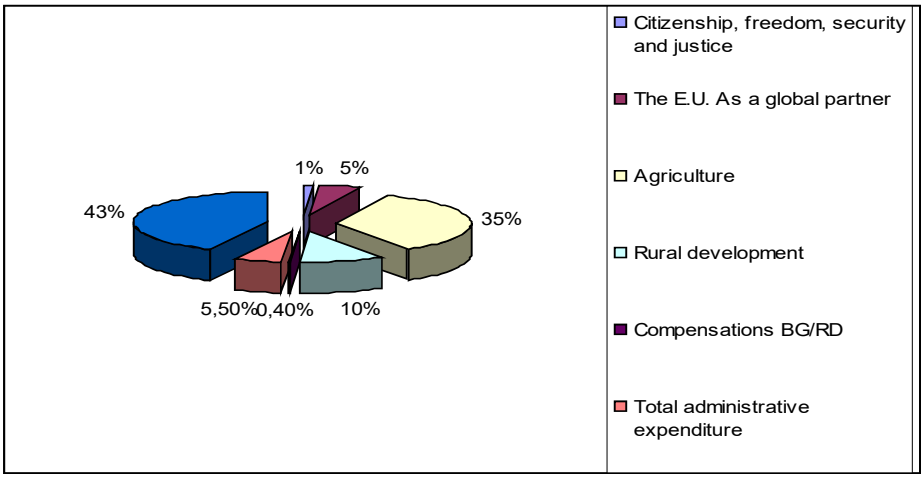
Rezumat. *Pentru ca Uniunea Europeană să capete o legitimitate adevărată în ochii cetăţenilor săi, politicile sale trebuie să fie efectiv implementate iar resursele sale administrate eficient.*

Anticiparea şi aprobarea veniturilor disponibile cu ajutorul cărora U.E. îşi va putea realiza politicile comune şi a cheltuielilor aferente acestora se realizează prin intermediul bugetului european. În anul 2007 bugetul U.E. se cifrează la 126,8 miliarde euro, ponderea semnificativa a capitolelor de cheltuieli fiind deţinută de cele care au ca scop creşterea coeziunii şi competitivităţii în spaţiul U.E. şi cele privind susţinerea agriculturii şi dezvoltării rurale.

Stabilirea politicilor comune şi alocarea teoretică a unor resurse nu sunt suficiente pentru atingerea obiectivelor propuse. Este nevoie de un control al modului în care sunt gestionate fondurile europene pentru ca, deşi cultura capitalistă are rădăcini adânci în majoritatea statelor membre, există totdeauna tentaţii de deturnare a fondurilor şi soluţii dintre cele mai ingenioase.

In order to make the European Union acquire a real legitimacy in its citizens' eye, its politics must be effectively implemented and its resources efficiently managed.

The anticipation and the approval of the available incomes through which the European Union will be able to accomplish its common politics, and the afferent expenses is achieved through the European budget. In 2007 the E.U. budget totals up to 126,8 billion Euros, the significant weight of the expenses chapters being held by those having as a purpose the rise of the cohesion and the competition in the E.U. space and those concerning the support of the agriculture and the rural development.



The establishment of the common politics and the theoretical allocation of some resources are not enough to reach the established objectives. A control of the way that the European funds are managed is needed, because although the capitalist culture has its origins in most of the member states, there are always temptations to misappropriate the funds and some of the most ingenious solutions.

The institutions accredited to carry out the control of the European funds work for the member states and for the European Union. The most important institution with such prerogatives is the **Account Court of the European Union**.

The European Account Court is the newest institution of the European Union. It was set up of the German Member of Parliament, Dr. Heinrich Aigner's initiative (the president of the Budgetary Control Board) in 1975.

It was convened for the first time in constitutive meeting at Luxembourg, on 25th October 1977 and it acquired through the Maastricht Convention (1993) a status that is equivalent to the one established for the other communitary institutions.

The need to create this institution was determined by the important increase of the communitary finances volume, by the resources diversity and its expenses and by the complexity of the operations imposed by their management.

The European Account Court's mission is to provide the independent audit about the way that the European Union funds are formed and used and to assess the way that the European institutions accomplish their tasks.

The Court analyses if the financial operations are correctly registered, if they are carried out according to the legal specifications and if they are managed so that they can provide efficiency.

The Court presents the results of its activity by publishing relevant reports, objectives and opportunities.

Through its activity, the Court wants to contribute to the improvement of the financial management of the European Union funds at all levels so that it can assure the European Union citizens of the financial resources' best employment.

The European Account Court is a collegial structure, formed by a number of members equal to the number of European Union states (27), but they do not represent the origin states' interests.

The Court members are named by the European Union Board, after the consultation of the European Parliament, at the proposal of each member state. The naming is made for 6 years. Their mandate can be renewed. The members choose among them a president for a period of 3 years, having the possibility to renew the mandate.

The Court's president is at this moment the Austrian HUBERT WEBER, and at Romania's proposal, OVIDIU ISPIR was named a Court member, having the position of Consultant of Romania Account Court.

The Court's staff must give proof of honesty and integrity in their activity and in using the Court's resources. Their actions must not be influenced, under any circumstances, as a result of some pressures or personal or financial interests. The Court adopted *"The Code of the good administrative behavior of the European Union Account Court staff"*.

The Account Court's members are organized in *audit groups*. They deal with the audit of some domains of activity, placed in 4 groups. Besides the audit groups, the Court also has other internal structures to coordinate the activity, realize and translate the activity reports, secretaryship activities so that it can assure the audit's and the staff's training quality etc.

In order for the audit activities to take place, the Court's auditors use an audit handbook. The audit handbook describes the procedures that must be followed while planning and executing the audit activities, while drawing up the reports, so that these different stages of the activity can be executed according to Court's politics and audit standards (PSAC).

The Court plans its work program for one and more years. The program for more years allows the defining and the bringing up to date of the Court's strategy, and the program for one year establishes the specific missions which will be accomplished during that year.

At the beginning of each year, the president of the European Account Court exhibits the yearly work program to the Budgetary Control Committee from the European Parliament.

The priority audit missions are established in the work program and the necessary resources are assigned.

As the Court cannot control every year the activity of all the persons that gain from or manage European Funds and according to the conventions it has the obligation to check every year only some of the aspects concerning the Union budget execution, it selects some domains of interest and institutions or persons that will be selectively controlled.

The determination of the audit subjects is based on risk analyses, the fears of the public opinion regarding certain problems, critical aspects from previous assessments etc.

The audit activity takes place most of the time at the institutions' residences which are the subject of the control activity, where the relevant documents and the staff can be examined. The meetings take place at the residence, in Luxembourg.

The Court has 760 employees (specialists in different fields). Depending on the circumstances, they appeal to other specialists who are paid for their services.

The whole audit activity has a solemn character, all the stages that are covered during the control activity being materialized in documents. Thus, planning the control activity supposes drawing up an Audit Planning General Memorandum and an Audit Program, both in written form. In the properly audit activity, the auditor determines the legacy and the regularity of the financial operations, as well as the good functioning of the accounts according to the gathered evidence.

Concerning the audit probation, there is a preference order in managing and assessing the evidence: written evidence, evidence that the auditor has gathered directly, evidence from third persons.

Another activity of the Court is represented by its meetings. In these meetings they draw conclusions concerning the controlled aspects and they make decisions regarding the content of the documents that will be published and which represent the official position of the Court with regard to the audit object. The meetings can be ordinary or extraordinary and they are secret. They are usually led by the president.

The result of the Court's activity is materialized in official documents like: reports, opinions, suggestions and assurance statements.

The reports are represented by some conclusions regarding the activity and the audited person and they are made up at the end of the control activity or periodically (for example, the yearly report).

The opinions are expressed following up some solicitations from other European institutions, especially concerning normative documents problems and projects, having a financial impact and those for the fraud control.

The suggestions are the Court's proposals, which come off its activity and which take into consideration the enhancement of the European funds management system.

The assurance statement is a document through which the European Committee is "released" from its executive tasks which have been given by the European Parliament at the same time with the approval of the budget, thus being certified that it accomplished its executive obligations.

The European Union Account Court has an independent character in comparison with the other European institutions.

This means that: the right to establish its procedure rules, to select the domain and the subjects of the audit, to establish the necessary resources and the time needed to perform it etc.

Its budget represents 0,1% from the amount of the communitary expenses or 1,6% from the amount of the administrative expenses of the E.U. The Court cooperates with the other communitary institutions and with those from the member states in order to achieve its objectives.

CONCLUSIONS

The Court has very strict rules concerning the fast answers that the employees are determined to give to those who are interested in its activity. The tone of the telephonic conversations, the velocity of the answers to the electronic messages or the received letters, the language employed in their drawing up are very thoroughly established in the civic respect spirit. The Court does not have to answer to problems that are not related to its activity or to offer confidential information, but in those cases there will be specified the institutions that have the necessary competence to give an answer and the justification of the confidential character of the information requested by the public.

The Account Court does not have jurisdictional prerogatives.

If the auditors discover certain disorders, including fraud, the communitary competent organisms are quickly informed, so that they can do what it takes.

However, the Court has a process quality, which is active and passive at the same time, and it means that it can sue if they prove that they defend a legitimate interest and it can be sued if, by its activity, a person or an institution has been damaged.

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AN APPROACH FOCUS ON DUTCH FISCAL SYSTEM

ABORDĂRI PRIVIND FISCALITATEA OLANDEZĂ

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Abstract. *Dutch fiscal system is materialize in „Tax Act 2001" and it is considerate to be easy and stalwart with tax level law but with gathering basis much higher. These are the requirements in order to contribute to increasing economic growth and to lead to a better occupation.*
Keywords: *taxes, debt, incomes, profit, fortune, dealings, excise.*

Rezumat. *Sistemul fiscal olandez îşi regăseşte reglementarea în „Tax Act 2001" şi poate fi considerat ca fiind simplu şi robust, cu cote de impozitare şi taxare mai reduse dar cu o bază mai mare de colectare. În esență, acestea sunt cerințele ca să poată contribui la stimularea creşterii economice şi generarea a noi locuri de muncă.*
Cuvinte cheie: *impozite, taxe, venituri, profit, avere, tranzacții, accize*

Preliminaries

Nowadays, Holland economy is considered having one of the most incentive fiscal systems. The MSE-es sector in Holland (firms/companies with less than 250 employees) is constituted from over 550.000 companies, that represent more than 99% in total Dutch firms and offer approximately 2,5 millions of jobs, which represents 60% from the total employed workforce. The turnover realized in MSE-es sector is approximately 450 billions EURO, and represent over 50% from the turnover realized in entire Dutch economy.

The fiscal system applied in Holland was introduced at 1st January 2001. By the new legislations in the field (Tax Act 2001) it was desired the creation of a new simple and stalwart system, with assessment and taxation quota more reduce but with a larger base of gathering, that could contribute to the stimulation of economic growth and generate of new jobs.

Budgetary incomes categories

Regarding to income and/or wealth of the individuals and legal entities taxes, we reveal that in fiscal Dutch system are defined three taxable income categories, for each of them the taxation quota applying differently:

1. *Incomes from salaries and other independent activities*. These are imposed by applying a progressive quota:

- until 16.893 euro, **34,40%**, from which 1,80% are taxes and 32,60% are contribution to the social insurances;
- between 16.893 and 30.357 euro, **41,95%,** from which 9,35% are taxes and 32,60% are contribution to the social assurances;

- between 30.357 and 51.762 euro, **42%**, with no contribution to the social insurances;

- over 51.762 euro, **52%** with no contribution to the social assurances.

2. *Incomes from shares in NV or BV companies*, in which case the shares held are at least 5%.The taxation quota applied to those incomes is 25%.

3. *Incomes from interests and investments*. The taxation quota is 30% on the taxable, estimated to 4% from the total net assets and in the case of exceeding 19.522 euro.

Incomes from salaries and contribution to the social assurances are deducted at source and are paid to the fiscal administration. Also, the dividend tax (25%) is restrained at the source, the company that distributes dividends being obliged to pay the restrained sum to the fiscal administration.

The profit tax is applied to private limited companies and public limited companies, but also to foundations or associations that carry on profitable activities. Starting from 1st January 2005, the taxation quota is 27% (26% for 2006 and 25% for 2007) for less than 22.689 euro profits and 31,5% (30,5% for 2006 and 30% for2007) applied to the sums over 22.689 euro. The wastage registered in a maximum three years previous period can be deducted from profits realized in the next years. The profits distributed to the shareholders are not deducted from the taxable amount. The fixed assets damping can be made by any way of depreciations, to the choice of the company.

Taxation of trade acts

Regarding to the taxation on the legacy, presents and goods transfers, we reveal that the special law (Inheritance Tax Act) defines three types of taxes:

a. *Legacy tax* is applied to the value of goods acquired from a person whose last residence was in Holland. The law establishes the maximum values of heritable goods for what is applied, in the certain circumstances, the exception from the tax payment.

Percent quota is different in accordance with the alliance grade (grade I relatives pays less than the more distant relatives or than that without alliance grade) and is applied on taxable values of the acquired goods (the acquired propriety value which from is subtract the excepted value). There are a maximum and a minimum percent quota, established in accordance with the legacy value.

b. *Presents tax* is applied to the value of goods acquired as a gift from a Holland cormorant person. The law establishes the maximum value of presents which for the tax is not applied and the cases and conditions exceptions from the tax payment (for example, the parent's presents for their children). The percent quota taxes are the same as the legacy case.

c. *Transfers of goods tax* is applied in the situation of legacy or present acquired from a person whose last residence wasn't in Holland. The law does not stipulate exceptions from the tax payment, and the percent quota taxes are the same as the legacy case.

In the same context it is proper to be underlined the fact that even the awards from gambling valuing more than 454 euro are 5% taxed. Any good won in this manner, and that could be determinate a market value, is considered award and is taxed therefore. The prizes from the Dutch lotteries are taxed at the source.

Indirect fiscal

Regarding to indirect fiscal we allow for, especially, VAT and excises. In Holland, the general quantum of *value added tax* (BTW) is 19%. Also, there are applied different quanta as it follows:

- 6%: for foods, medicines, papers and magazines, for certain medical services, certain services that suppose an intensive work consumption, certain entertainment services, transport of passengers services, water providing, certain goods and services used in agriculture;
- 0%: for exports in non-EU countries and, in the certain circumstances, for goods and services afferent provided to a beneficiary from another EU country.

In case of small businesses, family businesses and farming business there are applied special stipulations regarding to payment of BTW. For imported goods, BTW is due in the moment of input goods in European Union and it is calculated at their custom value.

Excises are applied in case of certain consumption goods, such as alcoholic beverage, tobaccos products, petroleum and mineral oils. For example, the excise value for a quart of Dutch liter is 6,21 euro, and for a quart of gas without plumb is 0,67 euro. The value of excises for tobaccos products depends on their price: in case of a cigarette pocket sold by 4,60 euro, the price include 2,63 euro excises.

Even for certain fresh drinks (fruits and vegetables juice, mineral water, soda beverage) are collected excises: for a quart of lemonade the consumption tax is 0,06 euro, and for a quart mineral water or fruits juice is 0,004 euro.

Dutch legislation regarding to consumption tax respects the UE Counsel directions about harmonization of the excises system in the European Union.

Legal transactions tax

Based on the law regarding the taxation of the legal transactions (the Act governing legal transactions) there are applied the following tax categories:

1. Real (immovable) transactions tax is applied at the acquisition of an immobile (land, building) situated in Holland. The tax represented 6% from the immobile market value or from the transaction value, when this value is bigger than the market value.

In most of the cases, the tax is retained by the notary, at the moment of transaction and paid to the fiscal authority.

2. Insurance tax is applied in quantum of 7% from the value of policy. There are excepted from the payment of tax life insurance, in case of accidents, invalidity insurance, health insurance, in case of unemployment, transport insurance.

3. *Capital tax* is applied in case of rise in capital operations made by the NV or BV companies, by organizations whose capital is divided in shares or by the cooperative, their headquarters being in Holland. The tax is in quantum of 0,55% and it is applied at the biggest value between contribution value (assets minus liabilities) and nominal value of shares.

Engine vehicle tax

Any person who has an engine vehicle (car, minibus, truck, motor-cycle) is obliged to pay a tax, that depends by the type and weight of the vehicle, the type of fuel, the fiscal residence of the person etc.

Vehicles for heavy transportation tax (HGV)

It is applied to the vehicles destined for heavy transportations of goods and is known as "Euro vignette". It is introduced based on a convention between Holland, Belgian, Luxembourg, Germany, Sweden and Denmark. The value of the tax depends on total number of vehicle axels and the European frame, from the point of its gas emission (Euro 0, Euro I, Euro II or over).

Obvious, besides these, there are another more contributions to public budget that are similar with the taxes. For example, *losses tax* – that is applied to the centrals of losses processing in accordance with the quantity of losses discharged in collection holes – is 84,78 euro per ton of non-combustible losses and 13,98 euro per ton of combustible losses. *Fuel tax (*12,45 euro per ton) is applied to the coal producers and importers. It is excepted from the payment of tax the coal produced or imported for being used in thermal power station or in any other purpose than as fuel.

Natural water tax (0,181 euro for each cm consumed water) is collected from the companies that exploit natural waters (pumping stations, farms, industrial installations that consume water in the production process or for cooling etc.). There are exceptions the cases in which the water consumption is relatively low and it is determinate by emergency situations or for irrigations in agriculture. C*urrent water tax* is applied to individuals or companies that consume water through a network distribution, no matter if the provided water is potable or not. The tax is 0,146 euro per mc and is applied to a maximum consumption by 300 cm per year, being collected by the water company and paid to the fiscal authority.

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ASPECTS ON THE FINANCING OF COMPANY

ASPECTE ALE FINANȚĂRII ÎNTREPRINDERII

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Abstract. *The aim of this paper is first, to show the evolution of different theoretical streams in corporate finance and second, to make an inventory of present and potential contributions of financial theory to financial strategy from decision-making points of view*.

Rezumat. *Scopul acestui articol este, în primul rand, de a trece în revistă evoluția principalelor concepții asupra finanțelor întreprinderii şi, în al doilea rand, de a evidenția o serie de contribuții actuale şi potențiale legate de strategia financiară în procesul decisional.*

Impact of the monetary policy, in particular by the credit control (fixing of the interest rates and monitoring of the monetary aggregates), on the situation of the companies cannot be studied by being unaware of that the risk of credit taken by the financial system with regard to the productive system is matched by or, more exactly, like determinant, the risk of not-realization.

This risk corresponds to the constraint of outlets which is exerted on the company of which perenity depends the sale on its products. By analogy, the risk of not-realization is with the activity productive what the risk of transformation is with the system of credit. The second manages time like the first must manage the cycle of realization of the capital, of its monetary form to its form goods sold on a market.

MATERIAL AND METHOD

The these risk assessment can be led from the double point of view of studies for conditions of control of the constraint of profitability on the one hand and the constraint of solvency in addition [3]. From this last point of view, it appears that the trajectories of companies which most frequently lead to a loss of control of the constraint of solvency are those which originate in [1]:

- important efforts of investments two to three years earlier,
- an absence of renewal of the productive potential corresponding to the safeguarding of financial autonomy, which leads to a growth of the risk of loss of competitiveness,
- a weight of the requirements in working capital for exploitation high inducing one increase in debt.

Even if the improvement of the risk management of the credit is an indispensable condition with the correct operation of the financial system, it can involve a perverse effect of rationing and of selectivity of the credit increased if, in same time, it is not accompanied by the improvement of the risk management of realization. The study of the performances of the companies cannot be led without the analysis of the modes of corresponding financing.

RESULTS AND DISCUSSIONS

The deterioration of the conditions of profitability of the productive capital takes part in the inflationary tensions and the search of financial transactions (acquisitions, absorptions, placements) likely to mitigate it deficit of productive effectiveness of the committed capital [6].

The study of operations of reorganization and the analysis of the capitalizations of the companies show that one fraction of the substitution of the capital to work is ascribable with the will to shorten the economic times of return on investment, by supporting the investments likely to quickly improve the account of results.

Analysis of the individual behaviors companies, using typologies based on the determinants of profitability [13], show the specific conditions of corresponding financing.

Analysis of the consequences of a variation of the interest rates in bond with the goals of monetary policy or, more largely, of the evolutions of the financial environment, is necessary to include/understand the nature and the methods of the arbitrations which the companies are led to reduce their various constraints (of outlets, of profitability, of solvency).

This way of research is particularly interesting in the case of small and the medium-sized companies for which the intermediation remains dominant. For these companies, the stake resides less in the increase in their own capital stocks that in the adaptation of the modes of financing to their temporal horizon, which passes by their capacity to produce relevant information intended for convince on their capacity to reduce the risk of credit taken by the lenders.

The comprehension of the differences according to the size of the companies requires to leave policy of investment and to reconsider the formation of profitability in order to know if problems of financing and access to the credit for small and the medium-sized companies would be justified by insufficient performances compared to the companies of bigger size.

However, the effectiveness or profitabilities of small and the medium-sized companies is higher than those of the large companies even if the heterogeneity of the situations is larger for the first [2]. It is also confirmed that if these companies are involved in debt, the interpretation of this result diverges from that usually done.

Many authors notes a negative correlation between the debt and profitability, which is contradicted on countable data of firms not - dimensioned for which the relation is positive [12].

To increase its financial autonomy, a company can call upon its shareholders and/or release a result which will be capitalized. This implies, to be realizable, that the firm has access to the money market easily (or that its principal shareholders can raise funds easily) and/or that its performances economic and financial are sufficient high.

The own capital stocks have as a cardinal function to guarantee the solvency of the company. They constitute, for a firm and the economic agents which are committed there, a reserve of safety allowing to face the accidents of internal or external origin (in period of business slowdown, the little involved in debt companies are favoured compared to those which privileged the loan with the detriment of the own capital stocks).

In other words, the own capital stocks are characterized by triple quality: * it is about capital with null current liability,

* they cannot claim with a fixed remuneration,

* they have as an ultimate function to cover the risk [11].

Each company, according to its economic and commercial situation, will seek with to optimize the recourse to the external financing according to the cost of this one but also according to the degree of autonomy which she wants to safeguard and its projects of development. For that, it is difficult to define in the absolute an optimal division between own capital stocks and debt.

According to the theorem of indifference of Modigliani-Miller (checked only under adequate conditions of operation of the financial markets "perfect"), the value of market of the firms is indifferent to the structure of the liability of their assessment (call with the shareholders or recourse to the debt). In this case, a productive investment is carried out only if it increases the value of market of the company, which depends only on the comparison between sound specific output and the average cost of the capital. The decision is, in this case, independent of structure of financing retained.

However the markets are not perfect, as the existence of asymmetry shows it of information and risks related to the loss of control of the load of the debt, what can lead the lender either to require additional guarantees or to ration the credit (by the rates and/or the quantities). In this context, the own capital stocks of the companies on the one hand depend closely on the amount of the long-term saving in France [9], on the other hand are closely related to financial profitability of the company since the released benefit can be capitalized and to allow to offer a gravitational remuneration to its future associates.

However, the intensity of the financial autonomy of a company, measured by the importance of its own capital stocks, is not therefore synonym of higher economic performances and, consequently, is not completely relevant to evaluate the health of the firm [12].

Small and the medium-sized companies manage requirements in funds for bearing of exploitation higher, which causes a recourse to the financing by bank credit current higher than their competitors of bigger size, because of heavier stocks and of the more important loads related to the credit between firms.

The relations customer-suppliers are generally established with the detriment of the small ones and medium-sized companies. In the light of the examination of the economic literature, the principal factors of vulnerability of Small and the medium-sized companies are multiple. They can be either of

internal origin, or of external origin. In a normative and quasi-recurring or systematic way, we find like vectors of the vulnerability of these companies:

- determinants related on the context or the environment like the weight of the legal and institutional constraints, the availability of the resources, the absence or the excessive support of the public authorities;
- strategic determinants like the speed of the financial communication, the will of transparency with respect to the various partners;
- determinants related to the mode of management, in particular by the control of certain parameters like the evolution of the BFR/CA, management beyond customers, the degree of diversification of the products and the markets;
- financial determinants through the level of profitability and released economic surpluses
- organisational and human determinants like the age of the company, the weak performance or productivity of its personnel

The financial profitability of company is the resultant of two effects:

a) The first relates to the multiplier effects of a modification of the distribution of the value added on economic profitability, taking into account a certain effectiveness of productive combination. Thus, when the effectiveness stagnates or drops, profitability can grow thanks to a modification of the division of the produced richnesses and conversely in the contrary case.

b) The second is more known; it is about the action leverage of the external contributions which measures the positive or negative incidence of the external contributions (debt readier of the Group companies) on financial profitability. It evaluates, for a rate of contributions external given, the effects of a difference between the economic profitability and the average cost of the external contributions.

This variation is the differential “profitability-cost”, if it is positive, the action leverage will be positive: the productive activity profits fully from the external financing and makes more than to compensate for its cost; and conversely if it is negative.

The analysis of the action leverage makes it possible to underline the weight of the constraint of financing what assumes, to differing degree, the industrial companies. Indeed, the comparison between the return on the capitals engaged in the industrial activity and that of the borrowed capital (interest rate) underline the intensity of this constraint and its extreme sensitivity to the fluctuations of the economic situation. So it limits the possibilities of adjustments available to the companies by reducing them to those offered by the management of labour (contract to duration determined, early retirement).

CONCLUSIONS

Paid to the clean financing, the self-financing (one deduces the dividends versed from the capacity of rough self-financing) constitutes an indicator of profitability afterwards remuneration of the shareholders and thus an evaluation of the capacity of capitalization of the company, before taking into account of the policy of investment. Small and the medium-sized companies are increasingly more profitable than the large companies after payment of dividends to the shareholders.

In not easily foreseeable environment, and thus generating heavy external constraints (emerged solvent limited, high real interest rates), the firms can exploit that internal variables. Among those, employment and the wages are less complexes to be handled and manage (in particular with the development of the desindexation of the wages on the prices and negotiations of branch), allowing, moreover, more or less to compensate for the fold effectiveness of the committed capital.

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TAX ASPECTS OF FUSIONS AND ACQUISITIONS OF COMPANIES

IMPOZITELE DE FUZIUNE ŞI ACHIZIŢIE A ÎNTREPRINDERILOR

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Abstract. *Each transaction of fusion or acquisition is single and requires the examination of several particular factors which must be analyses during preliminary control. In each situation, tax planning will constitute an important and complex stage. This is why it is imperative to plan these transactions carefully in order to reduce the tax burden of the salesman and to make the transaction least expensive possible from a point of view tax for purchaser.*

Rezumat. *Fiecare tranzacţie de fuziune sau achiziţie este unică şi implică analiza preliminară a factorilor particulari. În fiecare situaţie, planificarea impozitelor constituie o etapă importantă şi complexă. De aceea se impune pregătirea atentă a acestor tranzacţii în scopul reducerii sarcinii fiscale a vânzătorului şi, de asemenea, diminuării efortului cumpărătorului.*

INTRODUCTION

The central objective of the transactions of fusions and acquisitions, the companies try to be dissociated their competitors and to increase thus richness of their shareholders. Tax repercussions relative to these transactions are often considerations major. crucial stage to carry out a transaction successfully of fusion or acquisition is the preliminary control (due diligence review) which a whole of procedures includes/understands of investigation and examination having for object obtaining rather large numbers information about salesman in order to prevent the bad ones surprised being able to occur after enclose transaction of fusion or of acquisition.

MATERIAL AND METHOD

The mandate of preliminary control is entrusted to a team of professionals who generally includes auditors and legal advisers.

This stage calls upon several disciplines, of which accountancy, finance, management, the taxation, strategy financial and right. Moreover, analysis must be carried out in an integrated way. From the tax point of view, the transaction of fusion or acquisition can to aim at the acquisition and the sale of the actions or the acquisition and the sale of the credits.

In the event of acquisition actions of a company preliminary control allows the evaluation of the tax profile of the target company in order to hold of it account at the time of the negotiation of the price of acquisition.

The auditors grant also a detailed attention with convincing elements concerning assessed valuation of each credit held by the target company, with the losses deferred and their source, and with the other deductions. The tax elements usually re-examined during preliminary control are:

- Balance deferred of the tax credits to the investment
- Balance of the losses other than in capital
- Balance of the losses of capital
- Balance of the categories of damping tax (FNACC)
- Deduction for small company
- Benefit of manufacture and transformation
- Tax credits for the activities of scientific research and development experimental
- Tax credits for creation acceptable employment.

Connections between the financial statements and the income tax returns by examining particularly the related notes with the income taxes and the possibilities allows to update litigations with the tax authorities.

The legal aspect of preliminary control accentuates the official reports in order to recall likely operations to involve tax consequences like the declarations of dividends in capital or distributions under form reduction of the versed capital. It is necessary to analyze all the important contracts in order to determine the elements being able to have a tax impact.

The documents examine by the jurists are the following:

- Register of the shareholders
- Agreements governing the modes of options to buy of actions
- Contracts of acquisition of credits
- Contracts of financing.

To make sure of the respect of tax choices, the salesman sign a “letter of declaration” in which one certifies that it will carry out them tax choices in accordance with the agreement intervened with the purchaser. In this letter, the salesman attests that them information and tax documents that it provided within the framework of preliminary control are exact and complete.

The letter of declaration can lay down the payment by the salesman of one compensation for various reasons, as in the cases of abuse confidence or of contributions of taxes for years former to acquisition; the calculation of the compensation being envisaged in the contract of purchase. The other clauses laid down in this letter of declaration are:

- Clauses certifying the production of the income tax returns within the deadlines
- Clauses certifying the payment of all the taxes
  - to define the word “taxes”
  - Income tax
  - Deductions with the source
  - Customs etc.
- Clauses envisaging the outcome of certain problems such as:
  - Contributions of taxes for years former to acquisition
  - Refunding of taxes for years former to acquisition

RESULTS AND DISCUSSIONS

Like principal methods to carry out a project of fusion or of acquisition the economic literature retains the acquisition and the sale of the credits and acquisition and the sale of the actions. By tax reason, the salesman usually prefers to yield its actions (it carry out a capital gain of which a part is not taxable). The tax advantage sale of the actions is even larger if several private individuals hold the actions because each one of them to exemption be is entitled.

In the case of the sale of the credits, shareholders of the target company cannot generally profit advantages related to the capital gains; the company of which they are shareholders must pay taxes on the tax profits relating to the transfer of the credits and liquidation of the company involves for them a taxable dividend.

As regards purchaser, the acquisition of the credits proves to be the most advantageous method on the plan tax; the amount used for calculation of tax damping corresponds at the price paid for the goods and this paid price generally the assessed valuation of the goods exceeds belonging at the target company, the deduction for damping will be raised in future exercises.

In other words, the tax considerations constitute a major stake in the negotiations; to minimize the tax consequences for the salesman, this last could accept a less price, it salesman should logically accept the offer which will get the amount to him after taxes highest.

In the event of the acquisition of the credits, the risk is in general less low than that which rises from the purchase of the actions. Because the purchaser is not responsible for the tax past of the company acquired, control precondition is limited mainly to checking of the distribution of the price of purchase agreed upon between the parts (when credits are acquired or sold in block) and for respect of the joint tax choices.

With regard to the purchase price, the purchaser normally may find it beneficial to affect a greater part of the price of acquisition to the goods profiting of an accelerated rate of depreciation. Interests of the salesman in distribution of the selling price are with opposite of those of the purchaser.

The goal of the salesman is to minimize them taxes resulting from the sale of the credits, it generally may find it beneficial to allot the greatest proportion product of the sale to the categories goods whose transfer involves less tax consequences. He will want also to minimize the allocated amount with the goods in inventory or the redeemable goods being the subject of a high recovery of the deduction for damping.

Another advantageous tax choice is offered with regard to the accounts customers, in the American law being envisaged the possibility of purchaser of deducing from the income the bad debts or to establish a provision in their connection following the purchase of the company. As for the salesman of the accounts customers, the same law allows him to entirely deduce, as loss, the

difference between the face value of the clients' accounts and the proportion of the price selling awarded to the latter.

The purchaser can claim, in the year of acquisition, for the redeemable goods a deduction for damping which do not exceed half of the amount which it could normally deduce. In the event of the salesman, the transfer of redeemable goods with an amount more raised that the paid price involves the recovery of the deduction for damping and the realization of a profit in capital.

In acquisition of the actions, a basic concept is that of acquisition of the control which can take place during acquisition of a sufficient number of actions resulting in transferring it statutory audit of the salesman to the purchaser.

Some operations, such as one repurchase of actions or cancellation actions, can involve an acquisition of control for tax purposes.

Tax consequences rising of an acquisition of control are many:

1. Firstly, the company whose control was acquired is famous to have an end of the year of imposition at the date of acquisition of control, and a new year of assessment is considered to start at this time.

2. A second consequence of the application of the rules on acquisitions of control relates to the losses other than in capital. Usually, all them losses which are undergone before the acquisition of control cannot be deferred against profits or profits carried out afterwards the date of acquisition of control. Of even, undergone deferred losses after the date of acquisition of control cannot be used against profits or of the profits carried out before go back to acquisition of control. However, of the particular rules apply the losses in the case of firms selected “different losses that in capital” for tax purposes.

Indeed, the losses undergone before the acquisition of control can be deductible if the company whose control was asset continues to exploit the same one company or a similar company with a reasonable expectancy of profit.

3. Thirdly, the tax law contains particular restrictions with regard to the losses which are not carried out. Indeed, the latent losses, which consist of losses not carried out on goods the such redeemable goods, goods irredeemable, goods in acceptable fixed assets, stocks and them clients' accounts, are famous being realized immediately before the date of acquisition of control. Moreover, any latent final loss on a redeemable good it increases balance different losses that in capital and can be deduced only if the same company or a similar company is exploited.

4. Finally, the purchaser wants to profit from the balances of account of dividend in capital (which includes the nontaxable portion of the capital gains Nets carried out by the target company which the payment of the free dividend allows of impôt11) and account of tax in refundable hand with title of dividend (which is constituted of taxes which were paid by the company on its incomes of placements and on certain dividends and which would be refunded at the target company when it pours dividends with its shareholders) of the target company.

CONCLUSIONS

Legal expenses and accountants represent a share important of the expenses engaged at the time of one transaction of fusion or acquisition. For the purchaser, these expenses are not deductible in the year during which they were committed because they are by capital type and increase it rather cost of the acquired goods. In the case of the acquisition of the actions of a company, the legal and countable expenses increase the cost of the actions only if acquisition is successful. If they are related with a missed attempt at acquisition actions, they can be treated like a good in immobilization acceptable if the company can show that acquisition envisaged the integration of the activities of the acquired company with that of the purchaser. In the case opposite, the committed expenses could not to get any tax advantage. As for the expenses engaged by salesman, they constitute deductible expenditure for tax purposes.

Acquisition can be financed by the payment of a counterpart monetarist regulated with very the liquidities of the purchaser, the financing external or by the emission actions.

A) Financing of acquisition with the surpluses of liquidities of the purchaser does not involve a particular tax consequence.

B) In the case of a financing by loan, the principal concern of the purchaser is to ensure itself of the deductibility of the interests. If the purchaser does not have the assessed incomes necessary (of which it can withdraw them interests), it can plan acquisition so that the interests are deductible for the target company.

C) In the case of a financing by actions, the purchaser must realize that the payment of dividends to the shareholders can involve one cost of higher financing because the dividends are not deductible from the assessed income. If the financing is carried out by the issue of shares, the expenses related with this emission must also be capitalized and deadened over five years.

The tax authorities specify that expenses of financing engaged with regard to an emission actions cannot be deductible that if the company carries out really the transaction of fusion or acquisition.

The impact of a Fusion Acquisition on the policies human resources is generally very important. Remuneration is in the middle of the problems of the bringings together of companies. The questions to study go from the upstream (accounting of social engagements in IFRS, remuneration and development of consumer loyalty of the leaders) until the harmonization of the policies of remuneration, of the staff regulations as regards classification, variable remuneration and welfare benefits. These interventions also cover with the key aspects of the success of these projects of fusion with the remuneration of commercial which are key in the success of the objectives of fusion and bringing together of companies.

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ASPECTS OF MICROCREDITING IN ROMANIA

ASPECTE ALE MICROCREDITĂRII ÎN ROMÂNIA

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Abstract. *A great variety of organizations and institutions are active as suppliers of microcredit. They can be divided in three groups: NGO's, credit cooperatives and credit unions, banks. The paperwork is reviewing the main characteristics of the microcrediting services from Romania, the suppliers of these services, and the problems that are facing in their activity*

Rezumat. *O mare varietate de organizaţii sînt active ca ofertanţi de servicii de microcreditare. Aceştia pot fi grupaţi în trei categorii: organizaţii nonguvernamentale, cooperative de credit şi bănci. Lucrarea trece în revistă principalele caracteristici ale serviciilor de microcreditare din România, ofertanţii de astfel de servicii, respectiv cooperativele de microcreditare, şi problemele cu care se confruntă acestea în activitatea lor*

A great variety of organizations and institutions are active as suppliers of micro credit, divided in 3 groups: NGO´s, credit cooperatives and credit unions, banks. Some of the NGO´s possess the required professional level, or the business culture. Most of the credit cooperatives and credit unions are limiting their services to the own members, of which savings are offering the financial basis for their crediting actions. The banks are offering credit to small clients in collaboration with NGO´s and concerning the direct crediting, this means the creation of new loan products.

MATERIAL AND METHOD

A great variety of organizations and institutions are active as suppliers of microcredit. They can be divided in three groups: NGO's, credit cooperatives and credit unions, banks.

The great majority of the microcrediting programs are carried on by the NGO's. These include national organizations, much of them receiving assistance from international donors. The international NGO's are carrying on programs through the affiliated local agencies.

But, NGO's encountered great challenges in credit programs administration. Because they are programs of social assistance, just few of them posses the required professional level or the business culture in order to carry on effective credit operations. In fact, they must perform a substantial transformation, if they intent to become suppliers of specialised financial services. Instead of serving the "beneficiaries ", they should establish contract relations with clients.

Over twenty years, the NGO's are offering financial services. The NGO's of specialized microcredit has been in the first line of developing adequate organizational and institutional structures. They initiated designing of innovative microcredit technologies. Despite of significant advance in the field of microfinance, the most

NGO's are serving only a few thousand clients. The most of them is offering loans and usually, they have one or two credit products.

Although some of them require deposits from their clients which form a part of their borrowing collateral, just a few of them are mobilizing uncompulsory savings. But, NGO's are involved, in general, in deposit formation. They are not under the incidence of formal banking regulations and monitoring system because they are working without a formal bank license.

Recently, this restriction has motivated some NGO's to transform them into formal regulated institution. This process, known as promoting or quality improvement is giving the liberty for the formal microfinance institution to expand their number of financial services. And also, it strengths the NGO's access choices on financial markets for additional borrowing resources.

RESULTS AND DISCUSSIONS

From historically point of view, credit cooperatives usually served the population that was meeting difficulties in access to commercial banks. These tend to become more formal in their structure than NGO's, inclusively by setting up national and regional network.

Central financing facilities constitution is determining the reallocation of the cash excess between credit union members. In many countries, these have been included in a special category of the banking law and is representing subject of the separate regulation and monitoring mechanisms.

Most of the cooperatives and credit unions are limiting its services to own members, their savings offering the financial basis for their crediting actions. This is presenting the advantage that could better screen the potential debtor and to evaluate, to monitor and to recover borrowings. Like in the case of informal savings and crediting groups, the members are self selected, and it appears a pressure of realizing a complete repayment an on time of the loan. Social pressure and good information on member clients are very effective mechanisms.

Despite its advantages, the credit cooperatives are confronting with distinctive problems. The supply of financial services is restricted to its own members, and in this manner it's limited the availability (supply) of financial services, quantitative and qualitative, for clients with low income and growth potential.

Because the funds loanable are limited in general to the mobilized savings of its members, the credit cooperatives are restricted in their efforts to satisfy the credit request. The loans are granted, usually in smaller amounts than requested initially. These are available after the outstanding loans have been repaid. This is restricting loan opportunities and, therefore, their effectiveness. The lack of professional management can affect the quality of the loan portfolio

In Romania, starting with 1990 there was a growth of the number of credit cooperatives. Thus, in 1998 there were recorded a number of over 840 credit cooperatives. Starting 2000, the number decreased because of the new regulations imposed by the National Bank.

Today, there are a number of 124 credit cooperatives affiliated to a Central House organized in 19 agencies. This network covers the entire country and is called Creditcoop.

The object of activity, as stated in the statute, comprises the following domains:

- deposit acceptance;
- granting credit to people, other than own members and to the enterprise in the area;
- investments on interbank market;
- funds transferring;
- payments and settlements, inclusively of those between the affiliated credit cooperatives;
- consultancy concerning the activities carried on by the credit cooperatist organizations;
- factoring operations and commercial paper discounting;
- collateral issuing and pledge assuming;
- and it has treasury function.

If we take into account the operating environment of the credit cooperatives affiliated to the Creditcoop network, 65% of them are operating in rural area and 35 % in urban zone.

At 31 December 2005, the Creditcoop network was formed by Central House with 19 branches, and from a number of 130 credit cooperatives with 268 working points.

Moreover, the strategy of Creditcoop was to merge the credit cooperatives (the law allowed, in order to reach a minimum level of 3 billions lei of own funds).

At 25 of February 2004, the National Bank endorses the merging request made by a number of 504 cooperatives from which 406 absorbed by the 98 adsorbent.

Thereby, at 31 December 2004, Creditcoop was formed by a Central House and 16 branches. At the same period were affiliated 133 cooperatives which had 727 working points.

Besides the elements of the activity object presented by the Central House, the credit cooperatives are offering in addition:

- carrying on credits in behalf and in the name of the state from funds of the cooperatives members and for micro enterprise;
- issue and management of the credit and payment instruments;
- foreign currency operations;
- inter cooperatives credit and from commercial banks crediting;
- consultancy for own members and for micro enterprises;
- mandatory operations.

At the beginning of the 2006 year, Creditcoop recorded total assets of 132, 73 millions of euros, total income reached 45, 1 millions euros, liabilities of 88, 53 millions euros. Thus, the network recorded a gross profit of 4, 84 millions euros and net profit of 4,1 millions euros.

The involvement of the commercial banks in microfinance is relatively recently. Banks are appealing to a great variety of strategies to serve clients with low incomes,

which are regularly perceived as "non banking ". The microcredit can be granted direct and indirect.

The indirect ways through the commercial banks grants loans to the small clients and does comprise the so called "inked" programs with NGO's or other intermediary organizations. In these cases, banks offers loanable resources and intermediary organizations are granting (from other source – banks) to the members of the self-helping groups for micro enterprise activities. In this arrangement, banks have limited contacts with final debtors. These are not active involved in designing of the credit products or in credit administration. The NGO's are taking into account all the evaluation aspects, monitoring and loan recovering.

While this model is enlarging the access for clients with low income to banking loans, it proved to be of fairly success in the supply of sustainable banking services. The bank disposes of few incentives in developing the adequate credit technologies and those of cost – effectiveness. They are supporting on a number of organizations, each of them following different objectives and standard activities.

CONCLUSIONS

More interestingly was the recent involvement of some commercial banks in direct crediting through conceiving of new loan products – the supply of services for low income clients. This means the creation of specialized microcredit department in bank. This approach is very attractive particularly in realizing the availability of the financial services, quantitative and qualitative to help clients with low incomes, and for financial survey carried on by commercial banks. Powerful financial institutions are enjoining the public trust, as long as the clients recognize and perceive banks as trustful and as stable organizations.

The involvement of the banks in microfinance means the availability of their intermediation potential amplified. But, if the banks activity are ineffective and the personnel is not capable to change its culture and traditional banking attitudes, before serving low income clients remain barriers. Indeed, in these cases, it could be preferred the creation a new microfinance institution with a definite task and follows a set of objectives. This is necessary where banks have a weak reputation because of the failure of direct credit programs or when their activities have been undermined by the interference of the government.

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INSTITUTIONAL PUBLIC FINANCE ROMANIAN SYSTEM

SISTEMUL INSTITUȚIONAL ROMÂN AL FINANȚELOR PUBLICE

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Abstract. *Elaboration, implementation and monitoring budget process is leading by Public Finance Law and the others laws. MFP is responsible in elaboration of the annual budget laws, rectification laws, and the laws for approving annual execution accounts. These projects are presented by MFP in Govern and are assumed by the Govern, in order to be send to the Parliament.*
Keywords: *Public budget, incomes, budget outlays, fiscal, programming*

Rezumat. *Procesul de elaborare, execuție şi monitorizare a bugetului este guvernat de Legea Finanțelor Publice precum şi de alte acte normative (reglementări guvernamentale, instrucțiuni, metodologii, etc.). Ministerul Finanțelor Publice are principala responsabilitate în elaborarea legilor anuale ale bugetului, a legilor de rectificare, precum şi a legilor privind aprobarea contului anual de execuție. Aceste proiecte sunt prezentate de Ministrul Finanțelor Publice în Guvern şi sunt asumate de Guvern, pentru a fi trimise spre aprobare Parlamentului.*
Cuvinte cheie: *Buget public, venituri, cheltuieli bugetare, programare, fiscalitate.*

The budgetary legal frame

The public finance law, adopted in 2002, anticipate that the Parliament pass the annual bills of the budget and also pass the rectification bills, drawn up by the Government in the macro-economical strategy assumed context.

According to this Law, the Parliament cannot approve the amendments to the budget that lead to a majority of the budget deficit, the Government being the one in charge to establish the maximum level (the high water mark) of this indicator.

The budgetary context consists in five major phases: the budget draw up; discussing the project budget and adoption of the budget at the legislative level; the budget execution; implementation, monitoring; approving the general execution account.

In case when the budget law hasn't been adopted, with at least 3 days before the ending of the budgetary year, the Government will carry out the attributions predicted in the previous year budget, and the monthly expenditure limits cannot exceed, as a general rule, 1/12 from the previous year budget.

The state budget (public budget) – step by step

We represent the main bench-marks of the budget draw up calendar:

● 31st of March – macro-economic and social indicator's forecast for the budgetary year for which the budget is drawn up, and also for the next 3 years, is

realised by the organizations in charge. These indicators will be actualised during the budgetary process.

- 1st of May – The Ministry of the Public Finance transmits to the Government the goals of the fiscal and budgetary policy for the budgetary year for which the budget is drawn up, and also for the next 3 years, together with the expenditure limits established for the main credit's ordinators (the Ministries and Governmental Agencies).
- 15th of May – The Government inform the Parliament about the main directions of its macro economical and public finance policies.
- 1st of June – The Ministry of the Public Finance transmits to the main credit's ordinators a frame-letter in which is presented the macro economical context that is the background for the budget draft and for the methodology to drawn up the budget, but also the expenditure limits, approved by the Government.
- 15th of June – the change of the expenditure limit will be made by the Government, at the Ministry of Public Finance proposal, taking into account the proposal of the main credits's ordinators.
- 15th of July – the main credit's ordinators have the duty to transmit the budget draft for the next year to the Ministry of Public Finance, taking into account the expenditure limit and the predictions for the next 3 years.
- 1st of August – The budget draft handing in and the final annex, to the Ministry of Public Finance.
- 30th of September - The Ministry of the Public Finance, according to the budget draft received from the main credit's ordinators but also according to its own budget, elaborates the budget's law draft and the budgets drafts. These drafts/projects are transmitted to the Government.
- 15th of October – After the Government adoption of the annual budget law draft and the budgets draft, those documents will be transmitted to the Parliament for adoption.
- 31st of December – the Parliament adopt the Budget draft/project.
- 1st of January (next year) – Initiation of the budget approved by the Parliament.

The institutional frame for the coordination, implementation and administration of the comunitary / public funds

In the following period, the co-financing from the structural fund and from the Cohesion Fund will become an important resource for the National Development Plan policies. The EC, since December 2005 has decided that the structural and cohesion fund's allocation for Romania, should reach the 3.78% of the national GDP.

These funds solve the co-financing necessities of the local authorities and private organizations. For this aspect, a major goal of the Governmental macro economical policies is to rise the absorption capacity of the comunitary funds. We mention that institutional framework of the comunitary funds administration has been created, once the Government Decision no. 497/2004has been adopted,

and the Ministry of Public Finance has been designated as a coordinating national authority in order to schedule and implement the structural and cohesion funds.

Another major step in the optimisation of the comunitary funds administration is the foundation, in 2005 of the Certification and Payment Authority, under the command of the Ministry of Public Finance, which is in charge with the certification of the expenditures realised during various projects, and with the delivery of the fund demands to the European Commission. This authority detain as the global budgetary position the structural and cohesion funds and the own national contribution.

The budgetary policies will also facilitate the access to the structural funds and to the Cohesion Fund, through the allocation of important resources from the budget. The Government also takes into account the supplementary actions in order to maximise the absorption capacity of the resources, from the structural funds and from the Cohesion Fund, especially through the development of the absorption capacity of the public administration and also through the efficiency of those resources, regarding:

- specialised structures setting up, inside of the competent organisations, in charge with the comunitary funds allocation;
- employment of a sufficient number of personnel (staff);
- training of the personnel involved in the comunitary funds allocation;
- definition and implementation of the specific procedures, in accordance with the comunitary rules and principles.

Improvement of the mid-term budget planning

In 2006, the Romanian Government has initiated a reform process through the introduction of the strategic planning system at the central public administration level. This system will be implemented in two stages: elaboration of the management component of the strategic plans – during the first stage and the budgetary programming component – in the second phase. The goals of the strategic planning system are represented by the development of the governmental action, efficient management of the public policies, the development of the connexion between the public policies planning and the budget drawn up, but also the development of the coherence and efficiency in public funds spending.

Between the priorities aimed by this strategic planning system, we mention:

a) development of the elaboration and substantiation of the sectorial policies, through the development of the procedures, methodologies, and standards system development in the field of public policies;

b) institutional efficiency and rationalization;

c) improvement of the sectorial policies coordination with the governmental program, with PND or other national strategies self-comprehensive (for example the Lisbon Strategy) and correlation of the strategies with the existent resources in the consolidated budget;

d) improvement of the correlation of the sectorial policies/programs with the budgetary programming through the improvement of the mid-term budgetary planning system;

e) focus on the public funds utilization, in the budgetary planning process, through the improvement of the programs based budget system: defining the objectives SMART manner, defining the results/outputs/effects that will be obtained, systems and procedures of creation and collection of the monitoring indicators.

In 2007, The General Secretariat of the Government collaborates with the Ministry of the Public Finance in order to detail the instructions and the methodology of the 2008 budget elaboration and to offer assistance to the ministries, in order to elaborate the Methodology for Strategic Planning, Program based Budgetary Component and also the Methodology regarding the establishment of the performance indicators for the budgetary programs.

Fiscal Administration Reform

The Government has begin the reform process of the incomes administration in order to develop the efficiency of collection, reduction of the voluntary conformation task, and improvement of the services for the tax payers, promoting the integrity and transparency also.

The major problem for the collection and administration of the taxes is the lack of a functional IT system and also the slaw exchange of information regarding the declarations, payments and forced execution. Moreover, an important part of the VAT deduction is submitted to a preventive control and the control for selection is dominated by the works re-directed by other institutions (General Attorney, for example).

The main actions to be taken in the future period are regarding:

- additional development of the IT system, in order to allow a crossed verification/check, on time, of the payment declarations, self-acting delivery of the payment notifications and beginning of the forced execution process;
- delegation of the control responsibilities from the centre to the regional directions and development of an national control strategy.

In such manner is also included the institution of an analysing and identification system based on risk, in the domain of the tax payer's control, in order to save resources and growing the efficiency of forced execution process.

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FINANCIAL CONTROL – CONCEPT AND FUNCTIONS

CONTROLUL FINANCIAR – CONCEPT ŞI FUNCȚII

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Abstract. *The paper provides in-depth review of the concept of control and focuses on the definition, criteria for classification, specific forms, the various functions and the main goal of control. Control is linked with the key aspects of the modern management of organisations. The author emphasises that control is vital in ensuring the legality, efficiency, economy and reality of the documents issued and the transactions carried out by public bodies.*

Rezumat. *Obiectul controlului financiar îl formează actele şi operaţiunile emise sau înfăptuite de agenţii economici, instituţiile publice precum şi de alţi participanţi la viaţa economico-financiară a statului. În timpul controlului echipele de control trebuie să urmărească dacă actele şi operaţiunile care fac obiectul examinării îndeplinesc condiţiile de legalitate, operativitate, eficienţă, economicitate şi realitate. Având în vedre interesul practic major al societăţii cu privire la modul de administrare a banului public şi patrimoniului public şi privat al statului considerăm că actele şi operaţiunile materiale supuse examinării de către echipa de control vor trebui să îndeplinească cumulative aceste condiţii.*

KEY WORDS*: control, management, objectives of control, functions of control.*

Control has evolved and continues to evolve, as novel types of control emerge, due to the environment where it operates, which is, in its turn, constantly on the move, as a result of the advance of economic relations and the permanent evolution of market economy.

Reviewing the concept of control, one finds that it is a duty of the management, a function of leadership, a means of knowing reality and of correcting errors.

RESULTS AND DISCUSSIONS

The notion of control derives from the latin expression "contra rolus" which refers to the examination of the original act against a copy given for this purpose to a specialist.

In specialised literature there exist other definitions as well:

- in the Francophone view, "control is an verification, a careful inspection of the correctness of a document." (*Le petit Larousse. Dictionaire enciclopedique*, Larousse, Paris, 1975.

- in the Anglo-Saxon view, "control is the action of supervising someone, something, a careful examination or the ability to lead, a tool used to regulate a mechanism" (*The New Merriam. Webster Dictionary*, Merriam – Webster Inc. Publishers, Springfield, Massachusetts, 1989.

The sense that is most commonly associated with control is that of "examination", which is frequently associated with knowledge and enables the management to coordinate the activities within the organisation in a more economic and efficient manner.

Bertrand Fain şi Victor Faure, in their work "La révision comptable" emphasise that "internal control consists in the rational organisation of accounting and the accounting service, aimed at preventing or at least finding, without delay, errors and frauds. " (Fain, Bertrand, Faure, Victor, *Revizia contabilă*, Bucharest, 1948, apud. Marcel Ghiță (et col.), *Introducere în teoria şi practica auditului intern*, Universitas XXI, Iaşi, 2004, p. 29).

Bearing in mind the notion of control and considering the evolving context of the economic environment to which it belongs, financial control can be defined as the relationship between certain situations under consideration and legal provisions at a given moment.

In view of the above, financial control is, by virtue of its results, one of the economic methods which provides the management with the most information for three interested parties, namely:

- the state and its economic policies;
- the entity itself;
- the partners, as it enhances mutual trust in conducting transactions.

The main criteria for classifying the control activity:

- the field where it is conducted;
- the content of the control;
- the objectives of the control;
- the scope of the control.

There are many types of control in the economic field, namely financial control, customs control, banking control, product quality control, environmental control, work safety control, etc.

Financial control, even though it may take many forms, is animated by a single goal, common to all these forms, namely to examine the state of an activity at a given time in relation to the given objectives.

The activity is classified mainly according to the following criteria:

a) in terms of the moment of control as compared with the moment of the transaction;
b) in terms of the structure conducting the control;
c) in terms of the duration and intensity of the control;
d) in terms of the extent of the transactions.

In terms of the the moment of control as compared with the moment of the transaction, financial control is classified into:

- preventive financial control;
- ongoing operative financial control;
- subsequent financial control.

In terms of the structure conducting the control, it can be:

- financial control organised and exercised by state institutions;
- financial control organised and exercised by the entities own structures, as financial self-control.

In terms of the duration and intensity of the control, it is divided into:

- continuous control;
- cyclic control.

In terms of the extent of transactions, control can be classified as:

- total control;
- control by samples.

Objectives of financial control

„The objective of financial control, as a component of economic control, is to provide the state with information on the way in which public companies manage fixed assets and financial resources, the manner of creation and spending of public funds, the assurance of financial balance, the achievement of economic and financial efficiency, the development of the national economy and the realisation of the welfare programme." (Dan Drosu Şaguna, *Tratat de Drept financiar şi fiscal*, All Beck, Bucharest, 2001, p. 330).

The multitude of activities involved in the dynamics of the society's development directly impact on the content of control, whose object and scope is the extent of the implementation and achievement of the preestablished objectives, with the goal of correcting the deviations from legality and ensuring that similar deviations will not occur again.

The specific objectives of control, which are vital for the progress of society, include the appropriate and efficient use of public and private funds, the development of rigorous management, the legal conduct of administrative activities and the expeditious disclosure of information to authorities and the citizens by means of reports.

Achieving the objectives of control is in fact the guarantee of the adequate use of public funds; this cannot be achieved without high-level control systems.

The forms of control

Control systems can take the following forms:

- external audit;
- internal audit;
- management control.

The management process can be defined in relation to time: before action, it provides orientation; during action, it adjust; following action, it evaluates performance to draw useful lessons.

These three phases can be designated as: definition of objectives,

coordination, postevaluation.

Postevaluation, which is achieved by the control, signifies the assessment of the outputs. Its purpose is to provide a lesson so that the errors found may not be repeated and that strong points can develop further. It is aimed also at assessing the actions and decisions that were taken, especially the merits of those in charge, if they have sufficient scope for action.

Control, as command, is the *ensemble of mechanisms that direct actions*. Most experts agree that this type of control, as is understood in management, is related to a persons attempts to direct or influence the actions of other persons.

Control is an engineering of organisational influence; it organises the system of management that governs the technical function of each entity or organisation.

One can now refer to several types of control:

Execution control

It includes processes and systems designed to assure those responsible that their repetitive actions, issuing from their authority, will be, are and have been applied according to the proposed objectives, thus exempting the responsibles from having to coordinate the actions directly.

Strategic control

It consists of processes and systems that enable the management to decide on and adjust strategies. Strategic control gains major significance where strategy is not limited to a single decision and generates lasting dominant positions, called continual adjustments. Nowadays there is a trend that causes certain specialists to talk about agile entities.

Management control

This type of control must guarantee that current decisions are coherent with the strategy. The purpose of the management control is not to define strategy but to allow its implementation in time and space. Objectives, in this respect, aim:

- to guarantee that managers orient their actions adhere to their missions as stipulated in the strategy;
- to guarantee that in this manner the execution control organises the critical tasks for the adequate implementation of the strategy.

The management control consists of processes and systems that enable the management to be assured that the current strategic options and actions will be, are and have been coherent, especially thanks to the execution control.

The leadership of a manager is based on information that allow the evalution of a programme according to its objectives. The common tools are the *budgetary control*, which enables the monitoring of the compliance with the budget, generally on a monthtly bases; and the *control boards*, which contain data, not exclusively related to accounting but also to financial and technical aspects, that are updated at various moments. Such information does not only document the situation and monitor productive or capable indicators, but also signals future likely events, meaning that it is possible to alter them before

examination. When directed to the hierarchy, such financial and non-financial data constitute the "reporting".

One may consider that the traditional approach of the management control conceals the technical system in order to bring to the forefront the management based on the financial data of budgetary control. The modern pattern confers on the management control the duty of expanding the vision by analysing the performance of the technical processes assigned to managers.

Functions of control

In terms of its organisation and mode of exercise, and the role and objectives it pursues, financial control achieves several functions: the evaluation function, the preventive function, the documentation function, the recovery function, and the pedagogical function.

The evaluation function

It focuses on actions and operations of assessment of the situation at a given moment, of the results obtained at the end of a period, of the progress of the activity under circumstances of normality, legality and efficiency. By this function of control, one can assess against actuality and legality conditions, those difficulties, deviations and orientations that give rise to the actions that produce negative actions.

It is a function that allows a comprehensive, real, accurate and concrete assessment of the controlled activity. In addition to the assessment, this function also involves suggestions, proposals and the establishment and implementation of measures aimed at improving the results of the controlled activity. by supplementing the evaluation of the results with steps that facilitate improvement, control actively contributes to eliminating the causes that have generated deviations and to improving the economic and social activity.

It can then be stated that the evaluation function includes the cycle of the management process and provides an answer to the question "What have been the outcomes of the work done?"

A second function is the *preventive* one, which consists of a series of steps taken by the control bodies with a view to avoiding and eliminating frauds before they can cause negative effects, by identifying and removing the causes that generate or facilitate them.

The exercise of this function contributes to the prevention of the tendencies that require corrective measures. This function is derived from the fact that control is meant to focus attention on key objectives, ranked according to national priorities, which should prevent and eliminate the waste of human effort and material means and ensure economic efficiency.

CONCLUSIONS

Through these actions, control is designed to prevent the operations that are unlawful prior to the company's initiation of the actions. This action ensures the legality of actions and operations and also focuses on their advisability,

necessity and economy.

The documentation function facilitates the quantitative and qualitative knowledge of the objectives of social and economic development. Control is an integral part of the management process, as it provides data and information in support of economic and financial decisions.

The recovery function presents the major importance of the financial control and consists in the action to identify and recover the damage and take appropriate action against the offenders.

Such enforcement actions are taken either directly by the control bodies or at their proposal by an oversight body or by the judiciary.

The faults identified in the controlled body or the natural persons must be stated clearly by the control bodies, in strict compliance with the legislation in force at the moment the deviations occurred.

The pedagogical function has a formative character, designed to generalise positive experience. Through this function, control helps to improve the level of qualification for adequate resolution of duties. It is necessary that the controller have solid professional training and enjoy credibility.

These functions are accepted as being real, practical and operational. In achieving these functions, control takes on the features specific to them.

The *focus* of financial control is the documents issued and operations executed by economic entities, public institutions, and other organisations involved in the state's economic and financial activity. During control, the control teams must verify whether the documents and operations subject to the examinations adhere to the requirements of *legality, operativity, efficiency, economy* and *reality.* Given the society's practical interest in the management of public funds and the state's public and private assets, it is necessary that the documents and operations subject to the examination of the controllers must fulfil all the requirements mentioned above.

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EXTERNAL PUBLIC FINANCIAL CONTROL IN PUBLIC INSTITUTIONS

AUDITUL PUBLIC EXTERN ÎN INSTITUȚIILE PUBLICE

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Abstract. *The article presents an analysis of the chief characteristics of the external public financial control in public institutions in Romania. It refers to the framework legislation and the evolving and greater role and competences of the Romanian Court of Auditors, in the context of Romania's adoption of EU acquis in the field of external public financial control. The paper provides an extensive account of the functions and scope of external public financial control in overseeing the formation, use and management of state and EU funds by public institutions and bodies.*

KEY WORDS*: external public audit, Romanian Court of Auditors, Parliament, balance of accounts, EU funds.*

Rezumat. *Lucrarea îşi propune să evidenţieze caracteristicile funcţionale ale auditului public extern. În baza constatărilor rezultate din controlul efectuat, Curtea de Conturi are dreptul să decidă: suspendarea aplicării măsurilor care contravin reglementarilor legale din domeniul financiar, contabil şi fiscal; blocarea fondurilor bugetare sau speciale, atunci când se constată utilizarea nelegală sau ineficienţa acestora; înlăturarea neregulilor constatate în activitatea financiar-contabilă controlată, corectarea bilanţurilor contabile, a conturilor de profit şi pierderi şi a conturilor de execuţie.*

INTRODUCTION

External public audit is the chief type of control of the manner in which public funds are created and utilised. It is the remit of the Court of Auditors and focuses on the public entities, institutions that rely on public funding.

Fundamental principles of the external public audit:

- it is a parliamentary (legislative) control;
- it is an ex post control;
- it is a final control (final instance control);it is a control aimed at certifying accounts (discharge); The Court of Accounts is „the only competent body that, following the examination of accounts, can decide on discharges." (Law 94/1992, republished in the Official Gazette 116/2000, article 29, line 1) and „any decision by the executive authority on the discharge is only provisional" (Law 94/1992, republished in the Official Gazette 116/2000, article 29, line 2).
- it is an external control on the public entity;
- it is continuous;
- it is permanent;

- it is independent;
- it is selective;
- it is mainly programmed (planned).

RESULTS AND DISCUSSIONS

Missions and objectives of the external public audit:

- the formation, management and utilisation of the financial resources of the state and of the public sector;
- the management of the state's public and private assets and those of the state's territorial units;
- adherence to the law in managing the fixed and monetary assets;
- the sound financial management in terms of economy, efficiency and effectiveness.

The external public audit bodies:

- the Romanian Court of Auditors is the supreme financial control institution (article 1, line 1 of Law 94/1992, republished in the Official Gazette 116/2000, modified and supplemented by Law 77/2003), and consists of:
  - the subsequent financial control section;
  - divisions;
  - directions, services, bureaus, the jurisdictional section (trial court and court of appeals), jurisdictional college (trial court), the district and Bucharest chambers of accounts;
  - the subsequent financial control direction;
  - the jurisdictional college
- alongside the Romanian Court of Auditors there operate:
  - the general financial attorney;
  - the financial attorneys.

The functional characteristics of the external public audit:

- the financial controllers appointed to examine accounts prepare reports that present their findings and conclusions and make proposals related to the measures to be taken in connection with the situation of the accounts;
- at the request of the Senate or the Chamber of Deputies, the financial controllers examine state budget bill and those bills in the field of finance or public accounting whose application may result in a reduction of revenues or an increase over the expenditure approved by the budget law;
- on the basis of the findings of the control, the Court of Auditors is entitled to demand:
  - the suspension of the implementation of measures that do not comply with regulations in force in the financial, accounting and fiscal field;

- the blocking of the budgetary or special funds, when they are found to be used unlawfully or inefficiently;
- the elimination of the irregularities found in the examined financial and accounting activity, the correction of accounting balances, of the profit and loss accounts and of the execution accounts.

The characteristics of the position and scope of the external public audit:

- the formation and utilisation of the resources of the state budget, of the state social security budget and of the state's territorial units' budgets and also the flow of funds between these budgets;
- the formation, use and management of special funds and treasury funds;
- the formation and management of the public debts and the situation of the governmental guarantees for internal and external credits;
- the use of budgetary allocations for investments, of subsidies and transfers and of other types of financial assistance from the state or the state's territorial units;
- the formation, management and use of public funds by the autonomous administrative authorities and by the public institutions established by law, as well as by the state's autonomous social security bodies;
- the situation, progress and management of the public and private assets of the state and of the state's territorial units by the public institutions, utilities, national companies and corporations, and also the lease or rental of goods that are part of the public property;
- the formation, utilisation and management of financial resources allotted for environmental protection, improving the standard of living and labour;
- the use of the funds allocated to Romania by the European Union through the SAPARD Programme and of the accompanying cofinancing;
- the use of the funds resulting from the financial assistance given to Romania by the European Union and other international funding sources;
- other fields where the Court is competent according to the law;
- the institutional entities that are subject to external public audit are:
  - the state and the state's territorial units, as public legal persons, and their public, autonomous or non-autonomous services and institutions;
  - the National Bank of Romania;
  - the utility companies;
  - the companies where the state, the state's territorial units, the public institutions or the utility companies own, alone or in common, the whole or more than half of the shares;

- the autonomous social security bodies or bodies of other types that manage goods, values or trusts, part of a binding legal regime, when the law or their statutes stipulates it;
- the legal persons that:
  - ✓ benefit from governmental guarantees for credits, from subsidies and other types of financial assistance from the state, the state's territorial or the public institutions;
  - ✓ manage, on the basis of a lease or rental contract, goods belonging to the public or private domain of the state or of the state's territorial units;
  - ✓ do not meet their financial obligations to the state, the state's territorial units or the public institutions, the appropriate examinations being conducted in conjunction with representatives of the institutions competent in the field subject to the control;
  - ✓ are financial investment companies, associations and foundations that use public funds, the examinations being aimed at the legality of the use of such funds;

- the external public audit examines the situation of:
  - the annual general balance of accounts of the state budget;
  - the annual balance of accounts of the state social security budget;
  - the annual balance of accounts of local budgets;
  - the annual balance of accounts of special fund budgets;
  - the accounts of treasury funds;
  - the state's annual balance of payments and of the governmental guarantees for internal and external credits given to other legal persons;
  - the balance of accounts of public management of money, other values and material goods;
  - the balance of payments of public budgets;
  - the balance of subsidies and budgetary allocations for investments granted to beneficiaries other than public institutions;
  - the financial statements and balances of the budget funds providers and of the managers of funds that are governed by the public budget regime;
  - the balance of public debt operations.

Characteristics of responsibility (reporting) in the external public audit:

- the reports on the balance of accounts are examined by committees made up as follows:
  - three accounts counsellors from the subsequent financial control section, for the chief public funds providers whose budgets are approved by law;
  - the director of the subsequent financial control section, the deputy

director or the head of service and a financial controller, different from the one who conducted the control, for the public funds provider;
    - the director, the deputy director of the subsequent financial control direction of the Chamber of Accounts of Bucharest and a head of service;
- if, on examining the report, the supporting records and documents, the committee finds certain acts that are offences according to the law it can notify the competent prosecuting bodies and order the suspension of the examination;
- the resolution which decided on either the notification of civil trial courts or the discharge is communicated to the interested parties and the financial attorney;
- the notification of civil trial courts and the decision to end the control are communicated to the interested parties;
- in up to 6 months from receiving the reports of the balance of accounts from the bodies that are authorised to prepare and submit them to it, the Court of Auditors draws up the Annual public report, which it passes on to Parliament;
- the annual reports in connection with the local public funds are passed on by the district chambers of auditors to the deliberative public authorities of the respective territorial units;
- the Court of Auditors can submit to Parliament or, through the district chambers of auditors, to the deliberative public authorities of the respective territorial units, certain reports on the within the scope of its competence, whenever it considers necessary;
- the financial attorney notifies the competent prosecuting bodies about the offences found following the examination of the supporting documents;
- the Court of Auditors submits to Parliament and, through the district chambers of auditors, to the local city councils, reports on the fields within the scope of its competence.

CONCLUSIONS

The characteristics of accountability in the external public audit:

- the discharge does not provide the basis for legal exemption of those who have been discharged;
- the Court of Auditors is accountable before Parliament;
- the controls by the Court of Auditors are initiated ex officio and can only be ended by Parliament, only in cases when the legal competences have been exceeded;
- the decisions by the Chamber of Deputies or the Senate requiring that the Chamber of Auditors conduct controls within the scope of its competence are obligatory. No other public authority can make binding

requests on the Court.

The characteristics of the sustenability of the external public audit:

- the Court of Auditors prepares its own budget, provided for separately in the state budget;
- highly qualified specialists in fields that are within the scope of the Court's competence can take part as invited guests in the plenary sessions of the Court of Auditors and of the board;
- the Court is the supreme public financial control type (final instance), i. e. the parliamentary type (or legislative type) of public financial.

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THE REVALUATION OPTIMIZING OF VINE PRODUCTS ON ASSORTMENTS AT COTNARI SOCIETY IASI

OPTIMIZAREA VALORIFICĂRII PRODUSELOR VINICOLE PE SORTIMENTE LA S.C. COTNARI S.A. IAŞI

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The case study started from a model used by a prestigious winemaking company, located in Iasi district, SC Cotnari SA, and it aimed at shaping some optimum capitalization solutions.

In order to establish and identify the unknown data for such an economic-mathematical model, we have started from the fact that the turnover and retail expenses differ according to assortments and delivery periods. The economic coefficients that have been used to elaborate the linear programming model resided in the expense specifications, normative and standards, while some indicators came from calculation themselves.

The objective functions were those of maximising the total income obtained from the capitalization of output and maximisation of gross profit.

As for the variant of maximising the total income, the results prove that the optimum solution is that of keeping the maximum level of expenses and obtaining a higher total income compared with the standard variant.

In practice, this alteration may have its roots in the increase of the buying demand of a certain wine assortment that exists on the market, and the retail piece may vary, although within certain limits, in order not to discourage the demand of that certain assortment and the orientation of customers towards other assortments or producers.

The analysis of the results obtained by the second variant, namely the maximising of the gross profit variant, notice has been made that the level of the used resources equals the one of the first variants, still with a special stress on the total income.

A more efficient capitalization of wine products can be obtained also by means of directing all efforts towards magnetising customers' preferences towards their own wine production, thus leading to an increase of the market segment.

Table 1

The main economic indicators per variants and assortments (mil. lei)

Variant	Assortment	Total income	Total expense	Total gross profit	Net profit
V0	Selected	8316	7458	858	675
	Grasă	133055	119327	13728	10798
	Fetească	79500	71298	8202	6452
	Tămăioasă	67526	60559	6967	5480
	Frâncuşă	33264	29832	3432	2699
	Blanc	10977	9844	1133	891
	Total	**332638**	**298318**	**34320**	**26995**
V1	Selected	8316	7458	858	675
	Grasă	133140	119327	13813	10870
	Fetească	79557	71298	8259	6501
	Tămăioasă	67526	60559	6967	5480
	Frâncuşă	33264	29832	3432	2699
	Blanc	10977	9844	1133	891
	Total	**332780**	**298318**	**34462**	**27116**
V2	Selected	8438	7458	980	777
	Grasă	135008	119327	15681	12438
	Fetească	80667	71298	9369	7432
	Tămăioasă	68516	60559	7957	6312
	Frâncuşă	33752	29832	3920	3109
	Blanc	11138	9844	1294	1026
	Total	**337518**	**298318**	**39201**	**31094**

The selected arsenal would consist of promoting an aggressive marketing by means of intensifying the promotion actions, and having the customer's preferences mirrored by the label of the product.

Due to the peculiar conditions provided by the winemaking industry, the turnover and retail expenses organize themselves on a monthly-basis, in order to be able to identify seasonality of different wine assortments.

Out of the annually average retail expenses, variable expenses stand for 97.7%, and the rest of 2.3% represent fix expenses.

Taking into account the important quota the variable expenses represent out of the total retail expenses and the pursuit of the main goal, for an efficient capitalization of wine, a redistribution of the components of retail expenses with a

view to enhancing the weight of the expenses for labels and advertising could play an important part in the process of accelerating the sales.

A month has been assigned for every wine assortment advertised by SC Cotnari SA, during whose period the turnover could rise thanks to new managerial strategies.

At the "Grasa de Cotnari" assortment, the 4 % growth of total retail expenses will trigger a 10% increase in turnover at the end of February, compared with the currently used variant.

A 5% increase in retail expenses at the "Tamaioasa" assortment will determine, according to the new strategy, a 10% growth in terms of turnover by the end of march.

April comes with a 10% increase in terms of turnover at the "Selected" assortment, by means of enhancing the retail expenses up to some 4% (the same for the "Blanc de Cotnari" assortment)

For the "Francusa" assortment, the sales may boost up to 20% if the retail expenses increase by 7 %.

Table 2

The evolution of turnover and retail expenses in concordance with the proposed variant at SC Cotnari SA Iasi taking into account the different assortments and months

Assortment	Total trimester I		Total trimester II		Total trimester III		Total trimester IV	
	Turnover	Retail expenses	Turnover	Retail expenses	Turnover	Retail expenses	Turnover	Retail expenses
Selected	1914020,0	**224448,9**	**1995588,4**	217222,9	2124625,0	207632,7	2265119,0	265958,6
Grasă	26456547,3	2916682,4	26674736,0	2823895,7	29040099,0	2699224,4	50712086,0	3457463,1
Fetească	13866117,0	1550650,2	14553481,0	1520559,2	**16798864,9**	**1478248,4**	34266124,0	1861710,9
Tămâioasă	12291889,0	1502592,2	12331198,0	1448151,6	13250794,0	1384217,6	29610479,0	1773058,0
Frâncuşă	5034106,0	553803,6	5222987,0	543056,7	5685152,0	519081,5	**17898773,5**	**676066,3**
Blanc	2722410,0	701484,7	**2770386,0**	**697877,6**	2655510,0	657503,4	2839659,0	84220,6

CONCLUSIONS

The proposed model may prove its validity if the level of consumed resources at the standard variant increases by 0.2%

The major implications are determined by the variation of weight of variable expenses within the general framework of total retail expenses, namely by 0.4 %, as proved by the next table, in the case of maintaining the same quotas regarding the tax profit..

The proposed method may contribute to increasing income by 0.8%, retail expenses by 0.4%, thus triggering a profit increase by 6.6%.

Table 3

The budget of the general activity of SC COTNARI between 1.01. - 31.12.2004

Nr. crt	Specification	Total Standard variant	Total Proposed variant	%
I	Total income, of which:	332638,0	335265,8	100,8
1	Exploitation income	330353,0	332980,0	100,8
2	Financial income	1593,0	1593,0	-
3	Extraordinary income	692,0	692,0	-
II	Total expenses, of which:	298318,0	298814,9	100,2
1	Exploitation expenses, of which:	298068,0	298564,9	100,3
	Retail expenses	30411,0	30522,6	100,4
2	Financial expenses	250,0	250,0	
III	Reserves	2183,0	2183,0	
IV	Tax	5142,0	5482,9	106,6
V	Net results	26995,0	30678,3	106,6

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AGRARIAN RELATIONS AND THEIR EVOLUTION AFTER THE UNION OF THE PRINCIPALITIES

RELAȚIILE AGRARE ŞI EVOLUȚIA LOR DUPĂ UNIREA PRINCIPATELOR

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Abstract. *The agrarian relations from the Principalities before 1864 were unfolding within the agrarian regime imposed by the Organic Regulation, which limited the right of use of the land by the peasants and reserved to the masters a third of the estate as full propriety which prepared their transformation into absolute landowners. After the Union of the Romanian principalities in 1859, the most important measure was the agrarian reform of 1864 of Alexandru Ioan Cuza. In this document he abolished the hayrack and any other form of forced connection between the peasant and landowner and stipulated that two thirds of agricultural lands to pass in the propriety of the peasants.*

Rezumat. *Relațiile agrare din Principate înainte de 1864 se desfăşurau în cadrul regimului agrar instituit prin Regulamentul organic, care a limitat dreptul de folosință a pământului de către țărani şi a rezervat stăpânilor o treime din moşie ca proprietate deplină, ceea ce pregătea transformarea acestora în proprietari absoluți.*
După Unirea Principatelor Române din anul 1859, cea mai importantă măsură a fost reforma agrară din 1864 a domnitorului Alexandru Ioan Cuza. Prin acest act se înlătura claca şi orice altă formă de legătură silită dintre țăran şi proprietar şi se prevedea trecerea a două treimi din terenurile cultivabile în proprietatea țăranilor.

MATERIAL AND METHOD

In order to make this study, we started from the ground that the existent agrarian relations in the economy of a state have a great influence both on the economic results in agriculture and on the other branches of the economy with which agriculture has direct relations. As a consequence, in order to answer the requests of this study, we have gathered all the necessary data from different statistic official documents (yearbooks, census etc) as well as from the economical literature. The data refers to the social-economical status of agriculture, the relations among landowners and peasants, agrarian crises both before and after each of the seven agrarian reforms which took place after the Union of the Principalities, between 1864 and 1990.

In order to process and interpret theses data we have used the methods of techno-economical analysis among which the comparison method, statistic groups, division and monographic methods. The processed data were interpreted using also the inductive and deductive methods.

The results obtained are presented in the next chapter.

RESULTS AND DISCUSSIONS

The Rural Law of 1864 was the beginning of a new stage of economical and social development, with direct implications on land systematization and organization. Thus, comparing the statistics from the summer of 1864 with the table of appropriation, we can see, on the whole country, differences from one category to another and that many bondsmen were totally excluded from the appropriation by the landowners.

An example in point is in Botosani county, where from 461 frontmost peasants with 4 oxen and who had the right of appropriation, there were appropriated only 117, and in Vaslui county, from 636 frontmost peasants with 4 oxen and 3907 poor peasants who had rights, there were appropriated only 126 frontmost peasants with 4 oxen and 3009 poor peasants.

A characteristic of agrarian economy of the Principalities was the extension, especially in the Romanian Country of the institution of leaseholders. Lease holding appeared as a social-economical phenomenon in the last part of the 17th Century and disseminated rapidly after 1829, when landowners abandoned their domains as they didn't have capital, agricultural inventory and intrepidity. Thus, in the Old Kingdom, from the estates of 50-200 ha, there were leased only 20,8% of the arable lands to 19,2 tenants among the number of landowners, and from the estates of more than 250 ha there were leased only 29,3% of the arable lands to 27,6 tenants among the number of landowners.

A characteristic of agriculture is the fact that landowners, and especially the tenants didn't incline to make investments, as they had many obligations which came from the condition of bondsman.

As a consequence, leasing was a source of labour in order to make valuable large areas of agricultural land that existed in Romania which were taken from dereliction from the growing necessities of the internal and external market and a modality of parallel development of a small agriculture oriented not only on subsistence but also towards commerce.

The Romanian agrarian structure before the agrarian reform of 1918 can be considered highly disproportioned, presenting two polarizations characteristic to the agricultural exploitations of feudal type. The agriculture of Great Romania in 1918 was highly marked by the general economical underdevelopment of the country, characterized by excessive bipolarization of agricultural structure, with a system of unilateral extensive production dominated more on neo-feudal relations that capitalist ones.

The agrarian reform of 1918-1921 was tackled and applied in such a way that the great landowners propriety was maintained, most of the peasants without a land or with very little land were not appropriated, and those who were, were imposed such conditions that in a month or less they lost all lands. Achieving the agrarian reform of 1918-1921 was an important moment on the way of developing the forces and relations of production in agriculture.

In Romanian agriculture in the period between the two world wars there continued to exist (as a consequence of the way in which the 1918-1921 agrarian reform was involved) remains of feudal relations, which were a great drag on the way of productivity development.

The development of capitalism in Romania's agriculture by passing the great landowners from semi-feudal farms to the capitalist one, by slow transformation and with a high variety of forms from one to the other, all this opened the way to intensifying the agriculture, a phenomenon characteristic to all the countries with capitalist agriculture. But, at the same time, as it adapts more and more to the requests of the external market, it becomes one-sided.

The leasing relations had a negative influence on the development of the whole agriculture because they deepened the exploitation of the working peasants by the landowners and tenants and undermined the fertility of the soil. But the harmful action of leasing relations was amplified by the interest fight among the great landowner who lease and the capitalist enterprising tenant, determining the appearance of an agrarian crisis.

One of the main manifestations of the agrarian crisis was just the great drop of the prices at agricultural products, the increment of the difference between the industrial and agricultural prices which got to the depreciation of peasantry made products, to economic ruin of the working peasantry and to its captivation by kulaks and usurers. So, if for example the cost of a hoe was equivalent of 6,5 kg wheat in 1913, it got to 10 kg in 1939, and the coat of a scythe that was equivalent with 5,3 kg wheat in 1913, it got to 24,4 kg wheat in 1939.

The agrarian crisis meant for the poor and middle peasantry a new growth of debts and a worsening of their economic situation. Making the agrarian reform in 1918-1921 by the ransom of lands meant from the very beginning a captivation of poor and middle peasants to banks, to kulaks and usurers in order to be able to pay on time the installments for appropriation.

In the period between the two world wars the social-economical and political situations in which the Romanian agriculture develops were against the practice of an intensive multilateral developed agriculture, as a consequence of excessive land fragmentation. So, agricultural exploitations with a surface of up to 5 ha represented 75% of the total of agricultural exploitations and 28,02% of the whole area of the country; at the same time the exploitations of over 100ha represented 0,38% of the total exploitations, but held 4,53% of the whole surface of the country.

Consequently, within the structure of land propriety, Romanian agriculture was characterized by extensiveness and unilateralism, all this being increased by the place on which the Romanian agriculture was within the international capitalist division of labour.

The Great Union, the creation of the national unitary state, beginning with 1918 there was opened the favorable frame for the development of cooperative movement.

CONCLUSIONS

So, having a view on the most important moments regarding the evolution of agriculture after the Union of Principalities, we can state that, from legislative and social-economical point of view, the fundaments of European and Romanian agriculture are based in the last three decades of the 19th century and the beginning 2 decades of the 20th century, through the agrarian reforms of 1864 and 1918.

The Great Union, the creation of the national unitary state, beginning with 1918 there was opened the favorable frame for the development of cooperative movement.

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THE APPERANCE OF COOPERATIVE MOVEMENT IN EUROPE AND ITS INSIGHT IN ROMANIA

APARIȚIA FENOMENULUI COOPERATIST ÎN EUROPA ŞI PATRUNDEREA LUI ÎN ROMÂNIA

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Abstract. *Cooperation in agriculture represents a necessity dictated by the characteristics of activity from this field of production, by its position within the market economy. Cooperative movement has gained a large acknowledgement in the agriculture of developing countries, being in a continuous growth and multiplying its forms of manifestation as a reaction to adaptation to the evolution and economic flux features which agriculture develops together with the grows of productivity in agriculture.*

Rezumat. *Cooperația în agricultură reprezintă o necesitate dictată de caracteristicile activității din această ramură a producției materiale, de poziția ei în cadrul economiei de piață. Mişcarea cooperatistă a căpătat o largă recunoaştere în agricultura țărilor dezvoltate crescând continuu în amploare şi multiplicându-şi formele de manifestare ca o reacție de adaptare la evoluția şi trăsăturile fluxurilor economice pe care le dezvoltă agricultura cu ramurile din amonte şi aval de ea, alături de creşterea productivității în agricultură.*

MATERIAL AND METHOD

Cooperative movement and its forms of manifestation have been topics for discussions in the European countries even before their appearance. This study tries to make a short presentation of their appearance in Europe and especially in Romania. For this purpose, we have looked in statistic documents and specialized literature for statistic data referring to the appearance and content of different forms and methods of cooperation in agriculture, the causes and factors that determined their appearance, as well as their area of spreading.

In order to process and interpret all these data we have used the methods of techno-economical analysis, among which: the method of comparison, statistic grouping, division and monograph method. Processed data have been interpreted using the inductive method, together with the deductive method.

The results obtained are presented in the next chapter.

RESULTS AND DISCUSSIONS

These aspects mark the passing from subsistence agriculture to exchange agriculture, where they produce in order to sell and they sell in order to produce, which equals the intensification of economic fluxes and the appearance of new characteristics.

In the countries with a developed agriculture, cooperation has appeared as a way of diminishing all these consequences and in order to have the exploitations as private property and to maintain a healthy climate of competition.

Cooperation can be achieved within some simple structures, which facilitate and administrate more a system of relations, usually of contractual nature or can have as holder an organizational structure which has a capital due to the contribution of adhesive people, in this case being called "cooperative association".

As a consequence, cooperation requires the appearance of some relations between agricultural producers which can determine the growth of the objective of the propriety under conditions of a minimum erosion of the right of individual propriety.

The most important aspect which has to be mentioned is represented by the contribution of cooperatives to the concentration of offer of agricultural products and the regularization of their prices.

A direct domain of application of some forms of cooperation and association is turning to good account the field. An incomplete and irrational utilization of land has negative consequences on the level of production obtained and, at the same time, of the offer of products and on the way of responding to the consumers' request.

Among the great supporters of small peasant farms are: V. Madgearu, R.C. Stere, N. Cornățeanu and others. V. Madgearu stated that "the evolution of agriculture follows its own way", while R.C. Stere was saying that "facts showed that the laws for the industry were not valid for agriculture".

Cooperation and association can generate many advantages for those who have chosen such modalities of turning to good account the resources of production or running other activities which can be connected to agricultural exploitations.

The modern cooperative phenomenon was born from the need of mutual-aid of pauper classes of the society and had unique and famous initiatives such as the Pioneers of Rochdale, Schulze-Delitzsch, Raiffeisen. All these have amplified, crystallized and diversified in many countries and even on the level of the European continent. Cooperation and integration is achieved in many different types of agricultural stations, between the agriculture and the connected industries, as well as the private stations or associated farms or farmers.

From what we have already mentioned, there are three main systems of organizational practice of cooperations: the Rochdale system, the Schulze-Delitzsch system and Raiffeisen system.

Among the derivate systems which appeared in this period we have often encountered we can name: the Danish system, the Hass system, the Luzzatti system and Wollemborg system.

The Rochdale system was set up in 1857, as consequence of many meetings of some weavers from the town of Rochdale, who reached the conclusion to make an association in order to improve their moral and material status. The association took its legal form by joining as a mutual-aid association, as the "Rochdale Society of Echitable Pionners".

The Schulze-Delitzsch system was invented by H. Schulze-Delitzsch who, in order to put to practice his ideal and influenced by the ideas of economical and political liberalism of Fr. Bastiat and J. H. Carey, started from the ground that the report between labour an d capital is only a economical problem and, as a consequence, the solutions

can be only economical and they can be solved only under the conditions of non-intervention on the behalf of the state.

The F. W. Raiffeisen system that was stipulated by F. W. Raiffeisen groups the associations on regions, in unions of associations. The associations founded by F. W. Raiffeisen wanted, according to the conception of their founder, to remake the unity of the German state, affected by the liberal ideas and the market economy which make themselves known at the middle of 19th century.

If we have in view other derivate systems, we can name:

The Danish system. In Denmark, cooperation grew up, like in all countries, under the pressure of specific economical conditions of that country. As norms for association we can notice in the Danish cooperation: the idea of mutual aid of those who join; the solidary trust which can be limited or unlimited according to the cooperation; they don't have their own capital; the reach of the cooperations is limited most of the time to one village; the applicability of the principle "open doors"; entrance is free; the associates take from the benefice only the part that corresponds to the quantum of operations they did with that cooperation; they have the reserve fond, but with small amounts; the associates are equal as regards the administration of the cooperation.

The Hass system comes from Wilhelm Hass who lived in Germany among 1839-1913. He borrowed his ideas from Raiffeisen and Schulze-Delitzsch. The first cooperative of this kind appeared in 1872. This system had the following norms: it is based on the idea of own help which is used in the action of strengthening of agriculture; it is against the cooperations with multiple uses.

The Luzzatti system. These cooperations have social capital; they collect a tax of joining which is relatively high; in Luzzati's conception, the reserve fond could overcome the whole social capital charging itself from the joining taxes, shares from benefits which could go up to 20% and from the capital of associates who degrade from the quality of associate; responsibility is limited; it is not excluded the help from the state, and , finally, the cooperations from this system can make operations also with persons outside the association.

The Wollemborg system. The norms of this system were the following: small range of activity; small social capital; unlimited mutual responsibility; credit only on production; carrying out the functions is free; cooperation works in the rural system.

In Romania, the cooperative thinking has evolved approximately in the same way as the other European countries and we can see also the steps which can be considered the phases of the crystallization process of the cooperative doctrine.

Ideas of mutual aid appear in the Romanian culture in the first half of the 19th century, among the youth who did their studies in western Europe, as well as through the western literature, especially the French one. Among those who spread ideas of friendly societies in their writings and political facts, we can name: Teodor Diamant, Ion Eliade Radulescu, Ion Ghica, Ion Ionescu de la Brad, Cezar Boliac, Nicolae Balcescu, Petru S. Aurelian, Spiru Haret.

The appearance in our country of the first cooperatives of credit under the name of popular banks, imposes the need of creating laws in order to run those activities. This request was formulated on the parliamentary debates regarding the setting up of some institutions of agricultural credit.

Making the unitary national state created the favourable frame for a powerful development of cooperative movement.

In the period of land reform of 1864, the number of bondsmen was evaluated to be of 445.019, of whom 17,49% were frontrunner peasants (villagers with 4 oxen and a cow), 48,46% middle peasants (villagers with 2 oxen and one cow) and 33,60 poor peasants (villagers with at most one cow). According to the Land Law of 1864, 408,119 bondsmen were appropriated, 59.721 non-bondsmen were appropriated in the middle of the village and till 1878, 48.342 newly-married men.

According to the law of 1864 and the removal of Al.I.Cuza, there followed a period when there were issued many land laws (1881-1889), but the Law of 1864 appropriated a large number of families (516,2 thousand) and gave the greatest area of land (1994,6 thousand). Instead, the average area per family was the most reduced (3,86 ha in comparison with 5,12 ha in 1889), and on average of 4,08 ha indicates a rather large fragmentation of lands, an area that couldn't ensure a decent living for a family. Also, after the 1964 Reform, the need of money of the peasants determined a passing from natural economy to the money based one, which determined first a development of cooperation in the direction of rural credit and popular banks.

CONCLUSIONS

Cooperation in agriculture represents a necessity imposed by the characteristics of the activity from this branch of productivity, by its position within the market economy.

In Romania, the cooperative thinking evolved approximately in the same way as other European countries and we can notice the steps which can be the phases of the crystallization process of cooperative doctrine.

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APPLE MARKETING IN THE CONDITION OF THE SUCEAVA HILLS

VALORIFICAREA PRODUCȚIEI DE MERE DIN PODIȘUL SUCEVEI

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DARDR Iasi

Abstract. *The work presents different selling variants of apple production to SCDP Fălticeni which are taking into account some indicators as: total production, prices, turnover, costs and in final the economical result. After a comparative analisys of the four variants presented, it will be choosed the most efficient variant from economical point of view.*

Rezumat. *Lucrarea prezintă diferite variante de valorificare a producției de mere la SCDP Fălticeni ce ia în calcul o serie de indicatori ca producția totală, prețurile, cifra de afaceri, cheltuielile de producție și în final rezultatul economic. În urma analizei comparative a celor 4 variante prezentate va rezulta varianta cea mai eficientă din punct de vedere economic.*

The apple growing is most known and spread in temperate climate zone, and the appleas are occupying the first place if we take into accont the production level, food quality vale and the demand of it on market also.

High ecological plasticiy of this specie had allowed a vast geographical disemination of the numberous created and formed varieties in the most divers regiond of the globe.

High food value of the apple is due to the very balanced composition, of the biochemical component accesibility for the hma organism and not in the last row of the different olfactory, visual, tasteness. There have been identified over 170 substances only in flavor forming.

On world level apple growing is sitated on third place after citric fruits and banana, bt is on the first place between fruit growing varieties of mild climate producing more than double of it.

From the multiple particularities presented by the fruits growing, apple marketing has more characteristics:

a. fruits are harvested in generaly in a simple stage, constituting a „peak", both at harvesting time and at marketing time.
b. Delivering rithm of the fruits is not uniform all the time of the year, depending by the stage of matring of the varieties, in accordance with marketing and storage of it.
c. Physiological features of the fruits offer the possibility of storage and marketing for all the time of the year.

The above characteristics had lead to a study in order to optimize the best marketing options of apple in the conditions of south compartment of the Suceava hills.

WORKING METHOD

There were projectedfive variantsin order to optimize the fruit marketing, differentiated after delivery stage.

V 1 – entire marketing of the fruit qantity to different clients imediately after harvesting (testimonial variant);

V 2 – marketing in two stages:

- 50% from production imediately after harvesting;
- 50% of production in the period of 15 of august – 31 december;

V 3 – marketing in two stages, but other periods:

-50% of prodction imediately after harvesting

-50% of production in the period of 1 of january – 31 of march next year;

V 4 – marketing in three stages:

-50% of production imediately after harvesting;

-25% of production in the period of 15 of august – 31 december;

-25% of prodction in the period of 1 of april-31 of may next year;

V 5 – marketing in two stages:

-50% of production in the period of 1 of january – 31 of march next year;

-50% of prodction in the period of 1 of april-31 of may next year;

Based on prices recordedat the end of the 2004 it have been calclated the following indices:

- turnover; - quality of the fruits delivered to clients; - total production expenses; - total storage expenses; - estimated profit from fruits marketing; - profit ratio.

RESULTS OBTAINED

The structure of the 100 ha mode is presented in table 1.

Table 1

The structure mode on varieties on 100 ha

Nr.Crt.	Variety	Surface (ha)
1	Golden pure	45
2	Idared	30
3	Ionathan	16
4	Fălticeni	4
5	Rădăşeni	5
TOTAL	-	100

The level of the economic efficiency indices of the apple marketing from south compartment of the Suceava hills-representative to the Research and development Unit of fruits growing in Falticeni is presented in table 2.

Table 2

Economical efficiency of different variants of marketing to SCDP Falticeni 2004

Nr. crt.	Specification	Marketing variants									
		V_1		V_2		V_3		V_4		V_5	
		Marketing mode									
		mediate y after harvest	50% Im. After harvest.	0% 15.V – 31.XII	50% Im. After harvest	50% 01.I - 31.III	50% Im. After harvest.	25% 01.I - 31.III	25% 01.IV - 31.V	50% 01.I - 31.III	50% 01.IV - 31.V
1	Total production of apple	3.916	1.958	1.958	1.958	1.958	1.958	979	979	1.958	1.958
2	Percentage of loss from storage (%)	-	-	10	-	20	-	10	20	10	20
3	Total production marketed	3.916	1.958	1.763	1.958	1.567	1.958	881	783	1.763	1.567
4	Marketing prices	5.000	5.000	8.000	5.000	10.000	5.000	10.000	12.000	10.000	12.000
5	Sequential turnover	19.580	9.790	14.104	9.790	15.670	9.790	8.810	9.396	17.630	18.800
6	Accumulated turnover	19.580		23.894		25.460		27.996		36.430	
7	Total production expenses	15.664	7.832	7.832	7.832	7.832	7.832	3.916	3.916	7.832	7.832
8	Total storage expenses	-	-	391,6	-	783,2	-	391,6	687,4	783,2	.374,8
9	Production expenses+storage	15.664		16.055,6		16.447,2		16.743,0		17.822.0	
10	Total gross profit	3.916		7.838,4		9.012,8		11.253,0		18.818,0	
11	Profit ratio	36,7		38,6		39,5		42,2		54,1	

CONCLUSIONS

1.The fruit marketing variant represents one of the most important factor of the economical efficiency of the fruit growing varieties.

2. Studies undertaken till present are demonstrating the fact that fruits marketed echeloned is more profitable than the imediately after harvesting variant. For this variant is absolutely neccessary the storage facilities with controlled atmosphere.

3. The study revealed a nmber of aspects depending on the variant analysed. The main economical indicators that are important for the results are reffering to the percentage of storage loss, marketed price, total trnover, total expenses and gross profit. In the given conditions, respectively south compartment of the Suceava hills, the most suitable variants have proved to be V_4 and V_5. Thus, the accmulated trnover is grater than in comparison with other variants, the total production expenses are smaller, and the gross profit is grater, leading to a superior profit ratio.

4. The economical efficiency of the fruit growing production depends on a consistent number of factors, but one is detaching, representing fruits marketing.

5. The research undertaken till present had demonstrated the fact that echeloned marketing is superior imediately after harvesting one, but is neccessary the existence of fruits storage facilities with controlled atmosphere, with economical and social implications.

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A YIN-YANG APPROACH TO THE VICTORIAN GARDENS AND GARDENING

O PERSPECTIVĂ YING – YANG ASUPRA GRĂDINILOR VICTORIENE

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Abstract. *The Victorian period is famous for its series of breakthroughs, inventions, new ideas and discoveries that are skilfully and elegantly displayed by the horticultural area. An outlook over this generously endowed age would definitely focus on the elegant profiles of giant glasshouses, new species of plants and techniques of landscape architecture, the setting up of national horticultural societies, the discovery of new chemically-synthesised pesticides, the publication of revolutionary books on the evolution of species and their origin, delineating thus a very distinct and unique trail for the Victorian time and its place within the British and world history. One of the novelties this age ushers in is marked by the dawn of the affirmation of women as social actors. This paper intends to grasp, as in a double-mirrored game of yin and yang, aspects that have to do with the Victorian garden and gardening, by means of a descriptive approach.*

Keywords*: (Victorian age, garden design, plant species, landscape architecture).*

Rezumat. *Perioada Victoriana a ramas celebra prin seria de progrese, inventii, idei noi si descoperiri pe care le-a presupus si care nu au ocolit nici domeniul horticol. De la sere uriase la unelte de gradinarit, de la noi specii de plante la alte tehnici si perspective asupra arhitecturii gradinilor, de la crearea unor societati nationale de profil la inventarea unor substante sintetizate chimic pentru combaterea daunatorilor, de la publicarea unor lucrari revolutionare legate de specii si originea lor la recunoasterea oficiala a meritelor si dedicatiei unor pasionati horticultori, epoca Victoriana si-a marcat un traseu unic in istoria Angliei, devenind unul din momentele de referinta, care pregateste debutul perioadei moderne. Si daca epoca victoriana mai aduce ceva nou, timid, la inceput, dar din ce in ce mai pronuntat, ulterior, este afirmarea identitatii femeii ca actor social. Lucrarea incearca sa surprinda, ca intr-un joc de alternante, ying si yang, aspecte legate de specificul gradinii victoriene, prins intre cele doua dimensiuni, masculin si feminin.*

For much of the twentieth century and the current one the term Victorian, which literally describes things and events in the reign of Queen Victoria (1837-1901) stands for the epitome of a most complex, paradoxical age that was a second English Renaissance. Like Elizabethan England, Victorian England saw great expansion of wealth, power and culture.

The Victorians invented the modern idea of invention – the notion that one can create solutions to problems, that man can create new means of bettering himself and his environment, for Victorianism was an age of paradox and power. If progress is one Victorian epitome, freedom is the other. Men must be free. As a result free trade replaced the protectionist policy, governmental interference in

industry and social organization was resisted, and it all amounted in Matthew Arnold's words "doing as one likes".

Victorianism embraces not only an epoch but also a whole phenomenon whose significance goes far beyond the limits of the age. It might be defined as a magic blend of opposite tendencies: individualism and temperance, material pursuits and idealization of life, the influence of science and the force of religion.

However, the Victorian age, the age of industrial revolution and squalid city slums, was also the age of a popular explosion of interest in that most British of all occupations, namely, gardening seen and perceived not just as an intimate pastime. For the first time, a concerted effort was made by authorities to provide extensive public gardens. There was a reason for this benevolent behaviour by the members of the well-off society. They believed that gardens would decrease drunkenness and improve the manners of the lower classes. Intellectuals and the upper classes also encouraged gardening as means of decreasing social unrest. Victorians believed that a free world could never be conceived without education; therefore, elementary education was instituted in 1870. Dr. Matthew Arnold was the personification of the new spirit required to restructure an old-fashioned educational system by means of establishing the rights of free speech and gaining access to culture.

In this respect, one can talk about education even when it comes to gardening, for gardening has ceased to be a simple pastime and has gradually turned into an art that required trained skills and knowledge. If up to the Victorian age gardening was just one of the other male-exclusive occupations, this is the moment that starts to melt yin into yang, by bringing the first 'feminine' touch. This is the dawn of the emergence of women in the gardening profession, which became a popular hobby among women at home. Gertrude Jekyll (November 29, 1843–December 8, 1932) became the most popular name in garden design, while two colleges began to offer courses for women to study gardening.

Swanley College was founded in 1885 as a horticultural college for training men. It started to admit women in 1891, an d by 1896 it had 39 female students. The last of the men left in 1902 leaving the college to establish itself as a women-only college for horticulture.

In 1898 the Countess of Warwick founded Warwick Hostel in Reading to offer training to 'Surplus women in the lighter branches of agriculture'. This expanded and moved to Studley Castle in 1903, becoming Studley College for Women, teaching agriculture and horticulture. This is just another proof that gardening was no longer the exclusive hobby of the upper classes. As industry and commerce prospered, a wealthy middle class emerged; Improved transport and roads made it possible for villas to be built on the outskirts of towns where there was fresh air and an opportunity to display wealth and its attributes – let us not forget that was a moment of power, mostly, and power needs to be ostentatiously displayed. There was a desire for gardens with grandiose features, following the latest fashions and themes. In this respect, the choice of a rather odd and rare evergreen species comes to illustrate the dimensions of the grandeur of the epoch.

The monkey-puzzle became the 'must have' plant of Victorian society. It was introduced to Britain in 1795 by Archibald Menzies after his visit to Chile. But the plant remained a rarity until the 1840s when William Lobb rediscovered the tree on a plant-finding mission to South America. It would be planted to be seen as part of the landscape or, in smaller, suburban gardens, as the central feature to a bedding scheme.

Celebrated for its progress, invention, new ideas and discoveries, the Victorian period touched the field of landscape architecture and gardening as well. In this respect, Edwin Budding's new lawnmower invention meant that people could have manicured lawns, while gadgets such as cucumber straighteners were becoming increasingly popular.

In 1841, Victorian gardener Joseph Paxton, probably the most famous of the Victorian gardeners, creates the glasshouse at Chatsworth. He was the one who designed the new conservatory at Chatsworth and later the Crystal Palace in London, for which he was knighted by Queen Victoria. In 1851, the Great Exhibition of London was hosted by it. He eventually became a millionaire because of commercial investments, such as selling small greenhouses to amateur gardeners. In 1841, Alexander Shanks of Arbroath registered a pony-pulled mower that cleared the clippings away.

1845 witnessed the abolition of the glass tax, which made greenhouses and conservatories cheaper and more popular by making them far more affordable.

Conservatories or open spaces, public gardens or secluded back gardens reunited a certain vegetal domino, a peculiar pattern that melts the same yin-yang, masculine-feminine co-ordinates.

A front and rear *lawn* were considered imperative in a formal garden. Cottage gardens and woodland gardens were more informal, and lawns were not such a requisite. The large expanses of lawn on estates were trimmed by gang mowers, drawn by horses. The push mower, for more modest lawns, was patented during Victoria's reign.

Trees were used primarily to shade important parts of the house where direct sun was unwelcome, such as a dining room or veranda. In the city, trees were often planted along the street to aid in privacy. Weeping trees and those with interestingly coloured or shaped leaves were popular and used strategically to draw the eye. Depending upon climate, one might collect exotic trees and "display" them as part of the lawn decor. Most often these exotics were kept in conservatories.

Shrubs were used mainly for delineating property lines or marking paths. They might also be used to hide an "unsightly" wooden fence or house foundation, or used to frame doorways or bay windows. It was popular to mix the species of shrubs. Most properties at the turn of the century were fenced. Cast iron was by far the most popular material because it was the most ornamental. The more elaborate the home, the more elaborate (usually) the fence and gate. In more informal settings, rustic fencing was used. This might be made of "rustic" wood bent into decorative motifs. The picket fence was to be hidden with shrubs at best, or vines if shrubs were out of the question.

The Victorian garden was highly ornamental, for it generously displayed a rather wide range of ornaments - urns, sculpture, fountains, sundials, birdbaths, and man-made fishponds - were all commonly used.

Should we consider trees the 'masculine' dimension of the garden, the 'feminine' one comes with the delicate selection of flowers that any Victorian garden displays. In 1840 the most popular plants for displays were roses, chrysanthemums and dahlias, and it is worth mentioning that by that time there were more than 500 cultivars of dahlias. In Victorian times the fashion was to have a separate formal rose garden within the boundaries of the main garden. The use of same-height flora, was popular. Most often used to depict a motif or design carpet bedding came under attack by gardeners like Gertrude Jekyll, who thought that each flower and plant should be grown for its intrinsic beauty and not as part of a "carpet." Jekyll's idea of an "herbaceous border" called for flowers of varying heights. Usually planted along a shrub border, wall, or garden path, the herbaceous border began with the shortest plants in the front. Each successive row of flowers would be taller than the last, with the tallest plants at the back. Roses were extremely popular and climbing varieties were often trained over a trellis, bower or pergola. Urban dwellers without much of a yard would often plant large urns beside the front door with flowers or small shrubs. Flowers could also be planted along the front walk underneath the shrubs, which bordered it. Window boxes were also popular. All these peculiarities are still to be observed today in the former Victorian boroughs of large cities.

The vegetal mould may have changed in some respects, but the general outline has remained the same, as if interweaving another dimension of yin-yang, perceived this time as the past and the present that melt into each other with the naturalness of an *illo tempore* that 'breathes' its freshness over the centuries. One can even talk about the so called "Victorian plants", if one comes to think of - *Acacia, Ageratum, Amaranthus, Aster, Scarlet Basil, Begonia Tuberous, Begonia, Bluebell, Caladium, Calendula, Campanula, Chrysanthemum, Cockscomb, Coleus, Dianthus, Dusty Miller, Fern, Fuchsia, Geranium, Scented Geranium, Heliotrope, Impatiens Lobelia Marigold, Moonflower, Morning Glory, Nasturtium, Oxalis Pansy, Periwinkle, Petunia, Portulaca, Primrose, Rose, Miniature Rose, Snapdragon, Sweet Alyssum, Thunbergia, Verbena, Zinnia* – as being the ones that define the 'vegetal Victorian spirit'.

This unique spirit of the Victorian garden, and not only, was to be preserved starting with 1895, the year that meant the set up of the famous British National Trust, by the very same organism, that interweaves the same yin-yang duality, for it was founded by Miss Olivia Hill and Sir Robert Hunter and Canon Hardwicke Rawnsley.

Thus, the spirit of any Victorian garden appears to be a multifaceted one, reflecting the lights of time, hues of leaves and petals, symphonies of fragrances in a most intimate and delicate manner, that come to add a most peculiar trait to a even most peculiar age.

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SOME CONSIDERATIONS CONCERNING BIORHETORICS

CÂTEVA CONSIDERAȚII PRIVIND BIORETORICA

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Abstract. *In the present work the author aims to emphasise the possibility to look at living systems as biorethorical systems, pointing out the differences between the rhetorics of biology and biorhetorics. For a better understanding of these aspects the author makes a brief historical overview of the concept and theory of rhetorics -- considered art and science -- rhetoric being described as a persuasive way in which one relates a theme or idea in an effort to convince. Rhetorics of biology, which studies the rhetorics of biological discourse is distinguishable from biorhetorics, which analyses the behaviour of organisms in terms of primordial rhetorics.Such an approach is possible due to the development of a new rhetorics in the years 60's -70's of the 20th century , and due to the biosemiotic study applied to living systems .*

Rezumat. *În lucrarea de față, autoarea îşi propune să evidenţieze posibilitatea cercetării sistemelor vii ca sisteme bioretorice, subliniind diferenţierile dintre retorica biologiei şi bioretorică. Pentru a înţelege mai bine aceste aspecte, autoarea face o scurtă incursiune în istoria şi teoria retoricii, considerată artă şi ştiinţă a elaborării discursului în general, având funcţie primordial persuasivă. Retorica biologiei, care studiază retorica discursului biologic, se deosebeşte de bioretorică, care urmăreşte să analizeze comportamentul expresiv al organismelor vii în termenii retoricii primordiale. O astfel de abordare este posibilă ca urmare a apariţiei noii retorici în anii '60-'70 ai secolului al XX-lea în ceea ce priveşte aspectele legate de conţinutul comunicării-pe de o parte, şi datorită cercetării sistemelor vii din perspectivă biosemiotică pe de altă parte.*

Key words*: classical rhetorics, rhetorics of biology, biorhetorics, biosemiotics, biotrope, biocommunication*

Rhetorics –the art of presuasion, of expression – is an old discipline, dealing with the intentional aspect of communication, the language force, the effort of a message. Persuasion is a communication intended to convince. It includes not only all arguments, but also refers to non-argumentative forms of communication, such as advertising, threats, appeals to the emotions etc. Persuasion, according to its standard definition, is the process of consciously attempting to change attitudes through the transmission of some message.

The crucial question of biological sign systems –on which depends whether biosemiotics can be a true part of semiotics –deals with choosing between two alternatives: is biocommunication nothing more than signals, releasers, etc., absolutely unintentionally released and transferred, or an active process – the process of interpretation that transforms behaviour into signs. Since the latter has become a more viable view in current biosemiotics, it also opens a gate for the intentional aspects of biocommunication, i.e., to biorhetorics.

When speaking of biorhetorics, we need firstly to distinguish rhetorics of biology and biorhetorics. Theses aspects have been analysed by several representative researchers and biosemioticians such as Kalevi Kull (2001), David Depew, Celeste M., Richard Doyle, Leah Ceccarelli (2001), Stephen Pain (2002) and others. In order to define biorhetorics, it is necessary to look at the meanings and boundaries of rhetorics itself.

MATERIAL AND METHODS

Rhetorics is one of the three original liberal arts or trivium (the other members are dialectic and grammar) in Western culture.In ancient and medieval times, both rhetorics and dialectic were understood to aim at being persuasive. The concept of rhetorics has shifted from time to time during its 2500-year history. Today rhetorics is generally described as the art of persuation through language.

Western thinking about rethorics grew out of the public and political life of Ancient Greece, much of which revolved around the use of oratory as the medium through which philosophical ideas were developed and disseminated. Rhetorics thus evolved as an important art, one that provided the orator with the forms, means and strategies of persuading an audience of the correctness of the orator's arguments.

Today the term rhetoric can be used at times to refer only to the form of argumentation, often with the pejorative connotation that rhetorics is a means of obscuring the truth. Classical philosophers believed quite the contrary: the skilled use of rhetorics was essential to the discovery of truths, because it provided the means of ordering and clarifying arguments. Organized thought about rhetorics began in Ancient Greece. Rhetorics was popularized in the 5th century BC by itinerant teachers known as sophists,the best known of whom were Protagoras, Gorgias and Isocrates. Plato (424-347 BC) has outlined the differences between true and false rhetorics. His student Aristotle (384-322 BC) has even more famously set forth an extended treatise on rhetorics that still repays careful study today.Aristotle's treatise on rhetorics is an attempt to systematically describe civic rhetorics as a human art or skill. He identifies three different types of rhetorical proof: ethos –how the character and credibility of a speaker influence an audience to consider him to be believable; pathos –the use of emotional appeals and logos – the use of language in constructing an argument.

The Romans, for whom oration was an important part of public life, saw much value in Aristotle's rhetorics.Cicero, Quintilian were chief among Roman rhetoricians, and their work is an extension of Aristotole's. After the Roman Empire the study of rhetorics continued to be central to the study of the verbal arts; but the study of the verbal arts went into decline for several centuries, followed by a gradual rise in formal education, culminating in the rise of medieval universities. But rhetorics transmuted during this period in the arts of letter writing and writing sermons.

At the turn of the twentieth century, there was a revival of rhetorical study manifested in the establishment of departments of rhetorics and speech at academic institutions, as well as the formation of national and international professional organizations.Theorists generally agree that a significant reason for the revival of the study of rhetoric was the renewed importance of language and persuasion in the increasingly mediated environment of the 20th century.

Rhetorical theory today is as much influenced by the research results and research methods of the behavioral sciences and by theories of literary criticism as by ancient rhetorical theory. Early rhetorical theorists attempted to turn the study of rhetoric into a social science that allowed predictive analyses of human behaviour. Interdisciplinary scholars of symbol systems influenced a new generation of rhetorical scholars who drew from various disciplines to more fully comprehend the phenomenon of human communication in all its aspects.While ancient rhetorical scholarship had focused primarily on rhetoric as oral speech, contemporary rhetorical theorists are interested in the panoply of human symbolic behaviour—both the spoken and written word .

Rhetoric extends far beyond speech. Rhetoric has been found in image (Barthes 1977), in material culture (Grier 1997), in action (Peshkov 1998). In a way, rhetoric deals with innate needs or wants that are expressed with consideration of the audience.

Thus, asking about the limits of rhetorics, one may notice that rhetorical behaviour is possible also in non-linguistic sign systems. Furthermore, we may notice that rhetorical turns are not always consciously planned –they may appear on the basis of various desires, and the form they take at the level of linguistic expression may be entirely involuntary. If the rhetorical types take their origin on a prelinguistic level, then it infers that the language ability may not be required at all, at least for certain types of rhetorical behaviour.

In order to discover the seeds of rhetorics in biology, new rhetorics had to arise. While classical rhetorics emphasised style, delivery,and arrangement, new rhetorics focuses on knowledge-making techniques.

According to new rhetorics, language is seen as the medium for all knowledge-making. Correspondingly, if we assume that living organisms may posses knowledge-like qualities –an experience, a habit – then it should also require sign systems, a semiosphere. In this way we approach a topic analogous to rhetorics in the biological domain.

In comparative rhetorics, it has been possible to speak about rhetorics in animals. According to George A. Kennedy's approach (Kennedy 1998) to general rhetorics, rhetorics exists among social animals. Moreover, he states that humans and animals share a deep universal rhetorics and he also argues that plants share a rhetorics (Kennedy, 1992). However, he distinguishes between plant or animal rhetorics as purposive and unconscious, and the human one as purposeful and intentional. Therefore, biorhetorics works on the level of unconscious persuasion, although one may also notice that biosemiotics can be defined as the linguistics of unconscious.

RESULTS AND DISCUSIONS

Rhetorics of biology concern the ways biologists express their intentions in their writings or presentations; it is a study of rhetorics in biology. It is currently a rapidly developing field. We can see this, for instance, from a recent book published by Leah Ceccarelli (2001), from the online Poroi Journal published in 2001 and edited by David Depew, which is topically devoted to rhetorics of biology.; in addition, a recent meeting of the International Society for History, Philosophy, and Social Studies of Biology included a session Rhetorics and Biology: The Strategy of Communication in Modern Biological Thought.

The relationships between biological rhetorics and academic biology are controversial. On one hand, applied rhetorics is used in order to teach scientific writing to biology students. On the other hand, a knowledge of rhetorics is required in order to see behind the curtains set by the contemporary science writers, those who play a more important role in contemporary science than ever before.

Biorhetorics is a view on, and a study of living systems as rhetoric devices. This means that living systems are interpreted as analogical to parole, and not so much as langue. If a living organism is an entity that expresses and intends, then rhetoric is due.Because living organisms have needs, they cannot but express them, and accordingly affect the whole communication between organisms. Biological needs start from the recognition of absence. A result of the recognition of absence is expressed in searching behaviour. The ways an organism expresses its needs and desires can be turned into signs recognisable by other organisms of the community. Thus, we may consider evolution as the history of inventing new (bio) rhetoric figures, in order to persuade the surroundings to fulfil the organism's needs.The latter being able to grow in a semiosic chain, maintaining certain relationships to the biological needs without even knowing of them—as in the series of need, craving, want, wish. (Young P.Th. 1936)

If rhetorics has some relevance to biology, one may also ask about the situation with its sister discipline—stylistics. Indeed, the possibility and role of stylistics in biological systems has been pointed out by Sergey Meyen, for instance when he wrote about refrains in biological taxa. Thus, it may become possible to speak on an area that should be called biostylistics.

Taking into account the differences between rhetorics and biorhetorics, it is quite improbable that the classical notions of rhetorics are of much use in a biological realm However, it is reasonable to assume that there exists a certain diversity among biorhetorical figures, or biotropes..Biotropes can be defined as trope-like figures used in biological communication both by animals and plants. We can find and define among the biotropes: biohyperbole, bio-onomatopoeia,, warning coloration and alarm signals used by the animals.

A more proper candidate for a biotrope can be found in mimicry. A semiotic classification of mimicry types (Maran T. 2001) may thus serve as a more detailed distinction of biotropes. Mimicry-like phenomena have been described both in the evolutionary and individual level of biosemiotic level. Mimicry occuring in evolutionary time-scale is usually described as biological phenomena by terms of Bathesian, agressive mimicry and others. Whereas deceptive behaviour arising from activity of the individuals is often regarded belonging to the sphere of human culture. Both mimicry (evolutionary level) and mimesis (individual level) may be considered as two possible semiotic deceptive systems or as two different ways of functioning these systems.Comparing mimicry and mimesis shows characteristic features of both. Common to both systems, mimicry and mimesis increase complexity of the semiosphere via cyclical communication and selective feedback –the trait that may be considered as the common feature to all mimicry-like systems.

CONCLUSIONS

From the aspects presented above we may conclude the following:

1) biorhetorics is present in all living systems

2) rhetorical behaviour is possible in non-linguistic sign systems

3) rhetorical types take their origin on a prelinguistic level.

4) rhetorics exists among social animals and even plants

5) plant and animal rhetorics is purposive and unconscious while human rhetorics is purposeful and intentional

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SPATIAL SEMIOLOGICAL STRUCTURES (I)

STRUCTURI SEMIOLOGICE SPAȚIALE (I)

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Abstract. *As it is known, the man has created his own way of communication –the articulated language. This fact did not prevent the human beings from using as well, and even on a large scale, non-verbal means of comminication, such as body language, space and others. The organization of a space –considered as a phenomenon of communication – implies an informational message, that is the existence of a wide range of sign systems..To a great extent, these signs are nothing else but the codified elements of configuration, expression and structucture of a space. In the present work the author aims to analyse some aspects illustrating the correlation between the spatial and communicational components of the garden – an organised space, bearing a true semiological structure.*

Rezumat. *Faptul că şi-a creat un mod de comunicare ce îi aparţine în exclusivitate-limbajul articulat-, nu l-a împiedicat pe om să utilizeze, în continuare, şi încă pe scară foarte largă, mijloacele non-verbale, oamenii comunicând deseori şi prin intermediul spaţiului. Mesajul informaţional pe care îl implică organizarea spaţiului-considerat ca fenomen de comunicare-presupune existenţa unui repertoriu de semne; în mare măsură, aceste semne nu sunt altceva decât elemente codificate ale configuraţiei, ale expresiei şi ale alcătuirii spaţiului organizat. În prezenta lucrare, autoarea îşi propune să analizeze unele aspecte ce ilustrează corelaţia dintre componenta spaţială şi cea comunicaţională a grădinii-purtătoare a unei adevărate structuri semiologice.*

Key words*: semiotics, ecosemiotics, sociosemiotics, cultural semiotics, semiotic space, spatial structure, artifactial structure*

The immanently meaningful nature of space is closely connected with the semiotic essence of human being, beginning, on the one hand, from the dependence of the physical well-being of an individual on her/his ability to handle the surrounding space and, on the other hand, from philosophical discussion on the true nature and aim of human existence so as connected with the movement of semiotic structures in spatial configurations.

The study of culture is always intrisically semiotic, since it is always about comminication. Communication, be it inter-or intrasubjective, is always social and is executed through sign systems and artefacts that are frequently also the outcome of interaction.Therefore it would be natural to consider all disciplines studying cultural phenomena or human interaction as semiotic.

Gardens - as cultural phenomena – in which various natural and cultural sign processes appear , are semiotically active places in human habitat and need much more profound semiotic research. In the field of contemporary semiotics, the founding fathers of which (C.S. Peirce and F. de Saussure) have made no special statement on „culture" as such, we are faced with a trend that apparently seems to be dedicated specifically to the study of culture. Semiotics of culture, so as developed by the Tartu Moscow school, has its roots, through structural anthropology and linguistics, in the original context of semiology. Semiology, in turn shares certain common features with other disciplines of its epoch that studied cultural phenomena, sign systems and society.

F. de Saussure first indicated the resemblance of the majority of human sign systems to that of the organisation of language, and beginning from his doctrinal understanding, especially as combined with the formalist view on the structure of texts (and other cultural phenomena), the textualist description of culture has been in a favoured position in the paradigm associated with the semiotics of culture.

Structural anthropology, as represented by C. Levi-Strauss, in a way established an a priori natural metalevel treatment of culture and cultural phenomena that have—as if—been created according to a prior scheme.In spite of the fact that Levi-Strauss's findings in the structural resemblances between different cultural institutions can principally be explained by neither the organicists nor the textualist approach in terms of considering intentionality on the object level, his approach that focused on structural coherence between different sociocultural institutions became favoured also in the originally linguistic and literary trend later known as cultural semiotics.

MATERIAL AND METHODS

All sign systems operate in physical and/or semiotic space, at the same time all space, be it physical or conceptual, is semiotised via sign systems at several levels of modelling, begining from the creation of Umwelt.Culture is located in a certain physical environment, and artefacts are embeded in environment, shaping the latter in unique ways that have given reasons for the description of the planet in terms of culture areas.

Taking into account that all artefacts (including gardens) encompass a dimension of meaning, culture areas gain a purely semiotic aspect that has given rise to the description of them as semiotic spaces .(Lotman J.1992).Spatial configurations

can and have been used for the explanation of the structure of the human semiotic reality in general.

Space and place as certain categories with definite characteristics have often been turned into devices of describing different phenomena. We are regularly talking about the spatiality of certain artefacts, concepts, semantic fields,just like these phenomena gain their semiotic value through placement into an overall system.Thus space serves as substrate for culture also through descriptive techniques.Space has practically always been the subject of analysis , but it is the 20th century during which there have been discovered new aspects of space in the physical dimensions and also articulated the value of space as a very special and precious subject of anthropology (e.g. research of C. Levi-Strauss 1968). It was precisely the anthropological perspective that declared space to be the mirror of culture (while culture being, in C. Kluckhohn's popular formulation from 1961, Mirror for Man).

Ideological, social, cultural and other structures crystallised in environmental units by human activity can be of diverse character.

First space can be used for the synchronic description of the social structure and system of a socium. In C.Levi-Strauss's studies (Levi-Strauss 1968) we can witness spatial structures as settlements representing understanding of a socium of its various social divisions like gender, age, labour, marital status, physi(ologi)cal state. The spatial structure is the mirror of man's semiotic universe. In semiotically even stronger expression, Levi-Strauss claimed that spatial structure is the crystallisation of a society's sociocultural reality; in spatial structures there have been articulated the social, cultural, cosmological, cosmogonic and other purely semiotic structures.

Second, as a logical continuation of the above, space can function diachronically as a container of sociocultural memory. The anthropomorphic code thus became into a priciple that created coherence between several loci and unified them at a wider scale into „cultural space". Cultural space can be viewed as a semiotically and also physically more-or-less coherenly structured domain which is subjected to a centralised maintenance.Anthropomorphism so as described as an underlying code for the shaping of environment and erection of settlements thus allows to view large cultural phenomena as texts intentionally created for the transmission of cultural memory, ideological or other messages.

One of the most valuable clarifications of standpoints in cultural anthropology, was presented in C. Kluckhohn's book „Mirror for Man"(1961). Kluckhohn presented the idea of culture as a mentally constructed, behaviourally and cognitively organised structure that has about a dozen aspects to be paid attention to: culture is the total way of life of a people, the social legacy the individual acquires from his group, a way of thinking, feeling and believing, an abstraction from behaviour, a theory on the part of the anthropologist about the way in which a group of people in fact behave, storehouse of pooled learning, a set of standardized orientations to recurrent problems, learned behaviour, a mechanism for the normative regulation of behaviour, a set of techniques for adjusting both to external environment and to other men, a precipitate of history, a behavioral map, sieve, or matrix.

These aspects may probably be brought together in a statement that defines culture as an institution: culture is an organisation that contains several sub-institutions (e.g. sign systems) that are used by institutions (society, social groups) that, by active use, shape culture.Kluckhohn's views make also explicit that culture research has to concentrate on certain fundamental levels and areas of semiotisation: connections between culture and external environment, man as a biological being and a cultural entity, the semiotic reality of man and sign systems that allow to construct and express it.

These topics hook up with the major issues of semiotics, all the more –they indicate that culture research has to include combined approach to cultural phenomena in terms of unifying the Saussurean and Peircean semiotic paradigms. On the one hand we have to analyse relations between sign systems and environment, using the triadic sign conception, and on the other hand culture research must concentrate on relations inside and between sign systems themselves, basing itself on semiological ideas. In an interesting manner the methological standpoints of semiotics and semiology bring sign theories and cultural anthropology together in a roundabout way.

RESULTS AND DISCUSIONS

Space's and place's becoming into the focus of cultural attention has usually been in very evident and strong connection with the abilities, development and possibilities of man's capacity to use space. Such usage can also be split into two, and thus we can make a distinction between the different epochs, keeping in mind which aspects of space have gained importance at the relevant era.

The roughly two uses of space are of course physical, material on the one hand, and spiritual on the other.Similarly a distinction can be made between cultural epochs that focus on either spiritual or physical space.For example physical space, or the physical dimension of space, has been important during the era of formation of the cities, during the Age of Discoveries –in a word: during practically all periods of relatively rapid and overall social or sociocultural change.

The spiritual or conceptual dimension of space was of particular importance during the Middle Ages, and in a curious way it has regained its value in contemporary culture;it has always been important in the so-called primitive societies.In the Middle Ages, space was turned into a mechanism and dimension to integrate different cultural systems according to a given cultural dominant (religion).Spatial representations presumed high knowledge of diverse cultural areas. The cultural mechanisms of coding and maintaining both the spatial order

of cultural environment and the meaningfull structures of space are directly connected with general principles and factors determining cultural development.

For general semiotics, the emergence of biosemiotics leads to debates about the semiotic threshold and the borders of cultural semiotic systems. For cultural semiotics, the views of the founder of the Tartu school, J. Lotman, seems to be significant here. By comprehending human culture as a sphere of sign processes – the semiosphere -- and by emphasizing the importance of translation processes both on the internal and external borders of that semiosphere, the focus will inevitably move to the semiotic relations between culture and other culture, nature, or whatever lies behind the border.(Lotman J.2000).

Thus, culture is not a system closed into its semiotic totality but an open and dialogical entity that communicates, influences, and is influenced by the surrounding semiotic and nonsemiotic realms. Gardens and gardening as an intersection between human culture and nature have an especially important role in the current debate concerning ecosemiotics, as defined by Winifried Noth (1996) and specified further by Kalevi Kull (1998). According to Kalevi Kull ecosemiotics can be defined as the semiotics of relationships between nature and culture. This includes research on the semiotic aspects of the place and role of nature for humans, i.e. what is and what has been the meaning of nature for us, humans, how and in what extent we communicate with nature.Ecosemiotics has emerged in the boundary between fields that study culture and those dealing with natural phenomena.

CONCLUSIONS

From the material presented above we may conclude the following:

1. The ability to handle spatial structures is vital for cultural survival.

2. Examination of a culture's use of space allows us to view those specific semiotic structures that are linked to the identity discourse of a given socium.

3. Analysis of space as the substrate of all cultural semiotic systems is in direct connection with the predictability of the development of different cultures.Besides space as the substrate of culture, spatial structures are those within the limits of which all cultural production takes place.

4.Since culture is always both a cause and effect of particular political, economic, and technological circumstances ,as well as of cosmological and philosophical attitudes, each age and country leaves its own legacy, signifying in large measure its type of governance, degree of wealth, and level of construction skills, as well as its political character and religious beliefs. These things affect

the organization of space and the design of forms within it, which in turn rationalize and institutionalize patterns of cultural behaviour.

5. Gardens -- as semiotically active places-- contain and participate in different levels of semiotic processes, from biological communication up to cultural symbolicity, from personal cognition to social identities. They function as mediators between these different levels of communication, and, as such, may fulfill the role of a sign-vehicle in human communication.

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THE BEHAVIOR OF ONION CULTURE SOWED DIRECTLY TO THE ADHIBITION DIFFERENT FORMULAE OF HERBICIDES ABOUT LOCAL SPECTRE OF WEEDS FROM VANATORI ZONE, GALATI COUNTY

COMPORTAREA CULTURII DE CEAPĂ SEMANATĂ DIRECT LA APLICAREA DIFERITELOR FORMULE DE ERBICIDARE ASUPRA SPECTRULUI LOCAL DE BURUIENI DIN ZONA COM. VÂNĂTORI, JUD. GALAȚI

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Abstract. *The behavior of onion culture seeded directly to the applying of different formulae of herbicidation to the locally spectrum of weeds from Vanatori village, the County of Galati. This work presents the behavior of the onion culture sowed directly to the adhibition of some herbicides and blends of herbicides different in stages of vegetation of respective culture of the weeds. The determinations of the composition weeds, and the evolution of the degree of of long of the period of observation as well as the effects phototoxic about the culture. The results obtained were able to yes the agricultural producing a technological solution for the whole check of the spectrum of weeds on a period of precinct 45-60 after day sowed, critical period for culture onion sowed directly.*

Rezumat. *Lucrarea de fata prezinta comportarea culturii de ceapa semanata direct la aplicarea diferitelor erbicide si amestecuri de erbicide in diferite stadii de vegetatie a culturii, respectiv a buruienilor. Determinarile au vizat compozitia floristica a buruienilor, si evolutia gradului de imburuienare de-a lungul perioadei de observatie precum si a efectelor fitotoxice asupra culturii. Rezultatele obtinute au fost in masura sa dea producatorilor agricoli o solutie tehnologica pentru controlul intregului spectru de buruieni pe o perioada de circa 45-60 zile de la semanat, perioada critica pentru cultura cepei semanate direct.*

Enter culture onion (*Allium cepa*) through direct in crop in extensive field last in years all in the zones country, because it permits the procurance of bulbs for in an only one year consumptions years and is achieved with expenditures the little maul with as far as 35% culture onion from chive. The danger of compromising the culture represents it the weeds, in chief in first developmental stages of the culture, respectively up to a formation rosettes of 6-8 leafs, moments thereto are can executed breeding.

This work presents the results obtained concerning the rebutment local spectrum of weeds, to the adhibition of different doses of herbicides and the selectivity depending on phenophasis of the culture. Due to biologic peculiarities ale onion, 2-3 as far as weeks east and then 4-6 as far as weeks advanced were, in great demand most good formula of erbicidation, because the onion is cultivated competed by weeds.

MATERIAL AND THE METHOD

The experience was placed on ray of the Vanatori village, county of Galati, on a soil of guy average levigat chernozem, each variant having the surface of 10 cultivated hybrid mp Daytona F1.

In the testate year 2006 the selectivity and the efficaciousness, first in phases of vegetation ale onion, urmatoarelor herbicides:

- Stomp 300 EC pendimetalin 330 g/ l
- Lontrel 300 clopyralid 300 g/ l
- Goal 2 E oxyfluorfen 240 g/ l
- Gallant SUPER Haloxyfop-r-metil 100 g/ l

After the emergence of the culture they accomplished prolusion concerning the selectivity and the efficaciousness of the herbicide applied emergent, then they accomplished periodic prolusion concerning the selectivity of the herbicides against the plants of the onion and the efficaciousness in the rebutment weeds, of the herbicides aplicate emergent. The adhibition produced were done with apparatus. The doses and the ages of adhibition of the herbicides are presented the in the table 1.

RESULTS AND DISCUSSIONS

The ground on which it was located the experience is infested as much as heath mono how much the dicotyledonous si, these rearward be prevailing.

The present species were (fig. 1):

- Dicotyledonous annual: *Galinsoga parviflora, Hibiscus triorum, Solanum nigrum, Senecio vulgaris, Matricaria spp., Polygonum spp., Xanthium strumarium, Amaranthus retroflexus, Chrysanthemum spp.*

- Dicotyledonous evergree: *Cirsium arvense, Sonchus spp.*

- Annual monocotyledons: *Echinochloa crus., Digitaria sanquinalis, Setaria spp.*

- Evergreen monocotyledons: *Sorghum halepense, Agropyron repens*

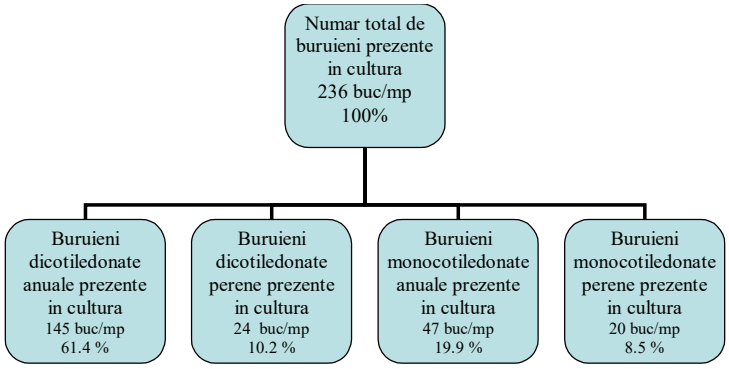


Fig. 1

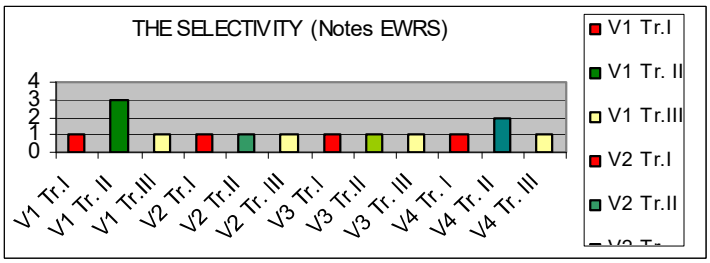
Result of the prolusion efectuated to 15 day by day treatments, as regards the selectivity of used herbicides of the by-pathes presented the in the table 1.

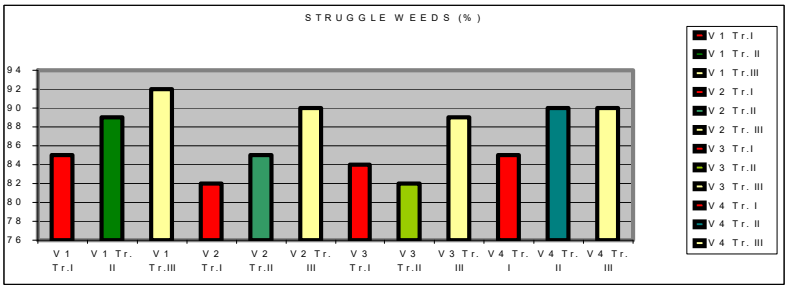
Table 1

The selectivity and the efficacy different herbicides apply in first stage of vegetation for culture onion sowed directly

Variant	Treatment	Herbicides applied	Doses l/ha	The moment adhibition	Fenophase the culture	The selectivity (notes EWRS)	Struggle weeds %
V1	I	STOMP 330 EC	6 l/ha	pre.	soon after sowed	1	85
V2	I	STOMP 330 EC	6 l/ha	pre.	soon after sowed	1	82
V3	I	STOMP 330 EC	6 l/ha	pre.	soon after sowed	1	84
V4	I	STOMP 330 EC	6 l/ha	pre.	soon after sowed	1	85
V1	II	LONTREL 300 + GOAL 2E	0.3 l/ha + 0.5 l/ha	postem.	3 true leafs	3	89
V2	II	LONTREL 300 + GOAL 2E	0.25 l/ha + 0.3 l/ha	postem.	3 true leafs	1	85
V3	II	LONTREL 300 + GOAL 2E	0.3 l/ha + 0.3 l/ha	postem.	4 true leafs	1	82
V4	II	LONTREL 300 + GOAL 2E	0.4 l/ha + 0.5 l/ha	postem.	4 true leafs	2	90
V1	III	LONTREL 300 +GALLANT SUPER	0.4 l/ha + 0.5 l/ha	postem.	rosette of 6 leafs	1	92
V2	III	LONTREL 300 +GALLANT SUPER	0.4 l/ha + 0.5 l/ha	postem.	rosette of 6 leafs	1	90
V3	III	LONTREL 300 +GALLANT SUPER	0.4 l/ha + 0.5 l/ha	postem.	rosette of 6 leafs	1	89
V4	III	LONTREL 300 +GALLANT SUPER	0.4 l/ha + 0.5 l/ha	postem.	rosette of 6 leafs	1	90

They noticed phenomena of phitotoxicity reduced and very reduced just to one of the second treatment to the variants 1 and 4, respectively in the case adhibition of the blend of LONTREL 300 + GOAL 2E in dose of 0. 3 L tchick + 0. 5 L tchick in equal-phase of 3-4 leafs and LONTREL 300 + GOAL 2E in dose of 0. 4 L tchick + 0. 5 L tchick in equal-phase of 4 true leafs. The testate herbicides had a good efficaciousness the very good and, assures the check weeds first in phases of vegetation onion. The selectivity and the efficaciousness of different herbicides applied first in developmental stages of the culture of the onion sowed direct Table 1.





CONCLUSIONS

For the rebutment and the check local spectrum of weeds from culture of the onion sowed directly, on the strength of the results obtained the in the year 2006, we recommend the following formulae of erbicidation first in developmental stages of the culture:

- I soon after sowed STOMP 300 EC in dose of 6 l tchick.

-II 3 true leafs LONTREL 300 + GOAL 2E in dose of 0. 25 L tchick + 0. 3 L tchick or.

-II 4 true leafs LONTREL 300 + GOAL 2E0. 4 L tchick + 0. 5 L tchick and.

-III rosette of 6 leafs LONTREL 300+ GALLANT SUPER 0. 4 L tchick + 0. 5 L tchick.

The study about behavior of the culture of the onion sowed directly, first in phases of vegatation, to the adhibition of different formulae of erbicidation you continue and in the future.

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NPK SOIL CONTENT MODIFICATIONS AND THE TOMATOES PRODUCTION FERTILIZATION EFFECT

MODIFICAREA CONȚINUTULUI DE NPK DIN SOL ŞI EFECTUL FERTILIZĂRII ASUPRA PRODUCȚIEI DE TOMATE

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Abstract. *In this paper was to evaluate the soil fertilization effect in four sorts of tomatoes cultivated in field condition, in west area country.*

The experience was done in a cambic cernosium soil, with low acidity reaction and the high natural fertility potential favorable vegetables cultivation. On the fertilization application have to realize high average productivity/ ha and sustain good yields fertility. The study was performed on control soil samples (without fertilizers) and soil samples after differentiated NPK fertilization in variable doses: $N_{30}P_{30}K_{30}$, $N_{45}P_{45}K_{45}$, $N_{60}P_{60}K_{60}$, $N_{120}P_{60}K_{60}$. The fertilization doses and the application methods in tomatoes fertilization were to determine in correlations between agro chemistry factors. The recherché material was using tomatoes samples in different precocity steady: early (Export II), half early (Stefania) and middle tardy (Ace Royal and Campbell1327). After research were observed the production increase was obtain at $N_{45}P_{45}K_{45}$ doses fertilization.

Rezumat. *In aceasta lucrare s-a urmarit influenta îngrasamintelor asupra productiei unor soiuri de tomate cultivate in conditii de camp, in zona de vest a tarii. Tipul de sol pe care s-a amplasat experienta este un cernoziom cambic, sol cu reactie usor acidă, cu un bun potential de fertilitate favorabil culturii legumicole. La aplicarea îngrasamintelor trebuie avut in vedere ca, in afara satisfacerii cerintelor plantelor, pentru a asigura sporirea susținuta a producțiilor medii la hectar, trebuie să se realizeze si ridicarea continua a fertilitatii solului. Cercetarile s-au efectuat pe un sol nefertilizat, precum si in conditii de fertilizare diferențială cu NPK in urmatoarele doze: $N_{30}P_{30}K_{30}$, $N_{45}P_{45}K_{45}$, $N_{60}P_{60}K_{60}$, $N_{120}P_{60}K_{60}$. Dozele de îngrăşăminte şi metodele de aplicare pentru îngrăşarea legumelor din grupa solano-fructoaselor, se stabilesc conform cu cerințele față de factorii agrochimici. Ca material de cercetare s-au folosit soiuri de tomate in diferite stadii de precocitate: timpuriu (Export II), semitimpuriu (Stefania) si semitarziu (Ace Royal si Campbell1327). In urma cercetarii s-a observat ca cea mai mare productie de tomate, la toate soiurile, a fost obtinuta la doze de $N_{45}P_{45}K_{45}$.*

The importance of tomato as a vegetable crop is reflected in its large-scale cultivation in the world. Tomato is grown in about 4 million hectares over 160 different countries.(International Plant

Nutrition Institute, 2007) Romania produces about 600.000 and 700.000 t tomatoes/year, current average productivity is 13.3-16.0 t/ha. (Statistical Rumanian Annuar, 2003)

Other research show that tomatoes production ist between 40-120 t/ha, differentiate for tomatoes sort: Export II – 60-80 t/ha, Stefania – 120-160 t/ha, Campbell 1327 – 40-80 t/ha and Ace Royal – 40-60 t/ha.(Ciofu R., 2003)

Tomatoes can be produced across a wide range of soil as long as drainage and physical soil structure is good. The plant produces a fibrous root mass, which can exploit the subsoil given the absence of cultivation pans. Most of the root mass is normally concentrated in the cultivated zone of top 60 cm and 70% of the root volume is in the top 20 cm of top soil. Optimum soil pH is between 6.0-6.5. (Manescu, 2003)

As a rule, all of the plants requirements for phosphorus and third to half of the nitrogen and potassium needs are supplied at planting. The remainder is applied over the course of the growing and cropping period.

Nitrogen is an important nutrient in tomatoes and timing and quality of application is critical. Excess nitrogen is often more common than deficiencies. Too much nitrogen will make plants very bushy and reduce the quality of tomatoes. Nitrogen affects both crop yields and quality.

Phosphorus is necessary for cell division and growth, root and shoots development, photosynthesis, energy transfer and movement of carbohydrates. Involvement in the plants energy cycle provides benefits to many aspects of busy growth and fruit production. Soil testing is recommended to assess phosphorus levels prior to planting.

Potassium is essential for metabolic processes that sustain plant growth and reproduction, playing a regulatory role in plants. Potassium also plays a vital role in photosynthesis, disease and drought resistance, protein synthesis, root maturity, crop maturity and the regulation of plant water use. (www.agrichem.com.au)

The fertilizers are better used in optimum water supply conditions. (Manescu B., 2003)

MATERIAL AND METHOD

Field experiments

Soil samples were taken (0-25 cm depth) before and after fertilization.

Fertilization was control (without fertilizers) and mineral fertilizers (NPK) in variable doses: $N_{30}P_{30}K_{30}$, $N_{45}P_{45}K_{45}$, $N_{60}P_{60}K_{60}$, $N_{120}P_{60}K_{60}$.

Analytical methods

Soil properties were analyzed using the fallowing methods: pH was determined in aqua solution.

Total N (%) was determined by the Kjeldahl method, digested in H_2SO_4 distilled and titrated with 0.1M NaOH.

Soil humus (%) was determined by the Tiurin method, humified soil organic matter was oxidized using potassium dichromate with sulphur acid (1:50) and excess dichromate determined by titration with Mohr salt solution. (Baksiene E., 2006) Phosphorus were determined by spectrophotometry using Spectrophotometer UV-VIS SPECORD 205 by Analytik Jena and Potassium by flame photometry method. (MAIA, 1983)

Tomatoes samples were collected on June-July (varieties Export II and Stefania) and August (Ace Royal and Campbell 1327).

RESULTS AND DISCUSSIONS

In table 1 was presented soil agrochemical parameters before experiment.

Table 1

Soil agrochemical parameters before experiment

Humus	pH	N(%)	P(ppm)	K (ppm)
3	6.34	0.29	163	160

The soil analysis show that soil its favorable for tomatoes cultivation.

The fertilization was applied in spring, with four weeks before tomatoes plantation.

In table 2 was presented soil agrochemical parameters after NPK differentiated fertilization

Table 2

Soil agrochemical parameters after NPK differentiated fertilization

Tomatoes varieties	Fertilization dozes	N(%)	P (ppm)	K(ppm)
Export II	Control	0.25	86.0	140
	$N_{30}P_{30}K_{30}$	0.25	92.4	140
	$N_{45}P_{45}K_{45}$	0.25	94.5	150
	$N_{60}P_{60}K_{60}$	0.26	114.2	147
	$N_{120}P_{60}K_{60}$	0.25	120.0	147
Stefania	Control	0.25	90.4	146
	$N_{30}P_{30}K_{30}$	0.24	110.2	143
	$N_{45}P_{45}K_{45}$	0.25	112.6	147
	$N_{60}P_{60}K_{60}$	0.25	120.1	143
	$N_{120}P_{60}K_{60}$	0.25	124.2	143
Campbell 1327	Control	0.25	84.6	140
	$N_{30}P_{30}K_{30}$	0.24	119.6	147
	$N_{45}P_{45}K_{45}$	0.25	121.7	143
	$N_{60}P_{60}K_{60}$	0.24	114.8	147
	$N_{120}P_{60}K_{60}$	0.24	106.9	143
Ace Royal	Control	0.27	94.5	150
	$N_{30}P_{30}K_{30}$	0.25	101.1	140
	$N_{45}P_{45}K_{45}$	0.25	122.0	143
	$N_{60}P_{60}K_{60}$	0.26	119.6	147
	$N_{120}P_{60}K_{60}$	0.25	123.2	143

The tomatoes production is present in table 3.

Table 3

Tomatoes production

Tomatoes varieties	Fertilization dozes	Production (t/ha)
Export II	Control	35
	$N_{30}P_{30}K_{30}$	35
	$N_{45}P_{45}K_{45}$	40
	$N_{60}P_{60}K_{60}$	32
	$N_{120}P_{60}K_{60}$	30
Stefania	Control	55
	$N_{30}P_{30}K_{30}$	58
	$N_{45}P_{45}K_{45}$	65
	$N_{60}P_{60}K_{60}$	64
	$N_{120}P_{60}K_{60}$	58
Campbell 1327	Control	50
	$N_{30}P_{30}K_{30}$	55
	$N_{45}P_{45}K_{45}$	63
	$N_{60}P_{60}K_{60}$	63
	$N_{120}P_{60}K_{60}$	46
Ace Royal	Control	41
	$N_{30}P_{30}K_{30}$	41
	$N_{45}P_{45}K_{45}$	44
	$N_{60}P_{60}K_{60}$	43
	$N_{120}P_{60}K_{60}$	34

CONCLUSIONS

The experiment shown that application of moderate doses NPK is essential for increased production but the fertilization with highly doses NPK reduce the production, less and less.

The fertilization with $N_{45}P_{45}K_{45}$ determinated maximum tomatoes yield.

NPK soil content was reduced after fertilization.

The tomatoes sorts did not influence the production.

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RESERCHES OF BIOMETRIC CHARACTERISTICS OF LETTUCE PLANTS (*LACTUCA SATIVA* L.) GROWN AT DIFFERENT RATES OF NITROGEN FERTILIZATION

CERCETĂRI PRIVIND MĂSURĂTORILE BIOMETRICE LA PLANTELE DE SALATĂ (*LACTUCA SATIVA* L.) CULTIVATE ÎN CONDIȚII DIFERITE DE FERTILIZARE CU AZOT

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Abstract. *The studies were made for emphasize the biometric characteristics and nitrogen content of two varieties of lettuce (Jessy and Marula), frecvent used in greenhouse culture, in different conditions of fertilization. Three rates of nitrogen fertilization were studied: 50, 100 and 150 kgN/ha, in two phases of vegetation, and the control (without fertilization). It was determinated the number of leaves/ plant, the size of the external leaves and weight of plants in harvesting period. The best results were achieved at nitrogen fertilization level of 100 kg N/ha. This study is applicable to increase a lettuce culture efficiency in greenhouse conditions.*

Rezumat. *Studiul a urmărit evidenţierea măsurătorilor biometrice şi conţinutului de azot total la două soiuri de salată (Jessy şi Mărula), frecvent utilizate în cultura de seră, în condiţii de fertilizare diferite. S-au experimentat 3 doze de fertilizare cu azot, respectiv: 50, 100 şi 150kg N/ha, aplicate fracţionat, în două faze de vegetaţie, care s-au comparat cu martorul (sola nefertilizata). S-au determinat mărimea frunzelor externe, numărul frunzelor / plantă şi greutatea plantelor la recoltare, precum şi conţinutul de azot total la recoltare. Cele mai bune rezultate au fost obţinute, atât din punct de vedere cantitativ cât şi calitativ, la fertilizarea cu doza de 100kgN/ha. Studiul urmăreşte o eficientizare a culturii salatei în seră.*

Lettuce (*Lactuca sativa* L.) is an essential salad crop for the Romanian diet. Nitrogen (N) fertilization are required for successful lettuce production and can influence lettuce quality.

The objective of this study was to evaluate changes in nutritional composition of two varieties lettuce in responses to Nitrogen fertilization during greenhouse culture in Tichilesti, Braila county. The aim of the present investigation is to study the effect of different rates of N fertilization upon number of leaves / plant, size of external leaves and weight of plants in harvesting period.

Nitrate content in leaf tissues ingested by human beings may be converted into nitrite, thereby causing methaemoglobinemia or even formation of carcinogenic nitrosamine (P. Tittonell, 2004).

MATERIAL AND METHODS

The investigation was conducted in the period 2005 – 2006, during the winter cycle in greenhouse with two lettuce cultivars.

The soil is assigned as vermic chernozem high carbonate with the following soil characteristics: loam texture, average organic matter content of 7,71%, pH (H_2O) – 7,75 and content of mobile forms of nitrogen, potassium and phosphorus – 0,183%, 0,102% and 0,012% respectively.

Three nitrogen rates were tested – 50, 100 and 150kg N/ha. The treatment was done as soil fertilization with NH_4NO_3 in two times. The experiments were conducted in four replications of the variants.

During the period of the vegetation we determined the nitrogen content and dry mass of plants during the critical phases of nutrition and the parameters of the biometric characteristics:

- number of leaves;
- size of leaves;
- weight of plants in harvesting period.

We determined these parameters in 20 plants from each variant.

RESULTS AND DISCUSSIONS

The observations indicated that the different rates of nitrogen fertilization influences the nitrogen content and dry mass of plants, the size of leaves and weight of plants in harvesting period. The results are synthesized in tab. 1 and 2.

Table 1

The results of agrochemical laboratory analyses during the critical phases of nutrition *(*D. Trifan, 2006*)*

No.	U%	MO%	pH	CE mmho/cm	CTTS %	Total N mg/100g soil
1	22,67	11,85	8,5	0,721	0,293	1,992
2	16,01	10,79	7,68	0,674	0,257	4,0
3	21,36	9,94	7,62	0,631	0,253	9,101

1 – the transplant phase; 2 – the head forming phase; 3 – the harvesting period.

We observed a decreasing tendency of nitrogen content in soil during the head forming phase and a increasing tendency in the harvesting period. This finding was explained a positive nonlinear correlation between the nitrogen nutrition and the phenophases (D. Trifan, 2006).

A slightly tendency towards increasing the leaves length of Jessy variety and Marula variety was observed with increasing the nitrogen rates until the determined level of 100kg N/ha – Jessy variety and Marula variety: 20.5cm and 24.4cm, respectively. Analogical tendency was observed in the number of leaves, too (10.8 of Jessy variety and 14.4 of Marula variety). The weight of plants in harvesting period is one of the important characteristics determining the production of lettuce. The value of this characteristics showed the positive effect of nitrogen fertilization in rates 100kg N/ha: 786.5g for Jessy variety and 1012.6g for Marula variety. The most obvious effect of nitrogen fertilization was observed in dry mass accumulation and nitrogen content of plants. The higher rates of nitrogen fertilization increased the dry mass of the Jessy variety by 7.63% and of the Marula variety by 7.83% in the harvesting period.

Table 2

Dry mass, N content and biometric characteristics of lettuce plants grown at different nitrogen rates

Treatments	Lettuce varieties	Dry mass (%)	Total N (%dm)	Number of leaves	Size of external leaves (L/l cm)	Weight of plants in harvesting period (g)
Control – without fertilization	Jessy	5.2	4.3	2.3	2.2/1.8	452.8
		6.5	6.23	8.2	10.6/9.2	
		7.22	5.4	8.5	14.3/12.5	
	Marula	6.12	4.68	3.1	3.5/1.2	685.4
		6.33	5.35	9.0	12.3/4.1	
		5.64	6.4	9.2	18.8/7.3	
50kg N/ha	Jessy	6.2	4.56	3.0	2.3/1.6	520.5
		6.58	5.28	8.7	11.5/9.5	
		5.88	6.23	8.5	14.8/11.9	
	Marula	6.1	4.8	3.2	3.6/1.2	722.9
		6.42	6.22	9.2	13.8/4.4	
		6.25	5.64	9.6	21.0/7.5	
100kg N/ha	Jessy	6.43	4.80	3.4	4.6 / 1.8	786.5
		7.2	6.56	9.6	12.2/10.8	
		6.8	5.22	10.8	20.5/24.2	
	Marula	6.37	4.67	3.2	3.8/1.2	1012.6
		6.66	6.72	9.6	16.5/5.8	
		6.11	5.46	14.4	24.6/8.8	
150kg N/ha	Jessy	5.48	5.62	3.2	4.4/1.8	750.3
		6.22	7.58	10.3	12.0/10.8	
		7.63	7.35	10.4	18.3/18.8	
	Marula	6.2	5.9	3.5	4.0/1.2	986.8
		6.35	7.62	9.4	16.3/5.2	
		7.83	7.24	12.8	22.6/7.5	

The higher dry mass of nitrogen treated plants with 150kg N/ha could be connected with the nitrogen high level content in the plants: 7.35% in dry mass for Jessy variety and 7.24 % in dry mass for Marula variety.

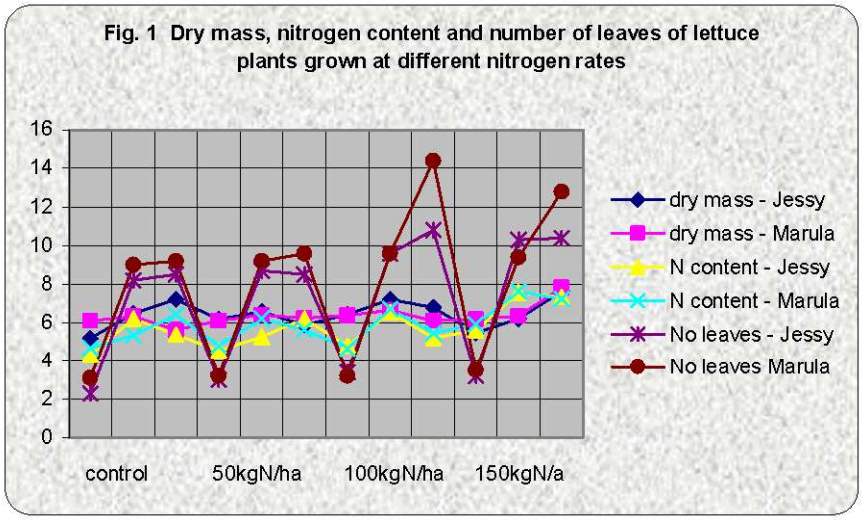

Fig. 1 Dry mass, nitrogen content and number of leaves of lettuce plants grown at different nitrogen rates

CONCLUSIONS

The results indicated that the different rates of nitrogen fertilization is positive correlation with the nitrogen content, number and size of leaves. The best results for level and quality of lettuce production were achieved at nitrogen fertilization level of 100 kg N/ha (Figure 1).

The dry mass of plants is also positive correlated with nitrogen content. Excess N can reduce head quality by lowering firmness or causing splitting.

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BERRY SPECIES VARIETIES CLASSIFICATION ON GROWTH AND PRODUCTIVITY INDICATORS

CLASIFICAREA SOIURILOR SPECIILOR BACIFERE DUPĂ INDICATORII DE CREŞTERE ŞI PRODUCTIVITATE

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Abstract. *The basic parameters of growth, photosynthetic activity, biological efficiency, productivity of various grades of berry cultures in intensive plantations have been investigated. On the basis of the lead researches classification of grades of wild strawberry, raspberry and black currant on investigated parameters with the purpose of use of the most productive and adapted to soil-climatic conditions of Republic Moldova and intensive technology of cultivation has been lead.*

Rezumat. *Au fost studiaţi indicatorii de bază ai creşterii, activităţii fotosintetice, productivităţii biologice şi utile ale diferitor soiuri ale speciilor bacifere în plantaţiile intensive. În baza investigaţiilor efectuate a fost efectuată clasificarea soiurilor speciilor bacifere după indicatorii studiaţi în scopul folosirii celor mai productivi în diferite condiţii de cultură şi condiţii pedoclimatice ale RM.*

For reception of high planned crops of qualitative berries in conditions of Republic Moldova it is necessary to use those grades which are is better adapted to soil-climatic conditions, have high potential of efficiency, demand less expenses at cultivation, suitable for the mechanized harvesting (a currant black, a raspberry). Thus it is necessary to consider the basic parameters of growth, biological and economic efficiency, an opportunity of maximal use soil-climatic conditions and suitable for intensive technology of cultivation [1-5]. Carried out researches also are devoted to the decision of these problems.

MATERIALS AND METHODS

Were investigated (1992-2006) the basic parameters of growth and efficiency of the zoned and perspective grades of wild strawberry, raspberry and black currant efficiency with various potential.

Following dozes of fertilizers have been investigated: during full fructification - nitrogen on the planned crop's eve of berries considering carrying out of active forms by plants and a level fertility ground; the control - without fertilizer.

At planting 80 t/hectares of manure + P360K270 are brought. Ground - chernozem ordinary, an irrigation - regulars. Researches have been lead by modern techniques used in intensive fruit growing.

RESULTS AND DISCUSSIONS

On the basis of the lead researches key parameters of growth, development and efficiency of berry cultures in plantations with a various level of intensity have been established.

The size of root system of berry cultures increased more intensively at young plants, and at fructifying - was flush with gradual reduction by the end of the period of operation of a plantation. The greatest parameters of root system have noted been for 3 year after planting at wild strawberry and a raspberry and 6 year at black currant. The great bulk of root system on length and weights settled down in a layer of ground 0-20 cm at wild strawberry and raspberry and 0-40 cm at black currant. At wild strawberry and the total length of annual gain at raspberry and black currants correlates quantity of rhizomes with intensity of growth of root system, as at young, and fructifying plants. Influence of grades on the size of root system and to its distribution, quantity of rhizomes and total length of an annual gain it is more expressed at young plants.

On mastered nutritious volumes as an element of structure of a plantation of root system, grades are classified on following groups: **Strawberry:** below average – Surprise des Halles; average – Red Gauntlet; high – Senga Sengana; Camarosa;. **Raspberry:** below average – Novokitaevskaia; average – Novosti Kuzmina; high – Fertodi Zamalos. **Black currant**: below average – Karelskaia, Altaiskaia Desertnaia, Ciornaia Lisavenko; average – Golubka, Minai Şmîriov, Belorusskaia Sladkaia, Seianeț Golubki; high – Stahanovka Altaia.

On force of growth, parameters of structure of bushes and development of elevated nutritious volume, the grade of black currant are classified on following groups: below average – Karelskaia, Golubka (Height of bushes 1,0-1,1 m); average - Seianeț Golubki, Minai Şmîriov, Belorusskaia Sladkaia, Studenceskaia (Height of bushes 1,2-1,4 m); high – Primorskii Cempion (Height of bushes 1,5-1,7 m).

The area of a sheet surface of berry cultures of young plants has increased the strengthened rhythm, and at fructifying - was took at high enough level within 2 years at wild strawberry and 5-6 years at raspberry and black currant.

On size of the area of sheet surface investigated grades can be classified on following groups: **Strawberry:** below average – Surprise des Halles (20 - 22 thousand m^2/ha); average – Red Gauntlet (25-28 thousand m^2/ha); high – Senga Sengana (35-37 thousand m^2/ha). **Raspberry:** below average - Novokitaevskaia (20 thousand m^2/ha); average – Novosti Kuzmina (25 thousand m^2/ha). **Black currant:** below average – Altaiskaia Desertnaia, Ciornaia Lisavenko, Golubka, Studenceskaia (15-18 thousand m^2/ha); average – Belorusskaia Sladkaia, Minai Şmîriov, Seianeț Golubki, Stahanovka Altaia, Altaiskaia Desertnaia, Ciornaia Lisavenko, Golubka (25-28 thousand m^2/ha).

The greatest areas of a sheet surface of plantings it is noted in plantations of wild strawberry for the third year after planting (35,3 thousand m^2/ha).

This breed had the highest parameters of biological (cca. 10 t/ha) and economic efficiency (2,19 t/ha); level of use active radiation in the general biomass 1,2 % and in berries - accordingly have made 0,3 %.

In plantations 3 years at wild strawberry and are more senior than 8 years at raspberry and black currant the area of sheet surface, biological and economic efficiency, level of use of solar radiation have considerably decreased, that leads to an inefficiency of use such to a plantation from the point of view of results of photosynthetic activity.

On biological efficiency and operating ratio of solar radiation of a grade it is possible to classify on following groups: **Strawberry:** below average – Surprise des Halles (6 t/ha, 0,75%); average – Red Gauntlet (8,7 t/ha, 1,2%); high – Senga Sengana (10 t/ha, 1,3%). **Black currant:** below average – Karelskaia, Altaiskaia Desertnaia, Ciornaia Lisavenko (4-5 t/ha, 0,6-0,7%); average – Minai Şmîriov, Belorusskaia Sladkaia, Seianeț Golubki (7-8 t/ha, 1,0-1,2%); high – Stahanovka Altaia (9 t/ha, 1,4%).

Productivity of fructifying plantations was took at a high level within 2 years at wild strawberry and 8 years at raspberry and black currant. The further operation of such plantations does not provide reception of crops which compensated the executed expenses on care of plantings and cleaning of berries.

On the level of crop of the berries, investigated grades can be classified on following groups: **Strawberry:** below average – Surprise des Halles (14-15 t/ha); average – Red Gauntlet, Senga Sengana (24-26 t/ha); high – Camarosa (40-45 t/ha);. **Raspberry:** below average – Novokitaevskaia (2,1-2,6 t/ha); average – Novosti Kuzmina (6-7 t/ha). **Black currant:** below average - Altaiskaia Desertnaia, Ciornaia Lisavenko (4-5 t/ha); average – Belorusskaia Sladkaia, Minai Şmîriov, Seianeț Golubki, Karelskaia, Stahanovka Altaia (8-10 t/ha).

The Bookmark of plantations of berry cultures it is demanded greater capital investments: from 30 thousand lei/ha at wild strawberry up to 42 thousand lei/ha at raspberry and black currant. Use of highly productive grades promotes increase efficiency of use of capital investments and to reduction of term of their recumbent till 1 year at wild strawberry and 4 years at black currant. It allows introduction in manufacture of annual culture of wild strawberry and to reduction of term of operation of raspberry and black currant till 4-5 economic crops of berries. The common resource of efficiency of the plantation for all period of its operation makes 24-48 t berries of wild strawberry, 32-40 t berries of black currant and 24-30 t berries of raspberry.

Reception of the annual income up to 27-30 thousand lei/ha at wild strawberry, 5,7-8,2 thousand lei/ha at black currant and 2,8 thousand lei/ha at raspberry at a level of profitability accordingly 75-84 %, 28-39 % and 13 % has been provided owing to use of grades with high potential of efficiency above 16 t/ha at wild strawberry and 5 t/ha at raspberry and black currant. The highest level of economic efficiency of use of capital investments, and also manufactures of berries it is received in plantations with use of grades of intensive type:

Strawberry: – **Red Gauntlet, Senga Sengana, Camarosa and Seascape**; **Raspberry:** – **Novosti Kuzmina and Fertodi Zamalos**; **Black currant**– **Belorusskaia Sladkaia, Seianeț Golubki, Karelskaia and Stahanovka Altaia.**

On the basis of the received results parameters of a plantation of intensive type of wild strawberry, raspberry and black currant for reception of planned crops of berries on ground with an average level fertility have been established. Corresponding parameters for ground with other level fertility and a used grade can be received at corresponding correction of each parameter according to developed to a technique.

CONCLUSIONS

At intensive cultivation of berry cultures in conditions for reception of planned crops of qualitative berries it is necessary for Republic of Moldova to use following grades and parameters of a plantation:

Strawberry: Crop of berries - 25-30 t/ha; grade - potential of efficiency from above 35 t berries/ha; density of planting - 74-80 thousand /ha; the area of sheet surface - 30-40 thousand m2/ha; fertility ground - humus - 2,8-3 %, azotes - 4 mg/100g ground, phosphorus - 3,2 mg/100 g ground, potassium - 25-26 mg/100 g ground; fertilizer - azotes on the planned crop's eve of berries; mulching ground - black polyethylene film in a number *(in plantations from the small area - black polyethylene film, straw of wheat or barley);* biological efficiency - 15-20 t dry substance/ha; operating ratio of solar radiation in fructifying plantations - 1,8-2,3 %; the period of economic operation - 2 years.

Raspberry: Crop of berries - 7-10 t/ha; grade - potential of efficiency from above 12 t berries/ha; density of planting - 8 thousand /ha; the area of sheet surface - 20-30 thousand m2/ha; fertility ground - humus - 2,6-3%, azotes - 4 mg/100g ground, phosphorus - 3,4 mg/100 g ground, potassium - 28 mg/100 g ground; fertilizer - azotes on the planned crop's eve of berries; biological efficiency – 10-12 t dry substance/ha; operating ratio of solar radiation in fructifying plantations - 1,2-1б4 %; the period of economic operation – 8-9 years.

Black currant: Crop of berries - 8-10 t/ha; grade - potential of efficiency from above 12 t berries/ha; density of planting – 6-8 thousand /ha; the area of sheet surface - 25-30 thousand m2/ha; fertility ground - humus - 2,8-3,2%, azotes – 3,8 mg/100g ground, phosphorus - 3,2 mg/100 g ground, potassium - 27 mg/100 g ground; fertilizer - azotes on the planned crop's eve of berries; biological efficiency – 7-9 t dry substance/ha; operating ratio of solar radiation in fructifying plantations - 1,2-1б4 %; the period of economic operation – 8-9 years.

Structure of bushes for mechanized cleaning of berries: the minimal height - 1,2 m; width at the basis of a bush - 0,25-0,30 m; quantity of stalks of different age - 15-18 pieces; an arrangement of stalks - mainly vertically, seldom.

Use of the offered technique allows providing to reception of a planned crop of berries from a plantation at the minimal expenses, using as much as possible soil-climatic conditions of cultivation and potential of efficiency of grades.

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IMPROVEMENT PERSPECTIVES FOR INTENSIVE BLACK CURRANT CULTURE TECHNOLOGY IN REPUBLIC OF MOLDOVA

PERSPECTIVE ÎN PERFECȚIONAREA CULTURII INTENSIVE A COACĂZULUI NEGRU ÎN REPUBLICA MOLDOVA

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Abstract. *On the basis of the basic parameters of growth of grades quantity of plants the method of definition has been developed for intensive gardens, considering a level of development by plants of elevated and underground volume depending on fertility used ground. The technique of definition of necessary quantity of phosphoric and potash mineral fertilizers has been developed for entering before a bookmark of plantings. The methodology of definition of quantity of nitric fertilizers, for reception of a planned crop has been formulated, considering charges NPK on 1 tone of berries, a level of a planned crop, factor of return of nutritious elements in ground by leaves and other bodies and factor of the amendment on fertility ground.*

Rezumat. *În baza indicatorilor de creştere a soiurilor a fost elaborată metoda de determinare a numărului optim de plante pentru plantaţiile intensive ţinînd cont de nivelul de valorificare a spaţiului aerian şi subteran de către plante în funcţie de nivelul de fertilitate a solului utilizat pentru înfiinţare. A fost elaborată metoda de calculare a cantităţii necesare de îngrăşăminte de fosfor şi potasiu pentru administrare înainte de înfiinţarea plantaţiei. A fost determinată metodologia determinării cantităţii îngrăşămintelor de azot pentru obţinerea producţiilor planificate de fructe ţinînt cont de consumul de NPK la 1 tonă de fructe şi producţia planificată, coeficientul de restituire a elementelor nutritive în sol cu frunzele şi alte organe şi indicele de corecţie la fertilitatea solului*

Introduction in manufacture of various technological receptions in intensive technology of cultivation of the black currant can be carried out on the basis of the account of all parameters, especially economic [2,5,6], which make set of the information which concern the executed expenses and the received profits.

With the purpose of definition of an optimum parity between them, for conditions of Republic Moldova of research are included an estimation of major factors which influence has crucial importance: a grade, density of standing of plants, a level of mineral maintenance [1].

The received results have served a basis for the development of an optimum quantity of plants and fertilizers for 1 hectare of plantations with the purpose of reception of a planned crop of qualitative berries and classification of grades on potential of efficiency.

MATERIALS AND METHODS

It is studied key parameters of growth and efficiency of plants (1992-2006) depending on density of planting from 4,2 up to 8,3 thousand plants/hectares with use of 9 grades with various potential of efficiency. Following dozes of fertilizers have been investigated: during full fructification - nitrogen on the planned crop's eve of berries considering carrying out of active forms by plants and a level fertility ground; the control - without fertilizer. At planting 80 t/hectares of manure + P360K270 are brought. Ground - chernozem ordinary, an irrigation - regulars. Researches have been lead by modern techniques used in intensive fruit growing.

RESULTS AND DISCUSSIONS

On the basis of the lead researches parameters of the basic parameters of growth, development and fructification of plants in plantations with a various level of intensity have been established.

On biological efficiency and a level of development of the solar radiation, the investigated grades can be classified in groups: below an average - 4-5 t/ha, 0,6-0,7 %; average - 7-8 t/ha, 1,0-1,2 %; above an average - 9 t/ha, 1,4 %, high - 12-15 t/ha, 1,5-1,6 %.

On a level of productivity of berries of a grade it is possible to classify in following groups: below an average - 4-5 t/ha; average - 8-10 t/ha; above an average - 12-15 t/ha, high - 20-25 t/ha.

Optimum parameters of structure of a plantation have been received on ground with an average level of maintenance with nutrients at use of grades with an average level of use of nutritious volume of ground and an elevated part of space. For definition of parameters of structure of a plantation on ground with a low and high level of maintenance nutrients and grades from weak and high force of growth of an elevated part and root system had been developed a technique of definition of density and schemes of landing of plants and factors of correction of relative force of growth of bushes, considering thus the received results on other fruit breeds.

The received results specify that use of grades with a low level of use of nutritious volume demands a lot of bushes on 1 ha for reception of productive parameters of structure of a plantation, especially on poor ground. Such tendency it is possible to consider negative because increases expenses for purchase of a landing material and accordingly capital expenses for a bookmark of a plantation.

Advantage will be given to grades of high force of growth which form optimum parameters of structure of a plantation with the least quantity of bushes.

Use of the given technique allows to determine necessary quantity of plants for various types ground on a level of security nutrients and corresponding grades on relative force of growth with the purpose of reception of optimum parameters of a plantation with smaller quantity of bushes both material and financial expenses for purchase of a landing material.

Table 1

Quantity of bushes of a black currant necessary for a bookmark 1 ha plantations depending on relative force of growth of plants and a level ground fertility

Development of nutritious volume of ground		Development of volume of air space		Ground fertility					
				Below an average, coefficient 0,8		Average, coefficient 1		High, coefficient 1,2	
Group	Factor	Group	Factor	Relative force of growth	One thousand plants/ha	Relative force of growth	One thousand plants/ha	Relative force of growth	One thousand plants/ha
1	0,8	1	0,7	**0,45**	**12,4**	**0,56**	**10,0**	**0,67**	**8,4**
1	0,8	2	1	**0,64**	**8,8**	**0,80**	**7,0**	**0,96**	**5,8**
1	0,8	3	1,3	**0,83**	**6,7**	**1,04**	**5,4**	**1,25**	**4,5**
2	1	1	0,7	**0,56**	**10,0**	**0,70**	**8,0**	**0,84**	**6,7**
2	1	2	1	**0,80**	**7,0**	**1,00**	**5,6**	**1,20**	**4,7**
2	1	3	1,3	**1,04**	**5,4**	**1,30**	**4,3**	**1,56**	**3,6**
3	1,2	1	0,7	**0,67**	**8,4**	**0,84**	**6,7**	**1,01**	**5,5**
3	1,2	2	1	**0,96**	**5,8**	**1,20**	**4,7**	**1,46**	**3,8**
3	1,2	3	1,3	**1,25**	**4,5**	**1,56**	**3,6**	**1,87**	**3,0**

Ground fertility it is necessary to maintain in following parameters: - humus - 2,8-3,2 %, azotes - 3,8 mg/100g ground, phosphorus - 3,2 mg/100 g ground, potassium - 27 mg/100 g ground.

In leaves of fructifying plants of a currant of black Republic Moldova in conditions it is possible to consider the optimum contents of mineral elements: **N - 2,2- 2,35%; P_2O_5 – 0,42-0,45% and K_20 - 1,41-1,45%.**

For reception of one ton of berries of black currant in soil-climatic conditions of republic of a plantation of black currant bears from ground following quantities of mineral elements: **N – 9,6 -13,2 kg; P_2O_5 – 2,3 – 3,0 kg and K_20 – 6,5 – 8,3 kg.**

The operating ratio plantations of black currant nitrogen from the brought fertilizers averages for years of researches 43-78%.

As a result of long-term researches it is established, that for creation of favourable conditions of growth and fructification of a plantation of black currant, at their bookmark application of fertilizers with the purpose of maintenance of optimum levels of mobile forms of phosphorus and potassium is necessary.

At definition of dozes of fertilizers necessary for entering before a bookmark of a plantation it is necessary to consider a layer of ground which is fertilized also its level fertility, operating ratio of elements of a mineral feed from ground and fertilizers. Using the laws revealed for other fruit breeds and on the basis of the received experimental data the technique of definition of dozes of fertilizers has been developed for entering before a bookmark of a plantation with the purpose of increase of a level of a mineral feed in ground up to optimum for the given breed.

It is established, that for increase of the contents of phosphorus and potassium in ground on 1 mg (layer of ground 0-40 cm), on the area 1 ha it is necessary to bring at a bookmark of a plantation: on ground with fertility below average - $PK_{165, 141}$, average - PK_{118}, high - $PK_{83, 71}$ and very high - K_{59} (tab. 2).

Table 2

Quantity of phosphoric and potash fertilizers necessary for a raising on 1 mg the contents of these nutritious elements in ground on 1 ha depending on the fertilized layer at a bookmark of plantings of a black currant and a level of its security mobile forms PK (kg active substance)

Level of security of ground mobile forms PK	Layer of ground **0-40 cm**	
	P_2O_5	K_2O
Below average	**165**	**141**
Average	**118**	**118**
High	**83**	**71**
Very high	**-**	**59**

Table 3

Quantity of mineral fertilizers of nitrogen of fructifying plantations of a currant necessary for fertilizer black for reception 1 tone of berries depending on a level of security of ground of mobile forms PK

Level of security of ground mobile forms PK	kg active substance
Below average	**6,9**
Average	**6,3**
High	**6,0**
Very high	**5,0**

By development of a technique of definition of quantity of the nitric mineral fertilizers necessary for entering on the planned crop's eve of berries considered: carrying out NPK from 1 ton of the berries, a planned crop of berries, factor of return of elements of a mineral feed in ground leaves and other bodies of plants and factor of correction on fertility ground [3,4].

At use of the given laws and the received experimental data for the black currant the quantity of mineral fertilizers of nitrogen (active substance) necessary for entering into ground for reception to 1 ton of berries depending on a level of maintenance of ground of mobile forms PK is established (tab. 3): below average – 6,9 kg, average – 6,3 kg, high – 6 kg and very high – 5 kg.

CONCLUSIONS

At intensive cultivation of black currant Republic Moldova in conditions for reception of planned crops of qualitative berries:

- ✓ At a bookmark of a plantation to use grades suitable for mechanized to cleaning of berries with high and very high potential of efficiency of type Belorusskaia Sladkaia, Minai Şmîriov, Seianet Golubki and to place on 1 ha optimum quantity of plants considering their relative force of growth;
- ✓ Fertility ground to maintain at a following level: – humus - 2,8-3,2%, azotes – 3,8 mg/100g ground, phosphorus – 3,2 mg/100 g ground, potassium – 27 mg/100 g ground.
- ✓ For maintenance of ground of necessary level PK to bring before a bookmark of a plantation that quantity of fertilizers, considering an initial level in the ground, the fertilized layer of ground and a level of the contents of mobile forms in fertilizers;

✓ In fructifying plantations for reception 1 tone of berries depending on level of security of ground mobile forms PK to be brought following dozes of nitric fertilizers: below average – 6,9 kg, average – 6,3 kg, high – 6 kg and very high – 5 kg.

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TECHNOLOGICAL AND ECONOMIC RESULTS IN APPLE CULTURE

REZULTATE TEHNOLOGICE ŞI ECONOMICE ÎN CULTURA MĂRULUI

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Abstract. *The set of technological steps applied to an apple plantation from SCDP Iasi in 2006 pointed out the role and importance of each technological sequence (factors) separately. Thus the breed, age of trees, the planting distance, the top crown shape, the level of fertilization and the phyto-sanitary treatments help obtaining the results regarding the quantity and quality of fruits.*

Rezumat. *Complexul de măsuri tehnologice aplicat într-o plantație de măr de la SCDP Iasi în anul 2006 a scos în evidență rolul şi importanța fiecărei secvențe (factori) tehnologice în parte. Astfel soiul, vârsta pomilor, distanța de plantare, forma de coroană, nivelul fertilizării şi nu în ultimul rând tratamentele fitosanitare concurează la obținerea rezultatelor privind cantitatea şi calitatea fructelor.*

The world fruit-growing has developed recently not necessarily by increasing the orchard surfaces and the total production but through the increase of the qualitative aspect of fruits, the medium production per hectare and the economic efficiency (Congress papers – Interpoma 2006). These parameters may not become highly efficient than by applying an integrated, modern culture technology through the use of all the technical and biological means to maintain and exploit the apple plantations. (1-4).

MATERIAL AND METHODS

To obtain some superior quantitative and qualitative production parameters in 2006 they applied at SCDP Iaşi a more special culture technology.
The experiments were effectuated on 3 apple breeds: Idared, Ionagold and Florina grafted on MM 106 planted at a distance of 4 x 4m and disposed as a fan-shaped espalier (tab. 1)

Table 1

Surfaces and tree age

Breed	No. of trees	Ha Total	Year of planting - ha					
			1992	1993	1996	1998	1999	2000
Idared	15000	24	3	5	3	2	3	7
Ionagold	6250	10	-	-	6	4	-	-
Florina	4375	7	-	4	3	-	-	-

The age of tress ranges between 6 and 14 years.

The interval between the tree rows was grassed (weeded), the vegetation was hashed three times, the remains staying on place as vegetal substratum. The branches resulted from the cuts for formation and fructification were also hashed.

Except for the cutting and harvesting works in the orchard there were not any other manual works applied.

In spring they administered 500 kg/ha of fertilizers with N-20 and P-20, and during vegetation they used foliar fertilizers (Folisof) – 16 l/ha applied in 4 doses simultaneously with the phyto-sanitary treatments.

To fight against pathogen agents and pests they applied 12 phyto-sanitary treatments (tab. 2).

Table 2

Phyto-sanitary treatments applied in 2006 for apple

No. crt.	Pheno-phase Date of effectuation	Pathogen agents and pests fought against	Pesticides used	Dose/ha L; kg
1	Budding April 5	Mite eggs, San Jose louse, flower ladybird, apple skin moth, bark diseases, mildew	Oxicupron + Oleocarbetox S + Damping sulfur	7,5 15,0 6,0
2	Blowing out of corolla April 20	Scurf, mildew, larvae, wool louse, mites	Zato + Zolone 25WP	0,2 5,0
3	Petal falling May 5	Mildew, scurf , monilia diseases, insects, apple wasp, aphides, mites	Zato + Reldan + Vantex	0,2 1,5 0,2
4	„Peanut fruit” May 23 for warning	Apple worm G1T1, aphides, scurf, mildew	Clarinet + Calypso	2,0 0,4
5	May 30	Apple worm G1T2, scurf, mildew	Dithane + Kumulus + Decis 25 WG	4,0 6,0 0,06
6	June 8	Scurf, mildew	Systhane Forte	0,4
7	For warning June 15	San Jose louse G1T1, apple skin moth, mites, scurf, mildew	Chorus + Fyfanon + Omite	0,3 4,5 1,0
8	8-10 days from the previous treatment June 24	San Jose louse G1T2, the same pathogen agents and pests as at the previous treatment	Dithane + Kumulus + Novadim	4,0 6,0 3,0
9	For warning July 5	Apple worm G2T1, mites, scurf, mildew, aphides	Folicur M + Calypso	1,5 0,4
10	10-12 from the previous treatment July 16	Apple worm G2T2, mites, scurf, mildew, etc.	Euparen M + Mospilan + Envidor	2,4 0,3 0,6
11	For warning July 31	San Jose louse G2T1, larvae scurf, monilia diseases	Euparen M + Fyfanon	2,4 4,5
12	8-10 from the previous treatment August 10	San Jose louse G2T2, other insects, diverse pathogen agents	Folicur M + Fyfanon	1,5 4,5

Since Florina breed is resistant to scurf and tolerant to mildew it was partially treated with fungicides.

For comparison they used the breeds Idared and delicious Golden aged 28, the tress being planted at a distance of 4 x 1m. The maintenance technology of this lot was identical with the one from the young plantations with the breeds Idared, Ionagold and Florina.

RESULTS AND CONCLUSIONS

- The meteorological conditions were especially favorable for the evolution of the pathogen agents (scurf) and pests.
- They effectuated 12 phyto-sanitary treatments out of which two in pre-floral state.
- The phyto-sanitary complex applied may be considered very effective; the results are presented in (tables 3 and 4):
- The apple scurf, the most dangerous pathogen agent in 2006, was well controlled by the fungicides: Zato, Clarinet, Chorus, Systhane Forte, Euparen, Folicur Multi and Dithane, thus the frequency of leaf attack was 35,6% and 64,2% on fruits for the untreated samples and at the treated variants they registered the frequency 5,0% on leaves and 3,2% on the fruits of Ionagold.
- They highlight the very good effectiveness of the insecticides: Calypso, Mospilan in the fight against the apple worm, the fruit skin moth, mining moths; Envidor for mites and Fyfanon for the San Jose louse
- The good or very good state of plantations insured the obtaining of a production over 35 t/ha.

Table 3

Effectiveness of fungicides in the fight against pathogen agents

Breed	Scurf				Mildew			
	Leaves		Fruits		Leaves		Copse	
	F%	I%	F%	I%	F%	I%	F%	I%
Idared	3,1	5,0	2,1	2,0	1,7	5,0	2,4	5,0
Ionagold	5,0	7,5	3,2	2,4	1,0	5,0	2,0	5,0
Florina	3,4	6,7	2,3	2,1	0,0	0,0	0,0	0,0
Ionagold untreated after blossom	35,6	47,8	64,2	57,4	34,7	51,5	26,0	40,0

Table 4

Effectiveness of pesticides in the fight against pests

Breed	% apples with worms (Cydia p)	% apples attacked by the San Jose louse	No. mites/10 leaves	Mining moths % mined leaves	% apples attacked by the apple skin moth
Idared	0,7	1,0	7,9	0,0	1,2
Ionagold	0,6	0,9	7,8	0,0	0,4
Florina	1,0	1,2	8,4	0,3	0,6
Ionagold untreated after blossom	62,0	74,5	279,1	59,4	64,7

Table 5

Apple production

Breed	t/ha	Structure by quality %			
		Extra	1st quality	2nd quality	Industry
Idared	37,2	69	21	7	3
Ionagold	34,9	65	23	8	4
Florina	29,8	61	26	9	4
Ionagold untreated after blossom	19,7	2	18	20	60
Idared sample 28 ages	22,5	45	21	15	29
Golden sample 28 ages	15,7	27	31	14	28

The apple production and the structure by qualities are presented in table 5.

From 1450 t of apples obtained from the young plantation, 1310 were for consumption in fresh state and only 140 t for industrialization. The percentage of apples extra is between 61 and 69, compared to only 27 – 45% for the apples from the plantation of 28 years. They also notice great differences (15 – 20 t/ha) of the medium production by hectare and the fruit quality is clearly superior for the ones coming from the young plantations.

The expenses effectuated for the maintenance of 41 ha apple in value of 417034 lei have the following structure:

- Expenses for pesticides – 144046 lei (34,5% from total)
- Expenses for fuels – 31701 lei (7,6 % from total)
- Expenses for packing materials – 3161 lei (0,75 % from total)
- Expenses for fertilizers – 31981 (7,7 % from total)
- Expenses for consumables – 521 lei (0,12 % from total)
- Expenses for the provisioning quota – 4792 lei (1,14 % from total)
- Expenses for third parties – 11793 lei (2,8 % from total)
- Expenses for salaries and salary fees – 180953 lei (43,4 % from total)
- Expenses for repayment – 8086 lei (1,9 % from total)

The highest expenses are the ones fro salaries followed by the ones for pesticides. The average of expenses by hectare for the young plantation is 10171 lei compared to 9705 lei for the old plantation; for the kilo of apples it is 0,29 lei for the young plantation and 0,43 lei for the old plantation.

The medium price of valorization of the apples coming from the young orchard is 0,90 lei/kg, insuring a profit of 0,61 lei/kg or 21573 lei/ha, compared to 0,6 lei/kg for the apples coming from the old orchard, what insured a plus of 0,17 lei/kg or 2805 lei/ha.

These short calculations highlight the effectiveness and profitableness of the young apple plantations that insure benefic economic results if they have an adequate technology. Only in such conditions we may appreciate that fruit-growing is a profitable branch of agriculture.

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CONTRIBUTION OF SCDP IAŞI TO THE AMELIORATION OF THE SWEET CHERRY, SOUR CHERRY AND WALNUT ASSORTMENT

CONTRIBUȚIA S.C.D.P. IAŞI LA ÎMBUNĂTĂȚIREA SORTIMENTULUI DE CIREŞ, VIŞIN ŞI NUC

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Abstract. *Between 1999-2007, to Iassy Fruit Growing Research Station they approved ten sweet cherry cultivars, namely: Cetățuia, an very early one; Cătălina, an early one; Golia, Maria, Bucium Tereza, Iaşirom and Ştefan, from mid-season ripening; Marina and George, with late ripening dates. Among these, Maria is the first Romanian self-fertile cultivar.*

Of the bitter cherry biotypes which was found till now on this area, two new cultivars have approved, namely: Amar Maxut with black skin and Amar Galata with half yellow and half red skin, both of them with superior features of precocity, high yields, fruit qualities and good resistence to frost, drought and diseases.

The new tart cherry cultivars, happily complete the assortments with different ripening periods, from the early one till the late one (Timpuriu de Osoi, De Botoşani, Pitic) which assure a fresh fruits consumption and canning industry for almost 53 days.

The cultivars of walnut, Miroslava , known as a early one, Velnița known as a good fruit bearing tree also on the lateral offshoots, Anica and Ovidiu , knowns for the special qualities of the fruits, assure a diversified assortments for the new orchards of walnut tree.

Rezumat. *În anii 1999-2007, la SCDP Iaşi s-au omologat zece soiuri de cireş, unul extratimpuriu (Cetățuia), unul timpuriu, (Cătălina), şase cu maturarea mijlocie (Golia, Maria, Bucium,Tereza, Iaşirom şi Ştefan) şi două cu maturare târzie (Marina şi George). Soiul Maria este primul soi românesc autofertil.*

Din biotipurile de cireş amar depistate în zonă au fost omologate două soiuri noi, Amar Maxut cu fructe de culoare neagră şi Amar Galata cu fructe bicolore, ambele cu însuşiri superioare de precocitate, productivitate, calitatea fructelor, cu rezistență la ger, secetă şi boli.

Soiurile noi de vişin, alcătuiesc un conveer varietal divers, cu epoci diferite de maturare de la timpurie la foarte târzie (Timpuriu de Osoi, De Botoşani, Pitic), care asigură un consum de fructe în stare proaspătă şi industrializare pe o perioadă de 53 de zile.

Soiurile de nuc Miroslava, prin timpurietate, Velnița prin rodire şi pe lăstarii laterali, Anica şi Ovidiu prin calitățile deosebite ale fructelor, asigură un sortiment de soiuri diversificat pentru noile plantații de nuc

In the 30 years of existence of the Research-Development Station for Fruit growing of Iaşi, ameliorators had as their main preoccupation the replacing of the inferior cultivars by new superior cultivars created in the Station or introduced from the world assortment.

These modifications of the assortment suppose a thorough knowledge from the pomological, agro-biological and economic viewpoint as a result of the trial of the new cultures in contest cultures.

In the 4th and 7th volumes of the Romanian Pomology, an important section is destined to the main cultivars of cherry and sour cherry and the 6th and 8th volumes are destined to the walnut cultivars. In the 4th volume they present 27 cherry cultivars out of which 16 are autochthonous and 23 of sour cherry out of which 5 are autochthonous, in the 6th volume, 96 walnut cultivars and biotypes out of which 93 are autochthonous, and in the 8th volume, the last one, appeared in 1969, 11 cherry cultivars and hybrids, 6 of sour cherry and 3 of walnut.

In the interval 1978-2007 they homologated as new cultivars in Iaşi 19 creation out of which 12 of sweet cherry, 2 of bitter cherry, 3 of sour cherry and 4 of walnut.

By introducing them in the 9th volume of the Romanian Pomology and in culture, the cultivars described in this volume will contribute to the significant melioration of the existing assortment since they complete the gaps in the consumption season of the fruits of these species, prolong the consumption season (by an earlier or later maturation of fruits as compared to the present-day cultivars) and surpass, from the productive and quality viewpoint, many of the cultivars zoned with the same maturation epoch or satisfying the same necessity.

MATERIAL AND METHOD

The biological material obtained from cherry resulted from the hybridization of 6 cultivars used as maternal or paternal genitors (Van, Stella, Boambe de Cotnari, Fromm, Ebony, Cireşe de Octombrie) and two sweet cherry hybrids (23/31 and 21/1).

From the rich genetic fund existing in the influence area of the Station they found out numerous valuable biotypes of sour cherry, bitter cherry and walnut out of which, after verifications and comparative contest cultures, they promoted only two new bitter cherry cultivars (Amar Maxut and Amar Galata), three of sour cherry (Timpuriu de Osoi, De Botoşani and Pitic) and four of walnut (Anica, Ovidiu, Miroslava and Valnița).

For sour cherry and sweet cherry, the trees were grafted on franc or mahaleb and for the walnut on selected walnut. The plantation distances were 5 x 4 m for sweet cherry and sour cherry and 10/10 m for walnut with a number of 3-10 trees in the variant (cultivar). The farm techniques applied was the one specific to each species and the trees were guided after the free fan-shaped espalier without a sustaining system for sweet cherry and sour cherry and globular canopies with axle for the walnut.

In the experimental fields they effectuated a series of measurements and observations regarding the tree vigor, the passing through the fructification phonological phases, precocity, self-fertilization, behavior towards the limitative factors of production (frost, drought and diseases specific to the three species), the fruit production and its quality, the main physical-chemical features of fruits and the way of use of fruits (fresh consumption and processing).

RESULTS AND DISCUSSIONS

Among the 12 new sweet cherry cultivars one has little vigor (*Golia*), three have a small towards medium vigor (*Tereza, Ştefan* and *Amar Galata*) the remainder of cultivars having medium vigor (*table 1*).

As for blossom, four cultivars have an early blossom (*Cetățuia, Cătălina, Maria* and *Amar Maxut*), two have a late blossom (*Golia* and *George*) the remainder of cultivars having medium blossom.

The maturity of harvesting of the fruits under study starts with the cultivar *Cetățuia* (21 May) and ends on 25 July with the most recent and belated creation (cultivar *George*), (*fig.1*). By completing the zone assortment with the cultivars mentioned they insure the prolongation of the fruit consumption from 40-45 days in 1985 to 64 days in 2007.

Cultivar *Maria* is the only and single cultivar from Romania, that may be catalogues ad self-fertile (48 %), the other cultivars registering small percentages (0-6,1 %).

The main physical-chemical features of fruits highlight a diversity of forms (kidney shape, heart shape), sizes (from small, 4,5 g at *Amar Maxut* to very big, 8,5 g at *Bucium*), colours (from black at *Amar Maxut* to bicolor, *Marina* and *Amar Galata*) and with a percentage of dry substance between 16 and 21 %.

In table 2 there are the features of 3 sour cherry cultivars created at SCDP Iaşi in the interval 1978-1994. As for vigor, the cultivar Pitic registers the smallest vigor as compared to the cultivars *Timpuriu de Osoi* and *De Botoşani* manifesting a medium vigor. As for the blossom period, the cultivar Pitic blossoms the latest (8.04-5.05), in this interval protecting it from the late hoar-frosts and frosts of spring. The phasing of fruit maturation for the three cultivars is also very interesting during a period of 53 days starting with the cultivar *Timpuriu de Osoi* (10-16.06), continuing with the cultivar *De Botoşani* (27.06-7.07) and ending with the cultivar *Pitic* (22.07-2.08) that is the most belated cultivar from the present-day sour cherry assortment. Cultivar *Pitic* stands out for its self-fertility.

The three cultivars present a diversity of shapes from a flattened sphere to an elongated sphere having weights from small (4,5-4,8 g at *Pitic* cultivar) to big at *De Botoşani* cultivar (6,9-7,8 g) and colours from crimson red to dark red.

Table 1

New sweet cherry cultivars created to S.C.D.P. IAŞI

Cultivar	Tree vigor	Blossom	Ripening maturity	Self fertility %	Fruit				Observations
		8 years average			Shape	Average weight -g-	Colour	Dry subst. %	
CETĂȚUIA	Medium	31.03-20.04	21-29.05	1,6	Flattened kidney shape	5,9-6,1	Red blakish	16,1	Very earlier maturity
CĂTĂLINA	Medium	1.04-21.04	07-15.06	2,6	Heart shape oblong	6,8-7,8	Purple red	16,2	Early maturiry
MARIA	Medium	2.04-23.04	15-23.06	48,0	Heart shape	7,4-8,3	Purple red	17,0	Self fertility
GOLIA	Small	19.04-30.04	20-28.06	5,9	Heart shape oblong	7,5-8,0	Red blakish	17,5	Very good qualities
MARINA	Medium	13.04-30.04	05-13.07	-	Heart shape oblong	7,6-7,9	Half red half yellow	17,7	Late maturity
BUCIUM	Medium	9.04-25.04	16-24.06	3,7	Heart shape oblong	7,8-8,5	Red blakish	17,8	Good yields
IAŞIROM	Medium	10.04-22.04	14-22.06	4,2	Heart shape oblong	7,7-8,1	Brown redish	17,9	Good yields and good qualities
TEREZA	Small to medium	15.04-25.04	15-23.06	5,1	Heart shape oblong	7,5-7,8	Red blakish	17,4	Small vigor and good yields

Cultivar	Maturity													
	May			June						July				
	20	25	31	5	10	15	20	25	30	5	10	15	20	25
CETĂŢUIA														
CĂTĂLINA														
IAŞIROM														
MARIA														
TEREZA														
ŞTEFAN														
BUCIUM														
GOLIA														
AMAR MAXUT														
AMAR GALATA														
MARINA														
GEORGE														

Fig. 1 - Fruit maturity division from current and expectant assortment to sweet cherry tree in Iaşi area

Table 2

New sour cherry cultivars created at S.C.D.P. Iaşi

Cultivar name	Tree vigor	Blossom period	Fruit maturation	Self-fertility %	Fruit			D.S. %	Observations
		Average for 10 years			Form	Average weight -g-	Colour		
Timpuriu de Osoi	Medium	4.04-25.04	10-16.06	4,9	Flattened sphere	6,0-6,5	Dark red	16,4	Precociousness, quality and productivity
De Botoşani	Medium	6.04-29.04	27.06-7.07	3,7	Flattened sphere	6,9-7,8	Dark red	16,5	High quality fruit. It cultivars by root suckers
Pitic	Little to very little	8.04-5.05	22.07-2.08	45,3	Elongated sphere	4,5-4,8	Crimson red	15,1	Little vigor, late maturation

Table 3

New walnut cultivars created at S.C.D.P. Iaşi

Cultivar name	Tree vigor	Fruit maturation	Blossom period	Self-fertility %	Fruit			% core	Observations
			Average for 10 years		Form	Average weight -g-	Colour		
Miroslava	Medium	Protogynous	21.04-12.05	8-12.09	Round ellipsoidal	14,2-15,2	White yellowish	51,5	Precocious cultivar, productive with very big fruits.
Anica	Medium	Protogynous	21.04-22.05	18-27.09	Round ovoid	13,5-14,1	Yellowish brownish	50,6	Cultivar bearing fruits also on the lateral copse.
Ovidiu	Medium towards little	Protandrous	21.04-22.05	11-20.09	Ovoid round	11,9-13,8	Yellowish	57,3	Precocious bred, productive with high percentage of core.
Velnița	Medium	Protandrous	28.04-22.05	16-25.09	Ovoid elongated	13,2-14,0	Brownish yellowish	53,2	Low vigor cultivar, productive, pleasant aspect

As for walnut, they homologated four new cultivars in Iasi, their characterization being given in table 3. All cultivars have a medium vigor, the cultivar *Ovidiu* registering a lower vigor as compared to the other cultivars.

As for the fructification mode, two cultivars are of the protogineus type (*Miroslava* and *Velnița*) and two of the protandros type (*Anica* and *Ovidiu*). The earliest blossom is registered at the cultivar *Miroslava* and the latest at the cultivar *Anica*, the cultivar *Miroslava* also having the most belated fruit maturation (8-12.09) unlike the cultivar *Velnița* that registers the most belated fruit maturation (18-27.09).

The fruits of the four cultivars have shapes, colors of endocarp and core, weights of fruit and percentage of core different from one cultivar to another and from one year to the other.

Each cultivar is different from the other by the fruit shape. Thus we register the round-ellipsoidal shape at the *Miroslava* cultivar, round-ovoid at the *Velnița* cultivar, ovoid-round at *Anica* cultivar and ovoid-elongated at *Ovidiu* cultivar.

The biggest weight of fruit was registered at the cultivar Miroslava (14,2-15,2 g) followed by *Velnița, Ovidiu* and *Anica* with weights of fruit between 11,9 and 14,1 g.

All the cultivars had a white-yellowish towards brown colour of endocarp, pleasant to sight with rounded ends, well closed peduncle orifice, regular fruit surface with little wrinkles and hollows.

The core percentage at all four cultivars surpasses 50% from the fruit weight, the most valuable cultivar under this aspect being *Anica* (57,3 %), followed by *Ovidiu* (53,2 %), *Miroslava* (51,5 %) and *Velnița* (50,6 %).

CONCLUSIONS

1. From the hybrid combinations of the years 1982-1989 they selected 10 hybrid elites of cherry, out of which they homologated 10 new cultivars in the years 1999-2007 (*Cetățuia, Cătălina, Golia, Maria, Bucium, Ştefan, Iaşirom, Tereza, Marina* and *George*).

2. From the genetic fund of the NE area of Romania they found out two valuable biotypes of bitter cherry that were promoted as new cultivars bearing the denomination of *Amar Galata* and *Amar Maxut*.

3. The cherry cultivars stood out by precociousness (*Cetățuia* and *Cătălina*), self-fertility (*Maria*), productivity and special fruit quality (*Golia, Tereza, Bucium; Iaşirom, Ştefan*), belatedness (*Marina* and *George*) and availability for industrialization (*Amar Maxut* and *Amar Galata*). We must mention that the variety assortment is prolonged by 19-24 days as compared to the present one.

4. The new cultivars of sour cherry make up a diverse variety assortment from early (*Timpuriu* de *Osoi*) to very late (*Pitic*), with an intermediate cultivar

(*De Botoşani*), insuring a fruit consumption in fresh state especially for industrialization for a period of 53 days.

5. The new walnut cultivars created at SCDP Iaşi, the first cultivars homologated in Moldavia, are qualitatively superior to the ones coming from other areas of the country and even Europe, insuring a diversified assortment with a high resistance to frost, drought and the diseases specific to walnut.

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THE PHYSICAL, CHEMICAL AND TECHNOLOGICAL FEATURES OF FRUITS AT SWEET CHERRY CULTIVARS AND HYBRID ELITES CREATED AT FRUIT GROWING DEVELOPMENT STATION IAŞI – ROMANIA

ÎNSUŞIRILE FIZICE, CHIMICE ŞI TEHNOLOGICE ALE FRUCTELOR LA SOIURILE ŞI ELITELE HIBRIDE DE CIREŞ CREATE LA SCDP IAŞI ROMÂNIA.

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Abstract. *The sweet cherry fruits, because of great minerals content, vitamins, low assimilated sugars, good looking aspects and good refreshing taste, are destined both for fresh consumption, being the first fresh fruits in the market, and processing industry under the form of natural juice, syrup, stewed fruit, jam, liquors and confectionery products. Sweet cherry processing in different ways was established on the basis of essential criterion for direction of utilization. The technological and structure features assessment of fruits at sweet cherry cultivars and hybrid elites created at S.C.D.P.Iasi were analyzed during ten years (1996-2006), on fruit samples harvested on competition culture available at experimental area. Was taken in the study ten new sweet cherry cultivars (Cetățuia, Cătălina, Maria, Golia, Bucium, Tereza, Iașirom, Ștefan, Marina and George), three hybrid elites propose for homologated (HC 840830, HC 840836 and HC 840935) and two bitter cherry cultivars (Amar Maxut and Amar Galata). The directions of utilization were fixed on the basis of examination, tasting and determination on the following aspects: fruit size, shape fruit, skin, pulp and juice colour, pulp firmness, succulence, taste, acidity, peduncle length, stone size and fruit ratio and dry substance content.*

Rezumat. *Cireşele prin conținutul ridicat de săruri minerale, vitamine, zaharuri uşor asimilabile, aspectul atrăgător şi gustul plăcut răcoritor sunt destinate atât consumului în stare proaspătă, fiind primele fructe proaspete ale anului cât şi prelucrării industriale sub formă de sucuri, siropuri, compoturi, gemuri, dulcețuri, băuturi alcoolice şi produse de cofetărie patiserie. Prelucrarea cireşelor sub diferite forme de industrializare a fost stabilită pe baza unor criterii specifice de evaluare pe direcții de valorificare. Evaluarea însuşirilor de structură şi tehnologice ale fructelor la soiurile şi elitele hibride de cireş create la SCDP Iaşi a fost analizată pe o perioadă de zece ani (1996-2006), la probele de fructe recoltate la maturitatea deplină din culturile de concurs existente în poligonul experimental. Au fost studiate 10 soiuri noi de cireş (Cetățuia, Cătălina, Maria, Golia, Bucium, Tereza, Iaşirom, Ştefan, Marina şi George), trei elite hibride propuse pentru omologare (HC 840830, HC 840836 şi HC 840935) şi două de cireş amar (Amar Maxut şi Amar Galata). Direcțiile de valorificare ale fructelor au fost stabilite pe baza examinărilor, degustărilor şi determinărilor la următoarele însuşiri: mărimea şi forma fructului, culoarea epidermei pulpei şi sucului, fermitatea pulpei, suculența, gustul, aciditatea, lungimea pedunculului, mărimea sâmburelui în raport cu fructul şi conținutul în substanță uscată.*

Sweet cherries by their high level of mineral salts, vitamins, easily assimilable sugars, the attractive aspect and pleasant refreshing taste are intended for both the consumption in fresh state as the first fresh fruits of the year and the industrial processing as juices, syrups, compotes, jams, marmalades, alcoholic drinks and confectionery and pastry products.

The sweet cherry processing under different forms of industrialization was established on account of some specific evaluation criteria for valorization directions.

The evaluation of the structural and technological features of fruits for the sweet cherry cultivars and hybrid elites created at SCDP Iaşi was analyzed for a period of ten years (1996-2006), for the fruit samples harvested at their full maturity from the contest cultures existing on the experimental polygon.

We studied 10 new sweet cherry cultivars (Cetățuia, Cătălina, Maria, Golia, Bucium, Tereza, Iaşirom, Ştefan, Marina and George), three hybrid elites proposed for homologation (HC 840830, HC 840836 and HC 840935) and two of bitter cherries (Amar Maxut and Amar Galata).

The valorization directions of fruits were established on account of examinations, tasting and determinations of the following features: size and fruit shape, skin colour and juice, pulp firmness, succulence, taste, acidity, peduncle length, size of stone as compared to the fruit and the contents of dry substance.

The knowledge of the physical-chemical composition of the cherry fruits constitutes a very important element to define their quality. By means of these data they may establish the cultivars that, in the respective soil and climatical conditions, have the best features and are worth being promoted, maintained in culture and bred in nursery-trees.

The alimentary value of fruits and the possibilities of integral valorization by the conservation in fresh state and as raw material for industrialization are reflected and result directly from their physical-chemical composition.

The continuous melioration of means and methods of packing, storage, transportation and distribution for the fresh fruits intended for the internal consumption or exportation and the progress made in the field of industrialization rely on the detailed knowledge of the physical and chemical features of fruits.

This paper comprises the description of the physical-chemical compositions of the most important cherry cultivars and hybrid elites created at SCDP Iaşi and the interpretation of the results obtained according to the soil and climatical conditions.

We tried to establish some criteria for the characterization and appreciation of the fruits from the physical, chemical, technological and biological and chemical viewpoint, criteria that will serve as a guide for the promotion and maintenance of these cultivars and hybrid elites, the establishing of the cultivar assortment for the influence zone of SCDP Iaşi and their zoning by regions and culture centers.

MATERIAL AND METHODS

For experimentation we used the fruits harvested from 12 cultivars homologated at SCDP Iaşi in the interval 1996 – 2006 and other three hybrid elites of cherry proposed for homologation. The cherry cultivars and hybrid elites are in two contest cultures with trees grafted on franc and mahaleb planted at distances of 5 x 4 m, guided as a free fan-shaped espalier without a sustaining system. The farm practices applied was that specific to the sweet cherry culture. We effectuated

observations and determinations concerning the productivity, date of fruit maturation, size, shape, skin colour, pulp and juice colour, pulp firmness, succulence, taste, peduncle length, stone size, contents if dry substance and acidity. The physical and chemical analyses were made on account of some parameters established by the testing guide UPOV and the requirements of the processing sector.

RESULTS AND DISCUSSIONS

Cultivar productivity. On account of the average productions obtained in the interval 1996 – 2006, within an intensive plantation (500 trees/ha) the cherry cultivars and hybrid elites under study may be grouped as follows (Table 1):

a. Very productive cultivars (over 12 t/ha);
b. Productive cultivars(10-12 t/ha);
c. Average productive cultivars (under 10 t/ha).

Fruit size. The majority of sweet cherry cultivars and hybrid elites under study have big and very big fruits (6,6 – 8,6 g the average weight of a fruit), only *Cetățuia* having medium size fruits (5,9-6,1 g). Though the bitter cherry cultivars have smaller fruits (4,5-5,9 g) the size is quite good for their category.

Fruit shape. It is variable from kidney shape (Cetățuia, HC. 840836) to heart shape (majority), two cultivars having the elongated heart shape.

By tasting they appreciated the acidity and fruit taste. Most of the cultivars and elites have a small acidity (10), five of them having an average acidity. The taste was sweet from Cetățuia and Cătălina to strong sweet, most of the cultivars and elites having an acidulated sweet taste.

Peduncle length. It was short at one cultivar (840836), long at five cultivars (Cătălina, Golia, Marina, Amar Maxut and Amar Galata) and medium for the remaining ones.

Stone size. As compared to the fruit, the stones were small (at HC 840836 and Tereza) and big to the Marina. The great majority of cultivars and elites had medium size stones and their size as compared to the fruit was also medium.

Dry substance. For the cultivars and hybrid elites under study there were values between 16% at the early cultivars (Cetățuia and Cătălina) up to 21% for the Amar Maxut. The dry substance values were high for the majority of cultivars and elites (16,8 – 20,3%).

We must mention that the data registered by percentage of dry substance were taken at the full maturity of fruits. The main technological features of fruits for the cultivars and elites studied are given in table 2.

Ripening date. The earliest fruits were obtained at the cultivars Cetățuia (21-29.06) and Cătălina (7-15.06). Most of the cultivars and elites had a medium maturation (15-28.06), two cultivars having a late maturation (Marina and Amar Galata between 28.06 and 15.07) and one having a very late maturation (George -15-25.07)

Fruit colour. The red colour was dominant with hues from red at the cultivar George, crimson red at the cultivar Cătălina up to dark red or brown at the majority of cultivars and elites. Two cultivars Marina and Amar Galata were bicolor (red and yellow) and one cultivar (Amar Maxut) was black.

Table 1

Structure characteristics of the fruits to same sweet cherry cultivars and hybrid elites. Annual average 1996 – 2006

Cultivar	Average fruits yields t/ha	Average weight -g-	Shape	Acidity	Taste	Peduncle length	Stone size	Stone size fruit ratio %	Dry substance %
				By tasting					
CETĂŢUIA	10,4	5,9-6,1	Kidney shape	Small	Sweet	Medium	Medium	6,5	16,0
CĂTĂLINA	9,6	6,8-7,8	Heart shape oblong	Small	Sweet	Long	Medium	6,5	16,0
HC. 840830	9,0	7,5-7,9	Kidney shape	Small	Very sweet	Medium	Medium	5,7	19,6
MARIA	12,1	7,4-8,3	Heart shape oblong	Small	Sweet	Medium	Medium	5,9	17,0
GOLIA	9,2	7,5-8,0	Heart shape	Small	Sweet	Long	Medium	5,2	17,5
BUCIUM	12,0	7,8-8,5	Heart shape	Small	Sweet tart	Medium	Medium	6,0	18,6
HC. 840836	9,3	6,6-7,6	Kidney shape	Small	Very sweet	Scurt	Small	5,2	18,0
HC. 840935	8,2	7,7-8,6	Heart shape	Medium	Sweet tart	Medium	Medium	6,0	17,3
TEREZA	11,5	7,0-7,8	Cordiform	Small	Sweet tart	Medium	Small	5,0	18,8
IAŞIROM	10,2	7,7-8,0	Heart shape	Small	Sweet tart	Medium	Medium to big	6,8	19,3
ŞTEFAN	11,3	7,8-8,1	Heart shape	Medium	Very sweet	Medium	Medium	5,6	20,3
AMAR MAXUT	8,1	4,5-4,7	Heart shape	Medium	Sweet tart	Long	Medium	5,8	21,0
AMAR GALATA	10,1	4,7-5,9	Heart shape	Medium	Sweet tart	Long	Medium	5,6	17,6
MARINA	12,3	7,6-8	Heart shape	Medium	Sweet tart	Long	Big	6,9	16,8
GEORGE	12,5	6,7-7,4	Heart shape	Small	Sweet tart	Medium	Medium	6,1	17,6

Tabelul 2

Tehnological features of the fruits at the new sweet cherry cultivars and hybrid elites to SCDP Iaşi. Annual average 2004 – 2006

Cultivar/elite	Ripening date	Skin colour	Juice colour	Pulp firmness	Pulp colour	Suculence
CETĂŢUIA	21-29.05	Red blackish	Purple red	Semifirm	Red	Medium
CĂTĂLINA	7-15.06	Purple red	Red	Semifirm	Red	Medium
HC. 840830	17-23.06	Red blackish	Red blackish	Firm	Red blackish	Mare
MARIA	10-20.06	Thin red	Red	Firm	Red	Medium
GOLIA	20-28.06	Roşie închisă	Purple red	Firm	Red blackish	Medium
BUCIUM	16-24.06	Red blackish	Red blackish	Firm	Red to red blackish	Big
HC. 840836	17-23.06	Red brown	Red blackish	Firm	Red blackish	Small
HC. 840935	17-25.06	Red brown	Red blackish	Firm	Red blackish	Big
TEREZA	15-23.06	Red brown	Red blackish	Firm	Red blackish	Big
IAŞIROM	14-20.06	Red brown	Red blackish	Firm	Red to red blackish	Big
ŞTEFAN	15-25.06	Red brown	Red blackish	Firm	Red blackish	Big
AMAR MAXUT	20-28.06	Black	Red blackish	Semifirm	Red blackish	Big
AMAR GALATA	28.06-8.07	Half red half yellow	White yellow	Semifirm	Yellow light	Big
MARINA	5-15.07	Half red half yellow	White yellow	Firm	White yellow	Medium
GEORGE	15-25.07	Red	Red	Firm	Red	Medium

Juice colour. Two cultivars (Marina and Amar Galata) had a white-yellowish juice colour the remainder of cultivars and elites having juice colours from crimson red to dark red.

Pulp colour. Most of the cultivars and elites it was red with hues from red to dark red except for the cultivars Marina and Amar Galat*a* where the pulp was white-yellowish or yellow-whitish.

Pulp firmness and succulence. It was high for the majority of cultivars and medium just for several favoring the consumption in fresh state with resistance to transportation and adaptability to the industrial processing.

CONCLUSIONS

1. The sweet cherry cultivars and hybrid elites studied have a good productive capacity and a very good fruit maturation for a period of 60 days from then ones with an extra-early maturation (Cetățuia) to those very late in maturation (George).

2. The 15 sweet cherry cultivars and hybrid elites provide fruits for consumption in fresh state and industrialization satisfying a large variety of tastes and requirements of the market and industry.

3. The ecological conditions of the years under study (1996-2006) had a significant influence on the conditions and especially on the fruit quality. The farm techniques applied and the moment of harvesting influenced this aspect in an equal mount.

4. Size, shape, firmness, uniformity, dominant colour of skin and pulp are basic features for the consumers of fresh cherries both on the internal market and the exportation.

5. Taste, flavour, succulence, juice colour, stone size, the adherence of pulp to stone, the easiness of peduncle separation, acidity and the contents in dry substance are essential characteristics in the industrialization process.

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THE PLANTING MATERIAL- IS A DECISIVE FACTOR FOR OBTAINING THE FIRST HARVESTS

MATERIALUL SĂDITOR – FACTOR DECISIV LA OBȚINEREA PRIMELOR RECOLTE

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Abstract. *The orchard was founded in spring of 2004 with crowned fruit trees of type "KNIP-BAUM". The plantation distance is 3,25x1,25 m, the mother/father plant M9, studied varieties: Idared, Golden Delicious Reiders, Jonagold de Costa and Čampion.*

It was established that the planting material of kind "KNIP-BAUM" utilized for the apple plantations allows to obtain the first crop just the plantation year (0,71-1,03 t/ha). The fruit production the second year depending on the soil biological features constituted 11,91-18,11 t/ha, but the third year was 17,62-26,60 t/ha of superior quality fruits.

Rezumat. *Livada a fost înființată în primăvara anului 2004 cu pomi cronați de tipul „KNIP-BAUM". Distanța de plantare 3,25 x 1,25 m, portaltoiul M 9, soiurile studiate: Idared, Golden delicious Reinders, Ionagold Decosta și Szampion.*

S-a stabilit că materialului săditor de tipul „KNIP BAUM" utilizat la fondarea plantațiilor de măr permite de a obține prima recoltă chiar în anul plantării(0,71-1,03 t/ha). Producția de fructe în anul doi în funcție de particularitățile biologice ale soiului a constituit 11,91-18,11 t/ha, iar în anul trei 17,62-26,60 t/ha de fructe de calitate superioară.

The strategic direction of the durable development of the fruit growing consists of the gradual replacement of the exhausted orchards with new type ones having productivity potential and fruit quality of 1,3-1,5 times higher than those anterior practiced (1,2,6).

The foundation of the apple intensive plantation in Holland, Poland, Germany, Italy etc occurs with crowned fruit trees of "KNIP-BAUM" type whose age is 2 years with superior biological values. On choosing of the varieties a particular attention is paid to the fact that these ones should be recommended in the CE countries having a capacity to form floral bunds on the annual growths. It allows that the second year after plantation to obtain a production of 4-5 kg/tree and the fourth year 15-18 kg/tree (3,4,5,7).

MATERIAL AND METHODS

In spring of 2004 at the "Codru-ST" firm, in the frame of a project financed by the Holland government, on a surface of 4 ha it was effectuated the plantation of a demonstrative orchard. In a study they were utilized crowned fruit trees aged two years of "KNIP-BAUM" type, Idared, Golden Delicious Reinders, Jonagold de Costa and Čampion varieties grafted on the mother/father plant M9.

The important fruit trees Holland constitute a material with superior biological qualities. As a witness served the Idared variety homologated in the Republic of Moldova.

As support elements they were utilized wood pillars and wire, and every fruit tree was palisades with help of the bamboo tutor. The soil was maintained grassy on the intervals between the ranges and herbicides field on the bands between the fruit trees on the range with the width of 1,2 m, the dripping irrigation.

The repetitions number in every variant is of four. The number of fruit trees in every repetition in 8. The emplacement of the repetitions is blocks, of the evidence fruit trees rendomizantly in every repetition. The fruit trees are directed under the system of structured axis with the horizontalization of the branches and young shoots by their attachment to the support elements.

RESULTS AND DISCUSSIONS

The first fruits crop was obtained the first year after plantation, because the plantation was founded with fruit trees of "KNIP-BAUM" type at which the majority of the terminal buds were generative.

Table 1

The fruits production in the plantation at the different apple varieties planted with fruit trees of "KNIP-BAUM" type, t/ha

Variety	2004 year	2005 year	2006year	Sum 2004-2006 year
Idared	0,71	13,53	19,56	34,51
Golden Reinders	1,03	11,91	26,60	39,54
Ionagold de Costa	0,73	18,11	20,59	39,43
Čampion	0,78	13,88	17,62	32,48
DS 5%	0,21	1,75	2,64	-

In 2004 the most fruits production recorded the Golden Reinders variety (1,03 t/ha). The Idared, Ionagold de Costa and Čampion varieties the fruit production is at the same level making up 0,70-0,78 t/ha.

In 2005 the least fruits production were recorded at Golden Reinders variety – 11,91 t/ha, but the most productive was the Ionagold de Costa variety – 18,11 t/ha. At Idared and Čampion varieties were recorded a productivity of 13,53-13,88 t/ha.

In 2006 the most productive was the Golden Reinders variety-26,60 t/ha, and the least production was recorded at Čampion variety 19,62 t/ha. The Idared and Jonagold varieties registered an average productivity of 19,56-20,59 t/ha.

The accumulated production of fruits during three years after plantation at the studied varieties constituted 32,28-39,54 t/ha. The highest cumulated production of fruits were recorded by the Ionagold de Costa and Golden Reinders varieties- 39,43-39,54 t/ha. In succession in diminution are placed the Idared variety- 34,81 t/ha and Čampion one- 32,28 t/ha.

All the agro technical measures effectuated in the fruit trees plantation are directed to the obtaining of a high production being regulated and competitive on the principal indexes of the fruit quality is considered the diameter of the fruits.

On the fruit diameter influence the fruit production and the soil biological peculiarities. All the fruit production obtained during the investigations corresponded to the standards in force and the investigated index at the mentioned varieties was between the limits of 70-90 mm (table 2).

At the Golden Reinders variety whose fruit has a cone-shaped form the biggest weight were constituted by the fruits having the diameter of 70-85 mm, the average constituted of 78,3 mm. at the Idared variety whose fruit is flat the studied index constituted of 70-90 mm, the average diameter was 79,6 mm. At Ionagold de Costa 16,4 percents of fruits had a diameter of 81-85 mm. the rest of fruits had the diameter bigger than 85 mm. at the Čampion variety the fruits weight with the diameter of 76-85 mm and bigger than 86 constituted respectively 62,5 and 37,5 percent.

Table 2

The weight of the fruits with different diameter at various apple varieties planted with fruit-trees of the "KNIP-BAUM" type, %

Variety	Diameter of fruits, mm					
	70-75	76-80	81-85	86-90	90	Average
Idared	8,0	30,0	30,0	20,0	12,0	81,5
Golden Reinders	35,0	50,0	15,0	-	-	76,5
Ionagold de Costa	5,0	45,0	45,0	5,0	-	80,0
Čampion	6,0	17,3	34,7	26,3	15,7	83,2

So, the precocity of the fruit trees fructification, the fruits production on the one unit of surface and its quality are hereditary properties and depend on the soil biological features and the planting material type utilized for the foundation of the fruit trees plantations.

CONCLUSIONS

1. The first crop of 0,71-1,03 t/ha was obtained during the plantation foundation year (2004) from the terminal burgeons differentiated on the anticipated branches in the fruit growing seed bed in the period of fruit trees crowning.
2. The fruits production is in growing the third year too, after plantation, the productivity of the Golden Reinders variety made up 26,60 t/ha and of Čampion, Idared and Ionagold de Costa varieties constituted respectively 17,62, 19,56 and 20,59 t/ha.
3. The production of obtained fruits meets CE standards requirements because the fruits diameter at all varieties in study was bigger than 70 mm.

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SEASONAL DYNAMICS OF NITROGENOUS CONTENT ON SOME SEEDLING CULTIVARS OF FRUIT TREES

DINAMICA CONȚINUTULUI ÎN AZOT LA PUIEȚII UNOR CULTIVARE DE PĂR ŞI PRUN

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Abstract. *The accumulation of nitrogen increased during the development of graft combinations in several fruit tree species. A different pattern in nitrogen accumulation was found in the graft point. Concretely, the nitrogen amount decreased from the scion to rootstock. A low degree of graft compatibility was associated to reduced nitrogen content above the graft point*

Rezumat. *S-au facut determinari ale continutului in axot total in diferite zone ale tulpinei pe parcursul perioadei de vegetatie la cateva combinatii de pomi altoiti in scopul elucidarii dinamicii acestui parametru prin prisma interactiunii altoi /portaltoii la combinatii cu grad diferit de compatibilitate. S-a constatat o crestere a continutului de azot pe parcursul ciclului anual al pomilor. De asemenea s-au remarcat diferente privind acumularea azotului in zona punctului de altoire la diferite specii studiate.i*

INTRODUCTION

Nitrogen is mainly present in the nature in the molecular form or as insoluble nitrites, which are not assimilated by plants. In soil, it is bound in soluble salts in a relatively low percentage. In spite of this, it is an important macroelement for plants where it is found mainly (15-19% from the total nitrogen content) in plasmatic proteins. In this way it is used for the generation of cellular constituents or it can be used as component in some physiologically active substances necessary in the energetic processes of the cells. A small nitrogen amount participates to the generation of nitrogen bases, ferments, and vitamins. It also participates to the formation of chlorophyll molecules and in the form of amide it can be used as source of ammonia. In the ionic form it plays an important role in the regulation of pH, osmotic process and in the cellular redox potential. The deficit in nitrogen has a greater impact on photosynthetic processes than other nutritive substances.

MATERIALS AND METHODS

The biological material used was four two-years old cultivars of fruit trees: pears cultivars Curé and Euras grafted on Cydonia oblonga BN 70, plum cultivar Stanley and apricot cultivar Goldrich, both grafted on Prunus cerasifera.

The seasonal dynamics of nitrogenous compounds were investigated under natural conditions during summer and autumn. The samples are collected among the three shoot zones relative to the graft point: at 2 cm above the graft union, at the grafting point and 2 cm below the graft union point.

The nitrogen content of each of the samples was estimated using the Kjeldahl technique and Kjeltech apparatus as described by Davidson et al (1970)

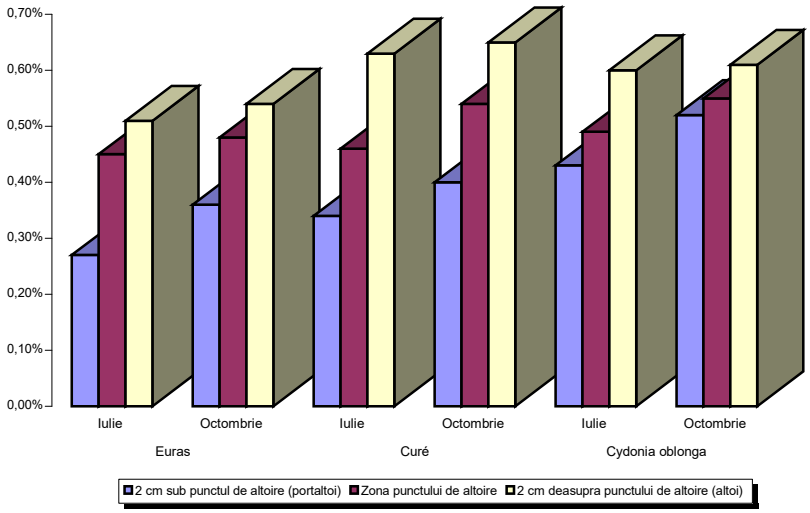
RESULTS AND DISCUSSIONS

The total nitrogen content during the developmental stages in the Euras and Curé cvs grafted on compatible quince rootstock (*Cydonia oblonga* BN 70) slightly increased (Fig. 1). There were differences in the nitrogen accumulation among the three shoot zones relative to the graft point. The amount of nitrogen in different plant parts was dependent on different phenomena such as:

- the absorption of nitrogen; this occurs in roots and it is ascendant transported to the leaves;
- the metabolic activity; the absorbed nitrogen is used in plant metabolism where it is incorporated in different biologically active compounds, such as proteins, chlorophylls amines etc. They are found in the tissues with an intense metabolic activity (parenchyma).

In compatible combinations, the ascendant flux through the graft union is easily occurring, so that our results indicate that the regeneration of xylem was successful in those species. In the same time, the amount of nitrogen was higher in the grafted plants (at the graft point) than in those (ungrafted) used as control. This can be explained due to the formation of tissues with an intense metabolic activity like callus or medullar parenchyma at the scion/rootstock junction.

Fig 1. Dinamic and pattern of nitrogen accumulation in pear cultivars Euras and Cure grafted on *Cydonia oblonga* BN 70



The plants grafted on *Prunus cerasifera* presented higher oscillations in the nitrogen amount although there was found a similar pattern of changes. In addition, for the Goldrich cv, the amount of nitrogen is lower above the graft union point than that detected to the Stanley cv or to control. The Goldrich/*Punus cerasifera* combination has a lower degree of compatibility meaning that the regeneration of phloem and xylem was made to a lower extent than for other combinations. This could induce a blockage in the sap ascendant flux at the graft union point leading to the accumulation of nitrogen compounds in this point.

Fig 2. Dinamic and pattern of nitrogen accumulation in Goldrich and Stanley cvs. grafted on *Prunus cerasifera*

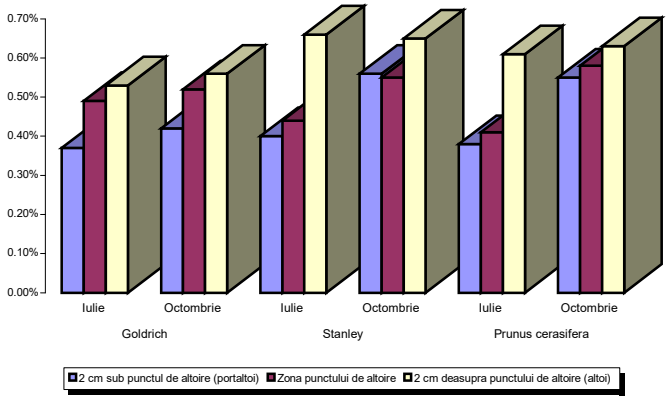
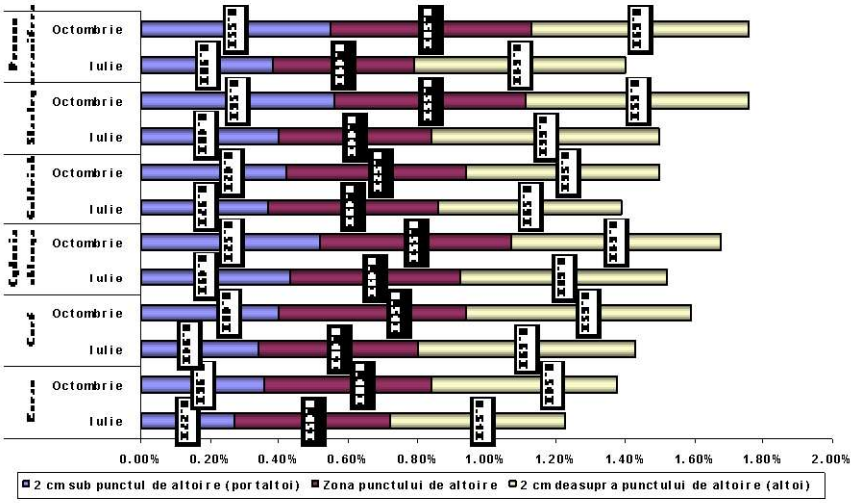


Fig. 3 The dinamic of nitrogen accumulation in the summer-autumn season in Euras, Cure, Goldrich, Stanlei cvs. *Cydonia oblonga* BN 70 and *Prunus cerasifera*



Concerning the dynamics of nitrogen accumulation during the plant development we found significant differences between the investigated species. The lower oscillations were found for the *Prunus armeniaca* cv Goldrich fact that could be correlated with the low metabolic activity of this species in this period of the annual cycle, being well known the fact that this species has a earlier recumbence period as the other species.

CONCLUSIONS

1. The nitrogen amount increased during the developmental stages at all investigated species.
2. The accumulation of nitrogen during the developmental stage registered highly variations, excepting the Goldrich cv where the dynamics of nitrogen accumulations was the most insignificant.
3. A different pattern of nitrogen accumulation was found in shoots where the highest nitrogen accumulation was registered above the graft union point, medium accumulation at the graft point and minimum accumulation below the graft union point.
4. A reduction in the nitrogen content was found above the graft union point at the Goldrich cv as compared to other species due to the low degree of compatibility of this graft combination.

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ETUDE APROPOS DE LA QUALITE DES FRUITS ET LA PRODUCTIVITE DE QUELQUES VARIETES DU FRAMBOISIER

STUDII PRIVIND CALITATEA FRUCTELOR ŞI PRODUCTIVITATEA UNOR SOIURI DE ZMEUR

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Rezume. *Le framboisier est une des cultures les plus repandues parmis les arbres fructiferes en Republique de Moldavie. Les sourfaces de framboisier sont en croissance et en 2004 ont atteint environ 390 ha. Les baies du framboise sont plus utilises pour la comercialisaqtion en etat frais. Les varietes du framboise qui sont cultives plus souvent pour leurs fruits sont: Barnaulisca, Scromnitsa, Delbard Magnifique, Rubin bulgarian et Liulin. Dans ce travail sont presentes les resultats des investigations (les annees 2002-2005) dans le cadre duquel on a etudie la productivite et la calite des fruits a 28 de varietes de farmboisier importe Republique de Moldova.*

Rezumat. *Zmeurul este una dintre cele mai răspîndite culturi printre arbuştii fructiferi cultivaţi în Republica Moldova. Suprafeţele cultivate cu zmeur sunt în creştere şi în anul 2004 a atins circa 390 ha. Bacele de zmeur sunt utilizate mai mult pentru comercializare în stare proaspătă. Soiurile de zmeur, care se cultivă mai des pentru fructe sunt: Barnaulisca, Scromnitsa, Delbard Magnific, Rubin Bulgarian and Liulin.*
În lucrare sunt prezentate rezultatele investigaţiilor (anii 2002-2005) în cadrul cărora au fost studiate productivitatea şi calitaea fructelor a 28 soiuri de zmeur introduse în Republica Moldova.

METHODES ET MATERIEL

La plantation a ete fondee en 2001 dans le champs experimental de l`Institut de Recherches Fruitiere de Chisinau. Dans l`etude on a inclus 28 varietes de framboisier, la distance de plantation: 2.5x0.5m, le varieteparmis lesquels et Barnaulisca,

RESULTAT ET DISCUTION

La plus grande production du framboise vient d`Europe avec une recolte anuelle de 115200 t qui constitue 50% de la production mondiale, les pays CSI produisent 40% et 10% provient d`Oceanie et des Etats Unis. Parmis les plus importants producteurs du framboise sont: Russie- 90000 t, Pologne – 40000 t, Allemagne- 20000t, Hongrie- 18000 t, Grande Bretagne- 11000 t, France- 8000 t [1].

La culture de framboisier a une haute resistence au gel, donne des fruits regulierement et une recolte calitative qui permet la recuperation rapide des investitions pour la fondation des plantations [3]. Les donnees des conditions climatiques sont presentees dans les tableaux 1, 2.

Table 1

Conditions climatiques, precipitations (mm) en Republique de Moldova

Mois	Moyenne 1891-1980	2002	2003	2004	2005
I	33	16,7	56,1	87,8	37,9
II	33	1,8	22,6	97,9	111,4
III	31	58,7	12,4	31,0	14,8
IV	39	30,6	34,9	28,0	49,5
V	52	10,4	20,6	75,0	75,8
VI	72	60,1	21,6	11,0	104,8
VII	64	133,4	17,4	101	17,6
VIII	49	80,6	27,4	25,6	150,9
IX	38	47,1	52,7	69,6	4,9
X	34	84,2	62,1	33,4	11,0
XI	42	76,2	9,9	72,3	48,1
XII	36	18,2	38,7	19,3	33,6
Moyenne /an	523	618,0	376,4	651,9	660.3
Moyenne/III-X	379	505,1	249,1	374,6	429.3

Table 2

Conditions climatiques, temperature (oC) en Republique de Moldova

Mois	Moyenne 1891-1980	2002	2003	2004	2005
I	-3,5	-1,9	-3,0	-3,8	1,2
II	-2,2	4,9	-5,5	-0,4	-2,7
III	2,6	7,2	1,0	5,4	2,3
IV	9,7	10,4	8,5	10,8	10,5
V	15,9	17,9	11,6	14,8	16,5
VI	19,4	20,1	21,2	19,3	18,6
VII	21,4	24,3	21,6	21,7	27,7
VIII	20,7	21,3	22,6	21,1	21,8
IX	16,0	16,6	15,6	15,9	18,3
X	10,1	9,5	9,9	11,4	17,2
XI	4,1	6,5	5,4	5,2	4,6
XII	-0,8	-4,8	0,4	2,1	1,2
Moyenne/an	9,45	11,0	9,04	10,29	11,43
Moyenne/III-X	14,50	15,9	13,9	15,05	16,61

Les conditions climatiques de Republique de Moldova se caracterisent plus souvent par une hiver froide avec du neige, parfois le gel d`hiver affectent les palntes du famboise, le niveau d`affectation depends de la resistence de la variete.

Souvent l`ete est privee d`eau (300- 600 m precipitations par an) et avec des temperatures hautes entre 20,1- 27, 7 degres C. Les varietes etudiee commence leur vegetation au debut d`avril.

Pour les conditions de Moldava, la hauteur des plantes de framboisier oscille entre 1,2- 2,5m. Pour obtenir une augmentation des recoltes et des fruits calitatives il est necessaire d`avoir un plus grand nombre des plantes bien developpees a une unite de surface avec une hauteur de 1,4- 1,6 m et une epaisseur d`environ 1 cm [4].

La productivite et la qualite des fruits par varietes depends de la quantite des precipitations, les temperatures auquels sont exposees les plantes pendants l`annee, de la resistence des varietes (tableau 3).

En Republique de Moldova il n`y a pas de varietes autochtones du framboise, crees pour les conditions pedo-climatiques existantes et les producteurs moldaves sont inetreses de cultiver des varietes productives avec des fruits d`une calite superieure et avec des differents periodes de maturation des bais pour obtenir une augmentation de revenu. L`introduction des nouveaux varietes du framboise necessite une etude de leur adaptibilite aux conditions pedo-climatiques de Moldova. D`apres les resultats presentees dans le tableau 2 on a etabli que la masse moyenne des fruits du framboise est de 2,35 g avec la limite de variation entre 1,4 g Kuthbert et 3,2 g Hibrid bulgarien. On a obtenu les plus grands fruits aux varietes suivantes: Hibrid bulgarien (3,2 g), Delbard Magnifique, Stolicina (3,0 g), Rubin (2,9) et au variete temoin Barnaulisca (1,8). La recolte moyenne obtenu par hectare a atteint 6,15 t avec la limite de variation entre 2,0 t/ha - la variete Kuthbert et 10,3 t/ha - la variete The Latham.

Les baies du framboise contient beaucoup des calories, il sont riche en vitamines et mineraux qui ont une grande importance dans le processus de la digestion et les plus recentes recherches ont determines qu`une serie des elements qu`il contient combat le cancer [2].

Parmis les indices d`apreciation de la qualite des fruits il y a le rapport entre le sucre et l`acide exprime par le coeficient sucre/acide et la note de degustation des fruits.

Plus les indices sont eleves, plus la qualite des fruits est elevee, les indices les plus eleves on les a determine aux varietes suivantes: Indian Summer (5,87), Walfriend (5, 65), Paull Camerzind (5,45), Barnaulisca (5,71), The Lathan (5,38).

Les meilleurs apreciations pour leurs fruits frais ont ete atribuees aux variations suivantes: Marfilk (4,92), President (4,8), Solnisco, Loyd George (4,71), Balsam (4,7).

Table 3

La qualite des fruits est la productivite des certains varietes de framboise, les annees 2002-2005.

Varietes	Masse moyenne de fruit, g	Recolte t/ha	Coeff. sucre /acide	Notte de degustation
1.Barnauliska (temoin)	1,6	5,8	5,61	4,58
2.Indian Summer	1,6	5,8	5,87	4,56
3.President	2,7	5,5	3,09	4,80
4.Paphinder	1,5	5,9	3,7 0	4,57
5.Khirjatci	2,4	9,4	2,94	4,57
6. Stolicina	3,0	6,1	3,21	4,64
7.Delbard Magnifique	3,0	9,3	3,26	4,59
8. Rubin bulgarien	2,4	8,9	2,40	4,63
9.Hibrid bulgarien	3,2	8,6	2,92	4,67
10. June	1,3	2,1	4,70	4,49
11.Marfilk	2,7	8,3	3,03	4,92
12.Kobfuller	2,8	4,6	2,55	4,46
13.Mallling Promiss	1,9	7,2	3,01	4,66
14.Meteor	1,7	3,3	4,21	4,64

15.Lazarevskaia	2,4	6,4	4,09	4,68
16.Brigantina	1,6	6,0	3,16	4,67
17.Balzam	2,0	5,4	3,01	4,70
18.Solnâşco	1,9	7,3	2,93	4,71
19.Lloyd George	2,6	7,4	3,72	4,71
20.Rubin	2,9	9,5	2,50	4,67
21.September	2,8	7,2	3,24	4,63
22. Walfried	1,6	7,1	5,65	4,60
23.Taylor	1,9	5,8	5,20	4,64
24.The Latham	1,9	10,3	5,38	4,62
25.Mallling Jewel	2,2	7,5	2,64	4,68
26.Roşu Wadensvil	1,6	7,1	3,94	4,50
27.Paul Camerzind	1,9	5,0	5,45	4,55
28.Kuthbert	1,4	2,0	-	4,62
Limite de variaţion	**1,4-3,2**	**2,0-10,3**	**2,4-5,87**	**4,46-4,92**
Moyenne	**2,30**	**6,15**	**4,14**	**4,69**

La limite de variation de qualite des fruits pour les annees 2002-2005 (tableau 4) nous permets de constater que les indices les plus elevees de la masse des fruits ont ete determinees en 2005: jusqu`a 3,7 g, la recolte maximale a ete obtenu en 2003: jusqu`a 20,8 t/ha, le coefficient sucre/acide en 2004 a atteint la chiffre de 9,02 et la notte pour la degustation de 4,96 a ete obtenu en 2003.

Table 4

Limite de variation du qualite des fruits et la productivitee du framboise

Indicateurs	2002	2003	2004	2005	Moyenne
Masse moyenne de fruit, g	1,1 - 4,9	0,8 - 3,4	0,7 - 2,6	1,5–3,7	0,9 -3,6
Recolte, t/ha	0,4 - 8,0	3,6 - 20,8	1,8 - 9,6	2,2–12,8	1,9 -12,8
Sucre / acide	1,72-6,6	1,5 - 6,44	2,4 - 9,02	-	1,87-7,36
Notte de degustation	4,5-4,88	4,42-4,96	4,42-4,79	4,3–4,86	4,45-4,88

CONCLUZION

En s`appuyant sur les resultats obtenus pendant la periode de 2002-2005, on peut dire que la productivite du framboise depends des plusieurs facteurs, en special de la variete, des conditions climatiques, du coeficient sucre/acide entre 2,4- 5,87 et la notte de degustation entre 4,46- 4, 92. l`etude effectue sur la framboise a mis en evidence les varietes suivantes: The Latham, Delbard, Magnifique, Rubin, Chirjaci, Rubin bulgarien, Hibrid bulgarien.

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RESULTS CONCERNING DEPORTMENT OF PEACH AND ALMOND VARIETIES ON SLOPES IN N-V ROMANIA

CERCETĂRI PRIVIND COMPORTAREA SOIURILOR DE PIERSIC ŞI MIGDAL PE TERENURILE ÎN PANTĂ DIN NV ROMÂNIEI

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Abstract. *Under soil, climate and orographic of Oradea studies were carried out, concerning the trees comportment on various shapes of relief. The biological material consisted of the species peach and almond trees, aged 3-10 years. The data regarding the growth show that the hills in the perimeter of Oradea fruit-growing leas in can be turned to account further on, by all the fruit-tree species of the temperate zone. The tree grow better on gentle slopes and on slightly inclined platforms, where the general slope should not be over 10-12 percent. The tree planting on terraces manages gave poor results as compared to the zones with no terraces. The data concerning the growth are however contradictory as to the trees position on the terrace platform; the comportment of peach-trees and almond-trees is better when they are planted on the top side of the platform.*

Rezumat. *Studiile au fost efectuate în condiţiile de sol, climă şi orografie ale zonei Oradea, referitor la comportarea pomilor în diferite zone de relief. Materialul biologic folosit la piersic şi migdal avea vârsta cuprinsă între 3 şi 10 ani.Informaţiile referitoare la creştere indică faptul că dealurile din perimetrul Oradiei, pot fi utilizate de toate speciile de pomi fructiferi din zona temperată.Pomii cresc mai bine în zone uşor înclinate şi în zone de pantă, unde înclinarea să nu depăşească 10-12%. Plantarea de pomi efectuată în zonă terasată a dat rezultate slabe comparativ cu cele fără terase. Informaţiile legate de creştere sunt variate în cazul poziţiei pomilor fructiferi pe platforma terasei. Comportarea piersicilor şi migdalilor este mai eficientă cânt sunt plantaţi în partea de vârf a platformei.*

INTRODUCTION

Not only the fruit-trees' species and varieties spreading but also the quantity and quality of the fruit production is close related to soil type, climate conditions and level of the applied technology.

The relief is an element that has an indirect influence over the fruit trees, so the climate and soil conditions are negatively or positively influenced. This type of changes may create some unfavorable conditions concerning fruit growing, like the level which must not be higher than 1,5-2 m.

In our country, the fruit trees department on slopes with a hard relief might become a problem, so there are tendencies to find an appropriate relief for fruit growing.

MATERIAL AND METHOD

Oradea is situated on the junction of the Western Plain with the Western Hills, with a medium temperature of 10,1°C and a pluviometrical regime, near 625 mm yearly.

The experience takes place on a slope, the characteristic soil is dark soft podsoled, with a high clay content (to 50%), which determines a regime, less favorable for fruit trees, the apparition of springs and sliding areas, in the years reach in precipitations.

The used variety was Redhaven grafted on the Oradea 1 peach, ten years old and the almond variety, called Pomorie, grafted on four parent stocks, three years old. The relief is the basis of the 3-5% slopes, representing ballasting fulfilled once the soil activities have been done.

Reproof made on the studied material are the following:

- the trunk circumference measurement
- trees' height
- thickness and length of the paling

There were taken eight trees in three repetitions and the results were statistically analyzed.

RESULTS AND DISCUSSIONS

The growth of the peach-trees planted on a undeveloped slope, after ten years is presented in table 1. Regarding to the presented results, follows that the slope basis with a percentage of 25% had a positive influence over trees' growth, comparing to the trees situated on higher slopes, where the yearly soil developments damaged the soil. In this case, the circumference was 6% lower, the difference was not statistically analyzed. In conclusion, the favorable place for peach-trees are terraces with 10-12% slopes.

Table 1

The department of peach-trees planted on a antierosion undeveloped soil in Oradea's area (ten years' plantation, Redhaven variety).

Nr	Relief	Trunk's circumference			Trees' height		
		cm	%	dif.	cm	%	dif.
1	Slopes' base	39,1	100	-	3,6	100	-
2	Ballasted slope	36,9	94	-2,2	3,5	97	-0,1
DL 5%		8,2			0,73		

Concerning peach-trees department developed in terraces, comparing to the plant base (Table nr.3), experiences show a favorable situation in case of the trees planted in terraces downstream, with positive differences obtained statistically and a negative deportment of trees planted upstream, including trees with a 15,6% lower circumference comparing to those situated on the base of the undeveloped slope.

A similar situation is that of the elements that determine wreath's development. The main reason of these differences between the two rows of the same terrace is because of the rich precipitations in the last three years (of the four from the planting period). This offered a rich water supply and created an overfilling for the threes situated upstream.

Table 2

Relief influence over peach-trees growth in Oradea (ten years plantation, Redhaven variety).

Nr	Relief	Circumference (cm)	%	Dif.	Meaning	Gap percentage	Height (m)	%	Dif.	Meaning	Wreath's width
1	Slopes base	22,4	100	0	-	3,84	3,00	100	0	-	2,27
2	Downstream tree terrace	23,1	103,2	0,7	xxx	19,04	3,03	101,0	+0,03	-	2,33
3	Upstream tree terrace	18,9	84,37	-0,5	000	21,42	2,50	83,3	-0,50	00	1,97
DL 5%		0,19				0,18					
DL 1%		0,32				0,29					
DL 0,1%		0,59				0,55					

Table 3

Relief's and parent stock's influence over almond's thickness growth after three years from planting

Parent stock / Relief	Amydalus				Almond				Peach			
	Circum ference	% Mt	Dif.	% gaps	Circum ference	% Mt	Dif.	% gaps	Circum ference	% Mt	Dif.	% gaps
Slope's base (Mt)	7,65	100	-	16,6	8,22	100	-	-	11,75	100	-	-
Downstream planted trees	7,43	97	-0,22	23,3	8,16	99	-0,06	7,7	8,80	75	-2,95	7,7
Upstream planted trees	5,31	69	-2,34	16,6	4,98	59	-3,24	16,6	8,18	70	-3,57	16,6
Parent stock	6,79	-	-	18,8	7,12	-	-	8,1	9,58	-	-	8,1

	Plum				Relief			
Parent stock / Relief	Circum ference	% Mt	Dif.	% gaps	Circum ference	% Mt	Dif.	% gaps
Slope's base (Mt)	8,76	100	-	15,8	9,09	100	-	8,1
Downstream planted trees	6,05	69	-2,71	25	-7,61	84	-1,48	15,9
Upstream planted trees	5,44	62	-3,32	40	-5,98	66	-3,11	22,4
Parent stock	6,75	-	-	26,9	-	-	-	-

The influence that relief and parent stock had after 3 years wreath's thickness growth on almond-trees is shown in table nr.3. The best results are obtained by the trees planted in the downstream part of the terrace. Trees planted upstream have a bad result (66% Mt).

This decreasing order is valid even for the medium results on the four parent stocks, the trunk thickness is minimized by almond- and plum parent stocks.

Concerning gaps, the percentage is increasing from the trees planted on the slope's base (8,1%) to those on the downstream (15,9%) and those on the upstream (22,4%).

Almond-trees deportment related to the three variants is similar to the peach-trees' one (Table 2), being influenced by the same conditions, where the main role had the water fallen from precipitations.

CONCLUSIONS

Analysis made by the two stoning species (peach and almond) cultivated in Oradea's fruit growing area, concerning behavior related to the growth influenced by the soil's orography and the fruit-trees' position on different relief, represents an useful hint in formulating some preliminary conclusions:

- The hills from Oradea's fruit growing area might be used by planting fruit-trees specific for the climate conditions of the area.
- Fruit-trees planting is more efficient on the soil with gradual slopes and on tablelands slow skewed.
- Good results, similar to those obtained from slow slopes and tablelands, are obtained in case of planting fruit-trees on 10-12% unterraced slopes.
- Fruit-trees planted on terraces arranged before, had bad results.

In case of the ten years' peach trees and three years' almond trees, the best growth results were obtained at the upstream planted trees.

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RESEARCH ON THE NEW PARENT STOCKS' SELECTION FOR THE PEACH SPECIES

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Abstract*. This paper represents a synthesis of research results performed between 1998-2206 at the Research Fruit-growing Station Bihor,regarding the revealing and the selection of new parent stocks for the species peach,of 8 selections.*

This research started at a nursery and continued at an orchard stage.From the studying material there were chosen 8 selections of peach from the cultivated and unprompted flora.

After finishing the research,specialists came to the conclusion that the best results could be obtained at the parent stocks Zafara,Bonami,Elita de Balc.

At the orchard stage the best results from the grafted variants were obtained at the following parent stocks: Bonami, Farhad, Franc (composition), Elita de Balc.

Rezumat. *Aceasta lucrare prezinta o sinteza a rezultatelor experientelor realizate intre anii 1998-2006, la S.C.D.P. Bihor,privitor la cercetarea si selectia de noi portaltoi de piersic .*

Cercetarile au inceput in faza de pepiniera si au continuat in faza de livada.Pentru materialul supus cercetarii au fost alese 8 selectii de piersic din flora cultivata si spontana.

Dupa terminarea cercetarilor ,specialistii au putut observa ca cele mai bune rezultate au fost obtinute la portaltoii Zafara,Bonami,Elita de Balc.

In faza de livada,cele mai bune rezultate la variantele altoite s-au obtinut la portaltoii Bonami,Farhad,Franc(amestec),Elita de Balc.

Peach is one of the most valuable fruit-tree species, because of their very well appreciated fruits. This species find favorable growing and developing conditions in the North-Western part of the country. From the factors that lead to an important quantitative and qualitative production, from one year to another, a big role plays the parent stock. There were conducted many studies concerning parent stocks' establishment on habitat. This studies were carried out by many researchers (Casavela, 1965, Măiescu 1969, Ionescu and partners in 1974).

The climate conditions, but especially the soil's one with a high clay content established studies of identification and selection of new parent stocks, which show adaptability to these soils and which have upper characteristics.

The studies started with the nursery stage at S.C.D.P. Bihor (1995-1998) and continued with the orchard stage (1998-2006). The climate conditions in the nursery stage were represented by annual average temperature of 9,1°C – 10,1°C and the amount of precipitations of 501-707 mm; on the orchard stage the annual

average temperature was 10,1°C and the precipitations' amount was near 577,2 mm. The soil where studies were carried out was brown podsoled, with a pH of 5,51-6 and a humus content of 1,07-1,85%.

MATERIAL AND METHOD

The material was represented by eight peach selections (table 1) from the spontaneous and cultivated flora.

Table 1

The coming up percentage and the entire and STAS seedling plant production at the peach parent stock selections

Number	Type	Seedling plant 's coming up percentage (m^2)	Entire seedling plant's production thousand/ha	STAS seedling plant production thousand/ha	Root's length (cm)
1.	Franc(composition)	46	451	395	196
2.	Farhad	60	600	317	190
3.	H.Hole (Mt)	54	533	475	176
4.	Nikitski	53	523	498	210
5.	Zafara	69***	686	540	183
6.	Elberta	54	536	465	178
7.	Bonami	66***	657	585	192
8.	Elita de Balc	67	670	635	202
	Medium	**59**	**582**	**489**	**191**
	DL 5%		6,62		
	DL 1%		8,34		
	DL 0,1%		11,81		

The planting distance was 40 cm at the seedling plant's nursery and the researching method was that of geometrical blocks, with four repetitions. The surface of a repetition land was 12 m^2. At the fruit-trees nursery, it was used the subdivided lands' method with three repetitions, assuring 25 ingathering plants. The planting distance was 90/25 cm.

In the orchard there was used the randomized blocks' method with three repetitions and the planting distance was 4/3 m. There were grafted three peach species: Springold, Cardinal and Redhaven.

The observations and analyses made were those concerning the scoming up percentage, seedling plant's STAS production, the grafted fruit-trees production at a planting density of 45.000 seedling plants/ha, trunk's thickness growing, the copse medium growth, the wreath's volume and fruits' production. The applied technology on the studied selections was the same applied in usual conditions of production.

RESULTS AND DISCUSSIONS

The coming up percentage and the seedling plant's entire STAS production is given in table nr.1. As given, a high coming up percentage between 66-69% comparing to Mt (54%) had Bonami, Elita de Balc and Zafara. A low coming up percentage had Franc (composition) 44%. The STAS production had high values at the species Bonami and Elita de Balc (585-635 thousands/ha) comparing to Mt of 475 thousand/ha, being significant higher. Low seedling plants productions were obtained at Farhad selection – 317 thousand/ha comparing to 475 thousand/ha in case of Mt, being significant lower.

The grafted trees STAS production (in thousand/ha, table nr.2) had high results in case of: Zafara, Bonami, Elita de Blac, situated between 23.000-24.555 pieces/ha, significant higher and low productions in case of Nikitski with 7,967 pieces/ha, significant lower comparing to Mt (12.000 pieces/ha).

Table 2

The grafted trees' STAS production at a planting density of 45.000 pieces/ha

Number	Rootstock	Variety			
		Springold	Cardinal	Redhaven	Parent stock medium
1.	Franc	6.750	8.100	16.200	13.000
2.	Farhad	13.500	17.550	16.500	15.750
3.	H.Hole (Mt)	9.449	17.850	10.800	12.600
4.	Nikitski	6.350	10.800	6.750	7.967
5.	Zafara	22.500	23.550	22.950	23.000***
6.	Elberta	12.150	10.800	14.850	12.600
7.	Bonami	22.800	24.500	22.983	23.428***
8.	Elita de Balc	24.200	24.883	24.583	24.555***
	Medium	**14.172**	**17.254**	**16.952**	**16.613**
	DL 5%				4.475
	DL 1%				5.960
	DL 0,1%				7.714

The trunk's thickness growth (table nr.3) given by the trunk's section's surface, had high values in case of selections: Bonami, Nikitski, Ferhad, Franc (composition) and Elita de Balc, situated between 44,8-67 cm^2 comparing to 39,5 cm^2 at Mt, being significant higher in case of Bonami, significant distinctive in case of Nikitski and very significant in case of the other selections given above.

All the other selections had a lower thickness growth comparing to Mt, the differences being insignificant.

Table 3

- year four –

Number	Parent stock	Trumb's section's surface	%	Difference Mt surface	Meaning
1.	Elita de Balc	67	169	27,5	***
2.	Franc(composition)	58,1	147	18,6	***
3.	Farhad	52	131	12,5	***
4.	Bonami	44,8	113	5,3	*
5.	Nikitski	50,6	128	11,1	***
6.	Elberta	40,2	101	0,7	
7.	H. Hole (Mt)	39,5	100	-	
8.	Zafara	37	93	-2,5	-
	Medium	**48,6**	**-**	**-**	
	DL 5%			5,16	
	DL 1%			6,86	
	DL 0,1%			8,92	

Concerning copse' medium growth, trees' height, wreath's diameter and volume (table nr.4) there are not differences at the studied selections comparing to Mt. The copse medium growth was situated between 46-52,6 cm comparing to 51 cm at Mt, trees' height was 2,65-2,98 m comparing to 2,57 m at Mt and wreath's diameter was 2,35-2,80 m comparing to 2,48 m at Mt, wreath's volume had high in case of Nikitski, Franc (composition) and Bonami, being situated between 9,579-9,005 m^3/ha at Mt.

Table 4

Copse's medium growth, trees height, wreath's diameter and wreath's diameter and wreath's volume

Number	Parent stock	Copse's medium growth (cm)	Trees' height (m)	Wreath's diameter (m)	Wreath's volume (m^3/tree)
1.	Franc(composition)	52,6	2,98	2,80	9,442
2.	Nikitski	46,0	2,71	2,35	7,562
3.	Farhad	46,0	2,65	2,55	7,830
4.	H.Hole (Mt)	51,0	2,57	2,48	7,450
5.	Zafara	52,0	2,70	2,60	8,096
6.	Elberta	51,0	2,95	2,48	8,551
7.	Bonami	49,0	2,83	2,82	9,005
8.	Elita de Balc	50,0	2,80	2,68	8,583

Fruit production at the grafted species (table nr.5) had high values in case of selections: Bonami, Elita de Balc, Franc (composition), situated between 13,7-10,8 t/ha comparing to Mt with 7,7 t/ha, being significant higher in case of Franc (composition) and very significant higher in case of Bonami and Elita de Balc. The other selection had lower values comparing to Mt, but differences are insignificant.

Table 5

Results' synthesis concerning fruits production

Number	Parent stock	Entire production	Medium production	% to Mt	Difference to Mt	Meaning
1.	Franc(composition)	41,2	13,7	180	6,0	***
2.	Nikitski	39,7	13,2	171	5,5	***
3.	Farhad	32,4	10,8	140	3,1	*
4.	H.Hole (Mt)	27,8	9,3	121	1,6	
5.	Zafara	23,2	7,7	-	-	
6.	Elberta	19,5	6,5	84	-1,2	
7.	Bonami	19,5	6,5	84	-1,2	
8.	Elita de Balc	18,9	6,3	83	-1,4	
	Medium	**27,7**	**9,2**	**107,9**	**1,5**	
	DL 5%					2,77
	DL 1%					3,68
	DL 0,1%					4,79

CONCLUSIONS

1. The higher coming up percentage was obtained at: Bonami, Elita de Balc and Zafara (66-69%).

2. High STAS seedling plant's productions at the surface unit were obtained at Bonami and Elita de Balc with 585-635 thousand pieces/ha.

3. The grafted trees' production had good results at the selections Zafara,Bonami,Elita de Balc (23.000-24.555 pieces/ha)

4. The trunk's thickness growth had good results at the selections Bonami,Nikitski,Franc(composition) and Elita de Balc with 44.8-67.0 cm*cm.

5. The copse' medium growth, the trees' height and the wreath's diameter had no significant differences comparing to Mt.

6. The wreath's volume had high values at the selections Franc(composition) and Bonami (9.442-9.005 m/ tree)

7. The high fruit production, from the grafted trees ,had the selections Bonami, Elita de Balc, Franc(composition) with 13.7-10.8 t/ha.

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THE USAGE OF NEW AMERICAN STRAWBERRY VARIETIES IN REPUBLIC OF MOLDOVA IN OPEN FIELD

UTILIZAREA SOUIRILOR NOI AMERICANE DE CĂPŞUN ÎN REPUBLICA MOLDOVA, PE TEREN DESCHIS

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Abstract. *Strawberries are grown extensively for market and home use. The cultivated strawberry is an American fruit originated by hybridization from the wild species of eastern North America and South America. The berries, which are rich in vitamin C, have a unique, tangy taste, and are highly valued as dessert fruit. Commercially, strawberry growers today receive over $250 million yearly for the freshly harvested fruit. About one-third of the crop is processed. This adds substantially to its overall value. Many varieties are grown successfully however, some varieties with special qualities may be best for a given region. Other varieties are chosen for such particular qualities as flavor, shape, or hardiness. New varieties of strawberries appear from time to time. These may grow well in one region, but prove unsatisfactory in other region. Before planting new varieties extensively, growers should test them for more than one year. Compare new varieties with those already successful and reject them in they are not superior to the standard varieties.*

Rezumat. *Căpşunul cultivat este de origine americană, fiind obținut în urma hibridării speciilor sălbatice din partea Nord-Estică şi Sudică a Americii. Fructele sunt bogate în vitamina C, au gust unic, fin şi sunt valorate ca fructe pentru desert. Din punct de vedere comercial, cultivatoriii de căpşun primesc anual peste 250 milioane dolari pentru fructele în stare proaspătă. Aproape o treime din producție este prelucrată. Multe soiuri sunt cultivate cu success, totuşi unele soiuri cu calități speciale pot fi utilizate numai în anumite regiuni. Alte soiuri sunt alese în particular pentru calități cum ar fi aroma, forma sau duritatea. Soiuri noi de căpşun apar de la an la an. Acestea pot creşte bine intr-o regiune, dar se dovedesc nesatisfăcătoare în altă regine. Înainte de utilizarea pe scară largă a soiurilor noi, cultivatorii trebiue să le testeze mai mult de un an.*

The implement of varieties with a high potential productivity, in course of 30 years(1974-2004) leaded to increase gross production of strawberry from 224 thousands tones to 1 mln tones.

These results was obtained on basis of renovating continuance the assortiment used in cultivation. The lead role in this activity become to University of California, wich varieties being implement only in this state assure 75% from gross production on this country.After view of scientists from this University, the usage of varieties will facilitate to increase gross production and in other states of USA. It is necesary to specify, the aproximatly 70% from expenses related to strawberry research are meant in special associated for creation a new varieties. In result was obtainedvarieties: Camarosa, Chandler, Oso Grande, Pajaro, Seascape,

Selva, Sparcle etc. wich potential in plantation of production go beyond quoto 50 tones per ha of fruit. Each variety it is destined for the certain condition of cultivation in open field, and even in protected field. Respective varieties have a high level of capitalization a nutritive space and capacity to develop more undergroung stems in the first years of vegetation. These varieties are in a investigation stage for cultivation on open field in central area of R. Moldova.

MATERIAL AND METHOD

Researching objects serve strawberry plants of 1-3 years, varieties: Red Gauntlet, Camarosa, Seascape, Chandler, Selena, Elsanta.

Investigations are effected at Fruit Growing chair of the State Agrarian University of Moldova, field-experience on the agricultural lands at SA ''ORHEI-VIT'' and Private Family Farm ''VRABIE NICOLAE'' district Hînceşti, wich it is situated in central area of Republic. Investigations are effected after wide methods used in modern Fruit Growing.

REZULTS AND DISCUSSIONS

In conformity with conception of Fruit Growing development in R. Moldova for 2006-2015 the yaerly fruit production will constitute 976 thousands tones. In development of these objects a special part confer berries species, wich culture is advangeous in most cases in all advanced countries. Through berries species a special place claim to strawberry.

The investigation results will opennew perspectives of utilization a strawberry varieties with a high productivity and better adapted to the concrete ecological and pedological conditions of cultivation, the structure of plantation for creation a favourable conditions to realize the strawberry plants potential in central area conditions of R Moldova. For the first time it will realize a complex relating to plantation structure and variety about obtaining ecological strawberry fruit production with usage of modern tehnique.

Experiments have been founded at SA " ORHEI-VIT" in fall time of 2005 but that from Private Family Farm "VRABIE NICOLAE" in fall time in 2006 with virus-free plants. At fondation of the plantation, mineral elements was not introduced, have been introduce only manure in 40-60tones quantite. The experimental land soil is simple-black isured with necesary quatity of humus and mineral elements for strawberry plants, with trickle irrigation.

To familiarize better, give a look at the pictures below.

Picture1. **Variety Camarosa**

Picture 2. **Variety Seascape**

Picture 3. **Strawberry plantation at SA „ORHEI-VIT”**

CONCLUSIONS

The results of effected investigation confirm that tha american strawberry varieties in pedo-climaterical conditions of R. Moldova are adapted to intensive cultivation culture, wich allow to obtain a high-efficiency than homolagate varieties.

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ASPECTS CONCERNING CLIMATIC CHANGES INFLUENCE ON VINE VEGETATIVE PHENOLOGICAL PHASE IN „DEALU BUJORULUI„ VINEYARD

ASPECTE PRIVIND IMPLICAȚIILE SCHIMBĂRILOR CLIMATICE GLOBALE ASUPRA FENOFAZELOR DE VEGETAȚIE LA VIȚA DE VIE ÎN PODGORIA "DEALU BUJORULUI"

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Abstract. *The problem of the extreme weather phenomena and the possibility of the important climatic changes lead the need for approaching sets of themes, which could establish the impact on the wine ecosystem. In practice of a durable vine, growing must considered the climatic changes, have regard at this time we do not confront of a series of the unknown factors. Must have regard allowed for the aspect of the implications of the climatic changes total on the frequency of precipitations with consequences in the dispersion of dryness and the expansion of phenomenon of turning into a desert. The researchers support that it is possible that the high temperatures, the dryness and the air pollution can lead the development of the diseases and to activate it harmful insects with consequences difficult to estimate for the wine health of ecosystem. The evolution of the climatic factors between 1979 and 2006 traced the tendency of their deviations of the annual averages multi specific for the vineyard Dealu Bujorului. By the data for the preserve moment, we can especially notice a change for the distribution of precipitations in the cycle of vegetation (of the short framed rainy periods of the long poor periods extreme temperatures in the dissension with the phases phenological of vegetation. The ecological states of wine environment now have a negative tendency increased with the total climatic changes. By time, all the probable climatic changes will have repercussions in the vineyards and on the durability of the wine plantations.*

Rezumat. *Problema fenomenelor meteorologice extreme si posibilitatea declansarii unor schimbari climatice majore au condus la necesitatea abordarii unor tematici care sa stabileasca impactul acestora asupra ecosistemului viticol. In practicarea unei viticulturi durabile trebuie să se ia in calcul schimbarile de clima cu atât mai mult cu cât în momentul de față ne confruntăm cu o serie de necunoscute. Trebuie avut în vedere aspectul cu privire la implicatiile schimbărilor climatice globale asupra frecvenței precipitațiilor cu urmări în răspândirea seceteişi extinderea fenomenului de deşertificare. Cercetătorii susțin că e posibil ca temperaturile ridicate, seceta şi poluarea atmosferică să conducă la dezvoltarea unor boli şi la activarea dăunătorilor cu consecințe greu de evaluat în sănătatea ecosistemului viticol.Evoluția factorilor climatici din perioada 1979-2006 au scos în evidență tendința abaterii acestora de la mediile multianuale specifice podgoriei „ Dealu Bujorului„. Din datele înregistrate până în prezent se observă o modificare a distribuției precipitațiilor îndeosebi în perioada de vegetație(perioade ploioase scurte încadrate de lungi perioadedeficitare), temperaturi extreme în neconcordanță cu fenofazele de vegetație. Condițiile ecologice ale mediului viticol au în prezent un accentuat trend negativ la schimbările climatice globale. In timp, toate modificările climatice probabile vor avea repercusiuni asupra mediului viticol, implicit asupra durabilității plantațiilor viticole.*

MATERIEL ET METHODE

A la Station de Recherche pour la viticulture et vinification Bujoru, les chercheurs ont fait une étude vers les facteurs climatiques leurs influence sur le cycle végétatif de la vigne avec implications sur la production et la qualité.Les analyses concernant l'évolution des facteurs climatiques se rapportent pour une période de 28 années (1979-2006) et pour un cycle végétatif de 10 années.Trois cépages ont été analysés Fetească regală, Băbească neagră et Merlot, leurs évolution phénologique pendant les 10 années et comment l'instabilité climatique confère des oscillations.

RESULTATS ET DISCUSSION

La température de l'air et l'humidité à côté des conditions socio-économiques sont des facteurs qui ont conduit la répartition de la culture de la vigne dans le monde.Pour la culture de la vigne se remarquent des seuils biologiques inférieurs et supérieurs. Les seuils biologiques inférieurs montrent la limite d'où est possible la culture de la vigne. Un de ces seuils est la moyenne annuelle de la température de 9 degrés qui délimite l'aréal de la culture économique de la vigne.Analysant l'évolution de ce paramètre se constate que le vignoble Dealu Bujorului bénéficie par une contribution thermique très favorable pour la culture de la vigne et notamment pour les cépages rouges. Et aussi la moyenne annuelle autant que la moyenne mobile se dirigent vers des augmentations des valeurs orientées dans l'intervalle 11,5 – 12,5^0 C, un surplus de 2-3^{0}C par rapport au seuil et avec 1^{0}C par rapport à la moyenne multi annuelle (figure 1). Le même paramètre mais pour la période de végétation (avril - septembre) mis en évidence la même tendance de chauffage de l'air entre 2000-2006 année avec 1,5^{0}C par rapport a la moyenne multi annuelle (figure 2).

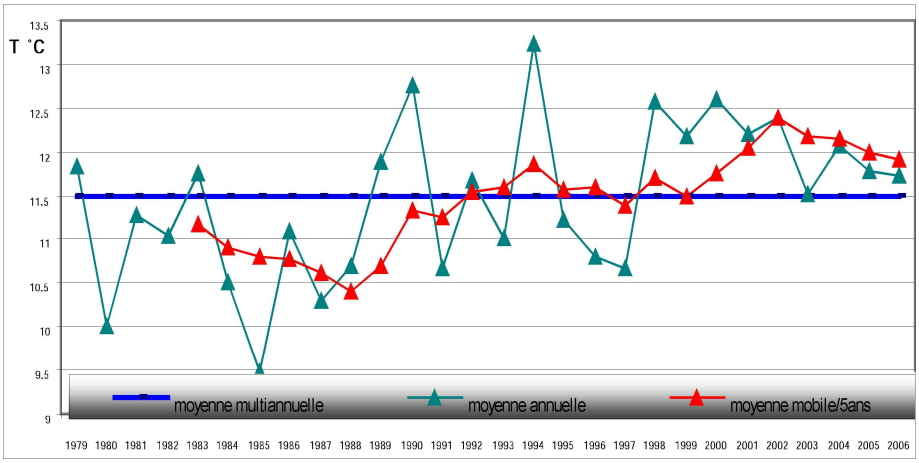

Figure 1 - La température moyenne annuelle de l'air pendant la période 1978-2006

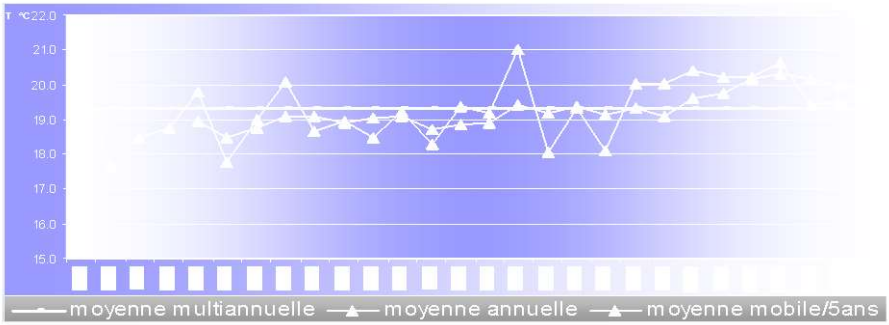

Figure 2 - La température moyenne pendant la période végétative (1978-2006)

La culture de la vigne est possible dans les aréals ou les précipitations annuelles sont entre 400-700 mm parmi les quelles 250-300 mm pendant la végétation. Par les figures (figure 3, 4) on voit que les précipitations atmosphériques présentent des oscillations très amples entre les années 1979-1997. Les dernières 10 années l'amplitude se réduit avec la tendance pour les précipitations de baisser sous les valeurs des moyennes multi annuelles. L'évapotranspiration potentielle élevée et la fréquence des vents arides de l'est contribuent au grand déficit d'humidité aérien et édaphique pendant les longues sécheresses de juillet - août.

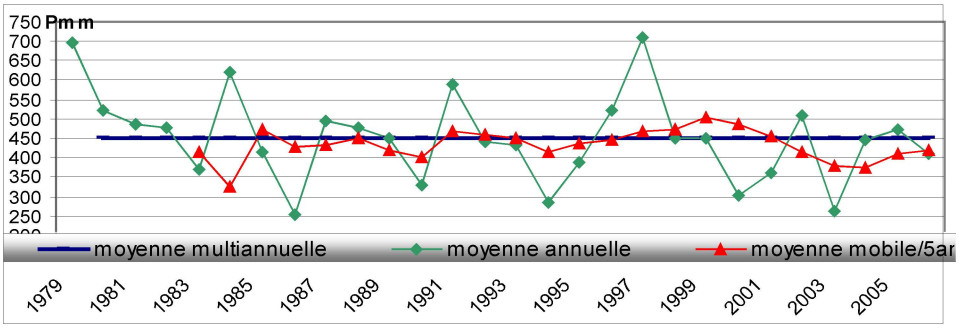

Figure 3 - La distribution des précipitations annuelles pendant la période 1978-2006

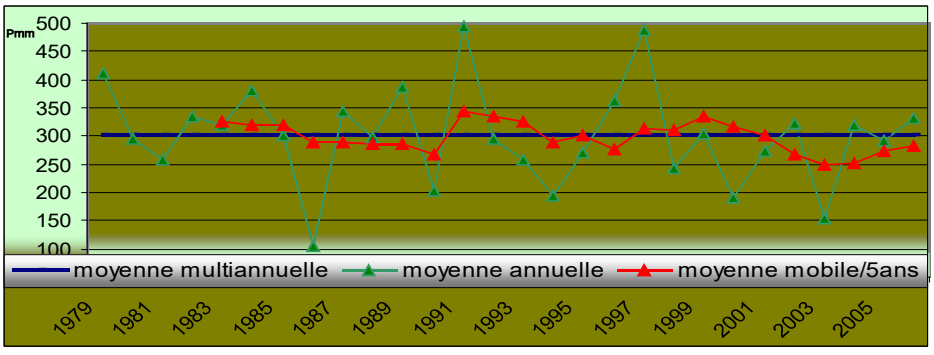

Figure 4 - Précipitations sur la période végétative (avril-septembre) 1978-2006

La température comme facteur externe influence le débourrement qui commence pour la plupart dans la deuxième décade d'avril. Le débourrement est en même temps pour tous les cépages et la distance de 7-14 jours entre eux comme est mentionnée dans la littérature de spécialité, disparaît. Par les figures (figure 5) on voit comme entre le cépage Fetească regală considéré précoce parmi les trois cépages étudiés et Băbească neagră comme cépage tardif les différences sont seulement de 3-4 jours.Cet aspect est vu sur touts les cépages qui se trouvent dans le vignoble et la cause et la température de l'air qui haute brusque et diminue le décalage entre les cépages. L'apparition des températures extrêmes dans la phase de repas végétatif depuis -17^{0}C en bas conduise vers le retard de débourrement, même si le point de vue thermique les conditions sont très favorables.

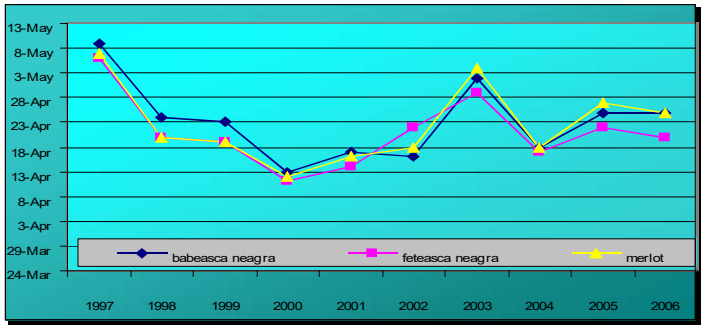

Figure 5 Le débourrement des cepages

La floraison se produit à la fin de mai au début de juin. Le premier est le cépage Fetească regală suivi par les deux cépages rouges.Les hautes températures qui se manifestent à l'approche de la floraison pendant les dernières années ont réduis considérables le décalage entre les cépages et ont diminue à moitié la durée de période. (figure 6).

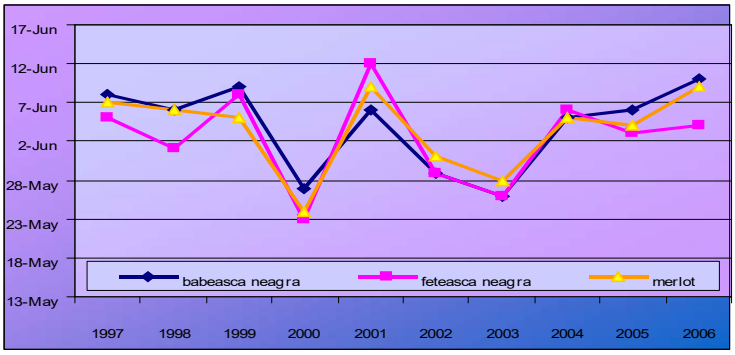

Figure 6 La floraison des cepages

La véraison est influencée aussi par les conditions climatiques. Analysant les figures (figure7) se remarque que tous les trois cépages commençant par l'année 2000 ont la tendance d'entrer très prématuré en véraison à cause des températures de l'air très hautes et notamment par les valeurs extrêmes qui dépassent souvent 30^0C. Le cépage Fetească regală est plus sensible. Le phénomène est accentué quand survient le déficit hydrique. Le commencement forcé de la véraison pour les cépages rouges se manifeste par une coloration des baies avant que celles d'être à la dimension typique pour le cépage. Si dans le court temps le déficit hydrique se redresse, les baies grandissent et la coloration se retarde, si non la production des raisins se diminue considérable.

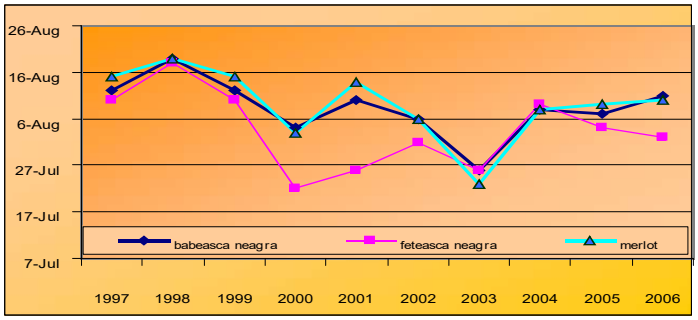

Figure 7 La véraison des cepages

Les variations climatiques annuelles se reflètent aussi sur l'époque de maturation des raisins. Par rapport aux caractéristiques technologiques des cépages Merlot et Fetească regală sont dans la période V de maturation et Băbească neagră dans la période VI. Analysant les figures (figure 8) on constate que les cépages passent dans une période prématurée de maturation Fetească regală dans la période IV, Băbească neagră dans le période V et le cépage Merlot seulement dans les automnes très chauds, étant un cépage de qualité il est plus stable et plus réceptif au chauffage climatique.

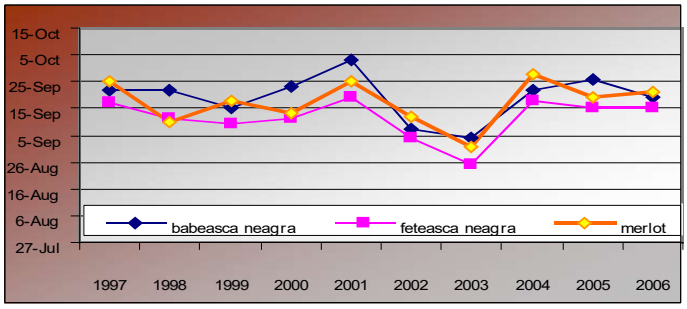

Figure 8- Maturation des raisins

Les accidents climatiques représentés par des gels prématurés de l'automne ont déterminé souvent la chute des feuilles. Pendant la période 1997-2006 la fréquence des gels est 4 années par 10 années et en même temps pour les trois cépages la végétation est interrompue. (figure 9) Par le parcours de déroulement des phenophases de végétation ont été enregistrées des longes périodes avec déficit hydrique encadrées par des périodes avec des pluies abondantes qui ont détermine l'amplification des maladies avec des conséquences négatives vers la récolte.

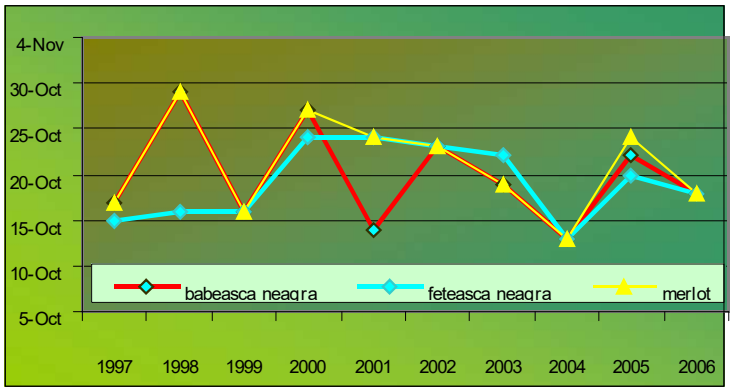

Figure 9 Tombée des feuilles

CONCLUSIONS

1. Dans le vignoble Dealu Bujorului s'est fait remarqué un chauffage de l'air avec 1,5-2˚C par rapport à moyenne multi annuelle et la réduction graduelle des précipitations sous la moyenne multi annuelle commencent après l'année 2000.

2. L'amplification des phénomènes de risque gel précoce, températures baissées après des périodes très chaudes, des vents très forts, tempêtes, chaleurs excessives deviennent des causes de stress.

3. La température comme facteur externe par ses valeurs élevées a redu le décalage entre les cépages en ce concerne le débourrement et la floraison et a raccourci la longueur des phenophases, les cépages étudies ont devenu plus précoces et ont changé la classe de maturation.

4. Si les changements climatiques continuent il est possible que l'aire de culture pour la vigne d'être modifiée et aussi la structure des cépages et les technologies de culture.

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PRODUCTION DES VINS BLANCS DE QUALITE A APPELLATION D'ORIGINE CONTROLEE DANS LE CENTRE VITICOLE JIDVEI – VIGNOBLE DE TÂRNAVE

TEHNOLOGIA DE PRODUCERE A VINURILOR ALBE DE CALITATE CU DENUMIRE DE ORIGINE ÎN CENTRUL VITICOL JIDVEI – PODGORIA TÂRNAVE

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Resume. *La recherche se réfère à la technologie de production des vins blancs de qualité de type AOC – CMD, des cépages Feteasca regală, Riesling Italien et Pinot gris, dans le centre viticole Jidvei- vignoble de Târnave. On a fait les expériences dans le cadre du Complexe de vinification de la S.C. Jidvei, dans la période des années 2001 – 2006, sur une chaîne technologique complètement automatisée. On a eu pour but : l'optimisation des processus technologiques qui sont à la base de la vinification primaire des raisins afin de réaliser des vins blancs de qualité.*

Mots clés: vins blancs, appellation d'origine. centre viticole Jidvei

Rezumat. *Cercetările se refereă la tehnologia de producere a vinurilor albe de calitate cu denumire de origine de tip DOC-CMD, din soiurile Fetească regală, Riesling italian şi Pinot gris în centrul viticol Jidvei din podgoria Târnave. Experienţele au fost efectuate în Compelxul de vinificaţie al SC Jidvei, în perioada anilor 2001-2006, la o linie tehnologicâ complet automatizată. Ele au avut ca scop: optimizarea proceselor tehnologice care stau la baza vinificării primare a strugurilor, pentru realizarea unor vinuri albe de calitate.*

Cuvinte cheie: vinuri albe, denumire de origine, centrul viticol Judvei.

Le Centre viticole Jidvei est le plus grand et le plus représentatif du vignoble de Târnave.

Il est situé entre les localités Cetatea de Baltă - Şona et comprend les surfaces viticoles des versants du couloir de la Târnava Mică (Şonă, Jidvei, Cetatea de Baltă) et la zone collinaire du sud (Balcaciu). Les conditions écologiques favorisent la maturation des raisins des cépages pour les vinsublancs de qualité, des époques V – VI de maturation. On peut en obtenir des vins à appellation d'origine contrôlée: secs et demisecs, en vendangeant la pleine maturité. (AOC – CMD).

MATERIEL ET METHODE

Les recherches se réfèrent à la production des vins blancs de qualité, des cépages Fetească regală, Riesling italien et Pinot gris. Période des recherches, 2001 – 2006. On a utilisé des raisins sains à haut degré de maturation et dont la composition physico-chimique assure l'obtention des vins de qualité.

Pour produire des vins on a utilisé la chaîne technologique modernisée du Complexe de vinification de la S.C. Jidvei (figure no. 1)

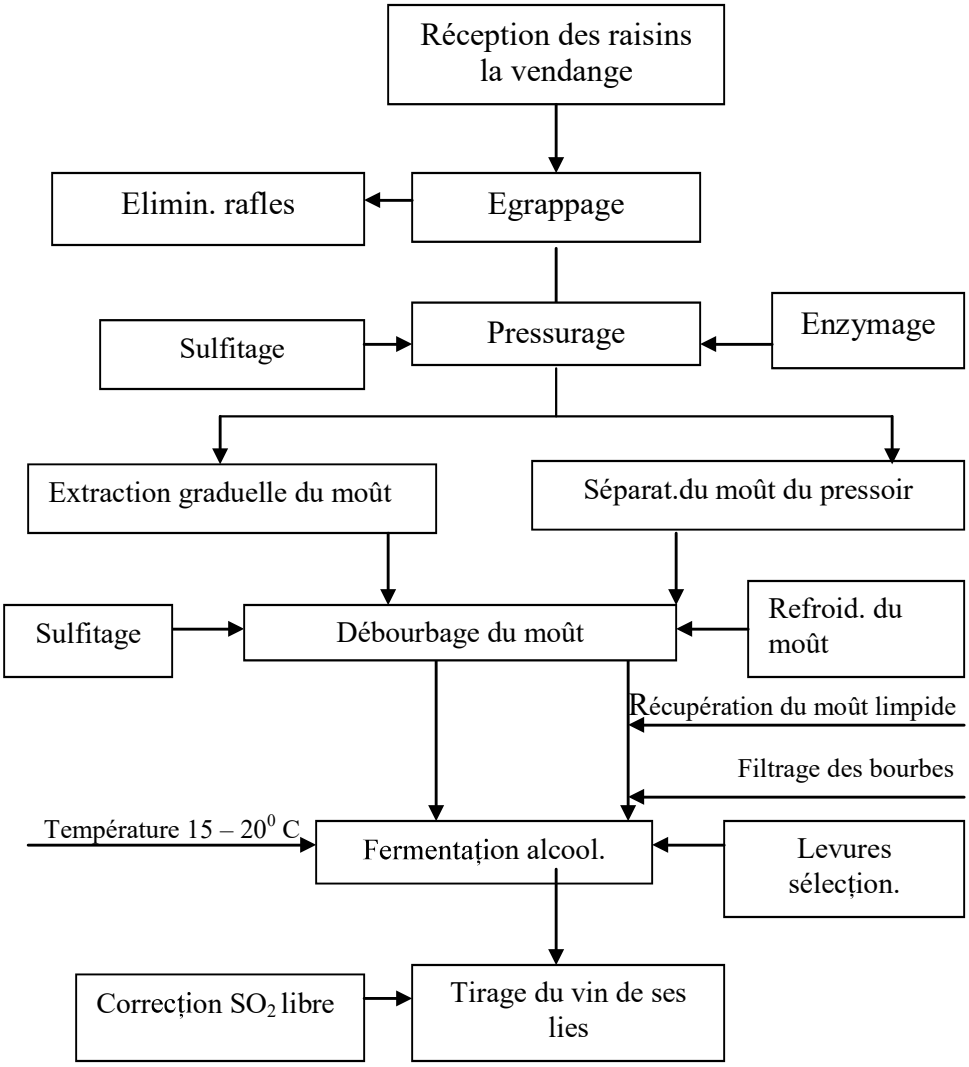

Figure 1. Chaîne technologique d'obtention des vins blancs à appellation d'origine contrôlée dans le Centre viticole Jidvei

Particularités technologiques :

- égrappage obligatoire, avant qu'on ne foule la vendange sous protection antioxydante;
- traitement enzymatique de la vendange foulée et presurage graduel, adapté à l'état phytosanitaire des raisins et à leur degré de maturation avec séparation du vin de goutte;
- débourbage du moût avant de fermenter, par refroidissement à 10^o C, pendant maximum 24 heures. Récupération du moût limpide et filtrage des bourbes;
- fermentation alcoolique du moût par insémination avec des levures lyophilisées, en citernes en inox équipées avec installation de climatisation;

- tirage du vin de ses lies après 5 – 10 jours une fois la fermentation alcoolique finie, correction avec du SO_2 libre pour empêcher le déclenchement de la fermentation malolactique, en vue de conserver l'acide malique dans le vin;

- automatisation du flux technologique, avec le tableau de commande et informations des circuits de produits (vendange foulée, moût, vin) y inclus les produits de lavage des installations;

RESULTATS ET DISCUSSIONS

Matière première . On a vendangé à la pleine maturation des raisins à une haute teneur en sucres de 190 – 204 g/L et acidité totale de 6,5 – 7,5 g / L exprimée en acide sulfurique (table 1). Il faut que l'indice gluco-acidimétrique soit équilibré, valeurs comprises entre 25 – 33 , afin de garantir l'obtention des vins blancs de qualité.

Table 1

Composition des raisins lors de la récolte
(année 2001)

Cépage	Date des vendanges	Sucres g/L	Acidité totale g/L H_2SO_4	Indice gluco-acidimétrique
Fetească regală	01.X	192,4	7,2	26,7
Riesling italien	05.X	200,0	6,5	30,6
Pinot gris	28.IX	204,6	6,0	34,1

On constate que tous les cépages accumulent dans les raisins lores des vendanges les quantités nécessaires de sucres pour en produire des vins de qualité (minimum 11 % vol. alcool). Les valeurs des indices gluco-acidimétriques témoignent d'un équilibre très bon pour la production des vins de qualité.

Schéma technologique . On a conçu un schéma technologique moderne pour la production des vins blancs de qualité, qui mette en valeur au maximum le potentiel qualitatif de la matière première (raisins).

Foulage et égrappage . On utilise l'égrafoulopompe modèle DPC – 300 P, productivité 20 – 30 t/heure, fabriquée en Italie par VELO. L'équipement est de type horizontal et réalise l'égrappage avant le foulage pour éviter le contact du moût avec les rafles. Les parties qui la composent:

- l'égrappoir, muni d'une caisse à vis sans fin pour l'alimenter en raisins; un cylindre rotatif perforé à axe battant avec des palettes pour séparer les rafles; une auge pour collecter et évacuer les rafles. La vitesse de rotation du cylindre et de l'axe à palettes est réglable, de sorte que les rafles éliminés n'entraînent qu'une moindre quantité de moût.

- L'égrappoir a des cylindres mous en caoutchouc siliconé pour éviter l'écrasement des pellicules et des graines des raisins. Ils sont actionnés par un moteur électrique pourvu d'un réducteur pour le régime des tours;

- L'électropompe volumétrique monovis pour prélever la vendange foulée, capacitaté maximum 30 hL / heure, puissance instalalée 5,5 Kw. On transporte par compression la vendange foulée afin d'éviter que les parties solides ne se frottent et ne s'effilochent.

Traitement enzymatique . Au cours de la séparation du moût de goutte, on soumet la vendange foulée au traitement avec des enzymes pectolitiques du type ULTRAZIM PREMIUM, en doses de 2 -5g/hL. L'action des enzymes se produit pendant 20 – 40 minutes, jusqu'à remplir de vendange foulée les pressoirs, et le rendement en moût de goutte s'accroît de 4 – 10 %. On débourbe plus facilement le moût obtenu par traitement enzymatique, et la limpidité après la décantation est très nette.

Pressurage de la vendange foulée . On utilise des presses pneumatiques à membrane modèle Wilmes, programmées électroniquement, pression 0,5 bars, rendement maximum 82 % moût. Le cycle de pressurage dure 2 – 3 heures et se réalise en 6 – 7 étapes, en fonction de la pression de travail.

Lors du pressurage pneumatique, les quantitées de polyphénols extraites des pellicules et des graines des raisins sont très Quand la pression dépasse 1 bar, la quantité de polyphénots s'accroît brusquement, notamment à Fetească regală.

Débourbage du moût. Opération obligatoire, pour l'obtention des vins blancs de qualité. Traitements préalables appliqués au moût: sulfitage avec des doses de 5 – 10 g SO_2 /hL et refroidissement du moût à 10^0 C. On y utilise l'échangeur de chaleur "tuyau en tuyau" avec 10 modules de refroidissement, surface d'échange thermique de 19 m^2, débit 25 milliers l /heure.

Le moût sulfité et refroidi à 10^0 C est laissé se débourber, pendant maximum 24 heures. On récupère le moût limpide et on filtre les bourbes, pour récupérer le moût.

Fermentation alcoolique. En vue de la fermentation alcoolique, on fait l'assemblage du moût de goutte avec 15 % moût de presse. Le plus souvent on laisse fermenter le moût de goutte pour en obtenir des vins de qualité et le moût de presse pour les vins de table.

Pour la fermentation alcoolique on utilise des citernes inox, capacité 36 000 litres, munies de 3 manteaux de refroidissement, de senzors pour indiquer la température à tout moment de la fermentation et de soupape à double sens pour la pression de CO_2.

La fermentation se fait avec des levures sélectionnées lyophilisées, la durée de la fermentation 10 – 12 jours. Quand la densité du vin se situe autour des valeurs de 0,994 – 0,0993 on estime le processus de fermentation terminé et le vin conserve maximum 2g / L sucres réducteurs.

Séparation du vin de ses lies. On la fait à 5 – 10 jours une fois la fermentation alcoolique finie, en séparant le vin du dépôt grossier de fermentation. On sulfite immédiatement le vin pour garantir 15 – 25 mg SO_2 libre / litre, qui prévienne la fermentation malolactique.

Automatisation de la chaîne technologique. Elle comprend: le circuit/page de commande et informations, pour charger les presses avec de la vendange foulée; page de commande et informations, pour charger les citernes avec du moût et la circulation du moût dans les citernes de fermentation; page avec des informations sur les éventuelles avaries pouvant survenir dans les instalations; page avec les circuits de lavage automatique des installations.

On signale : pressoirs pleins, couleur verte; pressoirs vides, couleur rouge; fermentateurs/recirculation du moût, couleur jaune; pompe en action, couleur verte; pompe arrêtée, couleur rouge; pompe avariée, couleur jaune; trajet sale, couleur grise etc.

Caractéristiques de composition des vins. Pour déterminer les caractéristiques de composition physico-chimique des vins de qualité à appellation d'origine contrôlée (AOC), on a utilisé les méthodes d'analyse officielles règlementées par les standards d'Etat. On les a faites pour les vins nouveaux (jeunes). Dans les tables 2, 3, 4 sont présentées les caractéristiques de composition des vins blancs de qualité de type AOC – CMD, obtenus dans la période 2001 – 2006.

Table 2

Caractéristiques de composition des vins Fetească regală (années 2001 – 2006)

Année / Paramètre	2001	2002	2003	2004	2005	2006
Concentration alcoolique % vol	11,20	11,40	12,20	11,50	12,20	12,00
Acidité totale g/L H_2SO_4	5,70	5,20	4,40	4,60	5,60	5,40
Acidité totale g/L $C_4H_6O_6$	8,72	7,95	6,73	7,03	8,56	8,26
Acidité volatile g/L CH_3-COOH	0,40	0,36	0,22	0,33	0,24	0,22
Extrait sec non réd. g/L	20,20	21,30	20,90	20,6	21,20	21,90
Sucres g/L	2,00	1,00	1,30	1,60	1,20	0,90

Table 3

Caractéristiques de composition des vins Riesling italien (années 2001 – 2006)

Annnée / Paramètre	2001	2002	2003	2004	2005	2006
Concentration alcoolique % vol	11,50	11,60	12,50	12,00	12,00	12,40
Acidité totale g/L H_2SO_4	4,64	5,20	4,01	4,35	5,70	4,94
Acidité totale g/L $C_4H_6O_6$	7,10	7,95	6,13	6,65	8,64	7,55
Acidité volatile g/L CH_3-COOH	0,36	0,40	0,44	0,42	0,33	0,40
Extrait sec non réd1. g/L	20,70	20,90	21,20	21,00	21,80	22,10
Sucres g/L	1,50	1,30	1,30	1,10	1,50	1,40

Table 4

Caractéristiques de composition des vins Pinot gris (années 2001 – 2006)

Année / Paramètre	2001	2002	2003	2004	2005	2006
Concentration alcoolique % vol	11,90	12,10	12,70	12,90	12,30	12,60
Acidité totale g/L H_2SO_4	4,90	5,20	3,92	4,50	4,90	4,70
Acidité totale g/L $C_4H_6O_6$	7,50	7,95	5,99	6,80	7,50	7,20
Acidité volatile g/L CH_3-COOH	0,22	0,40	0,36	0,40	0,33	0,30
Extrait sec non réd. g/L	21,00	21,20	22,50	22,10	21,30	22,10
Sucres g/L	2,30	1,50	1,30	4,00	2,50	1,20

CONCLUSIONS GENERALES

1. Pour produire des vins blancs de qualité à appellation d'origine contrôlée de type AOC – CMD dans le centre viticole Jidvei, on utilise les cépages Sauvignon, Fetească regală, Riesling Italien et Pinot gris. On a modernisé la chaîne technologique de la S.C. Jidvei, utilisant des équipements performants et automatisant les processus technologiques.

2. Sur la base des recherches effectuées dans les années 2001 – 2006 on a déterminé les paramètres physico-chimiques de composition, qui caractérisent les vins blancs de qualité du centre viticole Jidvei:

- Fetească regală: alcool 11,2 – 12,2 % vol., acidité totale 6,73 – 8,72 g/L acide tartrique, extrait sec non réducteur 20,20 – 21,90 g/L, aucres non fermentés 0,9 – 2 g/L.

- Riesling italien: alcool 11,5 – 12,5 % vol., acidité totale 6,13 – 8,64 g/L acide tartrique, extrait sec non réducteur 20,70 – 21,80 g/L, sucres non fermentés 1,1 – 1,5 g/L.

- Pinot gris : alcool 11,9 – 12,9 % vol., acidité totale 5,99 – 7,95 g/L acide tartrique, extrait sec non réducteur 21,0 – 22,50 g/L, sucres non fermentés 1,2 – 2,5 g/L.

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INFLUENCE OF CANOPY ON MUST AND WINE QUALITY IN THE ZWEIGELT VARIETY

INFLUENȚA COVORULUI VEGETAL AL BUTUCILOR ASUPRA CALITĂȚII MUSTULUI ŞI VINULUI LA SOIUL ZWEIGELT

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Abstract. *The investigation was carried out in 2006, at the Ampelographic Collection of The Horticulture Faculty from Iasi, on the red wine variety Zweigelt. We have studied the influence of the total foliage area, the canopy thickness and the foliage exposure at the direct solar radiation, on the yield quality. After the determination of must and wine quality, the correlations between the canopy parameters and the yield quality were established. It was found that the total foliage area was positively correlated with the sugars content from must, alcohol content from wine, total extract and total acidity. The anthocyans content from grapes and wine is diminishing once with the increase in the canopy thickness, and the decrease in foliage exposure at direct solar radiation. Our investigations have established that the variation of canopy parameters affected the anthocyanic profile, and the chromatic characteristics of the red wines.*

Rezumat. *Cercetările au fost efectuate în anul 2006, în Colecția Ampelografică a Facultății de Horticultură din Iaşi, la soiul pentru vinuri roşii de calitate Zweigelt. S-a studiat influența pe care o exercită suprafața foliară totală, îndesirea covorului vegetal şi gradul de expunere a aparatului foliar la radiație solară directă, asupra calității producției. S-au efectuat determinări privind caracteristicile mustului şi vinului şi s-au stabilit corelațiile dintre parametrii covorului vegetal şi calitatea producției. S-a constatat că suprafața foliară totală se corelează pozitiv cu concentrația mustului în zaharuri, tăria alcoolică a vinului, extractul sec total şi aciditatea titrabilă. Conținutul de antociani din struguri şi vin, se diminuează odată cu îndesirea covorului vegetal al butucilor şi umbrirea aparatului foliar. Din cercetările efectuate a reieşit faptul că variația parametrilor covorului vegetal influențează profilul antocianic şi caracteristicile cromatice ale vinurilor roşii.*

INTRODUCTION

The latest investigations carried out on guiding systems in vine show that the foliage exposure to direct solar radiation is the main factor, on which greatly depend both the accumulation of sugars, anthocyans and aromatic compounds into grapes and the level of must total acidity.

Starting from this assessment, many wine-growing countries have elaborated guidance systems with two vegetation plans, which ensure the success of red wine variety growing in viticultural areas with limited heliothermal resources.

The growth of leaf area exposed to direct solar radiation favours the anthocyan accumulation and diminution in must total acidity (*Schneider, 1989; Zufferey şi Murisier, 2005; Murisier, 2006*). The must concentration in sugars is less influenced; this parameter of yield quality depends on the size of total leaf area and grape yield.

The canopy thickness, expressed by IF leaf index (Schneider, 1989), has negatively influenced the accumulation of anthocyans into grapes, and determined the increase in must acidity.

Investigations had as aim to determine correlations between canopy parameters and must and wine quality in Zweigelt variety, under conditions of Wine-Growing Centre of Copou, from Iaşi vineyard.

MATERIALS AND METHODS

Experiments were set up at the Ampelographic Collection of the Horticulture Faculty from Iaşi. The biological material was represented by the Zweigelt red wine variety, grafted on SO_4 stock - Crăciunel 4 clone. The plantation with planting distances of 2.2/1.2 m and denseness of 3737 vinestocks/ha, is situated on a 12% slope land, at S-W exposure. The vine guiding shape is semi-high, in bilateral cordon with two trunks, and pruning is done in short fruit-bearing links (knot of 2 buds + vine shoot of 4-5 buds). The training system, vertical monoplane trellis, ensures a foliage exposure area of 2.61 m^2/m of row.

Three experimental variants were established, having the same number of inflorescences/vinestock and a different number of shoots:

- variant V_1, with 10 shoots and 15 inflorescences/stem;
- variant V_2, with 15 shoots and 15 inflorescences/stem;
- varianta V_3, with 20 shoots and 15 inflorescences/stem.

Determinations carried out: *total leaf area, leaf area exposed at direct solar radiation, leaf index, must concentration in sugars, anthocyan content from grapes, must total acidity, wine alcoholic power, titrable acidity, anthocyan content from wine and total dry extract.*

RESULTS AND DISCUSSIONS

1. Analysis of canopy parameters. The increase in shoot number/vinestock determined an increase in *total leaf area*: V_1 = 1.81 m^2/m of row, variant V_2 = 2.72 m^2/m of row, and variant V_3 = 3.63 m^2 /m of row **(tab. 1)**.

The leaf area exposed to direct solar radiation, photosynthetically active at a rate of 100%, did not show variations, being characteristic to the guidance system used in plantation, respectively 2.61 m^2/m of row. At V_1 variant, a deficit of 0.80 m^2/m of row was registered in total leaf area, at V_2 an insignificant leaf excess of 0.11 m^2/ m of row, and at V_3, an important leaf excess of 1.02 m^2/ m row.

The augmentation of the number of shoots and, implicitly, of leaves/vinestock has increased the canopy thickness. The values of *IF leaf index* have shown that at V_1, the foliage exposure space was not totally valorized; atV_2, the space used for the foliage exposure was better valorized; at V_3, because of leaf excess, canopy was thickened and leaves shadowed mutually.

Table 1

Variation of canopy parameters, in connection with the number of shoots/vinestock (Zweigelt variety)

SPECIFICATION	V_1	V_2	V_3
Total leaf area (m^2/m of row)	1.81	2.72	3.63
Exposed leaf area (m^2/m of row)	2.61		
Foliage excess/deficit (m^2 leaves/m of row)	-0.80	+0.11	+1.02
Leaf index (IF)	1.44	0.95	0.71
Foliage exposure degree (%)	100	95	71

The foliage exposure degree to direct solar radiation is of 100% for V_1, 95% for V_2 and 71% for V_3.

2. Grape yield and must quality. By maintaining an identical number of inflorescences/vinestock, the grape yield in experimental variants was:V_1 = 2.40 kg grapes/vinestock, V_2 = 2.50 kg grapes/vinestock and V_3 = 2.58 kg grapes/vinestock **(tab. 2).**

Table 2

Grape yield, content in sugars and anthocyans, and must total acidity (Zweigelt variety)

SPECIFICATION	V_1	V_2	V_3
Grape yield (kg/vinestock)	2.40	2.50	2.58
Must concentration in sugars (g/l)	175	185.1	203.0
Must total acidity (g/l tartaric acid)	6.3	6.8	7.2
Anthocyan content from grape skin (mg/l)	566.45	546.04	537.81

Must concentration in sugars. The analysis of experimental data has shown the positive correlation between total leaf area of vinestocks and must concentration in sugars. The lowest sugar concentration (175 g/l) was obtained at V_1, and the highest one (203 g/l) at V_3. Canopy thickening from variant V_3 did not influence sugars accumulation into grapes **(fig. 1).**

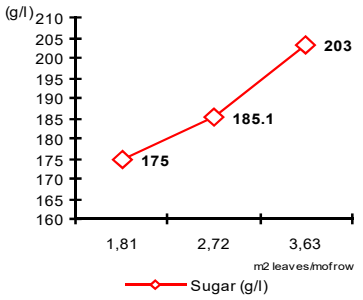

Fig. 1 Corelația dintre suprafața foliară și conținutul mustului în zaharuri

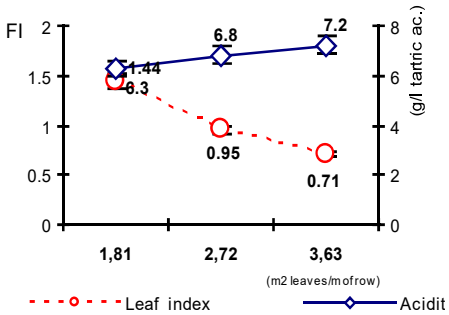

Fig. 2 Correlation between total leaf area, leaf index and must total acidity

Must total acidity. It has increased from variant V_1 to variant V_3, once with the augmentation of total leaf area of vinestocks **(fig. 2)**: at variant V_1, must acidity was of 6.3 g/l tartaric acid and at variant V_2 ,6.8 g/l tartaric acid, and at variant V_3, 7.2 g/l tartaric acid. The increase in must total acidity was caused by the augmentation of canopy thickness, leaves shading and slowing down of the malic acid metabolizing process.

The anthocyans content from grape skin. It diminished once with canopy thickening and shading of vinestock leaf apparatus. The highest anthocyan content (566.45 mg/l must) was registered at variant V_1, with leaves exposure to direct solar radiation of 100% and leaf index with maximum value.

V_3 has achieved the lowest anthocyan content (537.81 mg/L), with a leaf exposure to direct solar radiation of only 71% and a thickened foliage (IF=0.71).

3. Wine quality

Wine alcoholic power **(tab. 3)**. It has increased in relation with must concentration in sugars; the maximum value was registered at variant V_3 (11.29 % vol. alcohol).

Table 3

Wine characteristics (Zweigelt variety)

SPECIFICATION	V_1	V_2	V_3
Wine alcoholic power (% vol. alcohol)	10.51	10.83	11.29
Total dry extract (g/L)	23.7	24.5	27.9
Titrable acidity (g/L tartaric)	5.26	6.48	7.0
Total anthocyans (mg/L)	392.04	346.78	281.56
Malvidine (mg/L)	7.05	8.54	9.87
Cyanidine (mg/L)	14.95	9.76	7.48
Folin Ciocâlteu Index	37	33.83	31.95

Total dry extract. It was positively correlated to the leaf area developed in vinestocks: the lowest value (23.7 g/L) was registered at variant V_1, and the highest one at variant V_3 (27.9 g/L).

Wine total acidity. The influence of thickness on vinestock canopy and diminution in the degree of leaf exposure to direct solar radiation was shown by the analysis of wine titrable acidity. The lowest total acidity (5.26 g/L tartaric acid) was registered at variant V_1, with a maximum foliage exposure to direct solar radiation (100%), and the highest one (7.0 g/L tartaric acid) at variant V_3, with a thickened canopy and less exposed to direct solar radiation (71%).

Wine content in anthocyans. It was strongly influenced by leaf exposure to direct solar radiation. The maximum value of the anthocyan content was registered by variant V_1 (392.04 mg/l), with the best exposure of leaves to direct solar radiation (100%), and the minimum value (281.56 mg/l) by variant V_3, with leaf exposure of only 71%.

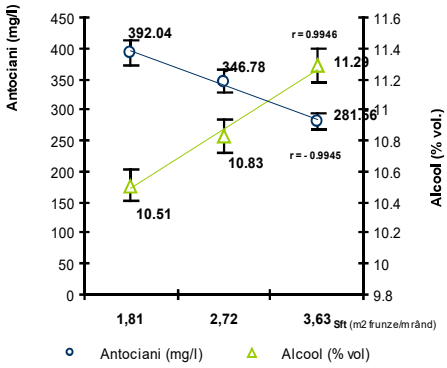

Fig. 3 Correlation between total leaf area, wine alcoholic power and anthocyan content

As concerns the anthocyanic components, we found that *malvidine,* which greatly contributed to the intensity of colour, was positively correlated to total leaf area of the vinestock, while *cyanidine* was negatively correlated to total leaf area and positively correlated to leaf exposure at direct solar radiation.

Wine colour characteristics. The analysis of colour characteristics pointed out that the intensity of wine colour was negatively influenced by thickening and shading of vinestock canopy **(tab. 4**). The wine obtained at variant V_1 has shown the most intense colour (chromaticity 60), and the wine obtained at variant V_3 , the lowest one (chromaticity 54.71).

Table 4

Wine chromatic characteristics (Zweigelt variety)

SPECIFICATION		V_1	V_2	V_3
Clearness		29.2	24.0	23.7
Chromaticity	**a**	60.16	56.07	54.71
	b	36.55	36.44	29.84

CONCLUSIONS

1.In Zweigel variety, with guidance shape of bilateral cordon and training system of vertical monoplane trellis, the optimum value of leaf index is done with 12 shoots/m of row and a total leaf area of 2.72 m^2 /m of row. The canopy, which develops 10 shoots / m of row, does not revaluate the space used by vinestock, for foliage exposure. A number of 20 shoots/m of row determines the canopy thickening.

2. In the absence of some limitative factors, such as canopy thickening and leaves shading, the must concentration in sugars is positively correlated to total leaf area of vinestocks; in Zweigelt variety, the maximum sugars concentration (203 g/l) was registered at a total leaf area of 3.63 m^2/m of row.

3. Must total acidity is increasing once with total leaf area of vinestocks and leaves shading. The highest must total acidity, of 7.2 g/L tartaric acid was registered at variant V_3, at which the foliage was exposed to direct solar radiation, at a rate of only 71%.

4. Canopy thickening determines the accumulation of lower quantities of anthocyans into the grape skin and, implicitly, obtaining less intense coloured wines. The lowest content of anthocyans, of 537.81 mg/l, was registered at variant V_3, with leaf index of 0.71.

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RESEARCH ON THE ROOT SYSTEM OF RED WINE VARIETIES GRAFTED ON VARIOUS ROOTSTOCKS IN COZMEŞTI VITICULTURAL CENTER OF HUŞI VINEYARD

CERCETĂRI ASUPRA SISTEMUL RADICULAR LA SOIURILE PENTRU VINURI ROŞII ALTOITE PE DIFERIŢI PORTALTOI, ÎN CENTRUL VITICOL COZMEŞTI - PODGORIA HUŞI

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Abstract. *Our research focuses on the Cabernet Sauvignon, Merlot and Fetească Neagră varieties grafted on 7 root stocks and selections of root stocks. We used the method of soil samples drawn from every 20 cm in depth, down to a total depth of 100 cm, of which we removed and weighed the roots. According to the data gathered, we proceeded to the graphical representation of the development of the root system.*
Key words: root system, root stocks, vineyard, Cozmeşti, Huşi

Rezumat. *Cercetările se referă la soiurile Cabernet Sauvignon, Merlot şi Fetească neagră, altoite pe 7 portaltoi şi selecţii de portaltoi. S-a folosit metoda de prelevare a straturilor de sol din 20 în 20 cm adâncime până la adâncimea totală de 100 cm, din care au fost separate şi cântărite rădăcinile. Pe baza datelor obţinute s-a procedat la reprezentarea grafică a dezvoltării sistemului radicular.*

The promotion of the red wine production directorate of Cozmeşti viticultural center of Huşi vineyard by SC Vinia SA Iaşi also had from the very beginning an experimental nature, namely that of determining the most adequate range of varieties and root stocks for that viticultural area, able to ensure good grapes production for high quality red wines. The first experiment results were published in 2004 and 2006 (D. Mursa et all.).

This paper shows the results of the research on the development of the root system of the Cabernet Sauvignon, Merlot and Fetească Neagră red wine varieties grafted on various root stocks, in the first 6 years after their plantation.

MATERIAL AND METHOD

The experimental plantations date back from 2000 and they are located in the Cozmeşti Farm of S.C. VINIA. Experimental varieties:

A. FETEASCĂ NEAGRĂ
- grafted on Berlandieri x Riparia, selection: Crăciunel – 26 (C 26);
- grafted on Berlandieri x Riparia, selection: Crăciunel – 71 (C 71);
- grafted on Berlandieri x Riparia, selection: Oppenheim – 4 (SO 4);
- grafted on Berlandieri x Rupestris, selection: Ruggeri – 140 (Ru 140);

B. CABERNET SAUVIGNON
- clone USA/grafted on Berlandieri x Riparia, selection: Crăciunel – 71 (C-71);
- clone USA/grafted on Berlandieri x Rupestris, selection: Paulssen 1103;
- clone 4 Iaşi/grafted on Berlandieri x Riparia, selection: Oppenheim 4 (SO_4);

- clone 4 Iaşi/grafted on Berlandieri x Rupestris, selection: Ruggeri – 140 (Ru 140);
- clone 7 Drăgăşani/grafted on Berlandieri x Riparia, selection: Crăciunel – 71 (C – 71)
- clone 7 Drăgăşani /grafted on Berlandieri x Riparia, selection: Oppenheim – 4
- clone 4 Valea Călugărească (SO_{4-4});

C. MERLOT
- clone Valea Călugărească / grafted on Berlandieri x Riparia, selection: Kober 5 BB;
- clone 8 Valea Călugărească / grafted on Berlandieri x Rupestris, selection: Ruggeri 140 (Ru 140);

The planting stock came from the experimental stations network. The land configuration is a gentle 6-7% slope, the soil is a fairly leached black earth turned before plantation at a depth of 60 cm. The vine rows are oriented on the direction of the level curves at a distance of 2,20 / 1.20 m.

Work method. We chose a medium-development vine of each variety and delineated the reserved nutrition area by the plantation distances: 2,20 x 1,20 m = 2.64 m^2.

Of the delineated nutrition area we dug out the soil layers together with the vine roots, every 20 cm, down to a total depth of 100 cm. We separated and weighed (table 1) the roots from every soil layer (horizon). Based on the weight of the roots from every soil layer, we proceeded to the graphical representation of the development architecture of the root system (charts 1,2,3).

Finally, the total weight of the roots was compared to the soil volume exploited by the vine root system, down to the depth of 1 m (2,640 m2 x 1 m = 2.640 m3) and we were thus able to determine the development of the root system.

RESULTS AND INTERPRETATION

Grafted vine is a new biological entity resulting from the association of the *Vinifera* grape-bearing vine variety with the root stock (American vine species), meant to fight indirectly phylloxera attacks. The two symbiosis products keep their biological characteristics, as the root system of the root stock is under the influence of the grape-bearing vine variety. This influence does not alter the architecture of the root system, however it influences the development of the roots. Hence, the root mass exploring the soil horizons is different, depending on the association by grafting of the grape-bearing vine variety with the root stock vines (table 1).

Table no. 1

Root weights on soil horizons

Variety / root stock	Soil horizon depths:										Total root weight (g)
	0 – 20 cm		20 – 40 cm		40 – 60 cm		60 – 80 cm		80 100 cm		
	(g)	%	(g)	%	(g)	%	(g)	%	(g)	%	
Fetească neagră / SO4	155	11	650	43	365	26	180	13	100	7	1405
Fetească neagră / Ru 140	85	7	420	33	425	34	195	15	135	11	1260
Fetească neagră / C26	150	8	400	22	985	54	220	12	70	4	1825

Fetească neagră / C71	160	11	470	32	675	46	110	8	35	3	1430
Cabernet Sauvignon clone USA / Paulsen 1103	60	6	265	25	545	52	120	12	55	5	1045
Cabernet Sauvignon clone USA / C71	70	11	145	23	295	47	85	14	30	5	625
Cabernet Sauvignon clone 4-ls / Ru 140	40	7	215	37	195	34	85	15	45	7	580
Cabernet Sauvignon clone 4-ls / SO4	75	11	285	42	190	26	95	13	55	8	680
Cabernet Sauvignon clone 7-Dg / SO 4-4	65	5	250	23	530	51	195	17	45	4	1025
Cabernet Sauvignon clone 7-Dg / C71	135	14	315	34	345	37	110	12	30	3	935
Merlot clone 8-VI / K5BB	55	7	450	53	200	24	85	10	50	6	840
Merlot clone 8-VI / Ru 140	50	4	300	26	580	51	140	13	65	6	1135

Fetească neagră grafted on various root stocks (chart no. 1). Researches pointed out the following:

- the most powerful root system is developed by the Fetească neagră variety grafted on the Berlandieri x Riparia Crăciunel 26 and 71 root stock sections. The total weight of the roots, in the first 6 years after plantation, on a depth of 1 m, is 1825 g on the C-26 root stock and 1430 g on the C-71 root stock;
- a less extended, yet deeper root system is developed on the Berlandieri x Riparia Oppenheim 4 selection root stock. The total weight of the roots is 1405 g and it explores the soil on a much higher depth than the C-26 and C-71 selections;
- the least extended root system is developed by the Berlandieri x Rupestris Ruggeri 140 selection root stock. The total weight of the roots is only 1260 g, however the root system is the deepest;
- the soil horizon where most of the roots grow is 40 to 60 cm deep. The exception is Fetească neagră grafted on the Oppenheim – 4 selection root stock, which also grows a large mass of roots in the soil horizon of 20 to 40 cm deep.

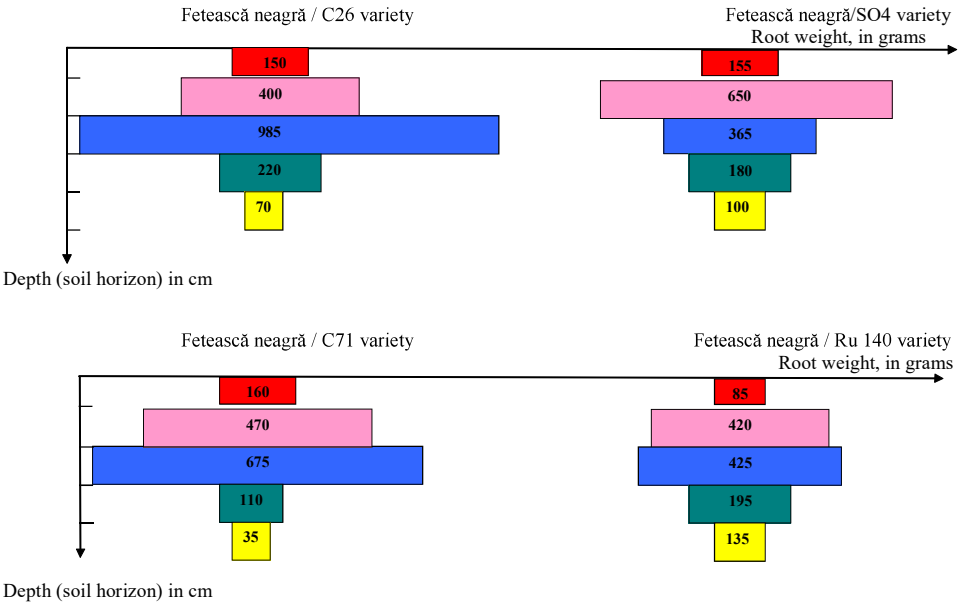

Chart no. 1 – Architecture of the root system of the Fetească neagră variety grafted on various root stocks

Cabernet Sauvignon grafted on various root stocks (chart no. 2). The study performed on the Cabernet Sauvignon clones grafted on a number of 6 root stocks showed the following:

- generally, the Cabernet Sauvignon variety, with less strength than the Fetească neagră variety, has a moderate induced influence on the development of the root system. The largest weight of the roots in the first 6 years after plantation, down to a depth of 1 m, is 1040 g on the Berlandieri x Rupestris Paulssen 1103 selection root stock and 1025 g on the Berlandieri x Riparia Oppenheim – 4 selection, clone 4 (SO_{4-4});

- the smallest root system is developed by the Cabernet Sauvignon 4 – Is clone variety, grafted on Berlandieri x Rupestris Ruggeri – 140 selection, in which the total root weight is only 500 g. In this root stock, root development on the whole is weaker in all the soil horizons;

- a deep root system is achieved in the Oppenheim – 4 and Paulssen – 1103 root stock selections, in which the root weight is large also at 100 cm deep;

- as regards the soil layers (horizons) where most roots grow, this is at 40 to 60 cm deep. The exception is the Oppenheim – 4 selection, which preserves the same superficial root system, at 20 to 40 cm deep, and has a large root weight;

- a strong root system with good representation in all the soil horizons is specific to the Cabernet Sauvignon variety grafted on Berlandieri x Rupestris, Paulssen – 1103 selection.

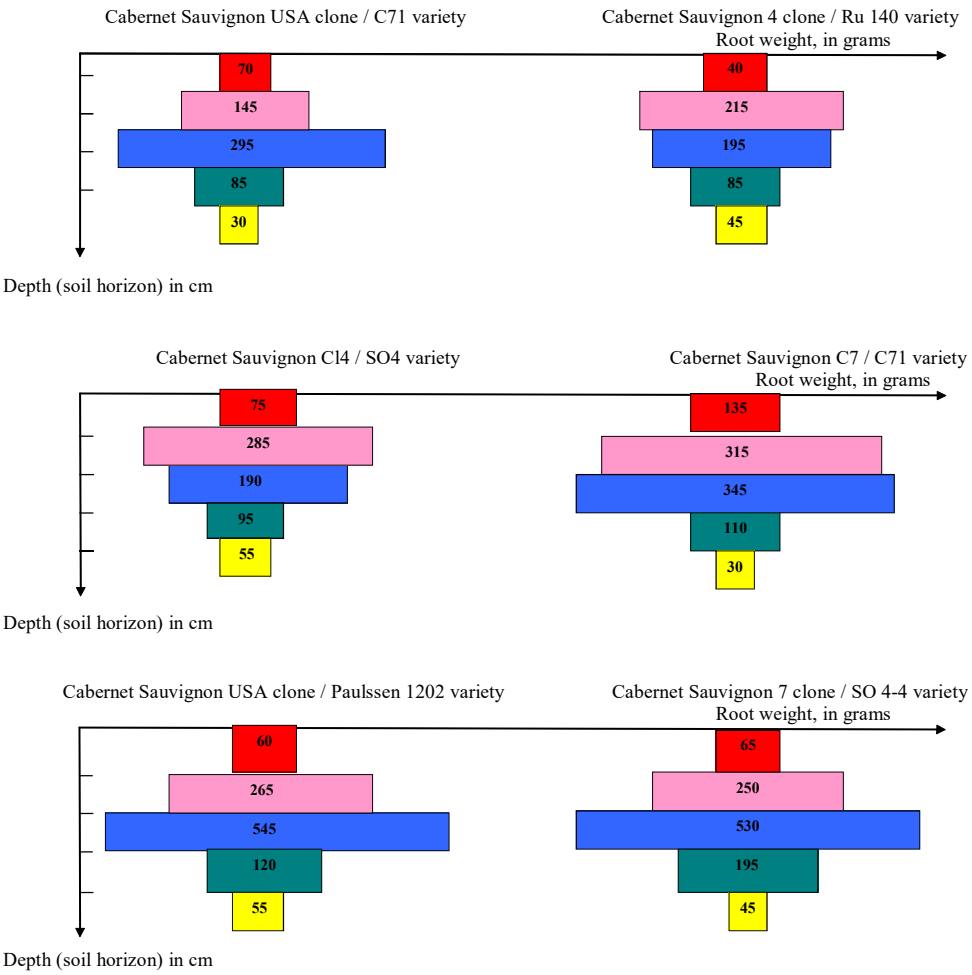

Chart no. 2 – Architecture of the root system of the Cabernet Sauvignon variety grafted on various root stocks

Merlot grafted on various root stocks (chart no. 3). We analyzed the development of the root system in the Merlot 8 – VI clone variety grafted on the Kober 5 BB and Ruggeri-140 root stocks. The findings were the following:

- the most powerful root system, in the first 6 years after plantation, is developed by the Merlot variety grafted on the Berlandieri x Rupestris, Ruggeri – 140 selection root stock, in which the total root weight is 1135 g. A deep root system with good representation in all the soil horizons, down to 100 cm, is developed;

- the Merlot variety grafted on Kober 5 BB grows a weak root system, as the total weight of the roots is only 840 g. Moreover, the root system is superficial, as it grows mainly in the 20 to 40 cm deep soil horizon;

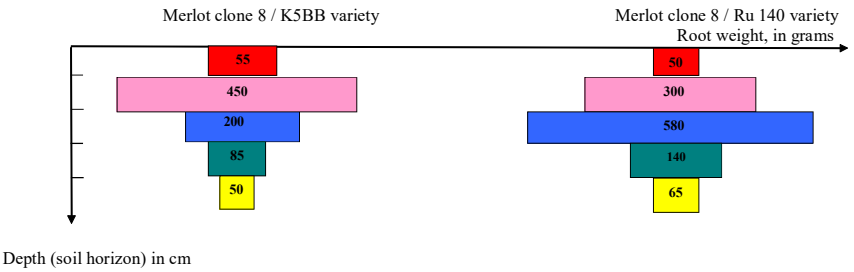

Chart no. 3 – Architecture of the root system of the Merlot variety grafted on various root stocks

OVERALL CONCLUSIONS

The following overall conclusions may be drawn of the experimental results obtained:

1. The root system of grafted vines preserve the biological characteristics of the root stocks, as the grape-bearing vine variety has an induced influence on root development.

2. Given the pedo-climate conditions of Cozmeşti viticultural center, Huşi vineyard, where pedological drought is frequent, grafted vines should grow a larger mass of roots, especially in the deeper (40 to 80 cm deep) soil horizons/layers.

3. The study performed showed that the red wine varieties grafted on Berlandieri x Rupestris root stock selections develop in the soil the most powerful and the deepest root system in the first 6 years after plantation. The Feteasc㠠neagră and Cabernet Sauvignon varieties grow a strong root system on the Berlandieri x Rupestris, Paulssen – 1103 selection root stock, and the Merlot variety on Berlandieri x Rupestris, Ruggeri – 140 selection.

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FLORICICA -NEW GRAPE VARIETY FOR WHITE WINE

FLORICICA -SOI NOU DE STRUGURI PENTRU VINURI ALBE

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Rezumat. *Floricica este un soi nou de viță-de-vie de struguri pentru vin alb. Floricica – soiul nou creat la Institutul Național pentru Viticultură şi Vinificație – eset destinat pentru vinuri albe de consum curent, de calitate şi spumante. Vigoarea butucului este mijlocie, strugurele e de formă conică cu o greutate de 140-150 g, Bobul este verde-gălbuie, de o mărime mijlocie (15 - 16 mm). Maturitatea strugurilor are loc în a doua decadă a lunii septembrie, cînd acumulează 190-220 g/l zăharuri, cu 9,0-12,0 promile aciditate, nota degustației vinului este 8,5-9,0. Productitvitatea este 5-6 kg de struguri la butuc şi 11-13 t/ha. Soiul are o rezistență sporită la mană, oidium, antracnoză, mucegaiul cenuşiu şi reyistență la geruri(-25 ^{0}C), ce dă posibilitatea a obține producție ecologic pură. Soiul Floricica este omologat in Republica Moldova în anul 2007.*

The new created variety Floricica was obtained in the National Institute for Viticulture and Winemaking of the Republic of Moldova by hybridization of Risling de Rhin and Datie de Senvalie (SV 20365). Authors : N. Guzun, T. Olari, M. Tsypco, B. Gaina, V. Sandu, S. David, P. Nedov, L. Supostat, M. Cernomoreț. It was homologated in the Republic of Moldova in 2006 for Center and South districts.

The vine's vigor is middle, the flower is hermaphrodite normal, soil is autofertile. The shape of the shoot's top is opened; the color of young leaf's upon part yellow sunburnt. Grown-up leaf of middle size has length of 15-20 cm , the shape of clapper is pentagonal, with three blades, green on upon part, the general shape is of 9-13 cm. The bunches have the conical shape, biaxial, of middle size, with the weight of 140-150 g, middle compact. The berry is of the middle size of 15-16 mm, the shape is round, the color of the skin is green-yellowish, sometimes waxed, middle thikness, pulp has the taste specific to the variety. The grape's maturity is in the second ten days of September. In conditions of Chisinau the productivity was 5,4 kg/vine and respectively about 12 t/ha. The variety Floricica accumulates in average 190-220 g/l of sugar and 9-12 g/l of. The period of vegetation is 140-145 zile. Bud's opening is in the third ten days of June, Blooming is in the first ten days of July, grape's maturity is in the second ten days of September, fall of the leaves is in the end of October – beginning of November. The variety has 80-85 per cent of fertile shoots, the log's maturity is good. The rezults obtaind show the high resistance of the variety Floricica to frosts and winter, it has 80-90 per cent of

viable eyes. In favorable years of deseases developement the variety has shown the high resistance to manna 7,5 points, oidium 7,0 points, anthracnose 8,0 points, grey rot 7,5 points. It is shown that in the years with favorable conditions of these deseases developement it is recomended to do 1-2 tratations with fungicides in dependence on the level desesases developement. The variety has good affinity for grafting with varieties of engraft Riparia – Rupestris 101-14, SO_4, Cobber 5BB. Vines are formed in bilateral girdle, with load of 30-40 eyes/vine, the length of cords is 4-5 eyes. Thevariety is recomended to be cultivated in the district Center (Codru) and South (Cahul) of the Republic of Moldova.

Table 1

Principal producing and qaulitative appropriations

Specifity	Unit of measure	Indexes
Resistance to frostr, eyes spoiled	%	10-20
Fertile shoots	%	80-85
Weight of a bunch	g	147,6
Weight of 100 of berriess	g	143,3
Grape juice content in sugar	g/l	229.3
Grape juice acidity (H_2SO_4)	g/dm^3	10,6
Grape productivity of a vine	kg	5,7
Grape productivity on 1 ha	t/ha	12,6
Coefficient of absolute fertility		1,9
Coefficient of relativ fertiliy		1,8
Marke of organoleptic tasting of young wine	points	8,1
Resistance to:		
manna	mark	7,5-8,0
oidium	mark	7,5
grey rot	mark	7,5
anthracnose	mark	8,0

The essence of the variety Floricica – new created grape variety for white common and qualitative wine with pleasant taste specific to the variety.

Advantages: stable harvest, high resistance to winter (-25^0C), mană, oidium, anthtracnose, grey rot, ecologic pure prodiction.

THE WINEGROWING REGION OF THE DOBROGEA HILLS CHARACTERIZATION REAGARDING MULTICRITERIAL CLIMATIC CLASSIFICATION (M.C.C.)

REGIUNEA VITICOLA A COLINELOR DOBROGEI CARACTERIZATA SUB ASPECTUL CLASIFICARII CLIMATICE MULTICRITERIALE (C.C.M.).

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Abstract. *In order to make a rational classification, useful in point of winegrowing region on Terra, J. Tonietto and A. Carbonneau (2000) suggested the climatic classification, each settled class being in the position of representing, in a realistic way, some climatic differences which will give the right reply of the grape vine or of the obtained production, all of this in point of a synthetic indicator.*

Therefore a multicriterional climatic classification was suggested, using three criterions, which are represented by three synthetic indicators: drought index (IS), heliothermal index (IH) and night cooling index (IF). The utilization of those indicators allowed making an opinion about climatic variability of the viticulture and the adequate settlement of the classification and of the climatic grouping for different winegrowing region.

Rezumat.*O cale larg folosita pe plan international de evaluare a aptitudinilor climatice ale unei podgorii sau ale unui centru viticol, pentru producerea vinurilor de calitate, este cuantificarea resurselor de temperatura, lumina si umiditate din perioada de vegetatie conventionala.*

Ca urmare a acestei situații, în ultimii ani, sub egida Organizației Internaționale a Viei şi Vinului, cu sediul la Paris, au apărut mai multe lucrări în care s-a utilizat o metodologie nouă, care foloseşte concomitent un număr de trei indicatori sintetici cu caracter ecoclimatic (multicriterii : indicele de secetă – IS, indicele heliotermic – IH şi indicele de răcire al nopților – IF).

Aceşti indicatori, folosiți într-un sistem multicriterial, au fost calculați şi pentru regiunea viticolă a Colinelor Dobrogei, utilizând date climatice pe o perioadă de până la 100 de ani, permițând astfel evidențierea diferențelor de climat din cadrul acestei regiuni si identificarea tipurilor de climat specifice, din cele 38 de tipuri ce se regăsesc la nivel mondial.

MATERIAL AND METHOD

In order to make this study, there have been utilized eco-climatic dates which concern the heliothermal resources and the hydric resources from the conventional vegetation period, from a number of 14 winegrowing centers from the Dobrogea Hills Region.

The obtained data base, was used in calculating the three synthetic indicators which have a eco-climatic character and are used by the multicriterional method: drought index (IS), heliothermal index (IH) and night cooling index (IF).

This indicators, used in a multicriterial system, had been calculated also for the wine growing center of the Dobrogea Hills, using climatic data stretched over a period of 100 years permitting in this way to see the different climate in this region, treat also to compare it with other wine-growing centers, offering the possibility to establish the wine-growing climate for each center, and also to outline the multicriteria climatic groups.

RESULTS AND DISCUSSIONS

The winegrowing climate of winegrowing centers from Dobrogea Hills Region.

After calculate the multicriterials index and their situation in specific variation classes (table 1)it can be observed that for the 14 winegrowing centers for Dobrogea Hills Region the climate vary just a little, respectively only the heliothermal index.

Table 1

WINEGROWING CLIMATES

established based on multicriteria from Dobrogea Hills region

Vineyard	Winegrowing centers	Drought index (IS)	Heliothermal index (IH)	Night cooling index – IF - (IX)	
				După media minimelor	După media temp. de noapte
Murfatlar	30.1 Murfatlar	IS_2	IH_4	IF_3	IF_2
	30.2 Medgidia	IS_2	IH_4	IF_3	IF_2
	30.3 Cernavodă	IS_2	IH_4	IF_3	IF_2
C.V.I.	0.28 Adamclisi	IS_2	IH_3	IF_3	IF_2
	0.29 Chirnogeni	IS_2	IH_4	IF_3	IF_2
	0.30 Mangalia	IS_2	IH_3	IF_3	IF_2
Istria	31.1 Istria	IS_2	IH_3	IF_3	IF_2
	31.2 Babadag	IS_2	IH_3	IF_3	IF_2
	31.3 Valea Nucarilor	IS_2	IH_3	IF_3	IF_2
Sarica Niculițel	32.1 Niculițel	IS_2	IH_4	IF_3	IF_2
	32.2 Tulcea	IS_2	IH_4	IF_3	IF_2
	32.3 Măcin	IS_2	IH_4	IF_3	IF_2
C.V.I.	0.31 Hârşova	IS_2	IH_4	IF_3	IF_2
	0.32 Dăeni	IS_2	IH_4	IF_3	IF_2

Hereby, the *drought index* is situated only in IS_2 class (climate with pronounced drought); *night cooling index* is situated only in cold nights climate class – IF_3, reaching the all 100% percent; the heliothermal index is the only which vary a little, meaning that it is situated in two classes, respectively IH_3 (temperate climate) and IH_4 (warm temperate climate), the last one being the dominant one, with 64% percent (figure 1).

We have here an unique situation for our country viticulture, the all 14 winegrowing centers which form this region being placed only in the pronounced drought climate (IS_2) and the cold nights climate (IF_3). There from it also result the possibility of happily growing for table grape sorts but also for red grape sorts for superior quality wine.

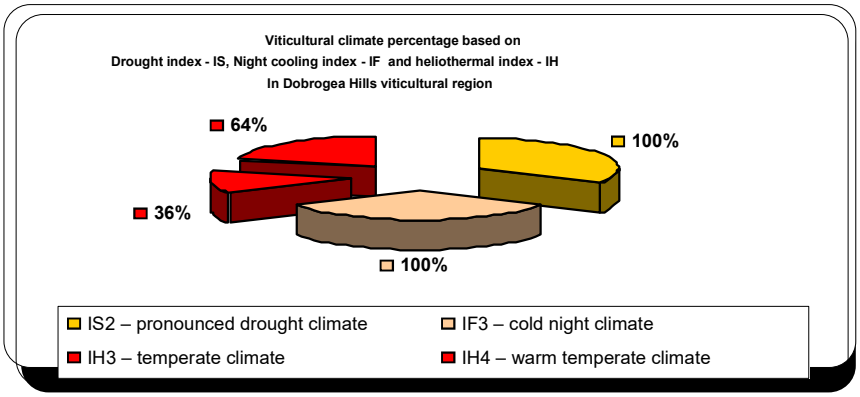

Figure 1 Viticultural climate – IS, IF, IH

The climatic groups representatives for the winegrowing centers from the Dobrogea Hills Region

In this winegrowing region frame it was delineated only two big climatic groups, from the all thirteen on the Romania territory (figure 2), respectively ***IS_2 IH_3 IF_3*** and ***IS_2 IH_4 IF_3***.

Regarding the number of constituent centers, these are different, thereby, the *IS_2 IH_3 IF_3* group, characterized by pronounced drought, temperate and cold nights include five centers: Istrița, Babadag, Valea Nucarilor, Adamclisi and Mangalia, detaining 36% from total, and the iar IS_2 IH_4 IF_3 group represent the majority (64%), constituted from nine winegrowing centers: Murfatlar, Medgidia, Cernavodă, Niculițel, Tulcea, Măcin, Hârşova, Dăieni and Chirnogeni.

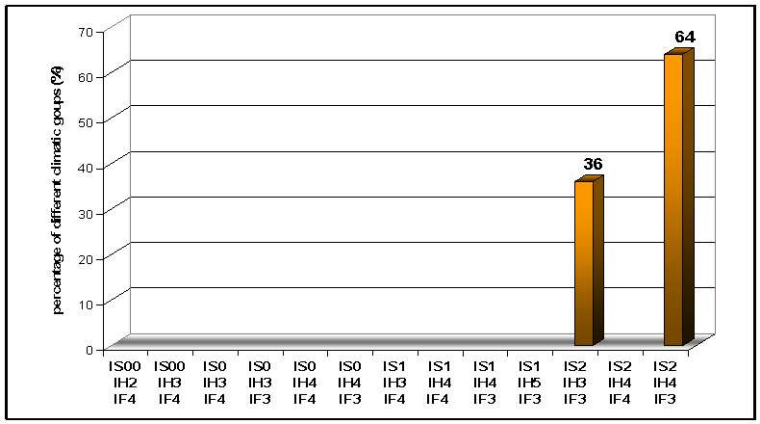

Figure 2 Percentage of different climatic groups (%)

The Dobrogea Hills winegrowing region climate is extremely uniform, with a line disposition for the two climatic groups, without significant discontinuities, having the drought index situated in IS_2 variation class, meaning that the winegrowing centers benefit of a pronounced drought index, based on a warm temperate (IH_4) or a temperate (IH_3) climate, with cold nights (IF_3).

In this region are some winegrowing centers (situated in IS_2 IH_4 IF_3 climatic group), where the climate is influenced by the presence of Black Sea or Dunare (Murfatlar, Cernavodă, Sarica-Niculiţel), with favorable effects especially in autumn, having an important role of thermal regulator, and the water steams create a favorable atmospheric humidity.

CONCLUSIONS

1. In Dobrogea area viticulture the components of winegrowing climate, established by multicriterial vary like that:

- the drought and the night cooling index are stabiles, being situated in a single variation class, respectively pronounced drought climate (IS_2 – 100%) and cold nights climate (IF_3 – 100%). The drought index situated in IS_2 class punctuate the pronounced drought conditions, in which situation the irrigation must be a current practice.
- the heliothermal index is mobile and it is situated in the warm temperate climate class (IH_4 - 64%) but also in the temperate climate class (IH_3 - 36%).

Therefore we can say that we have no important differences regarding the hydric regime and the temperature conditions from the September nights, fact which condition the obtaining of superior sugar concentrations in must. The plus of heliothermal resources permit the grape maturation in normal conditions for table sorts from IV – VI epoch, that mean for all the growing from national actual sort.

2. The winegrowing centers from this region are distributed in two climatic groups, with different proportion (size), the Dobrogea winegrowing area being dominated by *IS_2 IH_4 IF_3 - 64%* class, characterized through pronounced drought, warm temperate, cold nights climate, near to *IS_2 IH_3 IF_3* - 36% group, differentiated from the first class by replacing the IH_4 class with IH_3 class (temperate climate).

The climate elements presented in climatic groups: pronounced drought (IS_2), the warm temperate character of heliothermal index (IH_4), superimposed on September cold nights (IF_3), punctuate that in this month, the thermal conditions for grapes maturation are very favourable regarding the antocyanic pigmentation and tannin content from wine, but less favourable for specific sort aroma forming, especially for white wines.

3. The Dobrogea Hills winegrowing region has the smallest number of winegrowing climate from our country, only two types, representing 5% from the 38 world types.

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EVALUATION OF THE BIOLOGICAL DECLINE PHENOMENON OF THE VINE PLANTATIONS IN THE N-E OF MOLDAVIA

EVALUAREA FENOMENULUI DE DECLIN BIOLOGIC AL PLANTAȚIILOR DE VIȚĂ DE VIE, DIN ZONA DE N-E A MOLDOVEI

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***Abstrac**t. In the last 50 years appeared more and more frequently an alarming phenomenon having economic implications that determined the decline of the vines in numerous wine growing plantations.*

The phenomena of biologic decline or premature death of the vines was signalled also in the wine producing area of North-Eastern Moldavia where the induced damages lead either to the reduction of the number of vines in the affected plantations, or to the infection of the material destined for reproduction (affecting the grafting vine tendrils).

The researches concerning the biological decline of the vine under environment conditions in North-Eastern Moldavia have been initiated in fall of 2006 and there were investigated the vineyards of Iasi and Cotnari.

***Rezumat.** În ultimii 50 de ani, din ce în ce mai frecvent, a apărut un fenomen îngrijorător cu implicații economice determinat de declinul butucilor din numeroase plantații viticole.*

Fenomenul de declin biologic sau pieirea prematură a butucilor viței de vie a fost semnalat şi în zona viticolă din N-E Moldovei, unde pagubele induse conduc fie la reducerea numărului de butuci în plantațiile afectate, fie la infectarea materialului destinat înmulțirii (prin afectarea coardelor altoi).

Cercetările, privind declinul biologic al viței de vie, în condițiile ecologice din N-E Moldovei, au fost inițiate în toamna anului 2006, în care s-au investigat podgoriile Iaşi şi Cotnari.

The decline of the vine plantations in Romania reached special amplitude in the last years, the phenomenon being caused by a series of abiotic and biotic elements.

The action of these factors can be simultaneous or successive, the process of vine withering manifesting itself slowly in a period of 3 to 5 years or rapidly through its sudden death.

The economic impact of this disease has great importance while puts at risk the very existence of the plantations. Generally, the affected vines vegetates weakly, and from year to year portions of the vine do not start to vegetate or present a late shoot forth, the tendrils remaining short and the vine unleafed.

Debilitation is in a long period of time an irreversible process, the death of the plant being ended by a group of pathogens (Cavanni et co. 1987).

In Romania, the phenomenon of vine premature death was signaled in all vineyards, presently the process being in an extension phase, especially in the neglected plantations where the agro-technical measures were not performed according to technology and the phytosanitary protection was poorly performed.

The researches concerning this phenomenon under the ecological conditions form N-E Moldavia were initiated in fall of 2006 and as a result of the theme proposed in the project no. 47 of the program "Excellence research".

MATERIAL AND METHOD

In this period there were investigated the vine plantations of S.C.D.V.V. Iasi, S.C. Vinia S.A and S.C. Cotnari S.A. being identified parcels with biological decline symptoms: vines that have a weaker vegetation, offshoots with limited growth, rust mite tendrils, vines with withered branch portions.

In the respective parcels there were calculated the disease frequency by counting the affected vines against the healthy ones (100 vines in an analyzed parcel). The chosen varieties for this study are representative in the N-E area of Moldavia, namely: Aligoté, Fetească regală, Fetească albă, Muscat Ottonel, Merlot, Frâncuşă, Grasă de Cotnari.

The biological material sampled on the vines with decline symptoms were taken to the laboratory in the purpose of identifying the lignicola fungi implied in this phenomenon.

The methods used to isolate and identify the entophyte fungi in a multi-annual wood of the vines were the current ones in the laboratory technique (Grosclaude 1975): out of the affected wood were taken wood tissue samples under the bark, 0,3 – 0,5 cm long and 0,5 mm wide, that were put in a culture environment (CGA or malt 2 %). Of the numerous colonies formed in the environment were closely examined the ones specific for the respective fungus.

RESULTS AND DISCUSSIONS

Sampling the sick biological material samples included areas of the branches, multi-annual wood, rust mite tendrils, bark areas and was performed taking into account the particularities of the development cycle of the fungi, being known the fact that the majority of species on this substrata are included in the Ascomycotina and Deuteromycotina subdivision.

Form the sampled biological material there were analyzed the following lignicola fungi implied in the premature withering of the vines, namely: *Eutypa lata*, *Phomopsis viticola* şi *Cytospora vitis*.

As it can be observed in table no. 1, the affected vines came from plantations that have an age between 15 and 36 years and there was established the ecological debilitation of the vines as a result of the pedoclimatic conditions and agro-phyto-technical measures applied here. The port changes of the vine from the classic forms to a high trunk, determined appearance of wounds made by cutting, and these represented intrusion gates for the lignicola fungi.

On this background the vines became sensitive to lignicola fungi diseases, a very great frequency having the *Eutypa lata* fungus with a percent of 28% on the

varieties of Aligoté and 26 % on Muscat Ottonel, parcels located at S.C.D.V.V. Iaşi.

For the Aligoté variety, the affected vines presented whitering of a branch, limited growth offshoots, rust mite aspects, little chlorotic leaves with necrosis borders and the grapes had a weak development.

Table 1.

Technical monitoring sheet of Iaşi and Cotnari vineyards

Vineyard	Institution/ Owner	Variety	No. of analyzed vines	Attack frequency %	Lignicola fungi	Founding year
Iaşi	S.C.D.V.V Iaşi	Aligoté	100	28	Eutypa lata	1971
Iaşi	S.C.D.V.V Iaşi	Fetească regală	100	6	Phomopsis viticola	1991
Iaşi	S.C.D.V.V Iaşi	Fetească albă	100	15	Eutypa lata	1992
Iaşi	S.C.D.V.V Iaşi	Muscat Ottonel	100	26	Eutypa lata	1971
Iaşi	S.C.Vinia S.A	Fetească regală	100	23	Phomopsis viticola	1980
Iaşi	S.C.Vinia S.A	Merlot	100	18	Phomopsis viticola	1978
Cotnari	S.C.Cotnari S.A	Frâncuşă	100	8	Cytospora viticola	1984
Cotnari	S.C.Cotnari S.A	Grasă de Cotnari	100	5	Eutypa lata	1984

The branches of the vines that are withering had longitudinal cracks.

As a result of performed observations, the frequency of the *Phomopsis viticola* fungus attack had the highest values on the varieties of Fetească regală 23 % and Merlot 18%, located in the parcels from Comarna area.

On the tendrils affected by *Phomopsis viticola* fungus there can be observed, a pronounced whitening of the bark, especially on the first interknots, and on these there can be observed black dots. The lamina of the affected leaves was small chloritic and with dark brown irregular spots.

The cytosporiosis produced by the Cytospora viticola fungus determined withering of the vines from top to basis, the attack frequency being of 8 % for the Frâncuşă variety in Cotnari vineyard.

The affected vines weakly vegetated, the leaves ceased in growth becoming yellow without falling, the grapes having a dehydrated aspect.

CONCLUSIONS

As a result of the researches initiated in fall 2006 concerning the fungi that attack the bark and wood of the vines there can be observed:

1. Due o the modifications hat appeared in the vine culture technology there were produced some changes in the pathogen agents complex, and some of these

transferred from the group of potential or secondary pathogens in the group of major economic importance pathogens;

2. The ecological debilitation and the biological withering of the vines is a frequent phenomenon in the N-E area of Moldavia;

3. Among the fungi responsible with the vine decline, the greatest extension has the *Eutypa lata* fungus with a frequency of 28 %, followed by *Phomopsis viticola* fungus with a frequency of 23 % and *Cytospora viticola* fungus with 8 %;

4. The lignicola fungi are not the decisive and exclusive element in the process of premature death of the vines, these are only a link in the chain of the factors responsible for the development of this complex and heterogeneous process.

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THE INFLUENCE OF CLIMATIC FACTORS IN THE VINEYARD IN N-E OF MOLDAVIA, DURING 2001 – 2007

INFLUENȚA FACTORILOR CLIMATICI ASUPRA PLANTAȚIILOR VITICOLE DIN N-E MOLDOVEI, ÎN PERIOADA 2001 - 2007

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Abstract*. Evolution of climatic factors from last year had an unfavorable impact in the vineyard of NE Moldovei, register turning frequently from multiyear average. In this work there are analyzed the restrictive climatic factors who influence the development and fructification of vine (minimum absolute temperatures in the winther, maximum absolute temperatures, rainfall and sunstroke.*

The observations and determinations have been effectuate on varieties of Vinifera authorized and recommended to be cultivated in the viticultural centre Copou, vineyard Iasi. There were established the viability of grape vine winter buds, the fertility potential of variety, the resistance of attack main diseases the conditions application of phyto-sanitary treatments, the quantity and the quality of productions. The obtained results through this identifications variety the behaviour superior the climatic conditions unfavorable.

Rezumat. *Evoluția factorilor climatici din ultimii ani a avut un impact nefavorabil asupra plantațiilor viticole din nord estul Moldovei, înregistrîndu-se frecvente abateri de la mediile multianuale. În lucrare sunt analizați factorii climatici restrictivi care influențează procesul de creştere şi fructificare la vița de vie (temperaturile minime absolute din timpul iernii, temperaturile maxime absolute din perioada de vegetație, precipitațiile şi insolația).*

Observațiile şi determinările s-au efectuat pe soiurile Vinifera recomandate şi autorizate în cultură pentru centrul viticol Copou, podgoria Iaşi. In acest sens, s-a determinat viabilitatea mugurilor de iarnă, fertilitatea soiurilor, rezistența la atacul principalelor boli criptogamice în condițiile de aplicare a tratamentelor fitosanitare, producția şi calitatea acesteia. Rezultatele obținute au condus la identificarea soiurilor cu comportamentul cel mai bun la condițiile climatice nefavorabile.

The viticulture plantations from the North-East area of Moldavia, found at the northern border of the vineyard culture in Europe are more and more affected by the climatic changes that appeared in the last decade. The modification of the environment conditions determines changes in the metabolism, in the development of growth and development, with positive or negative influences on the quality and vitality of plants (T. Martin, 1968).

The quantitative and qualitative diminution of the crops and the damage of the grape vines from the viticulture plantations, as a result of the appearance of early frosts in autumn, of the harsh cold weather in the winter, and also of the late spring frosts, engenders significant losses for the viticulture patrimony (Calistru Ghe., Doina Damian şi colab, 1992, 1995).

Analyzing the monthly and season averages of the air temperature and the quantities of precipitations during the period 1901-2000, the frequency of the abundant precipitations and the frequency of meteorological phenomena from the cold season, the climatologic specialists within the National Administration of Meteorology emphasized an average warming per country of 0.3^0C, more pronounced in the eastern half of the country, where this warming is significant from the statistic point of view. From the pluviometer point of view, a tendency of decrease of the annual precipitation quantities was emphasized, more pronounced in the center of the country with slight increases in the North-East and some regions in the south.

MATERIAL AND METHOD

For the analysis of the eco-climatic factors, we used the data registered at the meteorological unit of the Station for Research and Development for Viticulture and Wine Production Iasi and those from the Regional Meteorological centre Moldavia – Iasi. The observations and determinations were carried out during the period 2001-2007 on the Vinifera varieties, recommended and authorized for cultivation for the viticulture centre Copou, Iasi vineyard, monitoring the development of vegetation phenophases , the viability, resistance to the attack of the main cryptogamic diseases, its production and quality.

RESULTS AND DISCUTIONS

The climatic factors from the period studied corresponds to years with different conditions (table 1 and table 2).

Table 1

The main climatic elements from Copou viticulture centre during the period 2001 -2006

Climatic elements	2001	2002	2003	2004	2005	2006
The global thermal balance, (Σt°g)	3129,4	3232,7	3325,8	3099,9	3156,2	3188,8
The active thermal balance, (Σt°a)	2984,1	3133,4	3241,7	3038,4	3063,4	3108,4
The necessary thermal balance, (Σt°u)	1334,1	1463,4	1561,7	1298,4	1363,4	1378,4
Σ annual precipitations, mm	748,0	602,8	485,4	593,5	646,1	500,2
Σ precipitations from the vegetation period, mm	533,2	432,5	293,5	386,1	433,9	341,5
Σ of the isolation hours from the vegetation period, hours	1512,9	1416,1	1630,2	1467,0	1461,2	1491,6
The annual average temperature,°C	9,5	10,3	9,5	10,0	9,8	9,6
Average temperature from – July,°C	22,1	23,0	21,2	21,5	21,6	21,5
– August,°C	21,4	20,2	21,2	19,8	20,5	21,0
– September,°C	15,5	14,9	15,1	15,0	16,6	16,2
The average temperature from the I and II June decades	17,6	18,3	21,9	18,8	17,9	16,9
No. of days with maximum temp. > 30 °C	31	18	31	9	20	28
The length of bioactive period, days	187	185	175	174	170	178
The real heliothermal index	2,0	2,1	2,5	1,9	2,0	2,1
The hidrothermql coefficient	1,8	1,4	0,9	1,3	1,4	1,1
The bioclimatic index of the grape vine	4,6	5,6	9,8	6,3	5,6	7,4
The index of oeno-climatic aptitude	4231,8	4367,0	4828,4	4369,3	4340,7	4508,5
General characterization of the year	rainy	normal	draught	draught	normal	draught

The Meteorological Station Iasi (184 meters altitude) indicates a multi-annual average value (years 1896-1955) of the annual temperature of $9.6\ ^0$C,

the average of July being +21.3^{0}C and of January being of – 3.6^{0}C , therefore an annual thermal amplitude of approximately 25^{0}C. In the last years we registered a slight increase of the thermal values, thus reaching an average temperature of 10.3^{0}C, in 2002, that shows a thermal plus of + 0.7^{0}C compared to the average multi-annual value.

The values of the global thermal balance from the period of vegetation (2001-2006) comprised between 3099.9 and 3325.8, show that in Copou-Iasi viticulture centre, the conditions of grape maturation are ensured until the V stage and there are fewer chances for the maturation of grapes from the VI and VII stages. The sums of active and necessary temperatures during the period of vegetation are comprised between 2984.1-324.7 respectively 1298.4-1561.7 (table 1). We notice a slight tendency of value increase in the last years.

In the conditions of the temperate climate of our country, the level (- 22.. – 30 ^{0}C) and the frequency of the absolute minimal temperatures have a major importance for the grape vine cultivation. Thus in the viticulture centre Copou Iasi, during the period 2001-2007, the absolute minimum temperatures during winter had values comprised between -17.0 and -25.1 ^{0}C in the air and of -19.0 and -29.5 ^{0}C at the soil surface (table 2).

Table 2

The minimum absolute temperatures registered during the period 2001-2007 in the viticulture centre Copou-Iasi

Year	in the air			Anul	at the soil surface		
	month	day	t ºC		month	day	t ºC
X 50 years	-	-	- 6.4	X 35 years	-	-	- 8.4
2001	XII	24	- 20.4	2001	XII	26	- 21.3
2002	XII	18	- 19,8	2002	XII	29	- 20.2
2003	I	13	- 21.6	2003	I	13	-23.0
2004	I	31	-17.0	2004	I	31	-19.0
2005	II	8	- 19,4	2005	II	6	-27,6
2006	I	23	- 25,1	2006	I	25	- 29,0
2007	II	24	-20,5	2007	II	24	- 26,8
minimum absolute t ºC during the period **1942-2000**				minimum absolute t ºC during the period **1959-2000**			
1946	XII	19	- 29.5	1996	XII	28	- 33.5

Compared to these values, the types from the variety reacted differently, according to the genetic characteristic of each, but also to the applied culture measures, the position of grape vines in the field (base, middle or upstream), the proportion of the anterior years' productions and the degree of maturation of the annual cords.

Analyzing the behavior of the varieties at frost (table 3), we ascertain that, in 2001, 2002 and 2003, when the absolute minimum temperatures varied between -17.0 ^{0}C and -20.4 ^{0}C in the air and -19.0 ^{0}C ….- 21.3 ^{0}C at the surface of the soil, the registered losses of buds were situated within normal limits, between 0 and 25 %, with the exception of Feteasca alba variety, in which case the losses were greater.

Table 3

The behavior of the main varieties from the assortment under frost conditions

Year / Variety	*Eye losses- %						
	2001	2002	2003	2004	2005	2006	2007
Fetească albă	32	36	14 - 54	11	19 – 72	4 - 86	70 - 100
Fetească regală	15	25	21 - 75	6	0 - 67	0 - 64	38 - 100
Aligoté	7	28	12 - 100	14	3 - 92	5 - 69	6 - 90
Chardonnay	10	13	12	0	28 - 48	12 – 50	1 - 86
Sauvignon	8	12	13	0	21 - 40	22 - 61	9 - 30
Muscat Ottonel	18	18	44 - 56	4	13 - 57	11 - 36	18 - 96
Golia	8	13	6 - 20	0	13	6	55
Chasselas doré	6	22	29	2	17 - 41	58 - 62	36 - 77
Gelu	12	19	16 - 29	0	20	58	79
Paula	13	20	2 - 55	2	22	60	82

*limit dates

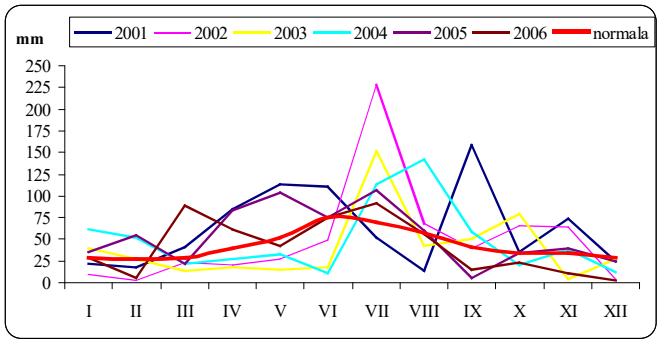
The significant losses of eyes were produced between the years 2003, 2005, 2006 and 2007, these being situated between 2 – 100 % (2003), 3 – 92 % (2005), 4 – 86 % (2006) and between 1 – 100 % (2007). The most sensitive varieties to the frost condition were Fetească albă, Aligoté, followed by the varieties for table grapes Paula, Gelu and Chasselas doré. The good resistance to frost was noticed in the new Golia variety.

A special situation occurred in 2007, when, after a warm winter, with long periods in which the maximum temperature in the air oscillated between 0 ^{0}C and 16 ^{0}C producing the phenomenon of plants annealing. In the interval 23-26 February 2007, the minimum absolute temperatures reached values in the air of -20.5 ^{0}C and – 26.8 ^{0}C at the surface of the snow layer, causing great losses of buds, the damage of the diaphragm and even of the annual wood. In the interval 0.01.2007 - 23.02.2007 from the 53 days, we registered negative values comprised between 0 °C and – 8,6 in only 5 days, and in 17 days values over + 10 °C and in the rest of time values between 0 °C and + 10,0 °C.

In the continental- temperate climate the vine requires an annual regime of precipitations comprised between 500 and 700 mm, of which at least 250-300 mm must be uniformly distributed during the period of vegetation under the form of necessary rains (more than 10 mm).

In Copou viticulture centre, the multi-annual average of precipitations (1972-2003) is of 572.9 mm, of which during the period of vegetation is 404.7 mm (with a minimum of 156.3 mm in 1973 and a maximum of 693.3 mm in 1991). In the last years we assist at a decrease of the precipitation regime (2001-2006), the annual average being of 567.9 mm, and in the vegetation period of 384.3 mm. In general, we notice non-uniform distribution of precipitations during the year (graph 1).

The precipitation deficit appears especially during the winter period and the beginning of the vegetation period (April-May) with repercussions over the triggering of phenophases at vine and in July-August months. In the analyzed period, this kind of situations were registered in the winter of 200-2001 with a deficit of 71.6 mm and in September- December 2006 of 90.3 mm, without negative influences over the grape vegetation and production.



Graph 1 **The monthly distribution of precipitations 2001 – 2006 (mm)**

Table 4

The accessible humidity and the water deficit in the soil

Width, cm	January 2001		December 2006	
	Uacc, %	Deficit, %	Uacc, %	Deficit, %
0 – 20	50	50	47	53
20 - 50	47	53	38	62
50 - 100	37	63	46	54
100 - 150	51	49	75	25

The abundant precipitations were registered in the conditions of 2005, during the period before flourishing (double values compared to the normal ones), the harvest being compromised in a proportion of over 80% because of the manna registered both on the leaves and on the clusters (intensity 82%, frequency 100%, attack degree 82%).

The climatic factors from the period 2001-2007 allowed to the varieties from Copou viticulture centre to go through the whole phonological specter (table 5), benefiting from an average number of 178 days with active vegetation.

Table 5

***The phonologic specter of the main varieties from Copou viticulture centre Iasi (2001 – 2006)**

Variety	De-bud	Flowery	Early stage of ripening	Technologic maturation	Fall of leaves
Fetească albă	23 IV – 4 V	28 V – 10 VI	25 VII – 20 VIII	10 – 29 IX	13 X – 6 XI
Fetească regală	25 IV – 3 V	29 V – 12 VI	27 VII – 23 VIII	10 – 29 IX	13 X – 6 XI
Aligoté	21 IV – 5 V	30 V – 14 VI	28 VII – 25 VIII	10 – 29 IX	13 X – 6 XI
Chardonnay	21 IV – 3 V	23 V – 11 VI	22 VII – 18 VIII	10 – 29 IX	13 X – 6 XI
Sauvignon	23 IV – 4 V	28 V – 13 VI	27 VII – 23 VIII	10 – 29 IX	13 X – 6 XI
Muscat Ottonel	22 IV – 3 V	25 V – 10 VI	22 VII – 20 VIII	10 – 29 IX	13 X – 6 XI
Golia	21 IV – 4 V	1 VI – 15 VI	26 VII – 20 VIII	10 – 29 IX	13 X – 6 XI
Chasselas doré	24 IV – 30 IV	1 VI – 14 VI	26 VII – 15 VIII	6 – 20 IX	13 X – 6 XI
Gelu	25 IV – 1 V	31 V – 10 VI	12 VII – 30 VIII	14VIII – 17 IX	13 X – 6 XI
Paula	20 IV – 4 V	20 V – 10 VI	5 VII – 26 VIII	5 – 30 VIII	13 X – 6 XI

*limit dates

The influence of climatic factors was reflected directly in the grape productions achieved by the studied varieties, which were fluctuant from one year to the other (table 6).

Table 6

The quantitative production of the main varieties from the assortment during the period 2001-2006

Year / Variety	Production, kg/ha						
	2001	2002	2003	2004	2005	2006	average
Fetească albă	5490	7862	4782	10052	602	5013	5633
Fetească regală	8000	10430	10208	12000	750	7988	8230
Aligoté	6800	9550	10980	14146	698	6999	8196
Chardonnay	x	x	x	7972	545	8064	5527
Sauvignon	6818	9026	10177	10290	754	10087	7859
Muscat Ottonel	6500	3843	11433	9000	400	7000	6363
Golia	10220	13600	13800	14700	3340	13300	11499
Chasselas doré	6000	10850	9932	10253	400	5123	6966
Gelu	12530	22000	13500	18400	1450	3100	11380
Paula	12100	19780	14800	17830	580	-	10850

According to the values of the minimum absolute temperatures and of the other unfavorable factors from the ecosystem, the varieties from the study achieved average productions close to their biologic potential in the years 2001, 2002, 2003 and 2004. The smallest productions were obtained in 2005, when in all the varieties the production was under 1000 kg/ha, with the exception Golia variety with 3340 kg/ha and Gelu with 1450 kg/ha.

CONCLUSIONS

1. In the analyzed period, we ascertained unfavorable tendencies in the evolution of the climatic factors, with a direct impact on the vegetative and productive impact of the viticulture plantations.

2. The following white wine varieties manifested a high sensitivity to frost: Fetească albă, Fetească regală and Aligoté and the table varieties: Chasselas doré, Gelu, Paula and a good resistance of Golia variety.

3. The average productions achieved were oscillating from one year to the other and from one variety to the other, the biggest productions in the frost years being registered in the Golia, Sauvignon, Fetească regală and Aligoté varieties.

4. In the future, it is very important to carefully watch the evolution of climatic perturbations, especially the extreme temperatures during the winter and summer, the long, pedological and atmospheric draught in view of elaborating the necessary solutions to attenuate their negative effects.

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THE INFLUENCE IN THE UTILIZATION OF THE SYSTEM FOR CLEARING THE MUST BY FLOATATION ABOUT THE QUALITY OF WINE

INFLUENȚA UTILIZĂRII SISTEMULUI DE LIMPEZIRE A MUSTULUI PRIN FLOTAȚIE ASUPRA CALITĂȚII VINULUI

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Abstract. *Wine pressing of the must of impurity witch are trained gravitational to the bottom of recipient or erected to the his surface is a prerequisite in the elaboration of white wines of quality. Flotation represents quick method to clear the must before the fermentation.*

The word "flotation" come from the English language and it means : to swim, to float, to erect to the surface. The closer meaning is: the solid mini pieces that are came from grape float in must are raised to surface, thus we can obtain a clear separation of the lees of the clear liquid. The method of clearing is based on the introduction of little bubbles of gas in the liquid, those are attached by the solid parts in flotation from must and then raise them to the surface. The mini solid pieces stay there in top forming a solid layer. This layer can be remove continuously from the surface or the clear liquid can be pulled by the his absorbtion to the inferior part through pipeline of total depletion of recipient. The clearing through flotation were longtime an usually method for treatment of residual waters. In the last years were used more intense in preliminary wine pressing of the must. Today can be use that a confirmed process for improving the quality of wine

Rezumat. *Deburbarea mustului de impuritati fie antrenate gravitational la fundul vasului fie ridicate la suprafata lui este o conditie esentiala în elaborarea vinurilor albe de calitate. Flotatia reprezinta un procedeu rapid de limpezire mustului inainte de fermentatie. Cuvântul flotatie vine din limba englezã si înseamnã a inota, a pluti, a se ridica la suprafatã. Intelesul mai apropiat este: particolele solide provenite din strugure plutesc în must ridicându-se spre suprafatã, astfel se poate obtine o separare netã a sedimentului de lichidul limpede.*

Procedeul de limpezire este bazat pe introducerea unor bule mici de gaz în lichid, acestea se atasează de pãrtile solide în suspensie din must si le ridicã spre suprafatã. Particolele solide rãmân acolo sus, formând un strat solid. Acest strat poate fi înlãturat continuu de pe suprafatã sau lichidul limpede poate fi extras prin absorbirea lui la partea inferioarã prin conducta de golire totalã al recipientului.

Limpezirea prin flotatie a fost mult timp un procedeu uzual pentru tratarea apelor reziduale. In ultimii ani s-a utilizat mai intens în deburbarea preliminarã a mustului. Astãzi poate fi utilizat ca un proces confirmat pentru îmbunãtãtirea calitãtii vinului

MATERIAL AND METHOD

For being obtain of the must were used the grapes belonging the kind Aligote which they were enzymatic with Extrazym, and the must obtained hade three destinations:

- The must obtained by classic method.
- The must obtained of the blacher wine pressing through flotation.
- The must obtained by pneumatic press wine pressing through flotation.

To three musts it caused the contain in sugars, organic acids, polyphenols total and the absorbance. The must resulted was soured with selected yeasts (IOC) to see the fermentation through a periodic determination of the density of the must to see the dynamic of fermentation. At the wine obtained it was applied wine clarification and the necessary treatments, after that they were made the physics -chemical current analyzes.

RESULTS AND DISCUSSIONS

Table 1

The analyze physics -chemical of the obtained must

Nr. crt.	The specification concerning the elaboration of the must	Sugars g/l	Total acidity g/l H_2SO_4	SO_2 total mg/l	Absorbance D_0 =420nm	Total polyphenols g/l
1	Clasic not claring	183	4,0	7	0,152	0,59
2	Blacher -flotating	188	4,2	7	0,124	0,32
3	Pneumatic-flotating Press	196	3,9	10	0,387	0,40

From dates of table 1 results as the resulting must from those three processes have the physics -chemical relative similar parameters, significant differences are noticed to the contend in polyphenols total which are placed in reduced limits closer at floated musts and special 0.32g/l in the case of utilization of the must floated resulted from blacher-tank and 0.40 g/l at the must made from pneumatic press. This parameter higher is explained through a long time of stockage in press comparative with one from blacher-tank. The highest contain in polyphenols was realized at must not claring 0.59 g/l. Luminous absorbance at 420 nm indicate a process of oxidation at the must resulted through the pneumatic press as the result of longer stationary in the nipper of the press where is oxygenated stronger in the process of the press (0.387 nm).

The floated must a most luminous it is accomplished through the utilization of the blacher - tank being at 0.124 nm. Therefore is enforced a shorter regime of press to a smaller amount of grapes and isn't necessary to wait until the press is full and probably a bigger regime of sulphytation for give it the antioxidate safety.

Table 2

The dynamic of fermentation's must

Date	Classic not claring		Blacher -flotation		The press pneumatic - flotation	
	Sugars g/l	Temperature °C	Sugars g/l	Temperature °C	Sugars g/l	Temperature °C
30.09	183	20	188	20	196	20
01.10	183	20,5	188	20,5	196	20,5
02.10	164	23	180	21	194	21
03.10	140	26	168	23	170	23
04.10	110	28	145	25	135	25
05.10	88	30	110	28	105	28
06.10	55	31	78	29	75	29
07.10	20	31	45	29	43	29
08.10	5	30	22	28	20	28
09.10			11	27	10	27
10.10			6	26	5	26

In the table 2 is presented the dynamics of alcoholic fermentation at three musts and it is noticed a metabolic **of** sugars more quickly in the case of the in floated must than in the case of floated must. This fact is caused of the material support more abundant from the frame of the in floated must comparative with the clear must through flotation which was disembarrassed of most impurity. The temperature of fermentation was higher at wine clarification must comparative with the one who is wine pressing must by flotation. The fermentation has resulted more easily in case of floated must.

The physics - chemical of pointers of achieved wine are presented in table 3 and they are showing significantly differences regarding volatile acidity which is higher at resulting wine by not claring must being at 0.51 g/l acid acetic, comparative with the one achieved by floatation, which was situated at 0.21 respectively at 0.24g/l acid acetic at the wine pressing wines resultants by blancher- tank and air press. Appreciable differences were noticed regarding extractivity of wines, the in reduced extraction was placed at 18 g/l derived wine by not claring must and at 21 g respectively at 22 g/l at those two variants.

The best luminous intensity at 420 nm was realized at wine derived from blacher - tank 1.24 nm, because his processing by floatation was realized immediately comparative with the one of resulted wine by pneumatic press, where the flotation was realized after a long period of stagnation in press where were in progress an oxygenation enough stronger. By this method, the wine has registered a tint yellowish.

The luminous intensity of wine at 420 nm was highest at the wine resulting from air press and special 0.116 where were happened biggest oxygenations, but don't in according to damage quality of wine. The obtained wine from press is with tint the yellowish maul than one obtained from blacher but without he has bareback gustatory repercussions falled across the oxidation initially the must. In order to reduced the oxidation from the bunker of the press is essary a sulphitation an energetical maul musts from coupled press with decrease of the duration of stationary in bunker (fig. 2).

Table 3

Indexes physico – chemical of wine – The harvest 2006

Nr. Crt.	The kind the way of elaboration	Alcohol % vol.	otal acid g/l H_2SO_4	Acidity vol. g/l CH_3 - COOH	SO_2 mg/l free	SO_2 mg/l total	Sugar Red. g/l	Extractnered. g/l	D.O. 420nm	Total polyphenols g/l	Organoleptic appreciation
1	Aligoté/must of Blacher nedeburbat by flotation	10,8	4,5	0,51	18	100	3	18	0,055	0,24	Mediocre hard without fineness
2	Aligoté/must de la Blacher deburbat by flotation	11,0	3,9	0,21	19	102	6	21	0,047	0,15	Very good with many kinds of aromas
3	Aligoté/must from air press deburbat by flotation	11,5	4,6	0,24	16	95	2	22	0,116	0,16	Very good with many kinds of aromas

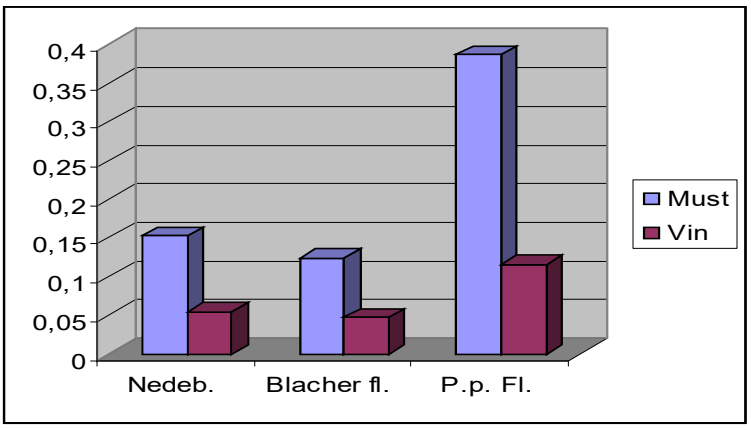

Fig. 1. Luminous intensity of must and wine

The amount of polyphenolics remanent in wine was of 0.24g/l in the case of wine resulting from nedeburbat must and smaller in the case of wine resulting from blancher –tank and air press and special 0.15 respectively 0.16 g/l total polyphenolics (fig.1)**.**

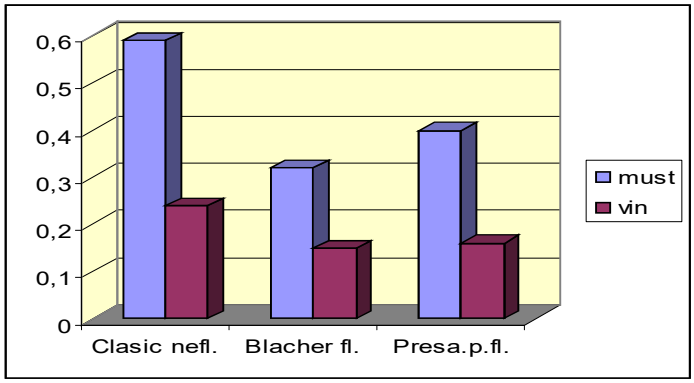

Fig.2. Polyphenolic compounds by must and wine

Below sensorial appearance the best gustatory and olfactory impressions gave the wines results by flotation, being expressive, harmonious with different kinds of aromas.

CONCLUSIONS

Significant differences consisted in what regarding the volatile acidity which is higher at the wine resulted from the not wine pressing being of 0.51 g/l acid acetic comparative with the one obtained by flotation witch was placed to 0.21, respectively 0.24 g/l acetic acid at wine pressing wines resulted from blancher - tank and air press.

Appreciable differences were seen regarding extra activity of wines, irreducible extract to the wine derived from the not wine press was smaller comparative with the one of wines derived by floated musts.

The luminous intensity of wine at 420 nm was highest at the wine resulted at the pneumatic press and special 0.116, where were produced the biggest oxygenations, but don't in according as endanger the quality of wine. The wine obtained from press is with tint the yellowish maul than one obtained from blacher but without having bareback gustatory repercussion falled across the initially oxidation of the must. In order to reduce the oxidation from the bunker of the press is necessary a sulphitation more energetically of the action of creation of the must from coupled press with the decrease of the duration of stationary in bunker.

The contain in total polyphenolic compounds highest was in the wine resulted from the not wine press must and the smallest in case of the wine result from blacher and air press.

Under sensorial appearance the best impression gustatory and olfactory are given by the wines realized by floatation, being expressive, harmonious with many kinds of aromas.

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DETERMINATION OF THE ROOTING PERCENTAGE FOR THE SPECIES *SALIX BABYLONICA* (WEEPING WILLOW)

DETERMINAREA PROCENTULUI DE ÎNRĂDĂCINARE LA *SALIX BABYLONICA* L. (SALCIE PLÂNGĂTOARE)

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Abstract. *Salix babylonia L. (Fame. Salicaceae) is a species originating from China with yellowish, greenish or easily glabrous pending stems, (only in the youth period having pubescent tops). Narrow-lanceolate leaves up to linear-lanceolate of 8-16 cm in length, with long and large acuminate top, narrow at the basis, with finely and pointedly serrate margins, grey, green and glabrous on the back. It has short petioles (5 cm). Aments appear together with the shortly pedicellate leaves with the male flowers of 4 cm and the female flowers of 2 cm. Yellow squamae densely haired at bottom. Male flowers have 2 nectariferous glands and 2 stamens. Female flowers have 1 nectariferous gland. It has a sessile ovary or almost sessile glabrous. The fruit is a capsule with 2 valves. Dehiscence with numerous small seeds provided with long silky silvery hairs. Since it loses quickly its germinating faculty they recommend its sowing immediately after its maturation. Their waist can reach up to 15 m. Taking into account its special qualities and the reproduction possibilities as well as the multiple forms of use for this plant they tried the reproduction by cuttings using as rooting substratum different types of soil.*

Rezumat. *Salix babylonica L. (Fam. Salicacae) este o specie originară din China, cu talia de aproximativ 15 m, frunye îngust lanceolate sau liniar lanceolate, de 8-16 cm lungime, dorsal verzi cenuşii. Planta este deosebit de apreciată pentru decorarea spațiilor verzi, datorită portului său plangător şi valorifică cu succes solurile cu umiditate ridicată. Lucrarea prezintă câteva aspecte privin înrădăcinarea butaşilor în medii de înrădăcinare diferite, în spațiu protejat.*

MATERIAL AND METHOD

The biologic material used for rooting of *Salix babylonica* was harvested around 6 March early in the morning. The copse were dimensioned at 0, 25 - 0, 35 cm length in with 1-3 mm in diameter. The cuttings obtained in this way were separated in: basic cuttings and middle cuttings. It was planted immediately after harvesting in plastic recipients filled with a soil mixture of 15-20 cm in thickness in a warmed space at the temperature of 18-20°C. The soil mixtures they used are prepared as follows:

V1 = garden soil (molehill) + sand – basic cuttings,
V2 = garden soil (molehill) + clay – middle cuttings,
V3 = sand – basic cuttings,
V4 = sand – middle cuttings,
V5 = water – basic cuttings,

V6 = water – middle cuttings,
V7 = soil – basic cuttings,
V8 = soil – middle cuttings,

Purpose in view:
- To determine the rooting capacity of cuttings,
- The cuttings quality depending on the place where they were rooted.

RESULTS AND DISCUSSIONS

In spring *Salix babylonica* is very decorative by its defoliation and in summer by its weeping posture. In table 1 are presented the average root length on variants and for the rooting segments.

Table 1

The average root length on variants and for the rooting segments

Nr. crt	V	ROOT													
		ROOTING CLASS											Length	*P.I*	*Obs*
		1	*2*	3	4	5	6	7	8	9	10				
1	V1				1			1		1		*5*	2,75	10,37	
2	V2					1	2	1	2	2			16,82	8,18	
3	V3								1	3	1	*3*	57,04	13,89	
4	V4						2	1	1	3	1		29,68	10,56	
5	V5				2		1		1	1	1	*3*	25,4	6,37	
6	V6			*1*	1	2	3				1		3,58	4,43	
7	V7			*1*	1	1	1	1	1	1	1		23,6	7,25	
8	V8			*2*		1	2		1	1	1		13,25	5,43	

In table no 2 are presenting length hinges rots and to interpose arithmetic for every repetition and variable.

Calculate error to intermediate absolute and interpose arithmetic result one digit ma large 3 and this to indicate Salix Babylonia implanting alright.

Table 2

Length hinges rots and to interpose arithmetic for every repetition and variable

Nr. crt	Repetition								E	R^2
	R1	R2	R3	R4	R5	R6	R7	R8		
V1	7	10	10	12	11	11	9	4	80	6400
V2	7	6	6	9	9	5	8	8	58	3364
V3	9	16	11	9	8	13	10	9	85	7225
V4	10	9	6	6	9	8	9	7	64	4096
V5	7	8	9	6	4	6	5	5	61	3721
V6	6	6	10	3	4	6	5	5	45	2025
V7	10	4	5	7	8	3	9	10	56	3136
V8	3	6	9	8	6	10	3	5	50	2500
R	59	65	72	60	59	60	65	59	499	
R	3481	4225	5184	3600	3481	3600	4225	3481		

The observations and measurements made prove that the basic cuttings root better than the cuttings harvested from the middle of the offshoot because they are thicker and closer to the dimensions of a classical cutting so they have a bigger number of buds and nourishing reserves. If we add the special decorating qualities to the easy rooting results the importance of its use in parks, gardens and water banks. The length and number of roots is very diverse depending on the type of cutting and the rooting substratum. Pentry ca obstinate dateless as other late in consideration average % (m %), must her other may little than digit 3.

Test calculating, ″ F ″ and test ″ T ″ herself to obis to result eve than valor eve wishy-washy.

Table 3

Synthesize results

Var.	Average	%	d′	T.t	Signification
V1	9,25	13,94	+1,55	+0,679	-
V2	7,25	7,17	-0,45	-0,197	-
V3	10.62	9,03	2,92	1,280	-
V4	8	4,5	0,30	0,135	-
V5	7,62	5,24	-0,08	-0,035	-
V6	5,62	6,58	-2,08	-0,91	-
V7	7	5,85	-0,7	-0,30	-
V8	6,25	6,4	-1,45	-0,63	-

CONCLUSIONS

1. Salix babylonica adapts very well to the soils with excessive humidity.

2. Salix babylonica reproduces very easily using basic cuttings.

3. Salix babylonica roots very well and its decorating characteristics recommend it for the use in the green spaces.

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THE URBAN LANDSCAPE AND THE LANDSCAPE URBAN CULTURE

PEISAJUL URBAN ŞI CULTURA URBANĂ PEISAGERĂ

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Abstract. *The industrialized society succeeds to apply to the architecture and urbanism sciences the label "for consume", or "a rewarding affair", without any consciences problems. This manner of advertising leaded, since longtime, to a manner of "work" which has disastrous consequences: huge urban polluted areas named "megalopolis", degraded build areas and degraded natural areas, ecological catastrophes, social destructuralization, stress and many form of psychic diseases, racism and aggressivity, greed and poverty, etc. The respect for the nature constituted in the past and constitutes nowadays one of the major factors which could to diminish, cure and prevent such disastrous consequences. The nature is the "weapon" or the instrument of the science called "landscape architecture". The esthetic researches guided the scientists to define the art of gardens as "esthetic action over the nature". They observed that the history and the time "mélange the culture into the nature, adapting some particular aspects of the nature to the style of a specific culture". Starting from these ideas, we can redefine the landscape architecture science, as a process where* ***"the culture became content of the nature"****.*

Rezumat. *Societatea industrializată a reuşit să aplice arhitecturii şi urbanismului eticheta „de consum", sau „afacere profitabilă", fără probleme de conştiinţă. Acest stil de publicitate a condus de mult timp la o manieră de „creaţie" având consecinţe dezastruoase: uriaşa poluare urbană din ariile numite „megalopolis-uri", degradarea zonelor construite şi a celor naturale, catastrofe ecologice, destructurare socială, stres şi multe forme de boli psihice, rasism şi agresivitate, lăcomie şi sărăcie, etc. Respectul pentru natură a constituit în trecut şi constituie şi azi unul din factorii majori care ar putea să diminueze, să vindece şi să prevină aceste consecinţe dezastruoase. Natura constituie „arma" sau instrumentul ştiinţei numită „arhitectură peisageră". Cercetările estetice au condus oamenii de ştiinţă să definească arta grădinilor ca „acţiune estetică asupra naturii". Ei au observat că istoria şi timpul „contopesc cultura cu natura, adaptând aspectele particulare ale naturii la specificul culturii". Plecând de la aceste idei, am putea redefini ştiinţa arhitecturii peisagere drept* ***„cultură devenită conţinut al naturii"****.*

INTRODUCTION

The nowadays society succeed to apply to the architecture and urbanism sciences the label "for consume", or "a rewarding affair", without any consciences problems. This manner of advertising leaded, since logtime, to a manner of "work" which has disastrous consequences: huge urban polluted areas named "megalopolis", degraded build areas and degraded natural areas, ecological catastrophes, social destructuralization, stress and many form of psychic diseases, racism and aggressivity, greed and poverty, etc.

The respect for the nature constituted in the past and constitutes nowadays one of the major factors which could to diminish, cure and prevent such disastrous consequences. The nature is the "weapon" or the instrument of the science called "landscape architecture".

Over the time, the natural environment action over the human beings constitutes a stimulant and a challenge. As a reaction to the nature provocation the man builds human settlements, which became, after a long evolution, very complex artificial ecosystems.

From their appearance and their development, until nowadays, every element of the human settlements reveals different kind of attitude. Unfortunately, the human intervention into the natural environment shows and proves the involution of the understanding and respect for the nature. We can tell that just this misunderstanding generated the missing of respect for the nature.

The human attitude versus the nature was different in time and suffers an interesting transformation. At the beginning the nature was respected and worshiped. The pragmatism estranges the mankind from the universal essence of the nature. As a consequences of this pragmatism the man enter into the illusion of his separation from the nature. From this moment we can distinguish three different attitudes versus nature, developed in time and space:

- one attitude tries to continue the respectful and harmonious integration into the nature;
- another attitude tries to speculate the usefulness of the natural elements;
- a third attitude was to look at the nature with hostility and fear; this attitude generated human settlements isolated from the nature.

The history of human settlements reveals these three human attitude through many examples.

In the beginning period, the human settlements were in harmony with the natural elements. Over the time, the relationships between human beings became aggressive. The mankind began to have fear and suspicion, and this reaction explains the creation of defensives walls around the cities in antiquity and medieval times. These walls were also a border towards the surrounding nature - the town was isolated from the nature.

Either at the beginning of human settlements, but also in antiquity and medieval times, the nature penetrates into the body of cities through individual gardens and cultivated terrains. In the Renaissance époque it is obvious the human need to express the nature through very simple landscape architectural works in the public spaces, or through artistic arrangements of the aristocratic gardens. Baroque, classicism and romantics periods increase the attention paid to the natural elements into the urban individual and public space. Finally, in the XIX, XX and XXI centuries, the industrialization process and the pollution phenomenon brought again the nature into the attention of town's inhabitants. And these are the times of a big fight against the pragmatic attitude which destroy the green urban spaces in order to build huge edifices. It seems that all the destructions created by the pollution until now it's not enough at all.

THE URBAN LANDSCAPE AND THE LANDSCAPE URBAN CULTURE

Starting from the moment of antiquity, until the XVIII century, we can say that the urban culture express itself, in space and time, by an "apparent exclusion" of the nature from the build urban space, and that because of the presence of the big defensives walls around the towns. We say "apparent" because this situation hides a real "urban permeability": it looks like absorption of natural elements by the urban organism, despites the walls.

Until today, despites the effort of our cities to became more and more artificial, Mother Nature permeate, more or less visible, into the urban structures.

Beyond the walls, the urban life of our cities had an important element which influenced over the time inhabitants life - and this element was in the past and still is today the CULTURE.

Related to the walls history there is also an ironical aspect of a kind of their function transformation. In the past of mankind the cities walls had as one function to border and protect towns from the invasion of the "wild surrounding nature". The irony consists in the fact that nowadays, the function of some walls inside our towns is to protect the nature from the "wild agresivity" of the inhabitants.

If we search carefully, history will help us to discover how the culture, through models and traditions, influenced architecture, urbanism and also landscape architecture. The urban culture can be considered as a reality with two fundamental dimensions, space and time, related through a proper rhythm and structure. The "body" of the cultural history and the sign of the urban evolution are represented by the build environment.

In this context, we can say that the city build step by step, through different ways, a proper "landscape culture", which was transmitted and enriched from a generation to another. It can be related the urban evolution and the importance of landscape architectural creation into the towns, with the ways and manners of creation of the urban culture and of the cultural models circulation.

Over the time, the human spirit was generally influenced by the manner of intervention in the natural environment, or by the human attitude versus the nature and the landscape architectural creations. As an example, the ways of the town's evolution and development, or the manner of compositions and details of historical gardens, constitute different human attitudes of intervention in the natural environment. But also, all these things constitute different forms of specific cultural behavior, subject to interpretation as cultural practice or as human sensibility forms. The culture has the quality to be transmissible, means not to be the attribute of a single person but the attribute of each member of a group and finally of the entire collectivity.

There is another quality of the culture which is very important: it can be "learned". The most accessible ways to assimilate the culture seems to be, over all times, the observation, the listening and the interaction.

These manners of assimilation succeed to give common experiences to different social category of urban inhabitants, experiences which was transmissible. The transmission of the cultural information can be done in the "body" of the cities, means in the urban spaces. These urban spaces, being streets and plaza, constituted proper places for human interaction and assimilation of cultural knowledge and models, through meetings and communication. So, it is obvious that the most efficient way to transmit the cultural models was "oral", by words.

We can suppose that the information about garden art, about landscape urban culture, was transmits mostly in oral manner, from a civilization to another, or into the same civilization.

An important relationship between the urban culture and the landscape architecture science resides in the landscape arrangements of these urban places. The manner and the style of these arrangements educated many generations of inhabitants, influenced their meetings and helped the communication between different people, belonging to different classes or to different countries, religions or cultures. In this context, now, we can talk about the landscape urban culture.

Here resides an important quality of the landscape urban culture: the power to unify the inhabitants over all differences, the power to give them the sense of collectivity, to make them feel that they are part and parcel of the town body and, beyond that, part and parcel of the same universe.

Analyzing the cultural models in the history, we observe that their circulation, disappearance and return, hide deep meanings and tendencies, bearing deep significances and symbols. At the beginning of XX century, through the "Theory of transcultural archetypes" the scientist Carl Gustav Jung explained that through our genetic heritage we keep deep inside a subtle memory of the all mankind past. Due to this deep memory we can detect and understand all the subtle symbols and significances, cultural or not. This subtle memory gives us "archetypal creative impulses", which are very spontaneous. Through these impulses the humanity creates, all a long the time, the most famous monuments, paintings, sculptures, scientific discovers or literature masterpiece.

Also, due to these "archetypal creative impulses", the human beings create beautiful gardens and other landscape architectural arrangements, since the antiquity till nowadays. Thus, we can explain the differences between the specific traits of oriental and occidental gardens.

This theory helps us to understand the deep meanings or symbols of some landscape creation of very ancient times - described by historians, but doesn't exist anymore – spontaneous or conceived, with organic or geometric shapes. These ancient creations could constitute sacred "formula", initiating and inspiring many generations, until today. These "formula" was taken over and "processed" by many landscape creators. In these creations we can easily discover the "gold rule" elements, a beautiful harmony and equilibrium.

Related with the historic evolution of the landscape architecture science and art, we should approach the details of this important aspect of the urban landscape culture: the power of the culture of being symbolic.

The symbolic character of some masterpieces gardens should be related with the psycho-emotional human side, which is opposite to the pragmatic human tendencies. Thus, in the history of the gardens we find that, over the time, appeared a differentiation of the functions: some gardens were sacred, other was decorative, other was useful, etc.

In his studies *Community and Environment,* about human settlements relation with the environment, the scientist E. Gutkind underlines: "In Occident, the interaction between the man and the environment is perceived in an abstract way, as a relation Ego-Object. In Orient, it is conceived as a real and direct relation Me-You. The occidental man fight against nature, the oriental man adapts himself to the nature and, as consequence, the nature adjusts to the man".

Another scientist, Cristopher Tunnard, explain in his book *Gardens in the modern landscape* that: "Since centuries…the occidental man imagines himself opposite to the nature. But, in fact, his so call proclaimed individuality is an illusion, because the truth is … that his identity is not separated from the nature, but together with nature". These wise observations explain very clear and understandable the differences between Orient and Occident landscape culture, between the oriental and occidental attitude versus the landscape and the different type of interventions in the natural environment, over the time. These attitudes are deep related with the urban landscape culture of each area or region, culture which can exist in different forms - pure or spoiled, or doesn't exist at all. In the case, where the urban landscape culture doesn't exist at all or was spoiled, the creator can transmit and educate the inhabitants, and here resides the powerful and responsible role of the landscape architect.

Despite the fundamental cultural differences, if we compare these two types of gardens – the occidental and the oriental one – it is obvious the fact that the general structure operates with the same morphologic landscape elements. It is obvious also that the composition rules and the manner of processing these elements are different.

In the occidental garden, for example in classicism, we feel strongly from the landscape composition that the human "dry" reason try to opposite to the nature, try to "became master of nature" and submit into geometrical shapes. The trees were cut, the grass was mowed, and the perspectives were controlled till the horizon. The free nature was excluded from the composition, beyond the walls of the gardens and parks.

Looking to the oriental garden, in Japan for example, all the elements of the composition were created related with the human scale and the natural environment. As a result, this garden seems to be an extension of the nature. The human landscape arrangements integrate harmonious into the natural landscape.

Certainly, not all the oriental gardens are conceived in free natural style and here we should underline the archetypal impulse combined with the transmission of the landscape culture over the borders. The gardens of the oriental pearl, Indian Taj Mahal from the XVII century, constitutes the best illustration of the existence of an oriental geometrical royal style.

The study of the cultural models transmission shows that in the areas where a style had a very deep influence, there is possible to find the existence of appreciation and even adoption of other cultural models. For example, the oriental garden seduced the occidental creators in the XVIII century. The first "oriental adoptions" was in England and later, the processed free oriental style became a beautiful original European free style.

CONCLUSIONS

Over the time, the balance between geometrical and free style shows the balance between different kinds of human personalities. In the XV century, the renascentist architect Alberti named the landscape arrangements "invented landscape", due to the fact that the landscape composition was submit to strict esthetical architectural rules.

The esthetician Roberto Assunto defines better another two landscape cultural aspects: the balance between the "Horizon of Orpheus" and the "Horizon of Prometheus". The Horizon of Orpheus means the respectful attitude for the Mother Nature which creates an urban landscape harmonious integrated in the natural environment. The Horizon of Prometheus means the pragmatic attitude versus the nature which creates the utilitarian and polluted urban landscape.

Another cultural comparison of Roberto Assunto is related to the "amphionic attitude", having roots in the antique legend of Amphion which had powers to raise walls and cities only by playing with his lyre. His sacred music was inspired from the power of Mother Nature and gave to these cities harmony and integration with the natural elements.

Despite the fact that the "architectural objects", means buildings and walls, conquered the urban space of our towns, the landscape architecture has the power, through its creation, to integrate these constructions into the nature. The landscape architecture still has the power to repair, to protect and to rehabilitate the urban space, can create a proper relation between these objects and the surrounding space, can give a new life and a new meaning for the "spatial emptiness" of the "super build" areas.

The esthetic researches of Roberto Assunto guided him to define the art of gardens as "esthetic action over the nature". He observed that the history and the time "mélange the culture into the nature, adapting some particular aspects of the nature to the style of a specific culture".

Starting from these ideas, we can redefine the landscape architecture science, as a process where ***"the culture became content of the nature"***.

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STUDIES CONCERNING THE UTILISATION OF "IN VITRO" MICROPROPAGATION IN THE CONSERVATION PROCESS OF SOME VALUABLE GENOTYPES OF PEPPER - *CAPSICUM ANUUM L.*

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Abstract. *Plant tissue cultures offer a powerful tool which might accelerate the production of pepper plants with desire quality traits and resistance to biotic and abiotic stresses. The success of these efforts depends on an efficient "in vitro" plant regeneration system and genetic stability of regenerated plants.*

The present study aimed at establishing a rapid and efficient method for the micropropagation of some valuable genotypes of pepper. Many concentrations and combinations of growth regulators were used to define an efficient regeneration medium. The best reaction - direct bud formation was observed on explants cultured on MS medium added with BAP. The combination of BAP and NAA increased the percentage of organogenesis and the development of the explants. While, in MS medium, added with NAA alone we obtained the development of the embryos to a complete plant and no adventitious buds were observed.

Rezumat. *Cultura de celule şi ţesuturi „in vitro" reprezintă în momentul actual o unealtă puternică care poate determina, accelerarea producerii de noi genotipuri de ardei cu trăsături calitative superioare sau cu rezistenţă la factorii de stres abiotice şi biotici, Succesul acestor eforturi depinde de dezvoltarea unui sistem de regenerare "in vitro" eficient care să permită obţinerea unui număr suficient de plante, în strictă dependenţă de obiectivul propus spre rezolvare, dar în acelaşi timp să menţină stabilitatea genetică a plantelor regenerate.*

Studiul de faţă işi propune determinarea stabilirea unei metode eficiente şi rapide de micropropagare a unor genotipuiri valoroase de ardei. În scopul identificării mediului cel mai efficient au fost testate numeroase concentraţii şi combinaţii de fitohormoni. Cele mai bune rezultate obţinute pentru inducerea lăstarilor a fost obţinut pe varianta de mediu Murashige Skoog, 1962 suplimentată cu BAP. Combinarea BAP-ului cu NAA a determinat o creştere a procentului de organogeneză şi dezvoltare a lăstarilor. Mediul MS suplimentat cu NAA singur nu a permis obţinerea de plante noi ci doar evoluţia explantului iniţial către plantă complet dezvoltată cu rădăcini.

INTRODUCTION

Plant genetic resources in agri-horticultural crops are of immense value to mankind. The plant breeders require large resources of genetic variation (genepools) for crop improvement. The bigger variation is, the better are the chances of finding particular characters, such as resistance genes for diseases, pests and nematodes or for adaptation to wider ecological amplitudes and stress conditions.

However, in the wake of spread of high yielding varieties, this genetic variability is gradually getting eroded. This situation leads to increasing demands for suitable actions in order to conserve the existing germplasm resources. Even more, the big proportion of the genetic erosion from now a day, impose immediate measures that should conserve the germplasm in such a manner that there are minimal losses or changes in genetic variability of the population

Recent years have witnessed significant advancement in researches demonstrating increasing applications of *in-vitro* techniques in the genetic conservation of germplasm resources. *In-vitro* techniques now provide suitable approaches, which can lead to the safe conservation of germplasm.

In the same time these techniques offers the possibility of a rapid multiplication of the valuable breeding material with the sureness of the preservation of the initial donor material. The multiplication technique in vitro allows the rapid multiplication of the plants as well as the individual clonation of the selected exemplars, which are presenting excellent qualities impossible to maintain through sexual multiplication. By the means of these techniques the process of multiplication can be associated with obtaining of virus – free plants.

Until now was reported: organogenesis from many explants (Agrawal eat al., 1989, Szasz et al., 1995), somatic embryogenesis from anther and immature zygotic embryos (Binzel et al., 1996) and even GMO (through Agrobacterium tumefaciens) – Kang et al., 1998. But until now there were no reports concerning the regeneration protocols for plant regeneration to Romanian pepper genotypes.

MATERIAL AND METHODS

The biological material is represented by seeds belonging to three genotypes – CERES, FERRARI F_1 and FIESTA F_1 , originated from the Vegetable Research and Development Station Bacau seed collection. The seeds were surface sterilized by immersion in mercuric chloride solution (HgCl2) 0.1% for 10 minutes, followed by repeated washing with sterile distilled water. The sterile seeds were cultivated on a basic medium Murashige Skoog, 1962 without hormones.

After 12-15 days the seeds germinated and the plants were used as donor source of explants – figure 1. The apexes were cultivated on 5 medium variants (table 1) derived from Murashige Skoog, 1962 and supplemented with 3% sucrose and solidified with 0.8% agar. The pH of the medium was adjusted at 5.8 before autoclaving at 121^0C for 20 minutes. The cultures were then incubated under controlled conditions (temperature 24^0C, light intensity of 2000 lux, 16-h photoperiod and 80% air humidity).

Figure 1 – Germinated seeds used as donor source for explants

The morphogenetic response of pepper explants to hormones types and concentrations in nutritive mediums was expressed as a number of explants which formed adventitious buds and where shoots differentiated.

Table 1

Variants of nutritive medium with different hormonal factors utilized for "in vitro" regeneration

Components	A_1	A_2	A_3	A_4	A_5
Macroelements	MS	MS	MS	MS	MS
Microelements	MS	MS	MS	MS	MS
Vitamins	MS	MS	MS	MS	MS
BAP	5.0	2.0	-	-	-
KIN	-	-	5.0	2.0	-
NAA	1.0	-	1.0	-	2.0
IBA	-	1.0	-	1.0	-
Sucrose	30 g/l	30 g/l	30 g/l	30 g/l	30 g/l
Agar	8 g/l	8 g/l	8 g/l	8 g/l	8 g/l
pH	5,8	5,8	5,8	5,8	5,8

After the development of the shoots the cultures were transferred to differentiation mediums that contained BAP and NAA in lower concentrations as well as GA3.

Well developed shoots were transferred on the rooting mediums that contained only NAA or without growth regulators.

After 2 weeks, the rooted plants were acclimatized and planted in a potting mixture of sterilized sand + vermiculite (1:1 ratio) in plastic cups, hardened in a mist chamber (80% relative humidity) for acclimatization during 2 weeks before transfer to green house.

RESULTS AND DISCUSSIONS

The data were taken every week after the inoculation of the explants on the cultivation medium. Over the first four weeks of culture, the ability of shoots regeneration was very low. Depending on the genotype, the number of explants with shoots amounted to 0.3-5.0 on average (table 2).

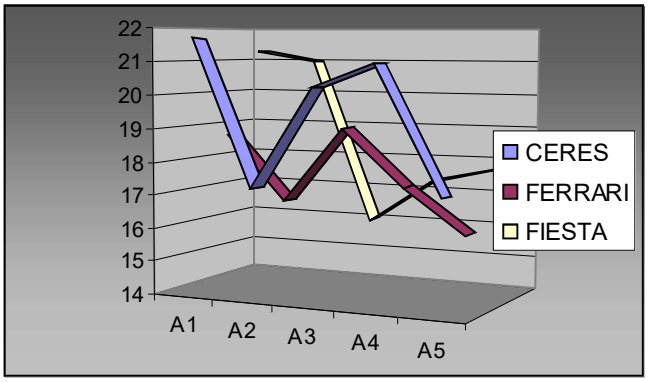
Table 2

The regeneration percent at pepper genotypes

Variant	CERES		FERRARI		FIESTA	
	Number	%	Number	%	Number	%
A1	21.7	90.4	18.7	77.8	21.3	88.9
A2	17.3	72.2	16.7	69.6	21.0	87.5
A3	20.3	84.6	19.0	79.2	16.0	66.7
A4	21.0	87.5	17.3	72.2	17.3	72.2
A5	17.3	72.2	16.0	66.7	17.7	73.6

* number is the means for 3 repetition, each repetition comprised 25 explants

The graphic 1 presents a schematic representation of the genotype behavior on the tested variants.



Graphic 1 - The genotype response on the tested nutritive variants

Direct bud formation was observed only on the variants A1 and A2, characterised by the presence of BAP. The combination of BAP and NAA increased the percentage of organogenesis and the development of the explants. Optimum values for bud induction from zygotic embryos were obtained in MS medium, supplemented with 5 mg/l of BAP and 1 mg/l of NAA (Table 1). One hundred percent of explants cultured on this medium turned green and showed a good differentiation: cotyledons spread and became large, hypocotyls reached an average of 1 cm to 1.5 cm in length. Since 6 days of culture we observed the emergence of some leaves and globular structures on the embryo explants without any intervening callus (Fig. 2). Continuous and asynchronic growth of buds was formed and the responses to organogenesis varied between cultured explants (from 3 to 19) with a mean rate of 7.5 per organogenic explant.

Figure 2: Globular structures and shoots developed on the apex basis

The substitution of NAA with IBA in combination with BAP initiated callus formation without regeneration. The regeneration medium MS with KIN was also not effective. The shoots, thus formed, were then transferred on a differentiation medium containing BAP, NAA and GA3 that allowed its further development and also the development of new shoots (fig. 3). The adition of GA3 in the medium improved the development of the shoots.

Full grown shoots were cultivated on rooting medium for the development of the roots. The most efficient medium was the medium containing NAA in concentration of 1 mg/l (fig. 4).

Figure 3 – New shoots developed at the basis of the initial explant

Figure 4 – Well developed plants with roots

After 2 weeks, the rooted plants were acclimatized – figure 5 and planted in a potting mixture of sterilized sand + vermiculite (1:1 ratio) in plastic cups, hardened in a mist chamber (80% relative humidity) for 2 weeks before transfer to green house.

Figure 5: Plants on acclimatization stage

Figure 6: Rooted plants prepared for planting

Figure 7 – Plants on potting mixture

CONCLUSIONS

In vitro plant regeneration depends on the genotype and explant source. Exogenous growth regulators are important for the expression of this capacity.

The results obtained, indicates the fact that bud induction is strongly depending on the cytokinins, more precise on the presence of the BAP in the medium. The combination with NAA improves the regeneration respond of the explants. When replacing the NAA with IBA the formation of the buds was inhibited.

If the cytokinins is represented by KIN, the induction and elongation of the adventitious buds is very low or even absent.

On A1 and A2 variants the shoot regeneration did not involved callus and by this it decreases the probability of somaclonal variation.

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STUDIES REGARDING THE QUANTITATIVE AND QUALITATIVE CHARACTERISTICS AT THE MULTIPLE USES SPECIE *SALVIA SCLAREA* L., IN THE BIOLOGIC CULTIVATION CONDITIONS FROM V.R.D.S. BACAU

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Abstract*: The studies were focused on Salvia sclarea L., known also as the herb of Saint Joan, şarlai, serlei, belongs to Lamiaceae family and in its native form is located in the South Europei, Asia and Middle East. This specie is important through its multiple uses: culinary, ornamental, and especially medicinal (antispasmodic, stimulate appetite, astringent effect, balsamic, tonic etc.), cosmetics, sicative oil etc.*

During 2004 – 2007 period of time, at VRDS Bacău, the biologic material obtained from local populations was studied. This material had a large genetic variability and it was used for the creation of the initial breeding material.

The studies concerning the morphologic characteristics (height and diameter of plants, number of branching, the form of plant, the colour of flowers), the behaviour in the agro-pedologic conditions from VRDS Bacau, the accomplished phonologic observations and the components of the essential oils revealed the value as a plant with multiple uses. In the volatile oil that was extracted from the plants Salvia sclarea a number of 28 components of essential oils were identified.

Rezumat *Studiile s-au efectuat pe Salvia sclarea* L.,., *denumită popular iarba Sfântului Ioan, şarlai, serlei, care face parte din familia Lamiaceae şi în stare nativă se întâlneşte în sudul Europei, Asia Mică şi Orientul Mijlociu. Această specie se remarcă prin utilizările ei multiple: culinară, ornamentală, în special medicinală (antispasmodice, stimulează apetitul, are efect astringent, balsamic, tonic etc.), cosmetică,ulei sicativ etc.*

La SCDL Bacău, în perioada anilor 2004 – 2007, s-a studiat materialul biologic obținut din populații locale, cu o mare variabilitate genetică, din care s-a creat material inițial de ameliorare.

Studiile caracteristicilor morfologice (talia şi diametrul plantei,numărul de ramificații, forma plantei, culoarea florilor. etc), comportarea în condițiile agropedologice de la SCDL Bacău, observațiile fenologice efectuate şi componența uleiurilor esențiale, scot în evidență valoarea de plantă cu utilități multiple a materialului biologic selectat. În uleiul volatil extras din plantele de Salvia sclarea au fost identificați 28 componenți de uleiuri esențiale.

Salvia, the richest genus from *Lamiaceae family*, includes almost 900 species in the entire world. *Salvia sclarea* has a great importance as an aromatic agent in the food, perfumery and cosmetic industry.

Salvia sclarea L., popular named the herb of Saint Joan, şarlai, serlei, belongs to *Lamiaceae* family and is natively found in the South of Europe Asia and Middle East.

The Herb of Saint Joan is a perennial plant of 0,6 – 1,0 m high. The specie is not pretentious towards environmental factors, but prefers the well drained soils, with a good sun exposure, dried or humid. It can not be cultivated at shadow, and the temperatures during winter below - 20 degrees, for a long period of time, can ditroy the plants. The utility rate of plant is 2 : 5.

Salvia sclarea is a plant with multiple uses: c*ulinary* (condiment, salads or teas, substitute for taste of bear, flavour of Muscat in wine); o*rnamental* (is a decorative plants through port, bush and flowers); *medicinal* (antispasmodic, stimulate appetite, has astringent effect, balsamic, tonic etc).; *melliferous*; *cosmetic* (soaps, fixative ş.a.)., and other uses (siccative oil).

The literature mentions that, as a result of oil analysis from *Salvia sclarea*, almost 72 volatile compounds can be identified in the plant. They correspond to 97,2 % from oil, and the majority of compounds were linalool, linalyl, acetate, terpineol, neryl acetat, geraniol, geranyl acetat, nerol, sclareol (D. Biondi, 1993). Other researches demonstrated the fact that in the leaves and flowers of a cultivar from Slovenia Republic were identified 34, respectively 27 compounds in essential oils.

The studies were accomplished at VRDS Bacău, on a biologic material selected from the "ex situ" collection that includes over 200 species with multiple uses cultivated in the accredited polygon of biologic agriculture.

MATERIAL AND METHODS

During 2004 – 2007 period of time at VRDS Bacău, local populations of *Salvia sclarea,* with a large genetic variability were studied. As a result of these studies, the initial breeding material was created and different lines that correspond from the cultivation point of view with the principles and techniques of biologic agriculture were obtained. The lines were selected after the adaptability, plant's height, flower's colour etc.

The cultivation was accomplished according with the principles of biologic agriculture, with low inputs: two phasic fertilisation with Cropmax 0,2 %, in the vegetative period and before blossom; four manual weeding on row and three mechanic weeding between the rows. The treatments for pathogen agent and pests control were not necessary.

The accomplished studies focused on the adaptability to agro-pedologic conditions from the East area of Moldavia, "bio" cultivation and multiple utility.

For the decorative characters the following quantitative and qualitative determinations were made: plant's height, diameter of bush, port, ratio height/diameter, number of floral cane per plant, the colour of flowers, blossom period, precocity to blossom, resistance to low temperatures during winter, starting on vegetation in the spring, branching degree of plants.

The volatile oils were extracted from the leaves of salvia, with hydro-distillation equipment, type Clevenger. The separation of volatile oils was made with gaseous chromatograph, utilising capillary column DB 5, of 25 m length and 0.25 mm diameter. The azotes was utilised as a bearer gas, and the initial temperature in the stove was of 40 ^{o}C, isotherm 5 minutes and raised till 280 ^{o}C, with a gradient of 4 ^{o}C / minute.

For the identification of the compound from the volatile oils the chromatograph in gaseous phase were coupled with the spectrometer IR with transformant Fourier (FT-IR) NICOLET, and the quantitative analyses was accomplished with a detector of ionizer in flame, coupled in parallel, the detector FT-IR not being destructive. For the spectrometer

FT-IR was used a spectral diameter of 4000 – 750 cm^{-1}, resolution of 8 cm^{-1} and an acquisition speed of 7 scan / second, the transfer line being warmed up at 250^0 C, detector MCT cooled with liquid nitrogen.

In the same time retention indexes Kovats were used for the confirmation of the exact position of drops in chromatogram through the utilisation of a series of n-alkali as reference.

RESULTS AND DISCUSSIONS

At *Salvia sclarea* specie the biologic material from the germ-plasma collection is valuable for capitalization in the breeding program, for the creation and promotion of new cultivars.

The studies concerning the quantitative characteristics, the main criteria in the activity of creation of the initial breeding and selection material, that underline the decorative characteristics, are presented in table 1.

Table 1

The quantitative characteristics of the initial breeding material

Cultivar	Plant's height cm	Plant's diameter cm	Ratio height/ diameter	no. inflorescence/plant	inflorescence lenght cm
Line SSA-12/2005	65 - 75	45 - 55	1,4 - 1,36	8 - 9	55-60
Line SSR-42/2005	**64 - 73**	50 - 60	1,28 - 1,22	**9-10**	**60-70**

Salvia sclarea Line SSA-12/2005

The morphologic studies shows that, the two selected lines have an elegant port, a strong branching degree, with a large number of inflorescences per plant, and with a pretty high length of floral cane. The smell of flowers is strong, pleasant and characteristic for the specie.

On remark the Line SSR-42/2005 through a lower port, a bigger number of inflorescences/plant and the length of floral cane

The studied focused on the qualitative characters are referred at plant's port, flower's colour, blossom period, earliness at blossom, resistance to low temperatures during the winter, starting on vegetation in the spring, branching degree of plants and are presented in table 2.

The both lines have the form of plant bush, the colour of flowers is different, the Line SSR-42/2005 is earlier in blossom, present a higher degree of branching and resist better to hibernation in the field.

Table 2.

The qualitative characteristics of the selected and studied lines of *Salvia sclarea*

Cultivar	Plant's port	Flower's colour	Blossom starts	Period of blossom	Resistance to hibernate	Branching degree
Line SSA-12/2005	bush	white	10 - 15 June	June – September	good	strong
Line SSR-42/2005	bush	dark blue	5 - 12 June	June - September	very good	very strong

Due to the high degree of variability of the initial biologic material, the individual selection was made on mother plants (vegetative), followed by the selection on families as a result of the generative multiplication (with seeds from elite plants that produced seeds in the same vegetation cycle). By these means we tried to shorten the selection period, the stabilization of the lines and the accomplishment of the proposed decorative objectives and especially the uniformity of the selected material.

***Salvia sclarea* LineSSR-12/2005**

Because *Salvia sclarea* is recognised specie, mainly as a culinary and medicinal plant, the main components of the volatile oils were determined, only in Line SSR-42/2005 due to the fact that it could be better stabilised from the point of view of distinctively, homogeneity in flower's colour and plants uniformity.

The main components in volatile oils from Line - SSR-42/2005 were identified through correlation between spectrum and the retention time (Table 3 and graphical representation).

On remark that, from the presented dates, the main essential oils have as main components Izopinocamfone (59,22 %) and β - Pinene (18,74 %).

Over 2 %, were found on components Mirtenol (2,88 %), δ - Elemen (2,36 %) and Cis.p.Mentadienol (2,32 %).

From the 28 identified components, 5 have between 1 - 2 % in essential oils:: α - Telandren (1,9 %), Mercen (1,47 %), Sabinen (1,23 %), Linalol (1,12 %) and β - Burbonen (1,05 %).

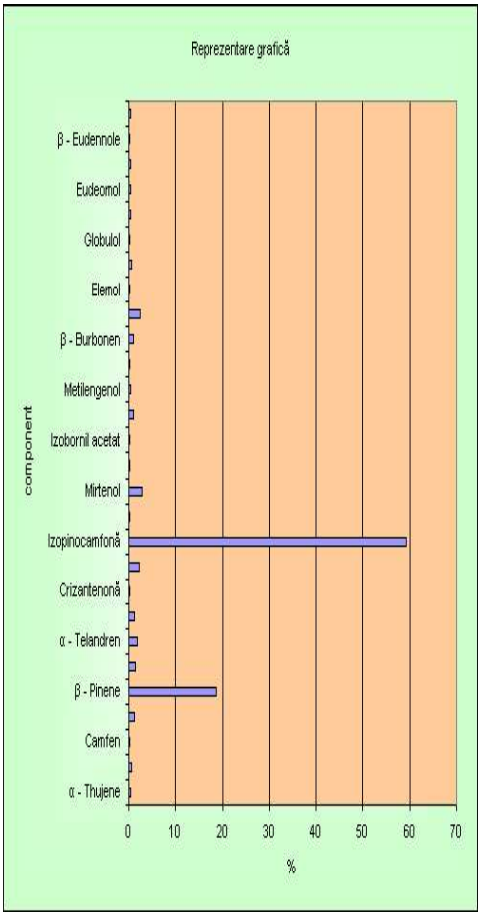
The other identified components are present in a percent of under 1%: α - Burbonen (0,93 %), α - Pinene (0,69 %), Ent - Spatulenol (0,53 %), tan - Cadecrol

(0,42 %), Metilengenol (0,39 %), α - Thujene (0,34 %), Viridefloral (0,33 %), Eudeomol (0,33 %), δ - Eudesmol (0,33 %), β - Eudennole (0,28 %), Homomirtenol (0,27 %), Crizantenonă (0,26 %), α - Corjunen (0,21 %), Globulol (0,21 %), Camfen şi Elemol with 0,17 %, , Izobornil acetat (0,13 %), α - Terpineol (0,12 %).

Table 3.

The main components in essential oils identified at *Salvia sclarea* L., Line - SSR-42/2005

Components	%
α - Thujene	0,34
α - Pinene	0,69
Camfen	0,17
Sabinen	1,23
β - Pinene	18,74
Mercen	1,47
α - Telandren	1,9
Linalol	1,12
Crizantenonă	0,26
Cis.p.Mentadienol	2,32
Izopinocamfonă	59,22
α - Terpineol	0,12
Mirtenol	2,88
Homomirtenol	0,27
Izobornil acetat	0,13
α - Burbonen	0,93
Metilengenol	0,39
α - Corjunen	0,21
β - Burbonen	1,05
δ - Elemen	2,36
Elemol	0,17
Ent - Spatulenol	0,53
Globulol	0,21
Viridefloral	0,33
Eudeomol	0,33
tan - Cadecrol	0,42
β - Eudennole	0,28
δ - Eudesmol	0,33



The other identified components are present in a percent of under 1%: α - Burbonen (0,93 %), α - Pinene (0,69 %), Ent - Spatulenol (0,53 %), tan - Cadecrol (0,42 %), Metilengenol (0,39 %), α - Thujene (0,34 %), Viridefloral (0,33 %), Eudeomol (0,33 %), δ - Eudesmol (0,33 %), β - Eudennole (0,28 %), Homomirtenol (0,27 %), Crizantenonă (0,26 %), α - Corjunen (0,21 %), Globulol (0,21 %), Camfen şi Elemol with 0,17 %, Izobornil acetat (0,13 %), α - Terpineol (0,12 %).

Chromatogram of volatile oil analyses 1 % in pentane is presented in Figure 1.

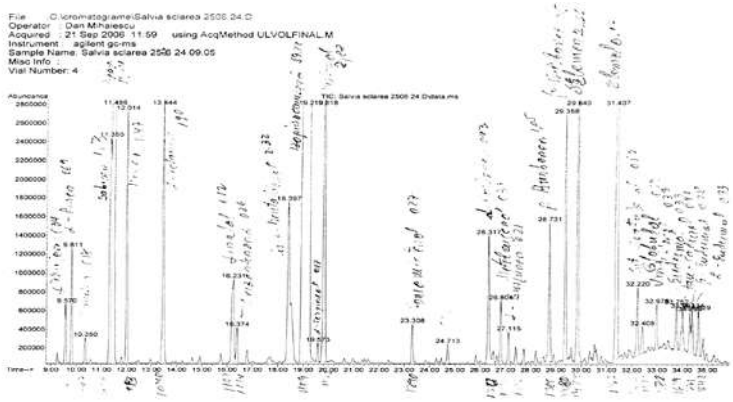


Figure 1. Chromatogram of essential oils from *Salvia sclarea,* Line - SSR-42/2005

CONCLUSIONS

1. At *Salvia sclarea* specie the biologic material from the germ-plasma collection is valuable for the capitalization in the breeding program, for the creation and promotion of new cultivars.

2. On remark the Line SSR-42/2005 through a smaller port, a larger number of inflorescences per plant and the length of floral cane.

3. The both lines have the form of plant bush, the colour of flowers is different, the Line SSR-42/2005 is earlier in blossom, present a higher degree of branching and resist better to hibernation in the field.

4. The main components in volatile oils of Lin - SSR-42/2005 were identified through the correlation between the spectrum and the retention time. On remark that, from the presented dates, the main essential oils have as main components Izopinocamfone (59,22 %) and β - Pinene (18,74 %).

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ON THE AGROBIOLOGICAL VALUE OF SOME LOCAL POPULATION OF RUNNER BEAN

VALOAREA AGROBIOLOGICĂ A UNOR POPULAȚII LOCALE DE FASOLE MARE (*PHASEOLUS COCCINEUS* L.)

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Abstract. *Runner bean (Phaseolus coccineus L.) is a less studied species in Romania, though it is highly spread on the territory of the country. In these circumstances, an agrobiological study in the Romanian environment is important to accumulate knowledge on the biodiversity features botanical and phenological ones). Also, this study provides information on the ecological plasticity. Research was carried out at the University of Agronomy from Iasi, on a collection of 24 local populations from Northeast part of Romania and some foreign varieties.*

The paper offers information on the main botanical characteristics (growth type, vigor, color of foliage, color of flowers, pods and seed etc.) and phenological feature (duration of different growth and development stages).

Rezumat. *Fasolea mare (Phaseolus coccineus L.) este o specie mai puțin studiată în Romania, în ciuda unei largi răspândiri pe teritoriul țării. În aceste circumstanțe, un studiu agrobiologic în mediul înconjurător al României este important pentru acumularea cunoştinţelor legate de trăsăturile botanice şi fenologice ale biodiversității. De asemenea, acest studiu oferă informații referitoare la plasticitatea ecologică. Cercetarea s-a realizat la Universitatea Agronomică din Iaşi, pe o colecție de 24 de populații locale din nord-estul României şi câteva varietăți străine.*

Lucrarea oferă informații asupra caractersiticilor botanice (tipul de creştere, vigoare, culoarea foliajului, a florilor, păstăi, semințe etc.) şi trăsături fenologice (durata diferitelor stadii de creştere şi dezvoltare).

Phaseolus coccineus L. (Runner bean) is a less studied species in Romania (4). A more complete and complex knowledge is possible by an agrobiological study. This study ensures a better knowledge on the botanical diversity and some phenological features of the some local populations and ecological forms. Also, the study offers information on the ecological plasticity and, mainly, on the resistance/susceptibility reaction to the main specific pathogens (1,2,3). The results of this study also, could be used in plant breeding and farming of this specie.

The paper presents the results on the main morphological, physiological and ecological characteristics of an assortment of local populations and some varieties.

MATERIAL AND METHOD

Biological material consists of a collection of 26 local populations and foreign varieties. The local populations were collected from different zones of Moldova (Suceava, Botoşani, Neamț, Bacău, Galați, Vrancea counties).

The experiment was organized in the research field of the Experimental Station of the University of Agricultural Sciences and Veterinary Medicine Iaşi, during 2004-2006 period.

Study method consists in observations and biological determinations on the main morphological, physiological and phenological characteristics of the assortment. Morphological characteristics were as following: growth type, plant height, number of branches, leaf color, vigor, inflorescence type, number of flowers/inflorescence, flower color, shape, color and dimension of pods, shape, color and size of grain. The main biological and phenological features were: sprout type, spring duration, number of days to the first true leaves and branches, the datum of blossoming, pod setting, seed maturation, duration of vegetation cycle etc.

Experimental data were comparatively analyzed, emphasizing on the differences and similarities and also, on the some agronomical performances of the most valuable populations.

RESULTS AND DISCUSSIONS

The obtained results are presented in table 1. The data from the table refer to the main morphological characteristics, which confer distinctibility, and to phenological ones, which indicate ecological adaptability.

Referring to morphological characteristics, the results show that:

- growth type is valuable at the most of population, with exception of population C_2, which is determinate;
- plant sprouting is hypogeic one at all the variants (only hypocotyl is sprouted at the soil surface and the cotiles remain in soil);
- plant height at the voluble plant is over 2,0-2,5 m, but at non-voluble one, it is about 40-50 cm;
- number of plant branches, varies between 2 and 5;
- plant vigor is, generally, high (14 variants) and medium (eight variants) and very high (for three variants) or very small (one variant);
- foliage color is dark green or green;
- flower color is white to majority of variants (16 of them), carmine red (seven variants) or carmine red with white wings (one variant);
- seed color is white (for 16 variants), violet with black arabesques (nine variants) and beige with brown arabesques (one variant);

- high correlation is evident between flower color and seed color: white flowers with white grains, red flowers with violet grains and red and white flowers with beige grains;
- pod size varies between large limits: 9-20 cm length and 1,3-2,1 cm width; usually, the pod length is positively correlated with the grain number;
- seed size (as length on the greatest dimension) varies between 15-22 mm; it is remarkable that the biggest pods produce the greatest seed;

The phenological features present a reduced variability. Having in view the great diversity of the places for collecting (plane, hill, submountain zones), it would be expected to have a larger ecological variability. It is supposed that some "ecological races" could not appear because of a too short period of cultivation (about 100 years), high circulation of seeds and high alogamy.

Phenological features can be observed in the table 1.

- sprouting duration was, constantly, of 12-15 days; some expected differences have been reduced by the relatively high average temperature of the sprouting period;
- duration from the plant sprouting to the blossoming varies between reduced limits, of 30-35 days;
- duration from the plant sprouting to pod setting varied between 60-75 days.

The last two features could offer information on the earliness, but this aspect was not revealed because of a large ecological plasticity. In the same time, it is possible that relatively high temperatures (very suitable for the respective vegetation stages) made uniform the behavior of studied variants.

The growth period was interrupted during 1-10 October period, by stopping the crop, technically justified by the necessity for land preparation for the future crop from the next year.

Table 1

Morphological and phenological characteristics of the biological material studied at Iaşi, 2004-2006

Variant	Collecting place	Morphological characters								Phenological features (number of days)				
		Branches number	Foliage color	Vigor	Flower color	Pod size (L/l) (cm)	Number of seeds/pod	Seed size (mm)	Seed color	Sowing-sprouting	Sprouting-first trifoliate leaf	Sprouting-first flowers	Sprouting - first pods	Sprouting-end of vegetation
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C_1	Great Britain	3-4	dark green	high	white	20 / 1,7	5-7	22	white	12-15	7	35	71	120-125 (1-10 oct)
C_2	Great Britain	4-7	dark green	high	white	17 / 1,9	4-6	20	white	12-15	8	35	66	120-125
C_3	Galaţi	3-4	green	high	white	10 / 1,9	2-3	17	white	12-15	3	34	74	120-125
C_4	Bacău	3-4	green	high	white	10 / 1,8	2-3	17	white	12-15	3	34	74	120-125
C_5	Vaslui	2-3	dark green	high	white	10 / 1,9	2-3	19	white	12-15	3	35	73	120-125
C_6	Iaşi	2-3	green	medium	white	9 / 1,7	2-3	22	white	12-15	4	35	72	120-125
C_7	Neamţ	2-3	green	medium	white	12 / 1,7	2-3	22	white	12-15	6	34	73	120-125
C_8	Iaşi	2-3	green	medium	white	9 / 1,7	2-3	17	white	12-15	6	34	72	120-125
C_9	Bacău	2-3	green	medium	white	10 / 1,8	2-3	18	white	12-15	4	35	70	120-125
C_{10}	Iaşi	2-3	green	medium	white	9 / 1,7	2-3	20	white	12-15	4	33	70	120-125
C_{11}	Vaslui	3-4	green	medium	white	10 / 1,3	2-3	17	white	12-15	4	33	71	120-125
C_{12}	Botoşani	2-3	dark green	medium	red with white wings	11 / 2,3	3-4	19	beige with brown arabesques	12-15	6	32	71	120-125
C_{13}	Iaşi	2-3	dark green	medium	carmin red	9 / 1,9	2-3	17	violet with black arabesques	12-15	6	33	71	120-125
C_{14}	Galaţi	3-4	green	high	carmin red	11 / 1,7	2-3	20	violet with black arabesques	12-15	4	34	73	120-125

Table 1 (continuation)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C_{15}	Vrancea	3-4	dark green	high	carmin red	11 / 1,5	3-4	16	violet with black arabesques	12-15	6	35	72	120-125
C_{16}	Suceava	3-5	dark green	high	carmin red	10 / 1,9	2-3	17	violet with black arabesques	12-15	6	34	71	120-125
C_{17}	Iaşi	3-5	dark green	high	carmin red	12 / 1,6	3-4	17	violet with black arabesques	12-15	4	33	71	120-125
C_{18}	Bacău	3-4	dark green	very high	carmin red	9 / 2,1	1-3	21	violet with black arabesques	12-15	3	33	71	120-125
C_{19}	Botoşani	4-5	dark green	high	carmin red	12 / 1,3	2-3	15	violet with black arabesques	12-15	6	33	72	120-125
C_{20}	Vaslui	3-4	dark green	high	carmin red	12 / 1,7	2-3	16	violet with black arabesques	12-15	6	33	72	120-125
C_{21}	Suceava	2-3	dark green	small	carmin red	10 / 1,7	2-3	20	violet with black arabesques	12-15	6	33	72	120-125
C_{22}	Bacău	4-5	green	very high	white	10 / 1,8	2-3	22	white	12-15	6	35	71	120-125
C_{23}	Iaşi	4-5	green	very high	white	10 / 1,3	2-3	21	white	12-15	6	35	71	120-125
C_{24}	Neamț	3-4	green	high	white	12 / 1,4	2-3	17	white	12-15	7	34	72	120-125
C_{25}	Brăila	3-4	dark green	high	white	12 / 1,5	2-3	22	white	12-15	6	33	73	120-125
C_{26}	Brăila	3-5	green	high	white	13 / 1,7	3-4	22	white	12-15	6	34	72	120-125

CONCLUSIONS

1. The study emphasized a great morphological diversity of the 24 Romanian local population of runner bean, expressed, mainly by the plant vigor and branching, color of flowers and seeds, the size of pods and seeds and number of seeds/pod.

2. Studied local populations, though come from rather different ecological zones, do not show evidently great phenological differences, referring to plant sprouting, blossoming, pod setting and maturation period. This aspect could be as an explanation of a great ecological plasticity of the studied populations.

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SUITABILITY OF *PHASEOLUS COCCINEUS* L. SPECIES FOR CULTIVATION IN SUSTAINABLE AGRICULTURE SYSTEMS

PRETABILITATEA SPECIEI *PHASEOLUS COCCINEUS* L. PENTRU CULTIVARE IN SISTEME DE AGRICULTURĂ SUSTENABILĂ

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Abstract. *The paper proposed to approach the suitability of the Phaseolus coccineus L. (runner bean) species (a less studied species in Romania) to the sustainable agriculture, with the main goal to develop of a farming standard technology, emphasizing on the crop establishment and carrying works.*

The results demonstrate that the best yield can be obtain by sowing 3 seeds/hole, at 40 x 80 cm distance and practicing more than four times water applications of 250-300 cubic meters. The level of highest yield varied between 2500-2800 kg/ha.

Rezumat. *Lucrarea îşi propune să abordeze pretabilitatea speciei P. coccineus, mai puţin studiată în România, la tipul de agricultură sustenabilă, urmărindu-se elaborarea unei tehnologii de cultivare standard, luând în considerare principalele verigi tehnologice: înfiinţarea culturii şi lucrările de îngrijire.*

Rezultatele demonstrează că cele mai bune producţii pot fi obţinute prin semănatul a trei seminţe/cuib, la 40 x 80 cm distanţă şi prin aplicarea a mai mult de patru udări cu norme de 250-300 m^3. Nivelul celor mai ridicate producţii a variat între 2500-2800 kg/ha.

The sustainable agriculture systems have already been knows at the world and also at national level. These systems became competitive because they represent a real alternative to actual intensive or industrial agriculture systems (8, 9).

To practice sustainable agriculture it is important to use suitable species. Usually, for this type of agriculture, the crops with a high ecological plasticity are recommended. Also these crops have to have certain rusticity and a rather genetically resistance to the main pathogens and pests. Scientific literature confirm this point of view and highly recommend cultivars (local populations) with a good ecological plasticity, with a rather resistance to pathogens and pests, accumulated during a long and empiric selection in the specific cultivation microclimatic zones (4, 5).

Our research from the Agronomical University Iaşi (Stan and Munteanu, 2000) revealed that in *Papilionaceae* family, *Phaseolus coccineus* L. (runner bean) is a suitable plant for a sustainable agriculture system. The runner bean is largely spread and cultivated in Romania, on small areas, but it is less studied (3, 4, 6, 7).

Scientific research on the world level pointed out detailed knowledge on the systematic, botanical and physiological features, ecology as genetically

breeding and cultivation technology in the different agricultural systems (1, 2). It was demonstrated that *P. coccineus* is, also, an important species for certain resistance genes to the diseases or some pathogen races, well know at the common bean – *P. vulgaris* (5).

Our research is focused to develop a cultivation technology of the runner bean, in the Romanian pedo-climatic conditions, emphasized on the crop establishment and irrigation.

MATERIAL AND METHOD

Experiment was carried out in a split plot design, with two factors and three variables for each of them, in the environmental conditions of the Research Station of Agronomical University Iaşi, during 2004-2006 years. Biological material consists of seeds of a local population C_{10} of *P. coccineus*.

The experimental crops were established by direct sowing in open field, during 5-10 May period, when in the soil, recorded temperatures exceed the biological level of 10-12^{0}C and the danger of early frosts was over. Sowing was carried out in the holes, on the 80 cm equidistant rows, with a distance of 40 cm between holes. The plants were conducted on a trellis with a steel wire, using textile thread (5).

The experimental factors and their graduation were as fallowing:

- factor A = number of plants/hole, with three graduations:
  - a_1 = one plant;
  - a_2 = two plants;
  - a_3 = three plants;
- factor B = irrigation application, with three graduations:
  - b_1 = non-irrigated;
  - b_2 = four irrigations;
  - b_3 = eight irrigations.

Watering was made by furrow, using a 230-300 m^3/ha application.

In these circumstances, the efficacy of variants was appreciated by vegetation stage, phytosanitary status and grain yield. Vegetation stage was assessed using a scale from 1 to 5 (1 = very bad, 5 = very good). Also the sanitary status was assessed using a 1 – 5 scale (1 = very bad, 5 = very good).

RESULTS AND DISCUSSIONS

The relevant results are presented in table 1.

Vegetation status was appreciated by the marks of 2 and 3 at all the non – irrigated variants. The other variants had a good and very good vegetation status, appreciated with marks 4 or 5.

The phytosanitaire status was good and very good at majority of the variants. The highest marks (4 and 5) were recorded at the non – irrigated variants. At the other variants, the marks were 3 or 4, because perhaps the excess of water during irrigation caused favorable conditions for pathogens and their diseases. It is important to know that this phytosanitaire status was recorded without any protection treatments.

Generally, phytosanitarian status was good and very good, also, because of "disease escape" process, mainly for the super half of the plants.

Table 1

Results on the runner bean technological variants (Iaşi, 2004 – 2006)

Variant		Vegetation status	Phytosanitarian status	Grain yield kg/ha	Differences	Significances
No.	Specification					
V_1	a_1 x b_1 (1x0)	2-3	4-5	1856	0	
V_2	a_1 x b_2 (1x4)	4-5	3-4	2230	+374	
V_3	a_1 x b_3 (1x8)	4-5	3-4	2350	+494	x
V_4	a_2 x b_1 (3x0)	2-3	4-5	2088	+232	
V_5	a_2 x b_2 (3x4)	4-5	3-4	2870	+1014	xxx
V_6	a_2 x b_3 (3x8)	4-5	3-4	2920	+1064	xxx
V_7	a_3 x b_1 (5x0)	3	4	2074	+218	
V_8	a_3 x b_2 (5x4)	4-5	3-4	2508	+652	xx
V_9	a_3 X b_3 (5x8)	4-5	3-4	2486	+630	xx

DL 5% = 492,20 kg/ha
DL 1% = 677,96 kg/ha
DL 0,1% = 933,32 kg/ha

Grain yield varied between very large limits, from 1856 kg/ha (variant V_1 = one plant/hole, non – irrigated) to 2920 kg/ha (variant V_6 = three plants/hole, irrigated with eight water applications of 250-300 m^3/ha).

Variants V_5 and V_6 recorded 2870 kg/ha, respectively 2920 kg/ha, with positive very significant differences and variants V_8 and V_9 recorded positive distinct significant differences, according to 2508 kg/ha and respectively 2486 kg/ha grain yield. Also, variant V_3 recorded positive significant differences, with a yield of 2350 kg/ha.

It is relevant the fact that variant with a medium number of plants on hole and rich irrigated regime (over four water applications) provided the best results.

CONCLUSIONS

1. A good crop of runner bean could be developed by direct sowing in the holes of three plants, situated at 40 cm in the 80 cm equidistant rows.

2. Irrigation is a very important cultural practice; the best results can be obtained by 4-8 times water application with a total water quantity of 1200-2000 m^3.

3. The highest yields are around 1800 kg/ha.

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THE PERSPECTIVES OF ORGANIC AGRICULTURE IN ROMANIA

PERSPECTIVELE AGRICULTURII ORGANICE ÎN ROMÂNIA.

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Abstract. *The roots of organic vegetable growing cannot be separated from those of organic agriculture in general. Organic agriculture (ecological, biological) had appeared as a reaction to the industrial agriculture, "intense uncontrolled" which had the following effects: the reduction of soil productivity caused by erosion; organic matters and nutrients loss; the pollution of surface water with sediments and chemical products that materialized later in a reduction of biological activity from soil, an increased resistance for chemical products used to control pests, pathogens and weeds; the useful flora and fauna destruction and the reduction of its biodiversity by using pesticides etc.*

Rezumat. *Rădăcinile legumiculturii organice nu pot fi separate de cele ale agriculturii organice în general. Agricultura organică (ecologică, biologică), a apărut ca o reacţie la agricultura de tip industrial, "intensiv necontrolata", fapt care a determinat: reducerea productivităţii solului prin eroziune, pierderea substanţei organice şi a elementelor nutritive; poluarea apei de suprafaţă cu produse chimice şi sedimente fapt ce s-a concretizat ulterior în reducerea activităţii biologice a solului; creşterea rezistenţei la produsele chimice de combatere a dăunătorilor, agenţilor patogeni şi buruienilor; distrugerea florei şi faunei utile şi reducerea biodiversităţii acesteia prin utilizarea pesticidelor etc.*

The term of "ecological agriculture" do not mean strictly "ecological", but a generous form of agriculture that combines the principles and techniques of biodynamic, organic, biological agriculture (Munteanu, 1999). So, an obligatory dimension of biological agriculture in the presented context is its ecological characteristic that consolidates or establishes the agricultural ecosystem reconstruction and maintenance quality. In fact, the measures for ecological protection ensure the system sustainability – a major goal of ecological agriculture (Toncea, 2002).

THE ORGANIC AGRICULTURE EVOLUTION

Undoubtedly, the organic/ecological/biological agriculture is now one of the most dynamic agricultural systems, especially in Europe (Stoian, 1999).

At the end of 2005, the areas used for ecological agriculture in the world were about 52 millions hectares, while in Europe were 6,5 million hectares (with 20% higher than in 2004). A situation of ecological agriculture is presented in *Table 1*.

The market for organic products in Europe had developed based on ecological food consumption consistency and field cultivation with the view of obtaining ecological products.

In Europe, in 2005 the organic marketing explosion amounted to 8 billion pounds. The main reasons for this development were the interest for health and environment protection and social and economical benefits.

Table1

The situation of ecological agriculture in Europe (FIBL, 2006)

Country	Year	Area (hectares)	% of total area	Number of organic farms
Albania	2004	803.95	0.07	57
Austria	2004	344,916.00	13.53	19,826
Belgium	2004	23,728.00	1.70	712
Bosnia/Herzegovina	2004	310.00	0.01	122
Bulgaria	2004	12,284.00	0.23	351
Croatia	2005	7,355.00	0.23	265
Cyprus	2005	1,017.96	0.71	225
Czech Republic	2004	260,120.00	6.09	836
Denmark	2004	154,921.00	5.76	3,166
Estonia	2004	46,016.00	5.17	810
Finland	2004	162,024.00	7.31	4,887
France	2004	534,037.00	1.80	11,059
Germany	2004	767,891.00	4.52	16,603
Great Britain	2005	690,270.00	4.39	4,010
Greece	2004	249,488.0	2.72	8,269
Hungary	2004	128,690.02	2.19	1,583
Iceland	2004	4,910.00	0.22	25
Ireland	2004	30,670.00	0.70	897
Italy	2004	954,361.00	6.22	36,639
Latvia	2005	43,901.99	1.77	1,043
Liechtenstein	2004	984.00	26.40	42
Lithuania	2005	64,545.00	1.86	1,811
Luxembourg	2004	3,158.03	2.49	66
Macedonia	2005	192.46	0.02	50
Malta	2004	13.00	0.13	20
Moldova	2005	11,075.00	0.44	121
Norway	2004	41,035.00	3.95	2.484
Poland	2004	82,730.00	0.49	3,760
Portugal	2004	206,524.00	5.42	1,302
Romania	2004	75,000.00	0.51	1,200
Serbia/Montenegro	2004	20,541.52	0.37	3,000
Slovakia	2005	93,943.00	4.19	218
Slovenia	2004	23,032.00	4.55	1,568
Spain	2004	733,182.37	2.87	16,013
Sweden	2005	206,579.00	6.80	3,138
Switzerland	2004	121,387.00	11.33	6,373
The Netherlands	2004	48,152.00	2.49	1,469
Turkey	2004	108,597.00	0.26	12,806
Ukraine	2005	241,980.00	0.58	72
TOTAL		**6,500,365.30**	**2.21**	**166,898**
U.E.		**5,853,910.37**	**3.42**	**139,930**

In Romania, the introduction of Government Urgent Injunction 34/17.04.2000 and the establishment of National Authority for Ecological Products (NAEP) represented concrete steps that had made ecological agriculture more dynamic.

Now, Romania has an adequate law system for obtaining (in optimal conditions) Bio products:

- Urgent Injunction of Government 34/17.04.2000 modified and completed with Urgent Injunction of Government 62/06.09.2006 regarding ecological agroalimentary products;
- The Government Decision 917/2001 regarding application norms of U.I. 34/2000;
- The Minister Disposition 417/110/2002 modified by Disposition 317/190 from 28 June 2006 regarding ecological agroalimentary labelling and the use of mark "ae";
- The Minister Disposition 153/2003 regarding import/export rules for ecological agroalimentary products;
- The Minister Disposition 527/2003 regarding the inspection and certification of ecological agroalimentary products;
- The Minister Disposition 20/2006 regarding the support for ecological vegetal production.

Table 2

The evolution of certified areas in ecological agriculture from Romania

Specifications	MU	Accomplished					Estimated
		2001	2002	2003	2004	2005	2006
Total area from which:	Ha	28,800	43,850	57,200	73,800	110,400	170,000
Cereals	Ha	8,000	12,000	16,000	20,500	22,100	34,000
Fodder crops and meadows	Ha	14,000	20,000	24,000	31,300	42,300	50,100
Oleaginous and proteic plants	Ha	6,300	10,000	15,600	20,100	22,614	51,000
Vegetables	Ha	100	700	200	300	440	560
Fruits	Ha	0	50	100	200	432	540
Forest fruits	Ha	100	300	400	500	17,630	26,000
Other crops	Ha	300	800	900	900	4,884	7,800

Source: MAPDR

Table 3

The evolution of ecological certified vegetal yield

Specifications	MU	Accomplished				
		2001	2002	2003	2004	2005
Total area from which:	to	24,400	32,300	30,400	55,590	131,898
Cereals	to	12,500	15,000	14,400	30,500	55,000
Oleaginous and proteic plants	to	7,200	11,000	12,480	37,000	45,600
Vegetables	to	4,000	7,000	2,000	3,000	7,200
Fruits	to	0	200	300	800	1,000
Forest fruits	to	400	300	320	4,500	16,748
Other crops	to	300	800	900	1,200	6,350

Source: MAPDR

Reffering to the destination of ecological products obtained in Romania, it may say that in 2006 almost 38% of vegetal yield was exported while 62% was distributed on intern market.

Recent studies of Romanian Academy, quoted by BBW, estimates that in Romania every year will be selled ecological agroalimentary products to the sum of almost 2 milions euro (almost 1 % of total agroalimetary market).

The actions for promoting the ecological agriculture concept in Romania will be accomplished through consultancy and extension, training and education, research/funds reception from sectorial projects (OM 662/2006).

The opportunities for ecological agriculture development in Romania are determined by:

- productive and fertile soils;
- chemicalization and technology had not reached the level from the industrialized countries;
- the traditional romanian agriculture is based on “clean” technologies;
- there is the posibility for determining ecological areas, unpolluted where it could be applied the practices for ecological agriculture;
- the ecological agriculture may become an important source for rural workforce;
- comparative and competitive advantage with conventional production.

CONCLUSIONS

The national development plan for ecological agriculture from 2007 to 2010 has two major objectives which are determined by quality and quantity.

The qualitative objective is based on ecological agriculture placement in the centre of romanian agriculture as a motor of durable agriculture justified through:

- economical viability in creating a market with an important potential for development;

- the guarantee of production process and in according with environment practices;

- the sale of products at prices with 20 to 60 percent higher than conventional products;

- professional trainings for young people with low investments capacities.

Quantitative objective is influenced by areas increase in ecological agriculture, as following:

- 2007 → 250.000 ha (1.70% of agricultural areas);
- 2010 → 400.000 ha (2.72% of agricultural areas).

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PRACTICAL ASPECTS REGARDING THE EVOLUTION OF SOME BIOMETRICAL PARAMETERS AT SOME NEW COMPARATIVE LARGE-PEPPER CROP, DEPENDING ON LEAF AND MINERAL FERTILIZATION, CULTIVATED IN VEGETATION VESSELS SYSTEM –IAŞI AREA

ASPECTE PRACTICE PRIVIND EVOLUȚIA UNOR INDICI BIOMETRICI LA CULTURA COMPARATIVĂ A UNOR CULTIVARE NOI DE ARDEI GRAS, FUNCȚIE DE FERTILIZAREA FOLIARĂ ŞI MINERALĂ, CULTIVATI IN SISTEMUL VASELOR DE VEGETATIE – ZONA IASI

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Abstract. *A less study domain from plant nutrition section is represented by leaf fertilization. For this reason, this paper work bring new results of some tests made using several new leaf fertilizers, some we can call ecological, results which will complete the specialty literature.*

Rezumat. *Având în vedere importanța alimentară şi economică deosebită a ardeiului gras, studiul comportării unor noi cultivare în anumite condiții pedoclimatice şi în diferite sisteme de cultură, constituie una din principalele preocupări pentru specialişti în vederea recomandării celor mai eficiente soluții practice adaptate la condițiile specifice fiecărei zone.*

Studiul de față urmăreşte influența fertilizării combinate (radiculare şi foliare) asupra unor aspecte biometric,e, la cinci cultivare de ardei gras.

În acest scop am folosit ca îngrăşământ mineral radicular complex 15-15-15, iar ca fertilizatori foliari au fost folosiți Folisof 221, Kristalon Verde, Fertcomplex C., Biostar.

Rezultatele obținute confirmă faptul că fertilizarea combinată (foliară + minerală) determină dezvoltarea viguroasă optimă a plantelor de ardei.

Large-pepper crops are given great importance among the vegetable species cultivated in our country. The large-pepper's relatively reduced energetic value is greatly compensated by a complex chemical composition, containing many valuable vitamins, mineral salts and glucose.

The present study monitors the influence of combined fertilization (root and leaf) on some biometrical aspects from four large-pepper crops. To this end the root complex 15-15-15 was used as mineral fertilizer, and Folisof 221, Green Kristalon and Biostar Fertcomplex C. as leaf fertilizers. The results confirm the fact that combined fertilization (leaf + mineral) determine a most favorable vigorous growth of large-pepper plants.

MATERIALS AND METHODS

The experiment was carried out on the premises of the experimental field of the Agrochemical discipline of "Ion Ionescu de la Brad" University of Agricultural Sciences and Veterinary Medicine, Iasi, in vegetation vessels, using mineral fertilizer (complex 15-15-15) and

leaf fertilizers (F_{221}, Fertcomplex, Green Kristalon and Biostar) in the large-pepper crop and monitoring the effect these two combined have on the production.

The experiment organized in vegetation vessels in 2006 is bifactorial, following the randomized blocks method.

A factor (leaf fertilization, non-mineral fertilization)

a1 - F_{221}

a2 - Fertcomplex

a3 - Green Kristalon

a4 - Biostar

B factor (leaf fertilization + mineral fertilization – complex 15-15-15):

b1 - F_{221} + $N_{80}P_{80}K_{80}$

b2 - Fertcomplex + $N_{80}P_{80}K_{80}$

b3 - Green Kristalon + $N_{80}P_{80}K_{80}$

b4 - Biostar + $N_{80}P_{80}K_{80}$

The complex fertilizer 15-15-15 contains 50% ammoniacal nitrogen, 50% nitric nitrogen, phosphorus 98% soluble in citric acid, 60% soluble in water, potassium 45% total active agent, humidity 1%, granulation 1-4 mm 90%, free acidity maximum 3%. This is a chemical fertilizer with well balanced basic elements (N, P, K), used in ecological doses (minimum) recommended for large-pepper crop ($N_{80}P_{80}K_{80}$).

Table 1

Composition and Characteristics of used leaf fertilizers

Leaf fert.	CSA %	pH	N g/l	P g/l	K g/l	B G/l	S g/l	Mn g/l	Mg g/l	Zn g/l	Cu g/l	Fe g/l	Mo g/l
F221	16	6,5-7	70	70	48	0,2	9	0,2	0,5	0,1	0,05	0,2	-
Fert.	16	6.5	80	80	75	0,3	0,4	0,4	0,04	0,04	0,1	0,3	0,03
Kris.	16	6,6	180	180	180	0,025	-	0,04	-	0,025	0,01	0,07	0,004
Ecol. fert.	**pH**	**Nt %**	**Norg %**	**Mat or %**		**Polizahar., polipept, prot.**					**Vitamins**		
Bios	5,8	2	2	12		13,5					B1, B6, PP		

Recommended concentrations for organic leaf fertilizer are: 0,2-0,3% (Biostar) and between 0,5 -1% for the chemical ones, while recommended doses are 2-3 l/ha for leaf organic fertilizers and between 7-8 l/ha for the chemical ones.

The biological material used was represented by four hybrids of Capsicum annuum: Albatros, Belladonna, Gypsy, Shy Beauty.

Albatros F1 is a very early indeterminate hybrid with extremely high yield potential. The plant is vigorous, with short internodes. Fruits are tapered, 3-4-lobed. The fruit color is white with yellow undertone, becoming bright red at biological ripeness. Fruits are 100-120 g in weight, 6-7 cm in diameter, 10-12 cm in length, with a wall thickness of 5-6 mm. This variety features an outstanding fruit-setting ability and intermediate heat resistance. Recommended for very early greenhouse and open-field production.

Belladonna F1 is a very early-maturing hybrid. The plants are vigorous, with a compact, indeterminate plant habit allowing very easy harvest. Produces a high percentage of 4-lobed, thick-walled (6-7 mm) fruit. The blocky bell-shaped fruit average 9-10 x 8-9 cm in size and 160 - 200 g in weight and are very uniform.

The fruit color varies from ivory at industrial ripeness to yellow at complete physiological ripeness. Resistant to tobacco mosaic virus (Tobamo virus P0). Particularly suited for early spring, summer and autumn production in glasshouses, as well as for cultivation in plastic film greenhouses, under plastic cover and in the open field for fresh market.

Gypsy F1 is a very early and extremely productive hybrid. Matures 60 days after transplanting. Plants have a compact growth habit and a height of 45-55 cm.

Fruits measuring 10x6 cm, have a great flavor and are light-yellow at industrial ripeness and red at biological ripeness. Resistant to tobacco mosaic virus. Recommended for very early production in glass greenhouses, plastic film greenhouses and in the open field

Shy Beauty F1 is early-maturing hybrid with vigorous plants and excellent yield potential. Fruits are blocky, thick-walled. The fruit color is ivory at industrial ripeness and red at biological ripeness. Suitable for fresh market and processing. Resistant to tobacco mosaic virus (Tm2) and bacterial spot. Recommended for cultivation in glass greenhouses, plastic film greenhouses and in the open field.

Mineral fertilization with the complex fertilizer 15-15-15 was carried out on May 23, 2006, one week before plantation.

Leaf fertilization was accomplished in three steps: the first fertilization before blooming, on July 4,2006; the second fertilization in the immediately following period, on July 12,2006; and the last fertilization during blooming, on July 18,2006.

RESULTS AND DISCUSSIONS

Part of the results obtained after measuring the leaf areas of the plants' leaves on variants (using the polar planmeter method) are presented in table 2, in square centimeters.

Table 2

Large-pepper production (t/ha)

Variants/ Hybrids	Gypsy		Albatros		Belladonna		Shy Beauty	
	cm^2	unfertilized diff.	cm^2	unfertilized diff.	cm^2	unfertilized diff.	cm^2	unfertilized diff.
Unfert.	2952	0	2396	0	2136	0	2464	0
F1	3120	168	2423	27	2298	162	2498	34
F2	3126	174	2447	51	2302	166	2498	34
F3	3237	285	2582	186	2289	153	2697	233
F4	3056	104	2408	12	2248	112	2498	34
M+F1	3580	628	2556	160	2599	463	2790	326
M+F2	3582	630	2689	293	2616	480	2876	412
M+F3	3621	669	2876	480	2621	485	3088	624
M+F4	3448	496	2502	106	2397	261	2652	188

M = unfertilized; F1 = leaf fertilization with F_{221}; F2 = leaf fertilization with Fertcomplex; F3 = leaf fertilization with Green Kristalon ; F4 = leaf fertilization with Biostar; M+F1 = leaf fertilization with F_{221} + $N_{80}P_{80}K_{80}$; M+F2 = leaf fertilization with Fertcomplex+ $N_{80}P_{80}K_{80}$; M+F3 = leaf fertilization with Green Kristalon + $N_{80}P_{80}K_{80}$ şi M+F4 = leaf fertilization with Biostar + $N_{80}P_{80}K_{80}$

Analysing the data present in table 2 one may note that the leaf area depends, in the first place, on the biological characteristics of each hybrid. Thus, the large-pepper hybrid Gypsy registers the largest leaf area, followed by Shy Beauty and Albatros. Belladonna is the hybrid with the smallest leaf area.

Applying leaf fertilization determines a growth of the leaf area on all variants, a maximum being registered in the case of the leaf Green Kristalon (with a difference of 669 cm2 for Gypsy, 480 cm2 for Albatros, 485 cm2 for Belladonna and 624 cm2 for the hybrid Shy Beauty).

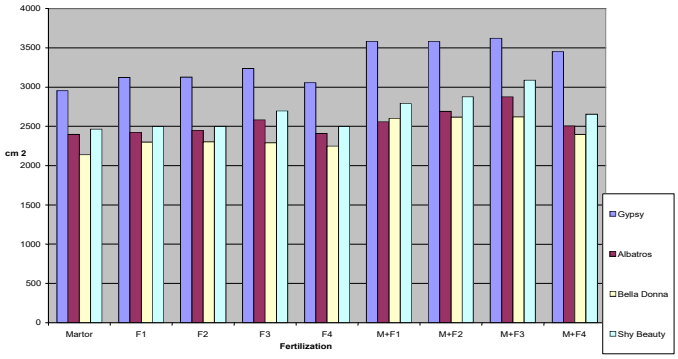

Figure 1 – The influence of fertilization on the leaf area of large-pepper plants

Mineral leaf fertilizers (F_{221}, Fertcomplex, Green Kristalon) determine greater growths of the leaf area compared to the leaf Biostar, an organic fertilizer. That is why we are entitled to state that the growth of the leaf area was caused by the mineral nitrogen present in the three fertilizers.

The basic root fertilizing obviously induces a superior growth of the leaf area, underlying once again the statement that the essential fertilization is that made through the root system, leaf fertilizers being seen only as nutritional supplement.

The differences are obvious, varying from 160cm to 669cm2 when compared to the unfertilized, in the case of combined fertilization.

Calculating the difference between the mean of the areas registered during leaf fertilization and the mean of those registered during combined fertilization, on each hybrid at a time, we can state that the best response (concerning leaf area) was given by the hybrid Gypsy (a 423 cm2 difference), then the hybrid Shy Beauty (a 303,75 cm2 difference), then the Belladonna (a 274 cm2 difference). The hybrid Albatros is situated last with a 274 cm2 difference. Consequently, the Belladonna hybrid gives a better response to the fertilization than the Albatros.

CONCLUSIONS

The leaf area is primarily determined by the genetic potential.

Combined fertilization (root + leaf) has proved to be our best option, bringing about the largest growths of leaf areas.

The Belladonna hybrid gives better responses to fertilization than the Albatros.

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PRACTICAL ASPECTS REGARDING THE USE OF NON-WOVEN TEXTILES AS MULCHING MATERIALS FOR A COMPARATIVE SWEET PEPPER CROP (*Capsicum annuum L.)*

ASPECTE PRACTICE PRIVIND UTILIZAREA TEXTILELOR NEȚESUTE CA MATERIALE DE MULCIRE LA O CULTURĂ COMPARATIVĂ DE ARDEI GRAS (*CAPSICUM ANNUUM* L.).

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Abstract. *Technical method of "mulching" assume covering the soil between rows and plants on rows with different materials (straws, shredded paper, plastic, unwoven textiles etc.). This protective, simple and with a wide aplicability method offers various benefits concerning yield's precocity, quality and quantity, soil structure maintenance and water conservation.*

The goal of this paper is the productive estimation for some sweet pepper cultivars (Albatros, Belladonna, Gypsy, Shy Beauty, Export) when these crops are mulched with plastic materials and unwoven textiles.

Rezumat. *Metoda tehnică de "mulcire" presupune acoperirea solului între rânduri şi între plante pe rând cu diverse materiale (paie, hârtie, plastic, textile neţesute etc.). Această metodă protectivă, simplă şi cu o largă aplicabilitate oferă variate avantaje cu referire specială la precocitatea, calitatea şi cantitatea producţiei, păstrarea structurii solului şi conservarea apei din sol.*

Scopul lucrării de faţă este estimarea producţiei pentru câteva soiuri de ardei gras (Albatros, Belladonna, Gypsy, Shy Beauty, Export), în condiţiile mulcirii acestor culturi cu materiale plastice şi textile neţesute.

The variety, as a production factor, has a major contribution in qualitative and quantitative yield increase. Some authors consider that the variety is decisive for an intensive crop.

The study regarding some cultivars behaviour in certain pedoclimatic conditions and different cultivation systems is one of the main preoccupation for specialists.

Mulching is an important method for obtaining healthy crops and it has several advantages: it reduces the need for tillage and the use of weed-control chemicals, water is conserved (mulches reduce the evaporation of soil moisture by lowering the soil temperature), it prevents the formation of soil crusts and drastic fluctuations in soil temperature. In the same time, mulch keeps the soil cooler in summer and warmer in winter, improving both root growth and nutrient availability. At the end of the growing season, organic mulches can be tilled into the soil to further increase the organic matter content and the water-holding capacity of the soil.

The aspects presented above motivated us to study the behaviour of some new sweet pepper hybrids in the conditions of Iasi county.

MATERIAL AND METHOD

Researches were carried out in 2006, in field and in an ICLF Vidra 5,4 plastic tunnel from University of Agricultural Sciences and Veterinary Medicine Iasi, Faculty of Horticulture.

During experience, were followed the mulching effects with two materials (*unwoven textiles* in two variants) and *black plastic* on a sweet pepper (*Capsicum annuum L.*) crop.

The characteristics of sweet pepper hybrids that were used during experiences are presented below:

Albatros F1 is a very early indeterminate hybrid with extremely high yield potential. The plant is vigorous, with short internodes. Side shoot (sucker) forming ability is poor. Fruits are tapered, 3-4-lobed. The fruit color is white with yellow undertone, becoming bright red at biological ripeness. Fruits are 100-120 g in weight, 6-7 cm in diameter, 10-12 cm in length, with a wall thickness of 5-6 mm. This variety features an outstanding fruit-setting ability and intermediate heat resistance. Recommended for very early greenhouse and open-field production

Belladonna F1 is a very early-maturing hybrid. The plants are vigorous, with a compact, indeterminate plant habit allowing very easy harvest. Produces a high percentage of 4-lobed, thick-walled (6-7 mm) fruit. The blocky bell-shaped fruit average 9-10 x 8-9 cm in size and 160 - 200 g in weight and are very uniform. The fruit color varies from ivory at industrial ripeness to yellow at complete physiological ripeness. Resistant to tobacco mosaic virus (Tobamo virus P0). Particularly suited for early spring, summer and autumn production in glasshouses, as well as for cultivation in plastic film greenhouses, under plastic cover and in the open field for fresh market.

Gypsy F1 is a very early and extremely productive hybrid. Matures 60 days after transplanting. Plants have a compact growth habit and a height of 45-55 cm. Fruits measuring 10x6 cm, have a great flavor and are light-yellow at industrial ripeness and red at biological ripeness. Resistant to tobacco mosaic virus. Recommended for very early production in glass greenhouses, plastic film greenhouses and in the open field

Shy Beauty F1 is early-maturing hybrid with vigorous plants and excellent yield potential. Fruits are blocky, thick-walled. The fruit color is ivory at industrial ripeness and red at biological ripeness. Suitable for fresh market and processing. Resistant to tobacco mosaic virus (Tm2) and bacterial spot. Recommended for cultivation in glass greenhouses, plastic film greenhouses and in the open field.

Export is a early-maturing hybrid. Plants have a height of 45-55 cm. Fruits are 75-110 g, with a wall thickness of 5-6 mm.

During experience, were followed the mulching effects with two materials V_2 (*unwoven textiles* in two variants V_2, V_3) and V_4*black plastic* on a sweet pepper (*Capsicum annuum L.*) crop.

Unwoven textiles were manufactured at S.C. Fibresin S.A. Iaşi and in their composition are jute - 80% and polypropylene - 20%. There were two variants of unwoven textile: V_2 = 160g/m^2 and 3,07 mm thickness and V_3 = 160g/m^2 and 3,32 mm thickness. Variant V_1 was a unmulched crop.

The experimental variants were settled in randomized blocks with 4 repetitions and each of them with 7 plants.

The crop from plastic tunnel was established at 24th April (*Table 1*) by planting the seedlings according to the following scheme:

55+70+110+70+110+70+55/30 = cca 43215 pl/ha (6 rows)

The sowing and transplanting were made in 340 cm^3 plastic pots.

It must be mentioned that during the vegetation period, there were not used chemical fertilization and tillage.

Table 1

Dates regarding the establishment and evolution for sweet pepper crops

Sowing	February 16th
Germination	February 27th
Transplanting	March 9th
Planting	April 24th

RESULTS AND DISSCUTIONS

The results obtained after total yield (t/ha) determination was made at cultivars are presented below, in the tables 2,3,4,5 and 6.

Table 2

Total yield (t/ha) of Albatros cultivar depending of mulch materials used

Variant	Yield	% of V_m	Difference (t/ha)	Significance
V_4	47,81	175,74	20,58	XXX
V_3	43,21	158,82	15,98	XXX
V_2	36,21	133,09	8,98	XXX
V_1	27,23	100	0,0	

DL 5% = 2,7 t/ha
DL 1% = 4,1 t/ha
DL 0,1%= 6,6 t/ha

Table 3

Total yield (t/ha) of Belladonna cultivar depending of mulch materials used

Variant	Yield	% of V_m	Difference (t/ha)	Significance
V_4	52,46	185,51	24,15	XXX
V_3	45,86	162,19	17,55	XXX
V_2	38,40	135,69	10,09	XXX
V_1	28,31	100	0,0	

DL 5% = 1,4 t/ha
DL 1% = 2,1 t/ha
DL 0,1%= 3,4 t/ha

Table 4

Total yield (t/ha) of Shy Beauty cultivar depending of mulch materials used

Variant	Yield	% of V_m	Difference (t/ha)	Significance
V_4	39,37	172,81	16,56	XXX
V_3	34,45	151,32	11,64	XXX
V_2	28,46	125,00	5,65	XXX
V_1	22,81	100	0,0	

DL 5% = 1,0 t/ha
DL 1% = 1,6 t/ha
DL 0,1%= 2,5 t/ha

Table 5

Total yield (t/ha) of Gipsy cultivar depending of mulch materials used

Variant	Yield	% of V_m	Difference (t/ha)	Significance
V_4	46,91	183,92	21,45	XXX
V_3	38,64	151,37	13,18	XXX
V_2	31,16	122,35	5,7	XXX
V_1	25,46	100	0,0	

DL 5% = 1,4 t/ha
DL 1% = 2,2 t/ha
DL 0,1%= 3,5 t/ha

Table 6

Total yield (t/ha) of Export cultivar depending of mulch materials used

Variant	Yield	% of V_m	Difference (t/ha)	Significance
V_4	36,02	174,76	15,43	XXX
V_3	30,02	145,63	9,43	XXX
V_2	25,81	125,24	5,22	XXX
V_1	20,59	100	0,0	

DL 5% = 1,7 t/ha
DL 1% = 2,5 t/ha
DL 0,1%= 4,1 t/ha

Analising the dates regarding total yield, we found that the best results were at variant V_4 (black mulch) and the following hybrids: Belladonna (52,46 t/ha), Albatros (47,81 t/ha) and Gypsy (46,91 t/ha). The values of total yield fluctuated from 52,46 t/ha (cultivar Belladonna, variant V_4 - black mulch) to 20,59 t/ha (cultivar Export, variant V_1 – unmulched crop).

Regarding unwoven textiles used for mulching, total yields were between 45,86 t/ha (cultivar Belladonna) and 30,02 t/ha (cultivar Export) for variant V_3 = 160g/m^2 and 3,32 mm thickness and between 38,40 t/ha (cultivar Belladonna) and 25,81 t/ha (cultivar Export) for variant V_2 = 160g/m^2 and 3,07 mm thickness.

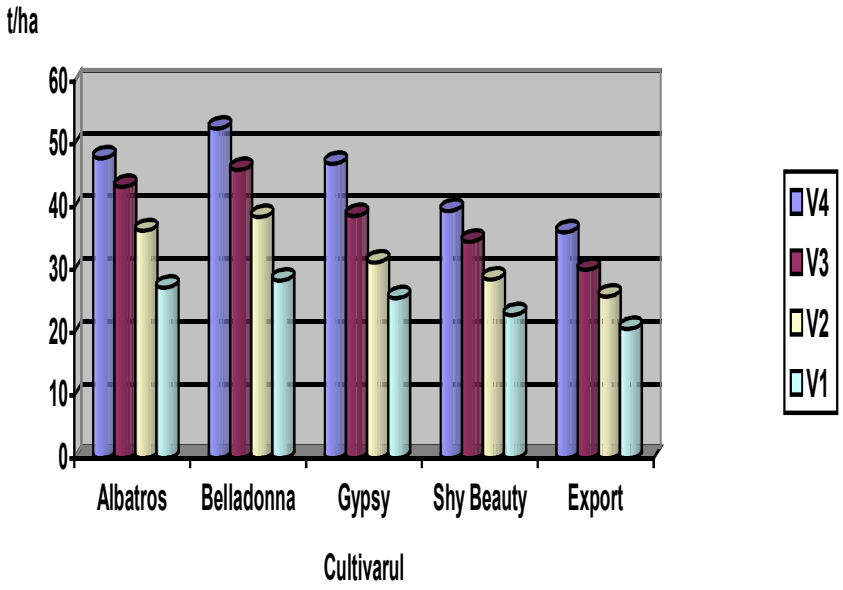

Fig. 1. The yield variation determined by mulch material used for the following cultivars: Albatros (A), Belladonna (B), Shy Beauty (C), Gipsy (D), Export (E)

CONCLUSIONS

1. The biggest total yields were at Belladonna (52,46/ha) and Albatros (47,81 t/ha), hybrids that were mulched with black plastic;

2. Reffering to those two types of unwoven textiles, the most important total yields were obtained at cultivar Belladonna (45,86 t/ha recorded at variant with unwoven textile - 160g/m^2 and 3,32 mm thickness and 38,40 t/ha for variant with unwoven textile - 160g/m^2 and 3,07 mm thickness).

3. It has been shown that black plastic mulch had the best results for sweet pepper crop.

4. The unwoven textiles chemical composition assure a superior grade of biodegradability, having an obvious ecological quality.

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THE INFLUENCE ON HK – 35 *PLEUROTUS* MUSHROOMS PRODUCTION OF DIFFERENT THERMAL TREATMENTS (STERILIZATION AND PASTEURIZATION) APPLIED ON SUBSTRATE

INFLUENȚA DIFERITELOR TRATAMENTE TERMICE (STERILIZARE ŞI PASTEURIZARE) APLICATE SUBSTRATULUI NUTRITIV, ASUPRA PRODUCȚIEI DE CIUPERCI *PLEUROTUS* - HK 35

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Abstract. *Pasteurization (heating wet material to 55°C to 60°C for 30 minutes) is the most critical step in growing mushrooms.*

One advantage of pasteurization is usually apparent: cost. Sterilization requires expensive high-pressure equipment of large capacity and more heat for longer periods of time.

The greater production on pasteurized substrate is due to the organisms left after pasteurization. There are indications that organisms, which are left after pasteurization, provide much of the nitrogen required by the mushrooms. They may fix nitrogen from atmosphere.

Therefore, the purpose of pasteurization is to eliminate the organisms, which compete with the mushrooms and to increase the organisms that discourage diseases, consume hemicellulose, provide nitrogen, and become food for the mushrooms.

MATERIAL AND METHOD

The quality of the cellulose substrate at inoculation is determined by its selectivity and it is presented like a feature of the nutritious material for which the best conditions necessary to an efficient and fast colonization by the mushroom growing are created. The creating of selectivity is achieved by thermal disinfecting of the nutritious substrate, disinfection that has the purpose to eliminate the competitors (disease organisms and pests) out of the substrate. This permits the obtaining of a high and constant yield throughout the whole technological cycle, contributing to the hydrolytic degradation of substrate and to the using of vegetal material as source of energy and synthesis.

Two methods of thermal disinfecting of the substrate were experimented: pasteurization and sterilization. In order to apply different thermal treatments a pool having a capacity of 4 m³, pool endowed with an airtight lid at its upper side for avoiding heat loss, was used. A net of pipes with orifices through which air penetrates into the cellulose substrate was placed on the bottom of the pool. The steam gets into the pool from the heating system through a pipe.

The experiments were organized using the randomized block method in three repetitions, a repetition being represented by four bags, (4x10 kg=40 kg substrate/variant), three cycles of growing/year.

The variants, which were used, are given below:

♦ V_1 (control) – the cellulose material wasn't exposed to any thermal treatment; this material was moistened through submersion for 20 hours, time after which it was drained, weighed, homogenized and inoculated;

♦ V_2 – the cellulose material, beforehand moistened through submersion for 20 hours was exposed to sterilizing through boiling for an hour and then cooled;

♦ V_3 – the cellulose material previously moistened was gradually injected with steam till the temperature of 60°C was obtained, temperature, which was maintained for 3 hours (*Fig. 1*);

♦ V_4 – the cellulose substrate was pasteurized through the hydrothermal method, the disinfection taking place at the same time with the moistening, through maintaining material in hot water, at a temperature of 55-60°C, for an hour. The moistening time was of 12 hours, time in which the temperature in the substrate decreased to 40-45°C.

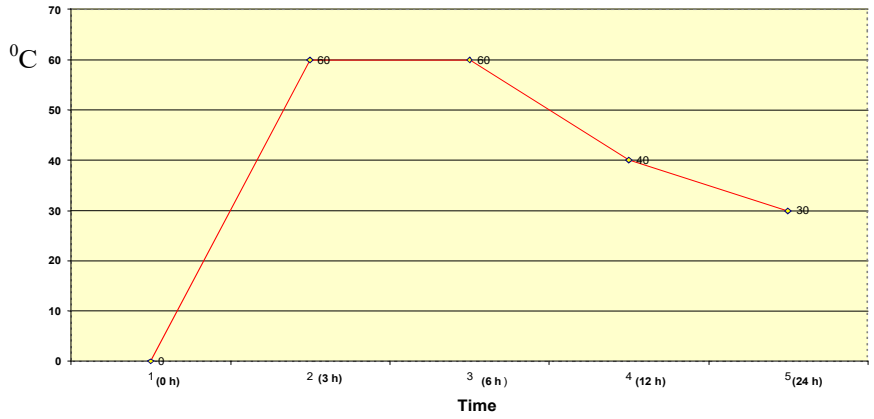

Fig. 1. The variation of the temperature in the substrate during the pasteurization process

After the thermical treatment we proceeded to the draining and cooling of cellulose material and then to the inoculation of spawn, the rate used for inoculation being of 1%, the hybrid used being HK 35, proceeding from Hungary. The nutritious substrate was made up of 50% wheat straw and 50% corn cobs.

RESULTS AND DISCUSSIONS

When the method of thermal disinfecting was used, the following results were achieved: variant 4, respectively the hydrothermical method of disinfection with hot water at 60°C, recorded the best results, the production obtained being of 25,7 kg mushrooms for 100 kg of nutritious substrate, the difference of production in comparison to the control variant (17,2 kg), being very significant (8,5 kg) (*Table 1 and Figure 2*).

Table 1

The influence of thermical disinfection of nutritious substrate on mushroom yield

Variant of disinfection used	Average production 2004-2005		Difference in production (kg/100 kg substrate)	Significance
	Kg/100 kg substrate	%		
V_1 – no thermical treatment (control)	17,2	100		
V_2 – hot water 100°C- 1 hour	15,8	91,9	- 1,4	-
V_3 – injecting steam 60°C- 3 hours	20,5	119,2	+ 3,3	xx
V_4 – submersion in hot water 60°C/1 hour	25,7	149,4	+ 8,5	xxx

DL 5% - 1,67
DL 1% - 2,53
DL 0,1% - 4,06

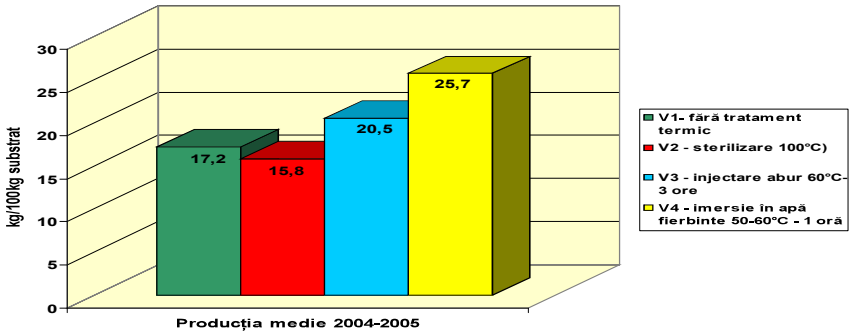

Fig.2. The influence of thermical disinfection of nutritious substrate on mushroom yield

The lowest production, 15,8 kg for 100 kg substrate, was obtained in the case of the variant in which the substrate was sterilized. The production obtained was reduced with 1,4% in comparison to V_1 (control). The sterilized substrate constituted a propitious medium to the green mould (*Trichoderma*), its propagation being very fast, leading to the inhibiting of spawn in the areas of infected substrate and implicitly, to the decrease of production (*Figure 3*).

Fig. 3. The influence of pasteurization temperature of the substrate

This method requires a longer period of time in order that the whole substrate substrate can reach the optimum temperature and it doesn't offer the certainty of the uniform temperature in the entire substrate mass, besides the fact it is very expensive (*Fig. 4*).

Thus, we established that after 3 hours of progressive injecting of the steam, there were parts in the substrate mass in which the recorded temperature exceeded 80°C, whereas in other areas of the pool, the temperature in the substrate wasn't rising above 30-35°C.

Thus, it can be explained why in the control variant, in the circumstances in which clean, dry, cellulose materials, with no disease organisms and pests were used, and the hygiene norms and the stages of the technological process were obeyed, reasonable results were obtained (17,8 kg mushrooms/100 kg substrate) without applying any chemical or thermical treatments on the substrate used in growing, the yield obtained being with 1,4 kg/100 kg substrate higher than the variant on which the cellulose material was sterilized.

On the variant disinfected with steam under pressure (V_3) a yield of 20,5 kg/100 kg substrate was achieved, having a distinct significant increase of production (of 3,3 kg) in comparison to the control variant.

CONCLUSIONS

1. The best yields (25,7 kg for 100 kg substrate) were obtained in the case of using the hydrothermical method of pasteurization (immersion in hot water, at 60°C);

2. By using the hydrothermical method of pasteurization an optimum and uniform temperature in the whole cellulose substrate was ensured in a very short time. The useful micro-organisms are not destroyed at this temperature, and due to the fact they are stimulated and they compete with the harmful micro-organisms, they ensure favourable conditions for the growth of *Pleurotus* mushrooms;

3. The lowest yields were obtained by sterilizing the cellulose material (15,8 kg for 100 kg substrate), method which destroyed all the useful micro-organisms existing in the substrate, thus being created an extremely favourable medium for the infecting with microbes, especially mould (*Trichoderma viridis*);

4. In the case of the disinfection variant with steam under pressure, the average yield was of 20,5 kg for 100 kg substrate

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INFLUENCE OF FOUR SPAWN RATES ON HK35 *PLEUROTUS* MUSHROOM YIELD AND DAYS TO PRODUCTION

INFLUENȚA A PATRU NORME DE MICELIU UTILIZATE LA ÎNSĂMÂNȚARE ASUPRA PRODUCȚIEI ȚI A DURATEI CICLULUI DE PRODUCȚIE

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Abstract. *Growers have thought, in the past, to optimize the amount of spawn used to inoculate their substrate. Increasing the amount of spawn used (up to 2 percent of the wet weight of the substrate) has resulted in increased yields. Increasing spawn rates from 0,5 percent substrate wet weight to 2 percent may result in yield increases of nearly 50 percent. Yield increases may be due to the following factors: the increased level of nutrient available in higher levels of spawn used and more inoculum points.*

By using a spawn rate of 2 percent of the wet substrate weight, it is possible to reduce the time to production by more than 7 days compared to a spawn rate of 0,5 percent. Thus, growers could complete the crop cycle faster, minimizing the exposure of the production substrate to pest infestations (ex. Lycoriella mali).

MATERIAL AND METHODS

Spawn produced in Hungary was used for experimenting on the hybrid HK 35. The producer recommends the spawn level of 1 kg for 100 kg substrate.

The substrate used was made of 50% shreded wheat straw and 50% ground corn cobs which, after homogenizing, were pasteurized using the hydrothermical method and then the substrate was inoculated with different spawn rates, having as a result the following variants: V_1 - 0,5% spawn, V_2 - 1% spawn, V_3 - 1,5% spawn şi V_4 - 2% spawn.

The influence of the quantity of inoculated spawn on the mushroom yield, the time length of production cycle and the economic efficiency was observed.

RESULTS AND DISCUSSIONS

As one can see in *Table 1* and *Figure 1*, the yield increased from 18,1 kg/100 kg substrate (V_1 – control) up to 27,5 kg/100 kg substrate by increasing the spawn level at inoculation.

Table 1.

Influence of spawn level used for inoculation of the nutritious substrate on the yield

Variant	Average yield		Difference of yield (kg/100 kg substrate)	Significance
	Kg/100 kg substrate	%		
V_1 - 0,5% spawn (control)	18,1	100		
V_2 - 1% spawn	25,9	143,1	+3,13	x
V_3 - 1,5% spawn	26,3	145,3	+4,74	xx
V_4 - 2% spawn	27,5	151,9	+7,61	xxx

DL 5% - 2,88
DL 1% - 4,36
DL 0,1% - 7

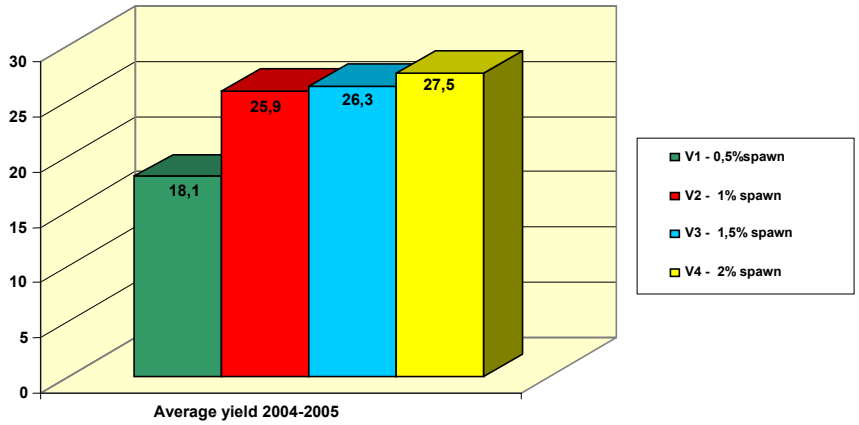

Fig. 1. Influence of spawn level used for the inoculation of the nutritious substrateon the yield

In the case of variant 2, for which the spawn level used was the one recommended by the producer - 1%, the average yield obtained was of 25,9 kg for 100 kg substrate, a significant increase of 3,13 kg for 100 kg substrate in comparison to the control variant being recorded.

In the case of variant 3, a yield of 25,9 kg/100 kg substrate was recorded, the difference of 4,74 kg in production in comparison to the control variant being a distinct significant one, and in the case of variant 4, for which the spawn level used was doubled to the one recommended (2% comparing to 1%), the yield recorded was the highest, 27,5 kg/100 kg substrate, having a difference in comparison to the control variant of 7,61 kg, a very significant one.

As regarding the influence of the spawn level on the time length of the production cycle, it came out that by using a spawn level of 2% of the wet substrate weight it is possible to reduce the production time with more than 7 days, in comparison to a level of 0,5% spawn. Thus, the growing cycle can be completed faster, minimizing the exposure time of the growing substrate to the infestation with different pests.

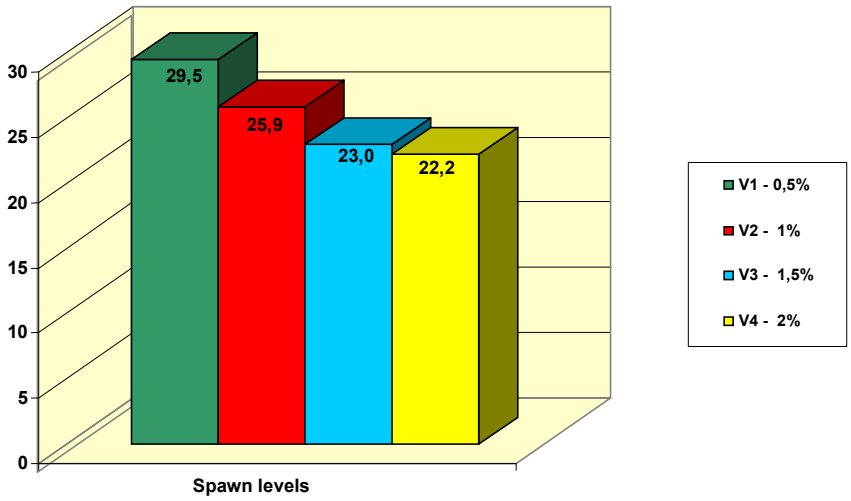

Fig. 2. Influence of spawn levels on the time length of the production cycle

Therefore, in the case of using some increased spawn levels, a negative correlation between the spawn level and the number of the production days is noticed. The higher the spawn level is, the lower the number of the production days is. (*Fig. 2*).

Research proved that the flies or the mosquitoes of the mushrooms (*Sciara fenestralis sin. Lycoriella mali*) can complete their life cycle in 25 days at 21°C whereas at a temperature of 18°C the life cycle can be ended between 35 and 38 days. A shorter growing cycle helps to minimizing the infestation level of a mushroom farm with different populations of insects.

From our own research, we noticed that a level of 1% spawn of the wet substrate weight is justified, in an economic point of view, by the yields obtained, and the time length of the growing cycle allows, in this case, the evacuation of the degraded substrate in time, thus the massive infestations with different pests being avoided. (*Tab. 2, Fig. 3*).

Table 2.

Costs and incomes obtained depending on the spawn level used at inoculation

Variant	Production (kg/100kg substrate)	Costs for spawn Euro/100 kg substrate	Incomes Euro/100 kg substrate
V_1 - 0,5 % spawn	18,1	2	32,0
V_2 - 1 % spawn	25,9	4	45,8
V_3 - 1,5 % spawn	26,3	6	46,5
V_4 - 2 % spawn	27,5	8	48,6

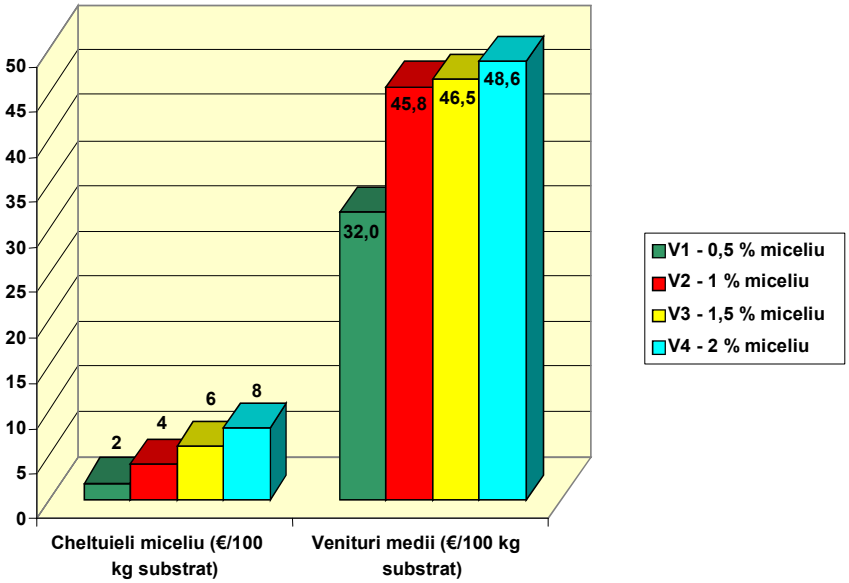

Fig. 3. Costs and incomes obtained depending on the spawn level used at inoculation

CONCLUSIONS

1. Using a spawn level of 1% led to the obtaining of high average yields (25,9%), the costs recorded being of 4 euro/100 kg substrate;

2. In the case of using a spawn level of 1,5%, the average yield obtained increased to 26,3 kg mushrooms for 100 kg substrate, the costs getting to 6 euro/100 kg substrate;

3. When the spawn level was doubled, the average yield recorded was of 27,5 kg mushrooms for 100 kg substrate (the increase being of only 1,6%), whereas the costs for the spawn/100 kg substrate doubled.

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ASPECTS REGARDING THE EFFICIENCY THE HERBICIDES AND CHEMICAL FERTILISERS ON YIELD INCREASE AND ON WEED CONTROL FOR THE TOMATO CROPS ROXANA, IN THE 2006 YEAR

ASPECTE PRIVIND EFICACITATEA ÎNGRĂŞĂMINTELOR CHIMICE, ERBICIDELOR ŞI PRAŞILELOR MECANICE ASUPRA GRADULUI DE ÎMBURUIENARE LA SOIUL DE TOMATE ROXANA ÎN ANUL 2006

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Abstract. *The investigation represent the experiments subject from the year 2006 concerning the knowledge of erbicides and chemical fertilizers influence on the weeding degree to the Roxana tomato variety.*

The weeding evolution and the efficiency of the controlling methods of weeds constitute the main measure concerning the ensurance of the best conditions for the tomato plants increasing and development.

Rezumat. *Cercetările constituie subiectul experimentelor din anul 2006 privind cunoaşterea influenţei erbicidelor şi a îngrăşămintelor chimice asupra gradului de îmburuienare la soiul de tomate Roxana.*

Evoluţia îmburuienării şi eficacitatea metodelor de combatere a buruienilor constituie principala măsură privind asigurarea condiţiilor optime de creştere şi dezvoltare a plantelor de tomate.

MATERIAL AND METHOD

The experiences concerning the influence of therbicides and chemical fertilizers on the production and weeding degree to the different tomato varieties transplantable in the field.

The factors taken in study were:

1. Factor A: the variety, with the degrees: a_1 "Roxana" variety
2. Factor B: the fertilization, with the fallowing degrees: $b_1N_0P_0K_0$; $b_2N_{125}P_{90}K_{60}$; $b_3N_{150}P_{120}K_{75}$; $b_4N_{175}P_{150}K_{90}$

3. Factor C: the erbicides used, with the following degrees: c_1 – unerbicides – unbreeded; c_2 – 2 mechanical; c_3 – hocings Treflan 48 EC 2 l/ha + Sencor 70 WP 0,300 kg/ha; c_4 - Treflan 48 EC 2 l/ha; c_5 - Dual 500 CE 2 l/ha + Sencor 70 WP 0,300 kg/ha; c_6 - Dual 500 CE 3 l/ha; c_7 - Goal 2E 2 l/ha + Sencor 70 WP 0,300 kg/ha; c_8 - Goal 2E 2 l/ha.

RESULTS AND DISCUSSIONS

The weeds controlling degree in the year 2006 to the Roxana variety, presents inferior values to the others two years. This thing is happened because of the great rainfall quantities from august month (130,20 mm), which determined a bigger weeding in the second part of vegetation period. The weeds controlling frames between 46,84% ($N_{175}P_{150}K_{90}$ – Treflan 48 EC 2l/ha) and 77,37% (unfertilized – Goal 2E 2l/ha + Sencor 70 WP 0,300 kg/ha), (table 1 and figure 1).

Table 1

The combined analysis of B+C factors on the weeding degree to the Roxana variety in the year 2006

Factorul A	Factor B	Factor C	No. existed weeds/m^2	No.weeds/m^2 controlled comparative with Mt.	The controlling degree	Scale EWRS	The difference significance
ROXANA	$N_oP_OK_O$	c_1	98,58	M_t	0,00	9	-
		c_2	20,35	78,23	79,36	6	**
		c_3	21,64	76,94	78,05	6	**
		c_4	29,20	69,38	70,38	6	**
		c_5	19,48	79,10	80,24	6	**
		c_6	25,79	72,79	73,84	6	**
		c_7	19,13	75,45	80,59	6	**
		c_8	23,41	75,17	76,25	6	**
	$N_{125}P_{90}K_{60}$	c_1	112,87	M_t	0,00	9	-
		c_2	32,91	79,96	70,84	6	***
		c_3	31,85	81,02	71,78	6	***
		c_4	43,61	69,26	61,36	7	**
		c_5	32,43	80,44	71,27	6	***
		c_6	39,85	73,02	64,69	7	**
		c_7	31,49	81,38	72,10	6	***
		c_8	37,04	75,83	67,18	7	**
	$N_{150}P_{120}$	c_1	119,79	M_t	0,00	9	-

	K_{75}	c_2	31,77	88,02	73,48	6	**
		c_3	32,40	87,39	72,95	6	***
		c_4	43,97	75,82	63,29	7	**
		c_5	31,91	87,88	73,36	6	***
		c_6	39,87	79,92	66,72	7	***
		c_7	31,13	88,66	74,01	6	***
		c_8	36,76	83,03	69,31	7	***
	$N_{175}P_{150}K_{90}$	c_1	138,08	M_t	0,00	9	--
		c_2	55,19	82,89	60,03	7	***
		c_3	51,57	86,51	62,65	7	***
		c_4	68,46	69,62	50,42	8	**
		c_5	49,60	88,48	64,08	7	***
		c_6	66,50	71,58	51,84	8	**
		c_7	48,11	89,97	65,16	7	***
		c_8	61,69	76,39	55,32	7	**

DL 5% = 22,13bur/m^2 (weeds/m^2);DL 1% =40,61 bur/m^2 (weeds/m^2);DL 0,1% =79,5 bur/m^2 (weeds/m^2).

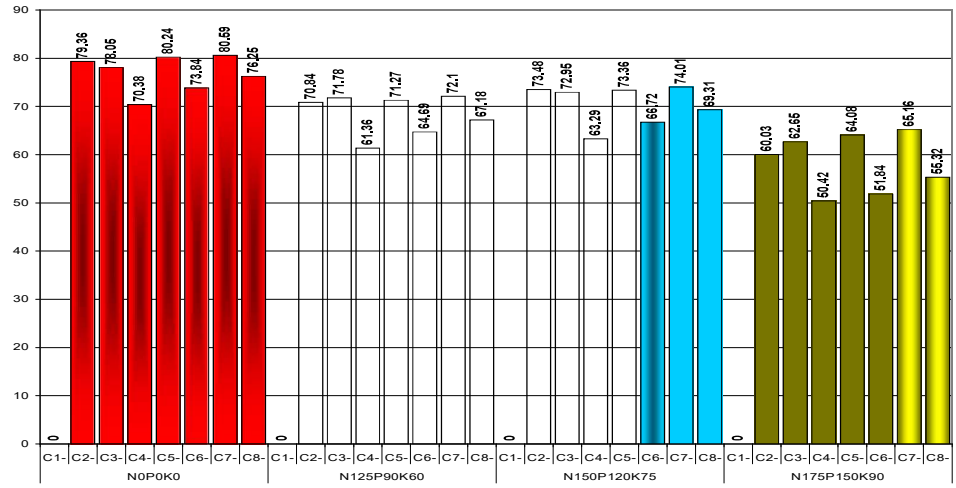

Fig.1. The weeds controlling degree to the Roxana variety in the year 2006

The unilateral action of the factor C (the controlling method) concerning the weeding degree reduction that is observed through a significant reduction of weeds comparative with the variant (unerbicided – unbreeded) until 32,47 weeds/m^2 in the case of Goal, 2E 2l/ha +Sencor 70 WP 0,300 kg/ha variant.

In the applying case of two mechanical hocings, the weeds number is reduced with 82,27 weeds/m^2 comparative with the unerbicided – unbreeded variant.

The percentage of the uncontrolled weeds after the application of the all controlling methods is about 39,99%. The monocotyledon weeds represent 7,24%, and dicotyledon weeds represent 32,75% (table 2).

The report between monocotyledon and dicotyledon is significantly influenced by the fertilization level.

Table 2

The repartition on the weeds/m^2 groups after the application of controlling methods to the Roxana variety, in the year 2006

Factor A	Factor B	Factor C	% uncontrolled weeds	Monocontyledons		Dicotyledons	
				Weeds/m^2	%	Weeds/m^2	%
ROXANA	$N_oP_OK_O$	c_1	100,00	28,35	23,94	90,06	76,06
		c_2	19,09	4,62	3,90	17,99	15,19
		c_3	14,05	4,05	3,42	12,59	10,63
		c_4	26,31	7,51	6,34	23,64	19,97
		c_5	12,81	3,75	3,17	11,42	9,64
		c_6	23,44	6,70	5,66	21,06	17,78
		c_7	12,74	3,72	3,14	11,36	9,60
		c_8	20,94	5,91	4,99	18,89	15,95
	$N_{125}P_{90}K_{60}$	c_1	100,00	25,33	19,07	107,51	80,93
		c_2	21,55	5,62	4,23	23,01	17,32
		c_3	21,35	5,62	4,23	22,74	17,12
		c_4	32,57	8,38	6,31	34,89	26,26
		c_5	19,41	5,15	3,88	20,64	15,53
		c_6	30,25	9,17	6,90	31,01	23,35
		c_7	18,04	4,78	3,60	19,19	14,44
		c_8	27,97	7,20	5,42	29,95	22,55

	$N_{150}P_{120}K_{75}$	c_1	100,00	24,46	17,27	117,19	82,73
		c_2	21,42	5,31	3,75	25,03	17,67
		c_3	19,67	4,94	3,49	33,92	16,18
		c_4	31,54	7,82	5,52	36,86	26,02
		c_5	18,93	4,73	3,34	22,09	15,59
		c_6	29,97	7,37	5,20	35,08	24,77
		c_7	18,29	4,55	3,21	21,36	15,08
		c_8	26,51	6,54	4,62	31,01	21,89
	$N_{175}P_{150}K_{90}$	c_1	100,00	22,58	14,44	133,76	85,56
		c_2	28,95	6,68	4,27	38,68	24,68
		c_3	28,09	6,43	4,11	37,48	23,98
		c_4	40,47	9,27	5,93	54,00	34,54
		c_5	26,18	6,05	3,87	34,88	22,31
		c_6	39,23	8,90	5,69	52,43	33,54
		c_7	24,77	5,64	3,61	33,08	21,16
		c_8	37,62	8,04	5,14	50,77	32,48
MEDIA			34,13	8,60	6,30	38,83	27,83

The monocotyledon weeds have a percentage included between 14,07% ($N_{175}P_{150}K_{90}$) and 23,01% ($N_0P_0K_0$), and the dicotyledon weeds present a percentage included between 76,98 % ($N_0P_0K_0$) and 85,93% ($N_{175}P_{150}K_{90}$), (fig.2.).

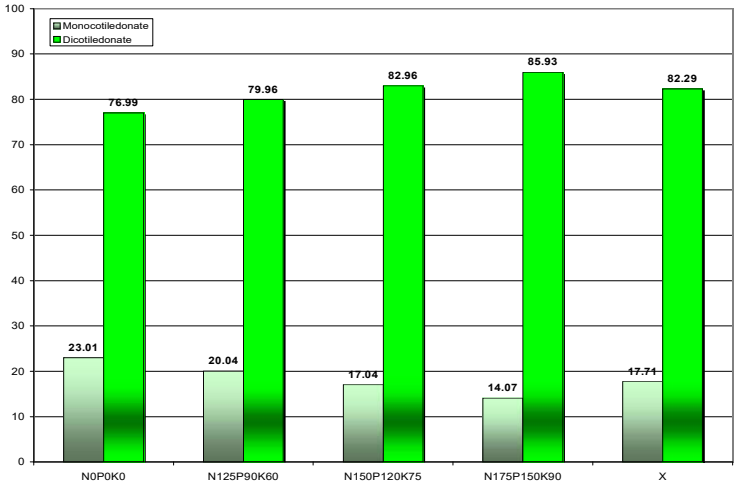

Fig.2. The report between monocotyledons and dicotyledons concerning the fertilization to the Roxana variety, in the year 2006

CONCLUSIONS

The main objects of the investigations effected in the year 2006 permitted the formulation of the following conclusions:

The weeding evalution and eficiency of the controlling methods constitute the main measure concerning the ensurance of the best conditions for the tomato plants increasing and development.

The weeds number in the year 2006 was about 47,70 weeds/m^2 in the case of the Roxana variety.

In the year 2006, to the Roxana variety, after the unilateral action of the factor B (fertilization) is registered the smallest weeds number.

The weeds number in the unifertilized variant is about 32,20 weeds/m^2 and increases in the measure in which the fertilizers quantity will be bigger, being of 67,40 weeds/m^2 in the $N_{75}P_{150}K_{90}$.

The controlled weeds percentage to the Roxana variety after the application of the all controlling methods is about: 39,99% in the year 2006.

In the frame of the Roxana variety, the monocotyledons have a percentage included between 14,47% ($N_{175}P_{150}K_{90}$) and 23,80% ($N_0P_0K_0$), in thue that the dicotyledons have a percentage included between 78,20% ($N_0P_0K_0$) and 85,53% ($N_{175}P_{150}K_{90}$) (table 2, figure 2).

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DEVELOPMENT AND TREND OF FRUIT GROWING IN MOLDOVA REPUBLIC

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Abstract. *In the period 1986 – 2006, essential changes took place in the fruit growing of the Republic of Moldova, both concerning the cultivated surface and the total production of fruits. Therefore the fruit growing inheritance surface was reduced from 251 thousands ha in 1993, to 111,8 thousands ha in 2006. At the same time, the importance of fruit growing plantations from the private sector increased from 20% to 52,3% in 2005. The production of fruit decreased drastically, from 1,09 million tons in 1993 to 0,37 million tons in 2006. The authors intended to emphasize the situation of the Republic of Moldova's fruit growing and the measures for increasing the plantations productivity.*

Key words: *fruit growing, productivity, plantation, harvest.*

INTRODUCTION

In its evolution fruit growing has passed many stages, among which the modification of ratio between state property and private one, in the favor of the private property. It is sufficient to mention that the area of fruit growing plantations has been greatly reduced. From 251 thou7sand ha in 1993 it diminished to 111,8 thousand ha in 2006. At the same time, the fruit total production has followed the same sense in 2006 were obtained 716,6 thousand tons less than in 1993. Hawing these realities in view the author sets himself the to evidence some aspect referring to fruit growing development in the context of the unprecedented reduction of productivity of orchards that have not yet been cut clear and foundation of new intensive and super intensive orchards.

MARERIALS AND METHODS

The study refers to the period 1986-2006 and aims at the evolution of principal indexes achieved in the fruit growing of the Moldova Republic such as: development of fruit growing plantation area; development of canceled, of the cut clear areas and of those planted with trees, bush fruits and strawberry; evolution of fruit growing plantations productivity and of the total production by species; modalities of turning fruits to good account; production evolution and average annual fruit consumption and of fruit products per capita.

RESULTS AND DISCUSSIONS

Extension of fruit growing plantations area till 1993 was ascent, reaching 251 thousand ha, and the total production of fruits reached an average level of one million tons (Table 1). Statistic data confirm the reduction of fruit growing plantations area of 2.2 times. The area of the fruitful orchards until 1993 increased and constituted 173,5 thousand ha (69,1 % of the overall plantations).

It is reduced upwards of 60 in comparison with 1993 and constitutes 104 thousand ha in 2006. Practically the total orchards area (111,8 thousand ha) the Moldova Republic has equals to the fruitful orchards area. From statistic data results that while the cut clear areas had an ascendant tendency, the young, plantations traversed an inverse sense.

Table 1

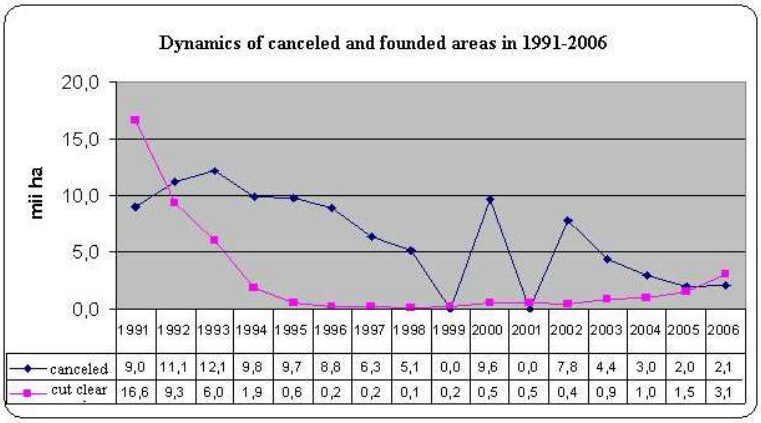
Evolution of the cultivate area with trees and bush-fruits in the period of 1991 -2006

Years	Fruit growing plantations area			Average harvest tons/ha	Total harvests of fruits		
	Total thousand ha	Inclusive fruitful			total, thousand tons	Inclusive in agro firms	
		mii ha	%			Thousand tons	%
1991	242,7	154,8	63,8	4,4	697,5	557,9	80,0
1992	241,8	159,5	65,9	3,1	506,2	395,4	70,4
1993	251,0	173,5	69,1	6,1	1087,8	818,8	75,3
1994	203,3	151,3	74,4	3,9	610,7	457,8	74,9
1995	**184,5**	**143,2**	**77,6**	**3,7**	**528,2**	**387,6**	**73,4**
1996	173,8	146,1	84,0	3,3	521,3	373,8	71,7
1997	165,2	149,4	90,4	6,3	946,0	714,9	75,5
1998	156,3	146,1	93,5	2,5	367,2	203,5	55,4
1999	151,5	141,1	93,1	1,6	220,0	42,7	19,4
2000	**136,6**	**129,0**	**94,4**	**2,0**	**255,4**	**126,2**	**49,4**
2001	122,0	118,0	96,7	2,7	315,0	138,7	44,0
2002	120,2	116,3	96,7	2,8	327,1	141,0	43,1
2003	114,3	108,0	94,4	5,7	617,2	319,8	51,8
2004	111,0	103,6	93,3	4,2	430,4	218,1	50,7
2005	**110,0**	**103,5**	**94,0**	**3,7**	**386,1**	**184,2**	**47,7**
2006*	111,8	104,0	93,0	3,6	371,2	165,0	44,4

Source: National Statistic Bureau; * - preliminary data

For example, in the period 1996-2002 the cut clear were reaching 5,1-9,6 thousand ha annually, and only 200-500 ha were planted (Fig.). Now the most part of the existent fruit growing plantations are in the period of drying, fruit-bearing and growing and are in a disastrous state with a small biologic potential with an exhausted period of exploitation and amortization and must be cut clear.

The average production per ha and the analyzed total harvest had an irregular evolution. It is sufficient to mention that during the last 16 years only three times (1993, 1997 and 2003) the average harvest of fruit growing plantations has overcome the level of 5 t/ha, and the total harvest only in 1993 reached the level of one million tons of fruits – as for the rest of years these indexes are in average at the level of 3-4 t/ha and 300-400 thousand tons of fruits that constitute the level of associated fruit growing productivity comprising the agropomiculture system and family gardens.



The fruit growing unsatisfactory state maybe administered to repartition of fruit growing plantations area (65 %) on spots having an inclination from 3-5 up to 5-10 degrees, all being subjected to erosion processes. At the same time, a great negative influence on the fruit growing plantations state and their productivity was brought about by ignorance or negligent accomplishment of agro technical measures. Accordingly, the productivity of the existent orchards progressively diminishes, and especially have been reduced the total harvests that in turn has determined the fate of enterprises for processing and industrialization of bruits (1, 2, 3).

With transition from planned economy to the free, competitive one the structure of property has changed in the favor of private sector which in 2005 represents 59,2 % of the total area and 52.3 % of the total harvest of fruits in comparison with 20 % of total harvest of fruits in 1991 (Tables 1, 2). In 2005 the fruit growing plantations area constitutes 110 thousand ha, inclusively seed-bearing fruits – 68.7 thousand ha, stone fruits 36.7 thousand ha, nut trees – 3.7 thousand ha and bush – fruits and strawberry - 0.9 thousand ha. It is important the facts in the Moldova Republic apples are produced, on 60.8 % of areas under orchards, which produce 72.1 % of the total amount of fruit production. On the second place are prunes with 10.7 % of the total production of fruits, and the peach, nuts, sour cherries, sweet cherries and pears hold relatively modest quotas (Table 3).

Table 2

Structure of cultivated area with fruit growing species in the Moldova Republic in the period 2000-2005 thousand/ha

Specification	2000-2004	2005		
	average	total	Inclusive in agro firms	Ponderation (%) of area in agro firms
Orchards, bacciferous plantations	**120,8**	**110,0**	**44,9**	**40,8**
Inclusive: **Seed-bearing**	**76,2**	**68,7**	**30,9**	**44,9**
Of which: Apple-tree	74,2	66,9	30,6	45,7
Pear-tree	1,6	1,4	0,3	21,4
Quince	0,4	0,4	0,0	0,0

Stone - fruits	**39,6**	**36,7**	**12,9**	**35,1**
Of which: Sweet-cherry	2,7	2,4	0,8	33,3
Sour cherry	3,7	3,2	0,7	21,9
Prune	23,7	21,6	7,2	33,3
Apricot	2,4	2,4	0,7	29,2
Peach	7,6	7,0	3,5	50,0
Nuts	**3,4**	**3,7**	**0,7**	**18,9**
Bush-fruits and strawberry	**1,0**	**0,9**	**0,3**	**33,3**

Table 3

Dynamics of the production amount of fruits and their structure in the aspect of cultivated species in the Moldova Republic

Specification	2000-2004		2005		
	Average thousand tons	%	Total thousand tons	inclusive: agro firms	
				Thousand tons	%
Fruits, berries and nuts	**389,4**	**100,0**	**386,1**	**184,2**	**100,0**
inclusive: **seed-bearing, total**	**284,9**	**73,2**	**285,6**	**164,4**	**89,25**
Of which: apples	275,5	70,7	278,4	163,3	88,65
Pears	7,4	2,0	6,1	1,1	0,60
Quinces	2,0	0,5	1,1	0,0	0,00
Stone-fruits, total	**88,1**	**22,6**	**86,0**	**19,5**	**10,58**
Of which: Sweet cherries	7,8	2,0	7,6	0,7	0,38
Sour cherries	12,9	3,3	13,8	0,4	0,22
Apricots	6,2	1,6	5,2	0,2	0,11
Prunes	47,7	12,3	41,4	11,3	6,13
Peaches	13,3	3,4	16,9	6,9	3,74
Nuts	**12,6**	**3,2**	**13,4**	**0,1**	**0,06**
Berries	**3,7**	**1,0**	**2,2**	**0,2**	**0,11**

In the period 2001-2006 of the total production of fruits, 41.5% was destined to processing, 30.4 % was turned to good account in fresh state at home, and 28.1 % was exported in fresh state (Table 4). An important cause, which leads to diminishing of fruit export of the Moldova Republic was represented by the poor quality of fruits both from the point of aspect and mode of presentation, except some reduced amounts of apple, prune peach.

Table 4

Evolution of production and turning to good account indexes of fruits in the period 2001-2006

Specification	MU	1986-1990	2001	2002	2003	2004	2005	2006
Average production	tons/ha	7,3	2,7	2,8	5,7	4,2	3,7	3,6
Total harvest	thousand tons	1037,0	315,0	327,1	617,2	430,4	386,2	371,2
Export	thousand tons	450,0	25,7	41,9	164,4	188,2	164,3	102,9
Processing	thousand tons	320,0	155,3	172,0	306,3	144,8	136,1	104,3
Home market	thousand tons	267,0	134,0	113,2	146,5	97,4	85,8	164,0*

*Note: Home market plus the deposited amounts for further turning to good account.

The total harvest of fruits and the annual average consumption of fruits per capita except 1993, 1997, 2003 and too almost an equal stand and a rather reduced one (Table 5).

Table, 5

Evolution of production and annual average consumption of fruits per capita, in the Moldova Republic, in the period 1993-2006

Specification	Years							
	1993	1997	2001	2002	2003	2004	2005	2006
Annual production of fruits per capita, kg	248,6	216,0	93,2	96,7	182,5	127,3	114,3	109, 8
Annual average consumption of fruits and fruits products, per capita, kg	-	-	75,4	43,8	114,0	81,7	55,7	69,4

The programme of the fruit growing development for the period 2003-2020 aims at the increase of fruits production, improvement of quality and of higher competitively. This programmer (5.6) forecasts that the areas occupied by orchards will reach 100 thousand ha up to the end of 2020, and the total harvest of fruits will reach one million tons in the period 2006 – 2020 (Table 6).

The stable development of fruit growing foresees the gradual displacement of exhausted orchards with ones of intensive and super intensive type having a productivity potential and quality of fruits of 1.3-1.5 times higher in comparison with the previous level on the basis of rational utilization of ecologic, biologic, technologic, economic resources characteristic for each sector of spot and fruit growing farm.

Table 6

Orientativ dynamics of basic indexes regarding the fruit growing development in the Moldova Republic, in the period 2005 -2020 (thousand tons annually)

Years	Total harvest	Export	Processing	Home market
2005-2010	628	200	330	98
2011-2015	870	250	380	240
2016-2020	980	300	440	240

In order increase the efficiency of existing plantations it is necessary to accomplish the census of orchards concomitantly with their productivity indexes. The obtained data will allow the development of a complex of measures for improvement of works in fruit growing, achievement of a more efficient productivity potential of plantations and the more rational utilization of land resources.

To stimulate the production of fruit growing planting material and foundation of fruit growing plantations (article 5 of the State Budget Lau on 2007, No.348-XVI of November 23rd, 2006) it is distributed for administration and management 17 million lei and 3 million lei for stimulation of nut culture development (4).

Resources to support the production of fruit growing planting material (grafted trees) and foundation of fruit growing plantations except bush-fruits plantations and strawberries will be utilized for partial compensation of the production expenses of grafted trees in the licensed, tree nursery as well as the cost of the fruit growing planting material used for foundation of fruit growing plantations.

The right to partial compensation of the production expenses of fruit growing planting material and for foundation of fruit growing plantations may benefit the economic agents regardless of the type of property and legal form of organization, who have founded tree nurseries as well as those who have founded fruit growing plantations.

CONCLUSIONS

In 2006 the fruit growing patrimony of the Moldova Republic has been diminished with 139.2 thousand ha, in comparison with 1993. Nowadays the orchards area constitutes 11.8 thousand ha of with seed-bearing 68.7 thousand ha, stone-fruits – 36.7 thousand ha, nuts-3.7 thousand ha, bacciferous-0.9 thousand ha.

The structure of fruit growing plantations is unsuitable, in the sense that fruitful plantations constitute 93 % and the most ponderation is detained by apple trees and prune trees while the pear trees, nut trees, apricot trees and other are cultivated on rather reduced areas.

The total production of the fruits was irregular and rather reduced, the quota being about 93.2-182.5 kg/per capita/annual, the annual average consumption of 73 kg/per capita.

The state development of fruit growing in perspective of 2020 requires investments worth 602 mln USA dollars which will be defrayed by the private sector, allocations from the state budget and foreign investments. The program also foresees the creation of a state fund for fruits production development in the Moldova Republic.

Subventions are granted: for production of fruit growing planting material (grafted trees) – in an amount of 20 thousand lei per one ha of field I area (bench grafting) or field II (bud grafting); for foundation, beginning with autumn 2006, of fruit growing plantations – in an amount of 10 thousand lei per ha of planted area with seed-bearing species and in an amount of 7.5 thousand lei for an area of one ha planted worth stone-fruits species.

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THE ECOLOGICAL FAVOURABILITY OF OLTENIA MICRO AREAS TO SUPLY THE COMPETITIVITY OF FRUITS GROWING PRODUCTS

FAVORABILITATEA ECOLOGICĂ A MICROZONELOR DIN OLTENIA, ÎN SPRIJINUL COMPETITIVITĂȚII PRODUSELOR POMICOLE

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Abstract. *To make an area and especially to make a micro area of the pomiculture represents complex concepts which define the favourability degree of an area for a structure of species and cultivars and which is reflected in the productivity, the fruit quality, adaptability and the ratability of the pomiculture plant.*

The activity of making areas of the pomiculture plants in our country is from ancient times. This aspect is evident in the South Carpathian area where were been sat almost all the pomiculture plants on largest areas.

The first attempts to make areas of the pomiculture were done by: Rădulescu D. (1922), Ştefănescu D. (1912, 1920, 1924), Georgian R. (1934), Botez M. (1938), Bordeianu T. (1943, 1944), Costetchi M. (1934), etc.

In 1950 showed up the first scientific and complex paper work regarding the process of making areas known as: "The pomiculture areas of Romania.", under the prestige of the professors Constantinescu N. , Bordeianu T., Sonea V. and Ioniță C, which has 11 pomiculture areas. After that Constantinescu N. and Teaci D., in 1955, enlarged the pomiculture areas at 13 areas. In conformity with this division of Oltenia was framed in the I – st. pomiculture region (the hills area) and 10 th region (plains area).

The Oltenia region includes an relative large area (over 25 thousands Km^2) and has different types of relief with exposition, altitudes differentiated soil types and which gave a ecological specify, for many existent micro areas. Here are cultivated over 15 % from the total of Romania fruit growing plants.

To evaluate the productivity potential of a micro area or its availability for the culture of the fruit growing plants was bas\ed on the paper works that we said to be the first in this domain and where we add the scientific works of De Groot (1998), Avermaete ş.a.(1998), Botu (1999), etc.

The final aim of this paper work is to put in value of these Oltenia micro areas which are capable to favourable evaluate some pomiculture plants cultivars although the food and economical values of these to determinate a real competition with the fruits from others countries.

MATERIAL AND METHODS

The biological material used in the work paper is formed of the cultivars studied in different places of this area; some of them were promoted in different ranges (Vâlcea, Gorj, Dolj, Olt, etc.).

The base fruit growing unit, which corresponds of one pomiculture micro area, with its specify elements was considered "The fruit growing basin".

The fruit growing basin (fruit growing micro area) is characterized with a special size (some places), disposed many of the time in hydrographical basin with specify relief, soil and clime conditions.

To characterize each micro area was used the method proposed by Mihai Botu (1999) and which included the following elements:

- the geographical factor (locating in the country, region);
- the orographic factor of the micro area;
- the climate factors (temperature, rain, air movements, climate accidents);
- the edaphic factor (the soil type, natural fertility, texture, pH, etc.);
- the biological factors (the species structure, cultivars and rootstocks);
- the historical tradition;
- the socio-economical factors of the micro area and of the region;
- the availability of land fund;
- the capital and available infrastructure;
- the professional factors and the insurance of the work;
- the distribution network and the delivery market;
- the quality of the product, the availability of the marketing;
- the government politics and of the region, etc.

On the base of this multiple parameters were define the fruit growing micro areas of Oltenia, with the specify characteristics and was outline a map with the position of those.

RESULTS AND DISCUSSIONS

The geographic region Oltenia was divided in 7 fruit growing basins, in fact fruit growing micro areas. In comparison with the old divisions in fruit growing regions (two), Oltenia includes areas comprised in established micro areas, and also areas which don't belong to the fruit growing micro areas.

The seven established micro areas are:

1. The fruit growing basin Rm Vâlcea (North Oltenia);
2. The fruit growing basin Horezu (North Oltenia);
3. The fruit growing basin Tg. Jiu- Câmpu Mare (North Oltenia);
4. The fruit growing basin Turnu Severin- Baia de Aramă (West Oltenia);
5. The fruit growing basin Drăgăşani- Bălceşti (Central Oltenia);
6. The fruit growing basin Craiova Hills (Central Oltenia);
7. The fruit growing basin Bistreț- Corabia (South Oltenia).

The geographic Oltenia was divided in 4 micro areas which belong to the SubCharpatian hills, two from the hills – central area and one from the plain area.

The micro – areas from the hills area include the biggest cultivated areas with fruit growing plants. The division of micro area has the scope to grow the

economical efficiency of the fruit growing cultures and to obtain good quality fruits.

It is not enough to ascertain that in Oltenia can be cultivated almost all fruit growing plants (trees and bushes), these have to be with economical efficiency and food value.

Those micro areas are specialised in plum and apple culture, but also present some specific culture elements. In Rm. Vâlcea basin are recommended for the future species like: walnut, chestnut and hazelnut, and in Horezu basin walnut, hazelnut and strawberry.

For Tg. Jiu – Campu Mare, walnut, chestnut and quince are cultivated and present view for the future. The fruit growing basin Tr. Severin – Baia de Aramă presents optimal conditions for walnut, hazelnut and cherry tree.

The fruit growing basins from the hills area allow some small and middle farms development (5-30 ha), rarely more because of the orografy of the land and because of the soils quality.

The advantage of these basins is that ensure a superior quality of the fruits, with the conditions of respecting the technology. The fruits present a high colour, high density of the pulp and a good taste.

The basins from the hills region of Oltenia (Drăgăşani – Bălceşti and Craiova Hills), are specialized on the apple and plum culture. The ecological culture from here favours other cultures as: peach, apricot, strawberry, cherry, walnut and hazelnut if the soil humidity is enough. With irrigation could be realised fruit growing farms of 10-15 ha.

A special situation it is found in Bistreț – Corabia Fruit Growing Basin.

This region is stretch along the Danube River and includes sandy soils of 55-60 % percentage.

That is a fruit growing micro area relatively new which offers conditions for peach and apricot cultures and also for others species.(cherry and plum).

The fruit growing cultures from this area needs irrigation and a strong fertility especially on the sand.

The advantage of these cultures consists in the fact that the fruit maturity of the same cultivar is produced with 5-12 days before of its homologue from other region of the country. This advantage permits the obtaining of high delivery prices in comparison with other fruits.

To divide the fruit growing micro areas of Oltenia impose the using of the ecological factors to establish some structures of species and especially of the assortment of cultivated cultivars.

At each fruit growing species were tried and evaluated many cultivars. The recommended cultivars for the micro area are optimal for the micro climate, realized big productions and very good quality fruits. Fruits obtained in these conditions are competitive on Romania markets or from the foreign countries and that way assure the necessary economical founds for a normal rural development.

Table 1.

The general characterisation of fruit growing micro areas of Oltenia

Fruit growing basin or micro area	Negative characteristics	Positive characteristics
- Rm. Vâlcea	- good choice of the areas with fruit growing destination; - good orography; - low productive cultivars without river meadow cultivars;	- are cultivate almost any species for temperate climate; - the intense colour of the fruit and high density of the pulp;
- Horezu	- good choice of the areas with fruit growing destination; - good orography; - heavy lands on the slope; - negative temperature at flowering;	- vocation for plum, apple, chestnut, cherry, strawberry; - the intense colour of the fruit and high density of the pulp;
- Tg. Jiu – Câmpu Mare	- not all the soils are properly for fruit growing; - wet soils, clay; - low winter temperature(-30^{0}C).	- are cultivate almost any species for temperate climate; - quality fruits at apple, plum, quince, chestnut;
- Tr. Severin – Baia de Aramă	-Very different soil conditions; - good orography;	- favourable area because of the Mediterranean climate; - the intense colour of the fruits;
- Drăgăşani – Bălceşti	- Lack of enough humidity of air and soil; - minimum temperature -30^{0}C.	- vocation for plum, apple, apricot, peach; - quality fruits at plum;
- Craiova Hills	- Lack of enough humidity of air and soil; - frequent minimum temperature of: -30 : -35^{0}C.	- are fruit growing apples, plums, pears, cherries, apricots, peaches; - quality fruits with irrigation conditions;
- Bistreţ - Corabia	- not enough humidity; - High temperatures in the summer; - Sandy soils low fertile;	- favourable for apricot, peach, cherry, plum; -the maturation of the fruits with 5-12 days earlier than in other Oltenia basins or in the country..

Table 2

Fruit growing basin or micro area	Important fruit growing centres	Important fruit growing species and cultivars and in perspective
- Rm. Vâlcea	Rm. Vâlcea, Călimaneşti, Dăesti, Bujoreni, Olăneşti, Păuşeşti-Măglaşi, Vlădeşti, Mihăeşti, Govora, Bunesţi, Galicea, Olanu, Milcoiu, Stoiceni, Frânceşti, Şirineasa.	Apple - Florina, Generos, Idared, Ionagold, Ionathan, Starkrimson, Goldenspur, Granny Smith, Liberty, etc. Plum - Stanley, Andreea, Anna Spath, Centenar, Agen 707, Tuleu gras. Walnut - Jupâneşti, Valrex, Valcor, Valmit, Hartley, Vina. Hazelnut - TGDL, Romavel, Valcea 22, etc.
- Horezu	Stoeneşti, Pietrari, Păuşeşti-Otăsău, Tomşani, Costeşti, Horezu, Vaideeni, Măldăreşti, Oteşani, Popeşti, Cernişoara, Roieşti, Grădiştea, etc.	Plum - Tuleu gras, Agen 707, Stanley, Anna Spath, , Carpatin, Andreea, etc. Apple - Florina, Generos, Ionagold, Jonathan, Golden delicious, Idared, etc. Strawberry - Premial, Coral, Gorella, Red Gauntlet, Senga Sengana,etc.
- Tg. Jiu – Câmpu Mare	Tismana, Câlnic, Perişani, Bârseşti, Câmpu Mare, Scoarţa, Bălăneşti, Novaci, Polovragi, Bengeşti, Baia de Fier, Prigonia, Tg Cărbunesţi, etc.	Apple - Florina, Generos, Golden delicious, Starkrimson, Idared, etc. Plum - Stanley, Centenar, Tuleu Gras, Anna Spath, Minerva, etc. Quince- Bereczki, Aromate, Aurii, De Constantinopol, etc.
- Tr. Severin - Baia de Aramă	Baia de Aramă, Cireşu, Ilovăţ, Podeni, Şovarna, Corcova, Strehaia, Tîmna, Greci, Rogova, Hinova, Căzăneşti, etc.	Apple - Florina, Generos, Ionagold,Starkrimson Golden Delicious, etc. Plum - Stanley, Tuleu Gras, Agen 707, Centenar, Anna Spath, etc. Sour cherry - Oblacinska, Nana, Mocăneşti, etc.
- Drăgăşani – Bălceşti	Drăgăşani, Câmpu Mare, Oteşti, Strejeşti, Ştefăneşti, Mădulari, Pesceana, Creţeni, Amărăşti, Măciuca, Fârtăţeşti, Tetoiu, Iancu Jianu, etc.	Apple - Golden delicios, Starkrimson, Ionagold, Florina, Idared, etc. Plum - Agen 707, Anna Spath, Tuleu gras, Stanley, etc. Apricot- Dacia, Mamaia, Sulina, Olimp, etc.;
- Craiova Hills	Banu Mărăcine, Motoci, Robăneşti, Terpeziţa, Breasta, Podari, Plenita, Vârtop, Radovan etc.	Apple - Golden delicious, Starkrimson, Florina, Generos, Ionathan, etc. Cherry -Germesdorf, Rivan, Van, Stella, Boambe de Cotnari, etc. Strawberry -Premial, Red Gaunthet, Coral, Gorella, etc.
- Bistreţ - Corabia	Bistreţ, Ghidici, Cârna, Tâmbureşti, Daneţi, Dolneşti, Sadova, Lişteava, Bechet, Amărăşti, Dăbuleni, Patelu, Călăraşi, Corabia, etc.	Peach - Springcrest, Springold, Crimsongold, Rommamer 2, Fantasia, Flacăra, Superbă de toamnă, etc. Apricot - Cea Mai Bună de Ungaria, Dacia, Mamaia, Sulina, Venus, Olimp, Litoral, etc.

CONCLUSIONS

- The Oltenia region assures many ecological conditions and for that it was divided in 7 fruit growing micro areas with specific characteristics Rm. Vâlcea, Horezu, Tg. Jiu – Câmpu Mare, Tr. Severin – Baia de Aramă, Drăgăşani – Bălceşti, Craiova Hills and Bistreț – Corabia);
- The fruit growing micro areas assure a developing of the pomiculture based on a special structure of species and of assortments of valorous cultivars;
- The fruit growing micro areas placed in high hills area are specific for apple, plum, walnut, cherry, sour cherry, quince, strawberry, etc., cultures and the micro areas situate in the hills area need irrigation to complete the deficit of water. In these micro areas are: apples, plums, cherries, sour cherries, apricots, etc.;
- The Bistreț – Corabia Basin is different from others because of the high temperatures, deficit of the rains, sandy soils. In this fruit growing basin apricot, cherry and plum find good, favorable culture conditions, in irrigation conditions;
- The fruit quality from the hill micro areas it is remarkable because of the high colour, high density of the pulp and a good taste. The fruit from Bistreț – Corabia Basin have an early maturation with 5-12 days before in other areas of the country.

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OVERVIEW OF THE RECENT STUDIES REGARDING IDENTIFICATION OF THE LESS SUSCEPTIBLE PLUM GENOTYPES TO PLUM POX VIRUS FIELD INFECTION

EVALUAREA FONDULUI DE GERMOPLASMĂ LA GENUL *PRUNUS* PRIVIND SUSCEPTIBILITATEA LA INFECȚIA NATURALĂ CU PLUM POX VIRUS

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Abstract. *In Romania, the main problem which occur in commercial plum orchards is endemic infection with Sharka, which is the most destructive viral disease, and even if does not kill plants seriously affects, in a wide range of symptoms, photosynthetic capacity of tree's foliage, causes high losses by considerably yield decreasing and fruit quality depreciation, outclass planting material making difficult to sell nursery stock. At RIFG, activities relating to germplasm maintenance and evaluation include for Prunus genus accessions of plum/prune and sweet/sour cherries. Evaluation of plum accessions is made by the descriptors used for Prunus genus, in ECP/GR GENRES Project 61 and is carried out to identify potential genitors with tolerance or resistance to infection with Plum Pox virus. So, despite of the very high infection pressure in field collection there are same varieties which did not present any distinguish specific symptoms of PPV (on the leaves or fruit) as Grase de Becs, Grase de Pesteana, Ciorasti de Mehedinti, Ciorasti de Prahova, Rosior de Densus, Negre de Bilcesti, Porumbele, Boambe de Leordeni, Negre de Toamna, Buburuze (old local varieties), Flora, Carpatin, Ialomita, Alina (new Romanian cultivars), Can, Wilhelmina Spath, Peche, Belle de Louvain, Kirke (foreign introduced varieties) and seven wild species. It is apparent that, by symptomatological evaluation, same local varieties are tolerant to PPV and, is a strong reason to believe that they include in their heredity a multigenic structure that can provide moderate levels of resistance or tolerance to a least some strains of Sharka.*

Rezumat. *In Romania, principala problema care apare in plantatiile comerciale de prun, cais si piersic este infectia endemica cu Sharka, care este cea mai distructiva boala virala si, chiar daca nu ucide pomul, afecteaza serios, printr-o gama larga de simptoame, capacitatea fotosintetica a foliajului, provoaca scaderea considerabila a productiei, depreciaza calitatea fructelor, declaseaza materialul saditor obtinut in pepiniere, etc. Activitatile legate de mentinerea si evaluarea fondului de germoplasma include pentru genul Prunus accesii din speciile prun, cires si visin. Evaluarea genotipurilor de prun se face utilizand metodologia ECP/GR GENRES Proiect 61 si are in vedere identificarea de potentiali genitori cu toleranta sau rezistenta la infectia cu PPV. In ciuda unei foarte mari presiuni a infectiei naturale, in colectie au fost identificate genotipuri care nu au etalat simptoame specifice de PPV pe frunza sau fruct cum ar fi Grase de Becs, Grase de Pesteana, Ciorasti de Mehedinti, Ciorasti de Prahova, Rosior de Densus, Negre de Bilcesti, Porumbele, Boambe de Leordeni, Negre de Toamna, Buburuze (vechi soiuri locale), Flora, Carpatin, Ialomita, Alina (noi soiuri autohtone), Can, Wilhelmina Spath, Peche, Belle de Louvain, Kirke (soiuri straine) si sapte specii salbatice. Se pare ca, dupa o evaluare simptomatica unele soiuri locale sunt tolerante la Sharka si, sunt motive sa credem ca ele include in ereditate structuri multigenice care induc un nivel, cel putin mediu, de rezistenta sau toleranta la unele forme de PPV.*

In Romania, by use, orchards cover 221 100 ha (1, 5% from total agricultural area) and produce in average 1 585 400 t of fruits from which 557 460 t are plums. (Romanian Statistical Yearbook, 2000-2005).

According to the available data, in 2004, Arges district (one of the 42 Romanian territorial administrative units), situated in South (Muntenia Region), as one of the main fruit and especially plum producing area, have had 97 882 t total fruit production from which 41 399 t where plums (70% of total orchard's area), that means 42,3% from total fruit production of the district and 8,7% from total Romanian plum production of the year. In fact, Arges district and other three from the same area, situated in close left-right-below vicinity, on the small surface (8,7% of total country's agricultural area) provide 20,4% of all Romanian fruit production and by extensive plum growing 26,7% of Romanian plum production.

The main problem which occur in commercial plum, apricot and peach orchards is endemic infection with Sharka, which is the most destructive viral disease, and even if does not kill plants seriously affects, in a wide range of symptoms, photosynthetic capacity of tree's foliage, causes high losses by considerably yield decreasing and fruit quality depreciation, outclass planting material making difficult to sell nursery stock.

Yield of sensitive varieties, which externalize disease's symptoms on fruit, lose commercial value for fresh market. Affected blemished, misshapen, distorted fruit with sunken lesions, if don't drop prematurely and rich harvest maturity, have poor flavor, lowered size, sugar content and anthocyanin level and can be sold, at low price, only to distilleries for brandy processing. Economically speaking, this highly damaging phatogen makes plum harder to grow with an acceptable profit. Only in Arges district 4 860 ha of plum orchards were abandoned in the last 15 years.

In Romanian natural environment, disease is everywhere present on wild host plants (trees, bushes, common weeds). So, keeping under control is very difficult by usual cultural methods as well eradication is impossible.

Studies regarding commercial cultivar's susceptibility to Plum Pox show that in the natural environmental conditions with high level of field infection pressure, disease spreads up to 36,6%, in orchards planted with healthy material, in the first 10-12 years after establishing, by aphid vectors from infected nearby trees and weeds.(Minoiu,2001).

Research Institute for Fruit Growing (RIFG), located in Arges district, lead all research activities in Romania concerning genetic resources and breeding, fruit growing technologies and propagation of planting material.

Collection, preservation, evaluation, study and germplasm use is an important concern of scientists working in the plant breeding.

Action is necessary to avoid the genetic erosion, maintain diversity and guarantee free availability to the genetic resources which can be utilized by current and advancing breeding methods to obtain new, more productive, of high fruit quality, better adapted to biotic and environmental abiotic stresses, varieties.

MATERIALS AND METHODS

At RIFG, activities relating to germplasm maintenance and evaluation include for *Prunus* genus accessions of plum/prune and sweet/sour cherries.

The national plum collection consist of 566 genotypes including 9 wild species, 183 cultivars and landraces of Romanian origin, 318 foreign items and 56 promising hybrids.

In collection, accessions are arranged to illustrate the historical evolution of plum genotypes: wild species, local varieties, foreign varieties and promising hybrids.

Inside each group, the genotypes are arranged taking in to account the ripening time. Each genotype is represented by three trees, grafted on *Prunus cerasifera* and planted at 4m x 4m. Evaluation of plum accessions is made by the descriptors used for *Prunus* genus, in ECP/GR GENRES Project 61.

In addition of collecting, preserving and studying of plum genetic resources activities, other important objective is breeding, by controlled hybridization, and releasing of new cultivars.

For this reason, studies of plum collected genotypes are carried out not only to identify potential genitors for tolerance or resistance to infection with Plum Pox virus, which is considered to be one of the most important diseases limiting Romanian plum production but, also, for other treats like productivity, high quality, low vigor, precocity.

RESULTS AND DISCUSSIONS

In Romania, PPV study has a long history, from over 40 years, being intensify in the last decades, as a response for increasing spreading and disease aggressiveness in commercial orchards.

Recoded data, collected in the last 10 years, regarding infection level with PPV on the leaves allow possibility to make a distribution of the investigated genotypes according to this treat showing cultivar's overmuch susceptibility to the disease and high pressure of the natural field infection in the experimental plot (Table 1).

Table 1

Genotypes distribution according to the % of affected leaves by PPV natural field infection at Research Institute for Fruit Growing, Pitesti-Maracineni

G.T	Total genotypes	Species		Autohtone cultivars		Foreign cultivars		Hybrids	
		Nr.	%	Nr.	%	Nr.	%	Nr.	%
1	142	8	5,63	65	45,77	59	41,55	10	7,05
2	95	1	1,05	31	32,64	54	56,84	9	9,47
3	47	-	-	18	38,30	22	46,81	7	14,89
4	46	-	-	11	23,91	26	56,52	9	19,57
5	78	-	-	20	25,64	51	65,39	7	8,97
6	64	-	-	18	28,12	38	59,38	8	12,5
7	22	-	-	5	22,73	15	68,18	2	9,09
8	32	-	-	5	15,63	26	81,25	1	3,12
9	40	-	-	10	25,00	27	67,50	3	7,50

Observations and determinations made over the years lead to optimistic approach to potential useful donors, with quantitative and eventual qualitative resistance, which can induce, at least, high tolerance to Plum Pox virus infection and, by this way, to control this devastating disease in the longer term.

So, despite of the very high infection pressure in field collection there are same varieties which did not present any distinguish specific symptoms of PPV (on the leaves or fruit) as Grase de Becs, Grase de Pesteana, Ciorasti de Mehedinti, Ciorasti de Prahova, Rosior de Densus, Negre de Bilcesti, Porumbele, Boambe de Leordeni, Negre de Toamna, Buburuze (old local varieties), Flora, Carpatin, Ialomita, Alina (new Romanian cultivars), Can, Wilhelmina Spath, Peche, Belle de Louvain, Kirke (foreign introduced varieties) and seven wild species.(Table 2)

Table 2

The less susceptible cultivars to the natural field PPv infection on leaf and fruit at Research Institute for Fruit Growing, Piteşti – Mărăcineni

No.	Genotype	Susceptibility to PPV infection*	
		Leaf	Fruit
1	Grase de Becs	1	1
2	Grase de Peşteana	1	1
3	Ciorăşti de Mehedinți	1	1
4	Ciorăşti de Prahova	1	1
5	Roşior de Densus	1	1
6	Negre de Bilcesti	1	1
7	Porumbele	1	1
8	Boambe de Leordeni	1	1
9	Negre de toamna	2	1
10	Buburuze	1	1
11	Flora	1	1
12	Carpatin	1	1
13	Ialomița	1	1
14	Alina	1	1
15	Vinete romanesti	8	7
16	Tuleu gras	6	4
17	Can	1	1
18	Wilhelmina Spath	1	1
19	Peche	1	1
20	Belle de Louvain	2	1
21	Kirke	1	1
22	Agen	7	5
23	Anna Spath	5	2
24	Stanley	4	2

* 1= no symptoms; 2= very low susceptibility; 3=low; 5=intermediate; 7=high; 8=very high susceptibility

It is apparent that, by symptomatological evaluation, same local varieties are tolerant to PPV and is a strongly reason to believe that they include in their hereditary multigenic structure that can provide moderate levels of resistance or tolerance to a least some strains of Sharka. Anyway, it seems there is no source of immunity to PPV that will protect trees against all reported strains of the virus.

Collecting data regarding the biological and agronomic traits of the preserved accessions and the current updating generated by losses or by new acquisitions is a continuous concern. Also finding and using of most promising parents in cross combinations, in order to increase efficiency of the traditional, conventional breeding approaches, is a permanently challenge.

Less susceptible genotypes to PPV infection can be used in plum breeding programs to improve tolerance to disease of commercial cultivars.

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THE INTERACTION OF GENOTYPE AND ENVIRONMENTAL FACTORS FOR ALMOND SPECIES CULTIVATED ON SANDS IN OLTENIA REGION

INTERACȚIUNEA GENOTIP FACTORI DE MEDIU LA SPECIA MIGDAL CULTIVATĂ PE NISIPURI IN REGIUNEA OLTENIA

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Abstract. *The specific climate conditions for the sandy soils in the South Oltenia are favorable for almond cultivation. For the experiment the zoning of the varieties is as important as the zoning of the rootstocks. These constituents variety x rootstock, becomes an independent entity with mutual influence in the growth and fructification of the tree. The Preanîi, Primorski, Sudak, Tohani 3/7, Nikitski with late blossom varieties have late blossom and present a superior quality of the fruit, expressed in the content of seeds core and fats. Some varieties have a good rezistance in the repose period and even at the reversion temperature, such as: Nikitski with late blossom, Preanîi, Primorski, Sudak, Greats of steppa.*

Rezumat. *Condițiile climatice specifice zonei nisipurilor din sudul Olteniei sunt prielnice culturii speciei migdal. În cadrul unei experiențe zonarea soiurilor este la fel de importantă ca şi zonarea portaltoilor. Aceste părți componente soi x portaltoi, se constituie ca un tot unitar de sine stătător cu influențe reciproce în creşterea şi fructificarea pomului. Soiurile Preanîi, Primorski, Sudak, Tohani 3/7, Nikitski cu înflorire târzie, prezintă o calitate a fructelor superioară, exprimată prin conținutul de miez şi grăsimi. Rezistență bună în perioada de repaus şi chiar la temperaturile de revenire o au soiurile: Nikitski cu înflorire târzie, Preanîi, Primorski, Sudak, Mari de stepă.*

INTRODUCTION

Owing to its specific characteristics such as: a low content in fertile elements and reduced cohesion, this type of soil (sands) demands the cultivation of a proper assortment of almond varieties and, at the same time, demands the application of agrotechnics for the varieties, according to their biological particularities.

For this purpose we have been proposed the study of 10 varieties, from among we would remark the most precocious, most productive and with the best rezistance of frost, disease and pest.

MATERIALS AND METHODS

The experiment was placed in Tâmbureşti area, where it is located the most important sandy soils areas in the South Oltenia. In this zone the sand hills are rounded and in some areas, the surface is lightly unevenly.

With a view to establishing the agrobiological characteristics of the varieties cultivated on sands, which leads to specification of the proper assortment for this area, we establish the following objectives:

- To examine the growth process of the varieties;
- To examine the fructification process of the varieties;
- To examine the frost rezistance of the studied varieties;
- To examine the precocity and productivity of the varieties;
- To examine the rezistance of diseases and specific pests for the varieties.
- Respectively the architectonics and the maximum zone of horizontal spreading for roots.

The studied almond varieties on sands were as follows: Nikitski with late blossom, Nikitski 62, Preanîi, Primorski, Sudak, De Ialta, Tohani 3/7, Ardechoisse, Greats of steppa and Y x L grafted on Frank peach tree.

RESULTS AND DISCUSSIONS

The start in vegetation, marked by the blowing out of the gemmas, takes place in the first decade or in the third decade of March, depending on the climate conditions. Among the studied varieties, some have an early start: Greats of steppa, Ardechoisse (4-24.03.).

On the same conditions, De Ialta, Primorski, Nikitski with late blossom varieties achieve a late start in vegetation, with 4-5 days delay, in comparison with the first varieties.

Depending on the same factor, temperature, at 22-28 days take place the start of intensive growth of the offsprings, firstly for the Ardechoisse, Greats of steppa varieties.

As regards the sum of vegetation growth, in the 7^{th} year from planting it was recorded an average of 130.8 metres per tree. It is to be remarked that the Sudak, Nikitski with late blossom, Tohani 3/7 varieties have significant growth in all of the experimental years.

An important growth in height it was realized by the Sudak, Tohani 3/7 varieties: in the 7^{th} year they exceeded 3 metres in height.

A lower height have Nikitski 62, De Ialta varieties (2.4 and 2.36 metres per tree).

The Greats of steppa, YxL, Sudak varieties have a compact top crown (2.25 – 2.60 metres per tree), so these varieties permit a shorter planting distance.

A great efficiency in thickness growth it was noticed at Sudak, Nikitski with late blossom, Nikitski 62 (98.0; 94.0; 92.0 mm per tree).

The start of blossom is in between 22.03. – 12.04.; this phenological phase opens with Greats of steppa variety.

De Ialta, Primorski, Nikitski with late blossom varieties produce a late blossom, following the first ones with 4-6 days delay.

The fruit ripening takes place generally in the third decade of August, but mainly in September. It is to be noticed: Ardechoisse, Preanîi varieties (24 – 28.06.; 6 – 12.09.)

A good rezistance of Corineum beyjerinki have: Ardechoisse, YxL, Tohani 3/7, Primorski, Sudak varieties.

At the reverse temperature of -1.3^{o}C, in April, it was noticed a very good rezistance from the varieties with late blossom (Greats of steppa, De Ialta).

The fact that, in the 7th year from planting, it was obtained an average yield of 7.8 Kg per tree in endocarp, proves the favourability of this area for the culture of the almond tree.

Significant values, over 3000 – 4000 Kg per ha of fruit in endocarp, produce the Nikitski late in blossom, Primorski, Sudak, Tohani 3/7 varieties.

An important weight rating it was emphasized to Greats of steppa and Nikitski with late blossom varieties (7.9; 6.8).

The content of core seeds varying in between 20.5% – 51.5%; the Preanîi, Primorski, Ardechoisse varieties, followed by Nikitski have an important percentage of core seeds.

On the depth of 40 -60 cm, the soil is penetrated only of 2.1% of the total number of roots for the Sudak variety and of 21.0% of the total number of roots for the De Ialta variety.

Further on, at the depth of 60 -70 cm and beyond, it does not find any root (figures 1-2 and 3).

Fig. 1 , 2 and 3

Analysing all these aspects of the matter, it results the different characteristics of growing and fructification for several almond tree varieties, on sands, and the necessity of applying differentiated agrotechnics.

CONCLUSIONS

1. The specific climate conditions for the sands in South Oltenia (Romania) are proper for the cultivation of almond tree species.

2. Some varieties develop a good rezistance during the repose period and even at the reversion temperature: Nikitski with late blossom, Preanîi, Primorski, Sudak, Greats of steppa.

3. The degree of root penetration depends also on the grains of sand mobility.

4. The following varieties could be remarked for the expansion in this area: Preanîi, Primorski, Sudak, Nikitski with late blossom, Nikitski 62, Tohani 3/7, Greats of steppa.

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DIFFERENTIATION STAGE AS PART OF "IN VITRO" MULTIPLICATION FOR QUINCE

FAZA DE DIFERENȚIERE ÎN CADRUL PROCESULUI DE ÎNMULȚIRE „IN VITRO" A GUTUIULUI

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Abstract. *A regeneration protocol was developed for three quince (Cydonia oblonga Mill.) cultivars: „Moldoveneşti", „Aurii", „Aromate"and two rootstocks: „Tip A" and „BN 70". For initiating the culture the terminal and lateral meristems were used (meristematic dom surrounded by two to three leaf initials); they were prelevated and putted on the medium in vegetative pause. The tested mediums are: Murashige-Skoog, Lepoivre, Fossard and Woody Plant Medium. For quince cultivars the highest results were obtained on MS medium (77,77%) supplemented with 0,1 mg/L BAP and ml/L AG_3; for the "BN 70" and „Tip A" rootstocks the most favourable differentiation medium was Fossard (58,33 %).*

Rezumat. *Pentru stabilirea protocolului de regenerare „in vitro" a gutuiului (Cydonia oblonga Mill.) au fost luate în studiu trei soiuri: „Moldoveneşti", „Aurii" si „Aromate" şi doi portaltoi: „Tip A" şi „BN 70". Pentru inițierea culturii s-au folosit meristeme terminale şi axilare, prelevate şi pasate pe mediu în perioada de repaus vegetativ. Mediile testate sunt reprezentate de: Murashige-Skoog, Lepoivre, Fossard şi Woody Plant Medium. Pentru soiurile de gutui cele mai bune rezultate s-au obținut pe mediul MS (77,77 %) suplimentat cu 0,1 ml/L IBA şi 1 ml/L AG_3 ; pentru portaltoii "BN 70" şi „Tip A" cel mai favorabil mediu de diferențiere a fost reprezentat de Fossard (58,33 %).*

MATERIALS AND METHODS

The quince and pear planting material production didn't satisfy the cultivator's expectations, neither before or after 1989.

The necessity to modernize the planting material production technologies of the two species, at present requests level, is determined by many other considerations such as:

- increasing the tree's density in field-grown trees and transition to intensive system culture, in which the selections of new rootstocks (vegetative), creation and introduction of new cultivars, the modernization of tree's conduct and carving allow to catch a sight of a new **„**era**"** in the two species culture, of course, this being conditioned by the rapid providing of more and more quantity of planting material.

- contributions to fast replacement of uneconomical sorts from the old field-grown trees and introduction of new middle-little vigour pear's cultivar, with fast fruit - bearing, that have compatibility with quince and tolerance to fire blight.

According to the national and international researches carried out until recently with regard to branches and meristems prelevation epoch which lead to conclusion that the optimum period is vegetative pause, we initiated the experiment between 11-25 November 2005.

The branches sterilization was achieved by immersing them in ethylic alcohol for 10 min, succeeded by their maintenance in Ca hypochlorite (6%) for 20 minutes.

The biological material was then rinsed for three times in bidistileted water and kept into the last water until the prelevation. For initiating the culture the terminal and lateral meristems were used (meristematic dom surrounded by two to three leaf initials); they are able to generate little plants in vitro.

After inoculation the explants were passed into the growing chamber at 24^0 C and a photoperiod of 16 h illumination and 8 h obscurity.

RESULTS AND DISCUSSIONS

The results on this paper include the phases of initiation and differentiation.

The starting phase of experiment: because the based mediums (Murashige-Skoog , Fossard , Lepoivre , Woody Plant Medium) contain only macro, microelements and vitamins, there were aded dextrose = 40 g/L; agar = 10 g/L; IBA = 0,1 ml/L; AG_3 = 1 ml/L; Na Fe EDTA = 3,2 ml/L. pH medium was between 5,5-5,7.

For this phase we made the following study: the influence of culture medium on explants differentiation. The experiment was initiated between 11-25 November 2005, with all five quince and rootstock cultivars.

The best results in differentiation stage (table 1) are obtained by „Moldovenești" cultivar (100% on MS, F, WPM mediums and 83,3% on L medium). It is the only one wich differentiated on WPM medium. The smallest results were obtained by "Aromate": 33,3% differentiation on MS and L mediums and zero explant on F and WPM mediums.

As for the rootstocks the best results are obtained by "Tip A". At the end of the stage all explants put on WPM medium were necrosed.

Less than 10 % contamination was observed and the buds on the Lepoivre medium were developed callus, more than the others. The influence of WPM medium was revealed by the inhibition callus forming (0 %).

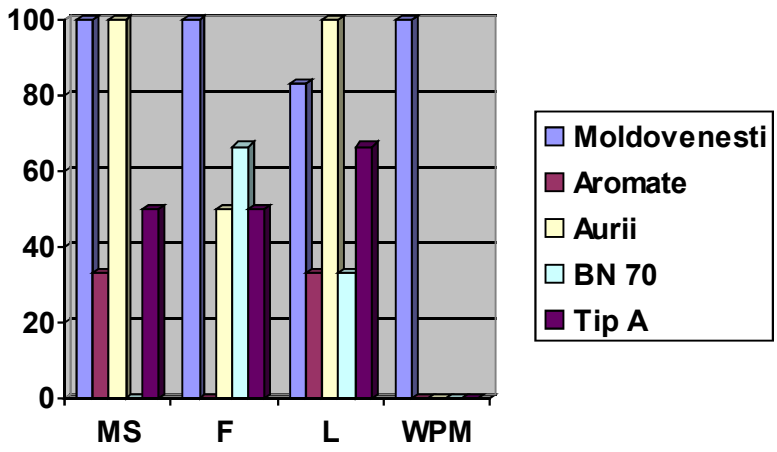

Fig. 1 Influence of culture medium on explants differentiation

Table 1

Influence of culture medium on explants differentiation

Cultivar	Tested mediums							
	MS		F		L		WPM	
	Differentiation rate*	%	Differentiation rate*	%	Differentiation rate*	%	Differentiation rate*	%
MOLDOVENESTI	6/6	100	6/6	100	5/6	83,3	6/6	100
AROMATE	2/6	33,3	0/6	0	2/6	33,3	0/6	0
AURII	6/6	100	3/6	50	6/6	100,0	0/6	0
BN 70	0/6	0	4/6	66,6	2/6	33,3	0/6	0
TIP A	3/6	50,0	3/6	50,0	4/6	66,6	0/6	0
Total	17/30	56,6	16/30	53,3	19/30	63,3	6/30	20,0

* At numerator – number of explants differentiated in rosette or bud
At denominator – number of explants put on the mediums.

CONCLUSIONS

For all quince cultivars the highest results were obtained on MS medium (77,77%) supplemented with 0,1 mg/L BAP and ml/L AG_3, followed by Lepoivre (72,20 %), Fossard (50 %) and WPM (33,33 %). For the "BN 70" and „Tip A" rootstocks the most favourable differentiation medium was Fossard (58,33 %); it was followed by Lepoivre (50 %), MS (25 %), WPM (0%).

The prelevation period and the initiation of the experiment are the most important stages because all experiment depends on the success of these phases. Function on these data, other values of the differentiation and multiplication rate on different mediums are obtained.

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THE INFLUENCE OF CULTURE'S MEDIUM ON QUINCE EXPLANTS CALLUS

INFLUENȚA MEDIULUI DE CULTURĂ ASUPRA CALUSĂRII EXPLANTELOR DE GUTUI

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Abstract. *To study the influence of culture mediums on quince (Cydonia oblonga Mill.) explants callus (taken from the cultivars: : „Moldoveneşti", „Aurii", „Aromate" and the rootstocks: „Tip A" and „BN 70") were tested four mediums: Murashige-Skoog , Fossard , Lepoivre , Woody Plant Medium; there were aded: dextrose (40 g/l), agar (10 g/L), IBA (0,1 ml/L), AG_3 (1 ml/L), Na Fe EDTA (3,2 ml/L). For quince, the favourable medium to develop the callus Lepoivre (23,3 %). The influence of Woody Plant Medium was revealed by the inhibition callus forming (0 %). The rootstock „BN 70" wasn't form callus on all the mediums.*

Rezunat. *Pentru a studia influența mediilor de cultură asupra calusării explantelor de gutui (Cydonia oblonga Mill.) din soiurile: „Moldoveneşti", „Aurii" si „Aromate" şi portaltoii: „Tip A" şi „BN 70" au fost testate patru medii: Murashige-Skoog , Fossard , Lepoivre , Woody Plant Medium cărora li s-au adiționat: dextroză (40 g/l), agar (10 g/L), IBA (0,1 ml/L), AG_3 (1 ml/L), Na Fe EDTA (3,2 ml/L). Pentru gutui mediul favorabil formării calusului este Lepoivre (23,3 %). Influența mediului Woody Plant Medium s-a manifestat prin inhibarea formării de calus (0 %). Portaltoiul „BN 70" nu a calusat pe niciunul dintre medii.*

MATERIALS AND METHODS

The quince and pear planting material production didn't satisfy the cultivator's expectations, neither before or after 1989.

The necessity to modernize the planting material production technologies of the two species, at present requests level, is determined by many other considerations such as:

- increasing the tree's density in field-grown trees and transition to intensive system culture, in which the selections of new rootstocks (vegetative), creation and introduction of new cultivars, the modernization of tree's conduct and carving allow to catch a sight of a new **„**era**"** in the two species culture, of course, this being conditioned by the rapid providing of more and more quantity of planting material.
- contributions to fast replacement of uneconomical sorts from the old field-grown trees and introduction of new middle-little vigour pear's cultivar, with fast fruit - bearing, that have compatibility with quince and tolerance to fire blight.

According to the national and international researches carried out until recently with regard to branches and meristems prelevation epoch which lead to conclusion that the optimum period is vegetative pause, we initiated the experiment between 11-25 November 2005.

The branches sterilization was achieved by immersing them in ethylic alcohol for 10 min, succeeded by their maintenance in Ca hypochlorite (6%) for 20 minutes.

The biological material was then rinsed for three times in bidistileted water and kept into the last water until the prelevation. For initiating the culture the terminal and lateral meristems were used (meristematic dom surrounded by two to three leaf initials); they are able to generate little plants in vitro.

After inoculation the explants were passed into the growing chamber at 24^0 C and a photoperiod of 16 h illumination and 8 h obscurity.

RESULTS AND DISCUSSIONS

The results on this paper include the phases of initiation and differentiation. The starting phase of experiment: because the based mediums (Murashige-Skoog , Fossard , Lepoivre , Woody Plant Medium) contain only macro, microelements and vitamins (table 1), there were aded dextrose = 40 g/L; agar = 10 g/L; IBA = 0,1 ml/L; AG_3 = 1 ml/L; Na Fe EDTA = 3,2 ml/L. pH medium was between 5,5-5,7.

Table 1

Culture mediums

	Murashige&Skoog (1962) mg/l	**Lepoivre (1977) mg/l**	**Fossard (1977) mg/l**	**Woody Plant Medium (1981) mg/l**
NH_4NO_3	1650	400	800	400
KNO_3	1900	1800	1011	-
$CaCl_2*2H_2O$	440	-	330	96
$MgSO_4*7H_2O$	370	360	370	370
KH_2PO_4	170	270	-	170
K_2SO_4	-	-	-	990
$Ca(NO_3)_2*4H_2O$	-	1200	-	556
NaH_2PO_4	-	-	138	-
$FeSO_4*7H_2O$	27,9	-	10,7	-
$MnSO_4*4H_2O$	22,3	0,75	8,45	22,3
$ZnSO_4*7H_2O$	8,6	8,6	5,75	8,6
H_3BO_3	6,2	12,0	3,09	6,2
$CuSO_4*5H_2O$	0,025	0,025	0,024	0,25
$Na_2MoO_4*2H_20$	0,25	0,25	0,024	0,25
$CoCl_2 \cdot 6H_2O$	0,025	0,025	0,118	-
KI	0,83	0,08	0,415	-
Na_2EDTA	-	-	18,61	-

Na_2SO_4	-	-	144,99	-
Vitamins				
Inozitol	100	100	54,048	100
Tiamin HCl	0,1	0,4	0,674	1,0
Ac.nicotinic	0,5	-	2,462	0,5
PiridoxinHCl	0,5	-	0,616	0,5
Glicin	2,0	-	-	2,0
Colin	-	-	0,104	-
Biotin	-	-	0,048	-
Ca pantetonat	-	-	0,476	-
Riboflavin	-	-	0,376	-
Ac. ascorbic	-	-	0,176	-

For this phase we made the following study: the influence of culture medium on callus forming. We initiated the experiment wishing to have clean and without callus explants, knowing that the explants obtained via calus are genetical modified. The experiment was initiated between 11-25 November 2005, with all five quince and rootstock cultivars.

Table 2

Influence of culture mediums on quince explants callus

Cultivar	MS (callus/ total expl.)	F (callus/ total expl.)	L (callus/ total expl.)	WPM (callus/ total expl.)
MOLDO VENESTI	0/6	1/6	1/6	0/6
AROMA TE	0/6	0/6	2/6	0/6
AURII	0/6	0/6	3/6	0/6
BN 70	0/6	0/6	0/6	0/6
TIP A	0/6	0/6	1/6	0/6
Total	0/30	1/30	7/30	0/30
Total (%)	0	3,3	23,3	0

* At numerator – number of explants with callus
At denominator – number of explants put on the mediums.

From the table 2 results that the most favourable medium to form callus is Lepoivre (23,3 %). The „Aurii" cultivar was developed callus in percentage of 12,5 as for the rootstocks „BN 70" didn't form callus on all the mediums.

The influence of MS and WPM mediums was revealed by the inhibition callus forming (0 %).

CONCLUSIONS

Into conclusion we can affirm that the medium which develops callus for quince cultivars and rootstocks is represented by Lepoivre.

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ASPECTS CONCERNING THE WORLDWIDE APPLE MARKET FOR THE INTERNATIONAL CONGRESS INTERPOMA 2006

ASPECTE PRIVIND PIAȚA MONDIALĂ A MERELOR ÎN CADRUL CONGRESULUI INTERNAȚIONAL INTERPOMA 2006

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Abstract. *The complexity of problems which the apple industry faces internationally is one of the main worries of specialists in this sector. In the last decade, solutions for dealing with these problems have been looked up.*

Growers, packers and resellers apply different marketing strategies to survive in the new market conditions and to obtain profit.

During the Interpoma International Congress 2006, several strategies have been presented for resolving the main problems of the apple industry, in the EU during 1996-2006.

This study tries to resume the data's concerning production, consumption and apple prices in Romania and other countries.

Key words: apple industry, marketing strategy, producers, consumers, common market, profit.

Rezumat. *Complexitatea problemelor cu care se confruntă industria merelor la nivel mondial constituie una din preocupările majore pentru specialiştii din domeniu. În ultimul deceniu s-a încercat găsirea unor soluții obiective pentru rezolvarea acestor probleme.*

Cultivatorii şi firmele care se ocupă cu ambalarea şi comercializarea merelor au aplicat diferite strategii de marketing pentru a supraviețui în noile condiții de piață şi penru a obține profit.

În cadrul Congresului Internațional INTERPOMA 2006 sunt prezentate strategii şi propuneri de abordări pentru problemele specifice industriei merelor şi este analizată situația consumului de mere în Uniunea Europeană pe perioada 1999-2006.

În această lucrare autorii prezintă o sinteză a datelor privind producția, consumul şi prețurile de valorificare a merelor în România şi Uniunea Europeană.

Cuvinte cheie: industria merelor, strategie de marketing, producători, consumatori, piață, profit.

For the last decade, apple industry has confronted major difficulties all over the world. Production has surpassed consumption, competition with other fruits got higher, and demands became more and more qualitative, the selling price lowered.

Therefore, surviving for growers and processors on the market became very difficult. Many of them have given up because of their incapacity of becoming competitive and obliging with the common market's rules.

Firms that still operate in the common market have applied different marketing strategies, trying to limit losses and becoming profitable again (O'Rourke, 2006).

One of the strategies applied was to resize the production capacity, by setting up new orchards and growing the storage places and processing centers. New cultivars were being used, with a high capacity of production, in super intensive systems of planting and with specific shapes of crown. All these led to obtaining very high yields and diminishing the production cost per unity.

This situation was not beneficial, as the price of fruits diminished faster than the costs for production. Therefore, the producers were unable to get their money back in due time.

O'Rourke, 2006 considers that this strategy auto-destructive and very harmful for the industry, concerning the fact that the orchards of those who drop pot of the business are taken over by others who use the exact same marketing strategy.

In this frame, a new approach has been set up: negotiation between competitive producers. Originating from areas with a tradition in apple growing the producers formed different alliances for facilitating surpassing financial difficulties.

These alliances can be simple, at regional level, but they can also become incredibly complex, such as inter-regional and international associations.

The main condition for them to function is that each producer signs over control of the brands and self image for the wellbeing of the group and accepts major attitude changes regarding the members of the group. The individual producer must pay a membership fee and relinquishes control over some activities, but, in return, they have access to information, counseling and different other services. Of course, such alliances can be very easily terminated due to disagreements.

Still, these kinds of alliances don't imply major changes for the offered products.

Therefore, a new approach has been made: the introduction of a new element (new apple sorts, or changing the images, through promotions, of those already existent) and then, promoting and valorizing products at much higher prices, on international markets. This is also possible due to obtaining of a unique geographical identity (AOC) through which the apple sort is recognized internationally.

For example, the Limousine region in France has an AOC status for the Golden Delicious apple sorts. The Melinda society in Italy owns an AOC status for Golden Delicious, Red Delicious and Reinette sorts. The Terentino Region owns a PGI for the Sudtirol apple sort and the Naples denomination for the Annurca Variety.

The brands impact on the common market keeps drooping as more and more products succeed to gain this status each year and they stop bringing important economical contributions.

A variant of this strategy means radical changing in the production system. Firms associate themselves in marketing clubs that deal with promoting a new product on the market. The initiator of the club decides which cultivar will be introduced in the system and be promoted, how many hectares will be planted with that apple sort and what quantity production will be sold and to whom (O'Rourke, 2006).

The impact the new apple sorts have on the market and the price for which they are sold compensates the investment made for promoting them. The problem is the impossibility of pre-seeing the customer's reaction in the moment the stocks will grow. One must also take into consideration the misunderstandings that can appear inside the club and the necessary effort for an efficient administering of the production, distribution and apple commerce.

Some producers consider that the problems they face can be solved through negotiation and collaboration. Those are the adepts of the marketing strategies generically known as "Bono" (O'Rourke, 2006).

Through this strategy, one can obtain external financing, which will be used to promote apple consumption, by showing the benefits of these fruits to health.

The apples have a tonic effect on the organism; it helps eliminating uric acids, and reduces the cholesterol and the absorption of toxins. It is recommended within obesity, for diabetics, children and for the elderly (Gradinariu G., 2002).

The challenge is: trying to change the usual consumption habits of the population, and to obtain financing where others have failed. It is also hard to assume, that competitive firms on the market will be able to work together as a team.

No matter how well promoted the apple sorts on the market are, if they don't satisfy the consumers' demands, everything is useless (O'Rourke, 2006).

Finally, the marketing programs orientated to production and their diversifications are not enough for solving the hard matters apples industry deals with. There is a high discrepancy between the offered products and the need for change of the consumers.

Desmond O'Rourke upholds a new theory to be tested. It is highly complex and acquires the latest marketing knowledge. The main idea is to understand the consumer, and the factors that influence him on fruit consumption.

We must take notice of the influence of the consumer's traditions, the changes caused by growth of income, and the attraction of new and exotic fruits.

Building a successful business, where the three ingredients (production, packaging and reselling) can easily mix, is extremely difficult and needs extraordinary managerial qualities.

For combining research with marketing programs designated for producers, will be necessary much more sophisticated industry organizations at a regional, national and international level, organizations that can define the consumer's desires. However, once the consumer's preferences are discovered through the research program, the responsibility of

fulfilling it becomes that of individual producers, packaging firms and distributors, by investing in apple sorts, systems and operations that would satisfy the demand.

Major changes in the attitude towards the buyer and competition will be necessary at firm and industry level. Otherwise, the profitability will be unsure.

The study "Tendencies in apple sorts consumption", PhD Wilhelm Ellinger presents some aspects concerning the situation of apple consumption in the European Union.

There has been taken into debate the accuracy of statistical data's regarding apple production and consumption and the selling prices compared with the real situation on the market.

Factors that influence the exactness of the data:

A. the accuracy of production price: it varies a lot from one producer to another, according to the destination of the harvest, quality of the fruits, brand, and region;

B. the correctness of export statistics: there are a lot of uncertainties between statistics of apple importing in the EU and statistics of exporting countries. Some small differences can be explained by merchandise transit and losses that appear anyway, but there are times when the differences are extremely high. For example, one can notice the difference between the Poland's apple exporting data's in other countries and the EU import statistics.

Table 1.

Differences between Poland and E.U regarding apple exports and imports

Apples	2004	2005
Poland (thousands tons) - exported	+28,942	+18,143
EU states (thousands tons) - imported	-20,986	-12,844

Considering the actual situation of the apple industry and the difficulties that apple growers are facing, it is crucial to have access to new information from the common market. This way, producers are able to take correct decisions and adopt viable marketing strategies.

As for the international apple export, New Zeeland has been till recently the biggest apple producer from the southern hemisphere. This country has unique apple varieties, offered for consuming under the ENZA brand, a well-known apple brand all over the world. It maintains its leader position by using innovation as future strategy and perfecting production methods, informatics systems and technical transfer from orchard to laboratory (Peter Beaven, 2006).

On the other hand, in Australia, fruit industry has been oriented towards the internal market, only small quantities of fruit being sent to Asia and Europe.

Within the multitude of producers, on a 1.9 million hectares of apple orchards and 24 million tons of fruit (mostly in Shaanxi and Shandong regions), China is considered an international producer. Its main distribution markets are the South East of Asia and Russia.

A great importance is given to packaging, for maintaining the quality, following the requirements of the International Market.

In China, the present tendencies are to optimize and centralize apple orchards, limiting the production at 30 million tons. 25 million tons are designated to internal market, the rest are for export (Yongbing Yuan, 2006).

Apples are the most important fruit species cultivated in Romania, about 44,6% of all grown fruits. After 1990, the apple production represented half of the cultivated fruits, in the last years being compared with the plum production (Beceanu D., Benea E., 2001).

In the following table's are presented data's concerning apple production, consume and commerce in Romania, during 2000-2005:

Table 2.

Apple production in Romania in the last years (FAO)

Year	M.U.	Quantity.
2000	t	490300
2001	t	507440
2002	t	491500
2003	t	811100
2004	t	1097840
2005	t	637980

Table 3.

Apple consumption in Romania, in the last years (FAO)

Year	Total (t)	Quantity day/capita(grams)
2000	461390	57,15
2001	445090	55,37
2002	529770	66,15
2003	638370	79,99
2004	653060	82,11
2005	667530	84,24

Table nr. 5

Data concerning apple consumption in some European states, during 2000-2005 (FAO)

Country Year	Food quantity/day/capita(g) –Apples					
	2000	2001	2002	2003	2004	2005
Germany	115,01	109,22	99,98	93,17	90,71	89,05
Hungary	111,44	85,24	58,09	82,15	71,79	68,91
France	66,41	76,87	75,69	63,94	67,62	86,80
Italy	56,56	66,09	56,65	45,57	61,89	49,71
Poland	48,38	68,63	76,08	69,29	74,73	81,47
Romania	57,15	55,37	66,15	79,99	82,11	84,24
U.K	36,11	39,91	38,86	41,02	46,61	61,49

Table 6.

Data concerning apple commerce in Romania, in the last years (FAO)

Years	2005	2004	2003	2002	2001	2000
Imports(thousands tons)	84,31	47,83	50,35	26,03	17,28	26,52
Exports (th. Tons)	108,24	74,82	75,96	41,28	21,66	22,19

Table 7.

Apple Prices in Romania

Year	Unitary price ($ /t)	Export ($ /to)	Import ($ /to)
2000	420,38	260,48	269,86
2001	317,27	321,05	280,16
2002	370,02	201,36	291,33
2003	387,43	227,81	200,93
2004	-	264,98	207,49

One can easily notice a major growth of the apple production in Romania, during 2003-2004, compared to 2005, when a little drop occurs.

Apple consumption/day/capita constantly developed, reaching maximum in 2005, but compared to other European states, it is still relatively low.

In the actual context, with a common market that is changing continuously, the transfer of information and collaboration between worldwide producers is the essential condition for the industry to function properly. (Peter Beaven, 2006).

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QUALITY AND PRESERVATION CAPACITY OF APPLE VARIETIES INTRODUCED IN MOLDAVIA

CALITATEA ŞI CAPACITATEA DE PĂSTRARE A SOIURILOR DE MĂR INTRODUSE ÎN R. MOLDOVA

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Abstract. *The Republic of Moldavia possesses all the natural conditions for the intensive development of fruit-growing. This branch from ancient times had and still has chances to remain one of the pillars of the national agriculture since it constitutes a wealth determining the effectiveness of the entire agrarian sector of the country. Occupying only 6,5 – 7,0% from the surface of the republic's arable lands, in the last two decades fruit-growing insures permanently about 15-20% from the income resulted from the trading of the agricultural production. In the intensive orchards of Moldavia apple trees predominate occupying more than 70% from the surface of 110 thousands ha and give 60-70% from the entire fruit harvest.*

Rezumat. *Republica Moldova dispune de toate condiţiile naturale pentru dezvoltarea intensivă a pomiculturii. Această ramură din străvechi timpuri a fost şi are şanse să rămână unii dintre pilonii agriculturii naţionale, deoarece ea constituie un belşug, determinând eficienţa întregului sector agrar al ţării. Ocupând doar 6,5 – 7,0% din suprafaţa terenurilor arabile ale republicii, pomicultura în ultimile două decenii asigură în permanenţă circa 15-20% din veniturile băneşti de la comercializarea producţiei agricole. În livezile intensive ale Moldovei predomină mărul ce ocupă mai mult de 70% din suprafaţa de 110 mii ha şi dau 60-70% din roada totală a fructelor.*

The industrial cultivation of apples highlighted the qualities and draw-backs of the district assortment. For example the breed Jonathan is strongly attacked by the apple mildew, the Golden Delicious from the Codru area and especially from the North proved to be less resistant to frost and the red Delicious is attacked catastrophically and everywhere by scald.

The future apple breeds are dictated by the social-economic level of the society development, the producers' and consumers' needs. The consumer asks permanently better fruits, ore qualitative, more beautiful and more qualitative products resulted from the fruit processing. The producer is not interested to maintain in production the breeds unsolicited by the market since the rapid change of assortment by a new cultivation, with an accelerated potential to get the harvest with high productivity and qualities brings substantial benefits. Tree must produce fruits early even in the first 1 – 2 years after their plantation in the orchard, with little vigor, frameworks well garnished with fruits of the spur type do as to increase their density by hectare. (I. Ţurcan, V. Bucarciuc 1995).

From this reason, in the last years in Moldavia, the breeds immune to diseases have been introduced and try to be produced: Prima, Redfri (coop. 13), Pristila, Golden Resistant,

Coop 10, Flirina and Jonofri. Breeds Prima, Pristila and Redfri are immune to the apple scurf. The Coop breed 10 is immune to scurf and mildew. The breeds immune to diseases need 6-8 chemical treatments ant the ones accustomed to them need even 12 or more. The cultivation of the immune breeds on special massifs leads to the decrease of the chemical processing where energetic expenses reach 50 %, and the dose of insect-fungicides – 70% for an orchard hectare. (V.F. Bucarciuc 1991).

The new breed introduced in the Moldavian orchards is Melrose. It ha advantages in what concerns size, colour, structure-texture of tissues, chemical quality and the gustatory qualities of fruits. But this is not enough. Also important is how they are kept.

MATERIAL AND METHOD

In 2002-2003 and 2003 –2004 we made some experiments to check the quality and capacity of maintenance of the new breed resistant to diseases. As a witness we took the prized breed Wegner. The breed Melrose is introduced in Moldavia being immune to scurf and mildew. The apples for experiments were harvested in the Association „Prietenia Agro" Soroca District. The apples of these breeds get ripe and are picked up in the third decade of September, the beginning of October. The pulp of the new breed Melrose is white towards yellowish, quite hard, crispy, and succulent. It has a sweet acidulated taste, very balanced and pleasant and a proper flavor. Melrose is good for middle draught.

The average mass of a fruit was determined by weighing 100 fruit and dividing it by 100 for the breeds Melrose and prized Wegner.

The apples harvested from the orchard were packed in standard cases no. 3 and preserved in the frigorific installation from the commune Truşeni, municipality of Kishinev, at the temperature of 0…-1^{0}C, with a relative air humidity of 90% in normal atmosphere (0,03% CO_2, 20,8% O_2) MEO (normal gaseous environment) and in the variant MGM (modified gaseous environment) packed in polyethylene bags with a thickness of pellicle of 40-50 microns, air tight where temperature was 0…± 1^{0}C, the relative air humidity was 90-95%, CO_2 3-5%, O_2 5-7%.

The quality of the orchard apples after preservation was determined according to the state standard 21122-75: Fresh apples, winter breeds.

After preservation we determined the weight losses according to the method VNII COOP.

RESULTS OBTAINED

In table no. 1 we give the results for apple quality after harvest at the Association „Prietenia Agro" Soroca District.

Table 1

Influence of breeds on the apple quality after harvest

Breeds	Years of experiments	Fruit quality			Average mass of a fruit		Fruit diameter mm
		Superior quality and first quality	Second quality	Third quality	in g	In % as compared to the witness	
Melrose	2002-2003	79,6	14,4	6,0	168,4	104,5	6,8
	2003-2004	92,4	4,2	3,4	172,3	103,7	7,0
Prized Wegner (witness	2002-2003	62,9	25,6	11,5	161,1	100	6,5
	2003-2004	69,3	22,8	7,9	166,2	100	6,7

Table 2

Apple quality after preservation %

Breeds	Preservation without an artificial cooling					Preservation with an artificial cooling				
	Duration of preservation in days	Weight losses	First quality	Non-standard production	Waste	Duration of Preservation in days	Weight losses	First quality	Non-standard production	Waste
2002-2003										
Melrose	120	3,5	90,5	1,9	4,1	180	2,0	96,8	1,0	0,4
prized Wegner (witness)	105	4,2	86,4	3,6	5,8	165	2,2	93,7	2,1	2,0
2003-2004										
Melrose	120	4,0	87,3	4,9	3,8	180	2,6	95,0	1,2	1,2
prized Wegner (witness)	105	4,7	85,6	3,8	5,9	165	3,5	90,1	2,4	4,0

The data from table 1 show us in a convincing manner that the quality of apples (extra and first equality) is higher at the new breed introduced in Moldavia – Melrose, as compared to the prized breed Wagner (witness). For example the fruits of the breed Melrose (extra and first equality) in 2003 reached 92,4%, the second quality 4,2% and the third quality 3,4%, and the pomological prized breed Wagner reached 69,3%, 22,8%, 7,9%.

The fruits of the Melrose breed have an average mass bigger by 3,7…4,5%, they have a bigger diameter than the prized Wagner breed from Moldavia. The fruits of the Melrose breed introduced in Moldavia are more colored, have higher gustatory qualities than the prized Wagner breed.

For preservation we put apples of extra and first quality in frigorific installations.

Research has proved that the new apple breed Melrose distinguishes itself by high trading qualities even after preservation.

From experiments we notice that the apples of the experimented breed Melrose have a longer preservation period both in MGO and in MGM, both in the preservation seasons from 2002-2003 and 2003-2004, as compared to the prized Wagner breed (witness).

The partial pressure of gases in the polyethylene bags (MGM) influences essentially the intercellular gaseous composition that regulates the physical and biochemical processes in fruits and leads to the weight losses in the period of preservation.

One of the main indicators of apple quality after preservation is the first quality of fruits. The first quality of fruits after preservation of the breed Melrose in the conditions of all types of packing was much higher than for the prized Wagner breed.

CONCLUSSIONS

As a conclusion we mention: comparing the quality of fruits after harvest for the apple breed introduced in Moldavia we see that the trees with immunity to scurf and mildew necessitating 4... 6 treatments against these diseases while the prized Wagner breed needs 10---12 treatments. The breed Melrose has a preservation capacity higher than the prized Wagner breed. This will allow us to provide consumers with fresh apples for a longer term since they almost lack pesticides and thus they do not cause damages to the human health.

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PERSPECTIVES IN THE EFFICIENT UTILIZATION OF THE INVESTMENTS FOR THE APPLES PRODUCTION

PERSPECTIVE ÎN UTILIZAREA EFICIENTĂ A INVESTIȚIILOR LA PRODUCEREA MERELOR

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Abstract. *In the apple plantation of Idared and Delbar Estival variety grafted on the father/ mother plant M9 there was calculated the recovery term of the capital investments for the apple plantation foundation and the economical efficiency of the fruit production depending on the trees plantation density on the one unity of surface and their emplacement way.*

It was established that the investments recovery term in diverse plantation structures had constituted 4,5-7,8 years, but the economical efficiency of the apples production depends on the mode of trees emplacement and the plantation distance between the plants on the range.

Rezumat. *Într-o plantație de măr de soiul Idared şi Delbar Estival altoite pe portaltoiul M 9 s-a calculat termenul recuperării investițiilor capitale la fondarea plantațiilor de măr şi eficiența economică de producere a fructelor în funcție de densitatea de plantare a pomilor la o unitate de suprafață şi modul de amplasare a lor.*

S-a stabilit că termenul recuperării investițiilor în diverse structuri de plantații a constituit 4,5-7,8 ani, iar eficiența economică de producere a merelor depinde de modul de amplasare a pomilor şi distanța dintre de plantare între plante pe rând.

The increased alimentary value of the fruits and their necessity in daily consumption of the man makes up the principal subject of the trees cultivation. The majority of the fruits production can be obtained not only by the extension of the reserved surface for fruit trees cultures, but also by the branch intensification, the replacement of the plantation having a fructification reduced level with other ones more productive (1,2,3).

The fruit growing intensification allows obtaining stable yields on the one surface unit and being competitive on the external market by the utilization of perspective varieties and the plantation foundation with more increased denseness (3).

These plantations fructify from the 2^{nd}-3^{rd} years after plantation but the stable crops are recorded from 4^{th}-5^{th} years (5,6,7).

The thickened plantation of the fruits trees accelerates the recovery of the capital investments for the orchards foundation, the assortment renewal and quicker adaptation of the obtained production to the market requirements (8,9).

MATERIAL AND METHODS

The investigation was accomplished in the apple plantation founded in 1996 having fruit trees aged by one year of Idared and Delbar Estival varieties grafted on the mother / father plant M9 the fruit trees were placed in solitary ranges and in bands formed from 2 and 3 ranges. The distance between the solitary lines and in bands constitutes 3,5 m between the lines in bond – 1 m, but between the fruit trees on the range 1,2; 1,5 and 1,8 m. as a witness served the plantation distance of 3,5 x 1,8 m in the solitary ranges. The fruit trees are conducted under the system of ameliorated thin spindle crown. The recovery of the capital investments and the production economical efficiency of the fruits were determined by establishing of the real expenses of the first six years after plantation, the price of the planting material and the value of the obtained production after the fruits commercialization according to the prices on the Moldova market.

RESULTS AND DISCUSSIONS

The intensive culture of fruits trees varieties including the apple one requires significant capital investments for the plantation foundation and its care till the economical fructification (4,8,9).

The effectuated investigations shows that the volume of the capital investments for the apple plantation foundation depends first of all on the way and the emplacement distance of fruits trees.

The capital investments during six years on the studied variants made up at the Idared species 60,62 -94,74 thousand leis/ha, and at the Delbard Estival variety was of 60,00 – 93,97 thousand leis/ha.

The highest value of the total production in the given period was obtained by emplacing the fruit trees in bands formed from 3 ranges with the plantation distance (3,5+1+1)x1,2 m. at the Idared sort the given indicator constituted 125,97 thousand leis/ha, but at the Delbard Estival one- 123,64 thousand leis/ha.

The investments recovery is the principal indicator of the entire activity of the orchards. At the Idared variety in 2001 the capital investments recovery did not occur only at the witness variant. On the other variants the capital investments recovery was definitively effectuated, but on certain distances of the fruit trees emplacement- (3,5+1)x1,5 m; (3,5+1)x1,2m; (3,5 + 1)x 1,5 m and (3,5+1+1)x1,2 m the investments recovery has already occurred in 2000.

It allows us to render evident that, if in 1999 the harvest was not compromised by the spring frosts, the capital investments on the mentioned variants were recovering the 4^{th} year after plantation. The other variants were recovering the 5^{th} year after plantation.

At Delbard Estival variety the total production is more reduced in comparison with the Idared one and respectively the term of recovery of the capital investment of the fruit trees in bands except that one having the plantation distance (3,5+1)x1,8 m. in the normal pedoclimatic conditions the recovery of the capital investments for the foundation of the apple plantation with the emplacement in bands occurs the 4^{th}-5^{th} years after plantation.

The essential indicator for the evaluation of a culture system in production is constituted by the economical efficiency of the fruits production. The effectuated calculations prove that during 2000-2001 years by the intensification of the cultural level increased the fruit harvest, the value of the total production and the expenses one (table 1).

Table 1

The economical efficiency of the apple production depending on the way and the distances of fruit trees plantation, 2000-2004 years

Way and distances of plantation, m	Average yield, t/ha	Value of production, thousand lei/ha	Expenses of production, thousand lei/ha	Profit, thousand lei/ha	Profitableness of the production, %
Idared variety					
3,5x1,8	13,5	29,7	12,15	17,55	144,5
3,5x1,5	15,6	34,32	12,77	21,55	168,8
3,5x1,2	17,6	38,72	13,10	25,62	195,6
(3,5+1)x1,8	18,7	41,14	13,87	27,27	196,7
(3,5+1)x1,5	21,8	43,60	14,15	29,45	208,2
(3,5+1)x1,2	23,4	44,46	14,92	29,54	198,0
(3,5+1+1)x1,8	19,6	41,16	14,47	26,69	184,5
(3,5+1+1)x1,5	22,0	41,80	15,29	26,51	173,4
(3,5+1+1)x1,2	23,8	42,84	16,11	26,73	166,0
Delbard Estival variety					
3,5x1,8	12,2	26,84	11,43	15,41	134,9
3,5x1,5	13,9	30,58	11,79	18,79	159,4
3,5x1,2	16,8	36,96	12,24	24,72	202,0
(3,5+1)x1,8	17,7	38,94	12,69	26,25	206,9
(3,5+1)x1,5	20,2	42,42	13,50	28,92	214,3
(3,5+1)x1,2	24,1	46,99	14,35	32,64	227,5
(3,5+1+1)x1,8	20,7	43,47	14,00	29,47	210,5
(3,5+1+1)x1,5	23,1	46,29	14,51	31,78	219,1
(3,5+1+1)x1,2	26,5	49,02	15,01	34,01	226,6

The highest fruit yield at the both varieties on an average for four year was recovered in the variants with the fruit trees emplacement in bands of 2 and 3 ranges. Dar, the quality of the fruits influenced negatively on the value of the obtained production in favour of the variants with lower plantation density. The greater production expenses reduced the profit that led to the diminishing of the apples production profitableness.

At the Idared variety in the variant with the fruit trees emplacement in solitary ranges the production expenses constituted 12,15 – 13,10 thousand leis/ha, the profit- 17,55 – 25,62 thousand leis/ha, but the profitableness- 144,5 – 195,6 percent.

In the variant with fruit trees emplacement in bands of 2 ranges, the indicators in study were increased making up respectively 13,87 - 14,96; 27,27 - 29,54 thousand leis/ha and 196,7-208,2 percent, but in bands from 3 ranges 14,47 – 16,14; 26,51 – 26,73 thousand leis/ha and 173,4 – 174,5 percent.

For the Delbard Estival species is maintained the principle exposed for the Idared sort and the greatest indicators were recorded in the variants with the emplacement of the fruit trees in bands of two and tree ranges where the profitableness had constituted respectively 206,9 – 227,5 and 210,5 – 226,6 percent.

It was established that due to the increase of the fruits price quicker that the expenses determined by the multiplication of the fruit trees thickness on the surface unit of the orchard, the capital investments in the variants with the fruit trees emplacement in solitary ranges were recovered an year later than in the case of the emplacement of the fruit trees in bands of 2 and 3 ranges but after the full fructification of the fruit trees, the production profitableness increased of 1,2 -1,3 times.

CONCLUSIONS

1. The foundation of the intensive apple orchards requires significant capital investments that increase with the multiplication of the thickness of the fruit trees from 1585 pieces/ha -60 thousand lei till 4542 pieces/ha – 94 thousand lei.

2. The most reduced period of the recovery of the capital investments at the Idared variety were recorded with the emplacement of the fruit trees in solitary ranges at the distances of 3,5 x 1,2 m- 4,8 years and in bands of 2 ranges at the distances of (3,5+1)x1,5 m- 4,5 years and the level of the profitableness constituted respectively – 195,6 and 208,2 percent.

3. The profitableness in the fruit trees plantations emplaced in bands of 3 ranges was reduced due to the more intensive multiplication of the production expenses and to the cashing reduction from the realization of 1 tone of fruits caused by the decrease of the quality.

4. At the Delbard Estival variety the principal indicators of the economical efficiency are more superior than the Idared one and reach the highest values at the emplacement of the fruit trees in bands of 2 and 3 ranges with the distance of plantation between the trees by range 1,2 m.

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THE INFLUENCE OF PRODUCTION TECHNOLOGY ON THE GROWTH OF APPLE FRUIT TREES IN A NURSERY

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Abstract. *During the period 2004 - 2006 the effect of two technologies of the production of apple fruit trees 'Jonica' and 'Šampion' were compared: the production of two-year-old trees with a one-year-old crown obtained through winter grafting in hand and the production of one-year-old trees obtained through summer budding. Independently from the cultivar, the trees coming from grafting had better growth parameters than the trees produced in the process of budding. Better growth results were obtained for 'Jonica' apple fruit trees than for the trees of 'Šampion' cultivar.*

INTRODUCTION

The results of some experiments have shown that good quality nursery material affect productivity of orchard (Van Oosten 1978, Vittrup 1978, Shepherd 1979, Poldervaart 1992, Poniedziałek at al. 1993). According to foreign literature data (Van Oosten, 1978; Merezhko 1987, Poldervaart 1992 Boostma and Baart, 1990; Wertheim and Groene, 1993, 1994, Bootsma 1995) and the domestic ones (Czynczyk at al. 1997, Bielicki and Czynczyk, 1999, Jadczuk 2000, Bielicki at al., 2003,), two-year-old trees with a one-year-old crown are especially useful for the establishment of modern orchards.

On the Polish market one-year-old shoots of budded plants are offered the most often. Such material requires to be formed after its planting into the orchard ground. Of course it is connected both with additional load of labour and money and with the delay of fructification. Planting two-year-old trees with a one-year-old crown can be some kind of a solution. Such trees are a little bit more expensive but they have a formed crown and they start to fructify practically in the year they are planted.

Comparison of production methods and growth parameters of one-year-old young apple trees of 'Jonica' and 'Šampion' with the two-year-old trees with a one-year-old crown of the same cultivars was performed in the paper.

MATERIAL AND METHODS

The experiment was carried in the years of 2004 and 2005, was set up in four replications, with 50 rootstocks per plot. Virus-free rootstocks M9 and grafts of two cultivars: 'Jonica' and 'Šampion' were the plant experimental material.

In the first year of the experiment, in March, winter grafting in hand was done. Rootstocks with the diameter of 9 to 12 mm were used for this purpose. The place of grafting was situated 20 to 25 cm from the highest growing roots.

Grafted rootstocks were put diagonally in crates and covered with humid peat. Such prepared material was put aside for the period of 14 days in the temperature of about 18 C. When the buds on scions started to swallow the crates were moved into a cooling place with the temperature of 1 to 2º C. The plants were kept in such conditions till the middle of April. Later they were planted into a nursery in 90 x 30 cm spacing. After this action the nursery school was being watered. From all the buds appearing on scions only the strongest one was left. When the leading shoot grew up to a dozen or so it was tied to a bamboo picket. On the turn of June and July the foil from the grafted scion was removed.

In the second year of the running of the nursery, in March, the trees were cut on the height of 70 cm. All the shoots growing below the cut were removed and only the one that grew from the highest top bud was left. When this shoot reached the length of 20 cm it was tied to a bamboo picket. In the process of vegetation from this leading shoot, long shoots started to grow at the angle close to the right one and they finally created a crown of a tree.

The second part of the rootstocks was also planted in spring into the field in 90 x 30 cm spacing. On the turn of July and August the budding by chip budding with cultivars 'Jonica' and 'Šampion' was carried out. In spring of the second year the rootstocks were cut above the budding place, leading the shoots without plug.

In autumn, in the middle of October the following observations and measures were done: the height of the trees (cm), the thickness of the trunk at the height of 30 cm above the ground (mm), the number of long shoots (longer than 20 cm) and they length (cm)

Above mentioned parameters were checked for plants coming from two methods of production. Hundred trees from each combination were taken randomly for these measurements.

STAT program was used for all statistic calculations and to show the differences the method of two-factor variance analysis was applied (cultivar, production method). Importance of differences among the combinations was evaluated on the basis of confidence interval with the application of Duncan test for the confidence level $\alpha = 0.05$. The results presented in figures are mean values of the two series.

RESULTS

Analyzing the average height of the trees it was found out that two-year-old fruit trees with a one-year-old crown were higher than one-year-old trees (figure 1). 'Jonica' cultivar reached the average height of 182,0 cm while in a traditional cycle (as a one-year-old maiden tree) it reached only 132,2 cm. A similar tendency was observed for 'Šampion', where the two-year-old trees reached the average height of 157,8 cm and one-year-old maiden tree 124,5 cm.

On the basis of statistic analysis for the average thickness of the tree trunks significant differences were observed for the advantage of two-year-old trees, independently from the cultivar (figure 2). The average thickness of the tree trunks of 'Jonica' cultivar respectively reached the values of 19,5 mm and 12,4 mm (for one-year-old maiden tree). For 'Šampion ' the values were respectively: 20,3 mm and 12,9 mm – for one-year-old maiden tree.

Two-year-old trees with a one-year-old crown significantly differed with the number of long shoots from the maiden trees produced in a traditional way. Their average number for 'Jonica' was 9,8 and only 3,5 for maiden tree. Smaller average values, but also significantly different, were obtained for 'Šampion' cultivar.
On two-year-old trees there were 7,4 long shoots while on one-year-old maiden tree only 2,5.

On the basis of the analysis of the length of long shoots it was found out that the biggest increment was observed for the trees of 'Jonica' – 52,8 cm (37,9 one-year-old maiden tree). Exceptionally, the trees of 'Šampion', coming from a budding method had longer increments of long shoots (38,1 cm) but not significantly different from the increments of the two-year-old trees (36,2 cm).

DISCUSSIONS

High costs of establishing of 1 hectare of an intensive orchard make nurserymen seek less expensive methods of the production of high quality material. Orchard men look for branchy trees, which are easier to be formed and which fructify in the second year after being planted. One of the ways is planting two-year-old trees with a one-year crown, consisting the most often of 5 to 10 shoots. Such trees are obtained in the same time as one-year-old shoots of a budded plant but their quality is incomparably higher. An orchard established from such a material gives a guarantee of a quick return of costs. Production of two-year-old trees with a one-year-old crown is a direction leading to the restriction of not ramified material, which is offered for sale in a nursery turnover.

On the basis of the obtained results one can find out that the method of production of two-year-old trees by winter grafting in hand, the method, which is presented here, has a very positive influence on the quality of the trees in comparison with one-year-old maiden tree obtained in a traditional budding method. The quality of the obtained nursery material, defined on the basis of growth parameters taken into consideration, was really better for winter grafting in hand. It is supported by the fact that both the height and the thickness of the trees as well as the number and length of the long shoots. The only exception was the parameter of length of long shoots, which was similar for 'Šampion' cultivar in two different production methods.

In the discussed experiment, two-year-old trees with a one-year-old crown of 'Jonica' cultivar had an average height of 182 cm. In experiments with the production of two-year-old trees of 'Jonica' cultivar on M9 rootstock Bielecki at al. (1998) and Czarnecki (1998) obtained almost the same height of trees (177,3 cm). However the diameter of trees obtained by the above-mentioned authors was smaller (14,0 mm) comparing to the considering experiment (19,5 mm). Such difference can be explained by both: application of different kind of 'Jonagold' cultivars in the compared experiments and by application of virus-free plant material (rootstocks and scions) in our experiment. This fact is not mentioned by the above authors.

Two-year-old trees with a one-year-old crown of 'Jonica' cultivar were significantly higher from the analogous trees of 'Šampion' cultivar. This difference in height could be caused by the fact that 'Szampion' is a weaker growing cultivar in comparison with 'Jonica'.

The method of winter grafting in hand, discussed in this paper, as a production method had a positive influence on long shoots growing, on average 9,8 pieces for 'Jonica' and 7,4 for 'Šampion'. Bigger number of long shoots for 'Jonica' can testify for the difference in easiness of ramification in both cultivars. Similarly, a better result in ramification of 'Jonica' comparing to 'Šampion' was observed by Sadowski and Dąbrowski (1998). The results of ramification of 'Jonica' trees in our experiment are better from those obtained by Bielecki at al. (1998) and Czarnecki (1998), who obtained only 7 offshoots on average.

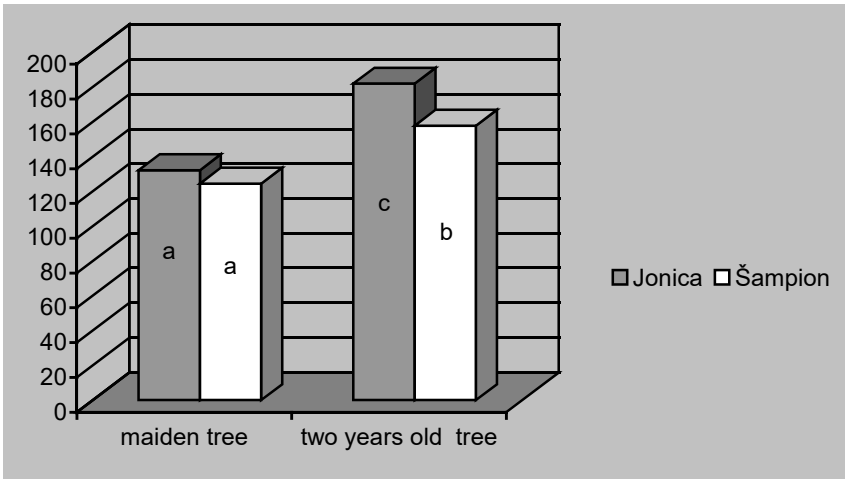

Figure 1. Average height of apple fruit trees depend on method of production (cm)

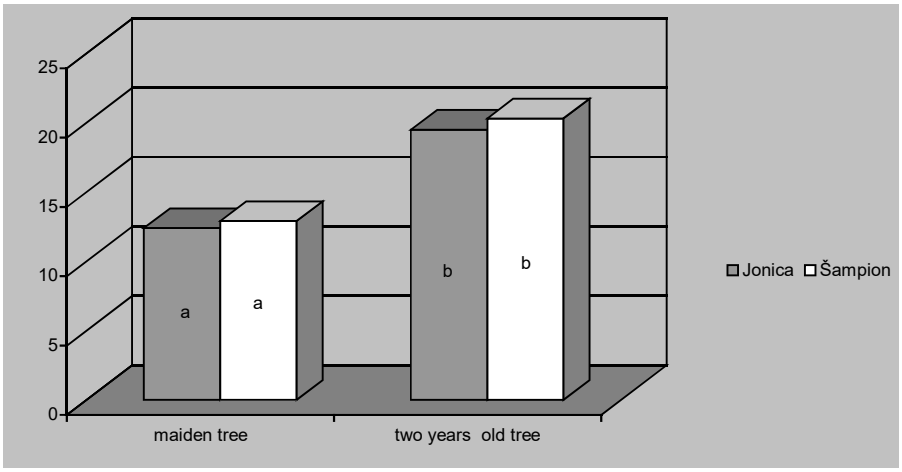

Figure 2. Average thickness of apple fruit trees depend on method of production (mm)

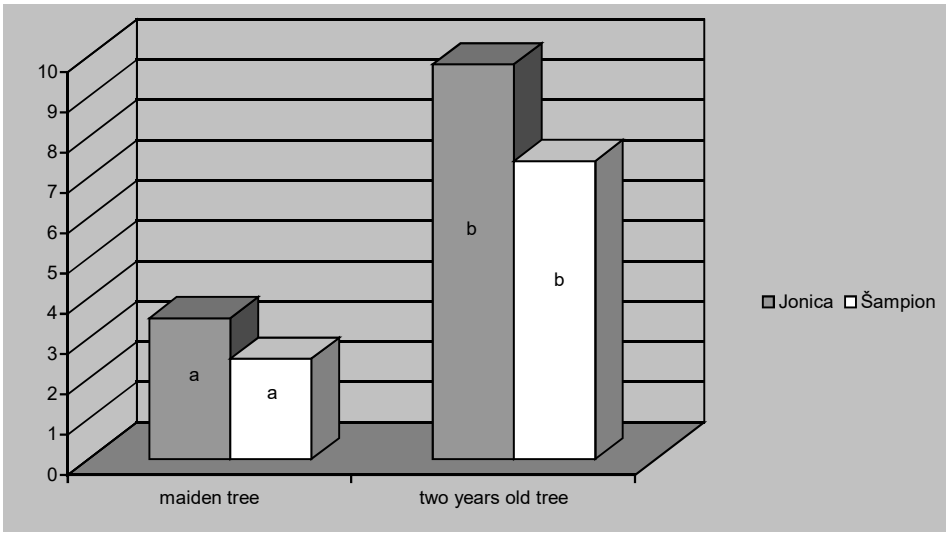

Figure 3. Average number of long shoots of apple fruit trees depend on method of production

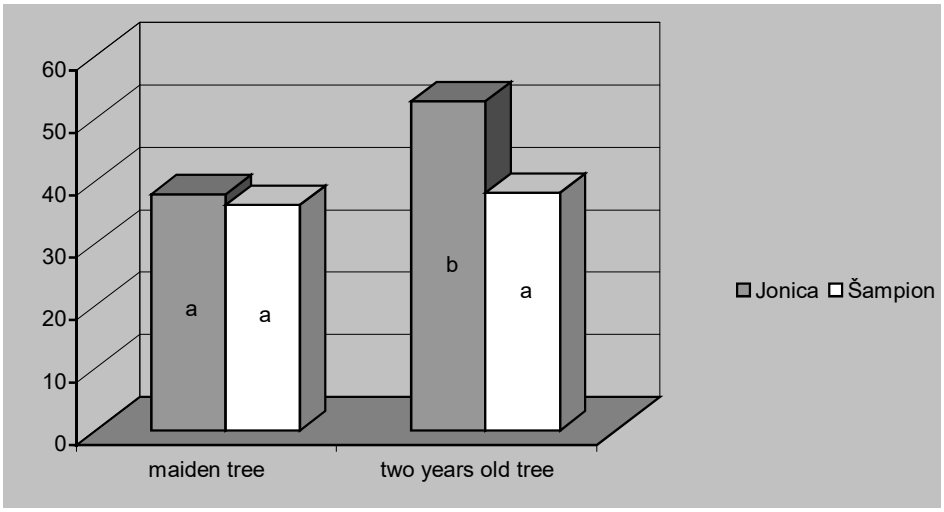

Figure 4. Average long of long shoots of apple fruit trees depend on method of production (cm)

CONCLUSIONS

1. The method of winter grafting in hand was found to be especially effective for the production of two-year-old trees with a one-year-old crown.

2. The trees obtained from grafting had better parameters of growth in comparison with the trees coming from a budding method.

3. The technique of winter grafting gave better results for the trees of 'Jonica' cultivar than for 'Šampion' one.

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THE NURSERY USEFULNESS OF SELECTED ROOTSTOCKS FOR THE PRODUCTION OF MAIDEN PEACH TREES

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Abstract. *The peach cultivars 'Harbinger', 'Redhaven', 'Reliance' 'Royalvee' were budded on three generative rootstocks Rakoniewicka seedling, Syberian C and Hui-hun-tao. The trees produced on Rakoniewicka seedling and Hui-hun-tao rootstocks had stronger growth, were higher, had a bigger diameter of stem and the sum of length of lateral shoots than the trees on Syberian C rootstock. The largest number of lateral shoots was obtained for maiden peach trees on Rakoniewicka seedling. The growth of trees of 'Harbinger' cultivar was the strongest whereas the growth of trees of 'Redhaven' cultivar was the weakest, independently from the rootstock used.*

INTRODUCTION

Many studies are carried out both in Europe and the USA to find new rootstocks for peach. (Layne 1974, Layne 1975, Layne 1978, Layne 1980, Rom 1983, Elfving and Tehrani 1984, Guerriero et al. 1985, Layne 1987, Ferree and Schmid 1988 Maćkowiak and Stachowiak 1994, Świerczyński and Stachowiak 1999, Perry et al. 2000, Świerczynski and Sękowska 2004)

The aim of the above experiment was to check the usefulness of three rootstocks and four cultivars for the production of one-year-old maiden peach trees in a nursery.

MATERIAL AND METHODS

The experiment was carried out in 2004-2006. The nursery trial was set up in four replications, with 25 rootstocks per plot. Seedlings: Rakoniewicka, Siberian C and Hui-hun-tao (*Prunus kansuensis* Rehd.) were budded on four cultivars of 'Harbinger' 'Redhaven', 'Reliance' and 'Royalvee' peach trees.

In the end of October (2005 and 2006) the following features of maiden peach trees were observed and measured: height (cm), their thickness (measured 30 cm above the ground), number and sum of length of lateral shoots. On the basis of the obtained results consistency with Polish Norm PN-R-67010 was checked.

Statistical analysis of the results was carried out using two-factor variance analysis (cultivar, rootstock) using Duncan's test for a confidence level $\alpha = 0.05$. The results presented in tables are mean values from two years.

RESULTS AND DISCUSSIONS

The percentage of obtained maiden peach trees depend on rootstock and cultivar (table 1). The higher percentage of the maiden trees was obtained on Siberian C and Hui-hun-tao rootstocks, lower on Rakoniewicka seedling.

The experiments conducted by other researchers (Young and Houser 1980, Yadava and Doud 1989) confirm that Siberian C rootstock positively influences the longevity of trees in an orchard and their frost resisting. Comparing the cultivars a higher percentage of the peach trees was obtained for 'Reliance' 'Harbinger' and 'Redhaven', a lower for 'Royalvee'. Hołubowicz and Bojar (1998, 1999), in their experiment, also observed a big usefulness of 'Raliance' cultivar. It can be confirmed by the present research where the biggest number of maiden peach trees was obtained for this cultivar.

Both, the applied rootstock and the cultivar affected the heigh and the thickness of maiden peach trees in a nursery (tables 2 and 3). Better results of these growth traits were observed for the trees on Rakoniewicka seedling and Hui-hun-tao rootstocks, a little worse on Siberian C rootstock. In an earlier experiment Świerczyński and Stachowiak (1999) also obtained higher and thicker maiden peach trees of 'Redhaven' and 'Reliance' on Rakoniewicka seedling and Hui-hun-tao rootstocks. Both, in the present and previous studies the results of height and thickness of maiden peach trees growing on Rakoniewicka seedling and on Hui-hun-tao did not differ significantly from one another.

In the present experiment the highest and the thickest were trees of 'Harbinger' cultivar, the trees on 'Redhaven' grew the weakest independently from the applied rootstock. In the previous experiment (Świerczyński and Stachowiak 1999) no difference in height and thickness of maiden peach trees of 'Redhaven' and 'Reliance' was noticed. Such a difference was shown in the present experiment only in connection with the height of the above mentioned cultivars.

The sum of length of lateral shoots and their number were significantly differentiated by the used rootstock and cultivar (tables 4 and 5). A bigger length and number of lateral shoots showed the trees growing on Rakoniewicka seedling, compared with the two remaining rootstocks. Among them the trees growing on Hui-hun-tao had a bigger length of lateral shoots and the number of lateral shoots did not vary within the range of the two rootstocks. Budded cultivars of peach trees also differentiated the results of these two growth parameters. 'Harbinger' cultivar maiden peach trees had more lateral shoots and they were the longest. The trees of 'Redhaven' were the opposite; there were the least number of lateral shoots and they were the shortest. In another experiment carried out in a nursery (Świerczyński and Sękowska 2004) it was found out that the length of lateral shoots of maiden peach trees depended only on a rootstock whereas the number of lateral shoots both on the rootstock and the cultivar. The differences between these two experiments may result from different soil and climatic conditions in the years experiments were conducted.

Power of growth of particular rootstocks and cultivars influenced a differentiated consistency of the maiden peach trees with Polish Norm PN-R-67010. Maiden peach trees grew stronger on Rakoniewicka seedling and on Hui-hun-tao and their bigger number met the requirements of the norm (the height bigger than 100 cm and the thickness more than 10 mm). Also maiden peach trees of 'Harbinger' and 'Royalvee' grew stronger but 'Redhaven' weaker thus the consistency with the norm was as mentioned above.

Taking into consideration the power of growth of maiden peach trees growing on individual rootstock it must be acknowledged that Siberian C rootstock differs significantly with the induction of a poorer growth of the trees in a nursery comparing with the other two rootstocks considered. Nowadays trees of a limited power of growth are preferred in an orchard production. Such advantages of Siberian C as a rootstock as: the improvement in trees longevity and delaying the flowering period, which decreases the risk of damage of flowers in spring, were earlier confirmed by other researchers (Young and Houser 1980, Yadava and Doud 1989). Bearing in mind good results obtained in a nursery as well as by other authors in an orchard there is a need of continuous studies on Siberian C rootstock.

Table 1

Percentage of obtained maiden peach trees depended on rootstock and cultivar

Cultivar	Rootstock			Mean value for cultivar
	Siewka Rakoniewicka	Siberian C	Hui-hun-tao	
Redhaven	45.1 ab *	50.1 bcd	51.0 bcd	48.9 b
Royalvee	40.7 a	46.4 abc	42.3 a	43.1 a
Harbinger	41.1 a	55.3 de	52.6 cde	49.6 b
Reliance	45.9 abc	58.3 e	53.3 de	52.5 b
Mean value for rootstock	43.2 a	52.7 b	49.8 b	

*Means followed by the same letters do not differ significantly at α = 0.05.

Table 2

Height of maiden peach trees depended on rootstock and cultivar (cm)

Cultivar	Rootstock			Mean value for cultivar
	Siewka Rakoniewicka	Siberian C	Hui-hun-tao	
Redhaven	122.7 a *	125.9 ab	127.0 ab	125.2 a
Royalvee	149.0 def	144.6 de	144.7 de	146.1 c
Harbinger	182.2 h	156.8 fg	164.8 g	167.9 d
Reliance	141.0 cd	132.8 bc	150.1 ef	141.3 b
Mean value for rootstock	148.7 b	140.0 a	146.6 b	

* Explanation: see table 1

Table 3

Thickness of maiden peach trees depended on rootstocks and cultivars (mm)

Cultivar	Rootstock			Mean value for cultivar
	Siewka Rakoniewicka	Siberian C	Hui-hun-tao	
Redhaven	14.3 ab *	15.5 ab	16.3 b	15.4 a
Royalvee	19.8 c	15.4 ab	15.2 ab	16.8 b
Harbinger	21.9 cd	20.8 cd	23.0 d	21.9 c
Reliance	16.8 b	13.5 a	19.7 c	16.7 ab
Mean value for rootstocks	18.2 b	16.3 a	18.5 b	

* Explanation: see table 1

Table 4

The sum of length of lateral shoots depended on rootstocks and cultivars (cm)

Cultivar	Rootstock			Mean value for cultivar
	Siewka Rakoniewicka	Siberian C	Hui-hun-tao	
Redhaven	354.4 a *	365.0 a	361.8 a	360.4 a
Royalvee	832.3 d	480.2 b	385.1 a	565.9 c
Harbinger	858.0 d	700.5 c	700.7 c	753.0 d
Reliance	512.8 b	382.9 a	719.3 c	538.1 b
Mean value for rootstock	639.4 c	482.1 a	541.7 b	

* Explanation: see table 1

Table 5

The number of lateral shoots depended on rootstocks and cultivars

Cultivar	Rootstock			Mean value for cultivar
	Siewka Rakoniewicka	Siberian C	Hui-hun-tao	
Redhaven	8.3 a *	10.7 abc	8.9 ab	9.3 a
Royalvee	20.8 ef	12.8 cd	8.8 ab	14.1 c
Harbinger	21.7 f	18.6 e	20.3 ef	20.2 d
Reliance	14.6 d	11.2 bc	12.0 c	12.6 b
Mean value for rootstock	16.4 b	13.3 a	12.5 a	

* Explanation: see table 1

Table 6

Percentage of compatibility of maiden peach trees with Polish Norm PN-R-67010 depended on cultivar and rootstock

Cultivar	Rootstock			Mean value for cultivar
	Siewka Rakoniewicka	Siberian C	Hui-hun-tao	
Redhaven	71.3 a *	66.9 a	69.8 a	69.3 a
Royalvee	95.5 d	85.7 b	92.4 cd	91.6 c
Harbinger	93.1 cd	90.3 bc	92.6 cd	92.0 c
Reliance	88.0 bc	86.7 b	88.6 bc	87.8 b
Mean value for rootstock	88.2 b	83.2 a	86.9 b	

* Explanation: see table 1

CONCLUSIONS

1. The power of growth of the obtained maiden peach trees depended on a rootstock and a cultivar. A stronger growth was observed on Rakoniewicka seedling and Hui-hun-tao, a weaker one on Siberian C.

2. Maiden peach trees of 'Harbinger' cultivar grew the strongest, of 'Redhaven' the weakest.

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GROWTH AND YIELDING OF FIVE CULTIVARS OF SOUR CHERRY TREES ON DIFFERENT ROOTSTOCKS IN ORCHARD

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Abstract. *Growth and yielding of five cultivars of sour cherry trees on two rootstocks were observed in the experiment, which was executed in the years of 2001-2006. The growth of the trees was presented in TCSA. All examined cultivars grew much stronger on F 12/1 rootstock comparing to Mazzard seedling rootstock. The growth of all cultivars was stronger than the growth of 'Łutówka'. A total yield of fruits was evaluated for each cultivar in the five following years. The yield of 'Lucyna' on both rootstocks was higher than the crop coming from 'Łutówka'. Additionally, an average mass of one fruit and the taste of all cultivars were evaluated. 'Dradem' had the biggest average mass of one fruit and 'Sabina' the smallest. The fruit of 'Dradem' and 'Lucyna' were the tastiest.*

INTRODUCTION

Poland is one of the main producers of sour cherry fruit in the world. The production of the fruit of this species amounted to 130 000 tons on average in the last years (Kubiak 2000).

It is commonly known that genetic factors, among others the rootstock, affect the growth (Ugolik and Hołubowicz 1988, 1989, 1990, Jadczuk 1994, Hrotkó and Simon 1996, Hrotkó et al.1996), and yielding of sour cherry trees (Schmidt et al.1983, Ludders 1986, Tylus et al.1986, Jadczuk et al. 1992, Jadczuk 1994, Anderson et al.1996, Hrotkó et al.1996).

In Poland there are very few cultivars of sour cherry trees that count productively. To check their usefulness for a commercial production in Wielkopolska region's conditions an appropriate experiment was executed in Agricultural Experimental Station belong to Agriculture University of Poznań.

MATERIAL AND METHODS

The experiment was carried out in 2001-2006. The trees were planted in spring of 2001 in a 4x2 m spacing. The orchard trial was set up in four replications, with 6 trees per plot. Each cultivars: 'Łutówka' 'Diament', 'Dradem', 'Lucyna' and 'Sabina' were grown on two rootstocks: Mazzard seedling and F 12/1. The increase in TCSA (Trunk cross-sectional area) was calculated after five years; this was a measure of tree vigour in the orchard. The yield of fruit harvested were registered for each plot in 2002 to 2006 and from these date mean fruit mass calculated on the basis of randomly checked samples a mass of 100 fruits. The CEC (Cropping efficiency coefficient) was calculated as a ratio of cumulative yield for 2002-2006 to TCSA at the

end of the 2006 season. The colour of the juice and the taste of fruit were defined in a four- grade scale (5- very good, definitely dessert fruit; 4- good, sweet-sour fruit, tasty; 3- satisfactory, sour fruit; 2- unsatisfactory, fruit too sour).

The significance of differences in a two-factor variance analysis was evaluated in Duncan test on the probability level $\alpha = 0.05$.

RESULTS AND DISCUSSIONS

The power of growth of the examined trees, expressed by TCSA was very differentiated (table 1). The growth of every cultivar was stronger when they were growing on F 12/1. The control cultivar 'Łutówka', which was growing the weakest in comparison with all examined sour cherry trees cultivars, also grew stronger on F 12/1 rootstock. Similarly, a stronger growth of 'Łutówka' on F 12/1 rootstock was obtained by Borkowska (1998) in the seventh year after planting. A quite opposite result was obtained by Ugolik and Hołubowicz (1988, 1989). In their experiments they found that a bigger TCSA characterized the trees of 'Łutówka' on Mazzard seedling. Among all evaluated sour cherry trees the trees of 'Lucyna' on both rootstocks, were growing significantly stronger. It is consistent with a pomological description of this cultivar made by Grzyb and Rozpara (1998). The trees of 'Sabina' were growing significantly weaker than 'Lucyna', which also supports the opinion expressed by Grzyb and Rozpara (1998). The trees of 'Lucyna' and 'Sabina', because of their strong growth, should be planted in a bigger spacing than 'Łutówka'. A medium power of growth characterized the trees of 'Dradem' and 'Diament'. The results of growth of the trees of 'Diament' and 'Dradem', expressed by TCSA correspond with the data published by Maćkowiak (1995). Comparing the growth of these two cultivars no stronger growth of 'Diament' on F 12/1 was observed in the discussed experiment, while it was found by Maćkowiak (1995).

Total crop of particular cultivars in 2002-2006 is shown in (table 1). Cultivar 'Łutówka' yielded a little bit better on F 12/1 rootstock. It is consistent with Borkowska observation (1998), who also obtained better yield of 'Łutówka' on this rootstock. Comparing to 'Łutówka', a significantly bigger total crop from a tree on the same rootstocks was obtained from 'Lucyna'. It confirms the opinion of Grzyb and Rozpara (1998), who recommend this cultivar for commercial planting. Yielding of the other cultivars, which were the subject of the studies, did not differ significantly from 'Łutówka' in the range of the same rootstocks. Cultivar 'Sabina', who yielded on the same level than 'Łutówka', which makes the first one preferable for amateur cultivation. The applied rootstocks did not affect the yielding of the examined cultivars.

CEC of the individual cultivar did not differ significantly, as far as the applied rootstock is concerned (table 1). It does not confirm Borkowska's experiment (1998), where a better CEC was found for Mazzard seedling. None of the new sour cherry tree cultivars exceeded 'Łutówka' in this coefficient.

The highest CAC obtained by the control cultivar was mainly caused by a small TCSA of this cultivar. The closest CEC to 'Łutówka' had 'Diament'. 'Diament' budded on Mazzard seedling rootstock is suitable for intensive sour cherry orchards. It should be planted in the same spacing as 'Łutówka'. Taking into consideration the results of the obtained CAC of 'Sabina' and 'Lucyna', really worse from 'Łutówka', they can be recommended for less intensive sour cherry orchards

The biggest average mass of one fruit was obtained for 'Dradem' (6.4 g). The mass was similar to the one found by Maćkowiak (1995). He obtained also a similar result of a one fruit mass for 'Diament' cultivar. Among the examined cultivars fruit of 'Lucyna' had an average mass, the same as 'Łutówka' fruit (5.2 g), 'Sabina' fruit mass was the smallest (5.0 g).

The best taste characterized the fruit of 'Dradem'(5). High estimation of the taste of 'Dradem' fruit pulp has confirmed the opinion of Maćkowiak (1995), who recognized this cultivar as an outstandingly dessert one. A very good taste characterized the fruit of 'Lucyna', which confirms a productive value of this cultivar. The fruit of 'Diament'(4) and 'Sabina'(4) were worse in taste, but the worst taste characterized 'Łutówka' (3).

Juice colour from 'Lucyna' and 'Sabina' fruit was similar to 'Łutówka' fruit juice. 'Diament' juice was lighter than the one from 'Łutówka' but 'Dradem' was described as a typical "glass" with light-red colour.

Table 1

The growth and yield of five sour cherry cultivars on two rootstocks

Cultivar	Rootstock	TCSA in 2002 (cm^2)	Total crop in kg/tree (1998-2002)	CAC (kg/cm^2)
Łutówka	Mazzard seedling	45.4 a *	44.8 a	0.99 d
	F 12/1	48.5 ab	49.1 abc	1.01 d
Diament	Mazzard seedling	54.6 b	50.3 abcd	0.92 cd
	F 12/1	63.3 c	55.8 cd	0.88 cd
Dradem	Mazzard seedling	62.4 c	47.4 ab	0.77 bc
	F 12/1	64.9 c	50.8 abcd	0.79 bc
Lucyna	Mazzard seedling	92.2 f	54.1 bcd	0.58 a
	F 12/1	104.9 g	56.3 d	0.53 a
Sabina	Mazzard seedling	73.3 d	50.6 abcd	0.69ab
	F 12/1	80.0 e	53.8 bcd	0.67 ab

* Means values marked with the same letters are not significantly different at p = 0.05

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THE INFLUENCE OF ROOTSTOCKS AND CULTIVARS ON EFFICIENCY, GROWTH AND QUALITY OF MAIDEN PLUM TREES IN A NURSERY

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Abstract. *The influence of three rootstocks and chosen plum tree cultivars on the growth, efficiency and quality of maiden plum trees was checked in the experiment. A better efficiency of maiden plum trees was found for Prunus tomentosa rootstock. A strong growth of the maiden plum trees was observed on Prunus tomentosa and Prunus cerasifera and a weak one on Wagenheim Prune. It influenced a smaller compatibility of maiden plum trees obtained on this rootstock with Polish Norm PN-R-67010 compared with the two remaining ones.*

INTRODUCTION

Scientific studies concerning fruit tree nursery concentrate mainly on looking for new dwarf rootstocks, especially for strongly growing fruit trees species, the group of trees a plum tree undoubtedly belongs to. The following rootstocks have been known for plum trees: Pixy (Beakbane 1968; Beakbane and Fuller 1971; Jacob 1980; Webster 1980; Stebbins 1981; Hartmann 1984; Embree et al. 2000), Citation (Perry and Carlson 1983; Okie 1987), Saint Julien K (Glenn 1961, 1968; Webster 1980; Okie 1987), Eruni (Trajkowski and Anderson 1988; Świerczyński 1998; Sitarek et al. 2000), Ferlenain (GF 2038) and Marianna 8-6 (Maridon), (Webster and Wertheim 1993; Webster 1997). The following seedlings have also been tested as dwarf rootstocks for plum trees: *Prunus angustifolia* (Helton 1976), *Prunus besseyi* (Bernhard and Mesnier 1975; Van Oosten 1979; Putov and Puchkin 1982), *Prunus cistena* (Kuppers 1982), *Prunus glandulosa* (Kuppers 1981), *Prunus hortulana*, *Prunus maritima*, *Prunus injucunda* (Brenhard and Mesnier 1975), *Prunus pumila* (Hartman 1995), *Prunus spinosa* (Helton 1976), *Prunus triloba* (Van Oosten 1979; Kuppers 1981), *Prunus prostrata* (Kishore and Randhawa 1983), *Prunus subcordata* (Okie 1987) *Prunus tomentosa* (Hartman 1995). Unfortunately, so far none of them have been widely applied in nursery practice.

The aim of these studies was the evaluation of the usefulness of *Prunus tomentosa* Thunb. as dwarf rootstocks for the production of maiden trees of chosen plum tree cultivars.

MATERIAL AND METHODS

The experiment was carried out in 2003-2006. It was set up in four replications, with 25 rootstocks per plot. In spring of the three following years the rootstocks *Prunus*

cerasifera, Prunus tomentosa, Wagenheim Prune were planted into a nursery ground. In summer they were budded with four plum tree cultivars: 'Herman', 'Cacańska Rana', 'Amers', 'Cacańska Lepotica'. In autumn the following features of maiden plum trees were observed and measured: number of obtained maiden plum trees, compared with the number budded rootstocks (%), height of maiden plum trees, their thickness (measured 30 cm above the ground), number and average length of lateral shoots. On the basis of the obtained results consistency with Polish Norm PN-R-67010 was checked.

Statistical analysis of the results was carried out using two-factor variance analysis (cultivar, rootstock) using Duncan's test for a confidence level $\alpha = 0.05$. The results presented in tables are mean values from three years.

RESULTS

Both the applied rootstocks and cultivars differentiated significantly the percentage of the obtained maiden plum trees. A better efficiency of maiden trees was obtained on *Prunus tomentosa,* a worse one on *Prunus cerasifera* and Wagenheima Prune. Among cultivars most trees were obtained for 'Cacańska Lepotica' and the least for 'Amers'. The other two cultivars were located between the above mentioned ones (table 1).

The height of maiden plum trees depended mainly on the applied rootstock, less on the budded cultivar. The highest trees were obtained on *Prunus cerasifera,* the lowest on Wagenheim Prune. The medium height was observed for trees growing on *Prunus tomentosa.* Independently from the applied rootstock the height of maiden trees of 'Herman' cultivar was significantly bigger that of 'Amers' i 'Cacańska Rana' and did not differ from 'Cacańska Lepotica' (table 2).

Maiden plum trees growing on *Prunus tomentosa* and *Prunus cerasifera* were much thicker and had a bigger number of lateral shoots compared with those growing on Wagenheim Prune. Also trees of 'Amers' and 'Cacańska Lepotica' differed significantly with thickness and number of lateral shoots from 'Herman' and 'Cacańska Rana' cultivars (table 3, 4).

The applied rootstocks also influenced the average length of lateral shoots. The trees on *Prunus tomentosa* and *Prunus cerasifera* had significantly higher values of this parameter of growth compared with Wagenheim Prune (table 5). The budded cultivars did not differ with the mean length of lateral shoots.

A better consistency of the maiden plum trees with the norm was obtained on *Prunus tomentosa* and *Prunus cerasifera*, a smaller one on Wagenheim Prune. The budded cultivar did not affect the quality of maiden plum trees defined in Polish Norm PN-R-67010 (table 6).

DISCUSSIONS

There are some opinions in literature that as a rootstock *Prunus tomentosa* blends well with plum tree cultivars (Tretjak 1983, Michev 1990, Krychev and Jankova 1999; Świerczyński 2001). The percentage of the maiden plum trees obtained in this experiment confirms the above mentioned opinions.

The percentage of the obtained maiden plum trees depended on the applied rootstock. A similar dependence was observed by Gąstoł and Poniedziałek (1998). However, such influence of the rootstock on the final number of maiden plum trees was not found by Grzyb and Sitarek (1996).

In the discussed experiment the maiden plum trees obtained on *Prunus tomentosa* rootstock had the growth parameters similar to those on *Prunus cerasifera,* with the exception of height. It is not consistent with the results obtained by Karycheva and Jankovej (1999), who had noticed much worse growth of maiden plum trees on *Prunus tomentosa* comparison with *Prunus cerasifera.* Also Gąstoł and Poniedziałek (1998) observed differences in the growth of maiden plum trees depending on the power of growth of the applied rootstock. However, on the basis of their results, Grzyb and Sitarek (1996) did not notice any influence of Pixy dwarf rootstock on weakening the growth of maiden plum trees in a nursery in comparison with *Prunus cerasifera* i Wagenheima Prune.

It was proved that genetic conditions of the power of growth of individual plum tree cultivars caused the differences in maiden trees growth, independently from the rootstock.

Significantly weaker growth of maiden plum trees on Wagenheim Prune caused their smaller consistency with the Norm. The average result obtained on this rootstock (43.7%) should be considered not satisfactory in a nursery production. *Prunus tomentosa*, in turn, seems to be a very promising rootstock and requires more advanced studies in an orchard.

Table 1

Percentage of obtained maiden trees depending on rootstock and cultivar

Rootstock	Cultivar				Mean value for rootstock
	Herman	Cacańska Rana	Amers	Cacańska Lepotica	
Prunus cerasifera	45.2 b *	49.9 c	42.2 a	71.7 f	52.3 a
Wagenheim Prune	46.9 b	48.6 bc	42.0 a	69.1 f	51.7 a
Prunus tomentosa	55.2 de	57.7 e	52.6 d	75.6 g	60.3 b
Mean value for cultivar	49.1 b	52.1 c	45.6 a	72.1 d	

*Means followed by the same letters do not differ significantly at p = 0.05.

Table 2

Height of maiden trees depending on rootstock and cultivar

Rootstock	Cultivar				Mean value for rootstock
	Herman	Cacańska Rana	Amers	Cacańska Lepotica	
Prunus cerasifera	158.4 d *	149.4 cd	142.7 bcd	149.0 cd	149.9 c
Wagenheim Prune	136.2 abc	129.4 ab	123.8 a	125.9 ab	128.8 a
Prunus tomentosa	147.8 cd	133.5 abc	136.7 abc	147.6 cd	141.4 b
Mean value for cultivar	147.5 b	137.4 a	134.4 a	140.8 ab	

* Explanation: see table 1

Table 3

Thickness of maiden trees depending on rootstock and cultivar

Rootstock	Cultivar				Mean value for rootstock
	Herman	Cacańska Rana	Amers	Cacańska Lepotica	
Prunus cerasifera	13.9 de *	13.8 de	15.6 g	15.6 g	14.8 b
Wagenheim Prune	11.6 ab	11.4 a	13.2 cd	12.4 bc	12.1 a
Prunus tomentosa	13.6 de	14.6 ef	15.3 fg	16.0 g	14.9 b
Mean value for cultivar	13.0 a	13.3 a	14.7 b	14.7 b	

* Explanation: see table 1

Table 4

Number of lateral shoots of maiden trees depending on rootstock and cultivar

Rootstock	Cultivar				Mean value for rootstock
	Herman	Cacańska Rana	Amers	Cacańska Lepotica	
Prunus cerasifera	3.6 ab *	3.4 ab	6.6 cd	4.6 bc	4.6 b
Wagenheim Prune	1.6 a	1.7 a	1.6 a	4.7 bc	2.8 a
Prunus tomentosa	3.0 ab	3.1 ab	3.0 ab	8.0 d	5.1 b
Mean value for cultivar	2.7 a	2.7 a	5.4 b	5.8 b	

- Explanation: see table 1

Table 5

Average length of lateral shoots of maiden trees depending on rootstock and cultivar

Rootstock	Cultivar				Mean value for rootstock
	Herman	Cacańska Rana	Amers	Cacańska Lepotica	
Prunus cerasifera	48.3 d *	40.5 cd	41.4 cd	37.0 bcd	41.8 b
Wagenheim Prune	25.3 ab	17.9 a	28.8 abc	25.5 ab	24.4 a
Prunus tomentosa	40.0 cd	37.8 bcd	38.5 bcd	45.7 d	40.5 b
Mean value for cultivar	37.9 a	32.0 a	36.2 a	36.0 a	

* Explanation: see table 1

Table 6

Compatiblity of maiden trees with Polish Norm PN-R-67010 depending on rootstock and cultivar

Rootstock	Cultivar				Mean value for rootstock
	Herman	Cacańska Rana	Amers	Cacańska Lepotica	
Prunus cerasifera	82.5 bc *	74.3 b	80.0 bc	82.1 bc	79.8 b
Wagenheim Prune	40.1 a	43.8 a	44.8 a	46.4 a	43.7 a
Prunus tomentosa	78.4 bc	80.0 bc	81.8 bc	84.9 c	81.4 b
Mean value for cultivar	68.1 a	66.8 a	69.9 a	72.5 a	

* Explanation: see table 1

CONCLUSIONS

1. The efficiency of maiden plum trees in a nursery depended both on the rootstock and a budded cultivar. The best efficiency of the maiden trees was obtained on *Prunus tomentosa* rootstock, worse on *Prunus cerasifera* and Wagenheim Prune.

2. Much weaker growth of maiden plum trees was observed on Wagenheim Prune in comparison with the two remaining rootstocks.

3. The percentage of the maiden trees, the most consistent with the norm was found for those growing on *Prunus tomentosa and* comparison with *Prunus cerasifera Prunus cerasifera.*

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STUDY UPON SOME PHYSIOLOGICAL PROCESSES IN SCION-ROOTSTOCK ASSOCIATION AT FOUR PEAR VARIETIES AND ITS CORRELATIONS WITH COMPATIBILITY

STUDIU PRIVIND UNELE PROCESE FIZIOLOGICE CE APAR ÎN ASOCIAȚIA ALTOI-PORTALTOI LA UNELE SOIURI DE PĂR ŞI CORELAȚIILE CU COMPATIBILITATEA

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Abstract: *It is known that fruit production is in a permanent interaction because of scion-rootstock association and because of this it is necessary to chose very carefully the varieties which have to be engrafted on the best rootstock adequate for the climatic zone where the new plantation will be set. The rootstock vigour has a very important role in variety's growing and fructification engrafted on it. This is why knowing the influences of physiological and biochemical processes upon association scion-rootstock has a major importance. Compatibility is a very important characteristic too because we could engraft a larger number of varieties on a compatible rootstock and this make it valuable.*

The present study was made in order to understand better the influences upon engrafting compatibility of some pear varieties.

Rezumat. *Este cunoscut faptul că producția de fructe este într-o permanentă interdependență, datorata asociatiei altoi –portaltoi, astfel, se impune alegerea judicioasa atât a soiurilor cât şi a portaltoilor, funcție de zona climatica unde se va înființa plantația, crescând astfel premizele realizării unei plantații închegate, cu o creştere şi o rodire optima. Vigoarea portaltoiului are rol determinant în procesele de creştere şi fructificare ale soiului altoit pe el. De aceea, cunoaşterea influențelor proceselor fiziologice şi biochimice asupra asociației altoi-portaltoi este de o importanță majora. Şi compatibilitatea este o caracteristică foarte importantă, deoarece cu cat portaltoiul este compatibil cu un număr mai mare de soiuri, cu atat este mai valoros.*

Studiul de față a fost realizat pentru o mai bună cunoaştere a influențelor asupra compatibilității la altoire a unor soiuri de păr.

Plants photosynthetic activity is determined by complex physiologic processes and an important role in first stages of trees development have growth processes. While studying some physiological aspects of scion-rootstock association we find necessary to took into consideration some biometric parameters also. These allowed us to analyze the photosynthetic apparatus and also the whole plant.

The present studies aim some aspects of the relations between photosynthetic apparatus and plant vital metabolism. A special attention was given to the assimilators pigments. There were analyzed the relations between grafting success percentage, shoots growing and thickness morphological index of the grafting zone as results of a good activity of photosynthetic apparatus.

MATERIALS AND METHODS

The researches were made during 2004 – 2006 and there were studied four pear varieties Curé, Euras, Contesa de Paris and Williams. The grafting method used was T budding. The aim was observing the behaviour of those varieties grafted on two different rootstocks.

The experiment was organized in randomized block trials with 4 variants and 3 repetitions. The studies were carried out in Iasi, in V. Adamachi Experimental Farm of the Fruit Growing Department.

There were analyzed growth conditions, grafting success percentage, shoots length, the thickness morphological index of the grafting zone, chlorophyll pigment content of the scions and rootstocks leaves and the dry substance (Table 1).

Chlorophyll determinations were made using leaves from varieties and rootstocks, during the period of vegetation and they showed some content differences depending on the specie and variety genetic heritage.

Thus, in *Pyrus sativa Lam.* leaves was determined a higher content in A Chlorophyll (209.76 mg/100 g) comparing with *Cydonia oblonga Mill.* (149.50 mg/100 g). B Chlorophyll was determined in the same time with A Chlorophyll and had lower values than it at both rootstocks. So, the determined values were 1.84 lower than A Chlorophyll at *Pyrus sativa Lam.* and 1.09 lower at *Cydonia oblonga Mill.*

Regarding A Chlorophyll content in varieties leaves the results are as it follows: the biggest accumulation had Curé (150.90 mg/100 g) and Euras (149.60 mg/100 g) varieties while Contesa de Paris and Williams had a lower accumulation, of 130.10 mg/100 g and 126.80 mg/100 g.

Table 1

Grafted pear growth biometric data depending the used rootstock

Variety	Rootstock	Scion offshoot high (cm)	Grafting success percentage (%)	Rootstock diameter (mm)	Scion diameter (mm)	Difference between rootstock and scion diameter (mm)
Curé	*Pyrus sativa Lam.*	142.20	94	15.1	13.2	1.9
Euras		156.50	95	13.8	12.6	1.2
Contesa de Paris		110.70	71	16.5	14.3	2.2
Williams		102.30	69	18.3	16.8	1.5
Curé	*Cydonia oblonga Mill*	102.00	93	12.2	8.8	3.4
Euras		137.50	95	11.6	9.1	2.5
Contesa de Paris		77.00	52	14.8	12.3	2.5
Williams		54.00	40	20.5	18.8	1.7

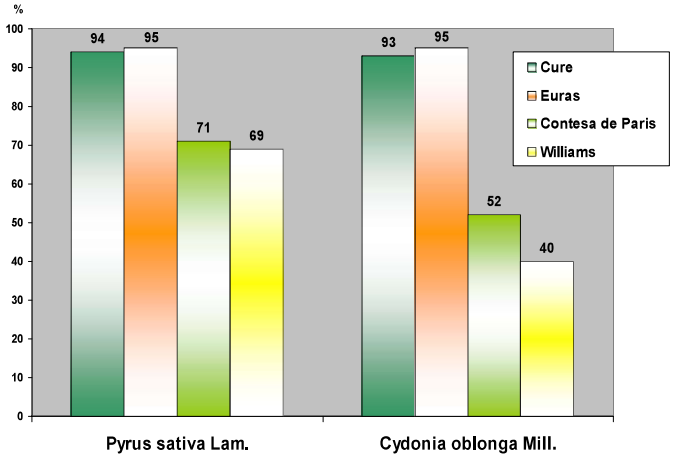

Figure 1. Grafting success percentage

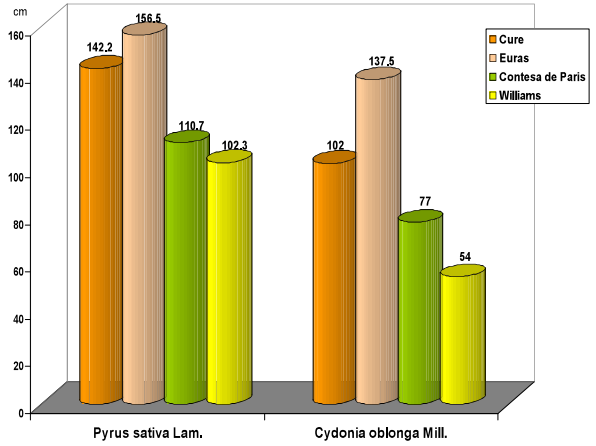

Figure 2. Scion offshoots groth high

RESULTS AND DISCUSSIONS

Studying some growth and photosynthetic index at *Pyrus sp*. showed that those depends on variety biological characteristics and in the same proportion on rootstock used for grafting. The influence of scion-rootstock association upon the studied indexes is not the same, though, a moderate growth is in direct correlation with a good capacity of shoots formation, a medium trunk thickness, a balanced distribution of assimilates. All these show an optimum relation between root system and epigeous part.

Table 1 shows the biometric data of those four pear varieties depending on the rootstock was used.

Concerning the grafting success percentage, there can be noticed differences between varieties grafted on the same rootstock and especially when there were used different rootstocks.

Though, Curé variety had 95% grafting success percentage grafted on *Pyrus sativa Lam*. and 93% grafted on *Cydonia oblonga Mill*. Euras variety grafting success percentage was 95% in both cases. Bigger differences were noticed at Contesa de Paris and Willians which have different compatibility with *Cydonia sp.* So, Contesa de Paris variety had 71% grafting success when *Pyrus sativa* was used and only 52% grafted on *Cydonia oblonga* while Williams variety had 69% grafting success on *Pyrus sativa* and only 40% when *Cydonia oblonga* was used as rootstock.

Analyzing at the joining zone the elements which characterize the compatibility of a combination (variety/rootstock) there can be seen that the differences between rootstock diameter and scion (upper and under the joining zone) at incompatible varieties grafted on *Cydonia oblonga* were bigger than when *Pyrus sativa* was used as rootstock. The most significant differences between rootstock and scion diameter was 2.5 mm registered by Euras grafted on *Cydonia oblonga* and 1.9 mm grafted on *Pyrus sativa*. At Williams variety grafted on *Cydonia oblonga* the difference was of 3.4 mm and only 1.2 mm when *Pyrus sativa* was used as rootstock.

From the researches concerning the thickness morphological index of the grafting zone regarding symbionts anatomical resemblance we could make some valuations upon grafting compatibility.

According to this index, a very good compatibility is assured when index value is higher than 0.33, a good compatibility when the index is between 0.33 - 0.30 and unsatisfactory when the index is under 0.30. In order to determinate this index there was measured rootstock diameter at ten centimetres under joining zone, scion diameter at ten centimetres upper the joining zone and the diameter measured in the joining area.

Table 2

Grafting zone morphologic evaluation of used pear varieties

Variety/Rootstock	Tree section area (cm^2)			Thickness difference between the scion and rootstock (cm^2)	The thickness morphological index of the grafting zone
	Upper the joining zone	Under the joining zone	In the joining zone area		
Curé/*Pyrus sativa Lam.*	1.36	1.78	2.18	0.40	0.41
Euras/ *Pyrus sativa Lam.*	1.24	1.49	1.78	0.25	0.46
Contesa de Paris/ *Pyrus sativa Lam.*	1.60	2.13	2.45	0.52	0.30
Williams/ *Pyrus sativa Lam.*	2.21	2.62	3.10	0.41	0.27
Curé/ *Cydonia oblonga Mill*	0.60	1.16	1.43	0.56	0.36
Euras/ *Cydonia oblonga Mill*	0.65	1.05	1.49	0.42	0.35
Contesa de Paris/ *Cydonia oblonga Mill*	1.20	1.72	2.80	0.52	0.24
Williams/ *Cydonia oblonga Mill*	2.77	3.29	4.04	0.52	0.20

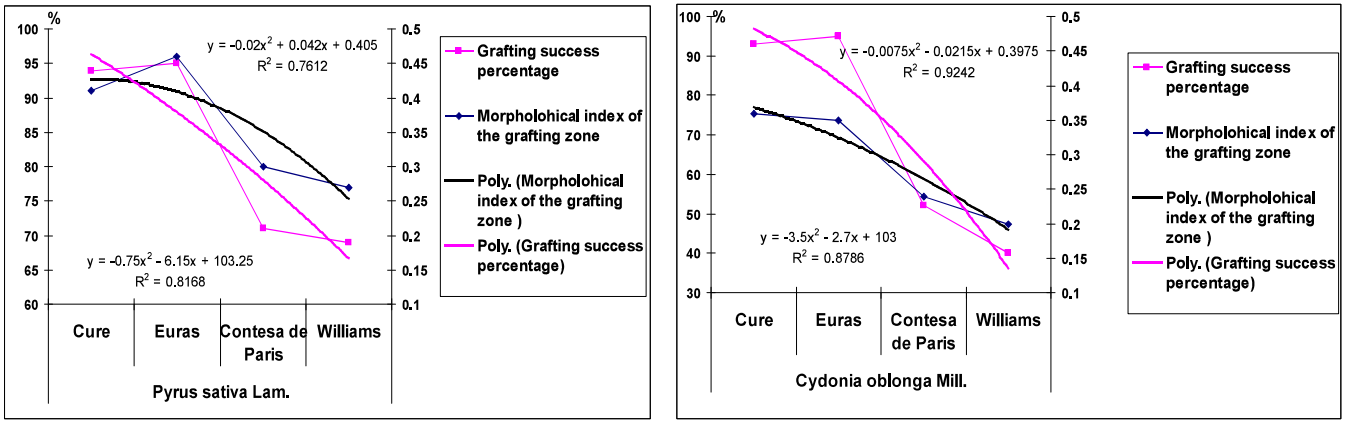

Figure 3. The correlation between the thickness morphological index of the grafting zone and grafting success percentage of pear varieties grafted on different rootstocks

After the measures were made in all 3 zones of the tree there were obtained interesting data which could explain better the scion-rootstock affinity phenomenon.

Curé variety grafted on *Pyrus sativa* has a morphological index of the grafting zone of 0.41 which make it very compatible. The difference between surface section under and upper the joining zone is small (0.40 cm^2). At the joining zone the surface section is 2,18 cm^2 which is in normal limits, fact which is confirmed by the higher grafting success percentage as well, of 94% in this case. When was grafted on *Cydonia oblonga*, the morphological index of the grafting zone was 0.36 the variety was included in the same group of compatibility, very good, fact sustained in this case as well, by the high grafting success percentage, 93%.

When Euras variety was grafted on a selection of *Pyrus sativa*, the morphological index of the grafting zone was 0.46 and grafted on a *Cydonia oblonga* selection the index was 0.36. Index values place both associations in first group of compatibility (very good compatibility). Differences between transversal section surface under and upper joining zone are small, of 0.25 cm^2 when grafted on *Pyrus* selection and 0.42 cm^2 grafted on *Cydonia* selection. The transversal section surface in the joining zone when Pyrus rootstock was used was 1.78 cm^2 and 1.49 cm^2 grafted on *Cydonia*. Grafting success percentage had the same high value in both cases. 95%

Contesa de Paris grafted on *Pyrus sativa* placed the variety in the second class of compatibility (good) with a index of 0.30 and when *Cydonia* rootstock was used in the last group (poor compatibility), when the index was 0.24. And the differences between rootsock and scion thickness were bigger (0.52 cm^2), comparing with Curé and Euras varieties. Transversal section surface in joining zone was 2.45 cm^2 when Contesa de Paris was grafted on *Pyrus* and 2.80 cm^2 grafted on *Cydonia*. These values are correlating with smaller percentage of grafting success, of 71% when grafted on *Pyrus* and only 52% grafted on *Cydonia*.

Grafted on *Pyrus*, Williams variety had the morphological index of the grafting zone of 0.27 which placed it in the group with poor compatibility and when *Cydonia oblonga* rootstock was used the index was 0.2 meaning a even poorer compatibility. The big values of transversal section surface, 3.10 cm^2 (grafted on *Pyrus*) and 4.04 cm^2 (grafted on *Cydonia*) comparing with the transversal section surface under and upper the joining zone it's another argument to place Williams variety in the last group of compatibility.

From the researches we made with the four pear varieties grafted on different rootstocks results that there is a direct correlation between had the morphological index of the grafting zone and grafting success percentage, correlation confirmed by the high values of correlation index R^2 (figure 3.). When the morphological index of the grafting zone has a small value, the grafting success percentage is also small and when the index's value is high the success percentage is also high.

Table 3

Variety and rootstock mutual influence upon scion offshoot growth high

Variety	Rootstock	Scion offshoot high (cm)	Relative high (%)	± d (m)	Signification
Curé (control)	*Pyrus sativa Lam.*	142.20	-	-	-
Euras		156.50	110.0	+0.14	-
Contesa de Paris		110.70	78.0	-0.31	0
Williams		102.30	72.0	-0.40	00
Curé	*Cydonia oblonga Mill*	102.00	72.0	-0.40	0
Euras		137.50	97.0	-0.05	-
Contesa de Paris		77.00	54.0	-0.72	000
Williams		54.00	38.0	-0.88	000

DL 5% = 0.26 DL 1% = 0.36 DL 0,1% = 0.49

As for the appreciation of varieties growth, grafted on two different rootstocks, this was made with the help of the biometric data concerning scion offshoot high, the thickness upper, under and in the joining zone. Using these data we could make some valuations of variety-rootstock mutual influence upon scion offshoot growing.

Analyzing the offshoots growth high variation and the variety-rootstock mutual influence upon scion offshoot growing at studied pear varieties (comparing with the control, Curé variety grafted on a *Pyrus sativa* selection) we can see that this varied between 72 – 110% when varieties were grafted on *Pyrus* selection and 38 – 97% when *Cydonia* selection was used. The differences we found are statistically assured and there were very significative at Contesa de Paris and Williams varieties grafted on *Cydonia* selection (table 3).

Table 4.

Varieties and rootstocks content in chlorophyll and carotenes pigments
(mg/100 g)

	A Chlorophyll	B Chlorophyll	Total Chlorophyll	A/B ratio	Carotenes	Total Chlorophyll /Carotenes
Varieties						
Curé	150,90	89,40	240,30	1,68	22,70	10,58
Euras	149,60	91,71	241,31	1,63	23,40	10,31
Contesa de Paris	130,10	76,42	206,52	1,70	25,13	8,21
Williams	126,80	77,19	203,99	1,64	26,65	7,65
Rootstoks						
Pyrus sativa Lam.	209,76	113,45	323,21	1,84	34,12	9,47
Cydonia oblonga Mill.	149,50	136,70	286,20	1,09	26,80	10,67

The accumulation of carotenes had +7.32 mg/100 g addition at *Pyrus sativa Lam.* comparing with *Cydonia oblonga Mill.*, where the accumulation was of only 26.80 mg/100 g.

At pear varieties a higher content of carotenes had Contesa de Paris and Williams, with 25.13 mg/100g and respective 26.65 mg/100 g while Curé had only 22.70 mg/100g accumulation and Euras 23.40 mg/100g.

CONCLUSIONS

1. Analyzing the data we obtained we could conclude that there is a correlation between the grafting success percentage, the morphological index of the grafting zone, offshoots growing and assimilative pigments accumulation in plants.

2. Curé and Euras varieties had high values for analyzed parameters and assured high percentage of grafting success while Contesa de Paris and Williams varieties were placed in the last group of compatibility, had lower pigments accumulation, small growth and lower grafting success percentage.

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RESEARCHES REGARDING THE INFLUENCE OF SOME PHYSIOLOGICAL PROCESSES UPON SCION-ROOTSTOCK ASSOCIATION AT FOUR PLUM VARIETIES

CERCETARI PRIVIND INFLUENȚA UNOR PROCESE FIZIOLOGICE ASUPRA ASOCIAȚIEI ALTOI-PORTALTOI LA UNELE SOIURI DE PRUN

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Abstract: *Among the complex factors which determine an important production increase and also a higher fruit quality, a very important role comes to the rootstock. Taking into the consideration the particular eco-pedological conditions where we cultivate fruit trees, not always the most favourable, the rootstock represent the main tool against soil limitative factors and allows the extension of fruit tree cultures on such soils.*

Aspects from the orchards as vigour, precocity, growing uniformity, fruit size and their quality are solved and with scion help and the best association scion-rootstock.

For a better comprehension of the influence upon engrafting compatibility we took into consideration some researches regarding anatomic-morphological, physiological and biochemical aspects at scion, rootstock and engrafted region. The main objective of the research was the study of some plum varieties behaviour engrafted on different rootstocks, in the ecological conditions of East Moldavia.

Rezumat. *În ansamblul factorilor care determină sporirea producției şi îmbunătățirea calității fructelor, un rol deosebit de important îl deține portaltoiul. Raportat la condițiile deosebite ecopedologice în care se cultivă pomii fructiferi, nu întotdeauna dintre cele mai favorabile, portaltoiul constituie principalul mijloc de luptă împotriva factorilor limitativi din sol şi asigură extinderea culturilor pe astfel de soluri.*

Aspectele din livadă privind vigoarea, precocitatea, uniformitatea de creştere, mărimea fructelor şi calitatea acestora sunt rezolvate în mare măsură şi cu ajutorul portaltoiului şi a combinației cea mai reuşită altoi-portaltoi.

Pentru o mai bună cunoaştere a influențelor asupra compatibilității la altoire se are în vedere efectuarea unor cercetări anatomo-morfologice, fiziologice şi biochimice în zona altoirii, portaltoi şi altoi, având ca obiectiv principal urmărirea comportării la altoire a unor soiuri de prun altoite pe portaltoi diferiți, în condițiile ecologice din estul Moldovei.

For a better efficiency of tree plantations it is necessary a good knowledge of plants physiological particularities, especially of photosynthesis, a process that determines the accumulations with direct implications in yields. Of activity of photosynthetic apparatus depend on metabolism intensity of the whole plant,

donor-receiver relations, and environment adaptation. And photosynthetic activity it's influenced by many exo and endogenous factors which could change photosynthetic apparatus structure and functions. This could be a premise of cellular metabolism modification, of which intensity depend the biologic productivity (11).

MATERIALS AND METHODS

The researches were made during 2004 – 2006 and there were studied four plum varieties Stanley, Pescăruş, Centenar and Tuleu gras. The aim was observing the behaviour of those varieties grafted on two different rootstocks, a selection of *Prunus domestica L*. and *Prunus cerasifera Ehrh*. The grafting method used was T budding.

The experiment was organized in randomized block trials with 4 variants and 3 repetitions. The studies were carried out in Iasi, in V. Adamachi Experimental Farm of the Fruit Growing Department.

RESULTS AND DISCUSSIONS

To know better the influences upon grafting compatibility we made some studies concerning physiology, biochemistry and anatomic-morphological changes that appear at scion-rootstock association.

Table 1.

Plum varieties dry substance

Variety	Rootstock	Dry substance (%)	Difference to the control	Signification
Stanley (control)	*Prunus domestica L.*	55.26	-	-
Pescăruş		55.63	+0.37	-
Centenar		49.54	-5.72	0
Tuleu gras		50.32	-4.94	0

DL 5% = 4.94 DL 1% = 7.49 DL 0.1% = 12.03

Stanley	*Prunus cerasifera Ehrh.*	53.73	-1.53	0
Pescăruş		52.82	-2.44	0
Centenar		43.92	-11.34	00
Tuleu gras		44.84	-10.42	00

DL 5% = 4.97 DL 1% = 7.53 DL 0.1% = 12.09

Dry substance content, determined in rootstock leaves varied between 67.79 % at *Prunus domestica L.* and 65.32 % at *Prunus cerasifera Ehrh.*

Regarding the varieties dry substance content the situation is as it follows: Stanley variety accumulated 55.26 % when was grafted on *P. domestica* and 53.73 % grafted on *P. cerasifera* and Pescăruş variety had a content of 55.63 % grafted on *P. domestica* and 52.82 % when grafted on *P. cerasifera*. So, Pescăruş registered a higher accumulation (+ 0.37 %) comparing with the control (Stanley varietz grafted on *P. domestica*).

Negative differences registered Centenar (-5.72) and Tuleu gras (-4,94) varieties, both when were grafted on *P. domestica*, differences statistically assured as

significant. In the case of grafting on *P. cerasifera* the differences were also negative but very significant.

The bigger differences that appear at the grafting on *P. cerasifera* of Centenar and Tuleu gras shows a reduced capacity of dry substance synthesis and a lower flow of glucides through grafting zone

Also, these varieties registered a lower accumulation in chlorophyll and carotenes pigments (table 2) comparing with Stanley and Perscăruş varieties which showed a better compatibility at grafting on both rootstocks.

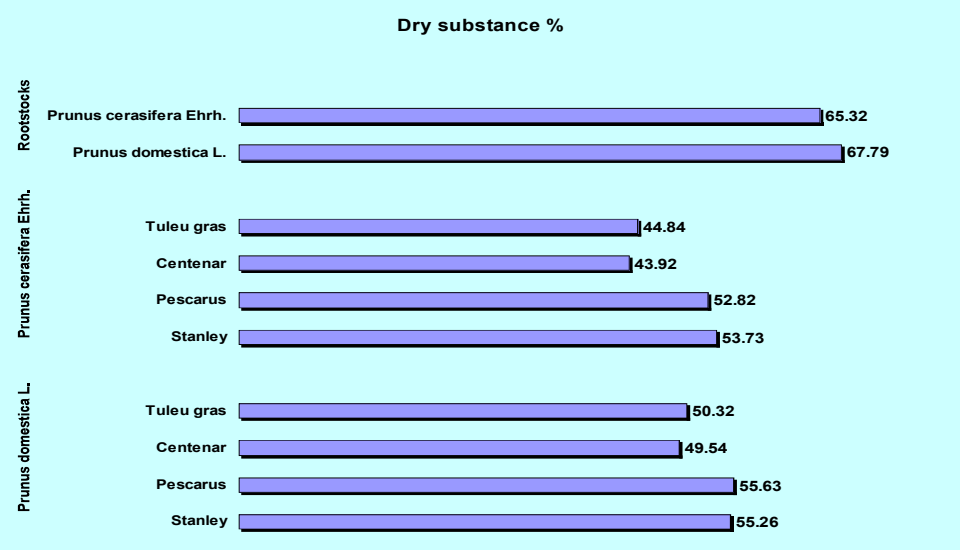

Figure 1. Varieties and rootstocks dry substance content

Table 2.

Chlorophyll and carotenes pigments content of varieties and rootstocks used for grafting combinations (mg/100 g)

	A Chlorophyll	B Chlorophyll	Total Chlorophyll	A/B ratio	Carotenes	Total Chlorophyll/ Carotenes
Varieties						
Stanley	149.10	92.43	241.53	1.61	17.50	13.80
Pescăruş	141.70	80.16	221.86	1.76	12.40	17.89
Centenar	121.34	73.18	194.52	1.66	20.10	9.67
Tuleu gras	133.12	79.86	212.98	1.67	16.25	13.10
Rootstocks						
Prunus domestica L.	169.32	80.25	249.57	2.11	38.71	6.44
Prunus cerasifera Ehrh.	189.40	101.50	290.90	1.86	24.00	12.12

The grafting compatibility was evaluated using the thickness morphological index of the grafting zone introduced by ICDP Piteşti Mărăcineni. The index is the ratio between scion transversal surface, rootstock transversal surface and grafting zone transversal surface. When the index has values higher than 0.33 varieties were appreciated as having very good compatibility, when the index is between 0.30 – 0.33 the compatibility is good and when the index is under 0.30 the compatibility is poor.

Analyzing table 3 we can say that Stanley variety, grafted on both rootstocks had a very good compatibility because the thickness morphological index of the grafting zone was superior to 0.30. The thickness difference between rootstock and scion was only 0.35 cm^2 (grafted on *P. domestica*) and 0.53 cm^2 (grafted on *P. cerasifera*). Grafting success percentage was higher in both cases (78 - 74%).

Also, a very good compatibility had Pescăruş variety of which morphological index was 0,40 (grafted on *P. domestica*) and 0,33 (grafted on *P. cerasifera*). The grafting succes was very good as well and varied between 82 – 76%.

Centenar variety is included in the same group, of varieties with very good compatibility, because of the high value of thickness morphological index (0.42), high grafting success percentage (73%) and small difference between transversal section of those two grafting partners of only 0.44 cm^2, all these when it was grafted on *P. domestica*. When Centenar variety was grafted on *P. cerasifera* thickness morphological index was 0.24 fact that indicates a poor compatibility. Also, the grafting success percentage was of only 55 % and the difference between rootstock transversal section and scion transversal section was 0.60 cm^2.

The biggest difference between grafting partners was registered by Tuleu gras variety grafted on *P. cerasifera* (0.72 cm^2). The thickness morphological index at this association had the lowest value, 0.23 and also the grafting success percentage, 49 %.

A small value of thickness morphological index (0.25) Tuleu gras variety had too when was grafted on *P. domestica* but in this case the grafting percentage was higher, 70 % and the thickness difference between rootstock and scion was omly 0.53 cm^2.

From figure 3 we can observe the correlation between the thickness morphological index of the grafting zone and grafting success percentage. At high values of grafting success percentage, in both grafting variants, Stanley and Pescăruş varieties, had high values of thickness morphological index. In the case of Centenar and Tuleu gras varieties, that have lower grafting success percentage (55 and 49 %), the thickness morphological index was only of 0.24 and 0.23 (poor compatibility).

These affirmation are sustained by the high values of correlation index R^2 = 0.926 (at grafting on *P. domestica*) and R^2 = 0.7101 (at grafting on *P. cerasifera*).

Table 3

Grafting zone morphologic evaluation of used plum varieties

Variety/Rootstock	Tree section area (cm^2)			Thickness difference between the scion and rootstock (cm^2)	The thickness morphological index of the grafting zone
	Upper the joining zone	Under the joining zone	In the joining zone area		
Stanley/*Prunus domestica L.*	1.36	1.71	2.26	0.35	0.35
Pescăruş/*Prunus domestica L.*	0.88	1.26	1.71	0.38	0.40
Centenar/*Prunus domestica L.*	1.07	1.51	1.67	0.44	0.42
Tuleu gras/*Prunus domestica L.*	1.60	2.13	2.95	0.53	0.25
Stanley/*Prunus cerasifera Ehrh.*	1.28	1.81	2.34	0.53	0.30
Pescăruş/*Prunus cerasifera Ehrh.*	0.70	1.13	1.83	0.43	0.33
Centenar/*Prunus cerasifera Ehrh.*	0.55	1.15	1.98	0.60	0.24
Tuleu gras/*Prunus cerasifera Ehrh.*	0.58	1.30	1.93	0.72	0.23

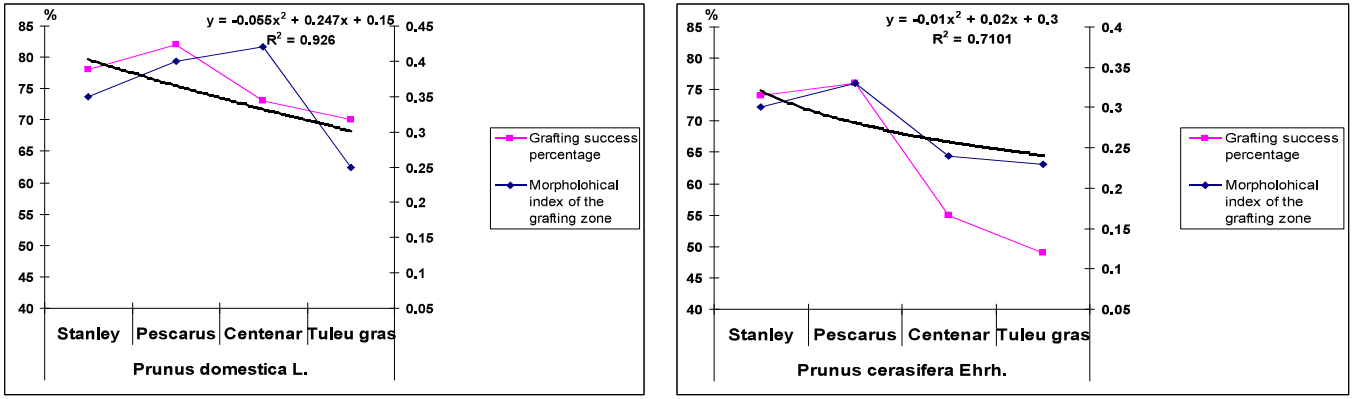

Figure 3. The correlation between the thickness morphological index of the grafting zone and grafting success percentage of plum varieties grafted on different rootstocks

CONCLUSIONS

The lack of affinity of incompatible associations could be observed by:

- ✓ localized forms of incompatibility, in the joining zone;
- ✓ lower value of thickness morphological index of the grafting zone;
- ✓ the accumulation of big quantities of dry substance above zone.

Leaves content in dry substance is correlated with varieties and rootstocks synthesis potential (chlorophyll and carotenes pigments).

At the associations with poor compatibility and poor joining (Centenar/*Prunus cerasifera*) could be noticed a significant lower content in dry substance comparing with trees that had a normal development.

The disturbances that appear in assimilated circulation are the result of a low development of roots and glucides stagnation above joining line, fact that determines the scion growing in diameter and also the joining zone at incompatible associations or with a poor compatibility.

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THE INFLUENCE OF PRUNING SYSTEMS ON THE PRODUCTION LEVEL OF FETEASCA NEAGRA 7 OD. CLONE FROM THE CONDITIONS OF THE VINEYARD ODOBESTI

INFLUENȚA UNOR TIPURI DE TĂIERE ASUPRA PRODUCȚIEI LA FETEASCĂ NEAGRĂ CLONA 7OD. IN CONDIȚIILE SPECIFICE DIN PODGORIA ODOBEȘTI

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Rezumat. *Soiul Feteasca neagra reprezinta unul din soiurile autohtone cu un viitor incontestabil in viticultura romaneasca. Ca urmare in perioada 2004-2006, la SCDVV Odobesti au fost efectuate cercetari care au urmarit stabilirea tehnologiei de cultura a clonului Feteasca neagra 7-20 omologat sub denumirea de FN 7 Od.*

Pentru a stabili cea mai buna solutie tehnologica s-a studiat cu atentie lucrarile agrofitotehnice in special taierile de fructificare in perioada de repaus (tipul de taiere incarcatura de ochi si repartizarea acesteia pe elementele de productie) cat si efectul lucrarilor si operatiilor in verde, in scopul valorificarii la maxim a potentialului cantitativ si calitativ al soiului.

Variantele experimentale au scos in evidenta superioritatea elementelor de rod lungi (coarde de 12-14 ochi) in defavoarea celor scurte (cepi de 2-3 ochi) . Un element esential in asigurarea unei bune fertilitati il constituie asigurarea la taiere a ordinii de amplasare a lemnului (lemn de 1 an, pe lemn de 2 ani, pe lemn de 3 ani). Deasemenea asigurarea unui raport optim intre suprafata foliara si incarcatura de struguri pe butuc, reglat si prin lucrarile in verde, constituie o conditie de baza in obtinerea unor productii superioare cantitativ si calitativ.

Feteasca neagra 7 Od. is one of the most valuable clones, created at the Research and Development Station for Viticulture and Enology Odobesti, starting from the indigenous variety called Feteasca neagra. The potentialul of production can be estimated agro-productively more efficiently within the same category are the sort of grapes destined to obtain red wines with a name from a controlled origin (DOC).

Feteasca neagra clone 7 Od. is characterized through a relatively low productive potential, however positive characteristics of this clone can be made significant through pruning methods, this way we can control the potential of production in a positive way by applying a specific pruning method with different potential crops.

The purpose of the present research is to estabilish a comparative study with respect to the response reaction regarding the productivity of the Feteasca neagra clone 7 Od. through the application of specific pruning methods and different potential crops.

Aiming for the optimization of the cultural tehnology in order to fully express its biological potential in the ecoclimatic conditions of the vineyard Odobesti, two pruning systems (the short pruning and the cane pruning) were studied was studied, as well as several bud loads that have a different distribution for the fruit-bearing parts of the vine.

MATERIAL AND METHODS

The research works were developed during 2004-2006 period at the Research and Development Station for Viticulture and Enology Odobeşti.

The research material taken into studies is Feteasca neagra clone 7Od. selected at the Research and Development Station for Viticulture and Oenology Odobeşti and homologated in year 2005, grafted on Kobber 5BB rootstock.

The vines were planted at a distance of 1,4 m in ranges and 2,0 m between the ranges, the training on half stem, the pruning system – the short pruning and the cane pruning, the pruning types - Guyot on half stem and Cordon system, the potential crop/m.sq. - 10-14-16-17.

It was studied 5 experimental variants on which apllied two type of pruning (Guyot on half stem and Cordon system), and the potential crop/m.sq. - 10-14-16-17 prezented in Table 1.

Table 1

The experimental variants studied

Variant	Pruning type	Units	No. of buds/sq.m.	No. of buds/vine
V_1	Cordon system	20 spurs of 2 eyes	14	40
V_2	Guyot on half stem	4 units of one spur of 2 eyes + one cane of 8 eyes	14	40
V_3	Guyot on half stem	4 units of one spur of 2 eyes + one cane of 9 eyes	16	44
V_4	Guyot on half stem	4 units of one spur of 2 eyes+one cane of 10 eyes	17	48
V_5	Guyot on half stem	2 units of one spur of 2 eyes+one cane of 12 eyes	10	28

For every experimental variant 4 repetitions were done, the vines being randomly distributed in the plantation in accordance with the method of the Latin square. Every experimental variant consisted of 18 vines each.

Observations, measurements and determinantions were made concerning the influence of the pruning system, the potential crop and the buds distribution, upon the fertility and the grapes yield of the clone Feteasca neagra 7Od .

The climatic conditions for vegetative period which had influenced the experimental period and the multiannual values are presented in Table 2

Table 2

Main climatic elements for the experimental period

Year / Month	Temperature (°C)			Precipitation (mm)			Sunlight (hour)		
	2003	2004	2005	2003	2004	2005	2003	2004	2005
April	9.8	11.8	10.5	20.3	63.0	25.1	192.9	238.3	181.6
May	20.5	15.4	16.9	57.9	29.3	58.5	326.8	233.2	248.8
June	21.8	19.7	18.5	12.2	55.8	97.4	360.2	257.1	224.5
July	22.1	21.5	21.5	63.5	10.7	302.8	260.1	249.1	260.6
Aug.	23.1	20.8	21.2	42.4	94.6	45.6	282.3	272.1	262.1
Sept.	15.9	16.3	17.6	68.3	31.4	91.1	179.6	227.0	190.5
Oct.	9.8	11.8	11.5	74.6	15.3	16.5	128.8	158.4	167.5
Average	17.5	16.7	16.8	48.4	56.7	91.0	247.2	233.6	219.3
Sum				339.2	397.1	637	1730.7	1635.2	1535.6
Multiannual values	M16.8			M 60.0 Σ 420.4			M 237.8 Σ 1602.3		

RESULTS AND DISCUSSIONS

The influence of the pruning systems, of the potential crop and the buds distribution on different fruit-bearing parts of the vine, upon the fertility of the Feteasca neagra clone 7 Od. is presented in Table 3:

- the average of fertile shoots ranges between 14.45 (V1) and 27.68 (V3);
- the average of sterile shoots ranges between 7.95 (V5) and 21.25 (V1);
- the average of total shoots is directly influenced by the potential crop per vine and varied between 24.13 (V5) and 41.08 (V3);
- number of inflorescences per vine ranges between 16.30 (V1) and 27.28 (V3).

Table 3

The influence of pruning system , the potential crop and the buds distribution upon the fertility of the shoots

Variant	Average shoots number/vine									Average inflorescences number/vine.		
	Fertile			Sterile			Total					
	Val.	Diff.	S.	Val.	Diff.	S.	Val.	Diff.	S.	Val.	Diff.	S.
V1	14.45	-5.75	**0**	21.25	4.86	**	35.70	-0.88	-	16.30	-5.03	-
V2	17.45	-2.75	-	14.28	-2.11	-	31.73	-4.85	**00**	19.40	-1.93	-
V3	27.68	7.48	**	13.40	-2.99	**0**	41.08	4.50	**	27.28	5.95	*
V4	23.73	3.53	-	16.43	0.04	-	39.18	2.60	-	23.73	2.40	-
V5	16.18	-4.02	-	7.95	-8.44	**000**	24.13	-12.45	**000**	17.93	-3.40	-
Exp. average	20.20	0.00	-	16.39	0.00	-	36.58	0.00	-	21.33	0.00	-
DL 5%		4.244			2.795			3.171			5.906	
DL 1%		5.879			3.871			4.392			8.180	
DL 0.1%		8.111			5.340			6.059			11.286	

Table 4

The influence of pruning system , the potential crop and the buds distribution, upon the percentage of the fertile shoot and the relative coefficient of fertility

Variant	Fertile shoots (%)			Relative fertility coefficient (C.F.R.)		
	Val.	Diff.	Sem.	Val.	Diff.	Sem.
V1	40.50	-14.02	00	0.48	-0.10	-
V2	54.87	0.35	-	0.61	0.03	-
V3	67.36	12.84	**	0.66	0.08	-
V4	60.44	5.92	-	0.60	0.02	-
V5	67.03	12.51	**	0.74	0.16	*
Exp. average	54.55	0.00	-	0.58	0.00	-
DL 5%		8.950			0.136	
DL 1%		12.396			0.189	
DL 0.1%		17.102			0.260	

Referable to the influence of the pruning system, the potential crop and the buds distribution on different fruit-bearing parts of vine upon the percentage of the fertile shoot and the relative coefficient (Table 4), result a big difference between the variant with short pruning (spur) V1(40.50%) and all the variants with the long cane pruning (over 54%).

This prove the fact that the short pruning (spur), isn't recommended for to have a high fertility. The highest fertility was encountered for the variant V3, namely, for the variant with a potential crop by 44 buds/vine and pruning in the long canes (9 buds/vine).

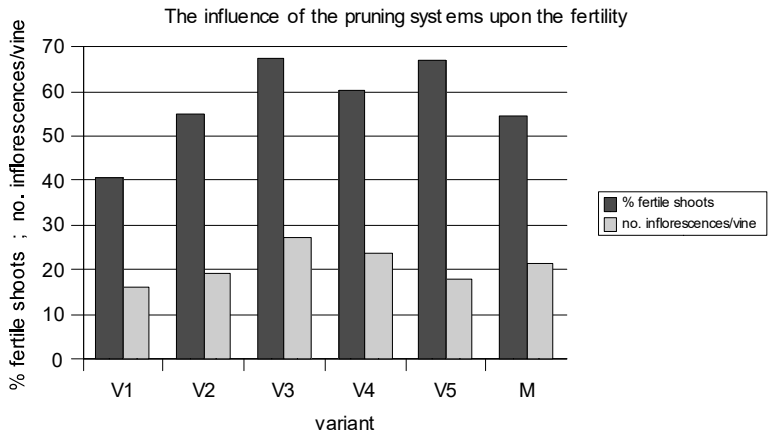

Fig. 1 Influence of the pruning system upon the fertility

The coefficient of relative fertility registered the mean variances, the lowest value was obtained for variant V1 (0.48) while the highest value was seen from variant V5 (0.74).

Table 5

The influence of pruning system , the potential crop and the buds distribution, upon the number and the average weight of grapes per vine and the grapes yield

Variant	Grapes											
	Average number/vine			Average weight (g)			Grapes yield/vine (Kg)			Grapes yield/ha (To)		
	Val.	Diff.	S.	Val.	Diff.	S.	Val.	Diff.	S.	Val.	Diff.	S.
V1	12.00	-2.33	**0**	155.67	-12.00	**00**	1.87	-0.56	**00**	6.81	-2.12	**00**
V2	15.23	1.00	-	169.33	1.66	-	2.59	0.16	-	9.56	0.63	-
V3	16.00	1.67	-	177.67	10.00	*	2.84	0.41	*	10.46	1.53	*
V4	17.33	3.00	**	164.67	-3.00	-	2.84	0.41	*	10.48	1.55	*
V5	12.00	-2.33	**0**	170.33	2.66	-	2.04	-0.39	**0**	7.52	-1.41	**0**
Exp. average	14.33	0.00	-	167.67	0.00	-	2.43	0.00	-	8.93	0.00	-
DL 5%		2.045			7.930			0.332			1.246	
DL 1%		2.833			10.983			0.460			1.727	
DL 0.1%		3.908			15.153			0.634			2.382	

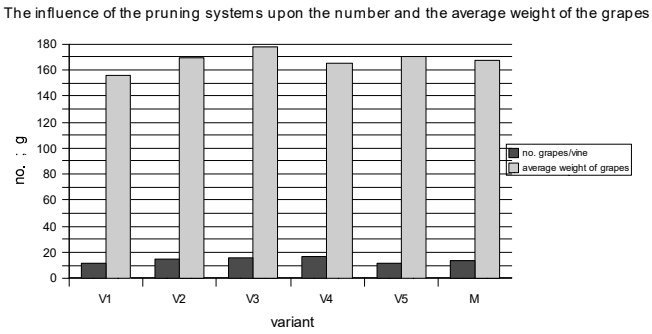

Fig. 2 Influence of the pruning system upon the number and the average weight of grapes per vine

The influence of the pruning system, the potential crop and the buds distribution on vine upon the number and the average weight of grapes per vine and the grapes yield for Feteasca neagra clone 7 Od. is presented in Table 5, therefore:

- as for the average number of the grapes per vine, the values oscillate between 12.0 for the variants V1, V5 and 17.33 for the variant V4;

-as to the average weight of the grape, the values varied between

155.67 g for the variant V1 and 177.67 g for variant V3;

- as for the average the grapes yield per vine this is content between

1,87 kg/ vine for variant V1 and 2,87 kg/vine for variants V3 and V4;

- the grape yields which was evaluated varied between 6.81 to/ha for variant V1 to 10.48 to/ha for variant V4.

Analyzing the quantitative characteristics for the grapes yield obtained, presented in Table 5, is evidently – as to the number of grapes per vine, a distinctive significant difference was noted between the variant V4, with the highest potential crop (48 buds/vine) in comparision to the experimental average, and negatively significant

difference for the variants V1 (40 buds/vine – the spur pruning), and V5 (28 buds/vine – the long cane pruning) with the lowest potential crop.

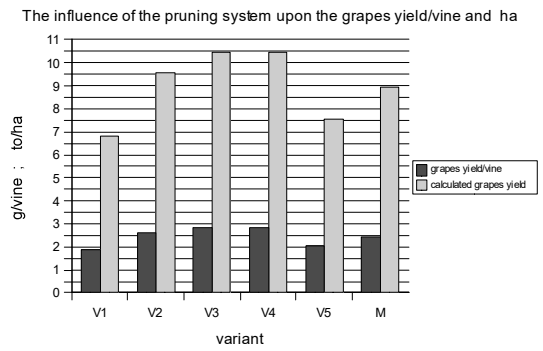

Fig. 3 Influence of the pruning system upon the grapes yield per vine and per ha

The situation is different as for the average weight of the grape, so, the lowest value – significant negatively distinct is encountered for the variant V1 (40 buds/vine - the spur pruning), and a significant difference for variant V3 (44 buds/vine - the long cane pruning).

The analize of quantitative grapes yield per vine and per ha (calculated), showed a pozitive significant difference for the variants V4 and V3 ,with the values very approach, namely 10.48 to/ha, and respectively 10.46 to/ha and distinct significant negatively for the experimental variant with the spur pruning (V1 – 40 buds/vine), with 6.81 to/ha, with 0.71 to/ha less even the experimental variant with the lowest potential crop (V5- 28 buds/vine).

This result confirm the fact that a bigger potential crop will determine to a bigger quantitative grapes yield for the varieties with a high growing vigour (such like the way Feteasca neagra clone 7 Od.), in the case when the potential crop is distributed on the units comprise one spur of 2 eyes + one cane of 9-10 eyes.

CONCLUSIONS

1. The results which were obtained emphasized that the Feteasca neagra clone 7 Od., achieved the very good quantitative grapes yield (10.46 to/ha for V3 and 10.48 to/ha for V4) used the cane pruning system;

2. The relative fertility of the clone FN 7 Od. decrease substantially (67,36 - V3 to 40,50 – V1) in the case used the spur pruning;

3. The grapes yield were obviously influenced quantitatively by the way the potential crop were distributed on the vine cane or the spur;

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REGENERATION OF GRAPEVINE PLANTS FROM FOLIARY EXPLANTS UNDER *IN VITRO* CULTURE CONDITIONS

REGENERAREA DE PLANTE DE VIȚĂ DE VIE ÎN CONDIȚII DE CULTURĂ *IN VITRO* DIN EXPLANTE FOLIARE

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Abstract. *Leaf explants were excised from in vitro developed shoots, Xenia and Cabernet 33 Vl. cultivars and cultured on Murashige & Skoog (1962) added with 1.5 mg/l Benzyl aminopurinã, 0.2 mg/l Acid indolil acetic, 40 mg/l adenine sulphate and 3% (w/v) sucrose. Adventitious buds developed after about 2 – 3 weeks of culture at the petiolar stub and with low frequency from lamina tissues. 80% - 85% from explans exhibited further shoots growth after several adventitious buds subculture on medium with similar composition except Indolyl acetic acid which was replace with Thidiazuron. The greatest regeneration capacity was showed by the youngest leaves situated in the apical bud.*

Rezumat. *Explante foliare prelevate de la lăstari diferentiati in vitro, genotipurile Xenia si Cabernet 33 Vl., au fost cultivate pe mediul Murashige & Skoog (1962) aditionat cu 1.5 mg/l Benzyl aminopurinã, 0.2 mg/l Acid indolil acetic, 40 mg/l adenine sulphate si 3% (w/v) zaharozã. Dupã 2 – 3 sãptãmâni de culturã la baza petiolului, si, în mãsurã mai micã pe suprafata laminei foliare, s-au dezvoltat muguri adventivi. 80% - 85% din mugurii diferentiati au evoluat în plante, dupã subcultura repetatã a mugurilor adventivi pe un mediu cu o compozitie asemãnãtoare cu a mediului initial, cu exceptia Acidului indolil acetic care a fost înlocuit cu Thidiazuron. Capacitatea cea mai mare de regenerare au manifestat-o frunzele cele mai tinere situate în mugurele apical.*

Like many woody crops, grape has been relatively recalcitrant to in vitro adventitious regeneration. Adventitious shoot organogenesis has been achieved from fragmented shoot apices, internode segments and leaves. Successful regeneration has been obtained with some cultivars, there is no reliable regeneration procedure thai may be applicable to all major cultivars. The most important factors involved in the regeneration process are the genotype, explant source, the media culture composition and culture conditions (Cheng and Reisch, 1989; Clog at al., 1990; Martinelli et al., 1993, Reisch at al., 1989; Tang and Mullins, 1990; Torregrosa, 1994, 1995). The methods were applied with good results in the obtaining of transgenic plants with modified characters (Martinelli and Mandolino, 1994; Kikkert at al., 1996). This paper describes a new method providing a high regeneration frequency of adventitious shoots in case of two *Vitis vinifera* varieties.

MATERIAL AND METHOD

The biological material used in the experiment consisted in herbaceous shoots of Vitis vinifera cultivars Italia and Cabernet 33 VI. produced from dormant cuttings planted in hydroponic culture conditions. Bud cultures were initiated from single axillary bud microcuttings without leaves and cultivated on MS basal medium supplemented with 2.25 mg/l Benzyl aminopurine. Foliary tissues obtained from newly developed shoots were used as initial explants for the regeneration protocol. Five leaves of various sizes (1.2 – 6.5 mm) were removed from the apical and the first axillary bud by a single cut made near the junction of petiole and lamina. The smallest leaves were removed with the aid of a stereomicroscope. Thirty explants were used for each culture medium or treatment.

The in vitro regeneration procedure involved three steps: induction of adventitious buds from foliary explants, regeneration and elongation of shoots from adventitious buds and rooting of shoots.

The composition of the culture media used in this study differed as regards the culture stage but always using the MS medium as base. The induction of adventitious buds was achieved on medium supplemented with 1.5 mg/l Benzyl aminopurine, 0.2 mg/l Indolyl acetic acid, 40 mg/l adenine sulphate and 3% (W/V) sucrose. Adventitious buds were transferred on two media: medium A, added with 2.0 mg/l Benzyl aminopurine and 0.5 mg/l Indolyl acetic acid and medium B, added with 2.25 mg/l Benzyl aminopurine and 0.1 mg/l Indolyl acetic acid. For the propagation phase involving successive subcultures every 30 – 45 days of adventitious buds microcuttings obtained from the proliferating shoots only Indolyl acetic acid was substituted with Thidiazuron. All culture media were sterilized by autoclaving 20 minutes at 120°C and 1 atm.

The culture was incubated in a controlled climate chamber at 25 ± 2°C, with a photoperiod of 16 hours. The light was provided by fluorescent tubes of white light.

RESULTS AND DISCUSSIONS

After about 5 – 7 days under culture, the leaves began to grow, showing a slight swelling. After 10 – 15 days, explants had swollen petiolar stubs, associated with petiole elongation. Adventitious buds began to differentiate at the buttom of the petiole or on the lamina surface after 20 – 25 days of culture. Buds continued to develop and after one month adventitious shoots had grown. At this time the greatest part of the regenerating explants showed a mass of adventitious leaves, buds and shoots up (Figure 1).

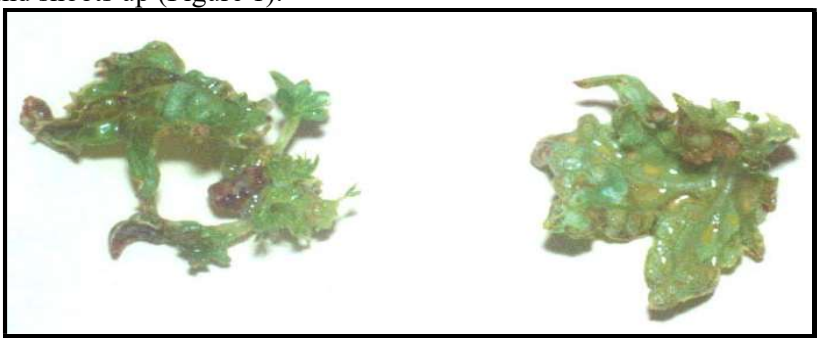

Figure 1 Adventitious buds formation from petiolar stubs and on surface lamina

The size of the leaves affected the capacity of explants to produse adventitious buds and shoots. The best results were observed in case of the smallest leaves (1.2 mm), the procent of explants producing adventitious shoots decreased with increasing leaf size (Figure 2).

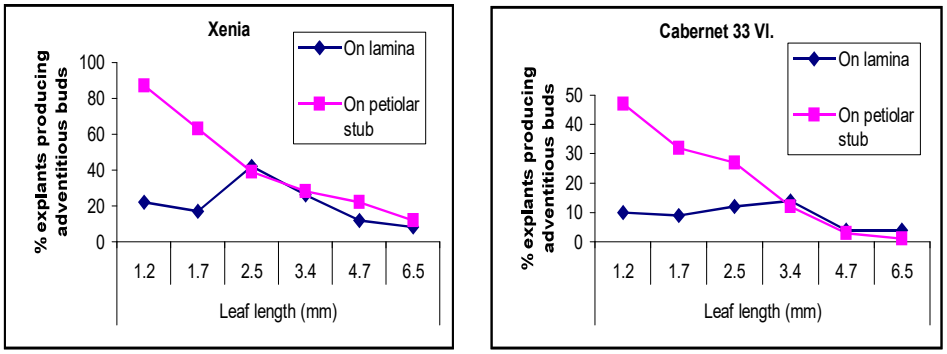

Figure 2 Effect of leaf size on adventitious buds organogenesis. Each value is a mean ± SE of 30 replicates.

The transfer of explants with adventitious buds to fresh regeneration medium at 4 weeks and at 8 weeks, promoted further shoot development. The percentage of explants forming shoots was dependent on the cultivar, the medium composition and the origin of shoots. The best regeneration occurred from explants represented by petiolar stubs with adventitious buds on A medium in case of both cultivars but, Cabernet 33 VI. variety was less responsive than Xenia. The percent of explants forming shoots on the surface lamina decreased with increasing the period of subculture from 4 to 8 weeks because of the necrosis of foliary lamina (Table 1).

Table 1

Adventitious shoots formation on regeneration media

Cultivar	Culture media	% Explants forming shoots			
		4 weeks		8 weeks	
		Petiolar stubs with adventitious buds	Surface lamina with adventitious buds	Petiolar stubs with adventitious buds	Surface lamina with adventitious buds
Xenia	A	33 ± 8	8 ± 4	42 ± 5	5 ± 2
	B	18 ± 2	5 ± 2	25 ± 3	3 ± 5
Cabernet 33 VI.	A	19 ± 5	7 ± 2	22 ± 3	3 ± 3
	B	14 ± 3	3 ± 3	16 ± 5	2 ± 2

At the time of the transfer of explants to fresh regeneration medium adventitious shoots were up to 3 mm long. Shoots continued to grow and after 6 weeks individual cultures had from 5 – 18 shoots greater than 4 mm long (Figure 3).

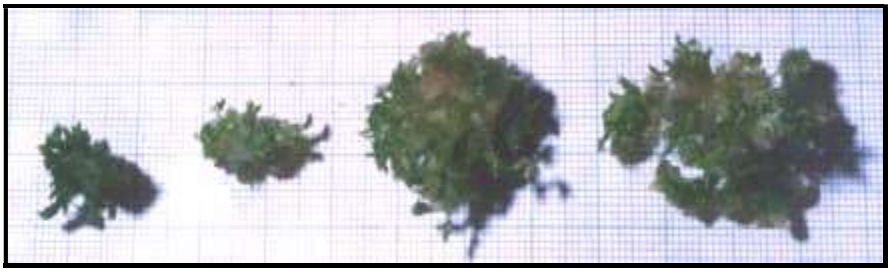

Figure 3 Adventitious shoots development during 6 weeks

The regeneration of shoots from adventitious buds situated at petiolar stubs resulted in superior shoots development in comparison with that obtained from adventitious buds situated on lamina surface (Table 2)

Table 2

Shoots development from different sites after 6 weeks

Cultivar	Site	Explants with shoots > 4 mm long (%)	Mean no. shoots >4 mm/explant
Xenia	Petiolar stubs with adventitious buds	76 ± 4	6.8 ± 2
	Surface lamina with adventitious buds	12 ± 2	3.0 ± 1.0
Cabernet 33 Vl.	Petiolar stubs with adventitious buds	38 ± 5	4.2 ± 0.8
	Surface lamina with adventitious buds	5 ± 1.2	2.0 ± 1.0

The propagation was continued by realizing successive subcultures of adventitious buds micro cuttings on fresh medium with similar composition in order to obtain a large number of shoots without morphologic and quality affected. The sprouting rate of buds was relative high during the four subcultures (92% - 72%) in case of both genotypes. The vitrification affected 7 % – 12% of the explants in the third subculture and 16% - 28% in the fourth subculture (Figure 4).

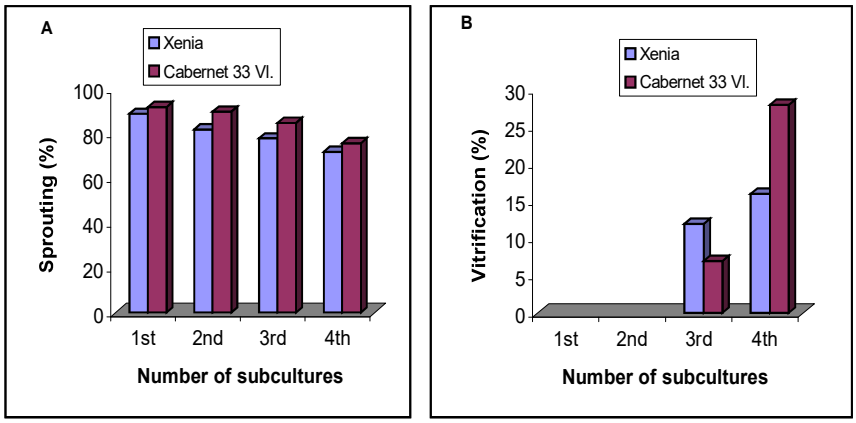

Figure 4 Percentage of sprouting (A) and vitrification (B) during four subcultures on the propagation medium

Rooting and roots growth occurred from more than 95% of adventitious shoots. After 25 – 30 days from shoots transfer into the rooting medium the plants were placed into presterilized peat pots and maintained in high humidity (90% - 95%).

When shoots reached 4 – 5 cm in height with 6 – 7 developed leaves the grapevines were acclimated to growth chamber conditions by lowering the humidity to 65 – 70%. The plants resembled normal young grapevine seedlings with spiral phyllotaxy and no tendrils (Figure 5). Root tip squashes of several regenerated plants reveled the diploid chromosome number (2n = 38). The regeneration process, from leaf to pots-grown adventitious plants occurred within 24 weeks.

Figure 5 Grapevine plants acclimated to in vivo conditions

CONCLUSIONS

Regeneretion from the petiole or on the lamina surface did not involve an intermediary callus stage. The youngest and the smallest leaves were the most organogenic at all regeneration sites. Regeneration declined with increasing leaf size. The percentage of explants forming shoots was dependent on the cultivar, the medium composition and the origin of shoots. The best regeneration occurred from explants represented by petiolar stubs with adventitious buds in case of both cultivars but, Cabernet 33 Vl. variety was less responsive than Xenia.

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PRESERVATION OF THE GRAPEVINE EXPLANTS ON MEDIA ADDED WITH OSMOTIC INHIBITORS

CONSERVAREA EXPLANTELOR DE VIȚĂ DE VIE PE MEDII ADIȚIONATE CU INHIBITORI OSMOTICI

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Abstract. *The explants represented by one internode and one leaf, both of them prelevated from plants obtained by stimulating the multiple axillary shoots belonging to meristematic tissues, inoculated on media lacking growth stimulators and supplemented with osmotic inhibitors developed very slowly, the maximum period of survival for the differentiated shoots when keeping the explant on the same culture medium being of 9 – 15 months.*

Although the survival rate of the explants was quite high both under conditions of half darkness and 17°C (80% - 97.5%) and under conditions of light at 25°C (90% - 97.5%), the percentage of explants which differentiated shoots was rather low: 12.5% - 17.64%, under conditions of half darkness and low temperature, and 17.9% - 30.5% under conditions of normal light and temperature. After 6 – 7 months of preservation on a medium containing Mannitol or acetyl salicylic acid, without transferring the explants on fresh media, the first signs of decay occurred, the leaves changing their colour and the roots gradually presenting signs of necrosis. Under such conditions, after 8 – 9 months of preservation on a medium containing mannitol and 14 – 15 months on a medium including acetyl salicylic acid (according to the genotype), the plants were passed on fresh media lacking growth inhibitors and added with 0.2 mg/l Kynetine and 1.18 mg/l indolyl acetic acid for stimulating the differentiation of new roots and the shoot growth. For stimulating the adult type behaviour, the fortification of the in vivo acclimatized shoots was accomplished by chopping the plants each 2 – 3 eyes.

Rezumat. *Explantele reprezentate printr-un internod si o frunză, prelevate de la plante obtinute prin stimularea lăstăririi axilare multiple plecând de la tesuturi meristematice, inoculate pe medii lipsite de stimulatori de crestere si aditionate cu inhibitori osmotici au evoluat foarte lent, perioada maximă de supravietuire a lăstarilor diferentiati în conditiile păstrării explantului pe acelasi mediu de cultură fiind de 9 - 15 luni.*

Desi rata de supravietuire a explantelor a fost foarte mare atât în conditii de semiîntuneric, la 17°C (80% - 97,5%), cât si în conditii de lumină, la 25°C (90% - 97,5%) procentul explantelor care au diferentiat lăstari a fost foarte mic: 12,5% - 17,64%, în conditii de semiîntuneric si temperatura redusă si 17,9% - 30,5% în conditii de lumină si temperatură normale. După 6 - 7 luni de conservare pe mediu cu Mannitol sau Acid acetyil salicilic, fără transferarea explantelor pe medii proaspete au apărut primele semne de senescentă prin schimbarea culorii frunzelor si necrozarea treptată a rădăcinilor. In aceste conditii, după 8 - 9 luni de conservare pe mediu cu mannitol si 14 – 15 luni pe mediu cu Acid acetyl salicilic (în functie de genotip) plantele au fost trecute pe medii proaspete, lipsite de inhibitori de crestere si aditionate cu 0,2 mg/l Kinetină si 1,18 mg/l Acid indolyl acetic pentru a se stimula diferentierea de noi rădăcini si cresterea lăstarului. Pentru stimularea manifestării unui comportament de tip adult a fost efectuată fortificarea lăstarilor alimatizati in vivo prin tăierea plantelor la 2 – 3 ochi.

Vitis vinifera genotypes are highly heterozygous and segregate during their sexuate reproduction. The grape cultivars and elite clones are thus maintained through vegetative propagation in order to maintain their genetic stability. Maintenance of grape germplasm in field collections is time-consuming, requires large amounts of space and is labour-intensive. The plants are also exposed to diseases, pests and risks of loss due to abiotic stresses and natural calamities (Withers et. Al., 1990 ; Ng & Ng, 1991). In vitro conservation offers a suitable alternative to field collections. Minimal growth storage plays an important role in short and medium term storage and is based on the length of the period between the subculturing stages (Withers, 1989).

Culture growth may be reduced by lowering the temperature, by controlling the culture media (use of osmotic inhibitors, use of growth retardants), by manipulation of the culture conditions (low oxygen presure) or by the combination of these methods (Henshaw, 1984; Ng & Ng, 1991).

At the Research and Development Institute for Viticulture and Enology, Valea Călugărească, experiments have been carried out on four in vitro-stored vinifera genotypes by using of mannitol (a metabolically inactive sugar alcohol causing osmotic stress) and acetyl salicylic acid for reducing the growth.

MATERIAL AND METHOD

The biological material used in the experiment consisted in nodal and apical explants differentiated under *in vitro* culture (the first subculture): prelevated from the vinifera genotypes, Xenia, interspecific hybrids Donaris x Buffalo, Sarba x Salvador and the mutant M1 - Xenia obtained by treatments applied with ethyl sulphonate methane.

Murashige&Skoog (1962) medium was the basical medium used with its macroelements and microelements reduced to a half , to which the following vitamins were added: glycin - 2 mg./l; myo-inositol - 100 mg./l; nicotinic acid - 5 mg./l; pyridoxin - 5 mg./l; tyamin - 10 mg./l and hydrolised casein - 50 mg./l. The media were supplemented with 30 g/l saccharose and 8 g./l agar and they didn't contain growth stimulators. The pH of the media was adjusted to 5.6 before being autoclaved at 120° C and 1 atmosphere during 15 minutes.

In case of the media taken as a main base, the following substances were added in order to slow down the growth process:

a) mannitol - 3 % (w/v);

b) acetyl salicylic acid: 100 μm, 250 μm, 500 μm, 750 μm.

The culture tubes were kept under different temperatures:

a) 17°C and half darkness;

b) 25°C ± 2°C, in artificial light.

After a conservation period of 3, 6, 9 and 15 months, the plants which differentiated were analysed in respect of their *in vitro* evolution. The survival rate was determined as a percentage of the cultures which presented viable plants, without taking into consideration the culture tubes that had been unintentionally infested during the handling process. The explants which differentiated young shoots were analysed in respect of the length, of the number and appearance of the differentiated leaves, capacity of rhysogenesis. When transferred inside nutritive pots, the plants were analysed for their stage of development and for the type of philotaxy.

Observations were made for 50 plants belonging to each genotype, by considering each conservation procedure applied.

The influence of the substances slowing down the growth process (mannitol and acetyl salicylic acid) was analysed in comparison with the evolution of the explants kept under standard conditions of medium.

RESULTS AND DISCUSSIONS

1) Analysis of the explants kept on a medium supplemented with mannitol

The survival rate of the explants ranged in between 80% (Xenia variety) and 97.5% (the interspecific hybrid Donaris x Buffalo) under conditions of half darkness, at 17°C.

Under standard conditions of light and temperature (i.e. 25°C ± 2°C), the survival rate of the explants registered higher values ranging in between 90% (the mutant Xenia) and 97.5% (Donaris x Buffalo).

After 3 months of conservation in half darkness, on a medium containing mannitol, part of the nodal explant leaves changed colour from green into light green or even white.

12.5% up to 17.5% of the explants developed into shoots, the explants which did not develop remaining viable. During conservation, some of the leaves became brown and died without influencing upon the viability of the buds. The length of the shoots that differentiated in the dark ranged in between 5.5 and 1 cm, those shoots developed 2 up to 6 leaves somehow smaller than those which differentiated in the light and vigorous roots. In several culture tubes (less than 5%) callus formation was noticed at the bottom of the roots, mainly in case of the interspecific hybrid Donaris x Buffalo.

When grown in the light, the percentage of explants differentiating shoots was higher (17.5% - 30%), but their evolution was rather slow when compared to that of the explants grown in a normal medium (without growth inhibitors) (Table1).

Table 1

Evolution of the explants after a period of conservation of 3 months

Genotype	Average weight of the shoot (cm)			Average number of internodes/shoot		
	Control	Mannitol (half darkness)	Mannitol (light)	Control	Mannitol (half darkness)	Mannitol (light)
Xenia	12±0.4	2,8 ± 0.5	3,4 ± 0.9	8.0 ± 0.2	2.2 ± 0.5	3.2 ± 0.2
Donaris x Buffalo	14±0.2	1,4 ± 0.2	3,6 ± 0.5	9.0 ± 0.5	2.2 ± 0.3	2.2 ± 0.3
Donaris x Salvador	11±0.1	09 ± 0.2	3,6 ± 0.4	7.0 ± 0.3	2.2 ± 0.3	2.2 ± 0.1
Xenia – M1	8±0.1	1.2 ± 0.2	2.8 ± 0.2	5.0 ± 0.3	1.2 ± 0.2	2.2 ± 0.1

After 8 - 9 months of conservation on a medium containing mannitol under the both culture conditions, without transferring the explants on fresh media, there were obtained shoots with a length of 3 – 4 cm, with very short internodes, tiny leaves, the gradual necrosis of the roots being the first symptoms of decay (Table 2). Under such conditions, the plants were transferred on fresh media lacking growth inhibitors and supplemented with 0.2 mg/l kinetin and 1.18 mg/l indolyl acid acetic for stimulating the differentiation of new roots and the shoot growth.

Table 2

Featuring of the plants differentiated after 8 - 9 months of conservation

Genotype	Shoot length	Number of leaves	Number of internodes	Length of internodes	Number of roots
Xenia	3.021± 0.2	6.14 ± 0.6	5.71 ± 0.2	0.49 ± 0.3	5.71 ± 1.2
Donaris x Buffalo	3.65 ± 0.9	7.25 ± 0.7	6.25 ± 0.4	0.55 ± 0.4	11.75 ± 0.9
Donaris x Salvador	4.18 ± 0.5	6.87 ± 1.0	6.0 ± 0.9	0.57 ± 0.2	8.75 ± 0.7
Xenia M1	4.8 ± 0.7	8.3 ± 1.2	8.0 ± 0.4	0.59 ± 0.2	5.33 ± 0.9

2) Analysis of the explants kept on a medium supplemented with acetyl salicylic acid

The survival rate of the explants was ≥ 90% for all the treatments with acetyl salicylic acid, but it had the value of 100% only for a concentration of 100 μm; that is why this concentration was selected for establishing inside the germplasm collection the genotypes selected for the 2nd stage of inoculation.

The maximum period of conservation on the same culture medium and maintaining the specific characters of the genotypes was of 9-15 months. The shoots gradually grew during the first period of 6 months of conservation, none of the genotypes registering phenomena of decay.

Starting from the 7th month of storage on the same culture medium under conditions of diminished temperature and in the darkness, it was noticed a gradual slowing down of the shoot growth (without being stopped) and the development of shorter internodes, therefore a kind of shoot dwarfing in the apical part (Table 3)

After 14-15 months of conservation under the same conditions, the leaves became yellow and grew mouldy, bringing about the death of the shoot.

Table 3

Length of the shoots (cm) during the 15 months of conservation on media containing acetyl salicylic acid

Genotype/Period of conservation	6 months	9 months	12 months	15 months
Under standard conditions (25°C ± 2°C, artificial light)				
Xenia	5.75 ±0.2	6,5 ± 0,4	6,9 ± 0,9	7,5 ± 0,4
Donaris x Buffalo	3.4 ± 0.4	4,2 ± 0,2	4,8 ± 0,8	5,2 ± 0,3
Donaris x Salvador	5.6 ± 1.0	7,2 ± 0,8	7,8 ± 1,2	8,6 ± 1,2
Xenia M1	6.7 ± 1.5	7,4 ± 1,8	8,2 ± 1,0	8,4 ± 1,7
Under conditions of half darkness and low temperature (17°C)				
Xenia	2.4 ± 0.9	2,5 ± 0,8	3,8 ± 2,6	4,2 ± 0,9
Donaris x Buffalo	1.9 ± 0.5	2,1 ± 0,9	3,7 ± 1,0	5,5 ± 0,5
Donaris x Salvador	2.7 ± 0.5	2,8 ± 0,7	3,7 ± 0,9	5,2 ± 0,3
Xenia M1	1,7 ± 0,4	1,6 ± 1,0	2,8 ± 0,8	4,0 ± 0,8

3. Analysis of the plants accommodated to *in vivo* conditions

The greatest part of the plants analysed after 4 months of culturing in nutritive pots presented characterstics which were similar to those of the grapevine plants obtained from seeds (Table 4): arrangement of the leaves according to a spiral philotaxy and lack of tendrils (Figure 1).

A small percentage (7%) of the regenerated plants from explants prelevated from Xenia variety and kept in the presence of acetyl salicylic acid presented characteristics of adult plant, the arrangement of the leaves according to a distich philotaxy and the presence of the tendrils (Figure 2).

Neither modifications of the leaf blade shape, nor modifications of chlorophyllian nature were noticed in this stage of plant development.

Table 4

Plant featuring after 4 after 4 months of culture in nutritive pots

Genotye	Medium supplemented with mannitol			Medium supplemented with acetyl salicylic acid		
	Number of tendrils	Type of philotaxy	Type of morphogenesis	Number of tendrils	Type of philotaxy	Type of morphogenesis
Xenia	0	2/5	Juvenile	6.9 ± 1	1/2;	Adult
Donaris x Buffalo	0	2/5	Juvenile	0	2/5	Juvenile
Donaris x Salvador	0	1/2; 2/5	Intermediary	0	2/5	Juvenile
Xenia - M1	0	2/5	Juvenile	0	2/5	Juvenile

After strengthening the shoots (by pruning the plants at 2-3 eyes), it was registered an evolution similar to that of the plants, no mattering the genotype and the storage method. The shoots had a length of 48–63.5 cm, they differentiated15-17 leaves, 14-15 internodes and 6-8 tendrils starting from the 7th internode. The differentiation of the tendrils demonstrates the fact that the plants become potentially fruitful only after a certain period of accommodation to aseptic conditions (Table 5)

Table 5

Featuring of the plants after strengthening the shoots (by pruning the plant at 2 – 3 eyes)

Genotype	Length of the shoot (cm)	Number of leaves	Number of internodes	Length of internodes	Number of tendrils	Type of morphoge nesis
Xenia	55.6 ± 2	16 ± 3	15 ± 1	3.7 ± 0.5	3.8 ± 0.1	Intermediary /Adult
Donaris x Buffalo	60 ± 0.5	15 ± 0.5	14 ± 0.1	4.2 ± 0.5	6.2 ± 0.5	Intermediary
Donaris x Salvador	63.5 ± 0.5	16 ± 1	15 ± 1	4.3 ± 0.2	7.1 ± 0.2	Intermediary
Xenia - M1	48 ± 2	17 ± 3	14 ± 0.4	3.4 ± 3	4.7 ± 0.1	Intermediary

CONCLUSIONS

The survival rate of the explants was influenced by the composition of the medium and the culture conditions, being greater on a medium supplemented with acetyl salicylic acid, under standard conditions. The gradual diminution of shoot growth was noticed since the 3rd month of storage on a medium with mannitol, and since the 7th month of storage on a medium containing acetyl salicylic acid. The period of conservation on media supplemented with osmotic inhibitors which allowed to maintain the characters of the shoots unaltered depends on the genotype, ranging in between 9 months (medium with mannitol) and 15 months (medium with acetyl salicylic acid). For stimulating an adult type behaviour, it is necessary to strengthen the shoots accommodated *in vivo,* by pruning the plants at 2-3 eyes.

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ASPECTS REGARDING ANTROPIC FACTOR INVOLVEMENT ABOUT EROSIONAL DEVELOPMENT FIGHTING PROCESS ON WINE-GROWING FIELDS IN CONTEXT OF A DURABLE AGRICULTURE

ASPECTE PRIVIND IMPLICAȚIILE FACTORULUI ANTROPIC ASUPRA LUCRĂRILOR DE COMBATERE A EROZIUNII SOLULUI ÎN PLANTAȚII VITICOLE ÎN CONTEXTUL UNEI AGRICULTURI DURABILE

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Abstract. *The paper presents some aspects concerning antropic factor implications in erosional processes evolution on wine-growing fields from Moldavia hillock zone, in context of a durable agriculture. Researches lined out that the wine-growing environment it is influenced in an induced manner by the antropic factor. The antropic factor acts through direct, indirect, multiple, complex, present or expectant means (far off in time). Man intervention can be positive and then it is succeeded the maintenance of the erosional processes in admissible limits or negative, with stern consequences in ground erosion evolution. The correct and in time application of pedo-hydro-improvement works make up a success chance in erosional processes effects limitation.*

Rezumat. *Lucrarea prezintă unele aspecte privind implicațiile factorului antropic în evoluția proceselor erozionale pe terenurile viticole din zona colinară a Moldovei, în contextul unei agriculturi durabile.Cercetările efectuate au scos în evidență că, mediul viticol este influențat în mod determinant de factorul antropic. Factorul antropic acționează prin mijloace directe, indirecte, multiple, complexe, prezente sau viitoare (îndepărtate în timp). Intervenția omului poate fi pozitivă şi atunci se reuşeşte menținerea în limite admisibile a proceselor erozionale sau negativă, cu consecințe grave în evoluția eroziunii solului. Aplicarea corecta si la timp a lucrarilor pedo-hidro-ameliorative constituie o şansa de reusita in limitarea efectelor proceselor erozionale*

INTRODUCTION

Most of the wine-growing plantations are placed on sloping fields, submitted to erosional processes. Pouring precipitations cause liquid and solid outflows in accordance with rain intensity and field working manner. Through its action, the human being can influence in a positive or negative way the erosion evolution on slopes. The field erosion significant reduction is accomplished through: antierosional arrangements on hydrographic tanks, the maintenance and erosional development fighting process behavior pursue in time, downpour effects reconstruction in time (1,2).

MATERIAL AND METHOD

The researches were done in SCDVV Bujoru Galati conditions, on sloping fields, different exhibitions and specific antierosional fitting out methods. The procedures used for erosional development fighting process were: $\mathbf{V_1}$- grassed bands (bromus orfeu) seeded from 8 to 8 intervals, with a 1, 2 m strip width, in order to realize the specific manual work for grape on vegetation cycle; $\mathbf{V_2}$- ballasting (the width of terraces is variable, in accordance with soil slope). Terraces were executed on level curves direction. The area is antierosional arranged with channels and outlets. For comparison, $\mathbf{V_M}$ – the control variant has been represented by wine-growing fields where it didn't interfere at time with repairing erosional process punctual effects.

The antropic factor evaluation was based on establishing the soil erosional process produced by pouring precipitations, battered antierosional work, antierosional work evolution in time.

RESULTS AND DISCUSSIONS

Human beings implication in amplification or erosional processes evolution stop required the undertaking of some activities regarding the studied soil ultimate conditions and those evolution in time under antropical pressure. Climatic recordings result from SCDVV BUJORU weather station (tab.1, graph1).

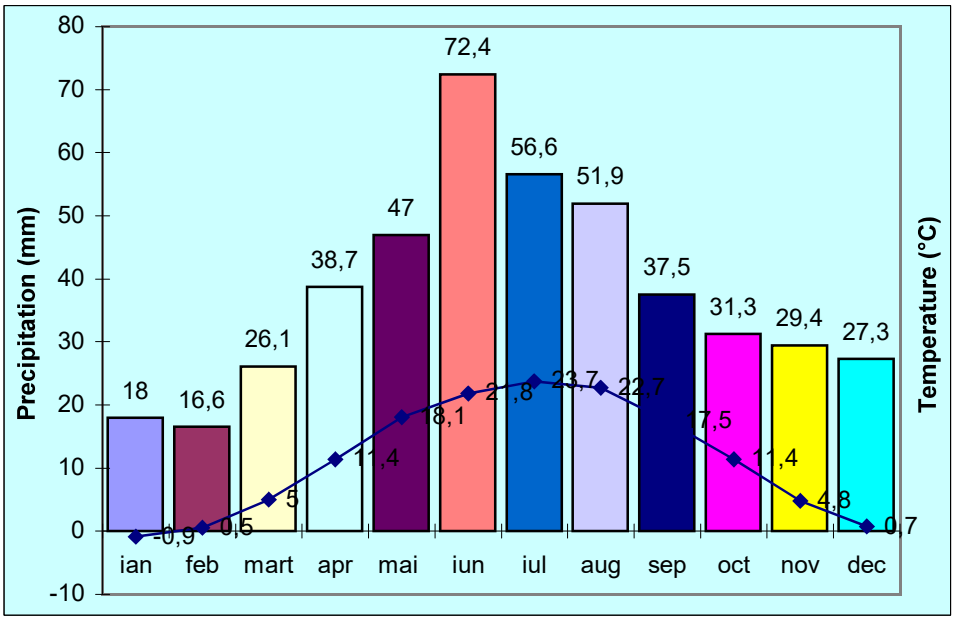
Rainfall during the vegetation period varied in wide limits, in accordance with year and engendered auspicious years (rainfall recorded were with at the most 9,7% more than multiannual average) and inauspicious years (rainfall surpassed the multiannual average). The rainfall variation in time is labeled by the big departure rainfall fallen in the same month but in different years, aspect what distinguish the rainfall deficit tendency on this zone.

The dynamic element of the erosional process on slopes what creates major implications is constituted by fluid and solid trickling resulted as succession of meaningful pluviometrical events. It's distinguished the helpful amounts bigger than 5mm/m^2 and which fall down likeness pouring precipitations. Typical for the studied zone are the likeness torrent rains which take place especially in the warm period of the year. The critical erosion season is situated on 25th of June – 25th of August.

Analyzing the dates presented in the 2nd table as regards the pouring precipitations characterization in the 1997th–2002nd vegetation period is remarked:

- the frequency for rainfalls with strengths that surpass 1,0 mm/min is 27,5%;
- the frequency for rainfalls with strengths sized between 0,6 mm/min and 1,0 mm/min is 72,25%;
- the frequency for rainfalls with the I_{15} bigger than 0,6 mm/min - 1,0 mm/min is 70,8%;
- the frequency for rainfalls with the I_{15} bigger than 1,0 mm/min is 29,2%;
- hadn't been recorded rainfalls with I_{30} and I_{60} bigger than 0,96 mm/min.

The erosional behavior of the experimental plots of land was correlated with the fitting out type. The soil erosion had been evaluated through measuring the culverts produced by rainfalls. In the analyzed period, the recorded rainfalls created considerable erosion at V_M (tab. 3). The maximum erosion had been produced follow the rainfalls recorded especially in the first and last decade of June.



Graphic 1 Precipitation and air medium temperatures monthly distribution at SCDVV Bujoru weather station (1979-2005)

Table 1

Precipitation's monthly and annual distribution

Year/ month	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
I	8,20	21,60	14,30	14,50	5,60	2,20	30,20	24,20	14,70	27,10
II	7,00	6,90	12,10	24,50	12,30	5,50	20,30	16,00	31,40	10,80
III	29,10	32,00	26,00	8,60	24,80	43,80	8,10	22,00	25,70	15,40
IV	63,70	16,20	43,00	33,40	45,80	43,70	18,30	43,60	18,40	54,20
V	29,90	48,10	29,00	16,70	30,50	4,80	28,30	41,10	59,20	40,00
VI	95,10	25,40	93,40	18,10	103,5	42,90	7,40	32,10	74,80	77,70
VII	165,0	35,60	37,00	48,70	10,00	98,70	38,10	99,50	98,60	31,80
VIII	109,7	85,00	72,30	16,20	0,80	122,0	13,20	44,30	26,50	92,10
IX	25,10	31,40	30,20	56,50	84,20	10,40	47,80	59,50	14,50	34,40
X	64,50	91,30	29,70	4,60	7,90	61,40	38,40	4,40	17,10	7,70
XI	42,70	46,70	16,90	51,00	11,60	67,70	5,40	38,00	66,90	7,70
XII	70,70	9,50	45,30	7,90	23,30	5,70	8,30	18,90	26,40	9,40
Sum	710,7	449,70	449,20	300,7	360,3	508,8	263,8	443,6	474,2	408,3

Table 2

Pouring precipitation's characterization (1997-2002)

Date	Total cantity	Rain duration (min)	Average iensity (mm/ min)	I_{15} (mm/ min)	I_{30} (mm/ min	I_{60} (mm/min)	Rainfall duration (min)	Rainfall intensity (mm/min)	Maximum intensity duration (min)	Maximum intensity (mm/min)
1997										
18.06	23,3	55	0,42	0,42	0,74	-	30	0,74	10	1,00
20.06	15,0	30	0,50	0,50	0,50	-	12	1,20	10	1,23
6.07	34,7	250	0,14	0,14	0,60	0,35	30	0,60	15	1,13
1998										
9.07	16,5	170	0,10	0,10	0,33	0,22	18	0,55	10	0,88
5.08	35,7	70	0,51	0,51	0,96	0,55	60	0,55	15	1,33
1999										
2.06	29,7	70	0,42	0,42	0,76	0,45	15	1,19	14	1,20
23.06	46,4	85	0,54	0,54	0,93	0,68	20	0,98	15	1,28
8.07	27,0	45	0,60	0,60	0,70	-	25	0,80	15	1,20
12.08	15,4	25	0,61	0,61	-	-	10	0,72	10	0,72
13.08	25,3	70	0,36	0,36	0,69	0,38	32	0,87	15	0,94
2.09	13,5	25	0,54	0,54	-	-	20	0,60	15	0,80
2000										
24.04	18,7	60	0,31	0,31	0,56	0,31	15	0,66	10	0,74
13.07	22,0	110	0,20	0,20	0,46	0,30	18	0,72	8	0,90
20.07	14,2	85	0,16	0,16	0,26	0,21	10	0,60	5	0,68
5.09	28,4	110	0,25	0,25	0,54	0,32	15	0,78	15	0,78
2001										
13.04	20,3	65	0,31	0,31	0,41	0,33	15	0,64	7	0,98
5.06	48,2	320	0,15	0,15	0,68	0,50	30	0,68	15	0,93
21.06	10,0	70	0,14	0,14	0,29	0,16	6	0,88	6	0,86
30.06	10,9	55	0,19	0,19	0,27	0,14	6	0,86	6	0,86
6.09	36,4	230	0,11	0,11	0,62	0,42	30	0,62	15	0,87
11.09	26,8	115	0,23	0,23	0,65	0,32	30	0,62	7	0,71
2002										
12.06	12,2	45	0,27	0,37	0,30	-	7	0,68	7	0,68
26.06	13,0	30	0,43	0,56	0,43	-	10	0,63	10	0,63
21.07	31,4	240	0,13	0,77	0,62	0,43	15	0,77	15	0,77
26.07	39,5	185	0,21	0,70	0,63	0,35	20	0,70	20	0,70
16.08	44,2	155	0,28	0,80	0,60	0,40	15	0,80	15	0,80

The soil erosion is directly stricken by rain sequence, soil humidity level at the taken place date, hydro ameliorative work's state, consistency with who the flows renew and interceptive canals desilting at time (fig.1). The clogged surface is distinguished only at $V_{M.}$ In V_M case, the antierosional work absence and defective repair of the rainfalls punctual effects leaded to a soil erosion recording bigger than the maximum admissible amount.

Fig. 1 Negative aspects on wine-growing plantation

Tabel 3

Soil erosion and cloged area

Variant	Erosion $m^3/ha/an$	Cloged area m^2/ha
V_1	Unconsiderable-1,2	-
V_2	-1,0	-
V_M	4,5-15	26-35

CONCLUSIONS

1. The human being influence in a positive way the erosional processes effects stop by the in time torrents reconstruction works, canal desilting, gradient terrace reconstruction, the slope soil reducing through ballasting, etc. For V_1 and V_2, the produced soil erosion vary average from 1,2 m^3/ha and year to unconsiderable (admissible limits).

2. The soil ballasting and the grape crop usage leads to erosional processes minimizing.

3. The fitting out work's non adequate and in time effectuation, upkeep and erosional development fighting process exploitation lead, in time, to a soil erosional amplification until detaching a big area from the agricultural circuit.

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RESEARCHES REGARDING THE TENDENCY IN SOME CLIMATIC FACTORS EVOLUSION FROM SOUTH MOLDAVIA HILLY REGION WITH REFERENCE TO VITICULTURAL PLANTATION

CERCETĂRI PRIVIND TENDINȚA EVOLUȚIEI UNOR FACTORI CLIMATICI IN ZONA DE SUD A MOLDOVEI, CU REFERIRE LA PLANTAȚIILE VITICOLE

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Abstract. *By its actions beside the normal limits and depending upon the vine bioclimate the climate risk demands causes violent destructions, finally resulting in total or partial losses of biological capacity. Establishing the climate risk it will be taken into account the limit of vine climate risk. The viticultural ecosystem is that functional unit of biosphere created and controlled by humans, in order to obtain a high quality grape production in ever profitable social and economic conditions. The viticultural ecosystem is directly influenced by the global climate changes.*

The human civilization is presently facing more dangerous environmental tendencies (9) among which the ones concerning the approached topic might be:

-Obvious climate changes, especially undertaken by temperature raisings, with deep ecological effects. Higher temperatures mean more extreme climate events (drought, heat waves, etc.).

-Production decrease, generally, the agriculture is extremely vulnerable to many of the convulsions which join the climate change.

Rezumat. *Riscul climatic, prin acțiunea lui în afara limitelor normale, funcție de cerințele bioclimatice ale viței de vie provoacă distrugeri violente, determinând în final pierderi parțiale sau totale ale capacității biologice. În stabilirea riscului climatic se va avea în vedere şi pragul de risc climatic al viței de vie.Ecosistemul viticol este acea unitate funcțională a biosferei creată şi controlată de om, în vederea obținerii unor producții de struguri, de calitate superioară în condiții economice şi sociale tot mai avantajoase. Ecosistemul viticol este direct influențat de schimbărilor climatice globale.*

Civilizația umană se confruntă în prezent cu mai multe tendințe ambientale primejdioase (9) printre care, referitoare la tematica ar putea fi:

-Schimbări evidente de climă manifestate îndeosebi prin creşterea temperaturilor cu profunde efecte ecologice. Temperaturi mai mari înseamnă mai multe evenimente climatice extreme (secetă, valuri de căldură, etc.).

-Producția scade în general , agricultura este extrem de vulnerabilă la orice modificare asociată schimbarilor climatice.

MATERIAL AND METHOD

The paper presents some climatic factors analysis (Dragomirescu Elena, Enacge L., 1998) that influences the grape growth and fruition process. In the last time had been noticed a climatical factors evolution deviation from the multiannual average with influences on vegetation phenophases unfolding.

The researchers sustain that it is possible like the raised temperatures, the drought and atmospheric pollution to conduct at some diseases and pest actuation

(for example, the acid rains decline the plant resistance toward pest etching). The agro ecosystem pattern making depends in a large measure (but not decisive) of the relation between plants and insects on the global climatically changes substance. As in plants case, the raised temperatures, the drought frequency and increase, the dryness cause *mutations* and modifications in *pest's* world with hard to evaluate consequences in the wine-growing ecosystem health. From these reasons it is important to know what the tendencies are in climatically factors with direct influences on grape crop evolution.

The research was done at S.C.D.V.V. Bujoru, Galati County. The weather study has been performed between 1979 and 2005.The weather evolution of the climatically factors and those evolution's tendency in the Moldavia south's hillock zone were tracked. The weather observations were recorded at S.C.D.V.V. Bujoru Weather Station. The precipitation regime, pouring precipitation and average temperature evolution were tracked. (Enache Viorica, 2004)

RESULTS AND DISCUSSIONS

In the 1st figure are graphically presented the monthly average precipitation and monthly average temperatures for Bujoru zone. The precipitation's monthly and yearly distribution shows that the maximum and the minimum values appear very distant. The rainier years were 1979 (644, 3 mm) and 1997 (690, 7 mm) and the lower precipitation were recorded in 1986 (251, 5 mm) and 1994 (286, 1 mm).

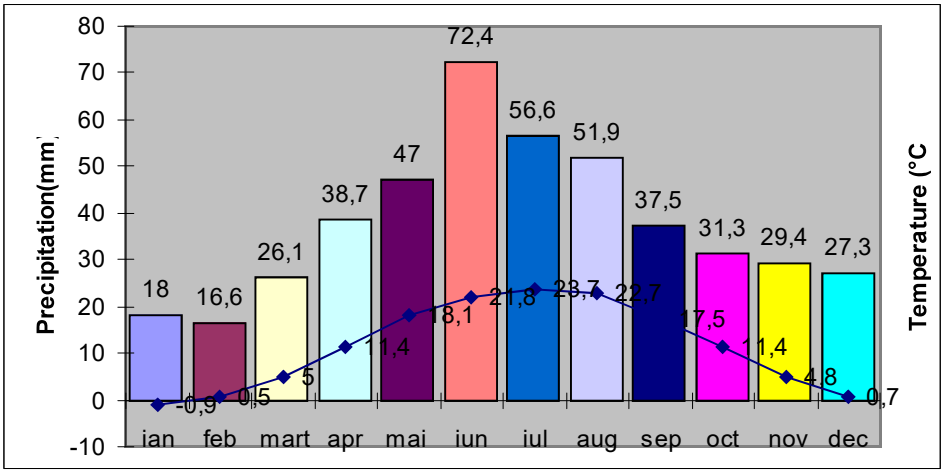

Fig. 1 The medium precipitation's regime and air temperature at RDVV Bujoru Weather Station (1979-2005)

Even if the analyzed period it's relativelly short, can be observed a ciclicity tendency of about 7-8 years in which the rainy interval alternates with the droughty one (fig. 2). The mobile average for 5 years that states in a convincing way the clime tendency suggest that in the 1986-1991, 1995-1998 and 2001-present intervals was and it is present the specific to drought phenomenon. Analyzing the yearly precipitation frequency (tab.1), results that the excessive rainy years gravity (25%) it's closed from excessive droughty years gravity. The yearly precipitation sized between 500-600 mm has the biggest frequency (45, 8 %).

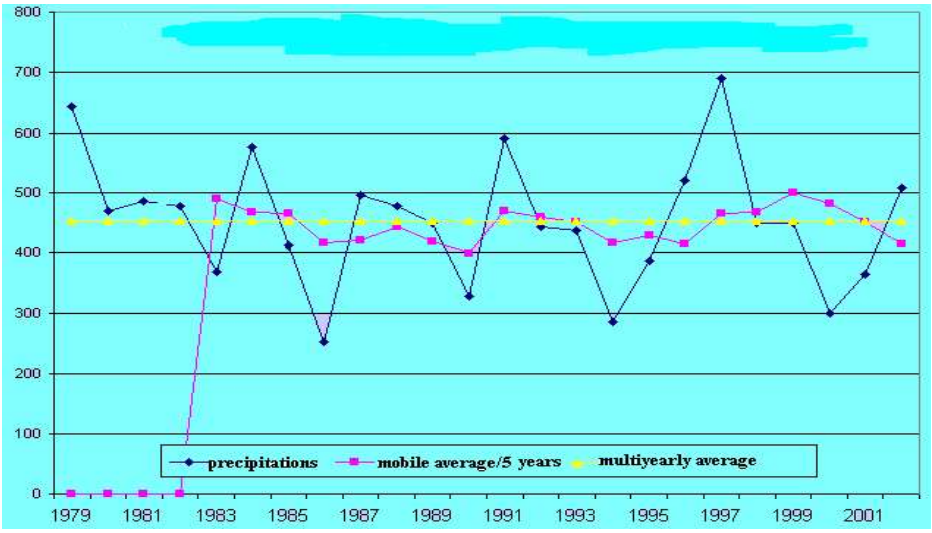

Fig. 2 The yearly precipitations (mm) at RDVV Bujoru Weather Station

Tablel 1

Yearly precipitation frequency between 1979-2002
Weather Station SCDVV Bujoru

Nr.	**Yearly precipitation** interval (mm)	Frequency	
		Ani	%
1.	200-300	2	8,3
2.	300-400	5	20,9
3.	400-500	11	45,8
4.	500-600	4	16,7
5.	600-700	2	8,3

Even thought the yearly precipitation sume excels in lots of years 450 mm, the pouring precipitations are specific to Bujoru zone, unbalanced distributed in the vegetative period, with large drought periods of time framed by short downpour periods.

Under the influence of the termic energy take place the grape vital processes. Each phenomenon it's conditioned by a temperature optimum which can be raised or low and the phenomenon can determine certain physiological and biological bridges. The inferior biological bridge at which the grape biological processes are unleashed is 10°C. As a upper limit, the 30-36°C temperature produce the blighting of the grape leafs (in accordance with type and foliar mass).

The air temperature evolution represented in the 1st fig. throught the multyannual average curve it's marked by a minimum in January (-0,9°C) and a maximum in July (23, 7°C). Between those limits the transition is done gradually.

The monthly values analysis of the interval between 1979- 2002 distinguish a – 9,3°C minimum in February, 1985 and a 27,0°C maximum in July, 2001.

As it can be seen in the 3rd fig., the mobile average on 5 tears indicates simple temperature abduction in the 1990-2002 intervals, which is increasing until now.

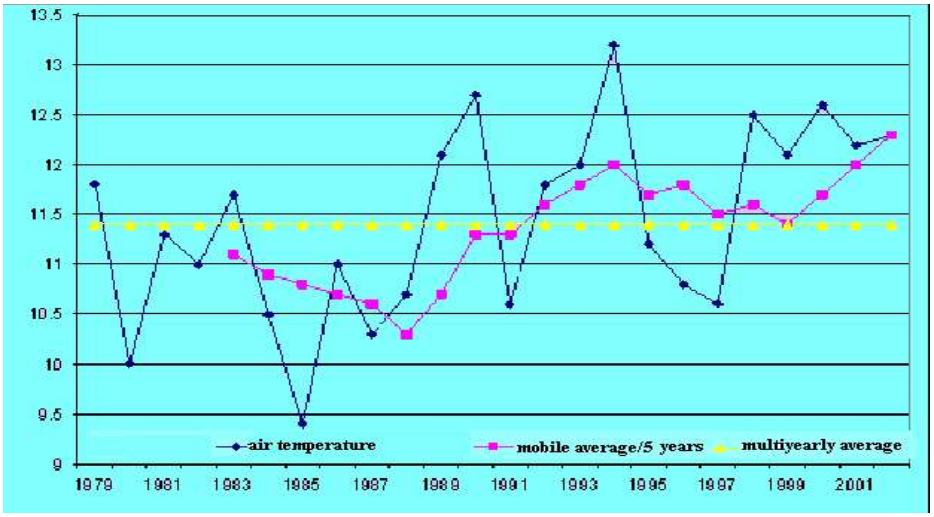

Fig. 3 The yearly average temperature ˚C at RDVV Bujoru Weather Station

CONCLUSIONS

Following the weather data regarding the monthly and yearly medium precipitation, the monthly and yearly medium temperatures can be argued that:

- in the last two decades there is a zone drying tendency, with a 7-8 years ciclicity when the rainy periods alternates with those extremely dry;
- it's registered a simple air temperature increase in the 1900-2002 intervals, which accentuates until now.

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CONTRIBUTIONS TO THE STUDY OF THE AGROBIOLOGICAL AND TECHNOLOGICAL VALUE OF THE VARIETIES FETEASCĂ REGALĂ AND RIESLING ITALIAN IN THE VITICULTURAL CENTRE OF JIDVEI TÂRNAVE VINEYARD

CONTRIBUȚII LA STUDIUL VALORII AGROBIOLOGICE ŞI TEHNOLOGICE A SOIURILOR DE VIȚĂ DE VIE FETEASCĂ REGALĂ ŞI RIESLING ITALIAN, ÎN CENTRUL VITICOL JIDVEI-PODGORIA TÂRNAVE

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Abstract. *In the paper there are presented the agrobiological and technological indices which characterize the varieties Feteascã regalã and Riesling italian, under ecological conditions, from the viticultural centre Jidvei-Târnave vineyard. The observations and recordings were done in the period 2004-2005, and have a special significanc, especially for Riesling italian variety, which hasn't been studied in this viticultural areal, as compared wuth Feteascã regalã varietuy.*

Rezumat. *În lucrare se prezintă indicatorii agrobiologici şi tehnologici care caracterizează soiurile Fetească regală şi Riesling italian, în condițiile ecologice din centrul viticol Jidvei-podgoria Târnave. Observațiile şi determinările se referă la perioada anilor 2004-2005 şi au o semnificație deosebită, în special pentru soiul Riesling italian, care nu a mai fost studiat în arealul viticol espectiv, în comparație cu soiul Fetească regală.*

The determination of the ecological relation which defines the vocation of the vineyards lies at the basis of choosing vine varieties and soil delimitation, in order to set up viticultural plantations and to elaborate culture systems. We have in view biotical and abiotical factors, their level of a integration in the functional unit of the viticultural ecosystem. Last but not least, the specificity of a vineyard is given by the vine variety as determining factor of the yield.

The rational use of the ecological conditions represents one of the technological means for practicing an adequate and performant viticulture. That's why it is important to know the biological potential, the agrobiological and technological value of a variety for an optimum use of the ecological offer in a vineyard.

The choosing of the most valuable varieties to make assortments depending on the yield is based in the knowledge of the agro biological and technological traits, and first of all on the qualitative value of the grapes, determined by their physical and chemical composition.

The detailed knowledge of the agro biological and technological traits of the varieties, represents the way in which the qualitative and yield potential of the culture in the region is appreciated in order to diversity the viticultural products.

MATERIALS AND METHOD

In order to establish the agrobiological and technological values of the vine varieties Fetească regală and Riesling italian in Târnave vineyard, the observation and recording were done within the viticultural Farm no. 23 belonging to S.C. Jidvei SRL , Filiala Alba in the period 2004-2005.

The observations and recordings were focused on :

- in order to establishing ***the agrobiological potential*** of the ieties we analyzed:
  - the phenologic spectrum of the varieties depending on the climatic conditions of the vine-growing year;
  - the growth vigor the varieties, by the wood quantity resulted from the cuttings and by measuring the length of the shoot growth;
  - the fertility and productivity of the varieties determining the percentage of fertile shoots, the values of fertility coefficients and productivity indices ;
  - resistance to the frost, by checking the buds viability, using the biological method (by forcing) and the direct e (by sectioning) ;
- in order to establishing ***the technological potential*** of the varieties we analyzed:
  - the grape quality obtained per vine and the quantity per hectare, the average weight of a grape, the number of grape per vine;
  - the quality of grape yield, by determining the weight of 100 grape berries, the sugar content, the total acidity of the must.

RESULTS AND DISCUSSIONS

Phenophases of vegetation (tab. 1). The beginning of vegetation at the varieties takes place in the second half of April, the first variety breaking the buds being Fetească regală followed at about a week by Riesling italian. The full ripens of the grapes is achieved in the last decade of December. The vegetation period of the varieties being 158-164 days, from the breaking of the buds till the full ripeness of the grapes. To this we should add about 20-27 days till the moment of falling of the leaves, when the varieties enter the period of biological rest.

Table 1.

The development of vegetative phenophases at the varieties under study (2004-2005)

Variety	Year	Phenophase of vegetation					
		Buds breaking	Beginning of shoot growth	Flowering	Grape formation	Full ripening	Fall of leaves
Fetească regală	2004	17 IV	29 IV	9 VI	13 VIII	23 IX	20 X
	2005	15 IV	22 IV	31 V	10 VIII	18 IX	23 X
Riesling italian	2004	20 IV	1 V	10 VI	15 VIII	27 IX	27 X
	2005	18 IV	26 IV	8 VI	13 VIII	23 IX	25 X

Comparing the two years of the study, the first variety ending the vegetation period is Feteascã regalã, followed by Riesling italian.

Both varieties belong to the group of middle period of vegetation, corresponding to the viticultural region of Transilvanian Plateau.

Vigour of growth (tab. 2). from the analysis of the data it results that at Feteascã regalã variety, the quantity of the wood resulted from the cuttings per vine was about 1.855 kg/vine, from which 0.865 kg/vine multiannual wood and 0.990 kg/vine annual wood. Related to hectare, the resulted wood represents about 7 tons.

Riesling italian is less vigorous, with an average quantity of the resulted wood of about 1.110 kg/vine, from which only 0.345 kg/vine multiannual wood and 0.765 kg/vine annual wood. Related to hectare, it represents 4.2 tons. Relating the wooden mass accumulated yearly per vine, at grape yields, it results that Feteascã regalã variety has a higher biologic productivity that Riesling italian.

Table 2.

Wood quantity resulted from cuttings (2004-2005)

Variety	Year	Wood quantity resulted from cuttings (kg/vine)	from which:		Wood quantity/ha (tons)
			Multiannu-al wood (kg/vine)	Annual wood (kg/vine)	
Fetească regală	2004	1.750	0.760	0.990	6.63
Fetească regală	2005	1.960	0.970	0.990	7.42
Average	**-**	**1.855**	**0,865**	**0.990**	**7.025**
Riesling italian	2004	1.100	0.430	0.670	4.16
Riesling italian	2005	1.120	0.260	0.860	4.24
Average	**-**	**1.110**	**0.345**	**0.765**	**4.20**

Fertility and variety productivity (tab. 3). The fertility of the varieties, expressed by the percentage of the fertile shoots, shows a higher biologic potential the case of Feteascã regalã, on the average 79,3% as compared to 64,7% at Riesling italian. The value of absolute coefficient is higher at Riesling italian variety (c.f.a. = 1,50), due to the fact that, generally, at this variety two inflorescences per shoot are formed.

The productivity of the varieties is high at Fetească regală (i.p.a = 196,2; i.p.r = 142,9) as compared to Riesling italian (i.p.a = 158,9; i.p.r = 110,1), as a result of the grape size, of 159 g and of the shoot fertility. At Riesling italian the productivity was smaller (i.p.a = 158,9; i.p.r. = 110,1) due to a smaller weight of a grape of 106 g.

We may conclude that Fetească regală makes use to a higher level of its biologic, fertility and productivity potential, under culture conditions from the viticultural center Jidvei.

Table 3

Fertility and productivity of the varieties under study (2004-2005)

Variety	Year	Fertile shoots (%)	Absolute coefficient of fertility	Relative coefficient of fertility	The average weight of one grape (g)	Absolute productivity index	Realtive productivity index
Fetească regală	2004	85.4	1.14	0.98	169	192.7	165
Fetească regală	2005	73.2	1.34	0.81	149	199.6	120.7
Average	**-**	**79.3**	**1.24**	**0.89**	**159**	**196.2**	**142.9**
Riesling italian	2004	63.7	1.39	1.02	107	148.8	109.2
Riesling italian	2005	65.7	1.61	1.06	105	169	111
Average	**-**	**64.7**	**1.50**	**1.04**	**106**	**158.9**	**110.1**

Variety resistance to frost (tab. 4). The variety resistance to frost was measured yearly, by checking the bud viability at the end of winter. The best behavior to frost was noticed at Riesling italian, the viability of the main buds being of 92,8% and 92,9% respectively, in the two years under study.

Fetească regală was more sensitive to low temperatures during winter, being known from the specialised literature that this variety is often affected by frosts, with a percentage of viable main buds of 80,3%. and 80,4% respectively.

The secondary viable buds were in a higher percentage at Riesling italian as compared to Fetească regală. The damages recorded at the main buds were approximately equal in both varieties.

We may say that during the two years of research, the estimated yield could be normally obtained by carrying out some correct front-bearing cuttings and using an adequate culture technology.

Table 4

Bud damages (%) recorded at the varieties under study (2004-2005)

Variety	Year	Main buds		Secondary buds		Tertiary buds	
		Viable	Dead	Viable	Dead	Viable	Dead
Fetească regală	2004	80.5	19.5	83.2	16.8	94.6	5.4
Fetească regală	2005	80.3	19.7	90.9	9.1	95.3	4.7
Average	**-**	**80.4**	**19.6**	**87.1**	**12.9**	**94.9**	**5.5**
Riesling italian	2004	92.8	7.2	94.4	5.6	99.5	0.5
Riesling italian	2005	92.9	7.1	96.5	3.5	98.3	1.7
Average	**-**	**92.8**	**7.1**	**95.5**	**4.5**	**98.9**	**1.1**

Grape yield (tab. 5). The productive potential of the varieties under study was expressed by the average number of grape formed per vine, the average weight of one grape, the yield obtained per vine, and that estimated per ha. The average density is 3600 de vines/ha.

The grape yield, the basic element in estimating the technological value of a variety, shows that Fetească regală has a higher productive potential, getting an average yield of 18,1 tones grapes/ha, while Riesling italian average productivity is 13,2 tones grapes/ha.

Table 5

Grape yields at the varieties under study (2004-2005)

Variety	Year	Grape yield (kg/vine)	Yield recorded per ha (t/ha)	Average no. of grapes/vine	Average weight of a grape (g)
Fetească regală	2004	4.83	17.4	28.6	169
Fetească regală	2005	5.20	18.7	34.9	149
Average	**-**	**5.04**	**18.1**	**31.7**	**159**
Riesling italian	2004	3.79	13.6	35.4	107
Riesling italian	2005	3.52	12.7	33.2	105
Average	**-**	**3.65**	**13.2**	**34.4**	**106**

The quality of the grape yield (tab. 6). The quality of the grape yield, expressed by the accumulations in sugars and the values of the total acidity of the must, points out the fact that both varieties, in years with normal climatic conditions accumulate high quantities of sugars: Fetească regală 208,5 g/l, Riesling italian 202 g/l, with values of the total acidity of the must higher than 5,5 g/l H_2SO_4. Thus it is ensured the obtaining of wines of quality in concordance with the biologic mature of the variety.

Table 6

The quality of grape yield at harvesting (2004-2005)

Variety	Year	Weight of100 grape berries (g)	Sugar content (g/l)	Acidity content (g/l H_2SO_4)	Alchoolic potential (% vol.)	Gluco-acidimetric index
Fetească regală	2004	221	205	5,7	12,05	35,96
Fetească regală	2005	252	212	5,4	12,47	39.26
Average	**-**	**236,5**	**208,5**	**5,5**	**12,26**	**37,91**
Riesling italian	2004	173	198	4,23	11,65	46,80
Riesling italian	2005	170	206	5,58	12,11	36,91
Average	**-**	**171,5**	**202**	**4,91**	**11,88**	**41,14**

CONCLUSIONS

- The length of the vegetative period of the two varieties under study, Fetească regală and Riseling italian is middle, which ensures the grape ripening in almost all the years, and in very favorable years, we can notice even an over-ripening.
- As far as the fertility and productivity aspects are concerned, the best results were noticed at Fetească regală, in which the fertility coefficients and productive indices were higher as compared to Riesling italian.
- The quantity and quality of the grape yield also shows a better behaviour of the autochthonous variety Fetească regală, the yield level being higher than 18,1 t/ha, as compared to 13,2 t/ha as in Riesling italian.
- Fetească regală and Riesling italian varieties, cultivated in the viticultural center Jidvei Târnave vineyard, valorized entirely the ecoclimatic conditions of the region, and as a result the white wines obtained were of quality, with special organoleptic traits.

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ROOTSTOCK INFLUENCE ON THE WELL BALANCED VEGETATIVE AND YIELDING CAPACITY OF MERLOT GRAPE VARIETY GROWN IN VALEA CALUGAREASCA VITICULTURAL CENTRE

INFLUENȚA PORTALTOIULUI ASUPRA ECHILIBRULUI VEGETATIV ŞI PRODUCTIV AL SOIULUI MERLOT ÎN CENTRUL VITICOL VALEA CĂLUGĂREASCĂ

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Abstract. *The research works carried aimed at establishing the parameters which are appropriate for the relationship system involving vinifera variety ~ rootstock partner ~ soil ~ climate ~ potential crop ~ grape as a raw material for the winemaking process ~ wine, as a background for finding out some scientific evidence in which the rootstock partner achieve the vigor ~ quantity ~ quality optimum for the Merlot variety.*

Were used roostoocks belonging to the species Vitis vinifera (RG clon 93) as well as hybrid Berlandieri x Riparia (8 B, 5 BB, 2 C, SO 4-4, 125 AA, 57 D, 26 C, 71 C), Berlandieri x Rupestris (140 Ru) and Vinifera x Berlandieri (41 B).

The interaction between the rootstock partner and the Merlot variety were complex, influencing the whole practical physiological and biochemical activity from plant with more or less evidently about the vegetative growing, fertility and productivity of the vine and quality yields.

From the analysis index using for the assessing the vegetative-productive balance (Ravaz index, growth-yield balance index, cm^2 leaf area/gram crop weight ratio) result that rootstocks 26 C and 140 Ru in the combination of graft with the Merlot variety have insured an quantitative and qualitative harvest.

Rezumat. *Cercetările efectuate au vizat parametrizarea sistemului de relații soi vinifera ~ portaltoi ~ sol ~ climă ~ strugure materie primă pentru vinificare ~ vin, ca bază pentru fundamentarea unei soluții ştiințifice în care prin partenerul portaltoi să se realizeze optimul vigoare~cantitate~calitate la soiul Merlot.*

Au fost folosiți portaltoi aparținând speciei Vitis riparia (R G clon 93) precum şi hibrizi Berlandieri x Riparia (8B, 5BB, 2C, SO4-4, 125 AA, 57D, 26C, 71C), Berlandieri x Rupestis (140 Ru) şi Vinifera x Berlandieri (41 B).

Interacțiunea dintre partenerul portaltoi şi soiul Merlot din combinația de altoire a fost complexă, influențând practic întreaga activitate fiziologică, şi biochimică din plantă cu repercusiuni mai mult sau mai puțin evidente asupra creşterilor vegetative, fertilității şi productivității butucilor şi calității producției de struguri;

Din analiza indicatorilor folosiți pentru aprecierea echilibrului vegeto-productiv (indicele Ravaz, indicele echilibrului vegetativ, raportul cm^2 suprafață foliară/ g strugure), a rezultat că portaltoii: 26C şi 140 Ru în combinația de altoire cu soiul Merlot au asigurat o relație optimă între creştere şi rodire cu efecte benefice asupra proiectarii recoltei cantitative şi calitative de struguri.

Knowing for each vinifera variety, the relationships which established between growth and yield presents a different importance in the modern viticulture The research works developed and winegrowing practice demonstrated that rootstock exercised an important influence about quality grapes, affecting the yield level through vigor confered of the vinifera variety. For this reason the quanitative-qualitative relation isn't unique, she albe to be changed by the rootstock partner (Pouget, 1987).

MATERIAL AND METHOD

The research works carried out in ecological stationary located in Valea Calugareasca vineyard within 1998-2004 by using Merlot variety grafted on a large range of roostocks with a different genetic provenance. Were used rootstocks belonging to the species Vitis riparia (R G clon 93) as well as hybrid Berlandieri x Riparia (8B, 5BB, 2C, SO4-4, 125 AA, 57D, 26C, 71C), Berlandieri x Rupestis(140 Ru) and Vinifera x Berlandieri(41 B).

The climatic conditions of Valea Călugărească vineyard were characterised within 1998-2004 by rich helyothermic resources on the relative background of deficient resources which ensured good conditions for obtaining high quality yields.

The mollic vertic reddish brown soil in the ecological stationary units presents physico-chemical characteristics which are favourable for the grapevine crop.

The vines were planted at a distance of 2 x 1 m. The training system was Spurred Cordon.

The following observations and determinations were made: intensity of the main physiological processes in the vine (photosynthesis, transpiration, respiration), by using an automatic analyser (LCA 4), the content in chlorophyll and carotenoid pigments in leaves, fertility and productivity of the vine, grape production (average weight of one grape, number of grapes/vine, yield, sugar content, acidity).

The relationship established between growth and production were exprimates by synthetic index: Ravaz index, (the ratio yield/pruning weight), growth-yield balace index (the ration between pruning weight x 100/grape yield + pruning weight (Maccarone and Scienza, 1996), leaf area productivity representing ration between the leaf area (cm^2) and the grape yield (g).

RESULTS AND DISCUSSIONS

Due to the fact that in a grafting combination the metabolic functions are distributed between two different genotypes, their interaction influences also on the intensity of the physiological processes developing in the plant (Table1).

The photosynthetic activity was more intense in case of Merlot variety in combination with 26C (5.44 µmol $CO_2/m^2/s$) and 125AA (5.30 µmol $CO_2/m^2/s$). The lowest values of the photosynthesis process intensity were registered in case of Merlot variety in combination with 41B (4.12 µmol $CO_2/m^2/s$) and 8B (4.22 µmol $CO_2/m^2/s$).

The respiration process intensity oscillated within relatively reduced limits, between 2.22 µmol $CO_2/m^2/s$ (125AA) and 3.01 µmol $CO_2/m^2/s$ (57D).

The intensity of the transpiration process ranged in between the limits of 3.06 mmol $H_2O/m^2/s$ (8B) and 4.12 mmol $H_2O/m^2/s$ (140 Ru, 125 AA).

Table 1

Intensity of the physiological processes in case of the Merlot variety, according to the rootstock (mean values for the flowering and veraison stages)

Rootstock	Photosynthesis intensity $\mu molsCO_2/m^2/s$	Respiration intensity $\mu molsCO_2/m^2/s$	Transpiration intensity $mmols\ H_2O/m^2/s$
93RG	4.43	2.11	4.07
140 Ru	4.66	2.78	4.12
41 B	4.12	2.98	3.88
5BB	4.76	2.83	3.99
SO4-4	4.60	2.57	3.71
71 C	4.30	2.56	3.25
2C	4.71	2.50	3.39
26 C	5.44	2.45	3.49
8B	4.22	2.73	3.06
57 D	4.29	3.01	3.77
125 AA	5.30	2.22	4.12
Mean	4.62	2.61	3.71

The research works showed that the leaf content in chlorophyll pigments registered higher values in case of Merlot variety in combination with 41 B (368.08 mg/100 g), 125 AA (367.36 mg/100 g) and 26 C (365.98 mg/100 g), and least in case of the combinations with rootstocks: 140 Ru (321. 40 mg /100 g) and 71 C (326. 43 mg /100 g). The carotenoid pigments content oscillated in between 7. 65 mg/100 g (8 B) and 18. 30 mg /100 g (5 BB)(Table 2).

Table 2

Influence of the rootstock partner on the leaf content in chlorophyll pigments (mean values for the flowering and veraison stages)

Rootstock	Chlorophyll „a" mg/100 g	Chlorophyll„ b" mg /100 g	Total chlorophyll pigments mg /100 g	Carotenoid pigments mg/100 g	Ratio Chlorophyll/ Caroten
93RG	265,68	73,72	339,40	14,43	27,18
140 Ru	217,75	103,66	321,40	15,84	19,68
41 B	285,31	82,77	368,08	13,92	28,07
5BB	270,81	88,33	359,14	18,30	24,92
SO4-4	275,70	71,85	347,54	9,09	39,76
71 C	255,54	70,89	326,43	8,74	37,29
2C	266,28	72,10	338,38	11,09	30,90
26 C	283,83	82,16	365,98	9,17	42,55
8B	260,67	93,73	354,39	7,65	45,98
57 D	263,40	70,54	333,94	11,90	30,09
125 AA	279,99	87,37	367,36	8,14	45,46
Mean	265.91	81.56	347.46	11.66	33.81

The ratio between chlorophyll and carotenoid pigments registered higher values in case of Merlot variety in combination with 8 B (45. 98) and 26 C (42. 55) and the lowest values were registered in case of Merlot variety in combination with 140 Ru (19. 68).

The differentiated influence induced by the rootstocks parteners on the physiological and biochemical processes in the grapevine differently influenced on on the productivity of the grapevines and the quality of the grape yield (Table 3). In respect of the grape yield, the greatest yields were obtained in case of the 26 C rootstock (2,60 Kg/vine). The rootstocks had a moderate influence on the average weight of a bunch, with except for 93 RG rootstock which induced the highest value. From among the rootstock parteners, the greatest value of the relative productivity index was registred in case of 26 C rootstock.

Tabelul 3

Influence of the rootstocks parteners on the productivity of the grapevines on the quality indexes of the grape yield

Rootstock	Yield Kg/vine.	Average weight of a bunch g	Absolute productivity index	Relative productivity index	Sugar g/l	Total acidity g/l H_2SO_4
93RG	2,25	89	141	86	221	3,7
140 Ru	2,40	89	146	92	217	3,7
41 B	2,17	105	156	83	218	3,9
5BB	2,37	90	149	91	218	3,8
SO4-4	2,24	101	159	86	213	3,7
71 C	2,32	105	153	89	219	3,6
2C	2,19	112	159	84	213	3,7
26 C	2,60	106	158	100	219	3,9
8B	2,14	100	151	82	215	3,8
57 D	2,09	98	151	80	219	3,6
125 AA	2,41	122	168	93	216	4,1
Mean	2.29	102	154	88	217	3.8

The rootstock parteners belonging to the hybrid Berlandieri x Riparia had a different behavior, achieving as much maximum quantitative (26C) quotient and minimum quantitative (57D), the other rootstocks presenting the intermediate values.The 41B rootstock, supposed as improvig the yield grapes (Constantinescu and colab., 1967) influenced in negativ sense the yield grapes to the Merlot variety, registering a less productivity level that 93RG rootstock.The 5BB rootstock, upmost in the winegrowing plantations, inducted a productive level around the average rootstocks using in experimentation, but less that 26 C rootstock.

The sugar accumulation in grapes depended in a little measure of rootstocks used in the graft combinations.The rootstocks which induced the highest sugar content were 93 RG, 26 C, 71 C and 57 D.

The rootstocks had a moderate influence on the acidity.

Grapevine rootstocks can have a significant influence on the optimisation of the vine's growth and fructification.The Ravaz index oscillated between 5,7 (2 C and 41 B) and 7,5(26 C), the results obtained being concordantly with results aquired of Betiga(2003). Among grapevine rootstocks used in the combinations of

graft with the Merlot variety is remarked 26 C which inducted a moderate vigor and a very productive level (fig.1.).

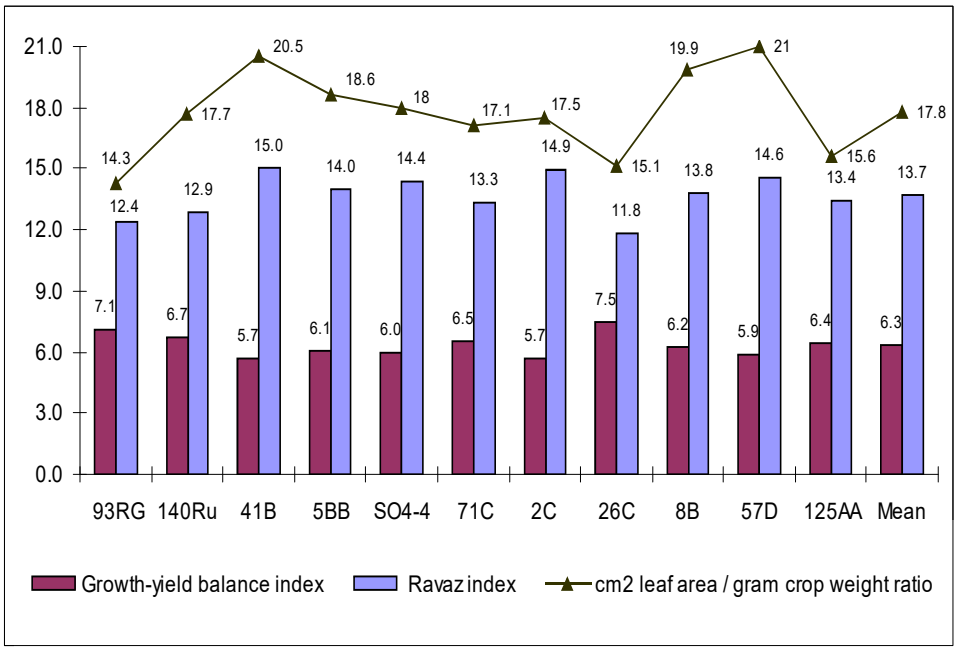

Fig. 1. Influence of the rootstocks parteners on the vine's growth and fructification

The growth-yield balance index, reprezenting the ratio between pruning weight x 100 / grape yield + pruning weight showed the percent contribution on the vegetative part to the whole production. After this index in the Merlot variety case emphasized the following rootstocks: 26 C (11, 8), 93 RG (12, 4) and 140 Ru (12, 9). The greatest growth-yield balance index values were obtained in case of the following rootstocks: 41 B (15, 0), 2 C (14, 9) and 57 D (14, 6). which inducted the low productive potential.

For Merlot variety the cm^2 leaf area / gram crop weight ratio required for optimal level of 26 C, 125 AA, 93 RG and 140 Ru rootstocks (fig. 1).

CONCLUSIONS

The experimented grapevine rootstocks had a differentiated influence on the physiological and nutritional processes in grapevine, implied in the quantitative and qualitative building up of the grape yield.

The analysis of the results obtained emhasized that 26 C and 140 Ru rootstocks in the combination of graft with the Merlot variety induced an high physiological and biochemical activity, assuring an optimum relation between growth and fructification with profitable effects on projection of quantitative harvest and qualitative of grapes.

In report with 5BB rootstock, upmost in the winegrowing plantations from our country, these rootstocks achieved an equilibrium between growth and fructification and may be recommended for establishing a new winegrowing plantations in Valea Calugareasca vineyard.

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ROOT SYSTEM ARCHITECTURE OF MERLOT VARIETY GRAFTED ON DIFFERENT ROOTSTOCKS AND GROWN UNDER THE PEDOCLIMATIC CONDITIONS OF VALEA CALUGAREASCA VITICULTURAL CENTER

ARHITECTONICA SISTEMULUI RADICULAR LA SOIUL MERLOT ALTOIT PE DIFERIȚI PORTALTOI CULTIVAT ÎN CONDIȚIILE PEDOCLIMATICE ALE CENTRULUI VITICOL VALEA CĂLUGĂREASCĂ

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Abstract. *The influence of the scion-rootstock interaction on the root system development was emphasized by the research works carried out in Valea Călugărească viticultural center under the conditions of a reddish-brown mollic vertic soil. The biological material used was Merlot variety grafted on 11 rootstocks: 8B, 26C, 57D, 71C, 2C, 5BB, SO4-4, 125AA, 41B, 140Ru and 93RG. When analysing the development of the rootstock root system in its depth (100 cm), it was noticed a differentiated distribution of the roots, even if for the greatest part of the rootstocks, the large mass of the roots is located inside a depth of 0-60 cm.*

The rootstocks having explored the soil profile the most efficiently, showing deeper and more uniform distributions of the root system were 140 Ru an.d SO 4-4. A weaker development of the root system in the depth of the soil profile showed the rootstocks 57D and 2 C, the other rootstock holding an intermediary position.

Such a differentiated development of the root system needing to explore a larger or smaller volume of soil would certainly determine differentiations concerning the mineral nutrition of vinifera varieties grafted on those rootstocks and implicitly on the qualitative and quantitative production of grapes.

Rezumat. *Influența interacțiunii altoi-portaltoi asupra dezvoltării sistemului radicular a fost pusă în evidență prin cercetările efectuate în centrul viticol Valea Călugărească, în condițiile unui sol brun roșcat molic vertic utilizând ca material biologic soiul Merlot altoit pe 11 portaltoi (8B, 26C, 57D, 71C, 2C, 5BB, SO4-4, 125AA, 41B, 140Ru, 93RG). Analizând dezvoltarea pe adâncime (100 cm) a sistemului radicular al portaltoilor luați în studiu s-a constatat o distribuție diferențiată a acestuia chiar dacă majoritatea portaltoilor marea masă a rădăcinilor se află cantonată pe adâncimea 0-60 cm*

Portaltoii care au explorat cel mai eficient profilul de sol, prezentând o distribuție mai uniformă și mai în adâncime a sistemului radicular au fost: 140 Ru și SO 4-4. O dezvoltare mai slabă a sistemului radicular pe adâncimea profilului de sol au prezentat-o portaltoii: 57D și 2 C, ceilalți portaltoi ocupând o poziție intermediară.

Această dezvoltare diferențiată a sistemului radicular, care conduce la explorarea unui volum mai mare sau mai redus de sol va determina în mod cert diferențieri în privința nutriției minerale a soiurilor vinifera altoite pe acești portaltoi și implicit a producției cantitative și calitative de struguri.

A better knowledge of the root system architecture and of the modifying factors represents an important necessity for elaborating adequate agro-technical measures so as to obtain constantly great productions of good quality grapes. In this respect it is worth mentioning the research works carried out by Oşlobeanu (1966), Popa (1974), Southey and Archer (1988), their research works emphasizing on the influence of the scion on the root system development and architecture in case of different vinifera/rootstock combinations.

MATERIAL AND METHOD

The research works carried out in 2003 in a checking plot where Merlot variety was grafted on a large range of rootstocks having different genetic origins. There were used rootstocks belonging to Vitis riparia (R G clone 93), as well as the hybrids Berlandieri x Riparia (8B, 5BB, 2C, SO4-4, 125 AA, 57D, 26C, 71C), Berlandieri x Rupestis (140 Ru) and Vinifera x Berlandieri (41 B).

The grapevines were planted at a distance of 2 x 1 m (5000 vines/ha). As a training form it was used the bilateral spurred cordon on half stem (h=60 cm).

The soil is a reddish-brown mollic vertic soil, such a soil being a rather limiting one for growing grapevine. It generally presents a loamy texture up to loamy-clayey, the content in loam on the soil profile being of almost 46.8%.

The content in carbonates (IPC=1.21) is low and therefore soil reaction is only a little acid, the pH being of 6.4, such a value being favourable for the grapevine.

The development of the root system distribution by the soil profile in case of the combinations vinifera variety/rootstock partner was determined by using the metric framework method.

RESULTS AND DISCUSSIONS

When analysing the development of the root system belonging to the grafting combinations of Merlot variety into soil depth (100 cm), the maximum development of the root system was registered into the depth of 0-60 cm in case of the greatest part of the rootstocks (fig. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11).

The density of the roots expressed as a total number of roots for the different grafting combinations of Merlot variety was significantly variable, the rootstock 71C proliferating the greatest number of roots and the rootstock 57D the smallest one. The rootstocks that explored the soil profile the most efficiently, presenting a deeper and more uniform distribution of the root system were 140 Ru and SO 4-4.

A poorer development of the root system into the depth of the soil profile had the rootstocks 57D and 2 C, the other rootstocks (8B, 26C, 71C, 5BB, 125AA, 41B, 93RG) holding an intermediary position.

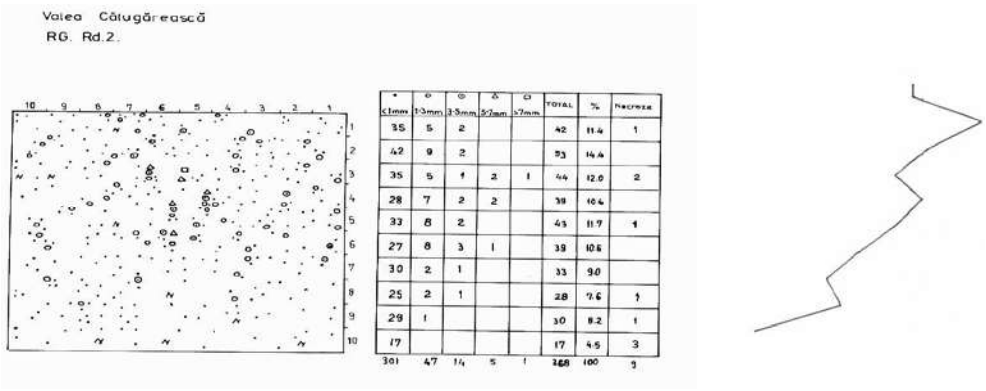

Fig.1- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/93RG

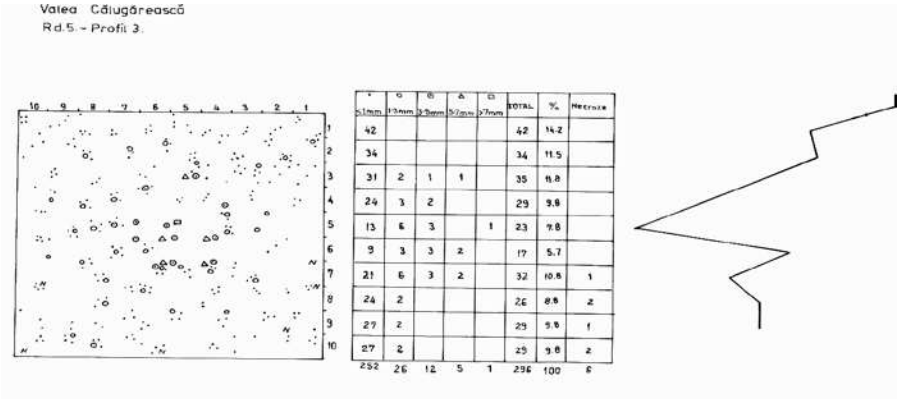

Fig.2- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/140 Ru

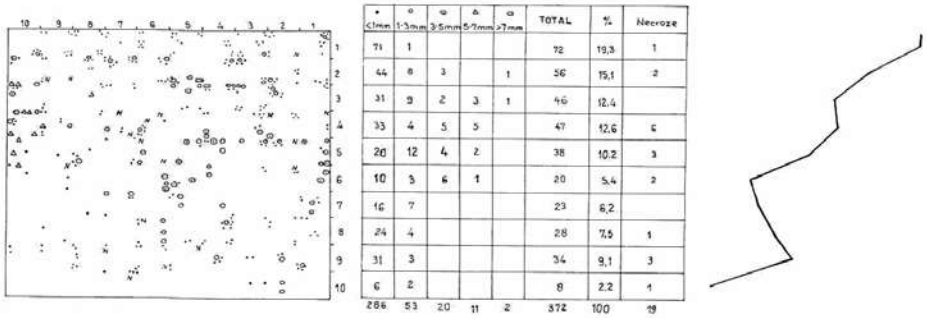

Fig.3- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/41 B

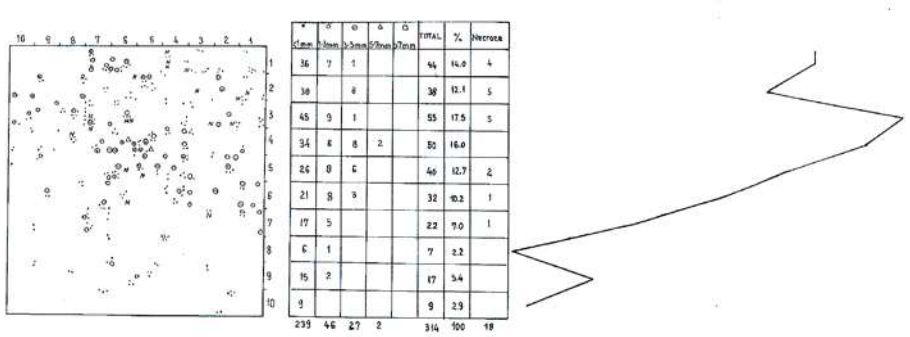

Fig.4- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/5BB

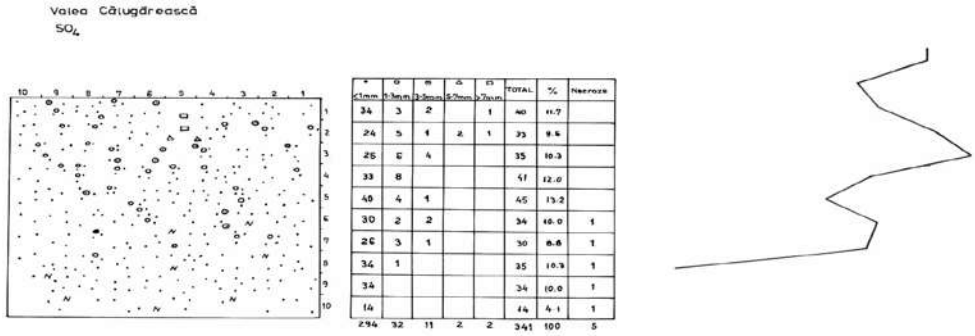

Fig.5- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/ SO 4-4

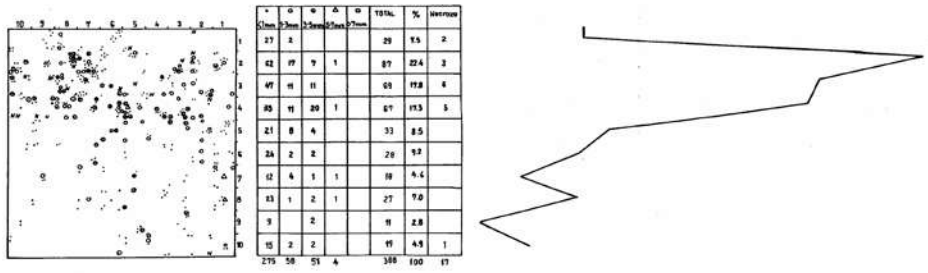

Fig.6- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/ 71 C

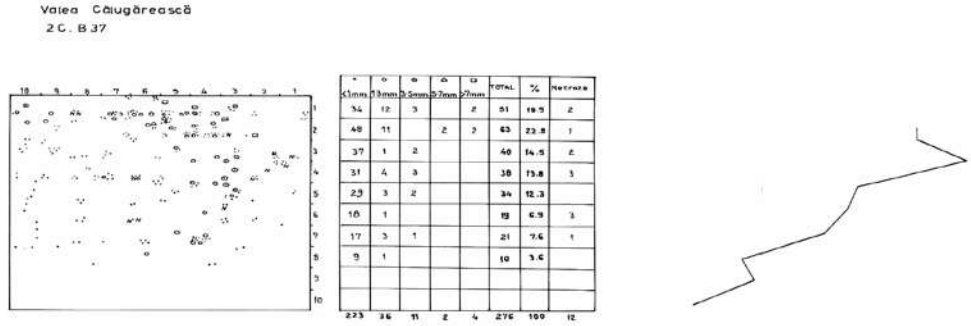

Fig.7- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/ 2 C

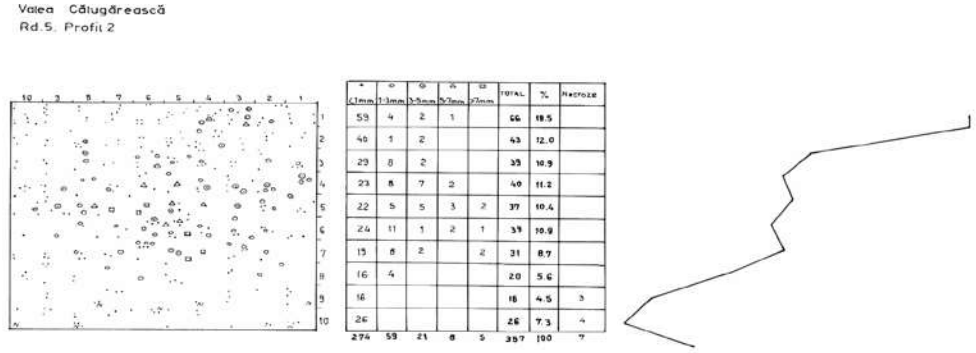

Fig.8- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/ 26 C

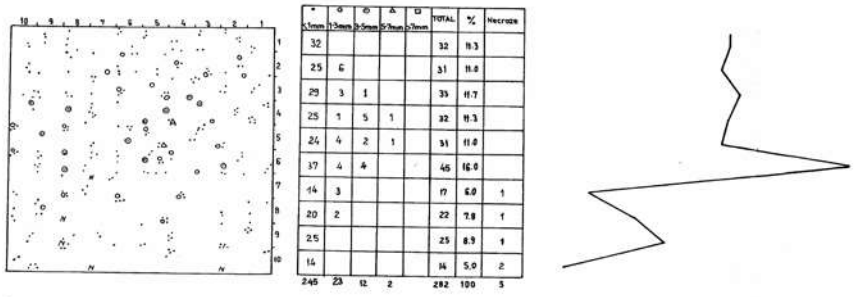

Fig.9- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/ 8B

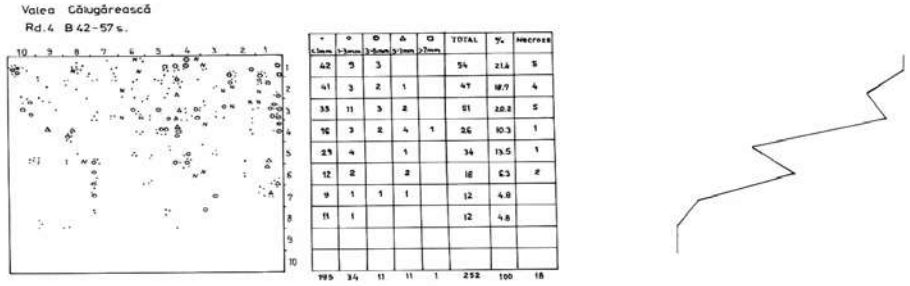

Fig.10- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/ 57 D

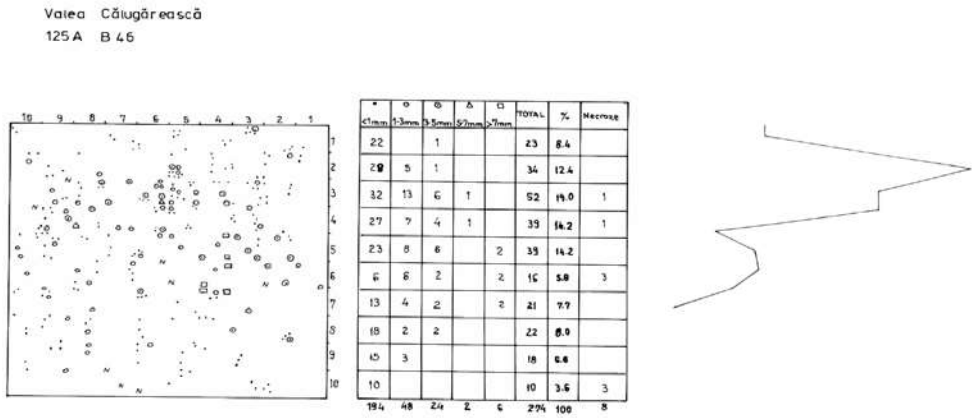

Fig.11- Diagram of the distribution in case of the root system belonging to the grafting combination Merlot/ 125 AA

The rootstocks SO4-4 and 140Ru having a deeper root system showed the smallest number of roots attacked by necrosis, which suggests the idea that they had a better resistance to drought under the climatic conditions of the years 2000-2002. A small number of roots attacked by necrosis were registered also in case of the rootstocks 8B, 26C and 125AA.

CONCLUSIONS

- The root system of the grafting combinations with Merlot variety presented a differentiated distribution according to the rootstock used in the grafting combination. The rootstocks 140 Ru and SO 4-4 presented a deeper and more uniform distribution of the root system, as well as the smallest number of roots attacked by necrosis, this suggesting that under the eco-climatic conditions of the years 2000-2002, those rootstocks had a better resistance to drought.

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RESEARCH REGARDING THE INTERDEPENDENCE BETWEEN THE QUANTITY AND THE QUALITY OF THE YIELD, FOR THE GRAPEVINE VARIETIES GROWN IN THE AVEREŞTI WINE-GROWING CENTRE - HUŞI VINEYARD

CERCETĂRI PRIVIND INTERDEPENDENȚA DINTRE CANTITATEA ŞI CALITATEA PRODUCȚIEI, LA SOIURILE DE VIȚĂ DE VIE CULTIVATE ÎN CENTRUL VITICOL AVEREŞTI-PODGORIA HUŞI

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Abstract. *The vine-growing center Avereşti is situated in the sloping zone of the Huşi vineyard, characterized by a lower level of heliothermic resources. These facts determine small sugar content and a high acidity of the must, the yield being generally valorized as table wines, sparkling wines, and rarely as the quality wines. Through the researches carried out between 2000-2002, it was established that the diminution of the yield quantity assures the increase of the sugar accumulation and the reduction of the acidity of the must. The results were used for establishing the yield level wich permit the obtaining of the quality wines at the Fetească albă, Fetească regală şi Aligote varieties.*

Rezumat. *Centrul viticol Avereşti este situat în zona deluroasă a podgoriei Huşi, caracterizată printr-un nivel mai redus al resurselor heliotermice. Acestea determină acumularea unor cantități mai mici de zaharuri în boabe şi un nivel ridicat al acidității mustului, producția de struguri fiind valorificată de regulă ca vinuri de masă, vinuri materie primă pentru spumante şi mai puțin ca vinuri de calitate. Prin cercetările efectuate între anii 2000-2002, s-a constatat că diminuarea producției de struguri asigură creşterea concentrației mustului în zaharuri şi într-o mai mică măsură, diminuarea aciditățiı mustului. Pe baza datelor obținute, s-au stabilit pentru soiurile Fetească albă, Fetească regală şi Aligote, nivelurile de producție care permit obținerea vinurilor de calitate.*

INTRODUCTION

The obtaining of the quality wines in the septentrional vineyards is conditioned by the climate favorability during the vegetation period. The lacking of thermic resources becomes a limitation factor for the sugar accumulation in the grapes, especially in the plantations situated on the high plateau, and with reduced resources of the solar radiation. Is the state of the Averesti wine-growing centre, situated in the northern part of the Husi vineyard, in a sloping region, with an average altitude of 280 m. In the condition of using the actual training system, the valorization of the biological qualitative potential of the white qualitative wines varieties, Feteasca alba, Sauvignon, and Pinot gris, become possible only in the years with climatic favorability, long and sunny autumns.

The aim of the research carried out between 2000-2002, it was to establish the relations between the level and the quality of the yield, and the limits of the yield between that the quality of the grapes assure the obtaining of the qualitative wines every year.

MATERIALS AND METHODS

The characteristics of the Averesti vine-growing centre are: the average temperature 9.6 °C, the annual precipitations 566.2 mm and the real insolation1438.6 hours.

The biologic material was the Fetească albă, Fetească regală and Aligote varieties, grafted on Kober 5 BB. The plantations are situated on a plateau of 285 m altitude and present the next characteristics: 2.2 between the rows and 1.2 m between the vines on the row, the density by 3490 vines/ha, the training form bilateral cordon with semi-high trunk. It was established 4 experimental variants:

- V_1, with 10.4 bud-load/m^2;
- M, with 17.0 bud-load/m^2;
- V_2, with 20.8 bud-load/m^2;
- V_3, with 24.6 bud-load/m^2.

The determinations: *the yield on the trunk and at the ha, the sugar content in the must, the sugar accumulation on the ha, the total acidity.*

1. The yield level. For the Fetească albă variety, the 10.4-24.6 bud-load/m^2 assures 2.04-4.59 kg grapes/vine. With the same bud-load, the Fetească regală variety realize 3.06-5.06 kg grapes on the vine, and the Aligote variety 2.44-4.27 kg/vine **(tab. 1**). The yield level for a ha is of 7.71-17.39 t for the Fetească albă variety, 11.58-19.15 t for the Fetească regală variety and 9.25-16.16 t for the Aligoté variety. The smallest quantities of grapes on the vine and the ha, were obtained with a load of bud of 10.4/m^2, while the biggest quantities of 24.6 buds/m^2 for the Fetească albă variety and 20.8 buds/m^2 for the Fetească regală and Aligoté varieties.

2. The sugar content in the must. The sugar accumulation was negatively correlated with the load of bud. The highest sugar concentrations were recorded at V_1 variant (10.4 buds/m^2), while the lowest at V_3 variant (24.6 buds/m^2). For the Fetească albă variety, which has the highest quality potential, the sugar content in the must was of 174.67-188.67 g/l; for the Fetească regală variety it was of 156.07-182.03 g/l, and for the Aligoté variety of 182.83-160.53 g/l.

3. The local product index. It expresses the sugar quantity which is accumulated for a ha plantation, and depends, on a high level, on the yield quantity. For the Feteasca albă variety, the values of the local product index was of 924-1971 kg sugar/ha; for the Feteasca regală variety of 1369-2125 kg/ha and for the Aligoté variety of 1098-1796 kg/ha (**tab. 1**).

Table 1

The yield, the sugar content in the must, the local production index and the total acidity of the must, depending on the bud-load, for the varieties grown in the Avereşti vine-growing centre, the Huşi vineyard (average values, 2000-2002)

SPECIFICATION		FETEASCĂ ALBĂ				FETEASCĂ REGALĂ				ALIGOTE´			
		V_1	M	V_2	V_3	V_1	M	V_2	V_3	V_1	M	V_2	V_3
The yield	Kg/vine	2.04	3.48	4.32	4.59	3.06	4.27	5.06	4.98	2.44	3.7	4.27	3.59
	t/ha	7.71	13.14	16.23	17.39	11.58	16.26	19.15	18.83	9.25	14.18	16.16	13.58
The sugar content in the must (g/l)		188.67	183.3	177.63	174.47	182.03	175.63	170.80	156.07	182.83	174.3	171.03	160.53
The local production index (sugar, kg/ha)		924	1512	1873	1971	1369	1855	2125	1909	1098	1606	1796	1416
The total acidity of the must (g/l, H_2SO_4)		5.39	5.44	5.57	5.69	6.87	6.97	7.23	7.61	6.55	6.86	6.90	6.96

4. The total acidity of the must. It positively correlates with the bud-load. The following values were obtained: 5.39-5.69 g/l H_2SO_4 for the Fetească albă variety, 6.87-7.61 g/l H_2SO_4 for the Feteasca regală variety and 6.55-6.96 g/l H_2SO_4 for the Aligoté variety.

5. The correlations between the yield quantity and the sugar content in the must. Negative correlations between the yield quantity and the sugar content in the must were recorded: for the Feteasca albă variety, r = - 0.9989; for the Feteasca regală variety, r = - 0.8009; for the Aligoté variety, r = - 0.7952 (**tab. 2**).

Compared to the M variant, the increase of the yield with 1 kg/vine determines the decrease of the sugar content in the must with 6.75-7.95 g/l for the Fetească albă variety, 6.11-27.54 g/l for the Feteasca regală variety and with 6.42-24.42 for the Aligoté variety.

Table 2

The values of the correlation and regression index, between the yield and the sugar content in the must (average values, 2000-2002)

VARIETY	Variant	Yield (kg/but.)	Sugar (g/l)	Correlation coefficient (r)	Regression coefficient (y/x)
Feteasca albă	V_1	2.04	188.67	- 0.9989	+ 5.37
	M	3.48	183.3		0
	V_2	4.32	177.63		- 6.75
	V_3	4.59	174.47		- 7.95
Feteasca regală	V_1	3.06	182.03	- 0.8009	+ 5.28
	M	4.27	175.63		0
	V_2	5.06	170.8		- 6.11
	V_3	4.98	156.07		- 27.54
Aligoté	V_1	2.44	182.83	- 0.7952	+ 6.45
	M	3.75	174.37		0
	V_2	4.27	171.03		- 6.42
	V_3	3.59	160.53		- 24.42

The decrease of the yield with 1 kg/vine compared to the M variant, determines the increase of the sugar content in the must with 5.37 g/l for the Feteasca albă, 5.28 g/l for the Feteasca regală and 6.45 g/l for the Aligoté variety.

6. The correlation between the yield and the local production index. There is a positive correlation between the yield and the local production index: for the Feteasca albă variety r = +0.9993; for the Feteasca regală variety, r = +0.9667 and for the Aligoté variety, r = +0.9862 (**tab. 3**). The biggest sugar quantities/ha, correspond to the highest yield levels, achieved with 24.6 buds/m^2 for the Fetească albă variety, 20.8 buds/m^2 for the Fetească regală variety and 20.8 buds/m^2 for the Aligoté variety.

Compared to the M variant, the increase of the yield with 1 t/ha, assures the increase of the sugar content with 100.8-116 kg/ha for the Feteasca albă variety, 55-93.4 kg/ha for Feteasca regală and 95 kg/ha for Aligoté. For the Aligoté variety, the exceeding of the biological yield potential, by overlooading the V_3 variant, determines the decrease of the sugar content with 116 kg/ha.

The decrease of the production level with 1 t/ha compared to the M variant, is accompanied by the decrease of the sugar content with 108 kg/ha for the Feteasca albă variety and with 103 kg/ha for the Feteasca regală and Aligoté varieties.

Table 3

The values of the correlation and regression coefficients between the yield and the local production index, depending on the bud-load (average values, 2000-2002)

VARIETY	Variant	Yield (t/ha)	Sugar (kg/ha)	Correlation coefficient	Regression coefficient
Feteasca albă	V_1	7.71	924	0.9993	-108.0
	M	13.14	1512		0
	V_2	16.23	1873		+ 116.0
	V_3	17.39	1971		+ 100.8
Feteasca regală	V_1	11.58	1369	0.9667	- 103.0
	M	16.26	1855		0
	V_2	19.15	2125		+ 93.4
	V_3	18.8	1909		+ 55.0
Aligoté	V_1	9.25	1098	0.9862	- 103.0
	M	14.18	1606		0
	V_2	16.16	1796		+ 95.0
	V_3	13.58	1416		- 116.0

Table 4

The values of the correlation and regression coefficients between the yield and the total acidity of the must depending on the bud load (average values, 2000-2002)

VARIETY	Variant	Yield (kg/but.)	Must acidity (g/l H_2SO_4)	Correlation coefficient (r)	Regression coefficient (y/x)
Feteasca albă	V_1	2.04	5.39	0.8969	- 0.034
	M	3.48	5.44		0
	V_2	4.32	5.57		+ 0.154
	V_3	4.59	5.69		+0.225
Feteasca regală	V_1	3.06	6.87	0.7880	- 0.082
	M	4.27	6.97		0
	V_2	5.06	7.23		+ 0.316
	V_3	4.98	7.61		+ 0.901
Aligoté	V_1	2.44	6.55	0.8746	- 0.274
	M	3.75	6.86		0
	V_2	4.27	6.90		+ 0.076
	V_3	3.59	6.96		+ 0.625

7. Correlation between the yield quantity and the total acidity of the must. By analyzing the experimental data, it can be noticed that the must acidity is not significantly influenced by the yield quantity.

The correlation coefficient has positive values : for the Fetească albă variety, r = 0.8969; for the Fetească regală variety, r = 0.7880; and for the Aligoté variety, r = 0.8746.

The values of the regression coefficient show that each 1 kg grapes/vine, more than the M variant, determines the increase of the must acidity with 0.154-0.225 g/l H_2SO_4 for the Fetească albă variety, 0.316-0.901 g/l for the Feteasca regală variety and 0.076-0.625 g/l H_2SO_4 for the Aligoté variety (**tab.4**). For the V_2 and V_1 variants, these differences are insignificant.

CONCLUSIONS

1. The yield is negatively correlated with the sugar content in the must: for the Feteasca albă variety, r = -0.9989; for the Feteasca regală variety, r = - 0.8009; for the Aligoté variety, r = - 0.7952. The smallest yield quantities per vine and per ha, correspond to the highest sugar concentrations.

2. The decrease of the yield with 1 kg/vine ensures the increase of the sugar content in the must with 5.37 – 7.95 g/l for the Feteasca albă variety, 5.28 – 27.5 g/l for the Fetească regală variety and 6.45 – 24.4 g/l for the Aligoté variety.

3. The yield positively correlates with the local production index. The increase of the yield with 1 t/ha, determines the increase of the local production index with 100.8-108 kg sugar/ha at the Feteasca albă variety, 55-103 kg sugar/ha for the Feteasca regală variety, and 95-116 kg/ha for the Aligoté variety.

4. The yeld does not significantly influence the must acidity. The decrease of the yield with 1 t/ha, determines the decrease of the must acidity with 0.034-0.225 g/l H_2SO_4 for the Fetească albă variety, 0.082-0.091 g/l H_2SO_4 for the Fetească regală variety and 0.274-0.625 g/l H_2SO_4 for the Aligoté variety.

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THE FOLIAR FERTILIZATION, UNCONVENTIONAL AND NONPOLLUTANT MANNER OF INCREASING THE PRODUCTION OF GRAPES IN THE DURABLE VITICULTURE

FERTILIZAREA FOLIARĂ - MIJLOC NECONVENȚIONAL ŞI NEPOLUANT DE CREŞTERE A PRODUCȚIEI DE STRUGURI ÎN AGRICULTURA DURABILĂ

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Abstract. *The paper presents the experimental results of a testing on a variety of Romanian and import foliar fertilizers, in the Ampelographic Collection of the University of Agricultural Sciences and Veterinary Medicine Iasi, on the Chasselas dore variety. The use of these products determines the increase of the contents of leaves in the assimilatory pigments, both on the total of pigments and on each pigment separately; the grape productions increased, the statistically ensured growths were comprised between 20.63 and 30.71; the resulting energetic indicators advance the factorial ones allocated and the quality of production of grapes is positively influenced, mainly through the increase of the total content of sugars. Among the products tested we noticed: Basfoliar active, Folplex 41, Folifert 997, Folifert K and Vinafert 2.*

Rezumat. *Lucrarea prezinta rezultatele experimentale ale testarii unui sortiment de fertilizanti foliari romanesti si de import, in Colectia Ampelografica a Universitatii de Stiinte Agricle si de Medicina Veterinara Iasi, pe soiul Chasselas dore. Utilizarea acestor produsi determina cresterea continutului frunzelor in pigmenti asimilatori, atat pe total pigmenti, cat si pe fiecare pigment in parte; productiile de struguri au crescut, sporurile asigurate statistic, au fost cuprinse intre 20,63 si 30,71; indicatorii energetici rezultativi îi devanseaza pe cei factoriali alocatiş calitatea productiei de struguri este influentata pozitiv, in principal prin cresterea continutului total în zaharuri. Dintre produsele testate s-au remarcat: Basfoliar activ, Folplex 411, Folifert 997, Folifert K si Vinafert 2.*

The supplementary fertilization through foliar manner, during the vegetation period, with complex nutritive solutions, is recorded in the durable agriculture as an important measure to improve the nutrition of plants (Dorneanu and the collaborators 2003, Bireescu and collaborators, 2005)

The permeation of nutritive elements and organic substances in the leaves takes place under the form of ions and molecules, in the course of diffusion through the cuticle pores and the interspaces among the cellules of the epidermis and the subjacent layers that represent the free layer of leaves (Borlan and collaborators 1995, Franke 1967).

The ions absorbed in the leaves are rapidly metabolized in physiologically active organic compounds, being integrated in the general metabolic process and having a stimulating role in the biosynthesis of amino acids, of assimilatory pigments, with positive effects in the growth and development of plants (Neuman and Collaborators 1981, Parker and collaborators 1980, Dorneanu and collaborators 2003)

MATERIAL AND METHOD

During the period 2004-2006 at SDE Iasi , V Adamachi farm, 16 foliar compounds were tested for the grape vine. We worked with Chasselas dore variety, grafted on the Kober 5BB stock. The plantation was founded in 1985 on a Cambic black earth with medium fertility potential, the plantation distances were of 2.2/1.2 m, the logs were driven in the shape of semi-high bilateral cord, with the cutting in fruit studs of 2-3 buds.

The experiment was of monofactorial type, in randomized blocks. The experimental variants were compared with a blank assay spluttered with water; the foliar products were applied in three stages using 10 l/ha (1.000 l solution/ha); the first treatment was applied after the blossom, and the next at intervals of two weeks.

After the second and third treatment, we determined the content of foliar pigments, and the full maturity of grapes, their production and quality.

RESULTS AND DISCUSSIONS

The foliar fertilization registered a significant influence on the photosynthetic efficiency of utilization, productivity and quality of the grape production.

The productive and energetic efficiency is remarked through production increases, statistically ensured, comprised between 20% (iron chelate 0.2%) and 30% (Folplex 411-1%; active Basfoliar 0.5%. The foliar fertilizers used stimulate the energetic efficiency of the solar energy transformation into biochemical energy, specific to the plat; thus the production of energy and the energetic balance, as resulting indicators, advances the allocated factorial ones. The net energetic increase is amplified, compared to the blank assay, with relative values comprised between 11.52 % and 20.66% (table 1).

The nutrients applied through foliar manner are metabolized in specific organic compounds, which have a biostimulative effect in the synthesis of assimilatory pigments (table 2), as a result the total content increases in the assimilatory pigments, compared to the unfertilized blank assay, with relative values comprised between 31.15% and 39.53%. Also, the content of each assimilatory pigment increases; in the case of “a” chlorophyll, the content increases from 1.1031 mg/g fresh substance, in the blank assay, up to 1.5443 mg/g fresh substance in the variant fertilized with Folplex 111-1%, and in the case of “b” chlorophyll, the content increases from 0.8636 mg/g fresh substance, in the blank assay, to 1.1756 mg/g fresh substance, in the variety fertilized with Folifert 997-1%.

The biostimulating role of foliar fertilizers was observed also regarding the productivity and quality indicators (table 3); the average weight of a cluster increased in relative values with 20.3-47.9%, and in absolute values with 28-30 g compared to the unfertilized blank assay.

Tabel 1

Productival and energetical efficiency of some foliar fertilizers on vine, Chasselas doré variety

Variants	Yield (kg/ha)	Productival efficiency (kg/ha)			Energetical efficiency (Mcal/ha)					
		dif.	%	semn.	OUTPUT	INPUT	bilanț	dif.	%	semn.
Control	8584	-	100	-	8584	3004	5580	-	100	-
Folplex 411-1%	11127	2543	129,63	xxx	11127	4450	6677	1097	119,66	xxx
Folplex 111-1%	10593	2009	123,41	xxx	10593	4237	6356	776	113,91	xxx
Microfert fer-0,3%	10401	1817	121,17	xxx	10401	4160	6241	661	111,85	xxx
Fortifert 411-1%	11029	2445	128,48	xxx	11029	4412	6617	1037	118,58	xxx
Fortifert 141-1%	10545	1961	122,84	xxx	10545	4218	6327	747	113,39	xxx
Folifert 997-1%	10913	2329	127,13	xxx	10913	4365	6548	968	117,35	xxx
Folifert Ca-0,8%	10696	2112	124,61	xxx	10696	4278	6418	838	115,02	xxx
Folifert K-0,4%	10866	2282	126,58	xxx	10866	4346	6520	940	116,84	xxx
Basfoliar activ-0,5%	11221	2637	130,71	xxx	11221	4488	6733	1153	120,66	xxx
30/30/30 + KH-0,5%	10355	1771	120,63	xxx	10355	4142	6213	633	111,34	xxx
60/30/30 + KH-0,5%	10634	2050	123,88	xxx	10634	4254	6380	800	114,35	xxx
Vinafert 1-0,5%	10672	2088	124,32	xxx	10672	4269	6403	823	114,75	xxx
Vinafert 2-0,5%	10796	2212	125,77	xxx	10796	4318	6478	898	116,09	xxx
Chelat de fier-0,2%	10371	1787	120,81	xxx	10371	4148	6223	643	111,52	xxx
Plantfert 1/12/11-1%	10518	1934	122,53	xxx	10518	4207	6311	731	113,10	xxx

DL 5% - 867 kg/ha
DL 1% - 1451 kg/ha
DL 0,1% - 1623 kg/ha

DL 5% - 268 Mcal/ha
DL 1% - 317 Mcal/ha
DL 0,1% - 581 Mcal/ha

Tabel 2

The influence of foliar fertilization on vine photosynthesis, Chasselas doré variety

Variants	chloro phyll "a"	chloro phyll "b"	Caroten	Total pigments			
				mg/g s. pr.	dif.	%	semn.
Control	1,1031	0,8636	0,5456	2,5123	-	100	-
Folplex 411-1%	1,5443	1,1700	0,7911	3,5054	0,9931	139,53	xxx
Folplex 111-1%	1,4781	1,1459	0,7395	3,3635	0,8512	133,88	xxx
Microfert fer-0,3%	1,4752	1,1457	0,7358	3,3567	0,8444	133,61	xxx
Fortifert 411-1%	1,5371	1,1686	0,7831	3,4888	0,9765	138,87	xxx
Fortifert 141-1%	1,4623	1,1643	0,7456	3,3722	0,8599	134,23	xxx
Folifert 997-1%	1,4798	1,1756	0,7593	3,4147	0,9024	135,92	xxx
Folifert Ca-0,8%	1,4687	1,1693	0,7488	3,3868	0,8745	134,81	xxx
Folifert K-0,4%	1,4858	1,1516	0,7587	3,3961	0,8838	135,18	xxx
Basfoliar activ-0,5%	1,5421	1,1660	0,7883	3,4964	0,9841	139,17	xxx
30/30/30+KH-0,5%	1,4341	1,1563	0,7336	3,3240	0,8117	132,31	xxx
60/30/30+KH-0,5%	1,4788	1,1592	0,7481	3,3861	0,8738	134,78	xxx
Vinafert 1-0,5%	1,4826	1,1518	0,7574	3,3918	0,8795	135,01	xxx
Vinafert 2-0,5%	1,4895	1,1675	0,7652	3,4222	0,9099	136,22	xxx
Chelat de fier-0,2%	1,4123	1,1510	0,7316	3,2949	0,7826	131,15	xxx
Plantfert 1/12/11-1%	1,4774	1,1430	0,7476	3,3680	0,8557	134,06	xxx

DL 5% - 0,3671 mg/g s. pr.
DL 1% - 0,5423 mg/g s. pr.
DL 0,1% - 0,7516 mg/g s. pr.

Under the climatic conditions specific to the experimental years, with deficit regarding the humidity, but abundant regarding temperature, the quality of grapes, expressed through the content of sugars and acidity, varies slightly, compared to the blank assay, according to the chemical composition of the foliar products used.

CONCLUSIONS

The foliar fertilization, as an unconventional means of fertilization, according to the experimental results, can substitute the basic, radicular fertilization, in a proportion of 10-12%.

The foliar fertilizers used are ecological, through the growth of crops much bigger quantities of nutrients are exported, compared to those applied through foliar fertilization.

Tabel 3

The influence of foliar fertilization on productivity and yield quality, Chasselas doré variety

Variants	The medium weight of grapes (g)				Dry substance (%)		Water (%)		Total sugar (g/l)				Total acidity (g/l)
	g	dif.	%	semn.	leaves	grapes	leaves	grapes	g/l	dif.	%	semn.	
Control	167	-	100	-	21,17	14,35	68,31	81,82	167,5	-	100	-	4,63
Folplex 411-1%	247	80	147,9	xxx	33,21	15,73	70,13	85,16	173,4	5,9	103,5	xxx	4,38
Folplex 111-1%	198	31	118,6	xxx	22,97	14,16	67,95	82,34	168,7	1,2	100,7	x	4,61
Microfert fer-0,3%	195	28	116,8	xxx	20,63	13,84	67,36	79,51	169,8	2,3	101,5	x	4,60
Fortifert 411-1%	248	81	148,5	xxx	34,57	17,14	71,36	84,65	173,6	6,1	103,6	xxx	4,31
Fortifert 141-1%	196	29	117,4	xxx	22,81	14,03	64,53	81,07	172,3	4,8	102,9	xx	4,57
Folifert 997-1%	239	72	143,1	xxx	35,32	17,54	72,45	85,36	171,5	4,0	102,4	xx	4,59
Folifert Ca-0,8%	224	57	134,1	xxx	29,16	15,68	73,16	84,58	173,5	6,0	103,6	xxx	4,51
Folifert K-0,4%	237	70	141,9	xxx	27,83	15,34	70,83	83,17	171,6	4,1	102,4	xx	4,58
Basfoliar activ-0,5%	245	78	146,7	xxx	36,02	17,76	73,51	85,93	170,8	3,3	101,9	xx	4,29
30/30/30+KH-0,5%	197	30	117,9	xxx	23,51	14,11	63,36	86,38	168,9	1,4	100,8	x	4,37
60/30/30+KH-0,5%	199	32	119,2	xxx	24,87	14,56	64,81	83,11	173,1	5,6	103,3	xxx	4,48
Vinafert 1-0,5%	201	34	120,3	xxx	25,18	15,01	66,37	82,43	172,3	4,8	102,9	xx	4,51
Vinafert 2-0,5%	198	31	118,6	xxx	27,33	15,16	68,56	83,64	171,8	4,3	102,6	xx	4,55
Chelat de fier-0,2%	201	34	120,3	xxx	22,41	13,41	64,08	85,16	168,7	1,2	100,7	x	4,59
Plantfert 1/12/11-1%	195	28	116,8	xxx	21,86	14,09	66,17	79,57	169,7	2,2	101,3	x	4,53

DL 5% - 13 grams
DL 1% - 17 grams
DL 0,1% - 25 grams

DL 5% - 0,8 g/l
DL 1% - 3,1 g/l
DL 0,1% - 4,9 g/l

The foliar fertilizers stimulate the energetic efficiency, the resulting indicators advance the allotted factorial ones, through the significant increase of grape production and its quality.

The foliar fertilizers stimulate the photosynthetic efficiency, the efficiency of the total content of assimilatory pigments, and of each apart.

All the foliar experimented fertilizers have proved to have a positive influence on the grape vine, among these being emphasized Basfoliar active-0.5%, Folplex 411-1%, Fortifert 411-1%, Folifert K-0.4% etc.

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THE IDENTIFICATION OF CLONES WINE VARIETIES BY ENZYMATIC ANALYSIS

L'IDENTIFICATION DES CLONES DES VARIÉTÉS DE VIN PAR ANALYSE ENZYMATIQUE

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Abstract. *The authors applied the isoenzymatic analysis of peroxydase (E.C. 1.11.1.7) by disk-electrophoresis to a clones a Sauvignon grapevine cultivars of Vitis vinifera L., with a view to identifying the "proteic fingerprint" of each clones. Between 3 and 7 bands with peroxydase activity were identified and the zymograms characterizing each grapevine clones were established. These then helped establish the genetic relations among the Sauvignon clones grapevine and verify hypotheses concerning the existence of similitude of native cultivar.*

Rezume. *Les auteurs ont appliqué l'analyse isoenzymatic de la peroxydase (E.C. 1.11.1.7) par l'disque-électrophorèse à les clones des cultivars Sauvignon, en vue d'identifier "la copie proteic" de chacun clone. Entre 3 et 7 bandes avec de la peroxydase l'activité ont été identifiées et les zymograms caractérisant chaque clones ont été établis. Ceux-ci alors aidés à établir les relations génétiques parmi le Sauvignon clones et vérifie des hypothèses au sujet de l'existence de la similitude du cultivar.*

La variance génétique des cultivars de vigne peut être indiqué en étudiant les produits chimiques de base des enzymes. L'activité des enzymes dans les extraits proteic obtenus à partir des jeunes feuilles des cultivars peut être démontrée par leur action catalytique, impliquant le dégagement des produits finals de varior (Bénin et le colab., 1988). Puisque l'activité catalytique des enzymes peut être les résultats de plusieurs protéines, le terme "isoenzymes" a été présenté, qui peut être distingué par les différences dans leur activité (Subden R.E. et colab., 1987). Les isoenzymes de Peroydases incluent un grand groupe d'enzymes spécifiques, comme : la NAD-peroxydase, la NADP-peroxydase, la cytochrome-peroxydase, la glutation-peroxydase et d'autres, leur nomenclaure systématique étant ce donateur d'hydrogen le donateur de peroxyde du code E.C.1.11.1.7 ou "du hydron" (H_2O_2-reductase). Dans une analyse des isoenzymes peroxidases clones dedans de Sauvignon au moyen de l'électrophorèse que les zymograms caractéristiques du clone ont été obtenus, qui a permis le traçage de leurs rapports génétiques.

MATÉRIEL ET MÉTHODE

On étudié les clones qui ont été obtenu en Roumanie de Sauvingnon: Sauvingnon – 9 Bl, Sauvignon – 62 Dg et Sauvignon – 111 St.

La matière employée était de jeunes feuilles des pousses principales, rassemblées au début de juin. Les feuilles étaient mortier rectifié et homogénéisé dans une solution tampon de Tris-glycérine de pH 8.3, rapport de 1 : 2.

C'était centrifugated alors pendant 10 minutes à 3000 rot/min, la température 4^0C. Les supernatants ont résulté de la décantation ont été plus tard frigorifiés à 4^0C jusqu'à l'électrophorèse.

Les isoenzymes de séparation ont été faites par l'électrophorèse dans des tubes verticaux remplis de solution tampon de gel et de Tris-glycérine de polyacrylamide de 5% (5 mM + 38 mM). L'électrophorèse a été conduite pendant 90 minutes dans un domaine électrostatique de 250 V à une température de 4^0C, jusqu'à ce que le mouvement bleu d'indicateur de migration de fenol de brome 8 centimètres. La benzidine a été employée comme réactif pour indiquer les bandes de protéine avec l'activité peroxidasic.

INTERPRÉTATION DES RÉSULTATS

Les clones étudiés sont caractérisés par 3 à 7 bandes électrophorétiques avec l'activité peroxidasic (tableau 1). À leur position dans le gel, ceux-ci étaient conformes separé à un de deux groupes :

- les bandes anodiques avec la migration rapide, démontrée dans tous les clones ;
- les bandes catodic avec la migration moyenne (lente ou réduite), utilisée pour l'identification de clones.

Tableau 1

Spectre d'Isoenzymatic de peroxydase dans les clones roumains de Sauvignon

Genotype	Nombre de bandes proteic	Intensité d'activité isoenzymatic :						
		P1	P2	P3	P4	P5	P6	P7
Sauvignon-population	6	++	+++	++	++	+++	++	-
Sauvignon – 9 Bl	7	++	+++	+++	++	++	++	+
Sauvignon – 62 Dg	5	-	+++	++	++	+	+	-
Sauvignon – 111 St	3	-	+++	++	++	-	-	-

Légende :
- absence de bande proteic ;
+ bas activité enzymatique ;
++activité enzymatique moyenne;
+++activité enzymatique élevée.

Les bandes isoperoxidasic démontrent le polymorphisme considerble en ce qui concerne leur nombre et le placement dans le gel et à l'intensité variable de la couleur. Les clones étudiés démontrent des spectres enzymatiques composés de 3 à 7 bandes peroxidasic, avec des fréquences changeant entre 33 et 100% (fig. 1).

Leur analyse a donné les résultats suivants :

- la bande P1 proteic avec l'activité peroxidasic moyenne et fréquence de 33% (la plus basse) a caractérisé seulement les clones suivants : Sauvignon -9 Bl ;

- la bande P2 proteic avec l'activité et la fréquence peroxidasic très intenses 100% a caractérisé tous les clones étudiés ;

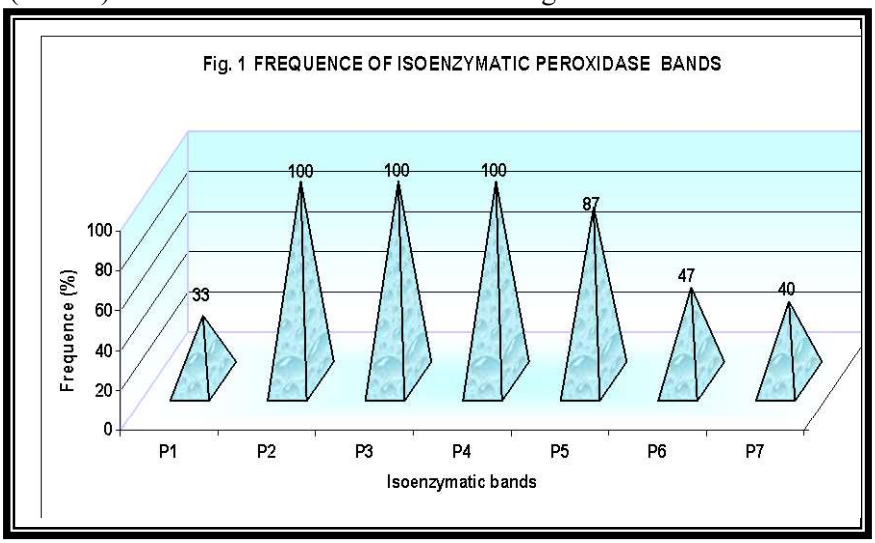
- la bande P3 proteic avec moins d'activité peroxidasic intense et 100% fréquences (de haute) a également caractérisé tous les clones étudiés. Le clone Sauvignon – 9 Bl démontrent également l'intensité enzymatique élevée ;

- la bande P4 proteic avec l'activité et la fréquence 100% peroxidasic moyennes a caractérisé tous les clones.

- la bande P5 proteic a la fréquence moins de de 87% être nonhomogeneous en ce qui concerne l'intensité enzymatique d'activité : très intense dans la Sauvignon-population; milieu dans la clone : Sauvignon – 9 Bl; bas dans la clone : Sauvignon – 62 Dg,; absent dans la clone Sauvignon – 111 St;

- la bande P6 proteic avec la basse activité peroxydasic et la fréquence seulement de 47% a caractérisé seulement les clones : Sauvignon – 9 Bl l et Sauvignon – population ;

- la bande P7 proteic avec l'intensité enzymatique très basse et la fréquence (réduite) de 40% a caractérisé la clone: Sauvignon – 9 Bl.



Interprétation de Zymogram (fig. 2) que le nombre variable de bandes isoenzymatic peroxidasic dans les clones étudiés est deteminé par la nature hozygotic ou heterozygotic du loccus des gènes synthétisant les enzymes.

L'interprétation de Zymogram donne les résultats suivants :

- la clone Sauvignon-9 Bl est caractérisés par un spectre isoenzymatic très complexe, avec 7 bandes proteic d'activité isoenzymatic intense et moyenne ;

- la population de Sauvignon démontrent un type très semblable de zymogram avec Sauvignon – 62 Dg, avec 5-6 bandes proteic et activité enzymatique intense ou moyenne;

- la clone de Sauvignon – 111 St exposition un polymorphisme isoenzymatic différent. Les bandes P2, P3 et P4 proteic sont les seules bandes communes.

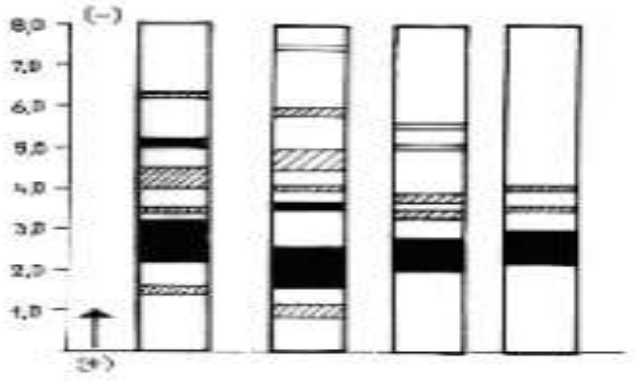


Fig. 2 - Zymograms caractéristiques des clones étudiés

CONCLUSIONS

- Dans les clones roumain de Sauvignon montre que les genotypes ont étudié les enzymes peroxidasic peut impliquer le loccus trois du gène la synthèse, puisque 3 bandes au minimum proteic avec l'activité isoenzymatic ont été démontrés. Le nombre maximum des bandes proteic 7 et lui peut être le résultat du caractère homozygotic ou heterozygotic du loccus trois du gène.
- La clone Sauvignon – 111 St est caractérisé par un éventail isoenzymatic seulement 3 bandes proteic (P2, P3, P4), qui certifie l'absence de heterozigoty.
- Tous les clones ont le differittement zymogrames ceux qui montre le polimorphism genetique et phenotipique de population de cepage Sauvignon blanc.

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THE ARCHITECTONIC OF RADICULAR SYSTEM AT FEW GRAPEVINE VARIETIES CULTIVATED IN IAŞI VINEYARD ON SOME SOIL TYPES

L'ARCHITECTONIQUE DE SYSTEME RADICULAIRE DE QUELQUES CEPAGES CULTIVÉ DANS LE VIGNOBLE DE IAŞI SUR LE CERTAINS TYPES DE SOL

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Abstract. *In this paper the authours present the architectonic of radicular system at Riesling italian, Muscat ottonel and Fetească regală grapevine varieties grafted on Berlandieri x Riparia Kober 5 BB rootstock and cultivated on some soil types in Iaşi vineyard. On notes major differeces between radicular system repartion and soil profile. The entertain system in same - maintenance mecanic of the ground.*

Rezumat. *În lucrare se prezintă arhitectonica sistemului radicular la soiurile Riesling italian, Muscat Ottonel şi Fetească regală altoite pe portaltoiul Berlandieri x Riparia Kober 5 BB, cultivate pe diverse tipuri de sol din podgoria Iaşi. Se constată diferenţe majore asupra repartiţiei sistemului radicular pe profilul de sol, deşi sistemul de întreţinere al viţelor în plantaţii este acelaşi şi anume ogorul lucrat.*

INTRODUCTION

La notion de sol passe inévitablement par la compréhension des fortes interactions qui existent dans le système sol-racine. Le sol est le support, le réservoir d'eau et de minéraux des racines. Le système racinaire est conditionné par un milieu dont les caractéristiques vont être déterminantes pour la vigne. Aux niveaux du sol et du sous-sol se rencontrent un certain nombre de variables d'état initiales (type de roche-mère, niveau d'altération, texture et structure des différents horizons), lesquelles déterminent les propriétés physiques du profil exploitable par le système racinaire en terme de profondeur, porosité, perméabilité, capacité de réchauffement. Il en dérive des variables d'état composites : réserve hydrique, température du sol, localisation des pics racinaires et toutes ces caractéristiques ont un rôle déterminant sur le développement des racines.

MATÉRIEL ET MÉTHODE

On a réalisé 4 profils de sols. La description de ces derniers s'est appuyée sur le code Munsel, code de référence internationale pour toutes caractérisations de sol. Les fosses ont été creusées de manière à pouvoir réaliser un profil de sol conjointement à un profil racinaire.

L'étude du système racinaire a suivit la méthode des coupes initiées par Louis Ravaz. Elle consiste a reporté sur un papier millimétré la position des racines qui apparaissent dans le grillage apposé contre le profil. Le grillage étant maillé de carré de 10 cm de côté, cette technique nous permet de reporter approximativement les coordonnées des racines selon deux axes x,y. L'étude du système racinaire se confronte à de nombreuses contraintes comme l'asymétrie des racines par rapport au rang, l'importance du volume occupé mais surtout la variabilité des diamètre des racines. Aussi, c'est pourquoi nous avons tenu compte de la grosseur des racines en les classant en 3 groupes simplifié afin de faciliter le travail:

-Racines de diamètre < 2mm,
-Racines de diamètre compris entre 2 mm et 5 mm,
-Racines de diamètre > 5mm.

Le but ici, est de faire un état des lieux général du comportement du système racinaire à 4 endroits précis dans le vignoble. Les profils sont réalisés sur les parcelles de chaque modalité et surtout en fonction du relief du vignoble.

INTERPRÉTATION DES RÉSULTATS

La Côte de Iasi se caractérise par des collines d'altitude moyenne de 100-150m, avec une altitude maximale de 209 m au sommet de la colline de Breazu. Les pentes des terrains viticoles sont comprises entre 5° et 20° avec une exposition sud, sud-est et sud-ouest. Ces conditions résultent de l'action de l'érosion des systèmes fluviatiles de la région notamment de la rivière Bahlui et de ses affluents. Aussi, ajoutée à la friabilité lithologique, l'intervention de l'homme a brisé l'équilibre naturel, en favorisant l'érosion accélérée par le défrichement des forets et des pâturages.

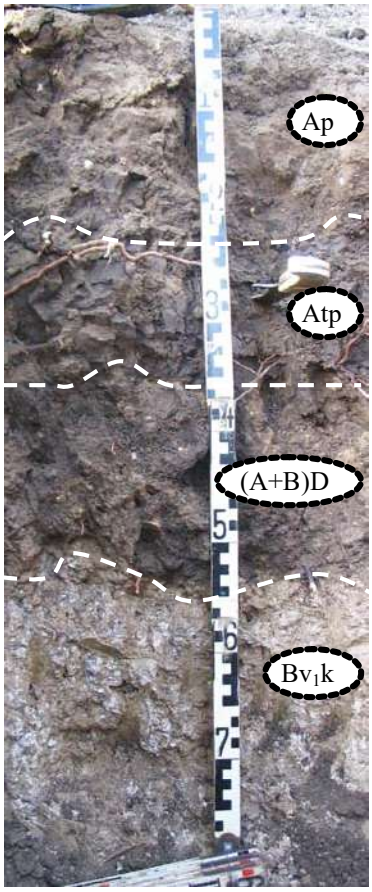
Du point de vue géologique, les formations de surface dans lesquelles est sculpté le relief actuel sont, pour la plus part, représentées par un complexe de marnes et argiles altérées avec du sable, auquel s'ajoutent, dans divers secteurs, de minces couches de grès calcaire, calcaires oolithiques, conglomérats et graviers (Barbu N., 1979).

Ces sédiments du Sarmatien moyen et supérieur soumis aux phénomènes de désagrégation-altération ont conduit à un manteau déluvio-colluvial presque continu dans les versants (Cotea V.D., 1996). Les sols de la zone de Iasi sont du type Chernozem (du russe : chern=noir et zemlya=terre), sol typique des régions continentales. Ils sont issus de la formation de matières organiques sur des loess et sous une végétation herbacée steppique abondante. Ils sont très noirs et très fertiles, équilibré en carbonate, et sont peu soumis au lessivage des éléments minéraux du sols (Calvet R., 2005).

Le climat est continental tempéré à nuances excessives, causées par une large ouverture vers les influences est européennes. Il s'exprime par des hivers froids jusqu'à rigoureux (-30°C) et des étés chauds jusqu'à caniculaires (40°C), le temperature mozenne este 9,6°C. On enregistre une pluviométrie annuelle moyenne de 517,8 mm et une humidité de 70%.

A. Description des sols du vignoble et le nombre de racines par profile :

PROFIL Nr.1, parcelle Riesling: Chernozems cambic, epicalcaric rétrogradé, argilo limoneux / argileux, fortement carbonaté.

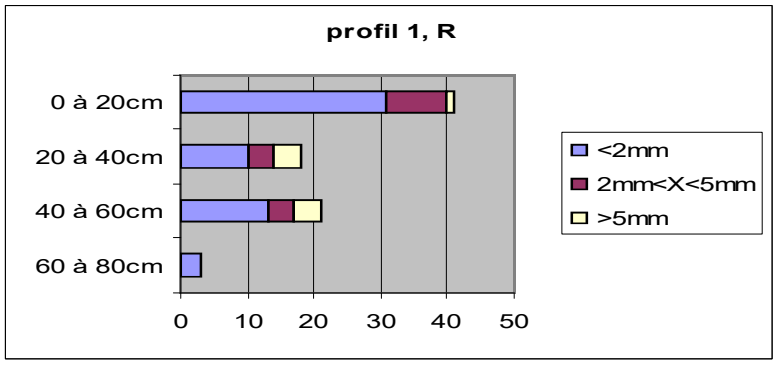


Ap 0-23cm; limoneux argileux; brun noirâtre (10YR 3/2,5); structure granulaire petite à moyenne rétrogradée (limoneuse); effervescence faible avec l'acide chlorhydrique (HCl); Passage net à l'horizon Am D1.

Atp 23-38 cm; limoneux argileux; noirâtre (10YR 3/2) à l'humidité, avec des stries de couleur brun jaune clair (10YR 4/4); structure grumeleuse polyédrique subangulaire sur le rang et polyédrique angulaire entre les rangs au niveau du passage des roues du tracteur; racines fréquentes; moyennement aéré entre les rangs et tassées modérément sous le passage des roues; effervescence faible avec l'acide chlorhydrique; passage graduel à l'horizon AmD2.

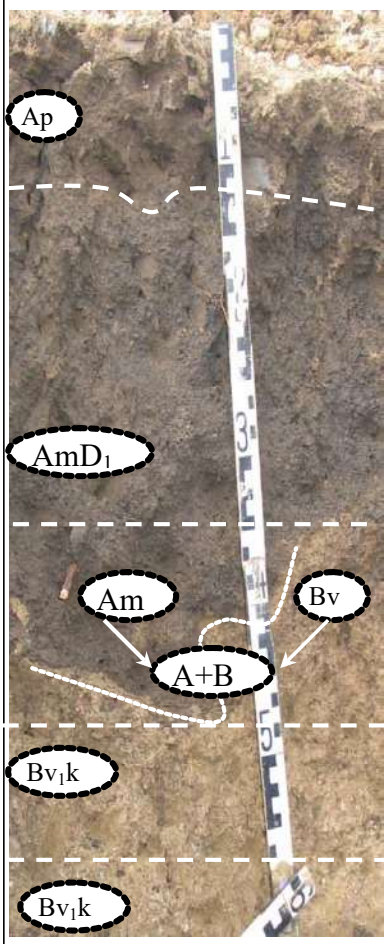
(A+B)D 38-55cm; limoneux argileux; noirâtre (10YR 3/3), avec des taches de couleur brun jaune clair (10YR 4/5); structure polyédrique subangulaire moyenne; racines fréquentes; peu aérée dans l'intervalle entre rangs et tassées modérément sous le passage des roues ; passage graduel à l'horizon Bv1.

Bvk1 64-88 cm; limoneux; brun jaune (10YR 5/6), avec des taches, pseudo mycélium blanc de carbonate de calcium (fig.4); structure prismatique; racines très rares; effervescence forte.



Nombre de racines sur l'ensemble du profil

PROFIL Nr.2, parcelle Muscat Ottonel : Chernozems cambic procalcaric rétrogradé, argilo argileux**,** fortement carbonaté

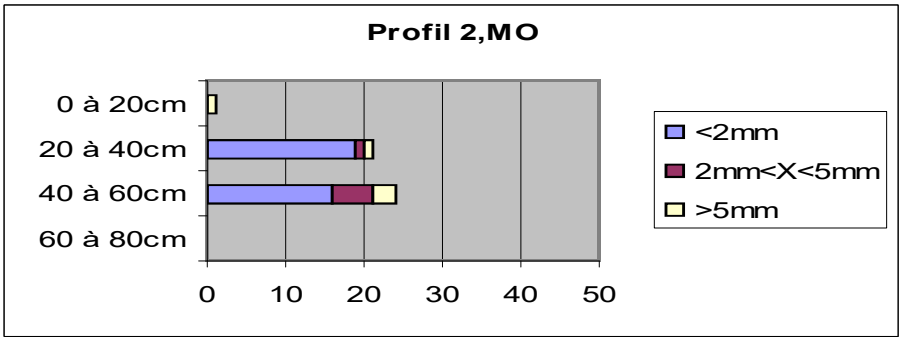


Ap 0-12cm; limoneux argileux; brun noirâtre (10YR 3/2,5); structure polyédrique subangulaire moyenne (fig. 6) sous le rang et polyédrique angulaire grande sous le passage des roues; moyennement aérée entre les rangs et tassée modérément sous la bande de roulement; effervescence très faible à HCl ; passage nette à l'horizon AmD1.

Am D1 12-35 cm; limoneux argileux; noirâtre (10YR 3/2) à l'humidité, avec taches locales de couleur brun jaune clair (10YR 4/4); structure grumeleuse à polyédrique subangulaire sous le rang et polyédrique angulaire moyenne sous la bande de roulement, moyennement aéré sous les rangs et moyennement tassée sous la bande de roulement; racines fréquentes ; effervescence modérée à HCl; passage graduel à l'horizon A+B.

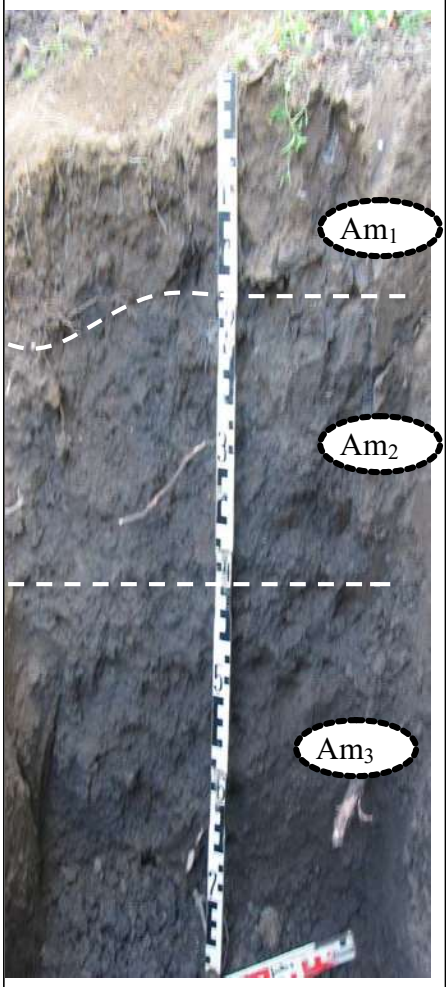
A+B 35-48 cm; limoneux argileux; noirâtre (10YR 3/2), avec des taches de couleur brun jaune foncées (10YR 4/5); structure polyédrique subangulaire moyenne ; racines fréquente; passage ondulé, sinusoïdale à l'horizon Bv.

Bv1k 48-63 cm; limoneux; brun jaune (10YR 5/6), pseudo mycélium blanc de carbonate de calcium ; structure columnaire prismatique; racines rares; effervescence forte.



Nombre de racines sur l'ensemble du profil

PROFIL Nr.3, parcelle Riesling : Chernozems cambic cumulic, peu carbonaté secondaire, argilo limoneux / argileux

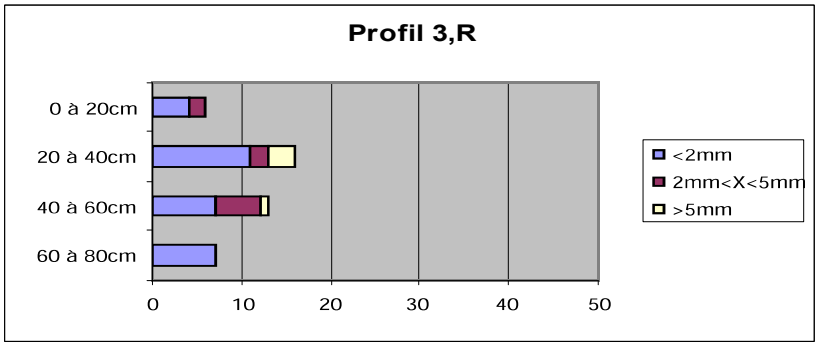


Ap 0-18cm; limoneux argileux; brun foncé (10YR 3/3); structure granuleuse petite à moyenne dans le rang et polyédrique angulaire grande sous la bande de roulement; moyennement aéré dans le rang et modérément tassée sous la bande de roulement ; racines de plantes adventives fréquentes distribuées préférentiellement sur la face des éléments structuraux (fig. 11); effervescence nulle avec HCL: passage clair à l'horizon Am1.

Am1 18-41 cm; limoneux argileux; noirâtre (10YR 2/1) à l'humidité ; structure granuleuse à polyédrique subangulaire; moyennement aérée ; racines très fréquentes; effervescence très faible à HCL; passage graduel à l'horizon Am2.

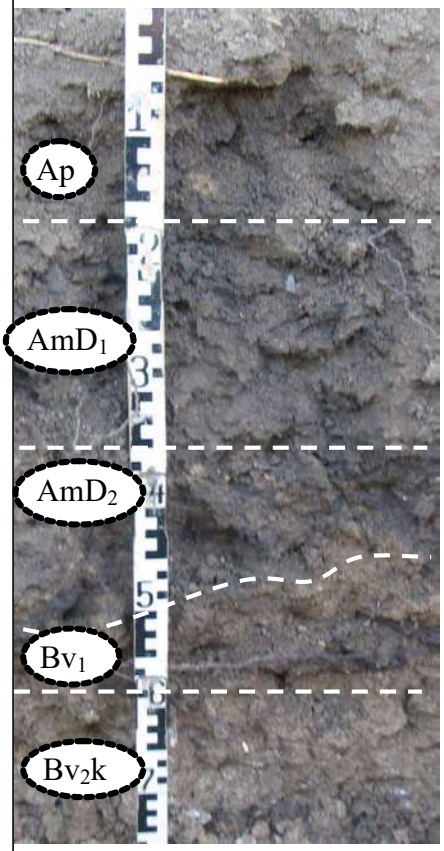
Am2 41-60 cm; limoneux argileux; noirâtre (10YR 2/1) à l'humidité ; structure polyédrique subangulaire à columnaire prismatique; racines fréquentes; moyennement aérée, effervescence faible à HCl; passage graduel à l'horizon Am3.

Am3 60-82 cm; limoneux argileux; brun très foncé (10YR 2/2 à l'humidité ; structure columnaire prismatique; racines rares; moyennement aérée. Effervescence faible avec HCL.



Nombre de racines sur l'ensemble du profil

PROFIL Nr4, parcelle Feteasca regala : Chernozems cambic epicalcaric, peu carbonaté secondaire, argilo limoneux

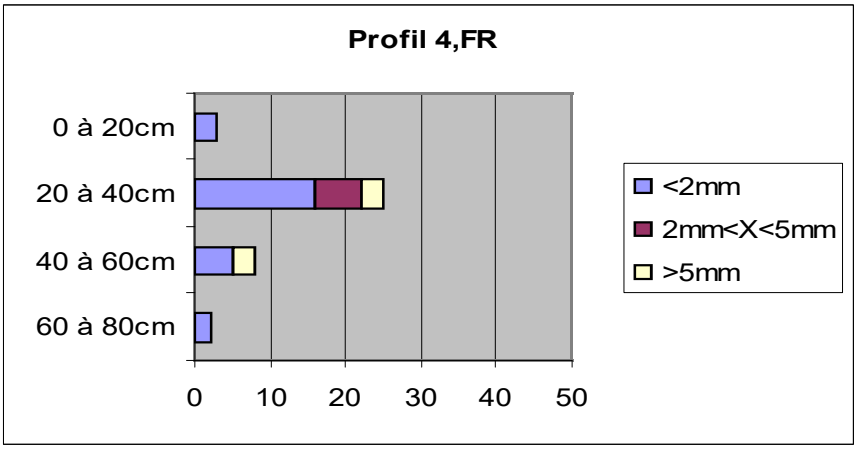


Ap 0-17cm limoneux argileux; brun foncé (10YR 3/3); structure granuleuse petite à moyenne dans le rang et polyédrique angulaire grande sous la bande de roulement; Moyennement aérée; face effervescence très faible avec HCl: passage net à l'horizon suivant.

AmD1 17-35 cm; limoneux argileux; noirâtre (10YR 2/1) à l'humidité; structure polyédrique subangulaire, moyennement aérée; racines très fréquentes; effervescence faible avec HCL ; passage graduel à l'horizon AmD2

AmD2 35-44 cm limoneux argileux; noirâtre (10YR 2/1) à l'humidité; columnaire prismatique; moyennement aérée ; racines fréquentes; effervescence moyenne avec HCl; passage net à l'horizon suivant ;

Bv1 44-58 cm; limoneux argileux; brun très foncé (10YR 2/2) à l'humidité; structure columnaire prismatique ; moyennement aéré ; racines rares; effervescence moyenne avec HCL.



Nombre de racines sur l'ensemble du profil

B. Le système racinaire

Nous constatons que la répartition des racines sur les profils est différente pour les 4 modalités. En effet, les modalités profil 3 riesling italian et profil 4 Fetească regală présentent un pic racinaire entre 20 et 40 cm, la modalité profil 2 Muscat Ottonel entre 40 et 60 cm et profil 1 Riesling italian entre 0 et 20 cm. Cependant une tendance générale semble se dégager : une raréfaction des racines en fonction de la profondeur ainsi qu'une zone préférentielle entre 20 et 60 cm. De plus, il est possible de remarquer que les racines de diamètre supérieur à 5 mm se concentrent exclusivement entre 20 et 60 cm (exception faite du cas profil 2 Muscat Ottonel) alors que les petites racines inférieures à 2 mm sont représentées à chaque strate quand les conditions le leur permettent.

Dans l'unité profil 1 Riesling italian, nous pouvons constater une décroissance continue du nombre de racine en fonction de la profondeur du sol. Mais c'est une chute brutale du nombre de racines à partir de 60 cm qui caractérise ce profil. La présence de l'horizon Bv1 avec son taux de calcaire le plus élevé (effervescence la plus forte au HCl), parmi les horizons de chaque unité, ne semble pas offrir des conditions de développement suffisantes pour la racine. Le système racinaire colonise donc les strates supérieures plus riche en matière organique et à la structure plus aérée. Aussi, c'est ce profil qui présente le plus grand nombre de racines (de diamètre inférieur à 2 mm), alors qu'a priori, il n'offre pas le volume de terre le plus important. Il semblerait que la vigne tend à compenser la réduction de son volume racinaire par une ramification des racines plus importante afin d'occuper au mieux le peu d'espace dont elle dispose (recherche d'eau, de nutriments).

Au niveau de l'unité profil 2 Muscat Ottonel, nous sommes confronté à une situation qui semble avoir quelques similitudes avec le profil 1 Riesling italain. En effet, nous avons également un horizon à forte concentration de calcaire (forte effervescence avec HCl). De nouveaux, les racines ne semblent pas pouvoir s'installer dans cette partie du sol. Aussi, nous observons que la première strate est presque dépourvue de racines. La cause peut être la fréquence plus élevée du désherbage ou sa profondeur dans cette partie du vignoble.

L'unité profil 3 Riesling italian est certainement le profil le plus différent des autres. En effet, il se situe dans une zone de micro dépression du relief, au niveau d'une coupure de pente (coupure concave). C'est pourquoi le sol, dans cette zone, est constitué d'une accumulation d'alluvions provenant de l'érosion de la partie supérieure de la pente, sur plusieurs dizaines de centimètre. La première incidence est la très faible teneur en calcaire qui est nulle dans les strates de surfaces et faible même à 1 m de profondeur. Ensuite, c'est la couleur noir foncée et l'humidité de la terre qui sont relevant ici. La colonisation racinaire apparaît répartie de manière plus homogène sur l'ensemble du profil. C'est aussi ce profil racinaire qui a le plus de racines dans l'intervalle 60-80 cm, ce qui montre que le sol ne présente pas les conditions limitantes des autres unités.

Enfin, le profil 4 Fetească regală, est celui qui a le moins de racines parmi tous les profils. La diminution du nombre de racines ne peut pas s'explique dans ce cas par la présence de calcaire puisque les test à l'acide chlorhydrique n'en montre pas de fortes concentrations.

CONCLUSIONS

- L'entretien mecanique du sol etablissement des racines en profondeur, la destruction des racine superficielles permet la pénétration d'autres racines en profondeur, ce qui este favorable a une bonne regulation de l'alimentation en eau de la vigne, plus particulierement les années de sécheresse.
- L'architecture de systeme radiculaire est influencé de porte-greffe, de fertilité et la profondeur de sol, de régime hydrique, qui ne dépend pas seulment de la constitution physique du sol et du sous-sol, mais aussi de la topographie du terrain, de l'importance et de la repartition des pluies ; l'exces d'humidite ou la secheresse qui peuvent devenir les facteurs limitants.
- Dans le cas de l'utilisation la meme porte-greffe le systeme radiculaire est influence de texture et structure de sol, des caracteristiques chimique et physique du sol, et de regime hydrique et d'aeration du sol.

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EXTRACTION, UNDER STATIC CONDITIONS, BY MEANS OF ETHANOL OF VEGETAL COMPOUNDS FROM THE VITIS VINIFERA SEEDS

EXTRACȚIA COMPUȘILOR VEGETALI DIN SEMINȚELE DE VITIS VINIFERA CU ETANOL ÎN CONDIȚII STATICE

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Abstract: *The specialized studies, published in the last years, report that there is not an optimum extraction protocol for all the vegetal sources containing polyphenols. The methods used in the polyphenols extraction from the vegetal materials are: (1) extraction by solvents, (2) solid phase extraction and (3) extraction by supercritical fluids. In the study herein, the method of extraction by solvents was tested (ethylic alcohol heated at a 40 °C temperature, 1:10 ratio) under static conditions, with periodical shunting for 24 hours. Vitis vinifera seeds pertaining to the Cabernet Sauvignon, Merlot, Băbească neagră and Fetească neagră varieties were used in the extractive process.*

The intended purpose was to select the richest vegetal material in total polyphenol compounds. In order to assess the efficiency of the extractive process, analyses of the vegetal extracts were carried out, in dynamics (15', 30', 60' and 24 hours), determining the content in total polyphenols (g GAE/L), antocyans mg/L, the tanoid matters index (IMT).

The polyphenol derivatives are components of the vegetal metabolic systems with vital functions in plants. The vegetal tissues of Vitis Vinifera contain various substances having functional phenol groups, pertaining to various classes of organic compounds.

Various studies on the polyphenols in grapes (Boureix M, 1976; Metche M. , 1986; Excaribano – Bailon, 2003; Boureix M şi colab, 1986; Cheyner V. şi colab., 1986) proved, on one side, essential in assessing the oenological potential of various varieties of vines and, on the other side, very important in assessing their benefic properties in maintaining the metabolic equilibrium and the human body health condition. Thus, the finding of the polyphenol compounds-rich vegetal sources as well as of the appropriate extraction methods were a major concern of the researchers in various countries.

MATERIAL AND METHOD

In the current study, the solid phase extraction method was tested under static conditions. Vitis vinifera seeds pertaining to Cabernet Sauvignon, Merlot, Băbească neagră and Fetească neagră varieties were used in the extractive process. In order to provide for the reproducibility of the experimental results, the characterization of the grape seeds was carried out, observing the methods standardized by “International Seed Testing Association" (ISTA). In accordance with the said methods, the humidity of the vegetal materials was established below 0,05 %, the physical purity 99,5 %, and genetic purity 100 %.

The grapes seeds, washed and dried in humidity free room, at a temperature of 20 – 25 °C were ground to sizes between 1 – 2 mm. The extractive process was carried out in glass-ground stopper and flat bottom bottles in which the vegetal materials were introduced, then the solvent was added, namely ethylic alcohol heated to 40 °C, solid material /solvent 1/10 ration. The extracts obtained at 15, 30, 60 and 1140 minutes from the moment of adding the solvent were separated from the vegetal materials by centrifugation for 10 minute at 6000 rotations/minute and preserved at 4 °C for analyses.

The assessment of the extractive process efficiency was carried out by determining the content in total polyphenols (GAE grams/liter) by Singleton and Rossi method – 1965, of the antocyans (mg/ml) by the R Gayon and Sonestreet method – 1965 and of the tanoid matters index (IMT) according to Bourzeix -1986

RESULTS AND DISCUSSIONS

The polyphenol compounds are individualized by a series of properties influencing the extracts' conditioning, separation and analysis techniques. Among these, we name the spectral properties, the molecular mass and solubility in various polar organic solvents. The extractive process of the polyphenol compounds is influenced as well by the vegetal product (origin, humidity, grinding degree), by the solvent (its nature, vegetal product / solvent ratio, contact time, temperature) and extraction procedure (discontinuous, continuous) (Excaribano – Bailon, 2003).

Considering the information in the literature, in order to sort the high content polyphenol compounds vegetal materials, the ethylic alcohol-based extractions method under static conditions was chosen. The data achieved are presented in figures 1 – 3.

In the first part of the study, the vegetal extracts were characterized from the point of view of the content in total polyphenols. The data obtained are graphically represented in figure 1.

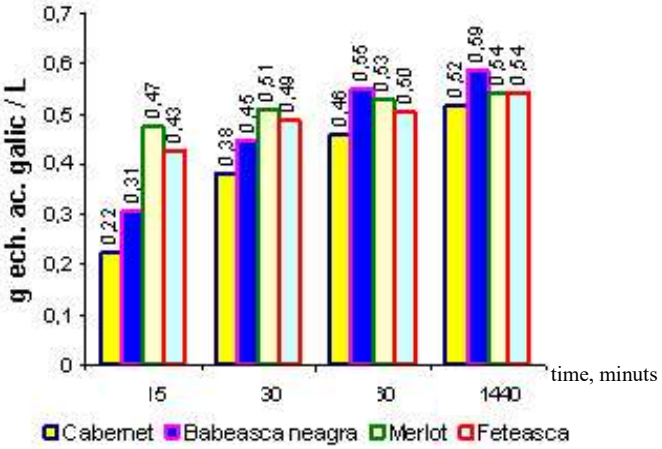

Figure no. 1. - Content of total polyphenols in vegetal extracts

After 15 minutes of contact between the solvent and the tested vegetal materials, the highest concentration in total phenols was determined in the grapes seed extract of the Merlot variety and namely 0,47 g GAE/L. In order, there followed the vegetal extracts of Fetească neagră with 0,43 g GAE/L, Băbească neagră with 0,31 g GAE/L and Cabernet Sauvignon with 0,22 g GAE/L.

In the extractive process carried out for 30 minutes, the concentrations of total polyphenols were, from the value point of view, very close in the vegetal extracts obtained from the grapes seeds of the Merlot and Fetească neagră varieties, registering an increase, compared to the experiment conducted for 15 minutes of 8,5 % and 3,9 %, respectively. A significant increase of the total polyphenols content, however, registered in the case of vegetal extracts obtained from the grapes seeds pertaining to Cabernet Sauvignon and Băbească neagră varieties. Thus, in percentage, in the vegetal extracts, the concentrations in total polyphenols increased by 72 and 45 %, respectively.

During the experiment in which the extractive processes were conducted for 60 minutes, vegetal extracts with a concentration in total polyphenols higher only by 2 and 3,7 % , respectively in the case of Fetească neagră and Merlot grapes seeds and by 21 and 22 % in the case of de Cabernet Sauvignon and Băbească neagră grapes seeds were obtained.

In the extractive processes carried for 1440 minutes, vegetal extracts in which the concentrations in total polyphenols did not register a significant increase were obtained, except for the vegetal extract obtained from the grapes seeds of Băbească neagră variety, in which a concentration higher by 7,2 % was determined.

The efficiency of the extractive process under static conditions was also assessed by the determination of the tanoid matters index (IMT) and of the content in antocyans. The data graphic representation – figure 2, shows a progressive increase of the IMT values along with the increase of the contact time of the solvent-tested vegetal materials.

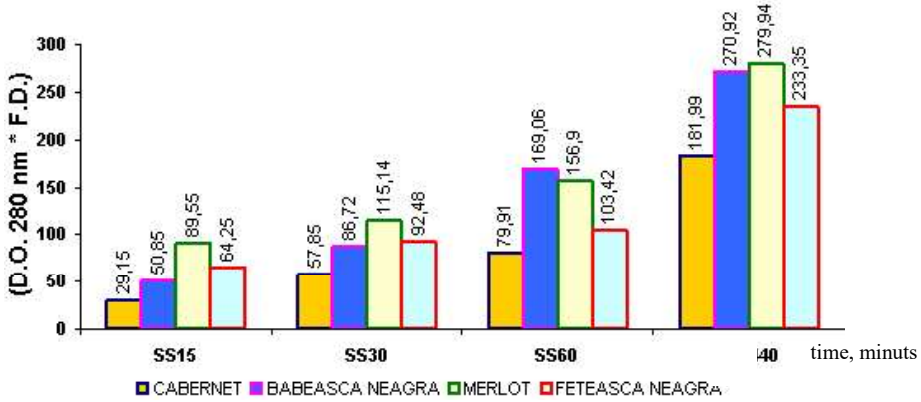

Figure no. 2 - Tanoid matters index in the vegetal extracts

The highest values were registered in the vegetal extracts obtained in the extractive processes conducted for 1440 minutes, those obtained from the grapes seeds of the Băbească neagră and Merlot varieties distinguishing themselves.

Figure 3 shows the data regarding the antocyan content of the obtained vegetal extracts. The graphic representation of the results shows, distinguishingly, the grapes seeds vegetal extracts of the Băbească neagră and Merlot varieties in which the antocyans content increased even after 15 minutes of contact between the vegetal materials and the solvent, registering increasing values at 30 and 60 minutes. As for the IMP values in the vegetal extracts of the Băbească neagră and Merlot variety grapes seeds, the highest antocyans concentrations and namely 36,45 mg/ml and 35,03 mg/ml respectively at 1440 minutes were determined.

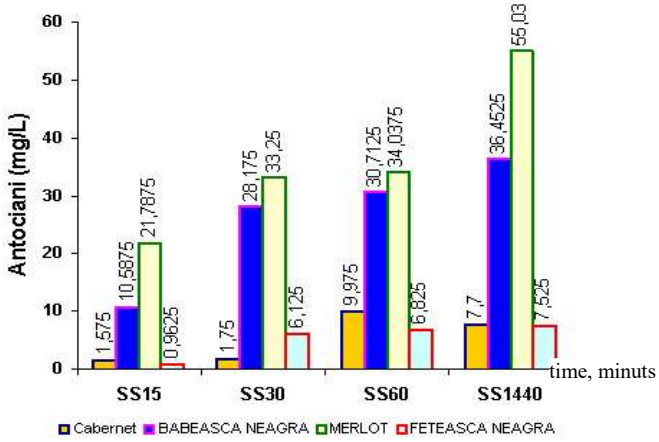

Figure no. 3 - Antocyans content in vegetal extracts

CONCLUSIONS

1. The total polyphenols in the tested vegetal materials are extracted in solvent in proportion of solvent 90 % for 60 minutes, and the tanoid matters and antocyans after 1440 minutes.

2. The richest vegetal extracts in total polyphenols, tanoid matters and antocyans were obtained by the extraction in ethylic alcohol of the grapes seeds pertaining to the Băbească neagră and Merlot varieties.

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RESULTS REGARDING THE TESTING OF SOME THE CONDUCTION FORMS OF VINE FOR THE PERIOD OF 2002 – 2006 IN SCDVV IASI

REZULTATE PRIVIND EXPERIMENTAREA UNOR FORME DE CONDUCERE A VIȚEI DE VIE LA SCDVV IASI ÎN PERIOADA 2002 - 2006

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Abstract. *During the period 2002-2006 at SCDVV Iaşi, semi-high and high forms of support in the semi-protected culture system were experimented. In Copou viticulture centre, the high form of direction with bilateral cord is generally used. In time, these cords are stripped off because of unfavorable climatic factors (frost, draught), because of the inappropriate application of the fructifications cut and the tendency to attribute a high load. The researches focused on eliminating these shortcomings by promoting some forms and types of cutting that aim at reducing the leaf bud weight (9-10 leaf buds/m2), by ensuring the renewal of cords every year, by maintaining the production capacity in optimal parameters and the increase of crop quality.*

Rezumat. *În perioada 2002 – 2006 la SCDVV Iaşi s-au experimentat forme de conducere semiînate şi înalte în sistem de cultură semiprotejată. În centrul viticol Copou este generalizată forma de conducere înaltă cu cordon bilateral. În timp, aceste cordoane se degarnisesc datorită unor factori climati nefavorabili (îngheț, secetă), a aplicării necorespunzătoare a tăierilor de rodire şi tendința atribuirii unor încărcături mari. Cercetările vizează îndepărtarea acestor neajunsuri prin promovarea unor forme şi tipuri de tăiere care urmăresc reducerea încărcăturii de ochi (9 – 10 ochi/m2), asigurarea reînnoirii cordoanelor an de an, menținerea capacității de producție la parametrii optimi şi creşterea calității recoltei.*

The introduction of the forms of conduction stalk, in the North-Eastern area of the country was performed relatively late comparing to the other areas (Pițuc et al., 1975) due to the climatic conditions with a restrictive character, during the vegetal rest period.

The studies performed during years presented the disadvantages of the cultivation of the vineyard in a base form and the advantages of the types of conduction of the stalk. The types of stalk conduction decrease the negative effect of the low temperatures at ground level, which creates a series of biological premises favorable to the differentiation of the buds, the reduction of the working force consumption and the increase of the quantitative and qualitative production (Macici et al., 1983). The results of the researches demonstrated that the height of the stalk of 70 – 100 cm is the best for the biggest production, without a significant decrease of its qualities.

At the same time, in the conditions of the Copou vine growing center Iaşi there was a generalization of the type of conduction of bilateral cord with loads situated between 14 – 23 leaf buds/m^2, depending on the variety and with safety elements at the basis of the vine.

The influence of some unfavorable climatic factors (frost, draught) and the tendency to leave big loads during the fructification cutting led, in time, to the unpacking of the cords by the drying out of the fruit elements or to their pushing to the edges. (Pițuc et al., 1989).

For the disappearance of these unwanted processes, during 2002 – 2006 the SCDVV Iaşi experimented types of conductions with the height of the stalks between 0,8 m and 1,0 m and types of cuts that insure the reduction of the fruit load, the yearly renewal of the cords, the maintenance of the production capacity at the optimum parameters and the increase of its quality.

MATERIAL AND METHOD

The experiment took place in the Agro-technical Polygon of the Iasi Station of Research and Development for vine growing and wine production on the Aligoté variety grafted on Kober 5 BB planted at the distance of 2,2 m between rows and at 1,2 m on a row, on a terrain of South -Western inclination and a slope of 5 – 6 %. The maintenance system of the ground is field worked alternatively with natural duration of grass growth. The vines were transformed from the method of conduction of the stalk – bilateral cord, to the type of stalk conduction with a height of 0,8 and 1,0 m., leaving during cuts a load of 26 leaf buds per vine, distributed on two spigots of 2 leaf buds, 2 cord of 10 leaf buds and a safety spigot at the basis of the vine. These variants were compared to the type of conduction on stalks of 1,0 m with bilateral cord and a load of 46 leaf buds on vine distributed on spigots and cords.

At the same time, there were performed changes on the system of maintenance as> for the variety with a length of stalk of 0,8 m the first wire was fixed at a length of 0,7 m, the second at 0,9 m, and the first row of double wires at 1,4 m. These allowed the performance of the tying of the cord in a circular shape, thus stimulating the uniform development of spring on their whole length (image 1).

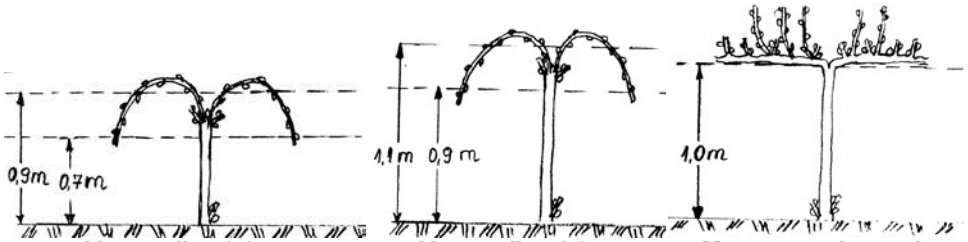

Image 1 – Experimental variants

There were performed observations and experimentation on the starting in vegetation (number of started leaf buds), of the fertility (total of spring, fertile spring, number of inflorescences), on the quantitative production (number of grapes, the medium weight of grape, mass and volume of 100 grapes, the vineyard production) and of its quality (the content on carbohydrates, the acidity of the must).

The variants were distributed in randomized blocks in four repetitions, every one of the 16 vine to be harvested. A series of data were statistically processed, using the variety analysis, mono factorial experiments, a series of years, counting the limit difference for the probability of 5%, 5 %, 1 % and 0,1 % for the decision of the significance of the differences among the variants.

RESULTS AND DISCUSSIONS

Both the starting of the vegetation and the grape production were influenced by the climatic conditions of the years that were taken into account. We mention the fact that in 2005 it was not possible to perform observations due to the fact that the wine production was compromised by the massive attack of the manna. The affluent precipitations during the period prior to the blooming prevented the performance of the fitosanitary treatments at the best moment.

The fertility coefficients registered superior values compared to the control sample, in all the observation years (table 1). These had absolute values between 2,15 – 2,35 and relative of 1,73 – 1,96. An exception is the year of 2006, when the buds were affected by frost, with repercussions on the fertility and productivity of the variety. The relative productivity index, indicator of the medium production of each sprout, accentuates the variant no. V_1 (196 – 216), lower level for the variant no. V_2 (190 – 196), but superior to the control sample. The absolute and relative productivity indices reflect the resultant of the complex interaction between the variety and the biotope being useful to the grape growers, being an indicator of the capacity of production of the vineyard, offering solutions regarding the establishment of the load of the fruit.

Table 1

The starting of the vegetation of the Aligoté variety

Year	2002			2004			2006		
Variants	V_1	V_2	Mt	V_1	V_2	Mt	V_1	V_2	Mt
No. of leaf buds/vine	26	26	46	26	26	46	26	26	46
No. of leaf buds/m2	10	10	17	10	10	17	10	10	17
Total sprouts	23	23	53	24	25	55	24	26	48
Fertile sprouts	19	17	34	20	20	36	5	18	30
Sterile sprouts	4	6	19	4	5	19	9	8	18
Number of inflorescences	41	40	56	47	44	58	28	33	36
The absolute fertility coefficient	2,15	2,35	1,64	2,35	2,20	1,61	1,87	1,83	1,20
The relative fertility coefficient	1,78	1,73	1,05	1,96	1,76	1,05	1,17	1,27	0,75
The absolute productivity index	237	259	180	259	242	177	206	201	132
The relative productivity index	196	190	116	216	194	116	129	140	83

V_1 – stalk = 0,8 m; V_2 – stalk = 1,0 m; Mt. = control sample;

Regarding the quantitative productions of grapes, these were irregular from one year to another, the smaller values dating back to 2002 and the biggest ones to 2004. Although in the case of the variants V_1 and V_2 the fruit load was of only 26 leaf buds/vine as opposed to the control sample no. 46 leaf buds/vine, during some years of production of the vine were pretty much the same not existing significant differences (table 2).

The superiority of the conduction forms is also reflected on the quality of the wine production. Thus, for the variant in which it was adopted the conduction form on stalks of 1,0 m height (V2) the grapes were bigger, with equal grapes, achieving an average mass between 104 – 150 g/grape, values statistically guaranteed, comparing to the control sample where the grapes did not exceed 114 g. The quantity of sugar from the must indicates a higher potential of accumulation of these for the studied variants, in comparison with the control sample, for all the years of experimentation, existing differences between 18 – 40 g/l, statistically guaranteed.

Table 2

Qualitative and quantitative parameters

Year / Variants	2002			2003			2004			2006		
	V_1	V_2	Mt	V_1	V_2	Mt	V_1	V_2	Mt	V_1	V_2	Mt
No. of grapes/vine	24,5	25,7	51,9	44,7	46,1	71,2	49,4	51,5	65,7	32,2	35,8	48,0
Grape production, kg/vine	2,03°°°	2,38	3,19	5,90	6,7	7,58	6,9°°°	7,55	7,92	3,96°	5,07	5,44
DL 5 %	*0,34*			*2,47*			*0,42*			*1,03*		
DL 1 %	*0,52*			*3,75*			*0,63*			*1,56*		
DL 0,1 %	*0,83*			*6,02*			*1,01*			*2,50*		
Average weight of a grape, g	96	104^{x}	86	134	146^{x}	106	140	148^{x}	121	130^{x}	150^{xxx}	114
DL 5 %	*17*			*34*			*26*			*12*		
DL 1 %	*26*			*52*			*39*			*19*		
DL 0,1 %	*41*			*84*			*63*			*30*		
Sugar, g/l	206^{xx}	198^{xx}	166	192	202^{x}	184	164^{x}	159	146	190^{xx}	181^{x}	159
DL 5 %	*18*			*14*			*16*			*16*		
DL 1 %	*28*			*22*			*24*			*24*		
DL 0,1 %	*44*			*35*			*38*			*38*		
Acidity, g/l H_2SO_4	5.3	5.4	6.1	5.8	5.5	6.0	6.2	6.9	6.5	6.9	6.8	7.6
The mass of 100 grapes, g				190	204	168	171	164	156	188	179	150
The volume of 100 grapes, cm^3				176	188	160	154	147	140	183	172	146

CONCLUSIONS

1. The decrease of the fruit load for the Aligoté variety, from 46 leaf buds/vine to 26 leaf buds/vine, led to the registration of some values superior to the fertility coefficients and to the productivity indices, for the achievement of similar productions and with a higher qualitative level.

2. The insurance of a higher content of carbohydrates leads to the increase of the qualitative level of the quality of wine and a exploitation for a competitive price.

3. The forms of conduction experimented have the advantage of allowing , every year, due to the fructification cuts, to renew the fruit elements, thus avoiding the phenomena of degarnishing of the cords. At the same time, the ease and the efficiency of the execution of the maintenance works (dry cuts, directed and ties sprouts, fitosanitary treatments) constitutes another positive characteristic of these.

4. The adaptation of the conduction forms and of the type of cutting for the environmental conditions represents a decisive measure for the achievement of constant productions year after year and of a superior quality.

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L'ISOLEMENT ET L'IDENTIFICATION DU MICROBIOTE LEVURIEN ET BACTERIEN SUR LES VARIETES DE RAISINS DU CENTRE VITICOLE BLAJ-LES VIGNOBLES DE TARNAVE (II^{e} partie)

IZOLAREA ŞI IDENTIFICAREA MICROBIOTEI LEVURIENE ŞI BACTERIENE LA SOIURILE DE VIŢĂ DE VIE DIN CENTRUL VITICOL BLAJ-PODGORIA TÂRNAVE (PARTEA A II-A)

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Abstract. *Entre 2001-2005, dans le laboratoire de microbiologie de S.C.D.V.V. Blaj, on a étudié le microbiote qui se développe sur les raisins et qu'on retrouve dans le moût et dans le vin, sur les variétés du centre viticole Blaj-vignoble de Târnave.On a isolé et analysé les souches de levures des classes Deuromycotina et Ascomycotina,les bactéries des genres Leconostoc, Lactobacillus et Acetobacter; au total, 112 souches de levures et 9 bactéries.*

Mots-clés: levures, variétés de raisins, vignobles de Târnave.

Rezumat. *In perioada anilor 2001 – 2005, in cadrul laboratorului de microbiologie de la S.C.D.V.V. Blaj, a fost cercetata microbiota ce se dezvolta pe struguri si care se regaseste in must si vin, la soiurile din centrul viticol Blaj – podgoria Tarnave. Au fost izolate si testate tulpinile de levuri din clasele Deuromycotina si Ascomycotina, bacteriile din genurile Leconostoc, Lactobacillus si Acetobacter. In total 112 tulpini de levuri si 9 bacterii.*

Le microbiote qui se développe sur les raisins durant la période de maturation passe inévitablement dans le moût et le vin. Connaître le microbiote et son évolution dans toutes les étapes technologiques est donc nécessaire, afin de produire des vins de bonne qualité du point de vue biologique.

MATERIEL ET METHODE

Les variétées dont on a fait des prélèvements sont: Feteasca regala, Riesling italien, Sauvignon, Traminer rose et Muscat Ottonel. La méthodologie de travail utilisée pour l'isolement des cellules de levures et des bactéries:

MATERIEL BIOLOGIQUE	SPECIFICATIONS	MOMENT DE L'ISOLEMENT
Grains de raisins	-lavage des grains de raisins à l'eau -distillation: 2-8 minutes	-au début de la maturation -à la maturation complète -à la surmaturation
Moût de raisin	- teneur en sucres 160-170 g/L 180-190 g/L 220 g/L -sulfitage: - moût non-sulfité	-au début de la fermentation -durant la fermentation tumultueuse (alcoolique) -à la fin de la fermentation

	- dose de 50 mg/l - dose de 100 mg/l - dose de 150 mg/l	
Vin nouveau/jeune	- titre alcoométrique 10,5 –12,5% vol.	-soutirage du vin clarifié du dépôt de fermentation

Isolement des levures . S-au utilizat: metoda dilutiilor succesive (S.Domerq, (1956),

On a utilisé la méthode des dilutions successives (S.Domerq, (1956), la méthode de l'isolement dans la culture pure par la tecnique de l'épuisement de l'anse, "méthode du pentagone" et "méthode des secteurs".

L'identification des souches de levures a été réalisée par:

-l'examen au microscope de la forme et des dimensions des cellules, après la culture, durant 3 jours

-à 25°C, sur un milieu liquide (moût de raisin stérilisé) et sur un milieu solide (moût de raisin agarisé.

-la formation du pseudomycelium, après la culture de 12 jours sur un milieu de pomme de terre agarisé

-la sporulation sur un milieu synthétique Gorodkova, observations après 30 jours

-on a utilisé le déterminateur réalisé par J.Loder et collab. (1970);

La caractérisation physiologique a été réalisée par les testes:

-la fermentation des sucres

-l'assimilation des sucres et des nitrites

-l'utilisation de l'alcool éthylique comme source de carbone

-la séparation de l'arbutine

Isolement des bactéries (lactiques et acétiques). On a utilisé les mêmes méthodes d'isolation que pour les levures. Les testes d'identification et de caractérisation physiologique:

-les caractères morphologiques (la forme et les dimensions des cellules)

-le caractère homo et hétérofermentatif

-la résistance à l'alcool

-la nature de l'acide lactique formé

-la quantité d'acide acétique formé

-l'assimilation de l'azote ammoniacal

RESULTATS ET DISCUSSIONS

Les souches de levures isolées font partie des classes *Deuromycotina* (tab. 1) et *Ascomycotina* (tab.2).

Tableau 1

Levures isolées de la classe Deuromycotina (centre viticole Blaj).

			Dont				
Genre et espèce	**Nombre total**	**%**	**Par grains**	**Moût au début de la fermentation**	**Moût pendant la fermentation**	**Moût à la fin de la fermentation**	**Dans le vin**
Candida mycoderma	8	7,14	4	1	1	1	1
Kloeckera apiculata	19	16,96	12	5	1	-	1

Torulopsis stellata	6	5,35	2	3	1	-	-

Des données présentées dans le tableau 1, il résulte que de la microflore levurienne spontanée qui appartient à la classe *Deuromycotina* se développant sur les grappes de raisins, les levures apiculées du genre *Kloeckera* (12 souches), suivies par les levures du genre *Candida* (4 souches). Dans le moût en début de fermentation, grâce au sulfitage et au pH du moût, la plupart des levures de la classe *Deuromycotina* sont éliminées. A la fin de la fermentation alcoolique et dans les vins jeunes/nouveaux, on peut rencontrer occasionnellement les levures du genre *Candida* et *Kloeckera*.

Tableau 2

Levures isolées de la classe Ascomycotina (centre viticole Blaj).

			Dont				
Genre et espèce	**Total**	**%**	**Par grains**	**Moût au début de la fermentation**	**Moût pendant la fermentation**	**Moût à la fin de la fermentation**	**Dans le vin**
Sacch. ellipsoideus	13	11,6	5	2	1	2	3
Sacch oviformis	12	10,7	1	1	4	4	2
Sacch italiens	8	7,1	2	2	-	3	1
Sacch bayanus	7	6,2	3	1	1	1	-
Sacch cerevisiae	5	4,6	1	1	1	1	1
Sacch chevalierii	5	4,6	1	1	1	1	1
Sacch hete-rogenieus	4	3,7	1	1	1	-	1
Sacch bailii	3	2,7	-	2	1	-	-
Sacch car-lsbeigers	3	2,7	-	1	-	2	-
Sacch kluyveri	3	2,7	2	1	-	-	-
Sacch rouxii	3	2,7	-	1	1	1	-
Sacch uvarum	2	1,8	-	2	-	-	-
Sacch florentinus	2	1,8	1	1	-	-	-
Sacch enpagieus	2	1,8	1	-	-	-	1
TOTAL GENERAL Saccharomyces	72	64,2	18	17	11	15	10
Kluyveromyces bulgaricus	1	0,9	1	-	-	-	-

Pichia membrani-faciens	2	1,8	2	-	-	-	-
Hansenula anomala	2	1,8	1	1	-	-	-
Hansenula ciferii	1	0,9	1	-	-	-	-
Dekkera bruxellensi	1	0,9	-	-	-	1	-

Des données présentées dans le tableau 2, il résulte que le microbiote levurien de la classe *Ascomycotina* domine sur les grappes de raisins, dans le moût et dans le vin. On a une dominance des levures du genre *Saccharamyces* 64,2 %. Par espèce, la situation est la suivante: 13 espèces de *Sacch: ellipsoideus*, 12 de *Sacch oviformis*, 8 de *Sacch. italians*, 7 de *Sacch. bayanus*, 5 de *Sacch. cerevisiae*, 5 de *Sacch. chevalierii*, 4 de *Sacch heterogenieus*, 3 de *Sacch bailii*, 3 de *Sacch carlsbergers*, 3 de *Sacch kluyveri*, 3 de *Sacch rauxii* et 2 espèces de *Sacch uvarum*, *florentinus* si *eupagieus*.

D'autres espèces de levures: 2 de *Pichia membranifaciens*, 2 de *Hansenula anomala* et une des espèces *Dekkera bruxelensis*, *Hansenula ciferii* si *Kluyveromices bulgaricus*.

L'isolement des bactéries. Les souches de bactéries qui ont été isolées des grappes et du moût sont:

			Dont	
Genre et espèce	**Total**	**%**	**Par grains**	**Moût au début de la fermen tation**
Lactobacillus	4	40	3	1
Leuconostoc	3	30	2	1
Acetobacter	2	20	2	-

On enregistre une dominance des bactéries lactiques des genres *Lactobacillus* et *Leuconostoc*, tant sur les grappes que dans le moût. Les bactéries acétiques sont présentes uniquement sur les grappes et n'apparaissent pas dans le moût, en début de fermentation.

Répartition du microbiote par cépage: (tableau 3).

Celle-ci enregistre des différences importantes, selon le degré de maturation des raisins et de leur composition chimique (accumulation de sucres et acidité totale).

Tableau 3

Situation du microbiote par variété

Variété	**Levures**		**Bactéries:**	
	Espèce	**Nombre**	**Genre**	**Nombre**
FETEASCA REGALA	*Sacch oviformis*	6	*Leuconostoc*	3
	Kloechera apiculata	5	*Acetobacter*	2
	Candida mycoderma	3		
	Sacch italicus	3		
	Sacch bayanus	2		
	Sacch heterogenicus	2		
	Sacch bailii	1		
	Sacch carlsbergers	1		

	Sacch ellipsoideus	1		
	Sacch cerevisiae	1		
	Sacch chevalieri	1		
	Hansenula ciferii	1		
	Kluylromyces			
	Bulgarieus	1		
Total	**Souches de levures**	**28**	**Bactéries**	**5**
RIESLING ITALIEN	*Kloechera apliculata*	5	*Lactobacillus*	3
	Torulopsis stelata	4		
	Candida mycoderma	2		
	Pichia membranifaciens	2		
	Scch bayanus	2		
	Scch ellipsoideus	2		
	Sacch uvarum	2		
	Sacch italicus	2		
	Sacch florentinus	2		
	Sacch bailii	1		
	Sacch cerevisiae	1		
	Sacch chevalieri	1		
Total	**Souches de levures**	**26**	**Bactéries**	**3**
SAUVIGNON	*Sacch ellipsoideus*	4		
	Sacch rouxii	3		
	Sacch Kluyveri	3		
	Sacch chevalieri	2		
	KLaechera apiculala	2		
	Dekkera Bruxelensis	1		
	Sacch carlsbergers	1		
	Torutopsis stelais	1		
Total	**Souches de levures**	**17**	**-**	**-**
TRAMINER ROSE	*Sacch ellipseudeus*	4	*Lactobacillus*	1
	Sacch oviformis	4		
	Sacch bayanus	3		
	Sacch italicus	3		
	Candida mycoderms	3		
	Kloekera apiculata	2		
	Hansenula anomala	2		
	Sacch eupagieus	2		
	Sacch bailii	1		
	Sacch cerevisiae	1		
	Sacch chevalieri	1		
	Torulopsis stelata	1		
Total	**Souches de levures**	**27**	**Bactéries**	**1**
MUSCAT OTTONEL	*Kloechera apiculata*	5	-	-
	Sacch oviformis	2		
	Sacch cerevisiae	2		
	Sacch ellipsoedeus	2		
	Sacch heterogeni	2		
	Sacch carlsbergers	1		
Total	**Souches de levures**	**14**	**-**	**-**

Des données présentées dans le tableau 3, on observe l'existence d'un microbiote riche sur les grains et dans le moût des cépages Feteasca regala,

Traminer rose si Riesling italien: 28 – 26 souches et 3-5 bactéries des genres *Lactobacillus*, *Leuconostoc* et *Acetobacter*.

Un microbiote moins significatif est enregistré pour les variétés Sauvignon (17 souches de levures) et Muscat Ottonel (14 souches de levures).

Dans la fig.1, on présente l'évolution des espèces de levures sur les grappes, dans le moût durant la fermentation alcoolique et dans le vin.

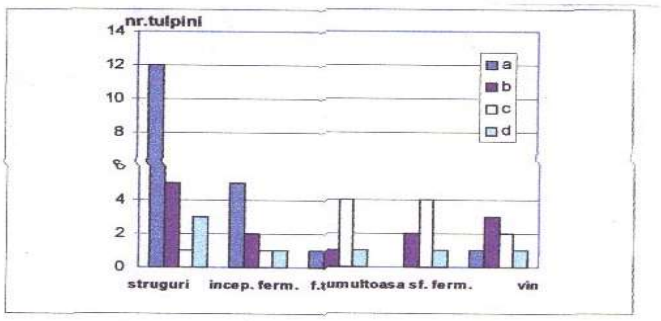

Fig.1. Evolution des espèces de levures sur les grappes, dans le moût et le vin:
a) Levures de l'espèce *Kloeckera apiculata*:
b) Levures de l'espèce *Saccharamyces*, varietatea *ellipsoideus*;
c) Levures de l'espèce *Saccharamyces oviformis*;
d) Levures de l'espèce *Saccharomyces bayanus*.

CONCLUSIONS GENERALES

1. Le microbiote spécifique qui se développe sur les raisins des cépages du centre viticole Blaj-vignoble de Târnave est dominé par les levures du genre *Saccharomyces* (72%), suivies par celles des genres *Kloeckera* (16,96 %), *Candida/Dekkera* (7,14%) et *Torulopsis* (5,35%).

2. Les bactéries qui constituent le microbiote des raisins et du moût appartiennent aux genres *Lactobacillus* (70%), *Leuconostoc* (30%) et *Acetobacter* (20%).

3. Le microbiote le plus riche sur les grappes est rensontrée pour les variétés: Feteasca regala (28 souches de levures), Traminer rose (23 souches) et Riesling Italien (26 souches).

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THE MORFOLOGICAL VARIABILITY OF THREE CLONAL SELECTIONS OF THE PINOT NOIR CULTIVAR ESTABLISHED USING SOME NEW MEANS FOR PROCESSING OF AMPELOMETRIC DATA

VARIABILITATEA MORFOLOGICĂ A TREI SELECȚII CLONALE ALE SOIULUI PINOT NOIR STABILITĂ PRIN UTILIZAREA UNOR NOI MIJLOACE DE PRELUCRARE A DATELOR AMPELOMETRICE

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Abstract. *Morphological variability of sorts and their clonal selections is impressiveand makes almost impossible the establishment of a unitar scientifical methodology that can allow easily recognise them.*

To eliminate the variation of phenotypic characters and their expression through numeric values, the ampelometric method is used, based on application of the „variation method" (H. Moog, 1938), expressing thus the variation of morphological characters in mathematic formula.

In this work, using ampelometry as a method of statistic investigation in elaborating data, new elements were obtained, that will certify the origin and the degree of similarity and dissimilarity between Pinot Noir sort's clones, the most eloquent of it's sort-population type.

Rezumat. *Variabilitatea morfologică a soiurilor şi a selecţiilor lor clonale este impresionantă şi face aproape imposibilă stabilirea unei metodologii ştiinţifice unitare pentru clasificare, care să permită recunoaşterea cu uşurintă a acestora.*

Pentru eliminarea variaţiei caracterelor fenotipice şi exprimarea lor prin valori numerice, se utilizează metoda ampelometrică, bazată pe aplicarea metodei „şirului de variaţie" (H. Moog, 1938), exprimând astfel variaţia caracterelor morfologice în formule matematice.

În prezenta lucrare, folosindu-se ampelometria ca metodă de investigare statistică în elaborarea datelor, au fost obţinute elemente noi, care să ateste originea şi gradul de similaritate şi disimilaritate între clonele soiului Pinot noir care este exemplul cel mai sugestiv al tipului soi-populaţie.

MATERIALS AND METHODS

Biological material necessary for this method was represented by adult leafage (20 leaves for each experiment), grown between nods 7 and 12 of copse from three clonal selection of the Pinot Noir sort (777, 115, 375), that were not suffering any disorder or pest. I chose this part of the plant for sampling because in the mentioned area the variability of the characters is little. Using the classical ampelometric method, I established I leaf's architecture 51 points of reference through 68 direct ampelometric measurements (fig.1) and results allowed calculation of 53 ampelometric values expressed as a report. Both values were measured and calculated for symmetric characters. The studied parameters are written in table no. 1.

The ampelometrical analysed sizes of the vine leaf were: the length of the main nervures (N1, N2, N3, N4); the distance among the basis lateral sinus and the petiole point (U, O) the opening of the lateral sinus (SS, Si) and of the petiole sinus (SP); length (ALT) and the width (AN) of the limb; external contour of the leaf (ENS, ENM, ENI, NL); the internal contour of the leaf (DS1, DS2, DS); the angle between median nervure and the end of the inferior lateral lobelet (ABE); the angles among main nervures (A,B,C), the angle which define the form of median lobelet; the reports between the lateral sinus basic and the nervures, the sinuses are propped up (UN2, ON3); the report between the length and width of the limb (L-A), the others having a small contribution.

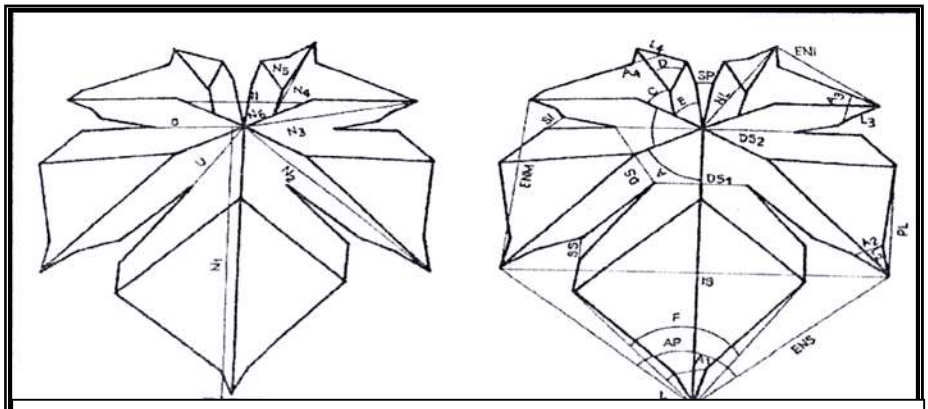


Figure 1. Diagramma representation of examined characters of vine leaf.

RESULTS AND DISCUSSIONS

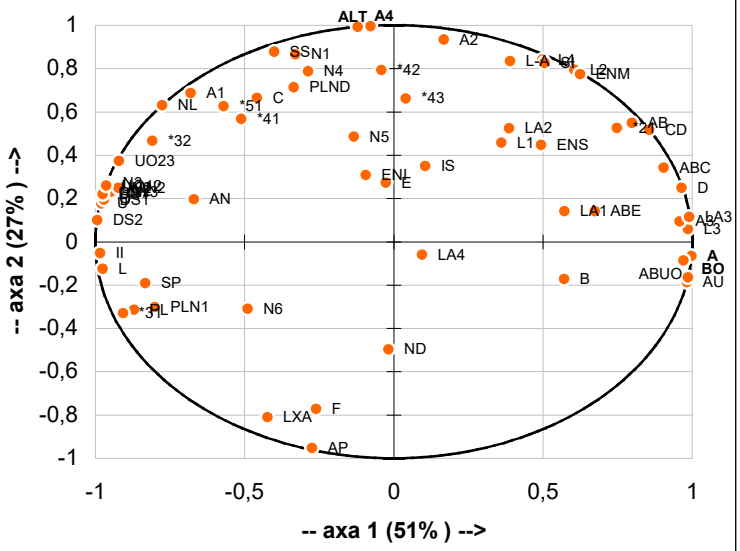
The application of the analysis in main components for Pinot Noir sort's clones

For applying the analyze method of the three sort's clones regarding the establishment of their relatedness and the sort they proceeded from, I extracted form table no 1 the medium values of all analyzed ampelometric parameters, for each experimental variant which was studied.

One first stage of the analysis in main components is, according to the descriptive informational method, the calculation of a correlative matrix between variables, based on Pearson coefficient (a simple correlation coefficient). It is calculated as an arithmetic average between standardized deviations of the two variables and which reflects the intensity of linear connexion between variables. It takes values from +1 to -1 and a value closed to these limits involves a stronger correlation between the two variables.

The next step consists in determinating the variables and their vectors in the area created by the first two main components.

Figure 2. The percentage of inertia for the components 1 si 2 (77%)



The percentage of inertia for the first two components, practically the most important, is 0,7725 (77%), from which 50,5% is on axis no 1 and 26,70 on axis no 2. It is renounced thus to present the components from the area that includes the total amount of parameters (of initial variables) and to the two-dimensional one (axis 1+axis 2) and it is kept the 77 percentage from total inertia.

The value of this percent is higher and reflects the fact that the two-dimensional representation distinguishes well linear correlations that exists between measured variables and those determined for all components.

If only the two components are analyzed, because they are the ones that represent the most of the inertia, it is observed that on main component no 1, the variables ENS (0,0842), ENM (0,1065), A (0,1702), B (0,0974), ABE (0,1149), *21 (0,1276), L-A (0,066) are positive, and these are situated on the circle of correlation at the extremity of axis 1, which it defines.

The negative vectors, on first main components there are many, these variables can be found on the correlation circle, in dial III and IV.

For axis 2, positive vectors many : N1 (0,2032), N2 (0,0551), N3 (0,0638), N4 (0,1847), Ss (0,2060), ALT (0,2330), variables that are situated on axis 2 or in dial I of correlation circle. The negatives vectors for axis 2 are SP (-0,0448), A (-0,0155), B (-0,0405), F (-0,1813), AP (-0,2236), variables situated in dial II-III of

correlation circle. The assessment of the experimental variants on factorial plan determined by it's main components, based on components coordinates on main axis , is represented in figure no 3, and only those with the greatest contribution to defining main factors placed eccentrically on main axis direction are important in realizing this study.

The observation of the diagram on the whole allows marking some areas (in which we find two experimental variants) that can be considerate groups to be, but to confirm this assumption it is necessary a cluster analysis of this homogeneous group composed of 3 clonal selections and the sort they came from.

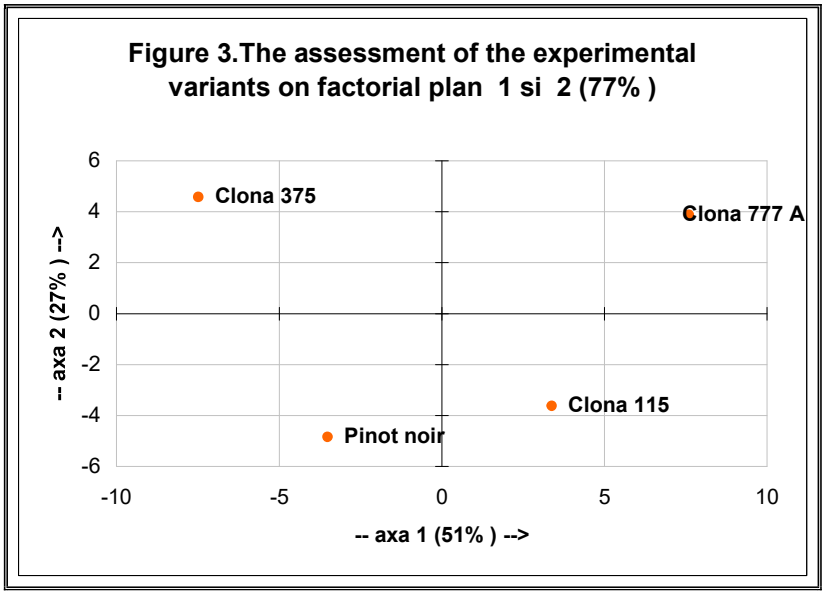


Figure 3.The assessment of the experimental variants on factorial plan 1 si 2 (77%)

For defining factor 1, clonal selection 777 (7,6037) had the greatest contribution, followed by 115 (3,33852), selection that united and formed a homogeneous group, with medium leaves, tronconical, pentalobate. They are situated at the extremity of axis 1.

At the other end there is clone 375 (-7,4791), which contribution was negative, and the sort Pinot Noir (-3,5070), variants with medium leaves orbicular, with less accentuated polymorphism.

Factor 2 was defined mostly by 375 (4,5806), in a positive way, and by selection 115 and Pinot Noir in negative way, that is (-3,6201) and (-4,8428).

Their position is eccentrically in one way and in the other, and the leaf's form differs for these experimental variants.

Table 1

Ampelometric mesures for the analysis in main components of Pinot Noir sort's clones

Clones/characters	N1	N2	N3	N4	U	O	SP	AN	ALT	ENS	ENM	ENI
Pinot noir	8,845	7,4125	5,4075	2,995	4,1475	3,97	1,42	12,265	12,46	7,3175	6,15	3,58
115	8,715	7,2	5,285	3,1725	3,37	3,7075	0,245	11,945	12,49	7,055	6,285	3,9025
777	8,96	7,24	5,2775	3,1775	3,2625	3,5225	0,3205	12,115	12,82	7,6475	6,4575	3,7
375	9,025	7,4975	5,5225	3,385	4,66	4,3875	1,07	12,23	12,915	7,195	6,31	3,8875
	NL	**DS1**	**DS2**	**DS**	**SS**	**SI**	**A**	**B**	**C**	**F**	**AP**	**ABE**
Pinot noir	3,7725	5,105	7,99	4,115	0,125	0,5175	63,05	51,95	49,75	98,65	105	145,8
115	3,6725	4,195	7,325	3,625	0,0325	0,53	65,15	62,15	48,05	101	104,45	159,675
777	3,7475	4,15	6,91	3,565	0,22	0,69	66,175	56,15	49,95	94,2	99,925	155,6155
375	4,0525	5,655	8,62	4,51675	0,31	0,5905	61,625	54	50,5	97,2	101,4	151,15
	***21**	***31**	***41**	**UN2**	**ON3**	**L-A**						
Pinot noir	0,8375	0,608	0,3435	0,536	0,723	1,015						
115	0,82625	0,6025	0,3595	0,472	0,70175	1,04435						
777	4,785	0,5825	0,35	0,449	0,66975	1,0605						
375	0,831	0,6115	0,3785	0,6205	0,789	1,05335						

CONCLUSIONS

The analysis in main components is a method statically- mathematics multidimensional, which can be applied in ampelometrics to establish in a first stage the characters that determine the differentiation of an assembly with phoenotipical similar characters.

The percentage of inertia of first 2 main components is 0,7725 (77%), from which 50,5% on axis 1 and 26,70 on axis 2, which reflects that two-dimensional representation of the plan determined by these sets off well the linear
connexions that exist between the 30 analyzed variables of the 3 clonal selections of Pinot Noir sort.

-it can be said that these variables that these variables separate best the experimental variants among themselves, by obtained values and by their variation and their contribution to the leaf's architecture is special for each of them, because they influence mainly the form of the leaf and less it's measures

-for factor 1, the greatest contribution had clonal selection 777 (7,6037) followed by 115 (3,3825), selections that united and formed a homogeneous group, with medium leaves, tronconical, pentalobate;

-factor 2 was defined mainly by clone 115 and Pinot Noir in a negative way, that is (-3,6201) and (-4,8428). At the other end it is situated clone 375 (-7,4791), which contributed negatively and Pinot Noir sort (-3,5070), variants with medium leaves, orbicular, with less accentuate polymorphism

-experimental variants are differentiated by polymorphism accentuated angle, of leaf's form and secondary by size angle. The size is influenced by clime conditions, applicated technology, and used parent stock

This comes to confirm from a statistical angle what was obtained with ampelometric descriptors.

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THE EFFICYENCY AND SELECTYVITY OF HERBICIDE OXYFLUORFEN IN WEED CONTROL IN THE VINE PLANTATIONS, IN THE VINEYARD – DEALU MARE

EFICACITATEA ŞI SELECTIVITATEA ERBICIDULUI OXYFLUORFEN, ÎN COMBATEREA BURUIENILOR DIN PLANTAȚIILE DE VII RODITOARE – PODGORIA DEALU MARE

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Abstract. *A trial was carried out to evaluate vine selectivity and weed control with oxyfluorfen formulated as suspension concentrates 480 g/l of active ingredient (Goal 480 SC) and concentrate emulsionable 240 g/l a.i.(Goal 240 EC) Efficacy experiments were conducted to determine the effect of rate, formulation, and application way of oxyfluorfen herbicide on annual grasses and broadleaves control and the tolerance of grapevigne to this herbicide. Oxyfluorfen was applied in preemergence on a clean soil and in postemergence when weeds had an average of two to three leaves and were no taller than 10-12 cm. Untreated controls and hand-weeded (weed-free) plots were also included for comparison. Four replications of all treatments were arranged in a randomized complete block design, and all data recorded were analyzed statistically. Means were separated by LSD at P = 0.05. Rainfall thereafter was frequent and adequate to support germination and rank growth of the following weed species: Chenopodium album L.,Capsella bursa-pastoris L.,Portulaca oleraceea L., Lamium amplexicaule L., Digitaria spp., Setaria spp. Data recorded during May and August included weed control ratings and percent weed ground cover. Results showed that oxyfluorfen 480 g/l (SC) was very similar to oxyfluorfen at 240 g/l (EC) and both formulations were efficient to control annual weeds when applied in pre-emergency or early post at different evaluation times, with no damage to grapevine. Although the highest sugar content of grapes occurred in the hand weeded controls, followed by all herbicide-treated plots, then by the nonweeded controls, the only statistically significant differences were between the hand weeded and nonweeded controls.*

Rezumat. *Au fost studiate două formulări chimice ale erbicidului oxyfluorfen (suspensie concentrată 480 g/l, concentrat emulsionabil 240 g/l) în scopul evaluării selectivității față de vița de vie şi eficacitatea de combatere a buruienilor. Tratamentele au fost efectuate în preemergență şi în postemergență devreme, când buruienile se prezentau în stadiile de la 2-4 frunze cu o înălțime de max. 10-12 cm. In câmpul experimental au fost instalate şi variantele: martor lucrat manual, martor netratat, experienta având 24 variante experimental, cu patru repetitii, aşezate în teren după metoda parcelelor subdivizate. Rezultatele obținute arată că cele 2 formulări chimice ale erbicidului oxyfluorfen sunt selective față de vița de vie şi au o eficacitate ridicată de combatere a buruienilor. Conținutul de zahăr al strugurilor a fost ridicat, apropiat de martorul lucrat manual. Erbicidul oxyfluorfen a prezentat selectivitate față de vița de vie.*

The chemical method of control is being every day more used and spread (Dastgheib and Frampton, 2000), in reason of their results they be faster, efficient and with accentuated residual effect, what allows, still, the control of the weeds before or after their emergency, reducing like this the possibility of reinfestation of the area and, consequently, the number of cultural treatments, making possible better distribution of the labor in the property. Among the recommended herbicides, the oxyfluorfen has been used extensively in the control of grassy and dicotyledonous weeds in vineyard (Domoto, 2003; Hannah, 2006). The objective of the work was to evaluate the acting of the herbicide oxyfluorfen formulated as much as suspension to 480 g/l, and emulsionable to 240 g/l concentrated.

MATERIALS AND METHODS

The purpose was to assess the biogical activity of oxyfluorfen herbicide. Studies were conducted on yelding vine in the experimental fields on a forest brown-reddish soil, with a neutral pH. An application of the treatments was accomplished in 23/05/05, in pré and early poast stage, in total area, when the plants harmful dicotyledonous were with two true leaves, and the grassy ones with three open leaves, using equipment of precision. The equipment was operated to 2,45 kg/cm^2, the a speed of 4,2 m/s, using a volume of water of 200 l/ha.

The trial was set up as a linear blocks design with 4 replications and individual plots of 86.4 m^2, the application way was adopted, characterizing the stadium of the harmful plants in the moment of the application (pré and initial post-emergency); as secondary treatment (subparcelas) the oxyfluorfen doses so much to 480 g/l as to 240 g/l was adopted; as subsubparcelas, the different times of evaluation of the efficiency of the oxyfluorfen.The evaluation times (sub-subparcelas) they were 30, 60, 90 and 120 days after application of the treatments (DAT) for the evaluations.

They were also included two witnesses, a weeded during the whole cycle of the experiment to evaluate possible toxicity symptoms to the plants of grapevine and another maintained without weeding for ends of comparison of his effectiveness in the control of the harmful plants, both no included in the variance analysis

For evaluation ends, were considered the species with homogeneous dispersion and the frequency of positive occurrence in the experimental portions

The effect of the herbicides was evaluated, being attributed notes from 0 to 100, in that 0 represent control absence and of toxicity and 100 total control of the species and total death of the plants. All the data were submitted to the variance analysis by the test F to 5% of probability.

RESULTS AND DISCUSSIONS

The variance analysis of the relative data to the control of annual weeds shows there to be significant effect of the factors doses and evaluation time separately, as well as of the interactions among them. All of the treatments were similar among themselves and significantly superior to the untreated control, independently of the formulation of used oxyfluorfen, in the application way and of the evaluation time.

The control of annual grasses and broadleaves at Valea Călugărească with oxyfluorfen herbicide was >70% throughout the summer in 2005 (tables 1 and 2).

Table 1

Efficiency ofoxyfluorfen on annual weeds in pre and earrly poast stage

	Doses	Application way	Efficacy %			
			T+30[3] (c_1)	T+60 (c_2)	T+90 (c_3)	T+120 (c_4)
Oxyfluorfen 480 SC	480 ml/ha (b_1)	Pre (a_1)	84.2	85.1	60.0 ^{000}	47.7 ^{000}
		Post (a_2)	82.7	87.7	64.0 ^{000}	48.0 ^{000}
	720 ml/ha (b_2)	Pre (a_1)	88.3	90.7	89.3	72.0 ^{000}
		Post (a_2)	89.0	92.0	90.3	78.0 ^{0}
	960 ml/ha (b_3)	Pre (a_1)	90.3	94.0	91.7	86.3
		Post (a_2)	91.0	95.7	92.3	91.2

Analyze of variance (summary):

F5% (Application way –A) ***1.47 (18.51)
F5% ((Doses –B) ..... 23.4 *** (4.46)..
F 5% ((Evaluation time –C).. 27.2 *** (2.84)
DL5%= 12.0; DL1%= 16,0; DL 0.1%= 21.1
F5% ((A*B).....0.10 (4.46)
F5% ((A*C).... 0.17 *** (2.84)
F5% ((B*C)..... 9.10 *** (2.34)
F5% ((A*B*C)..0.11 (2.34)

[1] Active ingredient (g/ha) ;
[3] Days after application; [4] Goal 4F concentrated suspension;

Table2

Efficiency ofoxyfluorfen on annual weeds in pre and earrly poast stage

	Doses	Application way	Efficacy %			
			T+30[3] (c_1)	T+60 (c_2)	T+90 (c_3)	T+120 (c_4)
Oxyfluorfen 240 CE[4]	480 ml/ha (b_1)	Pre (a_1)	83.3	85.8	59.0 ^{000}	49.0 ^{000}
		Post (a_2)	84.0	86.0	62.3 ^{000}	49.0 ^{000}
	720 ml/ha (b_2)	Pre (a_1)	89.0	91.0	87.3	73.0 ^{000}
		Post (a_2)	88.0	90.7	91.0	79.0 ^{0}
	960 ml/ha (b_3)	Pre (a_1)	90.0	94.0	92.0	85.0
		Post (a_2)	92.0	95.0	91.0	90.9

Analyze of variance (summary):

F5% (Application way) –A) 1.0 (18.51)
F5% ((Doses –B) ..... 20.1 *** (4.46)
F 5% ((Evaluation time –C) . 26.5 *** (2.84)
DL 5%=11.8; DL 1%=15.9; DL 0.1%=21.0
F5% (A*B).....0.01 (4.46)
F5% ((A*C)..... 0.20 *** (2.84)
F5% ((B*C)..... 8.70 *** (2.34)
F5% (A*B*C).....0.20 (2.34)

[1] Active ingredient (g/ha)
[2] Days after application; [4] Goal 2XL Concentrated emulsionable

Results that demonstrate the residual effect shows that it is a fall in the level of oxyfluorfen control in the smallest doses (480-720 ml/ha) starting from 90-120 DAT, that didn't reach satisfactory level of control, when applied in pre- or initial post-emergency. Pre or early poast applications of oxyfluorfen at 480-720 ml/ha a.i. controlled less than 80% annual weeds by late August; at 960 ml/ha a.i. controlled a higher percentage of annual weeds (85-95%) at 90-120 days after the initial treatment.

The unfolding of the interaction between treatments and evaluation time shows that independently in the application way, until the second evaluation time,

all of the treatments were similar amongst themselves, only differing of the witness without weeding. Starting from the third evaluation time, annual weeds were shown significantly more sensitive to the largest doses ,while in the last evaluation time only the treatment with oxyfluorfen to 960 ml /ha presented acting significantly superior to the others and similar to the of the weeded witness considered as 100%.

During the whole cycle of the plants of grapevine treated with oxyfluorfen didn't present symptoms of current offenses of the use of the product, showing a normal aspect, independently of the formulation of the product used.

The highest sugar content of grapes occurred in the hand weeded controls, followed by all herbicide-treated plots, then by the nonweeded controls, the only statistically significant differences were between the hand weeded and nonweeded controls (table 3).

Table 3

Influence of the herbicide oxyfluorfen about the sugar content of grapes (Merlot)

Experimental variant	g/l	+/- D	%
Untreted	185.3	0.0	100
Cultivation	203.7	18.4**	110
oxyfluorfen 480 g /ha a.i. (CE)	195.3	10.0	105
oxyfluorfen 720 g /ha a.i.(CE)	194.0	8.7	105
oxyfluorfen 960 g /ha a.i.(CE)	193.7	8.4	105
oxyfluorfen 480 g /ha a.i.(SC)	193.7	8.4	105
oxyfluorfen 720 g /ha a.i.(SC)	196.7	11.4	106
oxyfluorfen 960 g /ha a.i.(SC)	195.0	9.7	105
DL 5%=11.5; DL 1%=15.5; DL 0.1%=20.6			

CONCLUSIONS

The herbicide applied oxyfluorfen in the formulations 480 and 240 g/l was efficient in the control of the annual grasses and broadleaves. The pré-emergency or initial post-emergency applications gave effective weed control for a period of time between 2 to 4 months when applied in doses of 480-960 ml/ha a.i. The oxyfluorfen formulation to 480 g/l, when compared with 240 g/l, it allows a reduction in the dose of the commercial product, without affecting the effectiveness of control of the mentioned species The herbicide oxyfluorfen, in the different formulations and tested doses did not cause apparent symptoms of phytotoxicity in vine.

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AN APPROACH OF THE MANAGEMENT SYSTEM CONCERNING THE QUALITY OF WINE PRODUCTION

PROIECTAREA SISTEMULUI DE MANAGEMENT AL CALITĂȚII PENTRU PRODUCEREA VINURILOR

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Abstract. *The quality management system complies with SR EN ISO 9001:2001 standard. It is carried out running through the following stages: general requirements, reference material- related requirements, the management responsibility, the resources management, product manufacture, measuring, analysis and improvement.*

The system shall be designed for the entire process of wine production including the following stages: the grape ripening stage, vinification, the formation of wines, the maturation process, wine making/stabilization, bottling, wine ageing/temporary storage, labeling and packaging, wine storage and delivery.

There have been designed the system documents, namely: the quality-related policy; the quality manual, the system procedures, the job descriptions for each employee in charge with the quality related department, the work guidelines, wine traceability, control and monitoring of production process, the system validation and the registrations necessary for the design process.

The wine quality complies with the European Union regulations and meets the consumers' needs. The correct identification of the consumers' needs and meeting them before, during and after selling the wines are considered as key competitive advantages and the design of such quality management system has become a minimum condition concerning the consistency maintenance in the outlets.

Rezumat. *Sistemul de management al calitã ții este conform cu standardul SR EN ISO 9001:2001. El se realizează parcurgând următoarele etape: cerin țe generale, cerințe referitoare la documentație, responsabilitatea managementului, managementul resurselor, realizarea produsului, măsurare, analizã şi îmbunătã țire.*

Sistemul se proiectează pentru întreg fluxul de producere a vinurilor cuprinzând următoarele faze: maturarea strugurilor, vinificarea, formarea vinurilor, maturarea, fabricarea/stabilizarea, îmbutelierea, învechirea/depozitarea temporară, etichetarea şi ambalarea, depozitarea şi livrarea vinurilor.

S-au proiectat documentele de sistem şi anume: politica referitoare la calitate; manualul calităţii, procedurile de sistem, fişele de post pentru fiecare responsabil de compartiment asociat calităţii, instrucţiunile de lucru, trasabilitatea vinului, controlul şi monitorizare producţiei, validarea sistemului şi înregistrările necesare proiectării.

Calitatea vinurilor este conformã cu reglementările Uniunii Europene şi răspunde cerin ţelelor consumatorilor. Corecta identificare a nevoilor consumatorilor şi satisfacerea lor înainte, în timpul şi după vânzarea vinurilor sunt considerate avantaje competitive cheie, iar proiectarea unui astfel de sistem de management al calitã ții a devenit o condiție minimal ã de men ținere a unit ăților pe piața de desfacere.

The wine quality management system complies with SR EN ISO 9001:2001 standard. The system shall be designed for the entire process of wine production and represents a management instrument to maintain and improve the wine quality continuously.

MATERIAL AND METHOD

The substantiation of the system has been made based upon the research studies aiming at:

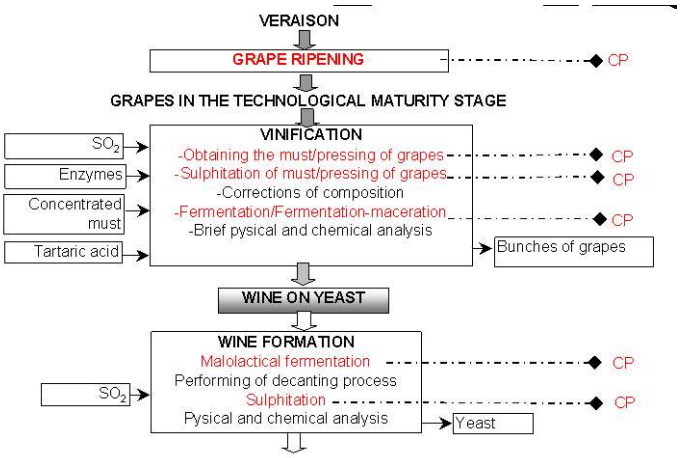
1. The risk analysis by establishing the crucial points (CP) during the entire process of wine making;
2. Defining the documents worked out for the design of the quality management system;
3. Written evidence (job descriptions, control cards for each technological process, work guidelines) and responsibilities related to the implementation of the reference material
4. Application of GS1 standards for the wine traceability and defining the entities of subsystem.

RESULTS AND DISCUSSIONS

The quality management system has been designed for the entire process of wine manufacture including the following stages: the grape ripening, vinification, the formation of wines, the maturation process, wine making/stabilization, bottling, wine ageing/temporary storage, labeling and packaging, wine storage and delivery.

1. The check points of the process of wine production

The risk analysis at the level of each technological operation established the following check points: the grape ripening, obtaining the must/pressing of grapes, the sulphitation of must/pressing of grapes, fermentation/fermentation-maceration, the malolactical fermentation, the sulphitation of the new wine, the sulphitation of the maturated wine, assembling/blending, tartaric stabilization, filtration, pouring of wine in the bottles (Figure 1).



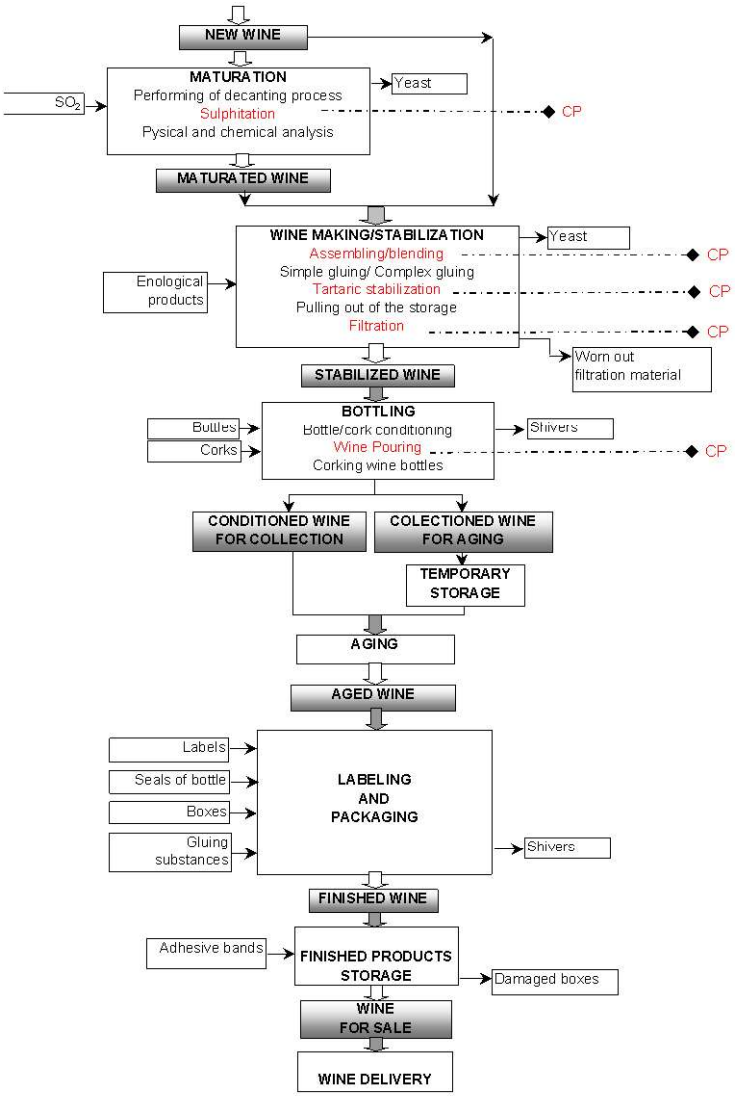


Figure 1. The technological flow of wine production and establishing the check points

For each check point there was defined the control parameter and there was performed the control procedure.

2. System documents

The quality policy concerning the wine making is oriented to carry out the performances of the products defined on the community wine market. The targets of the quality policy are as follows: meeting the customers' needs in full, increasing the turnover and the income; reducing the costs due to non-quality; the technological development of the institution; the staff satisfaction; the client's loyalty and business continuity; profitable partnerships concluded with the suppliers.

There was worked out the Quality Manual, including: the scope of the quality management system, the description of the system processes and of their interactions, documented procedures, information concerning the unit, analysis, approval and review.

The quality management system includes general and operational procedures. There were performed 5 general procedures (Table 1) and 12 operational procedures (Table 2):

Table 1

The general procedures of the quality management system

Name of document	Code	Ed/rev	Date of review
Control of documents	PG 01	0/0	9/4/2006
Control of registrations	PG 02	0/0	9/4/2006
Internal audits	PG 03	0/0	9/4/2006
Control of non-complying product	PG 04	0/0	9/4/2006
Corrective and preventive actions	PG 05	0/0	9/4/2006

Table 2

The operational procedures of the quality management system

Name of document	Code	Ed/rev	Date of review
Establishing and monitoring of the quality objectives	PG 01	0/0	9/4/2006
Analysis performed by the management	PG 02	0/0	9/4/2006
Training, competence, awareness	PG 03	0/0	9/4/2006
Identification and analysis of clients' needs	PG 04	0/0	9/4/2006
Supply	PG 05	0/0	9/4/2006
Production control	PG 06	0/0	9/4/2006
Handling, packaging, storage and delivery of product	PG 07	0/0	9/4/2006
Documents working out	PG 08	0/0	9/4/2006
Client satisfaction evaluation	PG 09	0/0	9/4/2006
Measuring and monitoring of product	PG 10	0/0	9/4/2006
Check of measure and control equipments	PG 11	0/0	9/4/2006
Internal and external communication	PG 12	0/0	9/4/2006

3. Written evidence

Responsibility and authority

For each Employee in charge with the department related to quality, there shall be drafted a job description which shall be signed and registered. The following positions shall be responsible for the quality: General Manager; Quality Manager; Quality Responsible; Chief of the Laboratory; Production/Development Manager; Head of Marketing Department.

The work guidelines represent detailed documents of the system being worked out as some procedures having the following structure: purpose, scope, working method, results, and conclusions.

The control and follow up of the production process shall be carried out based upon the control cards for each technological process by which there is demonstrated the system capacity to manage the planned results.

Such a Control card has the following structure: the scope, normative references, terms and definitions, work guidelines. 11 control cards were carried out for each check point of the production flow.

4. **The wine traceability** was performed based upon GS1 standards for defining the products: grapes, must/pressing of grapes, gross wine, maturated wine, stabilized wine, aged wine, finished wine, wine for sale. The entities of the traceability subsystem are described in Figure 2. The subsystem provides a number of 7 standard reports related to the wine traceability.

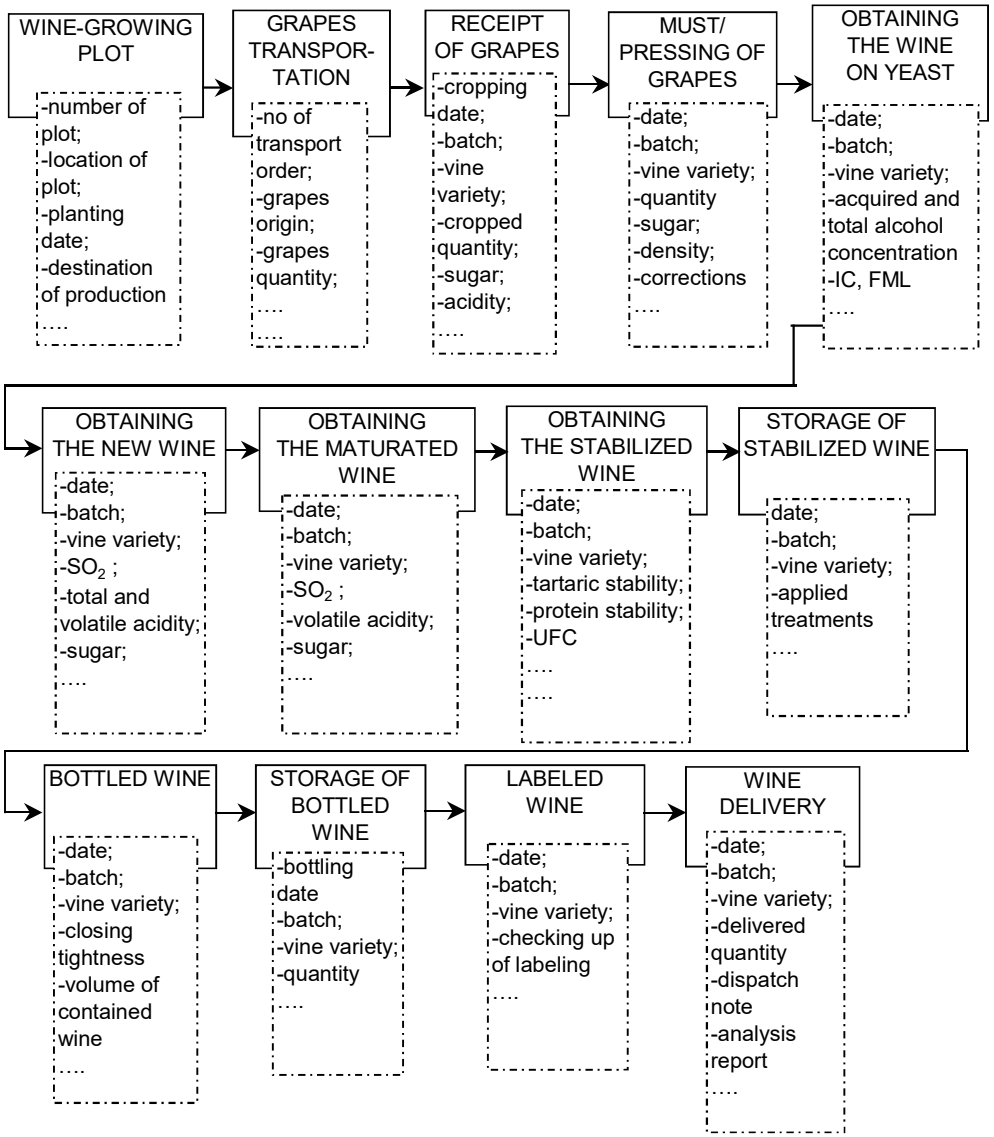


Figure 2. Entities of the traceability subsystem

CONCLUSIONS

1. The quality management system complies with SR EN ISO 9001:2001 standard and with the regulations of the wine-making field.

2. The wine production field has 11 check points and for each of these check points there are defined the control parameters and the control procedure.

3. The system has 5 general procedures and 12 operational procedures.

4. The following positions shall be responsible for the quality: General Manager; Quality Manager; Quality Responsible; Chief of the Laboratory; Production/Development Manager; Head of Marketing Department.

5. The wine traceability was carried out based upon a personal conception and using the SR EN ISO 9001:2001 standard in order to define the products.

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CALORIMETRIC STUDIES REGARDING DEVELOPMENT OF SOME YEAST SELECTED IN THE PRESENCE OF THE POLLUTANT $CuSO_4$

STUDII CALORIMETRICE ASUPRA CREŞTERII DROJDIILOR SELECŢIONATE ÎN PREZENŢA $CuSO_4$ CA FACTOR POLUANT

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Abstract. *In ordinary oenological practices the $CuSO_4$ treatment it still used to discard the sulfide hydrogen and other sulfate undesirable odors. This practice leads to an increase of copper concentration having negatives effects on the wine opalescence and oxidation level.*

The copper contamination sources: raw materials; anticryptogamic treatments with pesticides based on copper applied during grape processing, stocking and transporting; auxiliary materials; water used in technological processes and corrosion processes following grapes stocking and manipulation with copper equipments, etc.

The calorimetric method was applied to study the inhibition effect on Saccharomyces ellipsoideus yeasts growing of copper, studied like copper sulfate ($CuSO_4$), because this is active especially for useful microorganisms to alcoholic fermentation and negatives effects on wines.

Rezumat. *În practicile oenologice obişnuite încă se mai aplică tratamente cu $CuSO_4$ pentru îndepărtarea hidrogenului sulfurat şi a altor mirosuri sulfitice nedorite, ceea ce conduce la o creştere a concentraţiei de cupru având efecte negative asupra vinului privind opalescenţa şi nivelul de oxidare.*

Sursele de contaminare cu cupru ce pot ajunge în vin pe căi multiple sunt: odată cu materiile prime; în urma tratamentelor anticriptogamice aplicate viţei de vie cu pesticide pe bază de cupru; în timpul prelucrării strugurilor, depozitării şi transportului; din materialele auxiliare; din apa folosită în procesele tehnologice şi proceselor de coroziune în urma prelucrării, depozitării şi manipulării strugurilor cu utilaje confecţionate din cupru sau utilaje de cupru, etc.

Metoda calorimetrică a fost aplicată pentru studiul inhibării dezvoltării drojdiilor Saccharomyces ellipsoideus de către cupru, studiat sub formă de sulfat de cupru ($CuSO_4$), deoarece este activ mai ales asupra microorganismelor utile fermentaţiei alcoolice şi cu efecte negative asupra vinurilor.

MATERIAL AND METHOD

A calorimetric method to study the inhibition of microorganisms growing was used to quantitatively analyze the inhibitory effect of copper on three yeast strains.

Growing and development of yeasts was studied with Antares micro-calorimeter, capable to monitor simultaneous 24 samples (Arina Antoce, 1996).

Every one of the 14 units were filled with microorganisms in culture medium, in the presence of different inhibitory amounts. The samples were autoclaved in 50 ml glass vials, with tight stoppers, containing 5 ml growing medium (**YPG – yeast peptone glucose**) the inhibitory amount being introduced aseptically in every vial. For every experience it was used a 24 vials set with 4 blank vials containing culture with no inhibition addition, and in the other 20 vials $CuSO_4$ was added in an increase quantity. Usually it was used 4 vials with the same copper concentration to allow a simple estimation of reproducibility for registered growing thermogram.

The calorimeter detects the heat disengaged by microorganisms growing (cells growing) and transforms the thermal signal into an electrical one. Hereby, in the end we have the "calorimetric signal" or "increase thermogram" (***g(t)***) of microorganism – this is just an apparent evolution curve. Through different mathematical integration equation we obtain the real evolution curve of microorganism or ***f(t) curve.*** Finally still using mathematical calculation we can obtain the increase constant (***μ***), which may be used to quantitative comparison of microorganisms increase.

The studied yeasts strains are from microorganisms collection of some Romanian traditional winegrowing centers, being isolated and selected from spontaneous micro-flora and identified like *Saccharomyces ellipsoideus,* conserved in our laboratory like stock culture (*Saccharomyces ellipsoideus 4-21*, *Saccharomyces ellipsoideus* M_1 *and Saccharomyces ellipsoideus* b_1). The strains were pre-incubated for 24 hours at 30°C in liquid medium and then incubated (inoculation size was 10^{-6}) in calorimeter at same temperature and on the same medium. They were made experiences for a quantitative analysis of copper inhibition action which included the registration of inhibition action on 72 must samples. These samples were prepared with must containing variables copper concentrations, being inoculated with one of the three selected yeast strains, considered the most valuables for flavored wine making. For every inhibition concentration and yeast were made three or four repetitions (tables 1, 2 and 3).

Table 1

Saccharomyces ellipsoideus 4-21 yeast strain
(first variant)

Nr. of samples (calorimeter vials)	ml. $CuSO_4$ aseptically added	Concentration mg/l Cu^{2+}
1-4 witness	0	—
5-8	0,1	9,8
9-12	0,2	19,24
13-16	0,5	45,53
17-20	0,7	61,55
21-24	0,95	80,08

Table 2

Saccharomyces ellipsoideus M_1 ***yeast strain***
(second variant)

Nr. of samples (calorimeter vials)	ml. $CuSO_4$ aseptically added	Concentration mg/l Cu^{2+}
1-4 witness	0	—
5-8	0,69	60,77
9-12	0,95	80,08
13-16	1,25	100,39
17-20	1,58	120,62
21-24	1,93	140,01

Every *Saccharomyces ellipsoideus* strain used in calorimetric experiences was developed on liquid YPG medium (25 ml / 100 ml Erlenmayer balloon) for 18 – 20 hours at 30°C, to obtain an inoculum. From the inoculum 24 samples were inseminated, taking care not to exceed a cell density bigger than 1 - 9 x 10^6 (established with Thoma chamber), ready to be introduced for registration in the 24 calorimetric unities. The samples are made in 50 ml glass vials, autoclaved, with tight stopper, containing 5 ml of increase medium, to which it was added, aseptic, the different quantity of inhibition composite ($CuSO_4$), according to tables 1,2 and 3. For every experience was used a 24 vials set, the first ones being used like witness – no $CuSO_4$ added, while from the rest of vials were made groups in which was added increasing quantities of CuSO4. Usually were used 4 vials group with the same copper concentration to allow a simple estimation of registered growing thermograms reproducibility.

Table 3

Saccharomyces ellipsoideus4-21, M_1 and b_1 yeast strain
(third variant)

Nr. of samples (calorimeter vials)	ml. $CuSO_4$ aseptic added	Concentration mg/l Cu^{2+}
1-2 witness	0,00	—
3-4	0,55	49,64
5-6	1,25	100,39
7-8	1,93	140,01
9-10	2,67	175,25
11-12	3,25	198,5
13-14	3,50	207,5
15-16	4,00	224,17
17-18	4,25	231,81
19-20	4,50	239,06
21-22	4,75	245,93
23-24	5,00	252,47

RESULTS AND DISCUSSIONS

The reproducibility of the experiments was very good when the inoculum was similar from the stock culture age, pre-incubation time and yeasts cell number point of view. The increase thermograms for studied yeast strains were different according to strains type and the added cooper concentration. The highest copper concentration added was 250 mg/l Cu^{2+}.

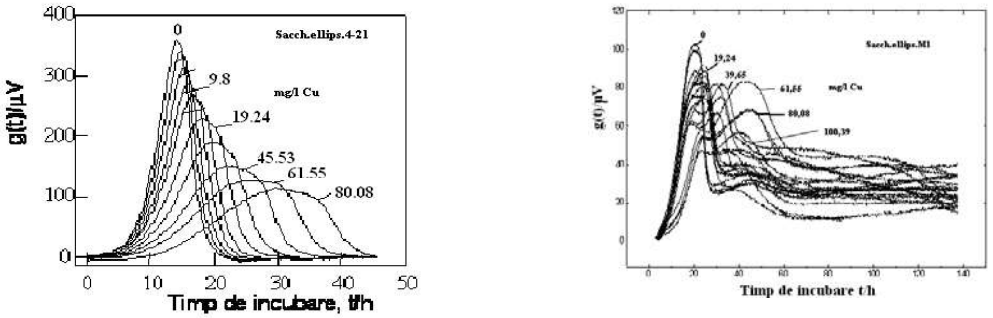

Figure 1. The increase thermogram of *Saccharomyces ellipsoideus 4-21* and *Saccharomyces ellipsoideus* M_1 strains

The „g(t)" curves depend, in some points, on the used yeast strain and the initial inhibition concentration (copper concentration). For example, the *Saccharomyces ellipsoideus 4-21* strain had big, large curves, with sticking tops, compared with *Saccharomyces ellipsoideus* M_1 which had smaller curves, sometimes with second small and dusty tops in the presence of high copper concentrations.

Such peculiarities are due, probably, to inherent differences between yeast strains regarding their increase behavior in the presence of some composites. As we can see for all the yeast strains the copper addition influence the increase thermograms; the increase of inhibition concentration lead to a progressive decrease of g(t) curves inclination, normally decreasing the top height and increasing the starting time in exponential increase phase. The effects produces by inhibition concentration increase on the increase thermograms may be quantitative analyzed using the increase speed value, to calculate the inhibition constant, determined for every culture.

The observed changes in increase thermograms are graduals and they are developing progressive when inhibition concentration increase. We can confirm the apparition of an exponential increase phase for all the yeast culture with the tested inhibition composite (copper), at the concentrations used in experiences. These are indicated that it exist a correlation between yeast growing and heat producing for the culture containing the tested inhibition composite.

It must be noted that the g(t) curves represent only the apparent exit signal of calorimeter, because the signal obtained from the instrument is affected by the permanent heat change between the calorimeter's unities and the environment, specific of calorimeter type conduction.

To obtain the effective evolution heat curve, the g(t) curve is integrated (equation 1):

$$f(t) = g(t) + K\int g(t)\mathrm{d}t \qquad (1)$$

f (t) – the evolution of real heat developed by calorimeter's unities;

g(t) – the apparent exit signal of the instrument;

t – incubation time;

K - conductivity constant of calorimeter's heat.

This operation, which give the speed increase value, is made automaton by the calorimeter's *soft* for the all 24 cultures and for every experience and finally we obtain a gradual decrease of μ value when the inhibition concentration increase. Obviously, the increase curves without inhibition composite are different from the ones obtained with inhibition composite, thus the effect of some composite on yeast may be quantitative analyzed by analyzing the curves differences with a special software. The main differences are the decrease of inhibited microorganisms increase speed and so a decrease of increase inclination curve and an increase of delay time of increase (Antoce O.A., 1996). Both aspects can be analyzed to characterize the yeasts growing, obtaining next parameters:

- increase speed constant μ

- delay time $t\alpha$

- K_μ = inhibition concentration which determine a decrease of increase constant with 0%

- K_θ = = inhibition concentration which determine an increase of delay time with 50%

- MIC_μ = minimal inhibition concentration at which is not observed the microorganisms

- MIC_θ = minimal inhibition concentration for which the increase appear at t = α time.

Figure 2 present the results regarding the final determined values of minimal inhibition concentration of copper which determine a decrease of increase constant with 50% ($K\mu$) and at which is not observed anymore the yeasts growing (MICμ) but also the determined values of K_θ and MIC_θ.

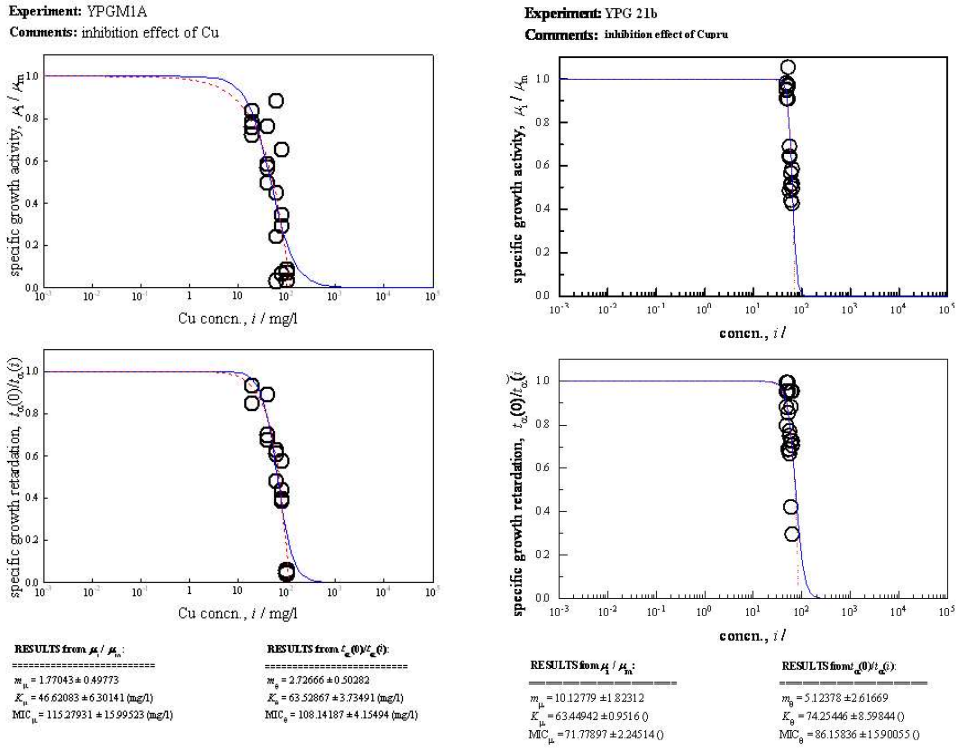

Figure 2. Calculation of minimal inhibition concentration of copper according to the decrease of the increase value and the delay of strain growing starting

As far as the rate of yeast growing is concerned we noticed that the inhibition dose is 50%, K_μ is 46,6 ± 6,3 mg/l and the minimal inhibition concentration MIC_μ is 115,3 ± 16,0 mg/l. For the case of growing yeast delay time the inhibition dose is 50%, K_θ is 63,5 ± 3,7 mg/l, and the minimal inhibition concentration, MIC_μ is 108,1 ± 4,1 mg/l.

CONCLUSIONS

►The calorimetric studies are proved to be useful to evaluate the influence of $CuSO_4$ as pollutant factor for fermentation microorganism. Through this method yeast strains resistant to some factors specific to one vineyard or winemaking technology can be selected.

►Even if the values for $K\mu$ and $MIC\mu$ determined by this method can easy vary according to experimental conditions, the method is useful for research activities but also for technological purposes to characterize the yeast strains tolerance to different inhibition composite.

►In the case of yeast growing speed decrease the inhibition dose is 50%, K_μ is 46,6 ± 6,3 mg/l and the minimal inhibition concentration MIC_μ is 115,3 ± 16,0 mg/l. For the case of growing yeast delay time the inhibition dose is 50%, K_θ is 63,5 ± 3,7 mg/l, and the minimal inhibition concentration, MIC_μ is 108,1 ± 4,1 mg/l.

►Based on the results of this research we concluded that the inhibitory copper dose is around 100 mg/l Cu^{2+}. Its concentration is very important to establish limits of wine toxicity because the quantity of the biological available metal has a higher importance than the total concentration for wine quality.

►Just like other calorimetric methods, the potential application of this method include the complex evaluation of culture media, expertise on food and wine additives, and anti-fungal agents, improvement of fermentation technologies, applications in medicine, pollution an environment, etc.

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ESTABLISHING OF RED WINES QUALITY OBTAINED IN RECAS AND MINIS VINEYARD ON THE BASIS OF ANTIOXIDANT AND CHROMATIC CHARACTERISTICS

STABILIREA CARACTERISTICILOR ANTIOXIDANTE ŞI CROMATICE ALE UNOR VINURI ROŞII OBŢINUTE ÎN PODGORIILE RECAŞ ŞI MINIŞ

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Abstract. *In this paper it was determined total antioxidant capacity, total polyphenols content and monomeric anthocyanins amount, as well as the chromatic characteristics of red wines processing in Recas and Minis wine making centers from tree grapes varieties Cabernet Sauvignon, Merlot and Pinot Noir. It was analyzed the young and aged in bottle wines. The polyphenols content it was determined by Folin-Ciocalteur method (expressed such as mM/L acid gallic. Total antioxidant capacity it was determined by FRAP method, being expressed as mM Fe^{2+}/L. The monomeric anthocyanins it was spectrometric determined by differential pH method. Chromatic parameters were comparatively determined by standardized methods and Glories method. Our study will permit establishing of some correlations between chromatic and antioxidant characteristics of red wines in different evolution stages, processing in two different vineyards from different black grapes varieties.*

Rezumat. *În acestă lucrare s-a determinat capacitatea antioxidantă totală, conţinutul de polifenoli şi de antociani, precum şi caracteristicile cromatice ale vinurilor roşii produse în centrele de vinificaţie Recaş şi Miniş din trei soiuri de struguri negrii: Cabernet Sauvignon, Merlot şi Pinot Noir. Au fost luate în analiză vinuri tinere şi vinuri învechite în butelie. Conţinutul de polifenoli totali s-a determinat spectrofotometric prin metoda Folin-Ciocalteu şi s-a exprimat în mM acid galic/L. Capacitatea antioxidană totală s-a determinat prin metoda FRAP fiind exprimată în mM Fe^{2+}/L.Conţinutul de antociani monomeri s-a determinat spectrofotometric prin metoda pH-ului diferenţial. Parametrii cromatici s-au determinat comparativ prin metodele standardizate A şi B şi prin metoda Glories. Studiul nostru permite stabilirea unor corelaţii între caracteristicile cromatice şi antioxidante ale vinurilor roşii obţinute in două podgorii, din diferite soiuri de struguri negrii şi aflate în diferite stadii de evoluţie.*

The determination of chromatic features of red wines and their adequate interpretation is very important for quality establishing of red wines (both young red wines and aged red wines). The modification of chromatic characteristics of red wines during their evolution is in strong correlation with their antioxidant properties [1,2,8].

The studies made till this moment contain the fact that from all the foods and drink consumed by humans, the wine represents the most important source of substances with protective role against cardiovascular diseases that represent the principal cause of mortality in developed countries. The greatest degree of cardioprotection is related to ingestion of red wine rather than white wine, beer or spirits. Quality and quantity of polyphenols are related to the variety vineyard, weather, soil and cultivation practices. It may tell, that the polyphenols contribute to the definition of organoleptic quality, to the food-hygiene and to the wines particularization [7]. The chemical structure of polyphenols is specially adapted for antioxidant activity (these are donators of hydrogen or electrons, or they capture free radicals present human organism that may cause oxidative degradation of some lipids molecules, proteins, nucleic acids, inducing in this way the appearance of degenerative diseases) [1,6,11]. Many studies have demonstrated that through wines aging, because oxidation and condensation processes, it was diminished the monomer polyphenols content (which has the antioxidant properties); also, it was monitoring the evolution of substances with antioxidant role during wine's evolution, it was studied the influence of different factors (biological, biochemical, technological) about wine quality, but not made correlation between the content of compounds with antioxidant power, wine's antioxidant capacity, chromatic properties depending on the evolution stage of wine obtained from different wine variety and in different vineyards [1,7,8].

MATERIALS AND METHODS

In this study were analyzed red wines processed of Recas and Minis wine making centers in 2005 harvest year. The selected wines were obtained from Cabernet Sauvignon (CS), Pinot Noir (PN) and Merlot (M) grapes varieties. The investigations were effected about both red wines categories: young and aging in bottle for one year. For these wines it were determined the chromatic parameters, total antioxidant capacity, total polyphenols content and monomeric anthocyanins amount, as well as the chromatic characteristics.

Reagent and equipment: All chemicals and reagents were analytical grade or purest quality purchased from Merck, Fluka, Sigma. Was used distilled water. Absorption determination for FRAP and total polyphenol content was made using Spectrophotometer Specord 205 by Analitik Jena.

Determination of Total Antioxidant Capacity - TAC (Adaptation of FRAP method - Ferric reducing ability of plasma) [3]. The Total antioxidant capacity in wine samples was calculated in mM Fe^{2+}/L. Correlation coefficient (r^2) for calibration curve was 0.9958.

Determination of phenolic compounds. The content of total polyphenolic compounds was determined by Folin-Ciocalteu method [3]. Total content of polyphenols in wines was calculated in mM gallic acid/L. Correlation coefficient (r^2) for calibration curve was 0.995.

Determination of total monomeric anthocyanins. The total monomeric anthocyanins will be spectrometric determined by differential pH method [4]. The pigments content was calcuated *as cyanidin-3-glucoside.*

Chromatic properties will he determine through high performance spectrophotometer analysis with a Analytic Jena Specord 205. It will be done the following determinations depending on used method: Standard method A and B [9, 12] and Glories method [5, 9].

RESULTS AND DISCUSSIONS

In the table 1 it was presented the chromatic parameters obtained by application of A and B standardized methods.

Table 1

Chromatic properties of red wine determined by standardized A and B methods

Grape variety		Method A		Method B					
		λd	Wine color	A_{420}	A_{520}	I.C	tgα	α	Wine color
Recas[1]	CS	614	red	3.3147	3.4013	6.7160	0.0866	4,95	red
	M	620	red	3.1473	3.2071	6.3544	0.0598	3,421	red
	PN	624	red	2.7795	3.0147	5.7942	0.2352	13,24	red
Recas[2]	CS	635	red	3.2147	3.8492	7.0639	0.6345	32,40	red
	M	631	red	3.0079	3.6122	6.6201	0.6043	31,14	red
	PN	626	red	2.6789	3.3971	6.076	0.7182	35,69	red
Minis[1]	CS	595	brawny	3,8125	3,6289	7.4414	-0.1836	-10,40	brawny
	M	592	brawny	3,5113	3.4731	6.9844	-0.0382	-2,19	brawny
	PN	597	brawny	3.3111	3,2249	6.536	-0.0862	-4,93	brawny
Minis[2]	CS	620	red	3.5473	4.3897	7.937	0.8424	40,11	red
	M	630	red	3.3697	3.9387	7.3084	0.569	29,64	red
	PN	615	red	3.2083	3.4228	6.6311	0.2145	12,11	red

1- red wines aged in bottle for 12 months; [2]- young red wines

The dates from the table 2 show the chromatic structure obtained by Glories method. By this method application, it was determined the percent with that each pigment category (yellow, red and blue) contribute to the total wine color. The results obtained for these methods are in perfect accord, namely, the wine shade identified by these methods is the same.

For all young red wines it was obtained the red shades, the wines from Recas even after 12 months for aging have the red color while the color of wine processing in Minis vineyard through aging became brawny.

As a rule, for red wines age, the absorbance at 520nm decreases while the absorbance at 420nm and 620nm increases, due to the shift from monomeric to polymeric anthocyanins [9]. Although all analysed samples proceeded from the same harvest year, 2005, the wines from Minis vineyard have the brawny color and for the wines from Recas vineyard the color which results after aging is red.

Regarding the influence of evolution stages of the wine it was observed that the structure of phenolic compounds varies very much during wine's maturation and aging. For wine that were aged for 12 months, the percent of yellow pigments which participate to the red wine total color formation is more than red pigments percent.

Table 2

Chromatic properties of red wine determined by Glories method

Grape variety		A_{420}	A_{520}	A_{620}	I.C*	T	Chromatic structure		
							% yellow pigments	% Red pigments	% Blue pigments
Resas[1]	CS	3.3147	3.4013	0.8146	7.6306	0.97	43.44	44.57	10.68
	M	3.1473	3.2071	0.7103	7.0647	0.98	44.55	45.40	10.05
	PN	2.7795	3.0147	0.5894	6.3836	0.92	43.54	47.23	9.23
Recas[2]	CS	3.2147	3.8492	0.7208	7.7847	0.84	41.30	49.45	9.26
	M	3.0079	3.6122	0.5873	7.2074	0.83	41.73	50.12	8.15
	PN	2.6789	3.3971	0.4283	6.5043	0.79	41.19	52.23	6.58
Minis[1]	CS	3.8125	3.6289	1.8983	9.3397	1.05	40.82	38.85	20.33
	M	3.5113	3.4731	1.6112	8.5956	1.01	40.85	40.41	18.74
	PN	3.3111	3.2249	0.8016	7.3376	1.03	45.13	43.95	10.92
Minis[2]	CS	3.5473	4.3897	1.6307	9.5677	0.81	37.08	45.88	17.04
	M	3.3697	3.9387	1.4986	8.807	0.86	38.26	44.72	17.02
	PN	3.2083	3.4228	0.9844	7.6155	0.94	42.13	44.95	12.93

2- red wines aged in bottle for 12 months; [2]- young red wines

IC and IC* have the same direction of evolution (the values decreased for aged wine). For all cases, the highest values of color intensity it was obtained for red wine from Cabernet Sauvignon grape variety and the smaller values for Pinot Noir red wine. The tonality present values between 0.6-1.0 for wines with red shade and the values more than 1 for wines with brawny shade. From the dates showed in the table 2 it was observed that the pigments structure reflects exactly the chromatic features of analyzed red wines. In general case, for wine with red shade, the red pigment class participates in more measure (over 40%) to underline of wine color, for wine with brawny shade, the red pigments percent decrease being accompanied of yellow-orange pigments percent increasing. The class of blue pigments participates at total color of wine in measure of 6-10% for red wine from Recas vineyard and in measure of 10-20% for red wine from Minis. For aged red wine the yellow pigments percent increase and the red pigments percent decrease, the both pigments classes are more equilibrate in aged wine.

In the table 3 are presented the values of total antioxidant capacity, total polyphenols content and total monomeric anthocyanins.

Table 3

The values of polyphenols, total antioxidant capacity and monomeric anthocyanins

Grape variety		Total polyphenols (mM acid gallic/L)	Antioxidant capacity (mM Fe^{2+}/L)	Monomeric anthocyanins (mg/L)
Resas[1]	CS	19.87	25.59	81.42
	M	17.65	22.03	76.43
	PN	16.30	18.72	71.29
Recas[2]	CS	22.89	28.11	152.23
	M	20.70	26.54	135.29
	PN	17.88	21.49	120.47
Minis[1]	CS	19.35	25.45	98.14
	M	18.21	23.89	89.71
	PN	16.09	18.16	81.04
Minis[2]	CS	26.91	32.89	189.76
	M	23.07	28.54	140.79
	PN	20.16	26.12	129.87

3- red wines aged in bottle for 12 months; [2]- young red wines

From these results it was observed that, by aging for one year, the antioxidante properties of analysed red wines decrease with 10-15% (for the case of Recas vineyard) and with 17-30% (for the case of Minis vineyard). This finding is very important because supplies the information regarding the evolution of antioxidant characteristics for red wines from Recas and Minis vineyards through aging. In all cases, the polyphenols content has the same direction of evolution with total antioxidant capacity (the TAC increases at once increasing of total polyphenols content). It was observed a linear correlation between these parameters, the correlation coefficient was R=0.96779. Particularly, it was distinguished a different evolution depending on the grapes variety used for wine making. The highest values for antioxidant capacity were founding in young red wine (in particular from Cabernet Sauvignon grape's variety).

Through aging the polyphenols content, the total antioxidant capacity and the total monomeric anthocyanins content were decreased. For the case of Recas and Minis vineyards, the biggest values of monomeric anthocyanins were founding in red wine from Cabernet Sauvignon grape variety, followed of red wines from Merlot and Pinot Noir grape varieties.

For young wines, the anthocyanins amounts were situated between 130-190 mg/L for wines from Recas vineyard and between (120-150mg/L) for wines from Recas vineyard. Through aging for one year, the content of monomeric anthocyanins decrease until (70-80mg/L) for wines from Recas vineyard and (80-100mg/L) for wines from Minis vineyard. The values of anthocyanins content are very different in rapport with grape's variety, wine evolution stage and origin place.

CONCLUSIONS

The highest values of color intensity it was obtained for red wine from Cabernet Sauvignon grape variety and the smaller values for Pinot Noir.

Total antioxidant capacity, polyphenols and anthocyanins content were showed different values in rapport with origin place (vineyard), grape's variety and evolution stage of red wine.

The polyphenols content has the same direction of evolution with total antioxidant capacity. Between these parameters it was observed a linear correlation for both red wine categories: young and aged in bottle.

Through aging decrease the total antioxidant capacity, total polyphenols content and total monomeric anthocyanins. The highest values for antioxidant capacity were founding in young red wines (in particular for red wine from Cabernet Sauvignon grape's variety).

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SCIENTIFIC CONTRIBUTION REGARDING MALOLACTIC FERMENTATION WITH SELECTED COMERCIAL BACTERIA STRAIN FOR SOME WINE FROM COTNARI VINEYARD

CONTRIBUȚII PRIVIND STUDIUL FERMENTAȚIEI MALOLACTICE LA UNELE VINURI DIN PODGORIA COTNARI FOLOSIND BACTERII LACTICE SELECȚIONATE

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Abstract. *The malolactic fermentation (MLF for short) is a very important process for wine industry. MLF was studied for red wine first but in our days is more and more usual for white wine too. It is advisable to make MLF for white wine especially when malic acid prevalent and has a negative influence in wine flavor.*

Our research was run in industrial condition in the 10 000 liters tanks and followed the stress factor influence against malolactic bacteria.

In our research we have used two different dry wines obtained from Cotnari vineyard, Sauvignon Blanc and Feteasca albă, in added of that we have used selectioned bacteria strains and a nutrients for wine.

Malic acid from grape juice and wine could be decarboxilated, by biologic way in lactic acid and CO_2. The process has called malolactic fermentation and is one of very important phenomenon, which takes place in vinification. The phenomenon was studied in red wine for the first time.

Today in more and more white wine it's necessary malolactic fermentation, especially in wine with high percent of malic acid. After malolactic fermentation, by biochemical point of view, malic acid loses one acid function from malic acid.

By biochemical view for this process it's exists three theories:

- Malic acid is transformed in D (+) and L (-) lactic acid with intermediate compounds like oxaloacetic and piruvic acid by malate-dehidrogenase (enzyme);
- Malic acid is transformed in D (+) and L (-) lactic acid by malic enzyme with one intermediate compound, piruvic acid. This enzyme action it's correlated with Mg^{2+};
- The tree one process supposes that malic acid it's directly transformed in lactic acid under enzymatic activity.

MATERIAL AND METHODS

Our research was carry one in SC Cotnari SA by industrial condition and has followed some aspects like stress factor influence against lactic bacteria (selectioned commercial strains) in some Cotnari wine like Sauvignon Blanc and Feteasca alba after alcoholic fermentation.

Table 1

The wine takes in study for malolactic fermentation

Nr. crt.	Wines	Reducing sugar (g/l)	Alcohol (% vol)	Total malic acid	pH	Total SO_2	Total acidity	Total polyphenolic
1	Sauvignon Blanc	3.9	12.1	4.2	3.56	20	7.5	8.7
2	Fetească albă	3.54	11.45	3.8	3.34	20	7.84	7.2

For malolactic bacteria mixture has used desacidifiated wine with pH = 4 and temperature 22^0C. For this desacidification process we used $CaCO_3$ like agent.

In the beginning the wines was enriched with nutrient complex recommended by bacterial strain producers.

In course of malolactic fermentation the wines was keep in constant temperature condition 20^0C.

The principal research objective was stress factor influence against malolactic process and repress influence of this factor too.

The analytical method for analyses was:

1. Reducing sugar was dosed by standardized method after one preliminary defecation process, with zinc hexacyanoferrate (II) recommended for white wine, and after that the copper ions was titrated by Luff - Shoorl method. For titration we have used one electronic titrator, TitroLine Easy type. (Schott).

2. Alcoholic content was dosed by density method in hydroalcoholic distillate obtained after wine distillation. For density measurement we have used one electronic densymeter, Anton Paar, type 4500.

3. Malic acid was dosed by enzymatic method and we used one enzymatic kit from Roche.

4. Total acidity – we used potentiometric method. For titration we have used one electronic titrator, TitroLine Easy type. (Schott).

5. pH- was measured with pH meter WTW type;

6. Free and total sulfurous anhydride was dosed by aspiration method and after that titration with NaOH.

RESULTS AND DISCUSSIONS

Malolactic fermentation was devolved continuous to the end for the both of wines, Sauvignon Blanc and Feteasca albă respectively. Regarding that it's important to mention pH was up to 3,2 so relative favorable for fermentation and temperature was keep in a constant propitious condition.

pH influence

pH is probable the most important parameter in malolactic fermentation. Malolactic fermentation will devolve more easily for wine with high pH (low acidity). In our research Sauvignon Blanc has low acidity and malolactic fermentation was more rapid than Feteasca albă. In added of that pH wasn't significant variation in malolactic fermentation for both wines.

In fact pH has one selective effect for bacteria and is one repression factor because of that.

Table 2

Malolactic fermentation for Sauvignon Blanc

Period (hours)	Reducing sugar (g/l)	Alcohol (% vol)	Malic acid (g/l)	IPT (A_{280})	pH
0	3.9	12.1	4.2	8.7	3.56
24	3.61	12.1	3.68	7.7	3.56
48	3.37	12.1	3.15	7.7	3.6
72	3.0	12.1	2.62	7.7	3.62
96	2.82	12.1	2.1	7.2	3.62
120	2.6	12.1	1.56	7.2	3.62
144	2.36	12.1	1.04	7.2	3.62
168	2.1	12.1	0.51	6.9	3.62
192	1.82	12.1	0	6.9	3.62

Table 3

Malolactic fermentation for Feteasca albă

Period (hours)	Reducing sugar (g/l)	Alcohol (% vol)	Malic acid (g/l)	IPT (A_{280})	pH
0	3.54	11.45	3.82	7.2	3.34
24	3.42	11.45	3.38	6.9	3.34
48	3.36	11.45	2.92	6.8	3.34
72	3.29	11.45	2.54	6.8	3.3
96	3.15	11.45	2.12	6.5	3.3
120	3.1	11.45	1.65	6.5	3.3
144	2.98	11.45	1.28	6.2	3.3
168	2.87	11.45	0.90	6.2	3.3
192	2.75	11.45	0.45	6.2	3.3
216	2.51	11.45	0	6.2	3.3

Malic acid degradation

The most probable because we've used selectioned bacterial strains, the malic acid degradation was linear along the fermentation. But for Sauvignon Blanc the degradation ratio was superior (probable pH influence).

Total acidity influence

Malic and tartaric acids in high percent constitute repression factors for malolactic fermentation making reduce in bacterial biomass.

Connected with that, fumaric acid has one stimulation effect for bacterial growth. But in concentration up to 0,6g/l has one inhibitory effect for growth.

For Sauvignon Blanc because total acidity was low than Feteasca it's permitted to make more rapid malolactic fermentation.

Ethanol influence

For up to 13 %vol, ethanol has one inhibitory effect for malolactic fermentation. Some scientists consider that ethanol influence is variable function of bacterial strains.

Sulfur anhydride

Has been one of most studied factors for malolactic fermentation, along the time. Sulfur dioxide influence really depends of concentration and regarding that sulfur dioxide has bactericidal or bacteriostatic effect. In added of that combined sulfur dioxide has inhibitory effect too. Sulfur dioxide effect is also variable function of bacterial species and biological stadium. In our research we have used two wine with small quantity of sulfur dioxide and malolactic fermentation was take place in favorable condition.

CONCLUSIONS

- pH has one notable influence in malolactic fermentation process. In our research we observed that Sauvignon Blanc (low acid wine) was more rapid in malolactic fermentation;
- Sulfur anhydride have also very important influence in fermenting process and connected with that is concentration in sulfur anhydride is very important;
- Another notable factor is temperature. Temperature must be keeping in high (20^0C) and constant for successful malolactic fermentation.

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RESEARCH REGARDING SPONTANEOUS AND INDUCED ALCOHOLIC FERMENTATION WITH SELECTED YEAST STRAINS FOR SOME WINE FROM COTNARI VINEYARD

STUDIU COMPARATIV PRIVIND FERMENTAȚIA ALCOOLICĂ SPONTANĂ ŞI INDUSĂ CU UNELE SUŞE COMERCIALE, LA UNELE VINURI DIN PODGORIA COTNARI

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Abstract. *The fermenting process is veriy imoportant in wine industry. Conected with that biotech company has produced in the last years selectioned yeast strains for wine industry implied in fermenting process. The research regarding wild yeast strains and selectioned yeasts, have a good point for wine industry. In added of that our research followed comparative study regarding fermentation, spontaneous fermentation and fermentation with comercial yeast strains. The research was made in SC COTNARI SA laboratory and the must sample was Frâncuşa and Feteasca albă grape variety. The must for comercial yeast strains was sterilizated first. By our research comercial yeast strains has made more rapid fermentation compared with wild yeast and assimilable nitrogen was used more efficient*

Biological research laboratory has developed in our times a lot of selectioned yeasts strains coming from different vineyards. The biological selection has followed some biological aspects like superior fermenting rate, resistance for low temperature and so on.

MATERIALS AND METHODS

The research was take place in SC Cotnari SA laboratory in harvested time 2006, and we was able to follow some different fermenting aspects connected with fermentation like compared study between spontaneous and induced fermentation. For induced fermentation we have used some commercial yeast strains. The must has belonged to Feteasca albă and Frâncuşa. For Fetească albă the grapes was harvested in the first time of harvesting time for first variant (lower sugar percent) and from second part for variant number 2For fermenting we was also used some recipients with 50 liter capacity.

Table nr.1

Grape must for research

Wine	Sugar (g/l)	Total acidity (G/l – tartaric acid)	pH	Assimilable Nitrogen
Fetească albă var.1	200	9.39	3.38	191
Fetească albă var. 2	220	9.19	3.46	268
Frâncuăşă	198	8.9	3.36	210

In our research we take in study some aspects connected with fermenting process as follow:

Reducing sugar evolution - It was measured by refractometric method in first time and after that by standardized method after one preliminary defecation process, with zinc hexacyanoferrate (II) recommended for white wine, and after that the copper ions was titrated by Luff - Shoorl method. For titration we have used one electronic titrator, TitroLine Easy type. (Schott).

Alcoholic content evolution was dosed by density method in hydroalcoholic distillate obtained after wine distillation. For density measurement we have used one electronic densymeter, Anton Paar, type 4500;

Total acidity – we used potentiometric method. For titration we have used one electronic titrator, TitroLine Easy type. (Schott).

Assimilable nitrogen – assimilable nitrogen was measured by usual method with formaldehyde. For titration we have used one electronic titrator, TitroLine Easy type. (Schott).

RESULTS AND DISCUSSIONS

Table 2

Fetească albă – 1st variant – Induced fermentation

Nr. crt	Sugar (g/l)	Alcohol (% vol)	Total acidity (g/l acid tartric)	pH	Assimilable nitrogen (mg/l)	Time (hour)
1	200	0	9.39	3.38	191	0
2	165	2.34	9.31	3.4	40	24
3	68.5	7.53	9.85	3.32	0	48
4	10.9	10.70	9.62	3.35	0	72
5	3.1	11.38	9.24	3.36	0	96
6	2.5	11.43	9.24	3.36	0	120
7	2.2	11.60	9.24	3.36	0	144

Table 2a

Fetească albă – 1st variant – spontaneous fermentation

Nr. crt	Sugar (g/l)	Alcohol (% vol)	Total acidity (g/l acid tartric)	pH	Assimilable nitrogen (mg/l)	Time (hour)
1	200	0	9.39	3.38	191	0
2	170	1.7	9.5	3.31	54	24
3	74	7.05	9.6	3.34	14	48
4	62	7.76	9.5	3.30	0	72
5	45	8.7	9.24	3.32	0	96
6	32	9.46	9.14	3.32	0	120
7	17	10.35	9.14	3.32	0	144
8	4,3	11.09	9.14	3.32	0	168
9	3.5	11.36	9.14	3.32	0	192

Table 3

Fetească albă – 2nd variant – Induced fermentation

Nr. crt	Sugar (g/l)	Alcohol (% vol)	Total acidity (g/l acid tartric)	pH	Assimilable nitrogen (mg/l)	Time (hour)
1	220	0	9.19	3.46	268	0
2	158	3.4	9.85	3.34	20	24

3	69.5	6.88	9.62	3.31	0	48
4	35.6	9.53	8.85	3.35	0	72
5	23	10.75	8.85	3.31	0	96
6	20	11.28	8.85	3.31	0	120
7	19	11.44	8.85	3.31	0	144

Table 3a

Fetească albă – 2nd variant – spontaneous fermentation

Nr. crt	Sugar (g/l)	Alcohol (% vol)	Total acidity (g/l acid tartric)	pH	Assimilable nitrogen (mg/l)	Time (hour)
1	220	0	9.85	3.46	268	0
2	165	3.29	9.64	3.38	106	24
3	85	7.1	8.8	3.35	40	48
4	69.5	8.4	8.8	3.35	0	72
5	34.5	10.08	8.8	3.35	0	96
6	22.7	10.7	8.8	3.35	0	120
7	14.3	11.19	8.8	3.35	0	144
8	14	11.38	8.8	3.35	0	168

Table 4

Frâncuşa – Induced fermentation

Nr. crt	Sugar (g/l)	Alcohol (% vol)	Total acidity (g/l acid tartric)	pH	Assimilable nitrogen (mg/l)	Time (hour)
1	198	0	8.9	3.36	210	0
2	179	0.8	8.92	3.3	46	24
3	104.1	5.2	8.9	3.29	0	48
4	63	7.6	9	3.27	0	72
5	21.7	10.3	8.5	3.34	0	96
6	7.5	11.13	8.5	3.34	0	120
7	2.3	11.4	8.5	3.34	0	144
	2.1	11.56	8.5	3.34	0	168

Table 4a

Frâncuşa – Spontaneous fermentation

Nr. crt	Sugar (g/l)	Alcohol (% vol)	Total acidity (g/l acid tartric)	pH	Assimilable nitrogen (mg/l)	Time (hour)
1	198	0	8.9	3.36	210	0
2	185	0.3	8.95	3.4	82	24
3	110	4.7	8.93	3.35	18	48
4	76	6.7	8.94	3.32	0	72
5	51	8.17	8.7	3.34	0	96
6	20	10.1	8.62	3.31	0	120
7	14.3	10.49	8.6	3.31	0	144
8	4.2	11.1	8.6	3.31	0	168
9	2.5	11.3	8.6	3.31	0	192

Fermenting sugar rate. For this point of view better fermentation rate was observed in commercial yeast strains especially in technical aspects. Fermenting process with commercial strains was more rapid and somehow liniar compared with spontaneous fermentation;

Total acidity. Was variable along the proces. This was probably because accumulation and loss acid function compound.

pH. Don't have significant variation in fermenting process.

Assimilable nitrogen. It's a very important parameter for fermenting aspects. For our sample the assimilable nitrogen percent was optimal for good fermentation. In this point of view, nitrogen was totally consumed in first 24/48 hours of fermentation;

Fermentation length. It's in great depends of type of strains. For commercial strains fermentation was shorter than for indigenous yeast. One explanation could be that for spontaneous fermentation may be some ecological succession in the yeasts population and for that the length of time could be longer.

CONCLUSIONS

-Spontaneous fermentation take a longer time for finally, that could be because ecological yeast succession;

-Commercial yeast studied has better that spontaneous one regarding fermenting rate, alcohol produce rate etc;

-pH has a little one variation along fermenting process;

-Totala acidity make variation along fermenting probably because accumulation and lost of acidic compounds;

-Assimilable nitrogen was more rapid consumed by commercial yeast strains.

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PHYTOPATHOLOGICAL ASPECTS WITNESSED DURING STORAGE AT APPLE FRUITS PREVENTIVELY TREATED UNDER ECOLOGICAL CONDITIONS (III)

ASPECTE FITOPATOLOGICE CONSTATATE PE PARCURSUL DEPOZITĂRII LA FRUCTELE DE MĂR TRATATE PREVENTIV ÎN CONDIȚII ECOLOGICE (III)

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Abstract. *The studies reveal pathological damage of fruit apple, manifested in storage , trying to find echological solutions for wastages. Prevented procedures which include post- harvest treatements with bioactive substances of natural origin represent a natural tendency which is studied in all the countries, with an advanced horticulture. The limitation of wastage, produced at storaged apples, because of the before mentioned reasons, was possible first because of the prevented fighting fitosanitare measures for pathogen in yards, which can partially go on their action in storages and second, as the result of the post harvest treatmenet planned before their introduction in cells. From a fitopatological point of view, the major cause of storage deseases, including the apple is represented by the technology applied in fruit growing and by the weather conditions of that year.*

Rezumat. *Cercetările abordează problema degradărilor patologice care se manifestă în depozite, la fructele de măr, urmând să caute soluții ecologice pentru limitarea pierderilor care se produc. Procedeele de prevenire care includ şi tratamentele post-recoltă cu substanțe bioactive de origine naturală constituie o tendință actuală, care este studiată în toate țările cu o horticultură avansată. Din perspectivă fitopatologică, cauza majoră a bolilor de depozit, inclusiv la fructele de măr, o constituie tehnologia aplicată în plantația pomicolă, dar şi condițiile climatice specifice din anul respectiv*

MATERIAL AND METHOD

The teaching aid on the 3rd year of study is represented by specific varieties, belonging to Idared apple type from 7 Fruit-Growing Ranch on the Station of research and fruit growing development Iasi, during the period of keeping. We have to remark that because of the retrocession. Fruit growing ranch lost almost 27 hectares, surface planted with other two types of apples Golden delicious and Starkrimson.

That why I go on studing only Idared type. At the studied fruits I applied before the getting in, 2 treatments of calciu chloride in 1% concentration (between 22-29 of september) treatements being made between a spell of one week.

On October 2006 we harvested manually the apple fruits from the organized experiment. The harvesting of the peduncle fruits was made according to STAS, avoiding their wrenching, striking or hurting. They were packed in pallet boxes that were transported to the frigorific preservation storehouse at Sârca – county Iaşi.

Here on October 13th, to each species we applied four variants of treatment as follows:

Variant 1: fruits treated with calcium chloride (the orchard unchanged variant).

Variant 2: fruits treated with calcium chloride + treatment with suspension of volatile oils obtained from Savory

Variant 3: fruits treated with calcium chloride + treatment with suspension of volatile oils obtained from sweet basil.

Variant 4 fruits treated with calcium chloride + treatment with watery solution of horseradish in concentration of 10%.

Variant 5: (control) fruits that were not treated after harvesting.

The treatment were made by fine spraying on the surface of apples using a suspension of volatile oils of savory and sweet basil dispersed with a special pump.

The suspensions containing about 60% volatile oils were freshly extracted from savory and sweet basil by the method of distillation through water vapors stimulation.

All variants were stored in a frigorific cell where we insured the temperature of $2^{o}C$, a relatively high humidity (of 90-95%), and the air circulation allowed a speed of at least 0,25 m/s at a recirculation coefficient of 30 recirculation per hour (abiding by the conditions recommended by STAS).

The analyses and observations from laboratory were effectuated in the months October, November, December, January, and March.

RESULTS AND DISCUSSIONS

In October (tab. 1) remarked a differentiation between the trait variants ant control variant, concerning the numbers of pathogens and their rankness.

In November (tab. 2) much more reduced values of pathogens observes at Idared $CaCl_2$ and Idared $CaCl_2$+ susp. oil vol. Savory.

In December (tab. 3) pathogen`s attack is quite, particularly of the control variants.

In the middle of storage (tab. 4) is detects an expansion a pathogen`s numbers, never short at traits variants of control variants.

Finally, unto finish period of storage (tab. 5), observed a reduction a pathogens attack cause of treatments, in proportion as 50% for some pathogens.

Table nr. 1

Pathogens avaible in apple - **OCTOBRE 2006**

Pathogens	Idared control			Idared Ca Cl_2		
	F%	I%	Gd%	F%	I%	Gd%
Podosphaera leucotricha	100	6,48	6,48	94	5,92	2,80
Venturia inaequalis	100	5,12	5,12	80	5	3,4
Botrytis cinerea	12	2,33	0,28	-	-	-

Table nr. 2

Pathogens avaible in apple - **NOVEMBER 2006**

Pathogens	Idared control			Idared Ca Cl_2			Idared $CaCl_2$+ susp. oil vol. savory			Idared $CaCl_2$+ susp. oil vol. sweet basil		
	F%	I%	G%	F%	I%	G%	F%	I%	G%	F%	I%	G%
Venturia inaequalis	100	3,5	3,5	88	5,58	4,2	88	6,17	5,68	96	6,63	5,04
Podosphaera leucotricha	100	6,88	6,88	98	6,2	3,6	98	5,59	4,92	100	6,3	6,3
Botrytis cinerea	21	2,5	0,89	13	1,2	0,04	14	2,14	2,56	15	3,53	1,84
Alternaria tenuis	40	2,6	1,04	28	2	0,56	14	2,1	1,6	24	3,2	1,26

Table nr. 3

Pathogens avaible in apple - **DECEMBRE 2006**

Pathogens	Idared control			Idared Ca Cl_2			Idared Ca Cl_2+ susp. oil vol. savory			Idared Ca Cl_2+ susp. oil vol. sweet basil			Idared Ca Cl_2+ sol. horseradish		
	F%	I%	G%	F%	I%	G%	F%	I%	G%	F%	I%	G%	F%	I%	G%
Venturia inaequalis	100	8,5	6,2	92	3,6	2,4	86	6,8	6,32	86	6,31	5,4	92	6,39	5,7
Podosphaera leucotricha	100	7,12	7,12	100	6,3	6,3	100	7,18	7,18	100	6,5	6,5	100	6,9	6,9
Botrytis cinerea	40	4,8	2,89	32	2,89	1,46	38	3,58	2,56	40	1,89	1,68	42	3,60	2,53
Alternaria tenuis	56	5,7	3,60	38	3,2	1,78	40	3,8	2,66	45	2,8	1,80	55	3,84	2,80
Gloeosporium fructigenum	2	1,22	0,2	3	1,67	0,23	-	-	-	-	-	-	-	-	-
Penicillium expansum	18	5,4	1,7	5	2,56	1,22	-	-	-	-	-	-	6	4,32	0.66

Table nr. 4

Pathogens avaible in apple - **JANUARY 2007**

Pathogens	Idared control			Idared Ca Cl_2			Idared Ca Cl_2+ susp. oil vol. savory			Idared Ca Cl_2+ susp. oil vol. sweet basil			Idared Ca Cl_2+ sol. horseradish		
	F%	I%	G%	F%	I%	G%	F%	I%	G%	F%	I%	G%	F%	I%	G%
Venturia inaequalis	100	9,60	9,60	98	4,33	2,91	98	7,24	6,64	98	6,55	5,9	99	6,8	6,56
Podosphaera leucotricha	100	9,80	9,80	100	6,90	6,90	100	8,48	8,48	100	7,6	7,6	100	7,4	7,4
Botrytis cinerea	66	5,48	3,87	45	3,9	2,88	26	2,4	0,88	48	3,45	2,43	68	3,14	2,56
Alternaria tenuis	70	6,78	4,63	67	4,63	3,54	58	2,87	2,06	64	3,98	2,78	72	3,67	3,21
Gloeosporium fructigenum	18	5,46	3,89	11	3,5	2,11	14	2,13	1,65	16	2,86	1,72	6	14	0,56
Penicillium expansum	21	2,42	1,8	4	3,7	2,6	12	4,2	2,87	-	-	-	6	8	0,23

Table nr. 5

Pathogens avaible in apple - **MARCH 2007**

Pathogens	Idared control			Idared Ca Cl_2			Idared Ca Cl_2+ susp. oil vol. savory			Idared Ca Cl_2+ susp. oil vol. sweet basil			Idared Ca Cl_2+ sol. horseradish		
	F%	I%	G%	F%	I%	G%	F%	I%	G%	F%	I%	G %	F%	I%	G%
Venturia inaequalis	100	9,88	9,88	100	6,23	6,23	100	7,88	7,88	100	7,12	7,12	100	7,48	7,48
Podosphaera leucotricha	100	11,6	11,6	100	8,96	8,96	100	9,43	9,43	100	12,67	12,67	100	12,45	12,45
Botrytis cinerea	68	5,8	4,14	54	2,5	2,04	48	2,13	1,56	52	3,78	1,89	72	4,8	3,2
Alternaria tenuis	74	6,85	4,89	71	4,67	3,12	66	5,21	3,12	70	4,12	3,34	78	4,67	2,76
Gloeosporium fructigenum	21	6,1	4,5	15	3,4	1,9	17	2,66	1,80	19	4,17	2,14	10	2,16	1,44
Penicillium expansum	23	3,1	2,6	8	3,82	2,17	14	2,8	1,02	3	2,4	2,01	9	5	1,05
Rhizophus stolonifer	43	4,67	2,53	21	4,2	1,85	9	6,4	0,23	32	2,89	1,21	17	3,14	1,87

CONCLUSIONS

Matter of the behaviour of studied fruits against pathogens we can say that all the treated types, with few exceptions, present a better resistence against the pathogens, comparing with control variant. At the treated fruits not only the values of parameters which reflect the pathogens attack were lower (frequency, strenght, degree of attack) but even a 1 or 2 month retardation of storage deseases appearance was found out, therefore:

- with 1 month at Idared type using $CaCl_2$ + suspension of savory essential oil against Gloeosporium fructigenum and Penicillium expansum pathogen ;
- with 2 months at Idared type using $CaCl_2$ + suspension of sweet basil essential oil against Penicillium expansum pathogen ;

At the end of conservation period an intensity of Podosphaera leucotricha attack was found out, more intense at the variant treated with horseradish solution.

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NON-DESTRUCTIVE METHODS TO EVALUATE THE PHYSICAL-CHEMICAL PROPERTIES OF FRUITS AND VEGETABLES

METODE NEDISTRUCTIVE PENTRU EVALUAREA PROPRIETĂȚILOR FIZICE ŞI CHIMICE A FRUCTELOR ŞI LEGUMELOR

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Abstract. *The mechanization, automation and IT adaptation of the machines and installations for sorting / calibration of vegetables and fruits asked for the inclusion in the specific conditioning flow of some OPISCAN devices able to appreciate the shape, weight, colour, specific warmth, elasticity and firmness of the products that are on the conveyor's belt.*

Complex IT programmes allow, on account of the primary data, to identify and separate (sort) the products by species, maturation degree, covering colour, size, weight or other criteria so as to insure a commercial uniformity.

Rezumat. *Mecanizarea, automatizarea şi informatizarea maşinilor sau instalațiilor de sortare/calibrare pentru legume şi fructe a impus includerea pe fluxul de condiționare specific a unor dispozitive OPISCAN în măsură să aprecieze forma, greutatea, culoarea, căldura specifică, elasticitatea şi fermitatea produselor care se află pe banda transportoare.*

Programe informatice complexe permit pe baza datelor primare să identifice şi să separe (sorteze) produsele pe specii, soiuri, grad de maturare, culoare acoperitoare, mărime, greutate sau alte criterii, în vederea asigurării unei uniformități comerciale.

To appreciate the quality of fruits they use visual and analytical criteria. While the criteria of the visual type (shape, size, color, noticing of certain flaws etc) are non-destructive, the destructive analytical criteria appeal to methods that imply the mincing, boiling and filtering so as to determine the contents of soluble sugars and starch, acidity and firmness etc.

At present the non-destructive methods become more and more spread. The non-destructive control of the internal quality may be used to determine operatively the samples on the valorization flow of products, to appreciate their quality at delivery or to evaluate some technologies in process of homologation. A use that has already asserted itself is the non-destructive determination of the sugar contents especially on the English market (in France, Italy, Spain, Great Britain and Israel). The Great Britain is mentioned for its significant investments in this field focusing on the trading of the high quality products, first of those with an advanced state of ripening.

The NIR check up for the firmness of mature fruits (kiwi, avocado, mango etc) makes possible the valorization at a maximum extent of the sugar contents and aims at an applicability in numerous domains (gluten determination, fodder quality, pharmaceutical industry, oil industry, plastics).

Bourgeois, Hellene (2002) highlights the possibilities of NIR (Near Infra Red = spectrometry in near infrared) to measure rapidly and non-destructively the sugar contents of fruits. The method is already an instrument adapted at the conditioning mechanical / electronic flow and functions in real time (instantaneous determination with an instantaneous data processing). There are also portable systems that allow determination on plantations so as to evaluate the culture technologies, the harvest date, the maturity state of the fruits preserved and the moment of their marketing. It is fit for the fruits with a thin epicarp (apples, pears, grapes, peaches, some melons) and applies more difficultly to those with a thick skin (2).

Vaysse, P. (2002) notices that a device of recent conception, meurtimeter measures the sensitivity to fruit damaging registering the percentage of fruits damaged (meurtris) after they were submitted to a fall from certain heights precisely established.

An instrument for testing the calibration installations is the instrumental sphere that registers shocks in three dimensions to which fruits are submitted during conditioning. The sphere PMS 60 (a compression) made from deformable rubber has a silicone oven that measures the sums of the forces to which it is submitted. The values are stored in the internal memory and are unloaded as some information (values expressed in Newton = $kg/m/s^2$) in the terminal of a computer. After initiating and launching of measuring, the sphere is put on the bottom of a packing in the absolute similar conditions to any fruit of its dimensions. They may determine in this way the critical points that may cause mechanical deteriorations in fruits in the three phases of a transport (loading, transport, storage) (21).

Costa, G. and collab. (2004) elaborated a NIRS calibration model based on determination effectuated beforehand that were correlated with the values of absorbance at a certain specific wave length for two apricot breeds Bergarouge and Goldrich. They noticed that the soluble dry substance (^{0}Bx), firmness (kg/cm^2) and dry extract (%) could be anticipated (indirectly evaluated) with a standard deviation acceptable as compared to the real values (5).

Kim and collab. (2005) used fluorescence induced in a multi-spectral manner to determine the contamination of apples with certain pollutants. They could identify a significant result in the aspect of 690 nm, where there is a difference between the uncontaminated samples and the contaminated ones (12).

Wulf, J. S. and collab. (2005) used the spectroscopy of fluorescence induced by laser (LIFS) as a non-destructive determination to establish the changes of the pigments contents from apples and carrots. The samples were excited by short laser pulses emitted at 337 nm and registered as spectral fluorescence directly on the surface of products at wave lengths between 350 and 820 nm.(25).

In parallel they measured the polyphenols contents of apples by liquid-chromatography of high performance. They noticed that the intensity modifications of the fluorescence in the range of wave length blue-green may be attributed to the variations in polyphenolic contents of fruits. The degradation of chlorophyll becomes also visible during storage in the red fluorescence of apple fruits (25).

Johnson D. S. and collab. (2005) tested the possibility of use of some acoustic determinations to evaluate the firmness of apples. They used apple samples different in texture and manner of conservation in various ways coming from two cultivars. The acoustic firmness was measured using an AFS unit (AWETA BV) in parallel with a penetrometer Lloyd LRX specifically adjusted. The measurements were made for three times.

For Cox there is a good relation between the penetrometric readings and the sensorial values (crispiness) and a less good correlation for Gala. At Cox there was a strong correlation between the acoustic firmness and the penetrometric readings and no correlation for Gala. The increase of the humidity losses at the Cox apples determined the increase of the sensorial values for crispiness and firmness but the index of acoustic firmness showed an opposite trend indicating that the turgidity of tissues is a contradictory factor in the acoustic measuring of the apple firmness (11).

Landahl, S. and collab. (2005) consider that the product texture may be evaluated as the elastic properties of tissues and firmness. The authors want to demonstrate the possibility of some technical non-destructive devices of impulse – acoustic response to determine the internal flaws of apples and the acoustic techniques if they depend on the biochemical changes from the cell walls in apples.

The apples were treated with microwaves to obtain fruits with internal flaws. They were measured by the classical lab equipment and the acoustic technique of impulse- response and the results were compared before and after the microwave treatment. With the classical equipment they did not find any differences between the treated and untreated fruits with microwaves. By the acoustic technique of impulse- response they found very significant differences between the untreated fruits and the ones treated with microwaves (13).

Eccher Zerbini, P. and collab (2005) In a preliminary testing of nectarines, the absorption coefficient at 670 nm measured at harvest was correlated with the fruit maturity and the softening after harvest. The purpose of the research was to model by TRS measured in harvest, the softening of nectarines during valorization. The softening during valorization after the cold keeping was modeled by a non-linear regression following a logistic model depending on the absorbance at 670 nm at harvest and in the period with 20^0C (R^2=0,85). The results of the previous tests ere confirmed integrally. Using this model and absorbance at 670 nm at harvest, it is possible to pre-eliminate the softening rate at 20^0C of the fruits studied necessary for a better trading (7).

Echeverria, G and collab. (2005) evaluated for the Fuji apples the effects of different storage conditions, the storage duration and valorization by measuring the production of volatile substances, tests of sensorial acceptability and determinations with an „electronic nose". The production of volatile substances was measured by means of a chromatograph gas and alternatively with an „electronic nose" and the acceptability of apples was measured by specific means (8). The PCA (Principal Component Analysis) model contains data for all fruits, at harvest and after storage showing that it is possible to identify fruits recently harvested and after different storage variants. On the other hand PCA on the production of volatile substances, the sensorial acceptability and the EN signals specific to all fruits allow a good differentiation between the fruits stored in the two types of controlled atmosphere with an acceptable variability coefficient (8).

Symoneaux, R. and collab. (2005) – mention that in a previous paper they studied the impact of the harvest date on the quality of apples by taking into consideration the correlations among the acoustic measurements (the coefficient compactness–density) and the sensorial evaluation. The studies were continued in the same manner for the different maturation levels and subsequently completed with the impact of conservation on the apple quality. They effectuated acoustic, sensorial and instrumental measurements on different apple breeds. They confirmed a high correlation between the acoustic measurements and the textural ones. The compactness proved to be a non-destructive parameter good to measure the apple texture. The correlation between the sensorial and instrumental measurements was also studied (18).

Vanoli, M. and collab. (2005) A non-destructive method TRS (Time – Resolved Reflectance) measures separately the two optical properties of absorption and dispersion in the depth of 1-2 cm from the apples pulp. The absorption coefficient measured at 630 nm by TRS evaluates the apple quality at harvest and after storage. The absorption coefficient at 630 nm was significantly higher at the first apples harvested. The apples with a higher absorbance at 630 nm had a less fruit mass as well as a more reduced percentage of colored fruits both at harvest and after storage. The fruits classified as super-maturated by TRS had a more reduced titrable acidity at harvest and higher soluble dry substance after storage. At the sensorial analyses these fruits were significantly sweeter, more flavored and more pleasant. We may conclude that TRS may be used to select apples after their maturation degree and to separate the fruits of different qualities from the same origin (20).

Casalonga, Sabine (2005) presents a prototype of flavor nanocaptor based on individual olfactory receptors called "artificial nose" with applications in security, defense, health and agro-alimentary field. The theoretical support is constituted by the discovery of the olfactory receptors and the great gene family that codify them (R. Axel and Linda Bucek Nobel prize for physiology and medicine in 2004).

By imitating the olfactory system of animals that may identify thousands of smells with a very high sensitivity, the electronic nose may be effective in the agro-alimentary field for the control of quality and food security. The European project SPOT – NOSED developing an olfactory biosensor based on the electrical properties of the specific receptors is functional (3).

Zanella A. and collab. (2005, 2006) study the extent in which the results of the conventional lab analyses correlate with the results of some innovating procedures. They present the robot Pimprenelle that determines automatically (but destructively) weight, the soluble dry substance, pulp firmness, titrable acidity and the juice contents (23).

The non-destructive apples in close infrared regarding the appreciation of transmittance to a sorting line with a higher speed than 4 apples/second (λ= 650-970 nm) by irradiation of the entire fruit, used a source with luminous intensity of 12 x 100W. They noticed that at the NIRS determinations effectuated (firmness and soluble dry substance) the results obtained were comparable and non-differentiated statistically from the classical lab determinations (destructive) (24).

Bargain, Veronique (2006) evaluates the last aspects regarding the non-destructive control of the internal quality of fruits. The producers (Greefa, MAF Roda, Aweta, Sinclair, Sacmi, Sorma – Compac, Setop etc) of sorting – calibration installations managed to inset on the flow models of NIR equipment able to determine the sugar contents, acidity, dry substance, oils, internal scald, vitrescence. (1).

The Setop company specialized in the calibration of melons discovered a new NIR method to determine non-destructively the firmness for melons and water melons. Other producers (Greefa, Sinclair etc) achieved a non-destructive impact method that evaluates products on account of elasticity. The company Aweta homologated a CAF device (Capteur Acoustique de Fermete) that strikes non-destructively the product and listens to the acoustic echo resulted according to firmness, succulence, freshness and internal structure. All the systems enumerated may be installed in line at the calibration installation with an execution speed from 1 to 10 fruits per second (1).

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EXOTIC HORTICULTURAL PRODUCTS FRESH AND PROCESSED TRADED IN IASI

PRODUSE HORTICOLE EXOTICE PROASPETE ŞI PRELUCRATE COMERCIALIZATE ÎN MUNICIPIUL IAŞI

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Abstract. *The offer of fresh fruits and vegetables (in less number) and processed under different forms (stews, juices, nectars, concentrates, sterilized in water or pickle) has been more and more important since 2005 in the important supermarkets from town Iasi. After the accession to the EU, these products become more accessible and diverse as assortment.*

Rezumat. *Oferta de fructe şi de legume (în număr mai mic) proaspete şi procesate sub diferite forme (compoturi, sucuri, nectaruri, concentrate, sterilizate în apă sau saramură etc) se concretizează tot mai importantă încă din anul 2005, la supermarketurile mai importante din raza municipiului Iaşi. După aderarea la UE, aceste produse devin mai accesibile şi mai diverse ca sortiment.*

The presence of the tropical fruits mentioned since old times in the Balkan space and the Romanian one is attested by the oldest documents. It may be understood due to the connections with the south and oriental countries **that were close to us** by origin, the common customs, the numerous intermediary commercial ways, the integrating economical and political sphere that was roman then Byzantine and finally ottoman and Phanariot. The Armenian and Greek tradesmen, the Walachian caravan men, the townsmen of all statuses and origins, the boyars, the great tradesmen or the high clergy were the keepers of a common civilization with unifying features between Orient and Occident, that also had a mutual daily existence in culture, music, clothes and in thinking and food habits.

From the 13th century, the dry fruits called "*fruits"* (**from the imported term "*bacalii*", traded by *bakkâlii* from Orient and Balkans;** from the Arabian word ***baqqal***, comes ***bakkâl*** in Turkish), were sold to be consumed during the fast periods. **Figs, dates, apricots, raisins,** and also plums, pears or other dry fruits were very looked for export items. The Romanian word "***băcănie***", store of foodstuffs has its origin in this term. The toponym Băcani is attested in Ţara Românească since 1493, and the onomastic name Băcanul, since 1583. They mention about "Prăvălii de băcănie" in a document from the archives of the monastery Sf. Apostoli (Ţara Românească, 1614).

A proof of the flowering trade deployed from eat to west is also the assortment of imported fruits that was sold on the market in Cluj in the 16th -17th centuries. A register of the municipality of Cluj registered for almost six decades (1578-1637) the variety, frequency and price of the fruits and vegetables that were

consumed by the foreign guests. **By frequency of appearance** they mention the following products: 16 types of vegetables (onion, radishes, parsley, cabbage, garlic, peas, horseradish, lettuce, red onion, beet, tarragon, melons, water melons, common sage, green garlic, dill), 16 types of fruits (apples, pears, plums, gooseberries, black currants, **almonds**, peanuts, cherries, grapes, peaches, nuts, walnuts, sour cherries, crab apples, wild strawberries), **2 species of imported fruits (*lemons and oranges*),** as well as 11 types of processed products (brine cabbage, vinegar, dry plums, ***raisins***, brandy, pickles, must of grapes, plum wine, aqua vitae, dry pears).

In the 17th century, the traveler ***Paul of Alep*** **(1653)** wrote in his notes: "Here it is the list of gifts given to the Voivode (n.b. Vasile Lupu, Moldavia): two jars of jam, a box of candied fruits, almonds, raisins, dates, apricots, salted and unsalted pistachio nuts."

In the 19th century, olives had on the market in Iasi a price three times bigger than quinces and a lemon cost as much as three quarters of a kilo of pears.

Table 1

Official price of some horticultural products on the markets from Iaşi, in **October 1832**

Product	UM	LV(lei- old currency)	F(farthings)
Cabbage	a hundred	4	-
Nuts	a thousand	2	-
Dry onion	¾ kg	-	16
Beans	¾ kg	-	14
Carrots	¾ kg	-	10
Quinces	¾ kg	1	20
Grapes (fruit)	¾ kg	-	32
Pears	¾ kg	-	24
Apples	¾ kg	-	20
Dry plums	¾ kg	-	16
Plum brandy	10 l	36	-
Marc brandy	10 l	40	-
Fruit brandy	10 l	44	-
Lemons	**pc**	**-**	**12**
Lemon juice	**¾ kg**	**2**	**20**
Olives	**¾ kg**	**3**	**-**
Saffron (ounce)	**ounce**	**2**	**20**

The exotic horticultural products fall into three large groups according to their geographic origin: **horticultural products from the temperate zone** (known), **subtropical and tropical**. We must mention that the majority of the subtropical and tropical products from importation are fruits, the sweet potatoes being the only vegetables (tropical) from this assortment. The subtropical and tropical vegetables are less known. This happens due to the fact that they have a more reduced commercial interest and their perishability.

Among the subtropical frits, the citric fruits are the most known ones. Their nutritional and dietary importance is remarkable.

Lemons- (Citrus limon**,** C.limonia) contain 87% water, their juice contains 17-27% sugars, citric acidity 0,75-1,2 g%, vitamin C 30-50 mg%.

Oranges (C. sinensis) have a juice with 12% sugars at most, citric acidity 1,3-1,5%, vitamin C 50 mg%, the skin has 0,6-1% volatile oil, the albedo (white and thin mesocarp) has 2% proteins, 6% cellulose, 7% reducing sugars and 2% non-reducing ones, 1,3% pectins, 1,2% ash, 0,35% citric acid, 0,15% hesperidins and 0,3% hydro-soluble flavones. They are the raw material for juices, concentrates, crystallized fruits, marmalades (bitter oranges), jams, essences etc.

Grapefruit (C. paradisi) has 90% water, 6% sugars, 1,3% fibers, about 40 mg% vitamin C, 0,2% minerals (potassium, calcium)

Tangerines (**C. reticulata**,) are of two types (mandarins, tangerines), besides **C. unshiu** (clementine and satsuma). They are the raw material for juices, volatile oils, syrup etc.

The citric fruits less consumed are **pomelos** (C. grandis) considered to be a kind of grapefruit, from which they make juice, concentrates, essences etc. **Limes (**C. aurantifolia-green lemons -sour lime) have a juice containing 10-15% sugars and 1-1,5% citric acidity, being processed like oranges though much more difficult.

Olives (Olea europaea subspecia sativa) have their fruit of 2,2-3,7-7,6g and the stone of 0,5-1,2g. The small ones contain 33% oil and the medium-big ones contain 30-28% oil. There are table olives that are pickled green or ripe and olives for oil extraction. The virgin oil is extracted by cold compressing or by heating and the sansa oil is extracted from the remains of the press.

Fresh **figs (Ficus carica)** have about 13,5% sugars, acidity 0,4%, protides about 2%, cellulose almost 3%, minerals 0,8%; they are industrialized in syrup, they are crystallized, turned into jams and are especially dehydrated.

Kiwi (Actinidia sinensis), originating from China, has 75-83% pulp, 10-15% skin and 7-10% seeds – the juice contains 81-87% water, 9-14% reducing sugars and 11-17% total ones, 1,4-2% acidity, 0,5% pectins, 0,4/ fibers, 0,6% minerals. In New Zeeland they produce syrups, frozen pulp and purée and the so-called kiwi wine with 8,5% vol. alcohol.

Pistachio (Pistacia vera) the fruit is a drupe with skin and core. The core has two flashy greenish perfumed cotyledons with 40-45% starch and 30-35% oil very sensitive to oxidation. It is dehydrated, salted and fried after decortication.

Fizalis (Physalis peruviana) is afruit related to tomatoes rich in vitamin C and carotene.

Carobs (Ceratonia siliqua) from the fam. Fabacee (leguminosae) have a pod 10-20 cm long and 2 cm wide, with 5-10 seeds, the pod pulp is very sweet), and the seeds contain a jelly. From carobs they make cacao substitutes (Karub, Karob) and alcoholic macerates for the preparation of bonificators in the recipes of fine distilled drinks.

Pomegranates (Punica granatum), fizalis (Physalis peruviana), **kumquats** (**Fortunella**- ovoid citric fruits) and **limequats** (**hybrids Citrus × Fortunella**) were also present in the offer from Iasi.

Tropical fruits:

Bananas (Musa sapientum). They consider fruits only the very sweet bananas that have 22-25 % glucides, 1-1,8% protides, 0,7- 1,5 % minerals, fibers 5,2 %.
The others called *plantains* (cooking bananas) are used as vegetables in the originating countries.

Avocado (Perseea gratisima) has about 1400 kcal/Kg, being more caloric than potato. It has 76% water, about 2% protides, under 1% sugars, over 14% lipids from which 9% monounsaturated and 2% polyunsaturated, minerals over 0,5% (potassium, phosphor, magnesium, calcium, iron), beta carotene 0,2 mg%, vitamin C 11 mg%, other vitamins E 2 mg%, PP has 2 mg%, group B in a higher proportion than other products.

Pineapple (Ananas comosus), originating from Paraguay, spread in the entire Latin America even since the 15th century, and subsequently in all the tropical counties with a humid climate. The spherical long fruit may reach to 3-4 kg (normal 1,5-2 kg) it is consumed fresh or processed (pieces in syrup, juice, concentrated juice). The natural juice has between 13-17 ^{0}Bx, 115-155 g sugar/ liter and 1,0-1,3 g% citric acidity.

Coconuts (Cocos nucifera) have a coconut milk 95% water, 0,7% protides, 4% sugars and 0,4% minerals. The fresh core has 46-50% water 36-39% lipids, 3-4% protides, 3-5% glucides, 2-4% fibers, 4, 3% minerals. From the oily core they extract the copra oil. The coconut milk may be preserved differently but it is less demanded.

Dates (Phoenix dactylifera) are very non-homogenous in contents according to their origin (Sifri - Saudi are the sweetest followed by the Tunisian ones -Deglet-Nour, and the least sweet are Miskani - Saudi and Rhars - Tunisian). They have a humidity of 11-55%, sugars between 42-82%, acidity 0,3-1%, fibers 15-17% (there are dates with only 5% fibers, such as Deglet Nour in Tunisia), protides 1,5-2%, minerals 1,2-2%.

Mango (Mangifera indica) has 80% water, 13-17% reducing sugars and 18-19% total ones, 0,5-0,8% acidity, fibers 1-5%, minerals 0,5%. The fresh fruit has 78% pulp and contains ascorbic acid 40-50 mg% and carotene over 3 mg%. It is processed as stew, crystallized fruits, dehydrated fruits, jams, syrup, and preserved pulps.

Papaya (Carica papaya) the fruit has 70-75% pulp, 15% skin and seeds, a humidity of 86-89%, 7-10% sugars, 2% fibers, 0,6% acidity, 0,6% proteins, 0,6% minerals. From papaya they make purées and pulps and from the latex of the fruits vegetable pepsin, a natural enzyme holoproteidical and protheolitical.

Maracuja (Passiflora edulis) (named after the shape of the flower of the passion fruit in the religious meaning)**,** has a humidity of 81%, sugars 10%, starch 1%, acidity 3-4%, minerals 0,5%. From the fruits they make juices and concentrates.

Opuntia (Opuntia ficus indica) named also Barbaria figs (in France) or Nopal (in Mexico). The pulp contains 83% humidity, 13% sugars, 2% pectins, 0,5% acidity, 1,2% protides. It is a raw material for marmalades.

Litchi (Litchi sinensis) has 81-87% humidity, 9-14% reducing sugars and 11-17% total ones, 1,4-2% acidity, 0,5% pectins, 0,4% fibers, 1% protides 0,6% minerals , vit. C only 4 mg%. It is a raw material for stews and juices.

Carambola (Averrhoa carambola), called the star fruit, is succulent, sweet – acid – it is consumed especially in fresh state (unpreserved).

Kiwano (Cucumis metuliferus), **rambutans (Nephelium lappaceum)** and **mangosteens (Garcinia mangostana)** were present in the commercial offer of some supermarkets from Iaşi, to test the customers' interest for them.

The sweet potato (Ipomaea batatas) has 72% humidity, 1,2% proteins, 25% glucides d.c. starch 12% and 11% soluble glucides, 3% fibers, minerals 0,4% (potassium, calcium, phosphor, magnesium), 25 mg% vitamin C and beta-carotene 4 mg%.

Table 2

Offer of subtropical and tropical fruits* Supermarket Billa Iaşi 07 .10.06

	Product	Assortment	Type	UM	Quant	Price	Origin
1	Lemons	subtropical	pro	Kg	1	2,99	Turkey
2	Oranges	subtropical	pro	Kg	1	5,49	Greece
3	Oranges	subtropical	pro	Kg	1	5,99	RSA
4	Tangerines	subtropical	pro	Kg	1	4,99	Turkey
5	Lime	subtropical	pro	pc	1	1,79	South Africa
6	Kiwi	subtropical	pro	Kg	1	11,99	Chile
7	Bananas	tropical	pro	Kg	1	2,99	Ecuador
8	Coconuts	tropical	pro	pc	1	2,49	Ivory Coast
9	Pineapple	tropical	pro	pc	1	8,99	Costa Rica
10	Mango	tropical	pro	pc	1	6,90	Brazil
11	Avocado	tropical	pro	pc	1	5,99	Israel
12	Figs	subtropical	dry	g	250	4,99	Turkey
13	Dates	subtropical	dry	g	200	2,59	Iran
14	Dates	subtropical	dry	g	220	1,99	Iran (IRI)
15	Pineapple stew	tropical	ind	g	565	1,59	Thailand
16	Pineapple stew	tropical	ind	g	565	2,39	Thailand
17	Pineapple stew	tropical	ind	g	565	2,45	Indonesia
18	Pineapple stew	tropical	ind	g	500	2,49	Thailand
19	Pineapple stew	tropical	ind	g	565	2,69	Thailand
20	Pineapple stew	tropical	ind	g	565	2,79	Thailand
21	Tangerine stew	subtropical	ind	g	314	1,99	Thailand
	Product	**Assortment**	**Type**	**UM**	**Quant**	**Price**	**Origin**
	Jonathan apples	temperate clim	pro	Kg	1	1,69	Romania
	Cucumbers	temperate clim	pro	Kg	1	1,99	Romania
	Green peppers	temperate clim	pro	Kg	1	2,59	Romania
	Potatoes	temperate clim	pro	Kg	1	1,09	Romania

*we did not include olives or the juices-nectars from tropical-subtropical fruits

Table 3

Offer of subtropical and tropical fruits cash &carry Selgros Iaşi 11.04.2007

Product	Assortment	Packing	Quantity	Price RON	Origin country
Stew					
Lyches	tropical	Box	580 g	5,30	Germany
Pineapple pieces	tropical	Box	420-640 g	1,6-6,4	Thailand, Germany, England, Slovenia, Czech republic
Papaya	tropical	Box	440-580 g	2,2-5,8	Germany
Kiwi	subtropical	Box			Germany
Tangerines	subtropical	Box			Germany
Dehydrated					
Figs	subtropical	bags	200-400 g	2,2-7,2	Turkey
Dates	tropical	bags			
Pineapple discs	tropical	casserole	500 g		
Fresh fruits					
Coconut	tropical	wholesale		16,5	South Africa
Bananas	tropical	wholesale		4,15	
Papaya	tropical	case	5 kg		Brazil
Cactus fruits	tropical	case	5 kg		South Africa
Hysalis		casserole	200 g	5,34	Columbia
Limaequats	tropical	casserole	150-200 g		Israel/Peru
Kumquats	tropical	casserole	150-200 g		Israel
Passion fruit	tropical	casserole	150-200 g		Columbia, Zimbabwe, South Africa
Pineapple	tropical	Bags with one fruit	about 800 g	5,43	Costa Rica
Avocado	tropical	Casserole with 4 fruits	about 250 g	2,61	Israel
Lemons	subtropical	case	1 kg	2,2	Turkey
Oranges	subtropical	Case, plastic bags	10 kg, 3 kg	2,96	Greece
Pomelo	subtropical	Bags with one fruit	1 pc	9,5	Israel, China
Grapefruit	subtropical	case	kg	3,2	Turkey
Clementine	subtropical	case	10 kg		Spain, Italy
Kiwi	subtropical	case	1 kg	4,75	Italy
Temperate fruits					
Strawberry stew	temperate	Box	400	58	Germany
Dehydrated apricots		Bags, casseroles	200-400 g	30-70	Romania
Dehydrated plums					

Table 4

World production of fruits with the 25 most important species (FAO data 2005)

Total Fruits	Temperate Zone	. tons	Place	Subtropical	Mil tons	Place	Tropical	Mil. tons	Place
Place 1-4	**Grapes**	65,6	**2**	**Oranges**	59,7	**3**	**Bananas**		**1**
	Apples	59,4	**4**						
257,2 (51%)		125,0	24,8 %		59,7	11,8 %		72,5	14,4 %
	Pears	19,5	**6**	**Olives**	14,4	**9**	**Mango**	28,2	**5**
	Peaches	15,8	**8**	**Lemons**	12,7	**10**	**Pineapple**	16,8	**7**
	Plums	9,5	**11**	**Dates**	6,9	**12**	**Papaya**	6,8	**13**
	Strawberries	3,6	**15**	**Grape fruit**	3,7	**14**	**Avocado**	3,2	**16**
	Apricots	2,8	**17**	**Kiwi**	1,1	**24**	**Persimmon**	2,6	**18**
	Cherries	1,8	**19**	**Figs**	1,1	**25**	**Anacardium**	1,7	**20**
	Almonds	1,6	**21**						
	Nuts	1,5	**22**						
	Sour cherries	1,2	**23**						
Place 5-25 156,5 (31%)		57,3	11,3 %		39,9	7,9 %		59,3	11,7 %
Place 1-25 413,7 (82%)		182,3	36,1 %		99,6	19,7 %		131,8	26,1 %
Unimportant fruits 91,3 (18%)	Raspberries, quinces, black currants etc. Temperate fruits unspecified (minor)			Pistachio, subtropical fruits unspecified (minor)			Tropical fruits unspecified (minor)		
505,0 (100%)									

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CONCENTRATION OF FRUIT JUICES

CONCENTRATUL DIN SUCURI DE FRUCTE

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Abstract: *The fruits are much appreciated for thei high content of vitamins and essential microelements, substances that have stimulating and restful effect upon human body. Preserving them like natural pasteurized juices or better concentrated juices, is the way the human body receives the essential substances, especially during the winter season, which assure its metabiological and physiological equilibru. Starting from this reason, modern technologies and also good practices are used during processing in order to obtain this kind of finished products without chemical or microbiological risk of contamination on.*

Rezumat: *Fructele sunt foarte apreciate pentru conținutul lor în vitamine şi microelemente esențiale, substanțe care au efect benefic asupra organismului uman. Prin conservarea lor ca suc pasteurizat sau suc concentrat, le putem consuma, mai ales în timpul iernii, asigurând astfel un echilibru metabolic şi fiziologic. Pornind de la acest motiv, se folosesc în prezent tehnologii moderne de prelucrarea fructelor prin care se obțin produse naturale, necontaminate chimic sau microbiologic.*

Concentration is a method largely used in the juice conservation, well purified and filtered that will reduce their volume by 5-6 times what diminishes considerably the packing and transport costs etc.

The modern installations may make the juice concentration by 7 times at most the initial concentration. In these conditions juices with soluble dry substance of about 10^0 refractometric may be concentrated up to 70^0 refractometric, a concentration where the activity of microorganisms is inhibited.

Nowadays there is the tendency to give up the advanced concentration of juices that need a big energy consumption and influence negatively the product quality achieving a concentration up to $40 - 45^0$ refractometric, applying the following as a supplementary conservation procedure: chemical conservation, aseptic conservation and packing.

Concentration may be made by several methods: evaporation, freezing, reverse osmosis and ultra filtration.

For the apple juice by evaporating 10, 20 or 30 % form the juice they may obtain in the flavor concentrate 60, 85 or 90 % from the flavor substances of juice.

As for other fruits the percentage of juice evaporated is 20 % for raspberries, blackberries, strawberries; 25 % for sour cherries; 20-30 % for black currants and bilberries.

The recuperation of flavors from the fruit juices bases on their solubility in water and their volatility.

Concentration is made for a contents of dry substance of 30-50 (65) % the technical procedures used in the concentration technology being thermal concentration, criocentration (with phase change) and reverse osmosis (without phase change).

According to the process continuity, concentration may be discontinuous or continuous and according to work pressure - normal or low - vacuum.

Concentration by reverse osmosis

Osmosis is a physical phenomenon that insures the turgescence of live cells and allows the exchange of substances by means of the semi-permeable membranes (plasmallema, tonoplast). Osmosis is a reversible phenomenon.

If upon the concentrated solution they exercise from the exterior a pressure superior to the osmotic pressure, the water from the concentrated solution goes in the diluted solution and a phenomenon of reverse osmosis takes place.

This concentration procedure is used frequently to obtain the concentrated citric juices.

Crioconcentration is the concentration method with a phase change that modifies in a more reduced proportion the chemical or organoleptic nature of the products transformed.

The principle of the procedure is the partial freezing of the water from product and the separation of the ice crystals from the concentrated product. The watery solutions frozen at temperatures the lower the more concentrated (the phenomenon of colligation).

The separation of crystals triggers by inclusion or adhesion a part of the concentrate too. A good separation is made only by centrifugation, pressing, washing-purification or by combination of these procedures. The cooling may be direct or indirect, preferring the former one that consumes less energy. In spite of al these, most of the installations from the food industry use the indirect cooling, being equipped with devices to remove the isolating ice layer deposited on the cooling elements. They concentrate through this procedure especially the orange juice and certain wines, in apparata called crystallizers, the latent warmth of solidification being taken over by a tambour. Inside it the cooling agent circulates, and on the outside the ice crystals are formed that are removed by scraping. The most known crioconcentrators are the installations: Linde-Krause, Votator and Daubron.

At the centrifugal systems, they pursue the formation of spherical crystals, uniform and big enough that do not adhere to the cooling device. The thermal-concentration consists in the evaporation of the water from the fruit juice by continuous boiling being the most spread procedure of concentration at world level. It may be achieved by three temperature stages (10-25^{0}C, 40-100^{0}C, 115-130^{0}C).

Among the thermal-concentration installations we mention:

-evaporator with a warming coat

-plate evaporator (eg. Installation Paravap)

-mechanically made film evaporator (eg. installations Rotofilm, Centritherm)

- concentration installations with double effect (eg. Manzini, Lang, Rossi-Catelli)

- triple effect installations (eg Wiegand, Unipektin, Stork, Luwa).

The concentration with simple effect is made in vacuum concentrators. Its functioning is discontinuous. The steam evacuated is condensed by means of a barometrical column in the barometrical condenser. The concentration with multiple effect is made in installations with two or three stages where the steam come from the first stage serves to warm the following stage(s). The energetic effectiveness is clearly superior and the water consumption is reduced. The product goes through the concentration stages, arriving to the concentration wanted in the final stage that has also the lowest temperature.

The aggregates with thermal-compression reuse the steam exhausted, compressing it up to the technological parameters necessary to reintroduce it in the retrace. They achieve an economy of the steam consumed. The procedure is most effectively used in combination with the multiple efect.

The installations with multiple efect may function both directly and in inverse current.

The method the most used on industrial level is the concentration by evaporation, the installations used being of the type Alfa–Laval, Schmidt, Manzini with double and triple effect to reduce consumption of utilities and the ultra fast concentration to insure the maintenance of the product quality.

Due to the fact that the volume of juice submitted to concentration decreases once with concentration, the more stages the installations has, the more concentrated the final product will be.

In our country the most spread concentration installation, used especially to obtain concentrated musts is the installation of the type IMUC , with double or triple effect and compression .

The concentration installation of the type IMUC is a continuous installation with double effect that meets the requirements of modern concentration techniques. The circulation diagram: inverse current. It is used generally for the concentration of products with high viscosity and heat sensitive.

The concentration installation IMUC has the following advantages:

- concentrates effectively the products with high viscosity

- the difference of temperature between the thermal agent and product may be easily controlled so the quantity of heat transferred by surface unit is high

- the total coefficient of transfer is high: 1850-1900 W/mpK.

- the duration of contact of product with the hot surface is very short, several seconds, so despite the entire recirculation, the total time of concentration is reduced

- continuous process completely automated.

Concentration installation with triple effect and thermal-compression of the type IMUC

The concentration diagram applied in the installation with triple effect and thermal-compression has its use in the case of high debits that by the economy of thermal agent and cooling water covers the plus of investments.
The particularities of these installations are: the pellicle multitubular evaporator with descendant pellicle achieved by free flow; the circulation of fluids is in parallel current, the thermal-compression is used in the first effect.

The functioning of the installation is automated and comprises:

- the product feeding in each evaporation body, with water in the mixing condenser and obviously, the heat carrier feeding. The feeding is made by means of the pneumatic valves.

- adjustment and the registration of the concentration degree of the finite product by means of the electronic refractometer

- electronic registration of the important work temperatures

- security devices: for a minimum and maximum level of product, by the vacuum in installation or the degree of concentration

- pneumatic regulators with proportional and integral action

- centralized switchboard.

The installation of concentration with triple effect also has other advantages such as: insures the maximum of economy of hear carrier due to the functioning in triple effect with thermal-compression, a reduced consumption of water, the cooling of product up to 7^0C, simple functioning and exploitation.

Among the modern installations of concentration of the grapes must produced by companies from EU, we mention the installation Concentramatic, produced by the company DEFRANCESCHI – the must is concentrated by water evaporation under vacuum at 20 degrees Celsius. The sugar losses in the evaporated water are very small, more than that the organolpetic features and the particular flavors are not altered due to the low temperatures to which the process takes place.

Another company producing such installations is represented by DELLA TOFFOLA – the concentration installation has a system of two or more effects and the concentration is made by means of steam.

The vacuum evaporator, ideal for must concentration in a system with low temperature under vacuum, has an output of 30 lt/h.

In USA, in the opinion of specialists from the company APV ANHYDRO, Towanda, NY, the most used concentration installations are the ones with triple effect or even quadruple with thermal-compressor being preferred the evaporators with descendant film.

In essence, the installation is made of a plate heat exchanger and with separating cyclone. By means of a pump, the liquid comes into the plate exchanger where a rapid heating takes place followed by the evaporation of a part in the water contained.

The biphasic fluid (mixture liquid-steam) from the plate heat exchanger passes into a separation cyclone that work under vacuum the separation of the two phases taking place: the liquid concentrated and the water steam.

The plate installations achieve a high heat transfer due to the big temperature difference between product and thermal agent on one side and on the other side due to the optimum construction of plates that favor the formation of rotatory currents on the corrugated surface of these.

Due to the high temperature during concentration they may also insure the sterilization of the finite product Consequently, if before concentration the installation was washed and disinfected correctly, the concentrate may be packed directly in septic conditions insuring a good conservation.

Most of the concentration installations are equipped with flavor recuperators.

The degree of concentration of the flavor substances is expressed by a ration having at nominator the quantity of fresh juice from which they obtain 1 kg of flavor concentrate. This is between 1/60 and 1/200 the most encountered being of 1/100 depending on product and the flavor recuperation installation.

The most encountered flavor recuperation procedures are either partial condensation or distillation. Compared to the first procedure, distillation insures a better flavor recuperation, but it has the disadvantage of the high cost of the steam used in the functioning of the distillation columns. This is why the company APV ANHYDRO, Towanda, NY proceeded to the combination of these procedures by incorporation of a distillation column in the concentration installation. The method present son one hand the advantage of diminished functioning costs due to the use of the same steam source both for the functioning of the distillation column and of the evaporator; on the other hand it has an obvious easiness in exploitation.

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THE ASSESSMENT OF PHISICO-CHEMICAL CHARACTERISTICS SOME ANTRADITIONALE OILS TYPES

APRECIEREA CARACTERISTICILOR FIZICO-CHIMICE A UNOR TIPURI DE ULEIURI NETRADIȚIONALE

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Abstract. *As present interes in alimentary industry is about processing prime materials ike : plum, apricot, peach core frut for obtain high quality edible oil with a large value [2,3].*

This oils was obtain in laboratory with Sox let equipment by stone fruit extraction. The oil ether was used like solvent and calico chloride anhydrous was used for distillation of solvent and for oils drying.

In this work were determinate physic-chemicals characteristics of some antraditional oils types like: acid value of acidity, saponification iodine value, peroxide value and iodine color. Was analyzed a lot of Bant's edible oil types by plum, apricot and peach.

Rezumat. *În industria alimentară a apărut tot mai mult ideea de valorificare a unor potențiale materii prime cum ar fi sâmburii rezultați în urma procesării unor fructe: prune, caise şi piersici, în vederea obținerii unor uleiuri vegetale comestibile, de calitate şi cu valoare alimentară mare.*

Uleiurile s-au obținut în laborator, prin extracția miezului din sâmburi cu ajutorul aparatului Soxhlet, utilizând ca solvent eterul de petrol, apoi s-a trecut la distilarea solventului şi uscarea uleiurilor pe clorură de calciu anhidră.

În această lucrare s-au determinat principalele caracteristici fizico-chimice a uleiurilor obținute: indicele de aciditate, de saponificare, de iod, de peroxid si culoarea de iod. Au fost analizate probe de ulei obținut din sâmburi de prune, caise şi piersici recoltați din zona Banatului.

MATERIAL AND METHOD

Phisico-chemical thechniques of oil

The determination of acidity value, sample acidity, saponification value, iodine value and peroxide value was determinated like in AOAC(1980) standards.

Acidity value determination

Metode description. Acidity value show free acids localization in fatt. Natural fett is neutre, but, in this medium ar forming free acids when is processing or preserving. This acids are determinated by titration with KOH, in alcholic solution.

Acitity value reprezent KOH quantity in mg who are necesary for neutraliation of free fatt acids in one gram of fatt(oil).[1,4,5]

Both determination are used for oils fatt acids quantidy determination and they have a large utilization like control value in processing technology. Betwen the acidity value(A.V.) and free acidity(F.A.) are the relation:

F.A. = 0,5041· A.V. g oleic acid/100g oil

For acidity value determination was used next formula:

$$A.V. = \frac{28 \cdot V \cdot f}{m};$$ [mg KOH/g], where:

V = solution volume of KOH used by titration (ml);
f = 0,8416; solution factor of KOH 0,5N;
m = sample quantity , in gram.

Saponification value determination

Metode description. Saponification value(index Köttstorfer) are determinated experimentaly,in the same way, and represent KOH quantity in mg who is necessary for one gram of fatt(oil) saponification and fatt free acids neutralization. [1,4,5]

For saponification value(S.V.) was used next formula:

$$S.V. = \frac{(V - V_1) \cdot 28{,}o55 \cdot f}{m};$$ [mg KOH/g], where:

V = 11,5ml; solution volume by HCl 0,5N used by titration of referance sample, in ml.
V_1 = solution volume by HCl 0,5N used by titration of sample (ml);
f = 1,1476; solution factor by HCl 0,5N;
m = sample quantity, in gram.

Iodine value determination

Metode description. Iodine value represent iodine quantity who is absorbed by one gram of fatt(oil). In conection with this fact is double connexion who exist in fact acids components structure. The determination of iodine value is quite difficult because iodine have low reactivity, and because the adition don't have a cantitative way. [1,4,5]

For iodine number was used next formula:

$$I.V. = \frac{(V - V_1) \cdot 0{,}01269 \cdot 100}{m},$$ g I_2/100g sample, where:

V = 18ml; solution volume by sodium tiosulfat 0,1 N used by referance sample titration, in ml:
V_1 = solution volume by sodium tiosulfat 0,1N used by sample titration, in ml;
0,01269 = iodine quantity found in 1ml sodium tiosulfat 0,1 N, g;
m = quantity of sample, g.Î

Peroxide value determination

Peroxide value represent the quantity of peroxide who is found in aliment structure and who havw the capacity to eliberated in one oxidative proces iodine by potasium iodine. [4]

For peroxide value, was used next formula:

$$P.V.= \frac{(V_1 - V_2) \cdot n}{g} \cdot 100 \quad [mEg/Kg\ oil]$$

,where:

V_1 = ml sodium tiosulfat used by sample titration;
V_2 = ml sodium tiosulfate used by referance sample titration;
g = quantity of sample,g;
n = solution normality.

Iodine colour determination

Metode principle

This metode was used for colour of sample determination by comparing the colour of sample with a colour scale who is realisation by potasium bichromat or iodine solution .In both casees the colour value is express like mg iodine in one ml products. [4]

Potasium bichromat scale is used only for the light colour oils till 10 mg iodine/ 100 ml product and for this point of view was determinated a iodine scale in this work.

The titration of iodine solution determination

5 ml of this solution was diluluted with 50 ml water and ater that was titrated with a sodium tiosulfat 0,01 N in the presence of amidine solution 0,5 ml ,till to disolour completely.

The titration of iodine solution 0,01 n = $\frac{1,269 \times V}{5}$ mg/ml, where:

- 1,269 – is the quantity of iodine (in mg),who corespond at 1 ml sodium tiosulfat 0.01 N;
- V-sodium tiosulfat solution 0.01 N used in titration, in ml;
- 5 – iodine solution volume used by titration, in

Photasium bichromate solution etalon was realizated dissolving 0,5 g potasium bichromate in distilled water boiled and colded. This solution is bring to 1000 ml in a quote balloon and is homogenise.

Colorimetric scale preparation

Iodine scale

After the iodine solution titration was stabilated was done by succesive weak solution by colorimetric scale whit concentration between 0,5…30 mg iodine, at 100 ml. quote balloon. At intervals of 14 mg-100 ml was executed by 1 mg in 1 mg dilution and at intervals of 14 – 40 mg iodine at 100 ml executed 2 mg in 2 mg dilution.

Procedure

The metode is comparing in visuale way.

By the quote balloon who contain colorimetric scale solution, ar transvazated equivalent volume in identics teste tubes:at each teste tubes ar wrote the iodine concentration, or potasium bicromate, by the case, in mg/100 ml solution.

The teste tubes are closed in flame and after that are keeping in a dark room. In this condition we can keep the solution for 6 mounth for iodine scale and 6 weeks for potassium bichromate scale.

After that we have to check iodine or potassium bichromate quantity, in case, by sodium tiosulfate titration.

By examinated oils perfectly clear we have to introduced in one same teste tube an egale volume of sample.

The sample colour is compared with the iodine scale solutions or bichromate, in case. The examination is doing by transparent. In case of light colour oils the examination is doing in front of white paper mand in case of dark colours oils,the examination is doing by oil dilution benzene and depending of this dilution we have to doing the iodine colour determinayion.

In both cases the iodine colour of analysed oils is the same with the multiply colour who are notate on the teste tube with eventualy dilution in mg iodine /100 mg oil. In potassium bichromate case , the convert in iodine scale is doing by value inscripted on the teste tubes divided with 5.

RESULTS AND DISCUSSIONS

Iodine value depend of nesaturated fatty acids and their proportion in fatt composition.

Iodine value are notate in the same table are included in 77,40- 92,21 interval , in conformity with that one of the chemical reactions is iodine addition of nesaturated fatt acides. In fact, iodine quantity determination (in gram), absorbed by a exact quantity of fatt (oil)(100 g),we had stabilited iodine value represent nesaturated level of fatt acides.iodine value for each three samples show which of them ,plum oil or peach oil, have smaller than 90 value are nesicative(undrying) and the apricot oil with semidrying oil value are biggest then 90.

The obtains value ane smaller then the usual one wich is found in speciality literature and this fact is explained keeping this oils a laarge time in air presents, wich is oxidative and polimerization and this samples have an iodine indexler then usual oils.

Plums and apricot, excluding reach have smaller acidity index (0,31 – 0,62), this show the core fruits freshness (colected in 2001harvesting seson),in fact acidity value depends of way of keeping. Smaller quantity of fatt free acides founded in the determinations(0,115 – 0,47) show that the oils are fresh. A mesure moleculare quantity medium for the fatt acids are reflected by saponification value. The close value show that this oils sample have a similar composition of fatt acides. Like in next table, saponification value (193,07 plum, 189,96 peach, 190,59 apricot) is included in studied interval values and this fact reprezent an important properties, because in apropriate conditions we can determinate in cain length medium of fatt acides components. Because of the biggest value (close by 190) in this samples doesn’t exist unsaponification substance in large quantity.

Peroxid index value are small (1,2 – 2,32 mE/kg oil) and this show that the oils are not rancid yet.

The iodine colour value obtained by plum, apricot and peach oils are comparative with usual oils value (sunflouer, maize germs, soy) in this case, was analisated raw extraction oils. The iodine coloures value are biggest then literature value (7-9 mg iodine/100 ml) rafined oils.

Table 1

Physic-chemicals properties of obtains oils by untraditionales oils types

Core oil	A.V.	L.V.	S.V.	I.V.	P.V.
Plums	0,62	0,317	193,07	84,60	1,32
Apricots	0,31	0,156	190,59	92,21	1,2
Peachs	0,94	0,47	189,06	77,40	2,32

$T_{\text{iodine 0,01 N}}$ = 2,3603 mg iodine/ml sol. 0,01 N

1 ml sol. iodine 0,01 N.....2,3603 mg iodine

x ml sol. iodine 0,01 N.....0,5 mg iodine

x = 0,21 ml sol. iodine 0,01 N

Table 2

Iodine solution 0,01 N determination

Nr. Crt.	Conc. (mg iodine/100 ml)	ml sol. iodine 0,01 N
1.	0,5	0,21
2.	1,0	0,42
3.	1,5	0,63
4.	2,0	0,84
5.	2,5	1,05
6.	3,0	1,26
7.	3,5	1,47
8.	4,0	1,68
9.	4,5	1,89
10.	5,0	2,1
11.	5,5	2,31
12.	6,0	2,52
13.	6,5	2,73
14.	7,0	2,94
15.	7,5	3,15
16.	8,0	3,36
17.	8,5	3,57
18.	9,0	3,78
19.	9,5	3,99
20.	10,0	4,2
21.	10,5	4,41
22.	11,0	4,62
23.	11,5	4,83

Table 3

Obtains iodine colours value

Sample(core oil)	Iodine colour mg iodine/100 ml oil
Plums	10,5
Apricots	10,5
Peachs	3,0

CONCLUSIONS

This work is about valorification the antraditionales sources who can became in short time an important prime materials in alimentary industrial processing, specialy in extractives oils industry.

Was realisated an physico-chemicals completed characterisation for core oils obtain by plums, apricots and peachs.

This work results is about acidity, saponification, iodine, and peroxide value and iodine colours are intergrating this types of oils in alimentary oils category with similare value like the vegetable clasics oils STAS used in human alimentation.

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STUDY CONCERNING METALS CONCENTRATION IN SOME ASSORTMENT OF BISCUITS

STUDII PRIVIND CONCENTRAȚIA ÎN METALE A UNOR SORTIMENTE DE BISCUIȚI

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Abstract. *In this paper we followed the identification and quantificationof the presence of some heavy metals like: Fe, CU, Zn, Cd, Mn and some macroelements: Na, K, Ca and Mg, in the following assortments of biscuits: glutenous, sugarous, with cream and diethetic. The samples have been harvested random from several trade centers and belong to some indigen and international producers. 23 samples have been exposed to the atomic absorption spectrophotometric analysis, after a previous 650^{o}C calcination and 0.5M HNO3 mineralization, as follows: 4 types of glutenous, sugarous and creamy biscuits and 3 assortments of digestive biscuits. And also, in the case of creamy products, the determination has been made separately from cream and lids. The obtained results have been compared both between biscuits attending to the same assortment and betweend the ones resulted from the analysis of different assortments.The interpretation has been made both graphical and analytical. We used the work protocol that is stipulated in the AOAC standards.*

Rezumat. ***In*** *prezenta lcrare s-a urmarit identificarea si cuantificarea prezentei unor metale grele:: Fe,Cu,Zn,Cd, Mn, alcaline si alcalino- pamantoase: Na,K,Ca si Mg. in urmatoarele sortimente de biscuiti: glutenosi, zaharosi, cu crema si dietetici. Probele au fost recoltate aleatoriu din diverse centre comerciale si apartin unor producatori interni si internationali. Analizei prin spectrofotometrie de absorbtie atomica, dupa o prealabila calcinare la temperatura de 650^{0}C si mineralizare cu acid azotic 0.5M, au fost supuse 15 probe dupa cum urmeaza: cate 4 tipuri de biscuiti glutenosi, cu crema si zaharosi si 3 tipuri de biscuiti digestivi. De asemenea, in cazul produselor cu crema, determinarea s-a facut separat din capace si crema Rezultatele obtinute au fost comparate atat intre biscuitii apartinand aceluiasi sortiment dar si intre cele rezultate din analiza celor aferente sortimentelor diferite. Iterpretarea s-a facut grafic si analitic. Protocolul de lucru folosit a fost cel prevazut in standardele AOAC.*

Keywords*:biscuits, metal, glutenous, cream, sugarous*

INTRODUCTION

The biscuits are products that have in comon their composition of flour, sugars and fats and low humidity. Because of the large number of raw and auxiliary materials that are used, of their different proportions and because the technological processes that are used, the assortment scale of the biscuits is very various. Depending of the sugar and fat amount in the recipe they can be: crackers, glutenous, sugarous and the last two can be filled with cream by interspersing a cream layer between two biscuit lids, the main purpose being the increase of the nutritive value as well as widening the assortment scale. If in plus, they are vitaminised, they can be framed in the dietetic products class. The biscuits are considered an important food for the human being, because they present the advantage that they have a relatively long valability limit, different compositions, that can be adapted to various nutritive needs, but in the same time erpresent an ikmportant energetic source [1,3,4].

METHOD AND MATERIALS

4 types of glutenous, sugarous and creamy biscuits and 3 types of dietetic ones have been analysed, the samples being harvested on random criteria from several trade centers, and from different local and international producers. Also, in the case of the creamy products, the determination has been made separately for lids and cream.

The analysed samples have been numbered accordind to (*table 1)*:

Table 1

Analysed samples numbering

Sample name	Sample number
Bulk glutenous biscuits	1
Premium imported glutenous biscuits	2
Local digestive glutenous biscuits	3
Local vitaminised glutenous biscuits	4
Local, sugar free, dietetic glutenous biscuits	5
Premium imported dietetic glutenous biscuits	6
Local children glutenous biscuits	7
Premium imported sugarous biscuits	8
Medium local sugarous biscuits	9
Medium imported sugarous biscuits	10
Bulk sugarous biscuits	11

Premium imported vanilla cream biscuits	12
Cheap local vanilla cream biscuits	13
Local bulk wild strawberry vream biscuits	14
Medium local vanilla cream biscuits	15
12'th biscuite cream	16
13'th biscuite cream	17
14'th biscuite cream	18
15'th biscuite cream	19
12'th biscuite lid	20
13'th biscuite lid	21
14'th biscuite lid	22
15'th biscuite lid	23

The determination has been made using the atomic absorption spectrophotometric method, as follows:

I. Sample preparation.

10g of vegetal material from every sample have been weighted and exposed to 600 Celsius degrees calcionation, for 8 hours. The obtained calcinate has been dissolved to 25 mL using 0.5M HNO3 under continuous stiring until the ash was completely dissolved. From the obtained solvate we realised 1:10 dilutions in order to determine the Ca, Mg, Na, and K.

II. The identification and amount determination of the metals Cu, Zn, Mn, Fe, Ca, Mg, K şi Na) using the atomic absorption spectrophotometric method.

The determination has been realised using an „contr AA 300" atomic absorption spectrophotometer, in the following standard conditions:

Flame type: C_2H_2/aer
Flamer hight: 6mm
C_2H_2 flow: 50l/h
Air flow: 568l/h
Distilated water has been used as standard solution.
Each metal amount has been determined with the formula:

$$Me = m_{me} \times \frac{25}{m_p} \times D \quad [mg/kg]$$

where Me = the contained metal amount, in mg/kg;
m_{me}= the metal amount read at the spectrophotometer, in mg/l
25 = HNO_3 0,5N solution volume, in ml;

m_p = sample mass weighted for the analysis, in g;
D = sample dilution.[6]

RESULTS AND DISCUSSIONS

The amounts, in mg/l, of each determined metal, read at the spectrophotometer and the wave lenght at wich the determination has been realised are presented in (*table 2)*.

Table 2

Metal amounts in mg/l in the samples read at the spectrophotometer

Sample No	Sample mass [g]	Mg [mg/l]	K [mg/l]	Ca [mg/l]	Na [mg/l]	Cu [mg/l]	Zn [mg/l]	Mn [mg/l]	Fe [mg/l]
1	7.0183	10.54	24.64	9.28	25.26	0.011	0	0	0
2	7.0204	12.97	25.75	17.69	25.3	0	0	0.03	0.13
3	7.1097	15.74	25.8	9.66	24.82	0.06	0.24	1.01	0.36
4	7.0216	13.32	25.17	8.91	24.67	0.49	0	0.22	10.21
5	7.0145	19.72	26.34	8.60	25.82	0.12	0.15	1.24	1.02
6	7.0077	4.85	16.09	3.93	26.23	0	0.89	0.39	0.69
7	7.0122	4.57	5.55	6.67	10.08	0.11	0	0	0
8	7.0621	12.06	25.10	8.25	23.88	0	0	0	0.04
9	7.0367	11.82	24.94	5.58	24.42	0	0	0	0
10	7.0255	12.53	25.30	6.13	24.32	0	0	0.10	0
11	7.0345	6.28	17.35	6.872	25.01	0	1.05	0.64	2.02
12	7.0386	11.80	24.83	6.37	24.13	0.36	0	0	0
13	7.0320	14.43	13.44	1.58	25.66	0.34	0.72	0.39	0.75
14	7.0344	13.29	17.35	4.26	24.32	0.18	0.66	0.35	1.52
15	7.0218	7.182	11.76	5.19	25.00	0.26	0.81	0.54	1.95
16	7.0077	2.97	20.98	3.79	14.02	0.08	0.02	0.01	0.07
17	7.0043	4.39	11.59	5.20	7.68	0.05	0.05	0	0.25
18	7.0059	0	11.63	3.87	5.51	0	0.01	0	0.30
19	7.0750	3.08	21.46	7.69	11.14	0.01	0	0	0.01
20	7.0742	4.94	14.84	5.60	17.94	0.27	0.69	0.54	1.23
21	7.0261	4.43	11.59	1.29	19.23	0.24	0.87	0.45	0.87
22	7.0088	4.70	11.63	1.47	17.63	0.19	0.68	0.29	0.75
23	7.0318	7.97	21.46	2.51	20.23	0.52	1.01	0.81	2.63

The amount of each metal in the analysed samples transformed in mg/kg are presented in (*table 3)*:

Table 3

The metal amounts in the analysaed samples calculated in mg/kg

Sample No	Mg [mg/l]	K [mg/l]	Ca [mg/l]	Na [mg/l]	Cu [mg/l]	Zn [mg/l]	Mn [mg/l]	Fe [mg/l]
Glutenous biscuits								
1	10.54	24.64	9.28	25.26	0.011	0	0	0
2	12.97	25.75	17.69	25.3	0	0	0.03	0.13
3	15.74	25.8	9.66	24.82	0.06	0.24	1.01	0.36
4	13.32	25.17	8.91	24.67	0.49	0	0.22	10.21
Dietetic biscuits								
5	19.72	26.34	8.60	25.82	0.12	0.15	1.24	1.02
6	4.85	16.09	3.93	26.23	0	0.89	0.39	0.69
7	4.57	5.55	6.67	10.08	0.11	0	0	0
Sugarous biscuits								
8	12.06	25.10	8.25	23.88	0	0	0	0.04
9	11.82	24.94	5.58	24.42	0	0	0	0
10	12.53	25.30	6.13	24.32	0	0	0.10	0
11	6.28	17.35	6.872	25.01	0	1.05	0.64	2.02
Creamy biscuits								
12	11.80	24.83	6.37	24.13	0.36	0	0	0
13	14.43	13.44	1.58	25.66	0.34	0.72	0.39	0.75
14	13.29	17.35	4.26	24.32	0.18	0.66	0.35	1.52
15	7.182	11.76	5.19	25.00	0.26	0.81	0.54	1.95
Cream								
16	2.97	20.98	3.79	14.02	0.08	0.02	0.01	0.07
17	4.39	11.59	5.20	7.68	0.05	0.05	0	0.25
18	0	11.63	3.87	5.51	0	0.01	0	0.30
19	3.08	21.46	7.69	11.14	0.01	0	0	0.01
Biscuit lids								
20	4.94	14.84	5.60	17.94	0.27	0.69	0.54	1.23
21	4.43	11.59	1.29	19.23	0.24	0.87	0.45	0.87
22	4.70	11.63	1.47	17.63	0.19	0.68	0.29	0.75
23	7.97	21.46	2.51	20.23	0.52	1.01	0.81	2.63

If we analise the data in table 3 we observe the fact that the biscuits (in the case of bulk glutenous biscuits that are sold at the smallest prices) have the lowest micro and macroelements content. The other 3 assortments, prepacked, show a near concentration of the analysed components, the recorded differences being unsignificantly, excepting the double Ca content of the imported biscuits, which also contain powder milk.

In the analysed dietetic biscuits group we observe the increased contribution in essential metals showed by the local sugar free dietetic biscuits compared with the other two groups, mostly with the ones adressed to the children.

Regarding the sugarous biscuits, that, according to the deffinition, are different of the glutenous ones by the increased sugar and fat contribution, we observe the low proportion of metalsb in the bulk product and the relatively egual repartition in the other three assortments.

Analysing the creamy assortments we observe an very different and random composition of macroelements, both between the whole biscuits and between the biscuits lids and creams, individualy analysed. This isn't the case of the microelements, that have recorded a relatively homogeneous repartition in the samples numbered from 12 to 23.

CONCLUSIONS

Analysing the obtained results and the ingredients list on the products labels, we reached the following conclusions:

is somwhere egual but are different from the one of the dietetic and creamy assortments, which makes us believe that the flour type, which is the basic raw material is the one that gives the metalic profile of these food products.

2. The sugar and fat, egg and powder milk adding, in the case of the creamy biscuits has no influence in the increase of micro and macroelements composition of the product, even haveing an inverse influence in some assortments.

3. the unhomogenity of the obtained data after analyzing the creamy biscuits, reported to the one realized on the lids and creams commits us to further wider and finer research over these assortments composition [2,5].

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CONSIDERATIONS CONCERNING THE QUALITY CRITERIA OF THE SWEET CHERRIES DESTINED FOR INDUSTRIAL PROCESSING

CONSIDERAŢII PRIVIND CRITERIILE DE CALITATE ALE CIREŞELOR DESTINATE INDUSTRIALIZĂRII

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Abstract. *Due to the high contents of sugar and special sensorial qualities, sweet cherries are very appreciated for consumption in fresh state and also as raw material for industrial processing as marmalade, jam, natural juices, stew, and crystallized fruits. In this paper the authors present a bibliographical synthesis on the main features of cherries that are important when they are prcessed industrially.*

Rezumat. *Datorită conţinutului ridicat în zahăr şi a calităţilor organoleptice deosebite, cireşele sunt foarte apreciate pentru consum în stare proaspătă, dar şi ca materie primă pentru prelucrare industrială sub formă de dulceaţă, gem, sucuri naturale, compot, fructe confiate etc. În această lucrare, autorii prezintă o sinteză bibliografică privind principalele însuşiri ale cireşelor care sunt importante în vederea prelucrării lor industriale.*

The quality criteria of the sweet cherries intended for industrialization take into account numerous features of fruits depending on their processing manner (marmalades, stews, crystallized fruits, juices, nectar, jams or dry fruits etc.). Many features of the fruit that are important for consumption in fresh state are taken into consideration also for industrialization (Webster & Looney, 1996). They observe mainly: ***the technological features*** (the ripening date, resistance and skin colour, pulp firmness, adherence of the stone to pulp, easiness of peduncle separation, adaptability to the mechanized harvesting); ***the morphological characters*** (shape, size and uniformity of fruits, skin colour, pulp and juice colour, stone size); ***senzorial features*** (taste, flavour); ***chemical composition*** (sugar contents, total acidity, tanoid substances, pectic substances)

Ripening date. The species with an early ripening date are prefered for industrialization since they insure they favour the appearence on the market of new products and thus allow the obtaining of some important revenu (Webster & Looney, 1996). There is the greater risk of apperance of the phenomenum of fruit chapping at very early species, that is why they recommend the use of covers against rain during harvesting (Andersen et al., 2003). The early species used for processing for canning or frozen fruits in the United States are : *Cavalier T,*

Chelan, Hartland (Andersen et al., 2003), and from the Romanian cultivars they recommend *Cetățuia, Scorospelka*, *Muncheberge fruhe (*Petre, 1993).

In the same time, it is important to exist a large range of species with phased ripening of fruits, to insure both the continuous technological flow in the industrialization units and not to surpass the storage and processing capacities of these especially for the fruits intended for juices and nectars, fruits that must be processed immediately after harvesting.

Skin resistance. They recommend the species with thin skin for processing as stew such as: *Boambe de Cotnari, Bigarreau Drogan, Bigarreau Donissen, Bigarreau Napoleon, Marina, Simbol,Roze* (Petre et al., 2005; Beceanu & Chira, 2003).

But to obtain frozen, crystallized or glazed fruits they prefer the fruits species that present a greater skin resistance they having also a greater resistance to cracking during the rainy periods of harvesting (*Black Star, Chelan, Satin Sumele, Samba Sumste*, *Hudson, Izverna* (Lugli, 2003, Budan & Gradinariu, 2000).

Pulp firmness is a feature pursued when processing fruits as deep frozen or crystallized fruits, glazed fruits, candied fruits for cocktail, stew and less for jams (Webster & Looney, 1996), recommending the harvesting during ripping (Beceanu & Chira, 2003) but for the processing as jams they recommend the harvesting before maturation for consumption when the pulp firmness is high enough to avoid the smashing to pieces of fruits in the syrup.

From the category of cultivars with high firmness of pulp from the Romanian assortment we enumerate: *Bigarreau Napoleon, Germersdorfer, Boambe de Cotnari, Bigarreau Donissen, Bigarreau Drogan* (Petre & Petre, 2004; Budan & Grădinariu, 2000). The new cultivars created in Romania, *Cătălina, Marina, Golia, Bucium, Ştefan* and *Maria* (Petre et al., 2005) also have a great pulp firmness very appreciated by producers.

From the United States assortment they use the cultivars: *Bing, Windsor, Schmidt, Emperor Francis* (Way, 1974). In Italy, the cultivars with high firmness are recommended for processing as crystallized or frozen fruits are: *Dura, Durona, Don Antoni, Genovese, Minnulara, Napoletana, Toscana, Caddusa* (Raimondo et al., 2006). From those cultivated in France a great firmness is held by the cultivars *Folfer, Bigalise, INRA 3476, Fermina, Ferdiva, Fertard* (Simard, 2005) that may be used for processing as crytallized fruits, glazed fruits, fruits for cocktail or frozen fruits.

Adherence of pulp to stone. It is important to the cultivars intended for processing as crystallized fruits, jams where there is the need to eliminate the stone beforehand. From this viewpoint there are cultivars with non-adherent pulp, adherent and semi-adherent to stone (Ghena & Mihăescu, 1967; Beceanu & Chira, 2003), those with non-adherent pulp being preferred. From the new cultivars created in Iaşi, *Golia* has the pulp non-adherent to stone (Petre & Petre, 2004), representing a valuable raw material for industrialization. Other cultivars from the Romanian assortment with non-adherent pulp to stone recommended for processing are*: Daria, Severin, Rubin, Jubileu 30, Van* (Petre, 1993).

Adaptability to mechanized harvesting. By melioration programmes they pursue the creation of cultivars with adaptability to mechanized harvesting

intended for industrialization that have the feature to ripe simultaneously and uniformly.

These cultivars are recommended to occupy an entire specilized orchard for mechanized harvesting and for industrial processing, the cultivar *Napoleon* being the most frequently met (Brunner, 1999). The Italian meliorators created the cultivars *Enrica* and *Bargioni 137* (Lugli, 2003) that are adapted to mechanized harvesting having a simultaneous ripping, reduced vigor and good fruit qualities for processing as jams, marmelades and juices. The fruits of the cultivars harvested in a mechanized manner have the quality to separate easily from the peduncle without suffering damages in the peduncular cavity (Beceanu & Chira, 2003 ; Richardson et al. 1998).

Fruit size. For processing as stew, crystallized fruits, frozen fruits, mix dry fruits or sweet cherries for cocktail (maraschino) the cultivars with big and medium fruit are important. From the Romanian assortment the fruits with size between 7 and 9 g are: *Ulster, Van, Bing, Vista, Sam, Boambe de Cotnari, Jubileu 30, Cerna, Daria, Severin* (Budan & Grădinariu, 2000), and from the new creations *Cătălina, Maria, Golia, Bucium, Tereza, Ştefan* and *Iaşirom* (Petre, 2006; Petre & Petre, 2004; Petre, 1993). In the world there are more and more cultivars with big and very big fruits. Thus in Canada the cultivars *Celeste Sumpaca, Samba Sumste, Sonata Sumleta, Summer Charm Staccato, Selah* (Lugli, 2003) have big fruits and in Italy the cultivars *Giulietta, Sweet Early, Early Star, Black Star* şi *Grace Star* (Lugli, 2003) are new creations with fruits between 9 and 12 g. The French assortment also has fruits of big and very big calibre: *Fertard, Duroni 3, Summit, Folfer, Giant Red, Bigalise* with sizes between 26 and 32 mm in equatorial diameter (Simard, 2005).

Uniformity. To process sweet cherries, the uniformity in size is more important than the size itself (Webster & Looney, 1996). The Italian meliorators created the cultivars *Enrica* and *Bargioni 137* (Lugli, 2003) especially for mechanized harvesting having simultaneous maturity but also fruits of uniform size to facilitate the mechanized calibration (Allauzen et al., 1995).

Skin colour. It is an important indicator for the correct choice of harvesting date for the cultivars intended for processing both for the cultivars with red fruits and those with yellow or white yellowish fruits (Webster & Looney, 1996). In all cultivars, regardless of skin colour, the contents of antocians and xanthophyll increases as ripening.

This external feature determins the choice of a processing destination, the cultivars with white, yellow and bicolor fruits being destined for stew, jam or marmelade (*Bigarreau Drogan, Bigarreau Donissen*, *Amar Galata*, *Napoleon*) (Petre et al., 2005). The cultivars with light red, crimson red or dark red fruits (*Ulster, Hedelfingen, Schmidt, Sam, Van, Kristin, Germersdorfer*) are intended for crystallization, freezing or liqueurs (Andersen et al., 2003; Budan & Grădinariu, 2000).

High quality sweetness are also obtained from the cultivars with dark or black pigments, their light bitter taste being also very important: *Amara, Silva, Amar Maxut* (Beceanu & Chira, 2003; Petre et al., 2005; Budan & Grădinariu, 2000).

Pulp colour. The cultivars whose pulp is white, yellow or weakly colored in pink recommended for processing as stew (Beceanu & Chira, 2003) are: *Bigarreau Donissen, B. Napoleon, B. Drogan* (Budan & Grădinariu, 2000), *Marina* (Petre & Petre, 2004). The cultivars with pink, red or dark red pulp that may be used in industrial processing (juices, crystallized fruits, jams) are: *Germersdorf, Pietroase Mari Negre, Pietroase Negre Pitz, Golia*.

In the case of processing sweet cherries, the stability of antocians or other pigments is more important than their quantity (Beceanu & Chira, 2003; Webster & Looney, 1996). Thus in the moment of cutting the fruit or keeping it in a pulps form, for their processing in the future, antocians have the tendancy to degrade leading to the fruit scald (Beceanu & Chira, 2003; Webster & Looney, 1996). Then the fruits must not be damaged so as not to degrade their colour by pigment oxidation and must use solutions to conservate the pigments.

Juice colour. Most of the cultivars have the same juice colour as the skin or pulp colour this aspect being important when establishing the fruit destination. Thus, the cultivars with a colourless juice or a weakly coloured juice are not recommended for industrial processing as juices or stews, jams, liqueurs, natural juices or natural colorants for confectionery. Conversely, the cultivars highly coloured are very appreciated for this purpose such as the Yugoslavian cultivar *Crnica* (Nicolic et al., 1998), or the cultivars of bitter cherry from the Romanian assortment *Silva, Amar Maxut* and *Amara* (Petre & Petre, 2004).

Stone size. There is no direct correlation between the fruit size and the stone size (Webster & Looney, 1996). There are some cultivars (*Maria, Amar Maxut*) that have a big fruit and a small stone and which are preferred for this reason (Petre & Petre, 2004). The cultivars with small stone are more advantageous for industrialization especially when they remove the stone to obtain the final product.

Flavour may be improved or even added during the sweet cherry processing (Beceanu & Chira, 2003).

It is defined by taste and smell specific to the cultivar and depends on the contents of volatile organic substances: aromatic hydrocarbons, alcohols, aldehydes, cetones, acids or esters (Webster & Looney, 1996). Since these substances are volatile the technological solutions for processing cherries must prevent their loss (Webster & Looney, 1996). For jams and marmelades the raw materials the most appreciated are those where taste and flavour are obvious (Beceanu & Chira, 2003) such as: *Summit, Coralise Gardel, Satin Sumele* (Charlot, 2003) from the French assortment, *Lala Star* from the Italian assortment (Sansavini & Lugli, 2005) or *Van , Bing, Sam, Bigarreau Donissen* from all assortments.

Sugar contents. The moment when most of the fruits of a cultivar have a sugar contents of at least 15^0 Brix is considered to be the optimum date for harvesting (Brunner, 1999; Beceanu & Chira, 2003). The cultivars *Bellise Bedel, Coralise Gardel, Bigalise Enjidel, Summit* (Charlot, 2003) are new French

creations with very sweet fruits that may be used for processing. In Romania at S.C.D.P. Iaşi we created the cultivars *Marina, Golia, Cetăţuia, Cătălina,* with very sweet fruits recommended for the food industry (Petre & Petre, 2004).

Total acidity. For sweet cherries, the total acidity is between 0,3 - 0,8% the highest values being registered at the cultivars *Amara, Izverna, Sam, Stella, Silva* (Rudi, 1992). The level of acidity is considered optimum when there is a contents of 7 and 8 g/l malic acid and it is important when processing cherries as natural juices or stew.

The tanoid substances conditioned the taste and conservation period, in contact with air determin the scald of the sectioned, broken or smashed fruits, a very unpleasant feature when the respective fruits are to be cut in pieces and stay in direct contact with air for a certain time (Beceanu & Chira, 2003). Sweet cherries have a contents of tanoid substances between 0,05 (*Boambe de Cotnari, Roz de Mărculeşti*) and 0,30% (*Negre zaharoase*) (Rudi, 1992). The contents of tanoid substances is higher for the cultivars with bitter and black fruits (eg. the cultivars *Bigarreau Napoleon* with 0,257% and *Amara* with 0,267%) (Rudi, 1992).

Pectic substances have the properties trought witch together with sucrose and organic acids - citric, tartric, malic – form gels. This feature lies at the bottom of preparing marmelades, gels, jams etc. (Beceanu & Chira, 2003). Sweet cherries have a reduced contents of pectines ranging between 0,06% and 0,82 % (Rudi 1992), the highest contents (0,36 and 0,39%) being found at the cultivars *Boambe de Cotnari , Clos* and *Mare de Trăinei* (Rudi, 1992).

CONCLUSIONS

For sweet cherry processing take into account all these criteria, but on the utilization directions groups.

For **sweetness** is necessary cultivars with white or black skin colour, with sweet or bitter taste, firm pulp and good fruit size. The cultivars *Bigarreau Napoleon, Amara, Bigarreau Donissen, Amar Maxut, Bing, Windsor* ar very apreciated. For **stewed** fruits is necessary a very firm pulp, intense colour and good sweet acidity balanced taste, like cultivars *Amara, Izverna, Sam, Stella, Silva, Crnica, Bigarreau Drogan, Bigarreau Donissen*, *Amar Galata*, *Marina, Golia*, *Napoleon.* For **jam** the fruits must have a uniformly skin colour, intense flavour and very good taste, an higher pulp stone ratio with adaptability to mechanized harvesting. Ar prefered *Daria, Severin*, *Schmidt, Sam, Van, Kristin, Enrica, Bargioni 137, Golia, Marina.* **Crystallized** fruits needs an higher firmness, a good skin rezistence and a great fruit size, such as cultivars *Germersdorf, Pietroase Mari Negre, Pietroase Negre Pitz, Golia, Schmidt, Sam, Van,, Durona, Don Antoni, Genovese, Kristin.* For **syrup, juice** or **liqueurs** ar necessary cultivars with diverse pulp and juice colour, from pink to red purple even dark red and also good succulence like *Amar Maxut, Amara, Silva, Black Star, Chelan, Satin.*The cultivars destined for **distilation drinks** must have fruits

very sweet and good yields with adaptability to mechanized harvesting, such as *Ponoare, Jubileu 30, Rubin, Bing, Schmidt, Sam, Van.*

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HARVESTING THE CUT FLOWERS

RECOLTAREA FLORILOR TĂIATE

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Abstract*: People know flowers from ancient times and the weaving of flowers was born simultaneously with their knowledge.*

The first flower shops appeared in 1870 in the period of strong development of towns and so the culture of flowers extended. At the end of the century, the decorative art becomes prosperous due to the influence of the Japanese ornamental art as well as the popularity that flowers started to enjoy from.

Flowers and their culture must be seen through their economic importance. Thus, the flower cultivation may be very attractive and very profitable either as a basic economic activity or as a complementary activity.

Rezumat: *Omul cunoaste florile din timpurile stravechi, iar elementele impletirii florilor s-au nascut simultan cu cunoasterea lor. Primele florarii apar in anul 1870 in perioada dezvoltarii puternice a oraselor, extinzandu-se astfel cultura florilor. La sfarsitul secolului arta decorativa devine infloritoare datorita influentei artei ornamentale japoneze, precum si popularitatii de care incep sa se bucure florile. Florile si cultura lor trebuie vazute si prin prisma importantei economice. Astfel, cutivarea florilor poate fi deosebit de atractiva si foarte profitabila, fie ca activitate economica de baza, fie numai ca activitate complementara.*

MATERIAL AND METHOD

The research was carried out by the "Moara de Vant" greenhouse of the D.S.P.M. Iasi. Like study object it was used plants from soil grown by Crisanthemum hortorum, Alstromeria aurantiaca, Freesia hybrida and Zantedeschia elliotiana. In the conditions of the classic technology, it was studied the behavior of plants after harvesting the stems by hand breaking, cutting with a sharp knife and pulling out, the vase life of flowers harvested at four stadies - uncolored buds, colored buds, half opend flowers and full opend flowers (primary florets for Alstromeria and Freesia), and the period of day for harvest - early morning or afternoon.

Valorisation flow sheet for the cut flowers:

- flower harvesting;
- their manipulation and transport to the conditioning point;
- conditioning of flowers by sorting, calibration, special treatments and commercial packing;
- pre-cooling if it is not effectuated simultaneously with conditioning;

- long or short term preservation, humid or dry;
- transport and delivery;
- attendance at the beneficiary.

Each step from the flow sheet has its role and harvesting is given the least importance one of the reasons being that the great majority of flowers lovers buy them thus jumping to the last phase of the flow sheet - attendance at the final beneficiary.

The most important factor for harvesting is the moment when one cuts the flower from the plant, each flower having its own optimum harvesting moment. This moment depends on the moment of valorization, market, transport, the day period, season, culture conditions.

For an immediate valorization, they harvest flowers in an advanced stage when flowers have a maximum decorative effect and they do not need to be submitted to some strong hydric or physical shocks and the sale is sure.

Depending on the market, beneficiaries have certain requirements especially regarding the degree of bud bursting open.

After harvesting, transport is the most stressful moment of the valorization technology for the cut flowers and regarding from the viewpoint of the harvesting moment, the most recommended one is the bud stage.

In spring and summer flowers are harvested in the morning since they have a maximum degree of hydration and in autumn and winter they are harvested after noon when they had enough time to accumulate enough glucides.

The maturation degree of flowers when harvesting them is transposed in the quantity of reserve substances that can be found in the flower and represents an important factor that influences the life-span in the vase.

If they are harvested prematurely, the low contents of glucides cannot sustain the development of the flower, the tissues insufficiently lignified do not have rigidity and the flowers bent – rose, gerbera – and the flower will never reach its normal size.

Harvesting in amore advanced stage insures a high quantity of reserve substances but the real ornamental duration is shortened.

The compensation of the lack of reserve substances when harvesting in the bud phase is made by stimulation treatments for the buds to burst open by opening substances obtaining thus some very important advantages:

- increased resistance to thermal and hydric stress, ethylene;
- outrunning the term of a new culture on the same land, so the production increase;
- harvesting at longer time intervals
- due to the high resistance to mechanical damage, the flow sheet may be mechanized;
- less material is lost due to manipulation, storage and transport;
- the weather caprices are avoided – late or early frosts, hale, storms;
- expenses for storage and transport decrease due to the reduced volume;

- adaptability to the refrigerating method for long preservation without losing quality at the beneficiary;
- the capacity to correct some culture deficiencies – weak light and high temperature influencing negatively the quality, colour and life-span in the vase.

Besides the optimum stage of flower bursting open, it is also important "how" and "where" we cut the flower stems especially at the species producing several floriferous stems gradually by seasons. Each one wants to harvest the flowers with the longest stem but the future production must not be sacrificed. Calla lily, alstromeria and chrysanthemum may be cut as low as possible but freesias must have at least three or four leaves necessary to feed the tuber-bulb.

Though they recommend a sloping cut, it is more important that is be smooth and made with a very sharpened and disinfected knife especially when they want to keep the material for long. The tissue portions remaining on sections block the conducting vessels of the stems and produce the flower withering.

For calla lily – Zantedeschia aethiopica – flowers are harvested by snatching, the vigorous stems must be kept with both hands so as not to destroy them. If cut or torn, the stem remainders represent entry ways for the pathogen agents. The ends are reduced subsequently with a well sharpened knife, perpendicularly on the stem; conversely it will split in the vase. The optimum moment is morning, on the sunny days or at noon on the cloudy ones in the phase of semi-open cornet when the cornet starts to detach.

The alstromeria flowers– Alstromeria aurantiaca – are also harvested by snatching grabbing the stem as close to the soil as possible. It is not as sensitive as calla lily; its ends may be torn later by hand. The optimum moment is morning when the plants are well hydrated and buds are well coloured not necessarily burst open.

Chrysanthemums – Chrisanthemum hortorum – must be harvested in the morning as early as possible to be at its maximum turgescence, by cutting or tearing in the phase of semi-open bud.

Through well conducted farm practices, the freesia flowers – Freesia hibrida – may be harvested in any moment of day if the tuber-bulbs obtained as a secondary production are used to start a new culture, the flowers must be cut so that on the stem remain 4-5 leaves necessary to feed the seeding material in the soil. If the inflorescence is long, the first flower must well open; conversely it does not have enough nourishment to open the other in the vase. With stimulating treatments, freesias may be harvested also in the phase of coloured bud. The harvesting is made with a knife or scissors and not manually since they may be pulled out of the soil.

CONCLUSIONS

Harvesting the floricultural material in optimum conditions one avoids the subsequent appearance of complications, deficiencies and unjustified losses. This operation must be made by qualified personnel with experience so as not to compromise the production from the start or even the entire production.

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IDENTIFICATION AND MONITORING OF THE ORNAMENTAL SPECIES FROM USAMV CLUJ-NAPOCA COLLECTION RECOMMENDED FOR LANDSCAPING

IDENTIFICAREA ŞI MONITORIZAREA SPECIILOR ORNAMENTALE DIN COLECȚIA USAMV CLUJ-NAPOCA, RECOMANDATE ÎN AMENAJĂRI PEISAGISTICE

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Abstract. *In Romania the landscape design of green spaces becomes an important problem, on the one hand because of the necessity to assure green spaces, and the other to assure green spaces for recreation and from the wish to rearrange and a better maintenance of green spaces according to the European Union standards.*

The collection of USAMV Cluj-Napoca offers a rich diversity of ornamental plants for students, university personnel and the public. There are many species (annuals, biennales, perennials), collected from over the word. The collection is periodically evaluated concerning the main morphological characteristics height plant, color of flowers, number of flower, blooming time, resistance to pests and diseases etc. The data are transferred to the web site.

Every year the collection is improved with new species, varieties and hybrids by our contact with persons from all around the world. Our purpose is to introduce new floral plant for recommended for landscape using the most modern and economical ways of designing in accordance with the international standards for their increase over the surrounding and human environment. In this paper we present the collection of dendro-floral plants from USAMV Cluj-Napoca.

Rezumat. *Amenajarea spațiilor verzi în România este o problemă de mare actualitate, pe de o parte din necesitatea de a asigura cadrul de verdeață, iar pe de altă parte pentru a asigura spații de recreare dar şi din dorința de amenajare şi întreținere a spațiilor verzi la nivelul standardelor Uniunii Europene.*

Colecția de la USAMV Cluj-Napoca, Disciplinele de Floricultură şi Arboricultură ornamentală, oferă o diversitate mare de plante ornamentale, studenților, personalului din universitatea şi publicului. Colecția cuprinde mai multe specii floricole anuale, bienale şi perene şi specii dendrologice, colecționate din întreaga lume. Periodic se efectuează evaluarea caracteristicilor morfo-decorative cum ar fi: înălțimea plantelor, culoarea florilor, numărul de flori, perioada de decor, rezistența la boli şi dăunători etc. Datele obținute sunt introduse într-un web site care este disponibil studenților şi publicului. Colecția este îmbogățită anual cu noi specii, varietăți, hibrizi, prin schimburile naționale şi internaționale de material biologic.

Obiectivul nostru este de a introduce noi specii ornamentale care ulterior să poată fi recomandate şi utilizate în spațiile verzi, folosind cele mai moderne şi economice metode de landscape în concordanță cu standardele internaționale, cu impact favorabil asupra mediului înconjurător şi uman. În lucrare este prezentată colecția de plante dendro-floricole de la USAMV Cluj-Napoca.

INTRODUCTION

In today's Romania particularly in the last years, we assist to the enrichment and diversification of floral and dendrological plants assortment used mainly for the conservation and the decoration of green spaces.

To use the ornamental species for green spaces, one must first know the main morpho-decorative characteristics of those and their beehive in our country. At the same time with the introduction of the new species and varieties, there is a need to improve the technology practices of the new species to the international practice.

At the USAMV Cluj-Napoca, Department of Ornamentals Plants, there is a reach collection of dendro-floral plants represented by annual species, biennales species, perennial species and ornamental bushes and trees. The collection is by time to time evaluated and a research group made of teachers and students from USAMV Cluj-Napoca records monitories and the results in a database.

We consider a priority to introduce in our collection the newest and best ornamental species from the countries with a long tradition in this area and also indigenes varieties not yet promoted.

Our researches are supported by the Ministry of Agriculture under AGRAL Program within the CEEX Modul I, nr. 29, research program. The research results are promoted at www.usamvcluj.ro/2006/SAEMS web site.

MATERIAL AND METHODS

The biologic material of dendro-floral species included in the USAMV Cluj-Napoca collections was review and recorded as being represented by 79 annuals floricultural species, biennials species and perennials species (Table 1), by 43 deciduous shrubs and trees and 15 species of conifers (Table 2).

Following the monitoring of the dendro-floral plants, we made a database that includes several fields on: botanic and popular names of the species, plants tall, medium requirements, methods of utilization, and technological particularities. This database is presented in the USAMV Cluj-Napoca web site.

Studies were performed for the dendro-floral species regarding the main morpho-characteristics (the plant height, decorative colour, time o decorative, colour, and so on) to be useful and recommended in green space work.

RESULTS AND DISCUSSIONS

Analysing the date presented in Table 1 for plants seeded on January – March 2006 time period, plants rise after 5-13 days, on temperature rage form 18-22 ^{0}C, and high humidity, and biennales floral plants that were planted in June-July 2005, we can conclude the following:

The plantation on field was done in the 10-15 May 2006 time intervals. The species were observed and morpho-decorative determinations were made. The flowering occurred after 82-84 days from seeding to the *Salvia splendens*, *Petunia hybrida*, *Alissum maritima* şi *Lobelia erinus*.

Most of the species flower in June-July time period and only a few in August (*Callistephus chinensis*, *Gladiolus hybridus*). Most of the perennials species begin to vegetate in April.

Most of the species presented shows a variety of colours, entire spectrum from white to

blue. Some species present one colour; some many colours and some had spots or macules.

Table 2 presents dendrological species existent in the USAMV Cluj-Napoca Park. The ornamental wood vegetation is very important, contributing to the beautiful view by the richest of colours, flowers, leaves or fruits.

The dendro-floral species identified and monitored by the USAMV Cluj-Napoca collection are presented in a database. Fig. 1 illustrates some images that can be found at the USAMV Cluj-Napoca web site indicated above.

Table 1

Observations made to the monitoring species at the USAMV collection

Specie	Group*	Sow data	Rise data	Nr. days sow-rise	Start of flower	Nr. days rise-flower	Flower color
Ageratum houstonianum	A	26.III	5.IV	10	30.VI	86	blue
Allium giganteum	P	-	5.IV	-	2.VI	57	move
Alternanthera amoena	A	-	decorative by evergreen leaves				
Alternanthera versicolor	A	-	decorative by evergreen leaves				
Althaea rosea	B	-	15.IV	-	23.VI	69	red
Alyssum maritimum	A	2.III	7.III	5	30.V	84	white-move
Ammobium alatum	A	26.III	3.IV	8	12.VII	100	white
Antirrhinum majus	A	20.II	27.II	7	7.VI	100	diverse
Aquilegia coerulea	P	-	7.IV	-	15.VI	69	diverse
Begonia semperflorens	A	10.XII	20.XII	10	28.V	158	white-red
Celosia arg.var plumosa	A	20.II	5.III	13	12.VI	99	orange
Calendula officinalis	A	26.III	3.IV	8	27.VI	85	yellow
Callistephus chinensis	A	26.III	4.IV	9	5.VIII	92	diverse
Campanula medium	B/P	-	2.IV	-	17.V	45	white-pink
Canna indica	P	-	20.III	-	30.VI	102	orange
Cheiranthus cheirii	B/P	-	20.III	-	22.V	63	ruginiu
Chrysanthemum carinatum	A	20.III	29.III	9	14.VII	107	diverse
Chrysanthemum coronarium	A	20.III	26.III	6	12.vii	108	yellow
Chrysanthemum leucanthemum	P	-	2.IV	-	9.VI	68	white
Cleome spinosa	A	20.III	28.III	8	12.VII	106	pink-move
Coleus blumei	A	decorative by evergreen leaves					
Cosmos bipinatus	A	20.III	30.III	10	16.VII	108	white-pink
Dahlia variabilis	P	20.III	28.III	8	25.VI	89	diverse
Delphinium cultorum	P	-	10.IV	-	26.VI	77	blue
Dianthus chinensis	A	20.II	26.II	6	20.VI	114	diverse
Dianthus barbatus	B/P	-	10.IV	-	2.VI	53	diverse
Dianthus alpinus	P	-	10.IV	-	10.VI	48	pink
Dicentra spectabilis	P	-	2.IV	-	10.VI	69	pink
Digitalis purpurea	B/P	-	7.IV	-	20.VI	74	purple
Gazania splendes	A	20.III	25.III	5	15.VI	82	diverse

Table (continuer)

Echeveria glauca	A	decorative by leaves					
Eschscholtzia californica	A	20.III	27.III	7	15.VII	110	yellow
Gaillardia picta	A	20.III	28.III	8	29.VI	93	orange
Galanthus nivalis	P	-	15.III	-	12.IV	28	white
Convallaria majalis	P	-	20.IV	-	4.VI	45	white
Gladiolus hybridus	P	18.IV	10.VI	22	29.VII	80	diverse
Gnaphalium lanatum	A	decorative by leaves					
Godeția grandiflora	A	20.III	25.III	5	30.VI	97	pink
Gomphrena globosa	A	15.II	27.II	12	18.VI	111	pink
Gypsophila paniculata	P	-	24.IV	-	23.VI	60	white
Helichrysum bracteatum	A	20.III	28.III	8	5.VII	99	diverse
Heliotropium peruvianum	P	vivace greenhouse			30.VI	-	move
Helipterum roseum	A	20.III	29.III	9	20.VI	83	pink
Heuchera sanguinea	P	-	20.IV	-	24.VI	65	purple
Hosta sp.	P	-	26.IV	-	24.VII	89	white
Hyacinthus orientalis	P	-	28.III	-	17.V	50	diverse
Hydrangea opuloides	P	-	25.IV	-	30.VII	96	pink
Hemerocalis fulva	P	-	20.IV	-	27.VI	62	orange
Hypoestes sanguinolenta	P	decorative by leaves					
Iberis umbellata	A	20.III	29.III	9	15.VI	78	pink
Impatiens balsamina	A	20.III	29.III	9	24.VI	87	red
Iresine sp.	A	decorative by leaves					
Leucajum vernum	P	-	2.IV	-	15.V	43	white
Lilium sp.	P	-	18.IV	-	11.VII	84	diverse
Limonium (Statice)	A	20.III	28.III	8	18.VI	82	move-white
Lobelia erinus	A	20.II	27.II	7	26.V	88	blue
Matthiola incana	A	20.III	25.III	5	30.VI	97	diverse
Mirabilis jalapa	A	10.III	21.III	11	7.VII	108	diverse
Muscari botrioides	P	-	15.IV	-	29.V	44	blue
Narcissus sp.	P	-	10.IV	-	20.V	40	white
Nicotiana alata	A	10.III	18.III	8	20.VI	104	white
Nigela damascena	A	20.III	27.III	7	17.VI	82	blue
Ocimum basilicum	A	20.III	28.III	8	20.VII	114	white
Oenothera biennis	P	-	25.IV	-	24.VII	90	yellow
Paeonia sp.	P	-	22.IV	-	15.VI	54	diverse
Papaver bracteatum	P	-	18.IV	-	28.V	40	red
Petunia x hybrida	A	10.II	21.II	11	15.V	83	diverse
Phlox drumondi	A	20.III	29.III	9	20.VI	83	diverse
Portulaca grandiflora	A	20.III	26.III	6	7.VI	73	diverse
Rudbeckia sp.	P	-	18.VI	-	24.VII	97	yellow
Salvia splendes	A	20.II	27.II	7	20.V	82	red
Santolina chamaecyparissus	A	-	18.IV	decorative by leaves			
Tagetes sp.	A	27.III	4.IV	8	23.VI	80	diverse
Titonia speciosa	A	20.III	25.III	5	12.VII	109	orange
Tulipa gesneriana	P	-	8.IV	-	17.V	39	diverse
Tropaeolum majus	A	10.III	21.III	11	27.VI	98	yellow
Verbena hybrida	A	20.II	5.III	12	24.VI	111	diverse
Viola x wittrockiana	B	20.VII	27.VII	7	9.IV	-	diverse
Zinnia elegans	A	26.III	31.III	5	28.VI	89	diverse
*A = annuals		B = biennials		P = perennials			

Table 2

Results concerning the monitoring of dendrological species from USAMV Cluj-Napoca Park

Species	Group*	Species	Group*
Tree and deciduous shrubs			
Acer campestre	A	*Deutzia scabra*	a
Acer negundo	A	*Eleagnus angustifolia*	A/a
Acer Variegatum	A	*Euonimus europeus*	a
Acer palmatum "Rubrum"	A	*Euonimus fortunei*	a
Acer platanoides	A	*Fortisithia x intermedia*	
Acer Globosum	A	*Fraxinus excelsior*	A
Acer pseudoplatanus	A	*Fraxinus excelsior Aurea*	A
Acer rubrum	A	*Fraxinus excelsior Diversifolia*	A
Acer Saccharinum	A	*Fraxinus excelsior Eureka*	A
Aesculus hippocastanum	A	*Fraxinus excelsior Pendula*	A/a
Ailanthus altissima	A	*Fagus sylvatica*	A
Albitzia julibrissin	A/a	*Fraxinus ornus*	A
Amelanchier arborea	a	*Hibiscus syriacus*	a
Berberis juliane	a	*Ligustrum vulgare*	a
Betula pendula (verucosa)	A	*Ligustrum ovalifolium*	a
Buddleia davidii	a	*Mahonia aquifolium*	a
Buxus sempervirens	a	*Pyracantha coccinea*	A
Callicarpa bodinierii Giraldii	a	*Rosa canina*	a
Campsis radicans	a.v.	*Spiraea vahouttei*	a
Caragana arborescens Pendula	a	*Symphoricarpus orbiculatus*	a
Castanea sativa	A	*Ulmus minor*	A
Catalpa bignonoidies	A	*Viburnum opulus*	a
Chaenomeles japonica	a	*Weigelia florida*	a
Cornus Sibirica	a	*Weigelia florida Purpurea Nana*	a
Cornus Sanguinea	a	*Weigelia florida Variegata Lucifer*	a
Corylus colurna	A	*Weigelia florida Tongo*	a
Corylus maxima Purpurea	a	*Weigelia florida Candida*	a
Cotoneaster horizontalis	a	*Weigelia florida Bristol Ruby*	a
Cotoneaster salicifolius	a	*Weigelia florida Styriaca*	a
Tree and Conifers shrubs			
Chamaecyparis lawsoniana Alumii	A	*Picea pungens argentea*	A
Chamaecyparis lawsoniana Elwoodii	A	*Picea glauca*	a
Chamaecyparis pisifera	a	*Thuja orientalis Elegantisima*	a
Chamaecyparis pisifera Bulevard	a	*Thuja occidentalis Brabant*	a
Juniperus chinensis	a	*Thuja occidentalis Danica*	a
Juniperus communis Hibernica	a	*Thuja occidentalis Globosa*	a
Juniperus horizontalis	a	*Thuja Rheingold*	a
Juniperus Pfitzeriana	a	*Thuja Smaragd*	a
Juniperus Pfitzeriana Aurea	a	*Thuja Aureospicata*	a
Juniperus squamata Blue Carpet	a	*Thuja Pyramidalis Compacta*	a
Juniperus Blue Star	a	*Thuja plicata*	A
Juniperus Sky rocket	a	*Thuja plicata Smaragel*	a
		Thujopsis dolobrata	a
Legend: * Trees (A); shrubs (a); climbers shrubs (a.v.)			

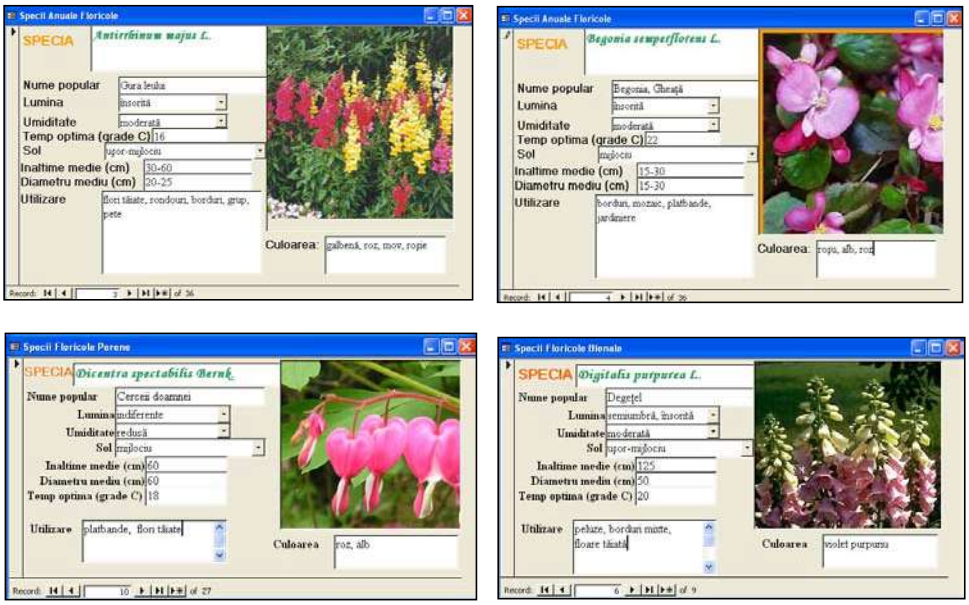

Fig. 1. Images from database

CONCLUSIONS

The enrichment and diversification of the collection with new dendro-floral species, is required by the new surfaces dedicated and their esthetical importance but also by the profit made by those in the business.

Following the collection review and monitoring of USAMV Cluj-Napoca dendro-floral plants, it was found a reach variety of plants enclosing 79 floricultural species, and 58 dendrological species.

The new factor is represented by the introduction of new species with superior morpho-decorative quality.

The data resulted for the research was included in a database that includes information about the main characteristics ad can be studied by accessing the web site www.usamvcluj.ro/2006/SAEMS

This species can be used for green spaces and will have a positive impact on environment and human habit.

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IMPROUVED METHOD FOR THE "IN VITRO" REGENERATION OF TRUE TO TYPE PLANTS OF *PELARGONIUM PELTATUM* L.

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Abstract. *The economical importance of „in vitro" tissue culture at ornamental plants is a actual problem, the existing results underlying the fact that over 500 million of plants are micro propagated annually, the biggest part of them being ornamental plants.*

The objective of this study was to develop a rapid system for regeneration of the important ornamental plant, Pelargonium peltatum L, from nodal explant. Single node explants were inoculated on basal MS (Murashige and Skoog, 1962) medium containing 3% (w/v) sucrose, supplemented with different concentrations and combinations of 6-benzylaminopurine (BAP), kinetin (KN), indole-3-acetic acid (IAA) or indole-3-butyric acid (IBA) and GA_3 for direct plant regeneration. Maximum numbers of shoot (14.3±1.5) were observed on the medium containing 2.0 mg/l BAP and 1.0 mg/l NAA after two - three weeks of culture.

Regenerated shoots were separated and rooted on same MS medium supplemented with NAA alone (in different concentrations) for 8-10 days. Well-developed complete plantlets were transferred on to plastic cup containing soil substrate. Acclimatized plantlets were successfully grown in greenhouses.

Rezumat. *Importanţa culturilor de ţesuturi"in vitro" la plantele ornamentale este o problemă de actualitate, rezultatele obţinute până acum subliniind o dată în plus acest aspect. Din cele peste 500 de milioane de plante multiplicate anual, proporţia cea mai mare o deţin plantele ornamentale*

Principalul obiectiv al acestui studiu este dezvoltarea unui sistem rapid de regenerare la Pelargonium peltatum L,utilizând ca inocul iniţialexplantele nodale. Acestea au fost inoculate pe un mediu bazal MS (Murashige and Skoog, 1962) conţinând 3% zaharoză, suplimentat cu diferite concentraţii şi combinaţii de 6-benzilaminopurină (BAP), acid indolil-3 acetic (IAA) sau acid indolil 3 butiric (IBA) şi GA_3. Numărul maxim de lăstari (14.3±1.5) a fost obţinut, după 2-3 săptămâni de cultură, pe mediu conţinând 2.0 mg/l BAP şi 1.0 mg/l NAA.

Lăstarii regeneraţi au fost înrădăcinaţi pe acelaşi mediu de bază MS suplimentat cu NAA, în diferite concentraţii, pe o perioadă de 8-10 zile. Plantele complet dezvoltate au fost transferate pe substrat de sol, după aclimatizare fiind crescute în sere.

INTRODUCTION

The genus *Pelargonium* L. is a rather big one and is comprised of well over 200 species. The majority are native to the Southern part of the African continent.

Because of their ability to survive in arid conditions, because of their adaptability, and, last but certainly not least, because of their beautifully colored flowers, there are probably only a few gardeners who have never grown pelargoniums. Most of the balcony and windowsill plants are, however, cultivars. Controlled hybridization started two centuries after their arrival to Europe in 1600 and reached its peak in Victorian England.

Micropropagation (in vitro propagation of axillary and/or adventitious buds as well as somatic embryos) is presently used as an advanced biotechnological system for the production of identical pathogen-free plants. Conventional techniques of vegetative propagation of *P. peltatum* based on cuttings are difficult because of the low rates of rooting. The cells and tissues cultures "in vitro" assure a unique opportunity to manipulate the morphogenesis in a perfectly controlled medium, thus offering a powerful complementary instrument that can help in overcoming such problems.

Plant regeneration in vitro is dependent on the manipulation of the inorganic and organic constituents in the medium, as well as the type of explant and the species. In most plants, successful regeneration from the callus or directly from the explants takes place after a series of subcultures in various media, in a sequence which is often specific to the species, variety, or the newly introduced genotype. The determining factors are the combination of the concentration in relation to medium volume and the composition of growth promoting and retarding regulators in the medium, the physiological status and competence of the cells and their capability for morphogenetic expression.

MATERIALS AND METHODS

Explants were collected from healthy, mature mother plants maintained at Vegetable Research and development Station Bacau. The young shoots excised from this actively growing plant,.were cut into 1.0 to 2.0 cm nodal segments and used for induction of multiple shoots.

Explants were washed thoroughly under running tap water for 30 min and treated with a surfactant, Tween 20 (10 drops per 100ml of sterilized distilled water). Then these explants were surface sterilized with 0.1% mercuric chloride (w/v) for 15 min and washed repeatedly using sterilized distilled water. Under aseptic conditions, explants were inoculated on basal MS (Murashige and Skoog, 1962) medium containing 3% (w/v) sucrose, supplemented with different concentrations and combinations of 6-benzylaminopurine, kinetin, indole-3-acetic acid (IAA), indole-3-butyric acid (IBA) or gibberellins (GA_3) for direct plant regeneration and root induction (Table 1). The pH was adjusted to 5.8 prior to the addition of 0.8% agar and autoclaved at 121°C (1.06 kg/cm2) for 15 min.

Cultures were incubated at 25±1°C under 16 hr photoperiod of 3000-lux light intensity.

The cultures were transferred at a 2 weeks interval on fresh media, for a period of 90 days. Observation of shoot multiplication and growth were recorded at weekly intervals. After two weeks, shoots of above 2.0 cm length were harvested and subcultured on the same medium for the continuation of the regeneration processes.

Table 1

Variants of nutritive medium with different hormonal factors utilized for "in vitro" regeneration

Components	P_1	P_2	P_3	P_4	P_5	P_6	P_7
Macroelements	MS	MS	MS	MS	MS	MS	MS
Microelements	MS	MS	MS	MS	MS	MS	MS
Vitamins	MS	MS	MS	MS	MS	MS	MS
BAP	2.0	2.0	3.0	2.0	-	-	-
KIN	-	-	-	-	2.0	2.0	2.0
NAA	1.0	-	-	-	1.0	-	-
IAA	-	-	1.5	-	-	-	1.5
IBA	-	1.0	-	-	-	1.0	-
GA_3	-	-	-	1.0	-	-	-
Sucrose	30 g/l	30 g/l	30 g/l	30 g/l	30 g/l	30 g/l	30g/l
Agar	8 g/l	8 g/l	8 g/l	8 g/l	8 g/l	8 g/l	8g/l
pH	5,8	5,8	5,8	5,8	5,8	5,8	5,8

A part of the newly formed shoots that demonstrated a good development of leafs were transferred to rooting medium containing different concentration of NAA (table 2).

Table 2

Variants of rooting medium with different concentration of NAA auxine

Components	R_1	R_2	R_3
Macroelements	MS	MS	MS
Microelements	MS	MS	MS
Vitamins	MS	MS	MS
NAA	0,6 mg/l	0,8 mg/l	1 mg/l
Sucrose	30 g/l	30 g/l	30g/l
Agar	8 g/l	8 g/l	8g/l
pH	5,8	5,8	5,8

After 2 weeks, the rooted plants were acclimatized and planted in a potting mixture of sterilized sand + vermiculite (1:1 ratio) in plastic cups, hardened in a mist chamber (80% relative humidity) for acclimatization during 2 weeks before transfer to green house.

RESULTS AND DISCUSSIONS

Shoot buds got initiated on nodal segments after 6 days of culture. Only 0.04% of the shoots didn`t have any positive development, the noted reaction being toward partial or total necrosis of the tissues. The higher frequency (97.5%) formation of maximum number of shoots was observed in 2 mg/l BAP in combination with 1.0 mg/l NAA (variant P1). Initially 1 or 2 buds developed, later upto 12 shoots of above 4 cm length were formed in node in two weeks. KN in combination with NAA was less effective than BAP as it induced only up to 72.0 % formation of 6 - 7 shoots.

Table 3

Effects of different concentrations of BAP, KN alone and in combination with IBA, IAA or GA_3 in MS medium for multiple shoot induction from node explants of *Pelargonium peltatum* L.

Variant	% of explant showing response	Average no. of shoots	Average length of shoots
P_1	97.5	14.3±1.5	3.7±0.38
P_2	85.0	13.9±2.9	3.5±0.28
P_3	90.0	12.0±0.5	4.1±0.52
P_4	83.9	7.9±0.5	4.4±0.46
P_5	72.0	8.0±0.5	3.1±0.60
P_6	75.5	11.0±0.4	3.4±0.29
P_7	74.7	10.8±1.6	3.3±0.34

Preliminary studies proved that nodal explants culture in MS medium individually supplemented with both BAP and KN showed remarkable response. Among cytokinins, 2.0 mg/l BAP responds well compare to KN in medium for shoot proliferation (see Table 3). In order to evaluate the synergistic effect of BAP with IAA, IBA and NAA for direct plant regeneration, NAA combinations responded well compare to IAA or IBA. The maximum induction of multiple shoots (14.3±1.5) was achieved from medium supplemented with 2.0 mg/l BAP and 1.0 mg/l NAA, 2 to 3 weeks after incubation, with an average shoot length of 3.7 cm (Figures 1 a-c).

Among the concentrations tested, the best response was noticed with 2.0 mg/l BAP and 1.0 mg/l NAA. Normally, other species like *P. peltatum* shows good response towards plant regeneration in MS medium in the presence of BAP combined with auxins as reported by various authors.

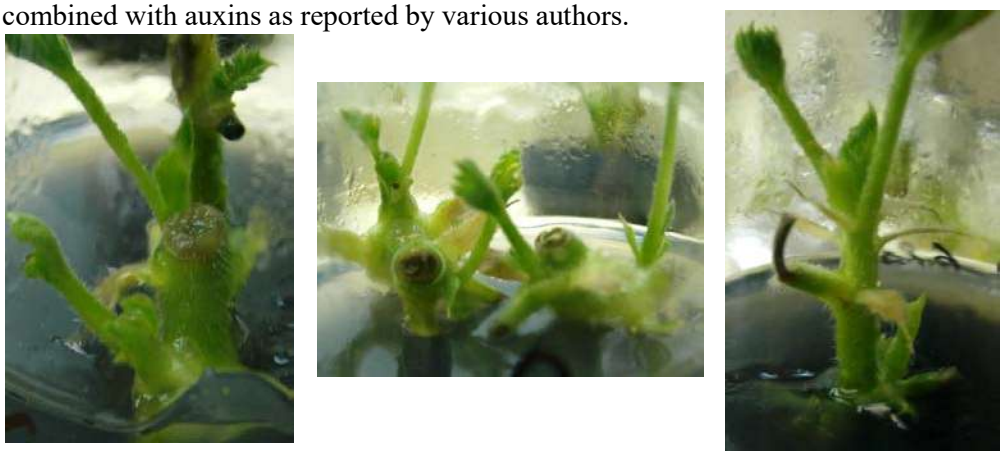

Fig. 1 a-c: Different aspects of shoots proliferation "in vitro"

After 3 to 4 weeks, when regenerated shoots reached a length of more than 4.0 cm, they were separated and transferred on MS basal medium with different concentration of NAA.

Table 4

Effects of different concentrations of NAA in MS medium for root induction from shoots of *Pelargonium. peltatum* L.

Variant	% of rooting response	Average length roots (cm)
R_1	**98.9**	2.6±0.29
R_2	**97.3**	2.9±0.26
R_3	**97.1**	3.1±0.50

The results obtained on the rooting medium shows the fact that NAA is ended the best auxin for root induction, the rooting reaction being positive on all the variants. Whereas root primordial emerged from the shoot base on first week of culture on auxin- supplemented medium. Maximum percent of rooting response (98.9%) were produced on R_1 variant characterised by the addition of 0.6 mg/l NAA in the basal MS medium. (Figure 2).

Fig. 2 – General aspects of shoots on rooting medium

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Fig. 3 – Plants on acclimatization stage

Fig. 4 – Acclimatized plants

For acclimatization – figure 3, plantlets were removed from rooting medium after twenty days of incubation and transferred to plastic pots containing soil substrate – fig. 4 and covered with perforated polythene bags to maintain humidity and were kept under culture room conditions for one week

After two weeks, polythene bags were removed and transferred to green house and placed under shade until growth was observed.

CONCLUSIONS

Direct shoot multiplication is possible for generating true-to-type plants of *Pelargonium peltatum*. This study supports the rapid multiplication of this useful medicinal plant by *in vitro* conditions. This report provides a simple protocol for the micropropagation of *Pelargonium peltatum*. Shoots can be easily derived from node cultures on BAP containing medium and subsequently rooted on NAA containing medium. The efficiency of the system could be improved to give rise to more shoot proliferation. This approach offers a means for producing identical plantlets from node explant of *Pelargonium peltatum.*

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SUBSTRATE INFLUENCE ON THE ROOTING AND ROOTS QUALITY ON *MAMMILLARIA ELONGATA* PLANTS OBTAINED FROM CUTTINGS

INFLUENȚA SUBSTRATULUI ASUPRA ÎNRĂDĂCINĂRII ŞI CALITĂȚII SISTEMULUI RADICULAR LA PLANTELE DE *MAMMILLARIA ELONGATA* OBȚINUTE DIN BUTAŞI

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Abstract. *Mammillaria elongata is well known and appreciated cactus species by the flower loved people. For this reason our researches come to multiply this plant and to find the best substrate for rooting, to satisfy the requirements for it.*

The aim of the researches was to establish the best substrate for rooting of Mammillaria elongata cuttings and the influence of the period of time from picking to placing of the cuttings on the rooting and quality of roots.

The experimental results show that the best rooting substrate is the one consisting of peat and perlit, while the best period for rooting was recorded on cuttings planted one day after pick.

Rezumat. *Mammillaria elongata este una dintre cele mai cunoscute şi apreciate specii de cactuşi de către iubitorii de flori. Din acest motiv cercetările noastre s-au axat pe identificarea celui mai bun substrat de înrădăcinare, pentru multiplicarea plantelor, în vederea satisfacerii cererii de piață.*

Scopul cercetărilor a fost acela de a stabili care este cel mai bun substrat de înrădăcinare pentru butaşii din această specie de cactuşi şi în acelaşi timp dacă perioada cuprinsă între momentul alegerii butaşilor şi plasarea lor pe mediul de înrădăcinare influențează procentul şi calitatea înrădăcinării acestora.

Rezultatele experimentale au arătat că, dintre substraturile utilizate, cele mai bun a fost cel format din turbă şi perlit, în timp ce butaşii plantați la o zi după recoltare au înrădăcinat cel mai bine.

MATERIAL AND METHODS

These researches were performed on the U.S.A.M.V. Bucharest flower greenhouses and at room temperature, during 2003-2004 study years.

The biological material was represented by cuttings picked from two years old healthy mother plants. It was organized a bifactorial experience:

- **A factor**- rooting substrate with 5 variables: a_1-sand, a_2-perlit, a_3-peat, a_4-peat+sand, a_5- peat+ sand.

- B factor- time period during the moment of cuttings harvest and the moment of placing them on the rooting substrate, with two variables: b_1-1 day, b_2- 4 days.

Three experimental series were made, for obtaining very concluding data:

- 31.03. - 30.05.2003, in the cold greenhouse of U.S.A.M.V. Bucharest, at medium 19º C temperature;

- 05.02. - 05.04.2004, on the same location, at medium temperature of 20ºC,

- 02.05. - 02.07.2004, on room conditions, at medium temperature of 24º C.
There were used plastic pots, with 3-4 cm diameter.

Two months after planting were made the following determinations: rooting percent and roots development (by measuring the roots length).

All the experimental variants consisted of four repetitions, each of them made from four cuttings.

RESULTS AND DISCUSSIONS

For a better representation of the rooting substrate and period from picking to placing, upon roots growth, on different temperature level conditions, the experimental results will be showed according with the three experimental periods.

There can be mentioned that if the rooting percent was total (100 %) for all the experimental variants, the roots development was different.

From table no.1 (experimental period 31.03. - 30.05.2003, and 19 ºC as the temperature level), there can be seen that the roots length, after two months from cuttings placing moment, is significantly influenced by the rooting type of substrate and by the period from their picking to placing.

Table1

Rooting substrate and period from picking to placing influence on *Mammillaria elongata* cuttings roots growth

Substrate (31.03.-30.05.2003)	Period from picking to placing (days)		Substrate average
	1	4	
Sand	3,05	2,25	2,65 E*)
Perlit	4,80	4,15	4,48 D
Peat	5,60	4,85	5,23 C
Peat + sand	7,50	6,73	7,12 B
Peat + perlit	9,80	7,40	8,60 A
Period average	**6,15 M***)	**5,08 N***)	

**) in the same column, the value noted with the same letter doesn't show significant differences on the 5% level, according to the Duncan Test*

In all the cases (cuttings placed after one or four days after picking), the roots length were higher on substrate consisting of „peat + perlit" (average value 8,60 cm), with significant differences from the other substrates. The smallest value was on „sand" (with an average value 3,25 times smaller). The intermediary value was on „peat +sand" (average value 7,12 cm).

Analyzing the influence of period from picking to placing, it can be seen that the cuttings placed one day after picking recorded longer roots than the other ones (average value of 6,15 cm to 5,08 cm, which, according to the Duncan Test showed significant differences, on the 5 % level).

The same trend is available for the other two experimental periods (05.02. - 05.04.2004, medium temperature of 20 ºC; 02.05. - 02.07.2004, medium temperature of 24 ºC.)(tables 2 and 3).

Table 2

Rooting substrate and period from picking to placing influence on *Mammillaria elongata* cuttings roots growth

Substrate (05.02.-05.04.2004)	**Period from picking to placing (days)**		**Substrate average**
	1	**4**	
Sand	2,53	1,93	2,23 E*)
Perlit	3,65	2,73	3,19 D
Peat	4,80	3,55	4,18 C
Peat + sand	5,23	4,15	4,69 B
Peat + perlit	5,83	4,80	5,32 A
Period average	**4,40 M***)	**3,43 N***)	

**) in the same column, the value noted with the same letter doesn't show significant differences on the 5% level, according to the Duncan Test*

The experimental results registered in table no. 2, available for the second period of experiments (05.02. - 05.04.2004, medium temperature of 20 ºC) show that the roots average length in increasing from "sand" (2,23 cm) to "peat +perlit" (5,32 cm) and in the same time from 3,47 cm (at the four days period from picking to placing) to 4,40 cm (at one day period), with the same differences significance between experimental variants.

Table 3

Rooting substrate and period from picking to placing influence on *Mammillaria elongata* cuttings roots growth

Substrate (02.05.-02.07.2004)	**Period from picking to placing (days)**		**Substrate average**
	1	**4**	
Sand	2,81	2,13	2,47 E*)
Perlit	4,32	3,30	3,81 D
Peat	5,50	4,15	4,83 C
Peat + sand	6,53	5,63	6,08 B
Peat + perlit	7,90	6,30	7,10 A
Period average	**5,41 M***)	**4,30 N***)	

**) in the same column, the value noted with the same letter doesn't show significant differences on the 5% level, according to the Duncan Test*

In the third experimental variant (02.05. - 02.07.2004) when the researches were made in room condition, and a temperature level of 24 ºC (table no. 3), the experimental data showed an increasing average value for the roots length from "sand"(2,42 cm) to "peat + perlit" (7,1 cm) and from 4,30 cm (four days period) to 5,41 cm (one day period).

So, no matter of the three experimental variant period, the rooting development on the *Mammillaria elongata* cuttings was influenced in the same time by the rooting substrate and the period during the picking and the placing of the cuttings on it..

Average experimental data from figure no.1 clearly revealed that the best rooting substrate is made of equal parts of "peat + perlit", followed by the "peat + sand" one.

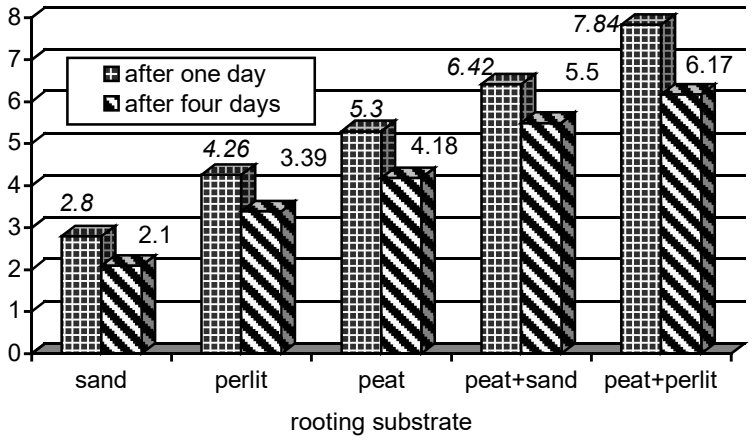

Figure1. Roots length on *Mammillaria elongata*, according with the period between picking and placing time

CONCLUSIONS

Cuttings rooting are better when they are placed one day after picking, when they are placed four days after picking. In this case, after four days, there is a higher dehydration and their turgescency is more difficult to recover.

Roots growth and development is depending on the substrate type too. The best results were recorded on the rooting substrate consisted of "peat + perlit"and the lowest results were on the substrate consisted of "sand".

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RESEARCH REGARDING THE DIVERSIFICATION OF THE METHODS OF BREEDING OF SOME OF THE SPECIES OF *SEMPERVIVUM*

CERCETĂRI PRIVIND DIVERSIFICAREA METODELOR DE ÎNMULȚIRE LA UNELE SPECII DE *SEMPERVIVUM*

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***Summary**: The species of the type Sempervivum are used more and more frequently in landscaping owing to their succulent nature, which explains their capacity to develop and withstand the conditions of long drought, barren soils and at levels of scarce vegetation. In the literature studied there were found no concrete specifications or results of the research concerning the breeding of these plants. This seems to justify the very limited assortment of species belonging to the Sempervivum type, as a consequence of the lack of information regarding the production of planting material. Considering that there are questions which have not been answered yet, questions regarding the types of slip seedlings used, the conditions of their rooting, of the substratum used for the rooting of the slip seedlings or of the leaf rosettes, some experiments were set up in the purpose of observing the behaviour of the species from the local assortment during its vegetative breeding.*

***Rezumat**: Speciile genului Sempervivum sunt din ce în ce mai frecvent folosite în amenajările peisagistice datorită naturii lor suculente, ceea ce explică capacitatea de a se dezvolta şi rezista în condiţii de secetă prelungită, pe soluri uscate şi cu nivele de troficitate scăzute. În literatura consultată nu s-au găsit precizări concrete sau rezultate ale unor cercetări privind înmulţirea acestor plante. Acest fapt justifică, se pare, sortimentul foarte restrâns de specii aparţinând genului Sempervivum ca urmare a lipsei de informaţii privind producerea de material săditor. Având în vedere unele întrebări care încă nu au primit răspunsul referitor la tipurile de butaşi folosiţi, a condiţiilor de înrădăcinare, a substratului folosit la înrădăcinarea butaşilor sau a rozetelor de frunze, s-au organizat unele experimente cu scopul de a se observa comportarea în procesul înmulţirii vegetative a speciilor din sortimentul autohton.*

MATERIAL AND METHOD

The material used to organize the research consisted of the plants belonging to two species of *Sempervivum*. The species under consideration may be found in the assortment of succulent plants, within the Faculty of Horticulture of the USAMV of Cluj-Napoca and were produced by the Botanical Gardens of Cluj and Iasi.

Sempervivum tectorum L. The plants have the appearance of rosettes, the diameter of which may reach up to 20 cm. The leaves are arrayed in concentric rows in upright position directed towards the center of the rosette, and the marginal ones are bent to the outside. The height of the rosettes is 4.0-5.5 cm.

The limb of the leaves is glabrous or lightly pubescent, the edges are covered with thin green small hairs. The limb has the shape of a spatula.

Its colour is green, and the top, ending into a thorn is reddish-brown. The rosettes form short pubescent offsets, of average thickness, on the edges of which daughter rosettes take shape, reddish-mauve coloured.

Sempervivum montanum L. It has smaller rosettes, with a diameter of 4.0-4.5 cm, the leaves are green, and the array of the leaves in the rosettes is tight in the center and loose on the outside. The leaves from the upper third are 5 to 7 mm thick. The daughter rosettes have few leaves and of small size. In May the mature rosettes give birth to inflorescences upheld by floral stems 10-15cm high. For the set up of the experiments, the substrata used for the rooting of the slip seedlings were the perlit and the river sand.

The degree of complexity of the experiments was average, the experiments depending on one factor and on two factors. The number of plants in one variant was 45, and then 15 in its repetition.

OBSERVATIONS AND MEASUREMENTS

At the moment of organization of the experiments, there were carried out measurements and analyses in the purpose of characterizing as thoroughly as possible the initial biologic material. These observations referred to the size and weight leaves or leaf rosettes. During the rooting phase, the values of the temperature of the air and of the substratum were recorded.

The observations and measurements carried out during or at the end of the experiment were calculated statistically and the arithmetical means were retained. They are presented in the tables, some of them being undergoing statistical calculations in order to establish the limit differences and the significations.

On the basis of the results obtained, one has drawn conclusions and recommendations for the floristic practice.

RESULTS AND DISCUSSIONS

Vegetative breeding and producing the planting material to the species of *Sempervivum*. The specialty literature mentions in unanimity the possibility of vegetative breeding of the species *Sempervivum* by rooting the leaf rosettes that are formed around the mother-plants.

There are very few sources that state that perhaps there is the possibility of vegetative breeding by the rooting of the leaves (leaf seedlings) as well. Starting from these affirmations, one has organized an experiment in which the leaves taken from the rosettes of *S.tectorum* which has reached a development specific to the mature plants were used as slip seedlings. For these to be characterized, they were measured and weighted (Table 1). The leaves were splitter into three categories: outward (large) ones, middle ones and those of the center of the (small) rosette.

Analyzing the data of table 1, these lead to a first conclusion, namely: the leaves from the *Sempervivum* rosette decrease in dimensions going from the outside towards its centre. Both absolute values and relative ones confirm these affirmations.

From the features analyzed, the length and weight of the leaves undergoes the biggest differences between categories. Thus, the length decreases by about 27% from the outside towards the middle and by 17% more towards the center of the rosette. The leaves in the centre of the rosette are shorter by 46% than the marginal ones. The maximum breadth and the thickness of the leaves from the upper third keeps the same tendency of decreasing the values (going) from the outside towards the centre of the rosette, but the differences between the categories are much smaller (maximum 10%).

Tabelul 1

Average values of the *Sempervivum tectorum* leaves' dimensions used as slip seedlings

No. crt.	Species	Length of leaves		Breadth of leaves		Thickness of leaves		Weight of leaves	
		mm	%	mm	%	mm	%	gr.	%
1.	*Sempervivum tectorum* (small leaves)	29.3	100	13.6	100	3.3	100	0.62	100
2.	*Sempervivum tectorum* (middle size leaves)	21.5	73	13.0	96	3.0	91	0.33	53
3.	*Sempervivum tectorum* (large leaves)	16.3	56	12.2	90	2.7	82	0.15	25

With respect to the weight of the leaves, this feature is the most variable one, with values intensely decreasing from the outside to the middle of the rosette (47%) and reaching up to 75% in the centre of the rosette.

The leaf slip seedlings were planted for the rooting in the perlit, being introduced with the bottom in the substratum in upright position. From that point on, one has created the optimal conditions for rooting, preserving a moderate humidity in perlit and air, keeping the temperature between the limits of 10°C and 22°C. After 18-20 days one has checked if the leaves rooted but the result was negative.

The experiment went on with verifying regularly the rooting. 50 days after the performance of the experiment, the leaves originating from the centre of the rosette began to turn brown and to lose their vigour. In the aftermath the same phenomenon was noticed with the leaves originating in the middle part of the rosette, and then those from the outside of the rosette grew brown as well.

The conclusion following this attempt is that the leaves of *Sempervivum* do not root in usual conditions using the classical methods.

In parallel with this experiment, one has used for the breeding of plants, rosettes of *S. montanum* which had been separated from the mother plants and which have been put for rooting in different substrata being maintained in different conditions of humidity (Table 2).

Analyzing these values one notices that the number of rosettes formed by a mother plant differs, in our case from 3 to 14, even though the mother plants were relatively uniform. One notices also that the rosettes formed by a mother plant vary both with respect to weight and the other parameters (the diameter of rosette and its height.

These rosettes were planted for rooting in substrata of river sand, perlit and grinded peat (2:2:1). Later on the conditions of rooting differed especially regarding the humidity in the atmosphere and in the substratum.

The rosettes maintained in tough conditions (of laboratory) - low atmospheric humidity (20-30%) and great variations in substratum from very dry to very wet, maintained their viable aspect for almost 100 days, whereas with other rosettes, especially the smaller ones, the leaves from the outside of the rosette began to fade; the phenomena continued, and finally, some of the rosettes faded without growing roots (Table 3).

Table 2

Values of the quantitative parameters of the rosettes used for rooting (*S.tectorum*)

Specification	Symbol	Weight (g)		Diameter (cm)		Height (cm)		Stem diameter (mm)	
		maxim	minim	maxim	minim	maxim	minim	maxim	minim
Mother plant	1	8.5	-	5.0	-	2.2	-	5.0	-
Daughter rosettes	1-5	7.3	1.5	2.6	1.5	2.4	1.4	6.0	2.0
Mother plant	2	7.8	-	5.8	-	2.4	-	4.0	-
Daughter rosettes	1-14	7.9	0.5	2.6	1.0	2.3	1.1	4.0	2.0
Mother plant	3	8.5	-	7.8	-	2.8	-	4.2	-
Daughter rosettes	1-6	8.2	2.9	2.9	2.2	2.5	1.6	5.0	3.5
Mother plant	4	7.9	-	6.5	-	2.2	-	3.5	-
Daughter rosettes	1-3	8.4	1.5	2.9	1.5	2.3	1.2	3.3	3.0
Mother plant	5	7.6	-	4.8	-	2.5	-	4.0	-
Daughter rosettes	1-3	7.4	1.4	2.8	1.5	2.3	1.3	4.5	3.5
Mother plant	6	6.8	-	5.5	-	2.3	-	4.0	-
Daughter rosettes	1-4	6.5	1.6	2.8	1.7	2.3	1.2	3.5	3.0

Table 3

Experimental results regarding the rooting and growing of rosettes of *Sempervivum montanum* in tough environment conditions

Variant	No. of rosettes for rooting	Rooted rosettes		Average values of the rosettes		
		nr.	%	diameter (cm)	height (cm)	No of rosettes formed
Big rosettes - > 2.5 cm	24	14	58.3	3.2	2.3	-
Average rosettes - 2.5 < 2.0 cm	24	11	45.8	2.9	1.8	-
Small rosettes - 2.0 cm >	24	7	29.2	2.2	1.2	-

The number of rosettes that rooted and were viable is small, the percentage of rooting wavers between 29.2% and 58.3%. One notices also a very weak development as compared to their initial size, as well as the lack of daughter rosettes. One notice that no rosette started to grow any daughter rosettes. Some rosettes of the same categories have been planted in the same substratum and have been maintained for rooting in hothouse conditions, with high values of the atmospheric humidity, and keeping the humidity in the substratum at low values.

The results of this experiment are presented in Table 4 and they emphasize the great differences from the results obtained in laboratory conditions.

Table 4

Experimental results regarding the rooting and growing of rosettes of *Sempervivum montanum* in optimal environment conditions

Variant	No. of rosettes for rooting	Rooted rosettes		Average values of the rosettes		
		nr.	%	diameter (cm)	height (cm)	No of rosettes formed
Big rosettes - > 2.5 cm	24	23	95.8	5.8	2.5	6.2
Average rosettes - 2.5 < 2.0 cm	24	21	87.5	5.1	2.3	5.6
Small rosettes - 2.0 cm >	24	20	93.3	4.2	2.1	4.8

The rooting of rosettes occurs in great number, being equivalent to a percentage wavering between 83.3 % and 95.8 %. The data in the table above support the hypothesis that bigger rosettes have greater chances in becoming mature plants which would form new rosettes.

The conditions of the experiment influences favorably the growth of the rosettes, reaching dimensions typical for their species (4.5-6.5 cm in diameter), as well as the formation of daughter rosettes. Their number is greater (6.2) for the plants originating from the rosettes the initial size of which was larger, and it decreases 4.8 for the plants stemming from smaller rosettes (Table 5).

Table 5

The synthesis of the experimental results regarding the formation of new rosettes to the plants of *Sempervivum* under the influence of the species and of the culture substratum

Variant	Size of rosettes, diameter (cm)		Rosettes formed		± d	Significance of the difference
	initially	after 100 days	no.	%		
S. tectorum x gravel (Mt)	7.2	11.5	4.3	100	-	-
S. tectorum x gravel + garden soil	7.5	14.6	5.2	121	0.9	*
S. tectorum x gravel + perlit	7.4	9.3	3.1	72	-1.2	o
S. montanum x gravel	2.7	3.8	6.5	151	+2.2	*
S. tectorum x gravel + garden soil	3.0	5.5	8.3	193	+4.0	***
S. tectorum x gravel + perlit	2.8	4.0	6.2	144	+1.9	*

DL 5% = 1.21 DL 1% = 2.36 DL 0.1% = 3.45

Along the idea of answering the question „In what conditions do the species of *Sempervivum* form a greater number of rosettes" one has set up an experiment with three different substrata in order to emphasize their influence.

Substrata consisted of coarse sand (gravel), gravel blended with garden soil (1:1) and gravel blended with perlit. (1:1). Analyzing the results of the table, one notices a variation of the number of newly formed rosettes, depending on the variants. Thus, the witness is surpassed by all the variants of the species *S. montanum* regardless of the culture substratum used, and it is surpassed even by variant 2, which differs from the witness by the culture substratum. The witness is superior to variant 3, where the species is the same, but the substratum is made up of gravel mixed with perlit.

In order to establish the influences of the two factors, the results were calculated so that one may determine the influence of the species (Table 6).

Table 6

The synthesis of the experimental results regarding the formation of rosettes of *Sempervivum* under the influence of the species

Variant	Rosettes formed		± d	Significance of the difference
	nr.	%		
Sempervivum tectorum	12.6	100	-	-
Sempervivum montanum	21.0	167	8.4	***

DL 5% = 2.16 DL 1% =4.04 DL 0.1% = 6.12

The results in the table emphasize that the species *S.montanum* forms more rosettes than *S.tectorum*, and the difference between them is very significant. In order to determine to what extent the culture substratum influences the rosette formation we analyze the data in the Table 7.

Table 7

The synthesis of the experimental results regarding the formation of rosettes of *Sempervivum* under the influence of the culture substratum

Variant	Rosettes formed		± d	Significance of the difference
	no.	%		
Gravel	10.8	100	-	-
Gravel + garden soil	13.5	125	2.7	**
Gravel + perlit	9.3	86	-1.5	o

DL 5% = 1.42 DL 1% = 2.53 DL 0.1% = 3.71

The data in the table show that the culture substratum does have an influence upon the rosette formation. The gravel - considered as witness - is surpassed by its mixture with garden soil, the difference obtained is distinctly significantly positive. Mixing the gravel with the perlit negatively influences the rosette formation, thus their number is smaller than that of the witness, and the difference is significantly negative.

CONCLUSIONS AND RECOMMENDATIONS

1. The species of *Sempervivum* do not allow for vegetative breeding using their leaves as slip seedlings in usual conditions and with classical technologies.

2. The rosettes without roots undergoing conditions of severe drought especially atmospheric one together with insufficient water in the soil preserve their viability for 50-60 days, they do not form daughter rosettes, and the leaves of the rosette begin to fade from the outside to the centre of the rosette.

3. The rosettes separated from the mother plant, provided they enjoy atmospheric and soil humidity, will grow numerous very thin adventitious roots, which stimulate the growth of the rosettes as well as the forming of new rosettes.

4. The number of formed rosettes by the plants of *Sempervivum* depends on the species but also on the culture substratum. A well drained substratum which has enough nutritious elements favors the formation of a greater number of rosettes.

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ASPECTS REGARDING THE SITUATION OF AGREEMENT AREAS FROM INSIDE AND OUTSIDE IAŞI CITY

ASPECTE PRIVIND SITUAȚIA ZONELOR DE AGREMENT DIN INTRA- ŞI EXTRAVILANUL MUNICIPIULUI IAŞI

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Abstract. *Agreement, in the frame of Iaşi city, is assured by a number of parks and public gardens, quite frequented (Copou Garden, Exposition Park, Botanical Garden etc.) but the analysis of the zones with the special statute of "agreement zone" underlined the following aspects: Ciric area is relatively seldom used by the citizens of Iaşi, because of certain dysfunctional items; Breazu area s not used at the desired capacity because of the poor accessibility and reduced agreement options; Ţicău area is not equipped and arranged in order to serve an agreement purpose; Cetățuia area is appreciated more for the surroundings and the specific micro-climate than for the existing opportunities; Galata area offers few recreational activities because it is not equipped and arranged and the Bucium-Repedea area is not sufficiently equipped to cope with a great number of visitors. The study underlined the fact that in the surroundings of Iaşi, in present, practically exists a deficiency of 3200 ha, because the surface of the in-city agreement zone is of only 38,30 ha, and the one of out-city agreement zone is of 367 ha.*

Rezumat. *Agrementul în cadrul municipiului Iaşi este asigurat de către o serie de parcuri şi grădini publice foarte frecventate (Grădina Copou, Parcul Expoziției, Grădina Botanică, ş.a.) dar analiza zonelor cu statut special de zone de agrement a evidențiat următoarele aspecte: zona Ciric este relativ slab utilizată de către ieşeni, datorită unor certe disfuncționalități; zona Breazu nu este utilizată la capacitatea dorită datorită accesibilității reduse şi dotării precare; zona Ţicău nu este dotată şi amenajată corespunzător funcției recreative; zona Cetățuia este prețuită mai mult pentru cadrul peisagistic şi microclimatul specific, decât pentru dotările existente; zona Galata oferă foarte puțin din punct de vedere recreativ, fiind nedotată şi neamenajată iar zona Bucium-Repedea nu are dotarea suficientă pentru a face față fluxului mare de vizitatori. Studiul a evidențiat faptul că în zona municipiului Iaşi, la ora actuală există practic un deficit de aproximativ 3200 ha, deoarece suprafața zonelor de agrement intravilane este de doar 38,30 ha, iar cea a suprafețelor de agrement extravilane de 367 ha.*

Daily agreement and especially the one practiced in week-ends and on holidays is assured, in the frame of Iaşi city by a number of green zones, which entered in tradition from this point of view, like as Copou Garden, Exposition Park, Ghica Vodă Strip, Botanical Garden etc. Inside the Iaşi city, agreement is also assured by the town's swimming pool, by Nicolina watering zone as well as by the plantations on Galata slope.

MATERIAL AND METHOD

The analysis of the territory around Iaşi was realized between May 2005 - October 2006, on a radius of approximately 15 km arround Iaşi, through visual monitoring activity of the actual statute of the agreement zones in Iaşi and in the surroundings; more complex observations were made together with the specialists from Forestry Department of Iaşi, being part of a larger study.

The acquired and processed data served for structuring the results regarding vegetation and it's settlement in different zones inside of the close perimeter of Iaşi in order to draw some conclusions about the agreement zones and their present status, because they are parts of nature quite altered by the human activity in the studied area.

RESULTS AND DISCUSSIONS

In the administrative territory of Iaşi, the following agreement zones provide the agreement function**:**

1. CIRIC ZONE - situated at 6 km northeast from the center of the city, on Ciric river's valley. The main attraction elements are Ciric forest with a 252, 2 ha surface and the Ciric group of lakes (I, II and III), with a total surface of 31,5 ha, at which there are added a number of facilities and specific arrangements: the beach, the landing place, the children's playgrounds and sport fields, the camping area, the public food facilities etc. Ciric forest, considered actually a park-forest, represents a plantation of native and exotic trees and bushes, planted between 1936-1963, in order to stabilize the slipping slopes and also to transform the area into an agreement base. Under floristic aspect (by C. Dobrescu and co., 1958 and E. Agachi, 1977) the right slope, planted in the early stages, has as main tree species the followings: American maple (*Acer negundo*) approximately 55%, oak (*Quercus robur*) – 15%, locust tree (*Robinia pseudacacia*) – 10%, ash tree (*Fraxinus excelsior*) – 6% and, in a reduced ratio, black American nut tree (*Juglans nigra*), Pennsylvania ash tree (*Fraxinus pennsylvanica*), large leaf linden tree (*Tilia platyphyllos*), elm tree (*Ulmus foliacea, U. procera, U. pumila*), Norway maple (*Acer platanoides),* Tartarian maple (*Acer tataricum*), wild chestnut (*Aesculus hippocastanum*), tree of heaven (*Ailanthus altissima*), sessile oak (*Quercus petraea*), mahaleb cherry (*Prunus mahaleb*), eleagnus (*Elaeagnus angustifolia*), honey tree (*Gleditsia triacanthos*), japanese locust tree (*Sophora japonica*), catalpa (*Catalpa bignonioides*) ş.a.

There was noticed that only the oak and the ash tree vegetate satisfyingly, while the maple and the locust tree suffer in case they are placed on eroded or salty soil. Bushes have a random representation through the following species: *Euonymus europea, Sambucus nigra, Corylus avellana, Crataegus monogyna, Prunus spinosa, Rosa canina, Viburnum lantana, Amorpha fruticosa, Colutea arborescens, Rhus typhina* etc.

In what regards the recreational function, the Ciric agreement base is not used at normal capacity by the citizens of Iaşi because of the following dysfunctional items:

- Poor public transportation for the visitors towards this area;
- Insufficient and uninteresting endowing of the agreement base with the required public facilities;
- Periodic pollution of the Ciric lakes' waters, fact that was the object of repeated debates in the local press.

2. BREAZU ZONE – is placed at north from Iaşi, at approximately 1 km in-city limit, the main attraction being Breazu forest. From all 49 ha of this forest, almost 33 ha assure the agreement, specifically the area placed at east from the county road. The tree species encountered in the Breazu forest are: sessile oak (*Quercus petraea*), oak tree (*Quercus robur*), hornbeam (*Carpinus betulus*), common maple (*Acer campestre*), maple (*Acer platanoides*), Tartarian maple (*Acer tataricum*), linden tree (*Tilia tomentosa, T. cordata*), ash tree (*Fraxinus excelsior*), elm tree (*Ulmus foliacea*), service tree (*Sorbus torminalis*), bird-cherry (*Cerasus avium*), wild apple tree (*Malus sylvestris*) etc. The underwood is represented by the following species: common smoke tree (*Cotinus coggygria*), standard tree *(Staphylea pinnata),* mangy wood (*Euonymus verrucosa*), european mangy wood (*Euonymus europea*), wayfaring tree (*Viburnum lantana*), dogwood (*Cornus mas*), red dogwood (*Cornus sanguinea*), privet (*Ligustrum vulgare*), hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), wild rose (*Rosa canina*) etc.

It's a transition forest between the forest steppe and the quercinee's belt, presently in a very advanced degradation ruderal becoming process, especially on the margins and the access ways. In what regards the recreational function, Breazu forest is not used at full capacity, because of the poor accessibility and relatively precarious endowment. The area offers the possibility of active and passive recreation in a microclimate that is specific for a plain forest, with a relaxing landscape, favored by the proximity of the vineyards nearby. During winter, a part of the area is suitable for sleigh tracks and even for ski.

3**. ȚICĂU ZONE** is situated in the northeastern part of the city, close to the in-city limit, on the afforested slope of Copou hill. The main attraction is Țicău forest, with a total surface of 230 ha, from which approximately 50 ha are used for agreement, up from Țicău district to Târguşor Copou zone. Țicău forest is a plantation established between 1966 şi 1978 cu with tree mixtures made from: oak (*Quercus robur*), Norway maple (*Acer platanoides),* American maple (*Acer negundo*), sycamore (*Acer pseudoplatanus*), common maple (*Acer campestre*), ash tree (*Fraxinus excelsior*), elm tree (*Ulmus foliacea*), locust tree (*Robinia pseudacacia*), bird cherry (*Cerasus avium*), wild service tree (*Sorbus torminalis*), forest pine (*Pinus silvestris*), larch (*Larix decidua*), nut tree (*Juglans regia*), poplar *(Populus alba, P. euramricana),* Mahaleb cherry (*Prunus mahaleb*), wild

pear tree (*Malus sylvestris*), red dogwood (*Cornus sanguinea*), privet (*Ligustrum vulgare*), hawthorn (*Crataegus monogyna)*, blackthorn (*Prunus spinosa*), elder tree (*Sambucus nigra*), Russian olive (*Elaeagnus angustifolia*) etc. Țicău forest is not endowed and arranged to offer a recreational function, being suitable only for walks. It also has springs, captured and directed to the base of the slope. In winter, a semi-arranged ski and sleigh track is available.

4. **CETĂȚUIA ZONE** is situated in the southern part of the city, close to the in-city limit, on the northern slope of the Cetățuia hill. The main attraction elements are represented by Cetățuia forest, Cetățuia monastery with the belle view nearby and to north, Frumoasa monastery.

Cetățuia forest, with a total surface of approximately 120 ha is partially used for agreement purpose (app. 20 ha), respectively the northeastern sector of the hill. In fact it is a plantation established between 1947 and 1978, for stabilizing the land slipping that was affecting this slope. The forest contains mostly mixed tree associations – oak, common maple, maple, Tartarian maple, sycamore, ash tree, elm tree, bird cherry tree, flowering ash tree, locust tree, honey tree, dogwood, red dogwood, hawthorn, wild rose, blackthorn, Russian olive etc. – or single specie tree associations (locust tree, poplar, pine, oak). As recreation function, Cetățuia forest offers only the landscape and the specific climate conditions, few unfit paths towards the top of the hill for the belle view point and the monastery, as well as a rather picturesque winding road.

5. **GALATA ZONE** is situated in the southwestern part of the city, on the slope of Galata-Miroslava hill, in-city as well as to the in-city limit. The main attraction element is the vegetation and the Galata monastery from nearby. Many parts make the forest and it is covering a total surface of 103 ha, from which a very small area, of only 4 ha, is used for agreement purpose (especially the in-city parts of the forest). The forest was a plantation established between 1952 and 1978 for stabilizing the slope, and it is made by pure tree associations of locust tree (25 ha) or by locust tree and pine (app. 30 ha), or by mixed tree associations (oak, linden tree, ash tree, sycamore, common maple, maple etc.) on app. 32 ha, the rest being small areas occupied by pine (4,4 ha), Euro-American poplar (3 ha) and willow (1,6 ha). From the recreational function's point of view Galata forest offers few things, being unfit and not endowed to serve this purpose.

6. **BUCIUM-REPEDEA ZONE** is situated in the southeastern part of Iaşi, at app. 10 km, on the slopes and the plateau of Repedea hill, which dominated the surroundings of Iaşi from 350-400 m altitude. The attraction elements are represented by the forest, the motel and the Bucium camping area, Tărâța hermitage, Repedea plateau with the belle view points towards the city, Repedea geologic-paleontologic reservation s.o.

The forest is part of the forestry slope Bucium – Pietrărie – Bârnova – Mogoşeşti – Poieni - Păun – Repedea, which covers a surface of app. 15.000 ha.

In the in-city area, the forest and the agreement zone occupy approximately 40 ha, containing sessile oak (*Quercus petraea*) and oak (*Quercus robur*);other species frequently appear : hornbeam (*Carpinus betulus*), linden tree (*Tilia tomentosa, T. cordata*), ash tree (*Fraxinus excelsior*), Norway maple (*Acer platanoides)*, common maple (*Acer campestre*), s.o. and from the bushes: hawthorn (*Crataegus monogyna*), standard tree (*Staphylea pinnata*), wayfaring tree (*Viburnum lantana*), hazelnut tree (*Corylus avelana*), dogwood (*Cornus mas*) s.o.

Although it is not well endowed and not fit for recreational purpose, being at the same time hardly accessible, Bucium forest is intensively frequented, especially in summer but also in winter, when opportunities for ski and sleigh rides occur.

The legal standards underline the fact that the city of Iaşi would require a surface of 3600 ha agreement zone, presently existing only 405 ha agreement zone, creating a deficit of 3200 ha. Because of the afforested surface of only 1044 ha from inside the boundaries of Iaşi, from which only 960 ha are considered as forests with recreational function, it was observed that covering the agreement areas' deficit is not possible. The solution could be the surroundings of urban area, by considering and arranging the forests to serve as recreational agreement zones, covering a surface of 6100 ha.

CONCLUSIONS

1. The analysis of the surroundings of Iaşi was made between May 2005 - October 2006, on a radius of app. 15 km around Iaşi, by visual monitoring of the present status of the agreement areas from in-city and the surroundings of Iaşi.

2. Inside the administrative boundaries of Iaşi, the agreement function is assured by the following areas: Ciric, Breazu, Țicău, Cetățuia, Galata and Bucium-Repedea.

3. Under the aspect of recreational function, Ciric forest, as agreement base, is not used at normal capacity by the citizens of Iaşi because of some dysfunctional items (poor service, insufficient endowing and lake's water pollution).

4. Breazu forest is not used at full capacity as recreational area, because of poor accessibility and precarious endowing.

5. As recreational function, Țicău forest is not endowed and arranged for this purpose; it is suitable only for walks. It also has springs, captured and directed to the base of the slope..

6. From the recreational point of view, Cetățuia forest offers only the landscape and the specific climate conditions, few unfit paths towards the top of the hill for the belle view point and the monastery, as well as a rather picturesque winding road.

7. From the recreational point of view, Galata forest offers few, being not sufficiently endowed and arranged for this purpose.

8. Although it is not well endowed and not fit for recreational purpose, being at the same time hardly accessible, Bucium forest is intensively frequented, especially in summer but also in winter, when opportunities for ski and sleigh rides occur.

9. Iaşi city would require a surface of 3600 ha agreement forests, presently existing only 38,30 ha of in-city agreement zones and 367 ha of out-city agreement zones.

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OBSERVATIONS REGARDING THE FORESTRY MONITORING ACTIVITY IN VADURI-NEAMȚ FOREST WARD

ASPECTE PRIVIND ACTIVITATEA DE MONITORING FORESTIER ÎN OCOLUL SILVIC VADURI – NEAMȚ

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Abstract. *The study was conducted in Vaduri-Neamț forest ward during 2004 – 2005, having as primary objective the forestry monitoring activity started in accordance with the National Monitoring Program for soil and forestry vegetation, approved by H.G. no. 1003/2003. The monitoring activity, realized through tests in permanent sample areas (PSA) pointed out the following aspects: the biggest ratio in the forest ward is represented by fir wood – beech wood association (64%); approximately 8% are practically pure breed (made by a single specie: spruce fir, sylvestris pine, alder); over 75% from the tree associations have a superior productivity; the dominant species in the target area were spruce fir, fir and beech and the forest's sanitary situation is generally good, with moderate actions of some damaging factors (felling and wind crashes, land sliding etc.).*

Rezumat. *Studiul a fost efectuat în Ocolul Silvic Vaduri-Neamț în perioada 2004-2005, având ca obiectiv activitatea de monitoring forestier demarată conform Programului Național de Monitorizare sol-vegetație forestieră, aprobat prin H.G. nr. 1003/2003.*

Monitorizarea efectuată prin sondaje în suprafețe de probă permanente (SPP) a evidențiat următoarele aspecte: ponderea cea mai mare în cadrul ocolului silvic o reprezintă brădeto-făgetele (64%), cca. 8% dintre arborete sunt practic pure (alcătuite dintr-o singură specie: molid, pin silvestru sau anini), peste 75% dintre arborete sunt de productivitate superioară, specii dominante în cadrul zonei analizate s-au constatat a fi molidul, bradul şi fagul iar starea fitosanitară a pădurii în ansamblu este bună, cu acțiuni moderate ale factorilor destabilizatori (doborâturi şi rupturi de vânt, alunecări de teren ş.a.).

From the geographic point of view, the forests administered by Vaduri-Neamț forest ward are placed in the Oriental Carpathians and include the Bistrița's tributary rivers' basins, in it's central part, up-river before Piatra-Neamț city, till Pângărați The ward's surface is in the frame of carpathian sub-province, the Northern Oriental Carpathians area, eastern marginal district of gravel mountains, the group of Obcine's district and of high forests from the marginal pleogenic gravel area.

From the geographical systematization's point of view, the ward's territory from the right bank of Bistrița occupies the two cathetus of Tarcău Mountains (U.P. I and U.P. II) and the left bank (U.P. III and U.P. IV) occupies the last ramifications of the Obcina Stânişoara.

The research was conducted in the frame of the forestry monitoring activity developed in accordance with the National Monitoring Program for soil and forestry vegetation, approved by H.G. no. 1003/2003.

MATERIAL AND METHOD

The forestry monitoring represents the surveillance activity for forest's health and an inventory of the national forestry stock in order to offer, on a permanent base, information regarding the evolution status of the vegetation and the forestry soils, the effects of stress factors (pollution, dryness, the weather conditions changing, diseases and pests) on the forest, the production stock's size and structure.

For monitoring the forestry vegetation, there was necessary to establish a national network (4 x 4 km) of permanent testing surveys in order to watch annually the health status of the trees with in the permanent sample areas (PSA) as well as to make a statistic inventory of the forests on a national and regional level (once at every 5 years).

A survey contains two permanent sample areas (PSA), of a circular shape, placed at a 30 m distance from the survey's center, disposed on a east-west direction in the fields with a plane configuration and on the level's curve in slope fields. Every PSA is made by two concentrically circles of 200 square meters and respectively 500 square meters. Only trees with trunks over 80 mm in diameter are inventoried. The inventory of the trees from the permanent sample areas' content includes: measuring the basal tree diameter, measuring the height of 2 – 3 trees from each diameter category, framing into positional classes (Kraft) and into tree quality classes (Badea O., 1998).

Gathering, validating and processing information was realized during 2004 – 2006, with a specialized informational program INTMON and the study was conducted within the frame of a collaboration between Vaduri Forestry Ward and a group of U.Ş.A.M.V. students, working for their probation period for the Forestry discipline.

RESULTS AND DISCUSSIONS

The forestry vegetation from within the target area is generally composed by three main species from the mountain zone (*Picea abies, Abies alba, Fagus sylvestris)* and for the hilly zone is composed by *Quercus petraea*.

From the conducted study we were able to identify the forestry formations, as well as the surfaces they occupy on production units and on total ward surface.

Table 1

The forestry formations' surfaces

Forestry formation	Surface (ha)	%
(11) Pure spruce fir association	19.0	
(12) Spruce fir – fir tree association	160.1	1
(13) Spruce fir, fir tree and beech tree mixtures	269.7	2
(14) Spruce fir – beech tree association	20.0	
(21) Pure fir tree association	98.5	1
(22) Fir tree – beech tree association	9662.5	64
(23) Fir tree and beech tree mixed associations	219.5	1
(31) Pure sylvestris pine tree association	7.4	
(41) Pure mountain beech tree association	3160.8	21
(51) Pure sessile oak association	627.4	4
(52) Sessile oak – beech tree association	973.5	6
(97) Black alder association	0.4	
(98) White alder association	17.7	
Total	15236.5	100

We observed that the biggest ratio is represented by the fir tree – beech tree associations (64%) in which superior productive fir tree – beech tree associations, the rest being average productive fir tree – beech tree associations. The observations revealed the fact that approximately 89% of the surface is covered with typical mountain forests and the rest of it with hilly forests.

In what concerns the fundamentally natural types' productivity we observed the following:

- 11 473.3 ha (75%) – are superior productive;
- 3 696.6 ha (24%) – are average productive;
- 66.6 ha (1%) – are low productive.

We observed a slightly decrease of the natural tree association's ratio in favor of the artificial ones, along with the altitude. The explain is that at the associations with a big ratio of spruce fir, a satisfying natural repopulating was not completed, most of the times, and so rapid completion was made in order to cover the landscape.

The forests within the Vaduri Forestry Ward represent a value due to their diversity but mostly to their protective functions and the realized parameters in these particular territorial conditions.

The structure's analysis on age and production classes underlined the following aspects:

1. The surface of the tree associations from the first three age classes decreased (especially first age class) while the surface of the mature tree associations increased. One of the causes is the execution mainly of the intermediary cuttings and in a smaller ratio of the mature tree liquidation cuttings.

2. The decrease of the spruce fir tree's ratio is mainly due to a more carefully application of the treatments for a better natural regeneration, quantitative as well as qualitative.

3. The increase of the surface occupies with different species of soft falling leaves trees can be explained only because of the exact identification of the association's element, especially for the young and very young tree associations. in order to determine more accurately the conditioning works' intensity.

4. The analysis of the regeneration mode for the main species indicates that: beech tree and fir tree are provided through natural regeneration (only from seeds), spruce fir tree comes 14% from natural regeneration and 86% from plantations and sessile oak tree comes 98% from natural regeneration and the rest from plantations.

5. The following species were artificially introduced: larch, Euro-American poplars, black pine, locust tree, Douglas fir and white pine. Among these, only larch is found on a more important surface.

6. Only 8% from the young trees in the ward are practically pure (plantations of spruce fir, sylvestris pine or alder), 27% are mixed young trees with a 50 – 80% main specie and the rest of 65% are mixed young trees with less than 50% main specie.

7. For the most of the young trees many floors were identified and for the dominant floor we frequently noticed a production class weaker than the rest of the young trees.

8. The average firmness in the ward was established at 0.78, fact explained mostly by the improvement of the damaging factors' effects (fallings, crashes, slides etc.).

The plant health status of the forest was found good, meaning there weren't registered insects' attacks or cryptogamous diseases with a calamity character. Besides the damaging factors written above we can mention also the organized or unorganized pasturing which reaches moderate values especially in U.P. I, III and IV. In conclusion, the action of the damaging factors is sporadic and affects very small surfaces compared to the total ward surface.

The forestry monitoring inventory within the permanent sample areas from Vaduri ward is made once at every 5 years for all the trees with a basal diameter bigger than 80 mm. The diameters are measured with a measuring tape and the height is measured with the dendrometer, for the same trees that were measured for the past inventories.

CONCLUSIONS

1. The forestry vegetation from the target area, from the territorial and climate conditions' point of view, is generally composed by three main species from the mountain zone (spruce fir, fir tree and beech tree) and sessile oak for the hilly zone. We observed that 89% from the area is covered with typical mountain forests, the rest being covered with typical hill forests.

2. The study's main objective was the trees' inventory in the permanent sample areas, consisting in: measuring the basal diameter of the trees, measuring the height of 2 – 3 trees from each diameter category, framing into positional classes (Kraft) and into tress' quality classes.

3. We observed that the biggest ratio is represented by the fir tree – beech-tree associations (64%) in which superior productive associations prevails (53%), the rest being average productive associations.

4. The plant health status of the forest was found good, meaning there weren't registered insects' attacks or cryptogamous diseases with a calamity character.

5. We also observed that only 8% from the young trees in the ward are practically pure (plantations of spruce fir, sylvestris pine or alder), 27% are mixed young trees with a 50 – 80% main specie and the rest of 65% are mixed young trees with less than 50% main specie.

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FRUIT TREES IN PUBLIC AREAS

POMII ÎN SPAȚIILE PUBLICE

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Abstract. *The fruit trees planting in public places has promising advantages for the environment, educational system, as well as the community life, stimulating people solidarity in achieving a correct long term administration frame.*

Some of the investigated directions worldwide are the following:

- Widening the fruit trees panting in public gardens already subject to specialized structure assistance;

-Integration of the fruit trees plantations in the alignments bordering the motor vehicle or pedestrian access ways, enjoying the benefit of the community support.

-Promoting the concept of a "community orchard" correlated to the model of a "public garden".

-Educational public programs stimulating the community solidarity and responsibility in the field of environmental protection, organization and maintenance of the planted areas.

-Social benefits

Presentation of some experiences belonging to the urban communities of Vancouver and Winnipeg-Canada, Bahia de Caraquez-Ecuador, Aomori- Japan, Nairobi-Kenya, Dakka-Bangladesh will illustrate these interests suggesting specific solutions undertaken with responsibility complying with the principles of a long term urban development

Rezumat. *Cultivarea pomilor fructiferi în spațiile publice are avantaje încurajatoare în ceea ce priveşte mediul înconujurător, sistemul educativ, precum şi al vieții comunitare, stimulând solidaritatea populației în vederea realizării unui cadru de gestionare corectă, pe termen lung.*

Câteva din direcțiile investigate în lume sunt următoarele:

- extinderea plantării de pomi fructiferi în grădinile publice care beneficiază deja de asistența unor structuri specializate.

- integrarea plantațiilor de pomi fructiferi în aliniamente care însoțesc căile de acces auto sau pietonale, beneficiind de sprijin comunitar.

- promovarea conceptului de „livadă comunitară", în corelare cu modelul de „grădină publică"

- programe publice educative care stimulează solidaritatea şi responsabilizarea comunitară în domeniul protecției mediului, al organizării şi întreținerii zonelor plantate

- beneficii de ordin social

Prezentarea unor experiențe aparținând comunităților urbane din Vancouver şi Winnipeg – Canada, Bahia de Caraquez – Ecuador, Aomori, Osaka – Japonia, Nairobi – Kenya, Beijing – China, Dhakka – Bangladesh, va ilustra aceste preocupări, propunând soluții specifice asumate cu responsabilitate, în concordanță cu principiile dezvoltării urbane durabile.

The care for environment arrangement displays various ways in supporting a lasting development of towns and cities.

The considerable investments in time embodied by money and natural resources are the characteristics of this company. The fruit trees planting in public places has promising advantages, increasing the intrinsic value, the diversity of scenery compositions and the recovery of investments as well. In addition, the esthetical qualities might be revaluated so that the scenery compositions should be equivalent or even overpass the traditional ones.

Such an action contributes on the other hand to strengthening of people solidarity in achieving correctly a long term administration, in adapting various people of different groups of age and the in stirring the concern for structuring and increase of self and group responsibility in communitarian life.

The practical aspects of direct revaluation at the highest level of the fruits reached to maturity when the nutritive content and the taste qualities are the best shouldn't be neglected as well.

This guideline that reduces the distance between the nutrition source and the community contributing to the increase of the local alimentary safety is encouraged and developed in many cities from U.S.A., Canada, and Australia but also in countries belonging to the third world from Southern America, Africa or Asia.

Of maximum importance in view of good functioning is the maintenance of these plantations.

Besides the problems occurred to the esthetical aspects, some major difficulties which require adequate resolutions should be signed out.

The gathering of fruit is the moment of maximum satisfaction people may have. To create an adequate crown to the scenery composition that is required and the direct access in case of fruit development are issues of great importance. A periodical supervision for an efficient revaluation is asserted during the fruit gathering.

Difficult situations may occur through whose administration the control should be maintained in order to preserve the plantation integrity without prejudicing the visitors. In such situation may be the fruit trees that easily lose their fruits which could blot, hit or make people, pavements or resting places with no grass dirty.

There are not few cases when large crops of fruit require a quick processing or their taking over by other communities from neighbourhood.

Referring to the maintenance of the plantation, the principle of species selection that imposes a minimum of labours well adequate to the climatic conditions, even though all of them require works of cutting, fertilizing, watering, supervision and treatments against damaging insects and mushrooms should also be attended. This last chapter reveals complex problems in performing such treatments in public spaces, the access to fruits being unlimited.

In spite of these difficulties, various communities successfully implemented the fruit trees planting in public places.

Even from the 90's, the Municipal Council from Vancouver, Canada, has created a strategy for a medium and long term durable development, an important place being hold by alimentary security. In supporting this desiderates, the exploration of opportunities concerning the fruit trees planting in parks and public places is imposed.

Several non governmental organizations that have contributed to the identification of the benefits, of the problems and of the opportunities related to this subject involved in this action.

Some significant guidelines of action are drawn out in the followings:

o The expending of fruit trees plantation in public or private gardens, beneficing of professional assistance of certain organization

o The multiplication and the integration of such plantations made up especially by apple trees, pear trees, nut trees and hazelnut trees in alignments along boulevards, streets or pedestal alleys that is founded on the communitarian or volunteered support.

o Promoting the concept" communitarian orchard" in correlation with the already functioning pattern of "public garden". This one supposes to find out unused locations at their capacity, organizations that assumes this action and a continuous communitarian counselling process .Worthy of mentioning is the program led by Laura Lopez in cooperation with "C.R.F.G"-Californian Cultivators of rare fruits, group made up of botanists, horticulturists and amateurs from 35 countries who founded an exemplary communitarian orchard in Highland Drive from California Poly Campus which should be followed by other similar experiments

o The development in parallel of certain educative public programs which should stimulate the communitarian solidarity and responsibility in environmental protection, of the organization and maintenance of the green spaces. The children and the young people from the dense populated towns and cities are the main beneficiaries.

In a similar way, such problems have been approached in Winnipeg, Canada, insisting on the educative programs which propose the implementation of modern urban education with ancient rhymes hence an experience that integrates traditionally ecological concepts, music and the art of previous and actual in harmony with the planet Earth.

Bahia de Caraquez is a town with 50.000 inhabitants from the Pacific Coast in Ecuador. In 1998 it suffered two great cataclysms, the former consisting in diluvium rains due to El Nino phenomenon that led to broad land sliding and the latter consisting in the 7, 2 degrees on Richter scale earthquake that provoked the collapse of many buildings with more floors.

The place of the disaster was called" The park among ruins ", park that was created and maintained by the community from neighbourhood that constitutes itself in an organization concerned with the ecology of the site. This activity consisting in works of versants consolidation using local means and recyclable materials having as goal the forestation of the river sides, the fruit trees planting which constitutes the source of nourishment and small economical activities have been extended along the river in a suburban area.

Similar concerns to those from the States and Canada may be also found out in Japan where in the case of Aomori town from Honshu islands it is the beneficiary of the results of the activity of the experimental resort shaped on apple tree growing hosted in this town.
Both the Local Council and the non governmental organizations from this town are interested in the implementation of a personal strategy in planting fruit trees in public places in climatic conditions specific to this island, in the industrial development initiating

communitarian politics of the citizens involvement in the management of problems of general interest that include the extension of these plantations.

In Africa, in Nairobi, the capital of Kenya, the National Council of Science and Technology, recognizing the important part played by the urban and the pier-urban agriculture, in the strategy of lasting development, has in view a series of programs adapted to their own conditions that propose the decrease of unemployment, of poverty and the assurance of food safety.

Most of such programs have in view towns like Nairobi, Mombassa and Kisumm.

The urban agriculture is considered to be an important mean of cheap and of high quality fresh food productivity for urban customers but also the direct access of the poor to nourishment.

The land areas designed by the local councils and authorities become experimental lots where a great variety of fruit and vegetables is produced under the direct guidance and supervision of certain specialists, using the up to date technology and following and respecting the principles of the ecological horticulture.

The urban communities have expressed their interest in such experiments, the authorities' intention being the implementation of as many similar initiatives as possible in spite of financial, technical or even legislative difficulties that frequently occur.

In Bangladesh, one of the most hardened country continuously threatened by cyclonic storms, floods with severe sequences, causing the lose of many human lives, crops and properties damages, through the Ministry of Environment and forests involvement and the substantial support of the World Bank, starting with 1989, there have been made efforts for the recovery of the plantations from the coast and the embanking and road system as well. Making use of local materials, of indigene working equipment and technology and of a cheap labour hand, such works were extensively performed in coast areas. The roads that exist along these embanking and surroundings are guarded by vast fruit trees plantations and various species of exotic species of wood which is exported for its use in the furniture manufacturing industry. Unexpectedly, people prefer the expending of exotic wood plantations because the material benefit is quickly achieved while the administration is developing educative programs in view of expending fruit trees plantations that bring long term significant benefits.

This short review of some concerns related to the insertion and the expansion of fruit trees planting in public places in some countries from the world which are in a continuous development, being unfortunately marked by an increase of economical and technological discrepancies, illustrates the concerns in finding out particular and special solutions which are assumed with a high level responsibility and in agreement with the principles and the provisions of a lasting development.

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GENERALITIES CONCERNING MULCHING IN LANDSCAPE ARCHITECTURE

GENERALITĂȚI PRIVIND MULCIREA ÎN AMENAJĂRILE PEISAGISTICE

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Abstract. *Mulching (a technical method of covering the soil/substrate with different materials) acquire an enhanced importance in the circumstances of sustainable landscaping increasing promotion.*

Landscaping mulching materials (bark, compost, shredded paper, leaves, sawdust, pine needles, lawn clippings, gravel, plastic, unwoven textiles) conserve soil humidity, suppress weeds and, most of them, furnish nutrients.

Mulching offers important benefits only if certain rules are respected (the materials and the time of mulching are well chosen and the mulch layers are properly spread).

Rezumat. *Mulcirea (metodă tehnică de acoperire a solului/substratului cu diferite materiale) capătă o importanță sporită în circumstanțele intensificării promovării amenajărilor peisagistice sustenabile.*

Materiale utilizate in arhitectura peisageră (scoarță, compost, hârtie, frunze, rumeguş, ace de pin, pietriş, plastic, textile nețesute) conservă umiditatea din sol, elimină buruienile şi furnizează substanțe nutritive.

Mulching oferă importante beneficii în condițiile respectării unor reguli (o bună alegere a materialelor şi a momentului de mulcire şi întinderea adecvată a acestora).

INTRODUCTION

Mulching represents the technical method through which the soil is covered with different materials with the view of conserving humidity and improving soil conditions.

The advantages of mulching acquire an enhanced importance in the circumstances of sustainable landscaping increasing promotion (minimal impact on environment, the use of native plants, improvement of soil structure, minimalization of water, fertilizers and pesticides consumption).

Materials used for landscaping mulching can be divided in two categories: *organic* (bark, compost, leaves, shredded paper, pine needles, sawdust, wood chips, lawn clippings) and *inorganic* (gravel, stones, biodegradable and non-degradable plastic materials, landscape fabric).

MATERIAL AND METHOD

Researches have been made in the past two years (between 2005 and 2007) at a major landscaping design firm from Iasi. In the same time, researching activity has

been completed with a solid documentation based on a large bibliography and exchanging opinions or ideas with other specialists.

RESULTS AND DISCUSSIONS

In time, researches and practice had shown the negative and positive aspects of some organic and inorganic materials that can be used for landscaping mulching (*Tab.1*).

Table 1

The presentation of positive and negative aspects for some landscaping mulching materials

ORGANIC MATERIALS			
No.	**Mulch materials**	**Positive aspects**	**Negative aspects**
1.	Leaves	- retain humidity in soil; - decrease temperature fluctuations; - improve soil microorganisms activity; - the leaves layer: 7 - 10 cm;	- needs to be shredded and decomposed before use;
2.	Shredded paper	- no residues; - degradable; - good weeds suppression; - the shredded paper layer: 2,5 - 8 cm;	- it may break at placement time; - high cost;
3.	Compost	- a considerable source of organic matter; - very good results in retaining the humidity in soil; - the compost layer: 7 –10 cm; - lifetime: 6 – 8 month;	- if it is not well decomposed, it may bring about plants burn;
4.	Bark	- slow decomposition; - provide nutrients; - the bark layer: 5 -8 cm; - good compaction resistance;	- slow decomposition; - may lead to insect and disease problems;
5.	Pine needles	- pine needles are handled easily; - retain humidity and porosity; - very good for acid loving plants;	- it may appear an acid reaction in soil;
6.	Sawdust	- slow decomposition; - provides nutrients;	- it may be shattered by wind;
7.	Wood chips	- help retain soil moisture; - creates path; - prevents heavy rain damage; - lifetime: 6 – 9 months; - gives a natural look;	- it may need supplemental fertilizers; - in time the chips may lose colors and the esthetic effect could be affected;
8.	Lawn clippings	- widely available and easy to handle; - maintain humidity, provide nutrients and good solarization; - lifetime: 1 – 3 month;	- layers more dense than 2,5 cm lead to anaerobiosis effects;
INORGANIC MATERIALS			
9.	Gravel/ Stones	- aesthetic; - long lifetime; - many colors and sizes available;	- may reflect the heat, having negative influence on plants development;

10.	Biodegradable and non-degradable plastic materials	- excellent effects in controlling weeds and retaining humidity in soil; - good applicability; - good weeds suppression;	- high cost; - there is the risk of soil pollution with parts from plastic material; - is not ecological; - removal complexity;
11.	Unwoven textiles	- has the ability of taking the objects shapes; therefore, they offer new design possibilities; - semipermeability for air, water, gas; - they are recyclable and biodegradable; - according to the results of the researches from Belgium, France, Germany, Switzerland, the individual protection (trees) or in group (shrubs) with unwoven textiles is the best mulching solution;	- high cost; - difficult removal (whenever we want to replace the material); - may be affected (torned, displaced) by certain animals (dogs, cats, moles etc.) - it may be appropriate to apply a pre-emergent herbicide before installing the fabric;

The trees and shrubs protection can be realized temporarily (over spring and wintertime) or permanently. Autumn represents the main moment for mulching, because the materials maintain the heat in soil during the winter and in the new season offer a higher "start" temperature. In spring, before sowing or planting time, the mulch could be removed to allow the soil warming. New mulch can be applied in the first weeks of spring in order to preserve humidity, protect soil structure against fast rains mechanic damages and enrichment with humus as a result of a slow decomposition of the organic materials used for covering.

For summer mulching, the materials used for covering should be spread all around the tree or shrub in a 4 –5 cm layer.

For winter mulching, the protective layer will be denser (8-12 cm) (Mateescu, 2002).

In landscaped areas, mulch should not be placed within 5 cm (shrubs) and 10 cm (trees) of the base of the trunk of trees or shrubs.

Ornamental trees and shrubs and pathways can be mulched permanently with bark or gravel.

The main goals of landscape mulching are water soil conservation (by reducing water loss through evapotranspiration - ET) and weeds suppressing (therefore, the interventions with herbicides will be reduced and the efforts for weeds manual elimination minimal).

Mulching has also different additional aspects, as following:

- regulation and maintenance of an optimum soil temperature level; therefore, the roots of arboricultural species are protected from excessive heating or cooling (Mateescu, 2002);

- improvement of absorbing and retaining water process in nutrition substrate;

- mulch prevents infiltration which encourage soil erosion and offer protection against its surface frost;

- improvement of soil characteristics (structure, especially porosity);

- soil degradation process decreases (heavy soils are improved and sandy soils are stabilized (Mateescu, 2002));

- mulching makes possible even a solarization of the nutritional substrate; the result of this process is a decrease of pathogens population (especially, nematodes) and weeds percent;

- preclusion of salts increase in soil;

- mulch can create a "free weeds/turf area" around protected species; therefore, the risk of damaging roots while mowing the lawn decreases;

- mulch can give planting beds a uniform, well-cared-for look;

- mulch can improve the appearance of any landscape;

Mulch that is not properly spread has undesirable effects. Covering soil with dense layers of mulch leads to humidity excess around roots system followed by decay and, therefore a stress for the plant. Mulch that is too deep will stimulate root growth in the mulch layer rather than in the ground. The resulting shallow root system is susceptible to cold and drought damage. Piling mulch (for example, gravel) against the trunk or stems of plants can stress stem tissues and may lead to insect and disease problems. A long-term use of some materials, especially lawn clippings, can affect soil pH or cause deficiencies/toxicity in micronutrients.

CONCLUSIONS

1. Materials used for landscape mulching are widely available, conserve humidity, have good weed suppression qualities and, most of them, furnish nutrients. Moreover, they are recyclable (paper, gravel) and biodegradable (wood chips, unwove textiles). Therefore, this type of mulching integrates in the "sustainable landscaping" concept;

2. The mulching time should be respected, as it varies from species to species, from area to area etc.;

3. Trees and shrubs mulching must respect certain rules regarding the type of materials chosen for mulching and, what is far more important, the depth and length of mulching layer; otherwise, the mulch will not be efficient and, in some cases, could have negative effects on trees and shrubs;

4. Mulching materials must "complete" landscape and, in the same time, increase its aesthetic value;

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LES ÉCOQUARTIERS – MODALITÉ DU DÉVELOPPEMENT DURABLE DES VILLES

ECOCARTIERELE – MODALITĂȚI DE DEZVOLTARE DURABILĂ A ORAŞELOR

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Abstract. *The sustainable development of cities can be achieved in several ways. One of them is the settlement of some ecological problems connected to already build districts using the increment of the vegetation area. Such a solution is proposed for the Suceava's district Obcini, highly populated and characterized by an important build area. The project requires the installation of green roofs and green walls for all the blocs of the district and the greening of electric poles and bus stations. After the project application, the green area will increase with 27,80 %, increment followed by all the known ecological benefits.*

Rezumat. *Dezvoltarea durabilă a oraşelor se realizează acționând pe mai multe direcții. Una dintre acestea este ecologizarea unor cartiere deja construite prin creşterea suprafeței ocupate de vegetație. Se propune un proiect de vegetalizare a cartierului Obcini din Suceava, caracterizat printr-o suprafață construită foarte mare şi o densitate ridicată a populației. Proiectul constă în realizarea de acoperişuri verzi şi pereți vegetali pentru toate blocurile de locuințe ale ansamblului precum şi în vegetalizarea stâlpilor electrici şi a stației de autobuz aferente. După aplicarea proiectului suprafața verde a cartierului va creşte cu 27,80 %, creştere însoțită de toate avantajele ecologice asociate acesteia.*

INTRODUCTION

La future voie suivie par le développement de la société humaine pose de plus en plus de problèmes à résoudre. Apres le sommet de la terre à Rio en juin 1992 on a enregistré une ample démarche d'intégration des principes du développement durable dans tous les domaines d'activité. En conséquence on a fait des efforts pour le développement durable des villes aussi, essayant d'assurer la qualité environnementale de celles-ci. Dans cette tendance plus ample, une place importante est occupée par les écoquartiers – quartiers construits ou rénoves. Cette écologisation suppose l'amélioration de la propreté dans les quartiers de façon permanente, la réduction des quantités de déchets par la réduction, le réemploi, le recyclage et la valorisation, l'amélioration les espaces naturels et du patrimoine végétal, la sensibilisation des enfants dans les écoles et des citoyens en général sur les différentes techniques de compostage.

Le projet qu'on propose vise les quartiers rénoves, pour leur augmenter la qualité environnementale. Parmi les moyens d'améliorer la qualité environnementale des quartiers urbaines déjà existantes on peut mentionner: les toits verts, les murs végetalisées, le mobilier urbain ou les clôtures végétalisées; elles vont contribuer au remboursement de la «dette écologique» des bâtiments qui initialement on remplace un espace naturel.

Les bâtiments écologiques vont apporter des avantages et bénéfices tant aux propriétaires qu'à la société dans son ensemble. Les toits et les murs verts diminuent les taux de CO et CO_2 pour plus d'oxygène produit, ils fixent des poussières atmosphériques et des pollens (l'évapotranspiration engendrée par les terrasses plantées élève l'humidité de l'air et favorise donc la formation de rosée, indispensable à la fixation des poussières et des pollens en suspension dans l'air), ils exercent des effets bénéfiques sur le climat, les microclimats, l'hygrométrie, et donc sur la santé et le bien-être des habitants (l'écotoit permet de récupérer une partie de la surface perdue, à cause de l'occupation du sol par le bâtiment, par les espaces verts); la présence de toitures vertes fait descendre la température ambiante des villes, ce qui est très important parce que les villes sont toujours plus chaudes que les campagnes adjacentes (le réchauffement excessif des toitures, du béton, de l'asphalte des rues et de la maçonnerie extérieure des murs réchauffe l'air environnant de quelques degrés supplémentaires). Les toits verts ont un impact très positif sur l'eau par une filtration et une épuration biologique des eaux de pluies et déterminent une régulation des débits hydriques (les eaux de pluies qui tombent sur les toits sont normalement acheminées vers les égouts pluviaux - ceci surcharge les égouts et les stations d'épuration d'eau tout en causant parfois des inondations de rues et de sous-sols ; les toitures et terrasses plantées, par leur capacité de rétention, d'évaporation et de relargage différé des eaux de pluies contribue à lutter contre les effets néfastes de l'imperméabilisation des sols pressente en villes a cause des surfaces bâties et des rues asphaltées). Les toitures végétales ont aussi des nombreux effets bénéfiques sur la biodiversité (sur les terrasses extensivement végétalisées, on utilise généralement les plantes de milieux secs et oligotrophes qui sont menacées de disparition à cause de l'eutrophisation générale des milieux ce qui assure en même temps la survie des espèces faunistiques associés. La contribution à l'amélioration de la biodiversité se manifeste aussi par la reconstitution d'un véritable maillage écologique et de corridors, qui autorisent au sein de la ville la circulation des espèces animales et végétales, les flux de gènes indispensables à la survie des espèces et à leur adaptation au milieu.

Du point de la vue technique (Liu, 2003), les toits verts assurent une protection et une étanchéité supérieure parce que les matériaux imperméabilisants sont abrités par les plantes des ultraviolets (UV) et du rayonnement thermique solaire qui dégradent les huiles du bitume élastomère qui devient par conséquence plus cassant. Comme ça, les toits verts confèrent une durée de 30 à 50 ans pour une membrane d'étanchéité. En même temps les toits verts offrent une protection contre les chocs thermiques par la réduction des variations de température jusqu'à 40%, confèrent une isolation thermique qui permet de réaliser d'importantes économies d'énergie et aussi une isolation phonique, la végétation absorbant les ondes sonores.

En ce qui concerne l'aménagement vert des façades (plantes grimpantes, balconnières, jardinières ou murs végétaux) lui aussi permet une meilleure régularisation thermique du bâtiment, protège les murs contre l'effet corrosif des pollutions urbaines et contre l'humidité (la disposition des feuilles de lierre par exemple permet de protéger totalement le mur de la pluie) (Dunnett et Kingsburry, 2004). La végétalisation des poteaux électriques, des lampadaires, des bancs publics, des abribus, des clôtures remboursent elles aussi une partie de leur « dette écologique » en produisant de l'oxygène, en filtrant les polluants, en attrapant les poussières et en offrant gîte et couvert aux oiseaux et d'autres animaux.

PROJET PROPOSÉ ET MÉTHODES

Etant donnes ces multiples effets favorables des bâtiments et mobilier urbain vegetalises, on a projeté une solution d'écologisation par l'augmentation du surface des espaces verts du quartier Obcini situe a l'ouest de la ville. Dans ce but nous proposons de verdir les toits, les murs, les poteaux, les bancs set les abribus de ce quartier. Généralement l'aménagement des toits verts peut être intensif et extensif (celui extensif a une substrat de croissance de plus faible épaisseur, utilise des plantes rustiques, de petite taille ne s'arrosent pas et ne sont pas destinée au publique; celui intensif se fait sur une couche épaisse de sol ou dans des bacs utilisant des arbres, des arbustes, des plantes avec fleurs, avec système d'arrosage automatique.

Pour l'ensemble d'immeubles collectifs du quartier Obcini visée par le projet, la structure portante est en béton, elle étant capable de supporter le poids prévue du toit vert. Les toits ont une faible pente (3-5%), un parapet en béton aussi et maintenant les membranes qui couvrent les bâtiments sont faites des matériaux bitumineux. Comme l'état actuel de ces membranes de hydro isolation n'est pas satisfaisant, on propose le remplacement de ces membranes bitumineuses avec les membranes d'étanchéité propres aux toits verts.

La solution technique consiste dans l'emplacement des cinque couches successives : une membrane d'etancheite, une couche de drainage, une couche de séparation et filtration, un substrat de croissance, une couche végétale pour réaliser des toits verts extensives.

La membrane d'etancheite qu'on propose est une membrane continue des fibres de polyéthylène avec grande densité (HDPE – produit de type TYVEK). Pour la couche drainage on utilise du gravier ou plaques de PVC alvéolées sur une épaisseur de 5-15 cm; elle va permettre l'écoulement de l'eau de pluie vers les draines du toit. Le gravier est moins cher mais il a un poids plus grand en temps que les plaques alvéolées de PVC sont plus légères et elles retiennent pour une période plus longue l'eau qui devienne disponible pour les plantes. La couche de séparation et filtration consiste en fibres minérales (ouate minérale) avec une épaisseur 5 cm. Son rôle est double: de retenir les fines particules du sol en laissant en même temps l'eau s'égoutter et d'empecher les racines de pénétrer vers la membrane d'étanchéité. Le substrat pour la couche végétale est un mélange a base de perlit (une roche volcanique expansé – 40%) avec tourbe (20%), gravier, sable (20%) et terre (20%) avec une épaisseur totale de 15 cm. Le perlit est très léger en assurant en même temps une aération adéquate du mélange; la tourbe retienne une grande quantité d'eau rapportée à son poids spécifique. Le gravier et le sable ont le rôle d'assurer la cohésion d'autres éléments constituants. Pour éliminer l'effet d'érosion exerce par le vent et la pluie, après la plantation des espèces végétales on ajoute une couche de 2-3 cm de gravier. Les plantes choisies sont des espèces vivaces, avec des feuilles succulentes, résistantes aux conditions écologiques extrêmes (forte insolation, températures extrêmes – chaleurs et gels, sécheresse, vent fort) qui s'implantent rapidement et vont couvrir facilement toute la surface disponible. Pour les immeubles T94 et T93 (figure 1) qui sont les plus hautes (P+10) et donc ont les conditions abiotiques les plus difficiles on propose *Sedum sp*., *Sempervivum sp., Saxifraga sp., Armeria sp*., dans un mélange sous forme de taches. Pour les immeubles 99, 100, 102, 104, 105, 106, 107, 109 (P+4) qui sont ombragées par les T94 et T93, on utilise des espèces plus exigeantes: *Festuca rubra* L., *Poa annua* L*., Allysum sp., Campanula sp., Iberis sp., Dianthus sp., Thymus sp., Gypsophila sp.* Les bâtiments

Fig. 1. Zone étudie

60, 103, 108, 110, 111 (P+4) sont plus ensoleilles donc sont plus appropriés pour d'autres espèces comme *Sedum sp*., *Sempervivum sp., Saxifraga sp., Armeria sp*.

Pour les immeubles 99, 100,102,104,105,106,107,109 et 110 on propose des façades vertes sur des structures rigides en acier, á l'aide de *Parthenocissus tricuspidata* Sieb. et Zucc ou *P. quinquefolia* L., sur les parois orientés vers le sud, sans fenêtres.

Dans l'ensemble d'immeubles visée sont dix poteaux électriques et un abribus. Sept poteau ont a la base de la terre donc on propose leur végétalisation avec du lierre (*Parthenocissus tricuspidata* Sieb. et Zucc ou *P. quinquefolia* L.) et les autres trois en plantant *Campsis radicans* L. en bacs de 1x0,6x0,4 m. La vegetalisation de l'abribus se fait en utilisant *Wistaria sinensis* (Sims) plantée en bacs aussi.

RESULTATS ET DISCUSSIONS

La surface totale étudiée (parmi les axes des routes limitrophes) est de 41015 m^2. La surface construite est de 14255 m^2. 80% de cette surface construite est représenté par les immeubles collectifs (11404 m^2), et 20% par les garages et d'autres constructions 2851 m^2). Les voies d'accès pour voitures et les voies d'accès pour les piétons occupent la plus grande surface, 21564 m^2, ou 52,58%.

La surface verte est représentée de petite zone, avec une surface totale de 5196 m^2 (12,67%). Apres l'application de ce projet, la surface verte serait plus étendue avec 27,80%. Si on ajoute la surface des espaces verts déjà existants on obtient 40,47% de la surface totale étudiée. En rapportant la surface verte au nombre des habitants résulte 1,75m^2 pour chaque habitant avant l'application du projet et 5,58m^2 après (2973 habitans).

Les économies en chauffage l'hiver et en refraîchement de l'air l'été contribueront a l'amortissement de l'investission initiale.

La mise en place de ce projet doit se faire avec grand soin surtout en ce qui concerne l'application de la membrane d'étanchéité, pour éviter les éventuelles futures infiltrations d'eau ou d'humidité. Le poids total des toits verts projeté ne dépasse pas la capacités portante des structures de résistance des bâtiments construites en béton.

CONCLUSIONS

Beaucoup de nos villes n'ont pour le moment un développement durable. Une modalité pour améliorer la situation est l'augmentation de la surface occupée par les espaces verts en utilisant les façades et les toits verts. Les bénéfices de ce démarche sont nombreuses plus d'oxygène produit, la fixation des poussières, l'élévation de l'humidité de l'air, la baisse des températures en été, la filtration et l'épuration biologique des eaux pluviales, la régulation des débits hydriques, l'amélioration de la biodiversité, de l'esthétique urbaine. Les bénéfices sont aussi techniques: protection et étanchéité supérieures des toits, meilleure isolation thermique et phonique.

Pour le quartier Obcini de Suceava on a propose la végétalisation des toits appartenant aux 15 immeubles collectifs totalisant 11.404m^2 ce qui détermine l'augmentation des espaces vertes avec 27,80%. La conséquence directe c'est l'accroissement de l'espace vert par habitant de 1,75m^2 a 5,58m^2.

La solution technique adoptée est assez simple et pas onéreuse, l'investission initiale s'amortissant en 2-5 années, le projet engendrant en plus toutes les avantages déjà mentionnés. Les façades et les toits verts sont des solutions modernes pour l'amélioration de la qualité de vie dans cette période quand l'ensemble de la société se confronte avec beaucoup et complexes problèmes écologiques.

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THE INFLUENCE OF ORGANIC FERTILIZATION ON TOMATO YIELD PRODUCED IN POLYTUNNELS IN ECOLOGICAL SYSTEM

INFLUENȚA FERTILIZĂRII ORGANICE LA TOMATELE CULTIVATE ÎN CÂMP ÎN POLITUNELURI, CONFORM SISTEMULUI ECOLOGIC

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Abstract. *The organic agriculture (especially organic vegetable growing) has seen worldwide advancement in the last years. Organic tomatoes crop produced in polytunnels will be a real successful only if there is an adequate fertilization programme and biological crop protection management. To obtain certified organic yield it is necessary to pass through a conversion period of two years in the tomato crop.*

Rezumat. *În ultimi ani, agricultura organică (cu precădere, cultivarea organica a legumelor) a cunoscut o dezvoltare remarcabilă la nivel mondial. Cultura organică a tomatelor în sere va înregistra succese doar în condițiile unui program adecvat de fertilizări şi a unui bun management al protecției biologice pentru cultura de tomate. Pentru a obține producții organice certificate este necesară trecerea printr-o perioadă de conversie de 2 ani.*

The experiences were carried out at Organic Agriculture Training Farm Foundation from Spătăreşti - Suceava. Biokontrol from Hungary inspected the farm in 2003. In the same year, the farm entered in a conversion process. One year later, in 2004, Ecoinspect from Romania began an inspection. (1).

The goal of researches is the study of organic fertilization effect on total tomato yield in conversion period and organic exploitation.

MATERIAL AND METHOD

The experience organized was a polyfactorial one, with three repetitions (Săulescu and Săulescu, 1967). The A factor was represented by a cultivar (a1- Belle F1, a2- Bakony F1, a3-Arletta F1), B factor by the organic fertilizers (b1- manure from extensive farms, b2- mature manure, b3- semifermented bovine manure) and C factor by the fertilizers dose used during experiences (c1 – 30 t/ha, c2 – 40 t/ha).

The planting had been done between 17th and 21th of april in concordance with climatic conditions of that year. The seedlings were produced in plastic pots (340 cm^3) and their age was of 50-56 days. During the seedling producing period, the seedlings were treated with products admitted by laws.

Planting distances were of 90 cm between rows and 45 cm between plants. In this case, the density reached 24691 plants /ha.

Total tomato yield was recorded each year and each month, beginning with 18 – 20 of June until the end of september (5).

The interpretation of the production results was based on calculation of differences-limit (4) that exist between experimental variants by determination of the differences from these. Each variant had been compared with the other variants from respective repetition (2).

The differences resulted for the total production were recorded in a table for variant analysis. In this way, it can be determined the organic fertilizers effect on tomato yield.

RESULTS AND DISCUSSIONS

The influence of organic fertilizers was studied for each experimental year and each type of fertilizer.

Regarding the influence of animal manure (provided by extensive farms) on tomato production (table 1), in 2003 varied from 57,5 t/ha (Arletta F1 x 30 t/ha) to 63,1 t/ha (Belle F1 x 40 t/ha). The production differencies from combination of research factors varied from -5,6 t/ha (a3c1 with a1c2) to 3,5 t/ha (a1c2 cu a1c1).

In 2004 by fertilizing the crop with animal manure from extensive farms, the production increased from 58,4 t/ha (hybrid Arletta fertilized with 30 t/ha) to 63,5 t/ha (when hybrid Belle was fertilized with 40 t/ha). The differencies resulted from factors combination varied from -5,1 t/ha (a3c1 with a1c2) to 2,9 t/ha (a1c2 with a1c1). During the organic exploitation by fertilization with animal manure from extensive farms, the production increase from 60,3 t/ha (when hybrid Arletta was fertilized with 30 t/ha) to 65,6 t/ha (when hybrid Belle was fertilized with 40 t/ha). The differencies of factors combination varied from -5,3 t/ha (a3c1 with a1c2) to 3,3 t/ha (a1c2 with a1c1). The influence of fertilization with mature compost was studied for each experimental year and each factors combination (table 2).

In 2003 by fertilizing the crop with compost, the production increased from 57,1 t/ha (Arletta F1 x 30 t/ha) to 64,3 t/ha (Belle F1 x 40 /ha). The differencies resulted from factors combination varied from -7,2 t/ha (a3c1 with a1c2) to 2,9 t/ha (a1c2 with a1c1).

In 2004 by fertilizing the crop with mature compost, the production increased from 58,3 t/ha (hybrid Arletta fertilized with 30 t/ha) to 65 t/ha (when hybrid Belle was fertilized with 40 t/ha). The differencies resulted from factors combination varied from -6,7 t/ha (a3c1 with a1c2) to 2,8 t/ha (a3c2 with a3c1).

During the organic exploitation by fertilization with mature compost, production increase from 61,8 t/ha (when hybrid Arletta was fertilized with 30 t/ha) to 66,8 t/ha (when hybrid Belle was fertilized with 40 t/ha). The differencies of factors combination by fertilization with mature compost varied from -5,0 t/ha (a3c1 with a1c2) to 4,3 t/ha (a1c2 with a1c1). The influence of fertilization with semifermented bovine manure was studied for each experimental year and each factors combination (table 3). In 2003 by fertilizing the crop with semifermented bovine manure, the production varied from 56,8 t/ha (Arletta F1 x 30 t/ha) to 62,3 t/ha (Belle F1 x 40 /ha). The differencies resulted from factors combination varied from -5,5 t/ha (a3c1 with a1c2) to 2,6 t/ha (a3c2 with a3c1).

Table 1

The influence of fertilizing with manure from extensive farms on total tomato yield in polytunnel in ecological system

The studied factors*	The experimental year											
	2003			2004			2005			2003-2005		
	Yield (t/ha)	Difference (t/ha)	Significance	Yield (t/ha)	Difference (t/ha)	Significance	Yield (t/ha)	Difference (t/ha)	Significance	Yield (t/ha)	Difference (t/ha)	Significance
$a_1c_2 - a_1c_1$	63.1-59.6	3.5	x	63.5-60.6	2.9	x	65.6-62.3	3.3	xx	64.0-60.8	3.2	xx
$a_2c_1 - a_1c_1$	58.7-59.6	-0.9		61.4-60.6	0.8		61.2-62.3	-1.1		60.4-60.8	-0.4	
$a_2c_2 - a_1c_1$	60.5-59.6	0.9		61.9-60.6	1.3		63.6-62.3	1.3		62.0-60.8	1.2	
$a_3c_1 - a_1c_1$	57.5-59.6	-2.1		58.4-60.6	-2.2		60.3-62.3	-2	0	58.7-60.8	-2.1	00
$a_3c_2 - a_1c_1$	60.3-59.6	0.7		61.1-60.6	0.5		61-62.3	-1.3		60.8-60.8	0.0	
$a_2c_1 - a_1c_2$	58.7-63.1	-4.4	00	61.4-63.5	-2.1		61.2-65.6	-4.4	000	60.4-64.0	-3.6	000
$a_2c_2 - a_1c_2$	60.5-63.1	-2.6		61.9-63.5	-1.6		63.6-65.6	-2	0	62.0-64.0	-2.1	00
$a_3c_1 - a_1c_2$	57.5-63.1	-5.6	000	58.4-63.5	-5.1	000	60.3-65.6	-5.3	000	58.7-64.0	-5.3	000
$a_3c_2 - a_1c_2$	60.3-63.1	-2.8	0	61.1-63.5	-2.4		61-65.6	-4.6	000	60.8-64.0	-3.3	000
$a_2c_2 - a_2c_1$	60.5-58.7	1.8		61.9-61.4	0.5		63.6-61.2	2.4	x	62.0-60.4	1.6	x
$a_3c_1 - a_2c_1$	57.5-58.7	-1.2		58.4-61.4	-3		60.3-61.2	-0.9		58.7-60.4	-1.7	0
$a_3c_2 - a_2c_1$	60.3-58.7	1.6		61.1-61.4	-0.3		61-61.2	-0.2		60.8-60.4	0.4	
$a_3c_1 - a_2c_2$	57.5-60.5	-3		58.4-61.9	-3.5	0	60.3-63.6	-3.3	00	58.7-62.0	-3.3	000
$a_3c_2 - a_2c_2$	60.3-60.5	-0.2		61.1-61.9	-0.8		61-63.6	-2.6	00	60.8-62.0	-1.2	
$a_3c_2 - a_3c_1$	60.3-57.5	2.8	x	61.1-58.4	2.7		61-60.3	0.7		60.8-58.7	2.1	xx
	DL 5% = 2,7t/ha DL 1% = 3,7t/ha DL 0,1% = 4,9t/ha			DL 5% = 2,8 t/ha DL 1% = 3,7 t/ha DL 0,1% = 4,9 t/ha			DL 5% = 1,9 t/ha DL 1% = 2,6 t/ha DL 0,1% = 3,4 t/ha			DL 5% = 1,5t/ha DL 1% = 2,0 t/ha DL 0,1%=2,6 t/ha		

Table 2

The influence of fertilizing with mature compost on total tomato yield in polytunnel in ecological system

The studied factors*	The experimental year											
	2003			2004			2005			2003-2005		
	Yield (t/ha)	Difference (t/ha)	Significance	Yield (t/ha)	Difference (t/ha)	Significance	Yield (t/ha)	Difference (t/ha)	Significance	Yield (t/ha)	Difference (t/ha)	Significance
$a_1c_2 - a_1c_1$	64.3-61.4	2.9	xx	65.0-62.4	2.6	xx	66.8-62.5	4.3	xxx	65.4-62.1	3.3	xxx
$a_2c_1 - a_1c_1$	61.5-61.4	0.1		62.4-62.4	0.0		62.8-62.5	0.3		62.2-62.1	0.1	
$a_2c_2 - a_1c_1$	63.5-61.4	2.1	x	63.5-62.4	1.1		65.9-62.5	3.4	xxx	64.3-62.1	2.2	xx
$a_3c_1 - a_1c_1$	57.1-61.4	-4.3	000	58.3-62.4	-4.1	000	61.8-62.5	-0.7		59.1-62.1	-3.0	000
$a_3c_2 - a_1c_1$	59.3-61.4	-2.1	0	61.1-62.4	-1.3		62.4-62.5	-0.1		60.9-62.1	-1.2	
$a_2c_1 - a_1c_2$	61.5-64.3	-2.8	00	62.4-65.0	-2.6	00	62.8-66.8	-4.1	000	62.2-65.4	-3.1	000
$a_2c_2 - a_1c_2$	63.5-64.3	-0.8		63.5-65.0	-1.5		65.9-66.8	-1.0		64.3-65.4	-1.1	
$a_3c_1 - a_1c_2$	57.1-64.3	-7.2	000	58.3-65.0	-6.7	000	61.8-66.8	-5.0	000	59.1-65.4	-6.3	000
$a_3c_2 - a_1c_2$	59.3-64.3	-5.0	000	61.1-65.0	-3.9	000	62.4-66.8	-4.4	000	60.9-65.4	-4.4	000
$a_2c_2 - a_2c_1$	63.5-61.5	2.0	x	63.5-62.4	1.1		65.9-62.8	3.1	xxx	64.3-62.2	2.0	x
$a_3c_1 - a_2c_1$	57.1-61.5	-4.5	000	58.3-62.4	-4.1	000	61.8-62.8	-1.0		59.1-62.2	-3.2	000
$a_3c_2 - a_2c_1$	59.3-61.5	-2.3	0	61.1-62.4	-1.3		62.4-62.8	-0.4		60.9-62.2	-1.3	
$a_3c_1 - a_2c_2$	57.1-63.5	-6.4	000	58.3-63.5	-5.2	000	61.8-65.9	-4.1	000	59.1-64.3	-5.2	000
$a_3c_2 - a_2c_2$	59.3-63.5	-4.2	000	61.1-63.5	-2.4	00	62.4-65.9	-3.5	000	60.9-64.3	-3.4	000
$a_3c_2 - a_3c_1$	59.3-57.1	2.2	x	61.1-58.3	2.8	xx	62.4-61.8	0.6		60.9-59.1	1.9	x

DL 5% = 1,9t/ha
DL 1% = 2,6t/ha
DL 0,1% = 3,4t/ha

DL 5% = 2,6 t/ha
DL 1% = 3,4 t/ha
DL 0,1% = 4,6 t/ha

DL 5% = 1,7 t/ha
DL 1% = 2,3 t/ha
DL 0,1% = 3,1 t/ha

DL 5% = 1,6 t/ha
DL 1% = 2,2 t/ha
DL 0,1%=2,9 t/ha

Table 3

The influence of fertilizing with seminfermented bovine manure on total tomato yield in polytunnel in ecological system

The studied factors*	The experimental year											
	2003			2004			2005			2003-2005		
	Yield (t/ha)	Difference (t/ha)	Significance	Yield (t/ha)	Difference (t/ha)	Significance	Yield (t/ha)	Difference (t/ha)	Significance	Yield (t/ha)	Difference (t/ha)	Significance
$a_1c_2 - a_1c_1$	62.3-60.2	2.1		63.7-62.5	1.2		66.3-61.9	4.4	xxx	64.1-61.5	2.6	x
$a_2c_1 - a_1c_1$	60.6-60.2	0.4		62.4-62.5	-0.1		61.7-61.9	-0.2		61.6-61.5	0.0	
$a_2c_2 - a_1c_1$	62.3-60.2	2.1		63.4-62.5	0.9		64.6-61.9	2.7	xx	63.4-61.5	1.9	
$a_3c_1 - a_1c_1$	6.8-60.2	-3.4	0	58.4-62.5	-4.0	000	61.7-61.9	-0.2		59.0-61.5	-2.5	0
$a_3c_2 - a_1c_1$	59.4-60.2	-0.8		60.1-62.5	-2.4	00	63.1-61.9	1.2		60.9-61.5	-0.7	
$a_2c_1 - a_1c_2$	60.6-62.3	-1.7		62.4-63.7	-1.3		61.7-66.3	-4.6	000	61.6-64.1	-2.5	0
$a_2c_2 - a_1c_2$	62.3-62.3	0.0		63.4-63.7	-0.3		64.6-66.3	-1.7	0	63.4-64.1	-0.7	
$a_3c_1 - a_1c_2$	56.8-62.3	-5.5	000	58.4-63.7	-5.3	000	61.7-66.3	-4.6	000	59.0-64.1	-5.1	000
$a_3c_2 - a_1c_2$	59.4-62.3	-2.9	0	60.1-63.7	-3.6	000	63.1-66.3	-3.2	000	60.9-64.1	-3.2	00
$a_2c_2 - a_2c_1$	62.3-60.6	1.7		63.4-62.4	1.0		64.6-61.7	2.9	xx	63.4-61.6	1.9	
$a_3c_1 - a_2c_1$	56.8-60.6	-3.8	00	58.4-62.4	-3.9	000	61.7-61.7	0.0		59.0-61.6	-2.6	0
$a_3c_2 - a_2c_1$	59.4-60.6	-1.2		60.1-62.4	-2.3	0	63.1-61.7	1.4		60.9-61.6	-0.7	
$a_3c_1 - a_2c_2$	56.8-62.3	-5.5	000	58.4-63.4	-5.0	000	61.7-64.6	-2.9	00	59.0-63.4	-4.5	000
$a_3c_2 - a_2c_2$	59.4-62.3	-2.9	0	60.1-63.4	-3.3	000	63.1-64.6	-1.5		60.9-63.4	-2.6	0
$a_3c_2 - a_3c_1$	59.4-66.8	2.6		60.1-58.4	1.7		63.1-61.7	1.4		60.9-59.0	1.9	

DL 5% = 2,7t/ha
DL 1% = 3,6t/ha
DL 0,1% = 4,8t/ha

DL 5% = 1,8 t/ha
DL 1% = 2,4 t/ha
DL 0,1% = 3,2 t/ha

DL 5% = 1,7 t/ha
DL 1% = 2,3 t/ha
DL 0,1% = 3,0 t/ha

DL 5% = 2,0 t/ha
DL 1% = 2,7 t/ha
DL 0,1%=3,5 t/ha

*Factor A – The cultivar:
a_1 – Belle F1, a_2 – Bakony F1, a_3 – Arletta F1

*Factor C – Fertilizer dose:
c_1 – 30 t/ha, c_2 – 40 t/ha

In 2004 by fertilizing the crop with semifermented cow dung, the production increased from 58,4 t/ha (hybrid Arletta fertilized with 30 t/ha) to 63,7 t/ha (when hybrid Belle was fertilized with 40 t/ha). The differencies resulted from factors combination varied from -5,3 t/ha (a3c1 with a1c2) to 1,7 t/ha (a3c2 with a3c1).

During the organic exploitation by fertilization with semifermented bovine manure, production increase from 61,7 t/ha (when hybrids Arletta and Bakony were fertilized with 30 t/ha) to 66,3 t/ha (when hybrid Belle was fertilized with 40 t/ha). The differencies of factors combination by fertilization with semifermented bovine manure varied from -4,6 t/ha (a3c1 with a1c2 and a2c1 with a1c2) to 4,4 t/ha (a1c2 with a1c1).

CONCLUSIONS

Tomato production obtained in ecological system is influenced by cultivar, as well as the type and the dose of fertilizer;

Between 2003-2005 by fertilizing with manure from extensive farms, the yield varied from 58,7 t/ha (Arletta F1 x 30 t/ha) to 64,0 t/ha (Belle F1 x 40 /ha). The yield differencies between factors combination varied from -5,3 t/ha (a3c1 with a1c2) to 3,2 t/ha (a1c2 with a1c1).

By fertilizing with mature manure, the tomato yield (during the experimental period) increased from 59,1 t/ha (when Arletta hybrid was fertilized with 30 t/ha) to 65,4 t/ha (when Belle hybrid was fertilized with 40 t/ha). The yield differencies between factors combination varied from -6,3 t/ha (a3c1 with a1c2) to 3,3 t/ha (a1c2 with a1c1).

By fertilizing with semifermented bovine manure, the total tomato yield increased from 59,0 t/ha (when Arletta hybrid was fertilized with 30 t/ha) to 64,1 t/ha (when Belle hybrid was fertilized with 40 t/ha). The yield differencies between factors combination varied from -5,1 t/ha (a3c1 with a1c2) to 2,6 t/ha (a1c2 with a1c1).

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STUDY ABOUT SOME KINDS OF SPRING TWO-ROW BARLEY CULTIVATED IN THE PLAIN OF BRAILA BETWEEN 2004 - 2006 REFERRING TO THE MAIN INDEXES OF QUALITY BEING IMPORTANT FOR THE MALT PRODUCTION

STUDIU ASUPRA CÂTORVA SOIURI DE ORZOAICĂ DE PRIMAVĂRĂ CULTIVATE ÎN CÂMPIA BRĂILEI ÎN PERIOADA 2004 – 2006, PRIVIND PRINCIPALII INDICI DE CALITATE IMPORTANȚI PENTRU FABRICAREA MALȚULUI

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Abstract. *This study is an analysis of the main physico-chemical quality indexes of the three kinds two-row barley, being important for a quality malt production.*

This work presents the results obtained in the last three years (2004-2006), through parameters monitorization of two-row barley production.

Results determinations accomplished to the beans of two-row barley for beer have been compared to the main parameters which must have to be used-up in the industry of the beer. The basic staple used for obtaining the malt and the beer is the barley and two-row barley.

Rezumat. *Acest studiu este o analiza a principalilor indici de calitate fizico-chimici a trei soiuri de orzoaica de primavara, importanti pentru fabricarea unui malt de calitate.*

Aceasta lucrare prezinta rezultatele obtinute in ultimii trei ani (2004-2006), prin monitorizarea parametrilor productiei de orzoaica de primavara.

Rezultatele determinarilor efectuate la boabele de orzoaica de primavara pentru bere au fost comparate cu parametrii principali pe care trebuie sa-i indeplineasca pentru a putea fi utilizate in industria berii.

The basic staple used for obtaining the malt and the beer is the barley and two-row barley.

The effective quality of barley and two-row barley represents a resultant of interactions a kind, technology of the culture and environmental conditions.

The kind is the main factor which influences about uniformity, amilotic activity and the efficaciousness of the in extract, but it is in the same time determinant and referring to the specific reaction to the variation in time and space, intensity of the impact with the limitative factors of environment which cannot be avoid through technology.

The non-observance of specific technologies of the culture of fated barley the brewage as the: Bear off moderate doses of fertilization with azote, the failure optimum densities of the field, the non-observance of the links of the key ale the

flux of harvest the storage (likewise with one used for the production seeds) can lead to a complete obtain of not good harvests for malting and obtaining the beer.

In this work we have proposed to analyse from physico-chemical and technological viewpoint several kinds of tow-row barley.

MATERIAL AND THE METHOD

There were analysed a number of 2 kinds of two-row barley for beer (Thuringia, Annabell) being cultivated during 2004-2006 and the kind Xanadu in 2006, identical conditions, in the Plain of Braila.

The biologic material was analysed from organoleptic viewpoint, physico-chemical, technological and compared to the standards in the industry of malt remake. The analyses were efectuated in Comcereal Braila lab analyses.

The Result determinations efectuated to the beans of tow-row barley for beer were compared with the main parameters which must be for being used in the industry of the beer.

RESULTS OBTAINED

Conditii of standard quality (SR 13477/2003) ale barley for beer, necessary the industry of the beer MMB, g min. 42 Bodies Straine max. 3, Humidity Max. 14, Beans The big maul of 2,5 mm, min 85% germinations min 95% viability min 98% contained of the protein su max 11,5 % purity the kind min 93%.

The organoleptical analyses of the proofs of barley and studied two-row barley corresponded to the in force standards.

The results obtained after the physico-chemical analyses of the two-row barley to the proofs the average influence about the genotype of one in three years of the culture to the kinds Annabell and Thuringia.

We appreciate that the sortments I and II (and the uniformity), was influenced by the the climatic factors in modes particularly, because the technology wasn't modified.

The assortment I and II presented the average values contained between 89,33 to the kind Annabell and 90,42 to the kind Thuringia, respectively 92 to the kind Xanadu in the year 2006. The studied kinds were conformed to technical requests and recommended by the international organisms.

The humidity to all the proofs analysed in two years had the average values diminished what they framed in the limits of the requests recommended by international organisms and STAS what shows that cropping and the storage it had been made in good conditions.

The viability Registered normal values of the standards for the industry of the beer (the table.1).

All the proofs of two-row barley being analysed were responsive to the water.

Table 1.

RESULTS OBTAINED

PROBA		The humidity (%)	Foreign bodies (%)	The assortment (%)	Viability (%)	The protein (% su)
STAS		max 14	max 3	min 85	min 98	max 11,5
THURINGIA	2004	13	1,89	91,25	99	11,10
	2005	12,87	2,36	92	98	11,63
	2006	12,69	4,16	88	100	9,92
	media	12,85	2,80	90,42	99	10,88
ANNABELL	2004	12,5	1,5	93	100	10,53
	2005	13,6	3,21	87	99,00	10,79
	2006	12,22	3,68	88	99,86	9,87
	media	12,77	2,79	89,33	99,62	10,39
XANADU	2004	-	-	-	-	-
	2005	-	-	-	-	-
	2006	12,65	4,48	92	98	9,0
	media	-	-	-	-	-

For obtaining the beer the content of protean substances of beans of two-row barley is above 12 from substance dried because across this limit the barley becomes malt and results malts with a low randament. The cultivated kinds presented different values from one year to another below the appearance accumulation of protean substances, but on the average they framed in the standard in force limits, these oscillating between 10,88 to the kind Thuringia (fig.2) and 10,39 to the kind Annabell (fig.1), respectively 9,00 to the kind Xanadu in the year 2006 (fig.3 si fig.4).

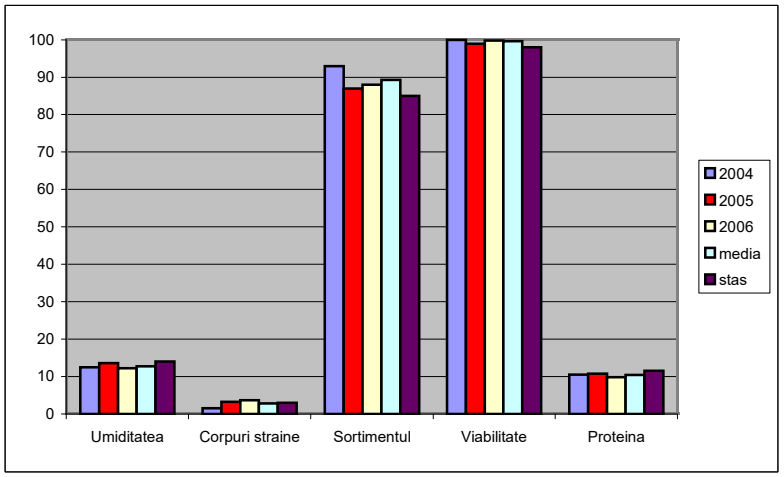

Figure 1 -The main indexes of quality of the kind annabell

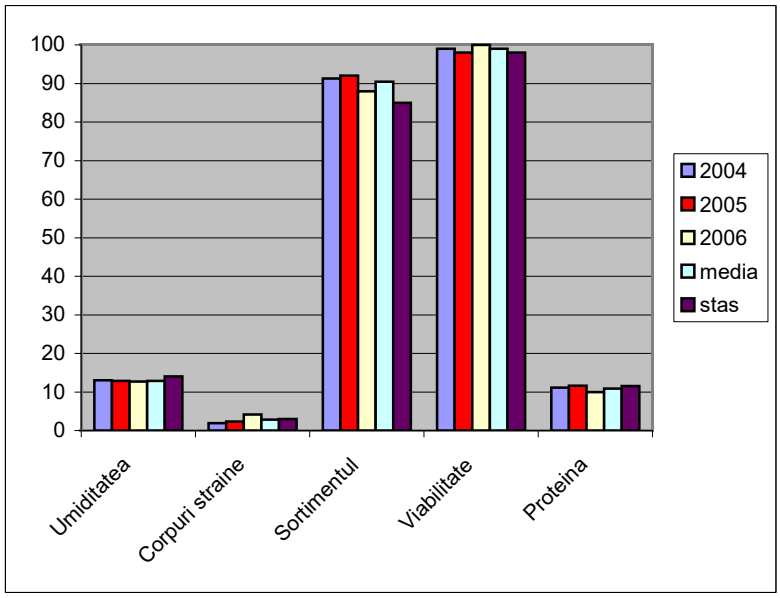

Figure 2 - The main indexes of quality of the kind thuringia

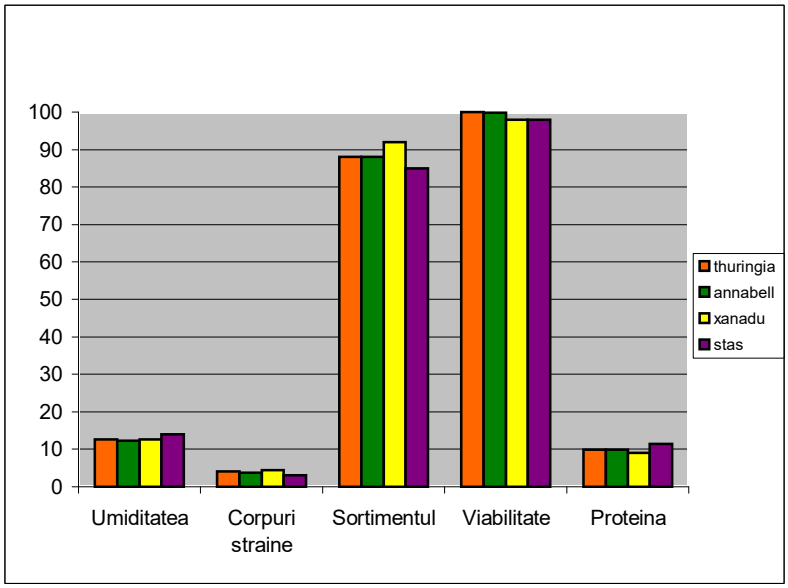

Figure 3 - The difference between kinds of 2006

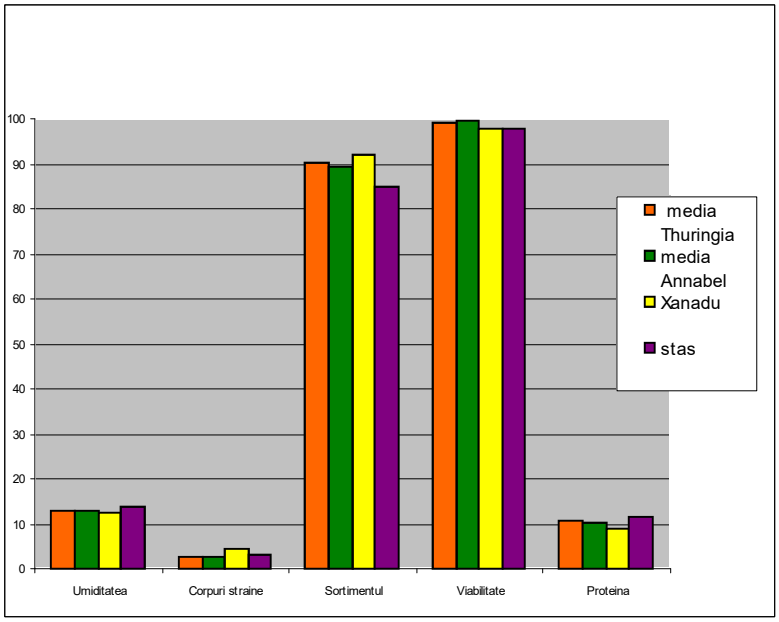

Figure 4 - The difference between kinds

On ensemble, on the strength of physico-chemical determinations efectuated it appreciate as the studious kinds, corresponding the recommendations of the international organisms and STAS for the industry of malt and the beer.

CONCLUSIONS

On the strength of determinations efectuated about the proofs of two-barley we can do the next general appreciations:

The kinds Annabell and Thuringia presented the in on the average values for the main physical and chemicals indicators which could be integrated in the standards for the industry of the beer. The germinative energy the assortment, protein content.

The kinds Annabell and Thuringia presented low values in protein content and superior to starch, very good parameter for the industry remaking the malt.. It can be appreciate that the kind Xanadu presents the view for the industry of malt.

The observations will continue and get thoroughly into.

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CRITERIA FOR IDENTIFYING AND DRAWING ON PLANS SOIL HETEROGENEITY FROM TERRACED PLATFORMS

CRITERII DE IDENTIFICARE ŞI REDARE PE PLANURI A HETEROGENITĂȚII SOLURILOR DE PE PLATFORMELE TERASELOR

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Abstract. *The conjugated effect of complex improvement works for terraces and of their subsequent exploitation on the heterogeneity of soil units cannot be pointed out on plans made at a lower scale than 1:5000 or even 1:2000. The representation of soil units on higher plans than 1:2000 is difficult and needs additional efforts, especially in laboratory. One of the possible solutions in this case is drawing maps with soil units at a lower scale, and soil units with areas of a few square meters , spread preferentially in certain areas (for instance, upstream the terraced platform) should be represented on plans drawn at higher than 1:200 scale. The paper presents some considerations on choosing the scale for making up plans, in order to show the heterogeneity of soils from terraced platforms.*

Rezumat. *Efectul conjugat al lucrărilor ameliorative complexe de amenajare a teraselor şi cel al exploatării ulterioare a acestora asupra heterogenității unităților de sol nu poate fi evedențiată pe planuri întocmite la scara mai mică de 1:5000 sau chiar 1:2000. Reprezentarea unităților de sol pe planuri mai mari de 1:2000 este greoaie şi necesită eforturi suplimentare mai ales în faza de laborator. Una dintre soluții posibile în acest caz ar fi întocmirea hărților cu unități de sol la scara mai mică iar unitățile de sol cu areale de câțiva metri pătrati, răspândite preferențial în anumite zone (ex. în partea de amonte a platformei terasate) să fie reprezentate exemplificativ pe planuri redactate la scări mai mari de 1:200. În această lucrare se prezintă unele considerații privind alegerea scării pentru întocmirea planurilor în vederea redării heterogenității solurilor de pe platformele teraselor*

INTRODUCTION

Making a soil study (text of detailed characterization of environment, soil units and interpretation of data obtained in the field and laboratory, and corresponding mapping material) requires characterizing and systematizing of base soil data, interpreting and estimating these data for different purposes (Florea, 1987).

According to the studies from specialty literature and Internet, CD-ROM, correlated to our own observations on the effect of settling on soil characteristics, we may confirm the increase in soil heterogeneity after the arrangement works and even after using soil for agriculture or gardening on terraced platforms.

According to the methodology of carrying out soil studies (ICPA, vol.I-III 1987, Florea 1964, Andreiaşi 1999), in a soil and field mapping unit, other soil and field areas may be included until 10-15% of the area. Soil studies necessary to the projects of slope arrangements or setting up vine and fruit tree plantations are done at the scale of 1:5000-1:2000. Because the minimum rational area of soil units, represented cartographically at the above-mentioned scales, is of $1cm^2$, the size of other soil areas included in soil or field cartographic units is of $60m^2$ (on plans with the scale of 1:2000) and respectively, 375 m^2 (on plans with the scale of 1:5000). According to Florea (1964), the minimum size of soil lengthened units is $0.2cm^2$ or 5mm at diameter in case of circular units. The rational size of soil units represented on plans at a larger scale than 1:5000 is of $1cm^2$. The area of $1cm^2$ on plans made at the scale of 1:500, 1:1000, 1: 2000 şi 1:5000 corresponds to 25 m^2, 100 m^2, 400 $m^2$and, respectively, $2500m^2$. Frequently, the great soil heterogeneity on terraced platforms cannot be presented cartographically at scale of 1:5000 and even at scale of 1:2000.

The paper presents some considerations on choosing the scale for making up plans, in order to show the heterogeneity of soils from terraced platforms.

MATERIALS AND METHODS

The conjugated effect of complex improvement works for terraces and of their subsequent exploitation on the heterogeneity of soil units cannot be pointed out on plans made at a lower scale than 1:5000 or even 1:2000. The representation of soil units on higher plans than 1:2000 is difficult and needs additional efforts, especially in laboratory. One of the possible solutions in this case is drawing maps with soil units at a lower scale, and soil units with areas of a few square meters , spread preferentially in certain areas (for instance, upstream the terraced platform) should be represented on plans drawn at higher than 1:2000 scale. The determination of scale at which plans are drawn will be done according to shape and size of areas occupied by soil units within terraced platforms. The heterogeneity of some specific features of soils is shown both by the uneven development of cultivated plants and by some bio-indicator plants. The base elements in defining soil units are the morphological characteristics of main soil profiles, pointed out in the field, and completed with laboratory chemical analyses. The morphological description of soil profile in the field, in tight connection with the environment factors, and human action, is done according to the methodology of elaborating soil studies (I.C.P.A-1987).

RESULTS AND DISCUSSIONS

Soil mapping of terrace-arranged fields was made by morphological, physical and chemical characterization of main soil profiles placed downstream, in the middle side and upstream the terraced platforms. Most of the times, the characterization of these soil profiles was not enough for showing soil heterogeneity on arranged terraces. In these cases, the field mapping was required-a key to a larger scale than the one of the map, on which the results of research were shown.

Choosing the key-fields must be done so that they include the areas of all soil units. Therefore, the detailed mapping was necessary, with high denseness of profiles, placed in such a way that all soil and genetic conditions should be characterized correspondingly. Determination of the sites for profile placing, in order to characterize the complexity of soil cover on terraced platforms could be done according to preliminary remarks shown in scheme 1. Thus, the uneven character of vinestock or fruit tree development could be determined by certain soil characteristics. Morphological, physical and chemical characterization of soil profiles from areas where the differentiate vinestock or fruit tree development was found, and interpretation of obtained data in field and laboratory could elucidate the causes of soil nature, which have limited their development.

Additional information concerning the heterogeneity of certain soil characteristics could be obtained by inventorying the species from field flora, which develops in studied areas. The presence on terraced platforms, on which vine or fruit tree plantations were set up, of weeds with different requirements towards soil, has reflected the heterogeneity of the edaphic environment.

We think that in most of the above-mentioned cases, the cause of the presence of different weed associations was the edaphic environment, as soil was cultivated with the same plant species or variety for a longer period, and the same technology was applied on the entire terraced platform.

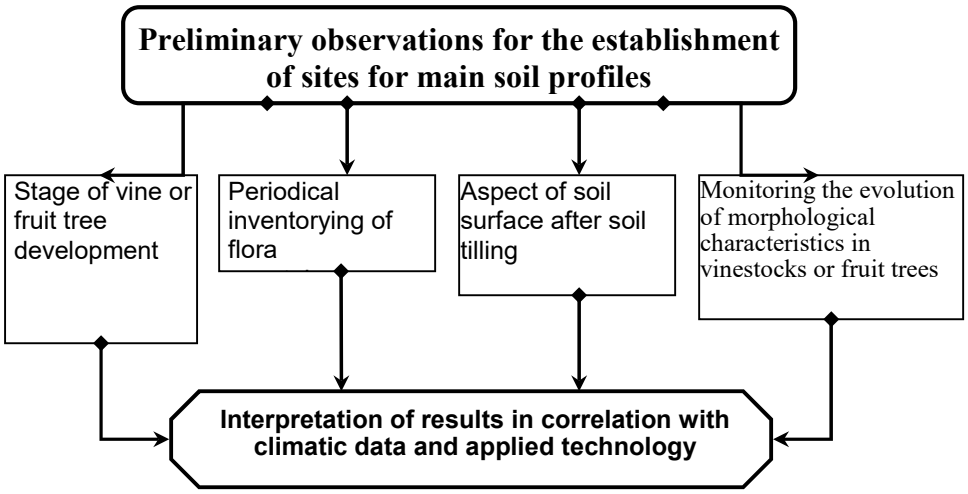

Fig. 1 – Informative scheme for determining the sites of profile placement , in order to characterize the complexity of the edaphic environment on terraced platforms

The differentiated development of vinestocks or fruit trees during the vegetation season, estimated according to the vigour of stocks and leaf color has indicated a possible modification in certain soil characteristics, requiring either sampling or soil profiles. The more accurate determination of leaf color can be done by using color samples from "*Munsell color charts for plant tissues*". The color samples from this atlas can be defined according to the parameters of the three variables: nuance, value and color.

The uneven color aspect of the area of freshly tilled soils is another indicator of the uneven character of soils from the terraced platforms. Placing the soil profiles for special soil studies will be done in all the areas where the modification of light, saturation and nuance of color is found out. The color of soil area in dry and wet condition will be defined according to color samples from "Munsell Atlas".

The modification of the field slope and achievement of terraces represent another cause of soil heterogeneity. Knowing the mode of making terraces is useful for establishing the differentiated study on platforms of upstream-arranged terraces, in the middle side or upstream the slope.

Choosing the representative areas for exemplifying will be done according to the limitative factor of the development of cultivated vegetation (depth at which calcium carbonate issued, $CaCO_3$ content, intensity of soil salinization and degree of salinization and/or sodium percentage, degree of soil stripping, etc.)

In order to establish the scale for presenting the key-fields, where soil units with lower area are also included, it is necessary to pass through the following stages:

- Delimitation in the field and determination of size and shape of soil units on the terraced platform;
- Choosing the scale of plan drawing according to size and shape of soil units, by using data from table 1.

Table 1

Informative sizes for presenting soil units from terraced platforms and determination of scales for plans drawing

Minimum area of soil unit		Minimum width of lengthened soil units		Maximum area of other soil units (m^2)	Scale of the plan
In the field	On map	In the field	On plan		
4 m^2	1 cm^2	1 m	0.5 cm	0.6	1:200
25 m^2	1 cm^2	2.5 m	0.5 cm	3.75 m^2	1:500
100 m^2	1 cm^2	5 m	0.5 cm	15 m^2	1:1000
400 m^2	1 cm^2	10 m	0.5 cm	60 m^2	1:2000
2500 m^2	1 cm^2	25 m	0.5 cm	375 m^2	1:5000

Soil heterogeneity on the platforms of terraces is growing after clearing of vine or fruit tree plantations and soil preparation for setting up new plantations. After clearing, by root stump removal by hand or mechanized, some micro-depressions appeared, which were partially filled with soil mixture from soil-genetic horizons, crossed by vine or fruit tree roots. The leveling works of terraced platforms have resulted in the even character of soil layer at surface (0-30 cm), but soil heterogeneity from subjacent layers was maintained. We think that the drawing on plan of soil heterogeneity was not necessary because of clearing works, but they should be mentioned in the text of the soil study. The knowledge of soil heterogeneity on the terraced platforms was useful in order to establish the technology of plantation setting up (choosing the planting material, establishing the planting alignments of vine or fruit trees).

CONCLUSIONS

The characterization of soil profiles, placed downstream, in the middle side and upstream of terraced platforms, is not enough for showing the soil heterogeneity on arranged terraces. In these cases, the mapping of key –fields is required at a greater scale than the scale of the map, on which are the results of research.

The establishment of sites for profile placing, in order to characterize the complexity of soil cover on the terraced platforms can be done according to preliminary observations on the uneven character of vinestocks or fruit tree logs, additional information on inventorying the species from weed flora, which develops in the studied areas.

The presence on terraced platforms, on which vine or fruit tree plantations were set up, of weed species with different requirements toward soil, shows the heterogeneity of the edaphic environment. In most of studied cases, the cause of the presence of different weed associations is the edaphic environment, because soil is cultivated with the same plant species or variety for a longer period, and the same technology is used on the entire terraced platform.

In order to establish the scale for showing the key-fields, in which soil units with lower area are included, it is necessary to pass through the following stages: field delimitation and establishing size and shape of soil units from terraced platforms; choosing the scale of plan drawing, according to size and shape of soil units, by using data from table 1.

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TECHNOLOGIES FOR PRECISION IRRIGATION IN HOTICULTURE

TEHNOLOGII PENTRU IRIGAȚII DE PRECIZIE ÎN HORTICULTURĂ

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Abstract. *Technologies refers to fixed sprinkler and drip irrigation systems for vegetables in land and glass houses, also for viticulture and urban areas. Its refers also to sprinkler self-propelled installations, used especially for vegetables. Its respond to spatial location needs. Have been analyzed components of regulation systems (sensor types, utilization conditions, controllers, regulation devices), possibility to recover of investments for these equipments, through water economy and water taxes diminishing.*

Rezumat. *Tehnologiile se referă la sisteme de irigație fixă prin picurare şi aspersiune pentru cultura legumelor în spații acoperite şi în camp, plantații vitipomicole şi spații verzi urbane, ca şi la sisteme de irigație prin aspersiune cu instalații autodeplasabile, folosite în special pentru culturile de legume în câmp. Ele răspund nevoilor de diferențiere spațială a regimului de irigație.*

În această lucrare sunt analizate componentele sistemelor de reglare (tipurile de senzori, controlere, dispozitive de reglare), condițiile de utilizare şi posibilitățile de recuperare a investiției pentru aceste echipamente prin economia de apă şi reducerea tarifelor pentru apă.

1. INTRODUCTION

In Prut River land and its adjacent zone were realized before 1989, irrigation arrangements on 75000 hectares approximately, spread in Botosani, Iasi, Vaslui and Galati counties. Also, there are smaller irrigation arrangements in hydrographic basins of Prut River tributaries, which use water from lakes.

Irrigation technology's becomes rapidly increasing, due to reduction consumptions demand in irrigation, by strictly laws relating environmental protection, by climatic changes, institutional reforms etc.

In horticulture's irrigation are used the most performed methods and techniques due to increasing profit in case of vegetables, flowers, orchards and urban recreational zones.

In glass houses and solar as well as in viticulture and orchards there are used either drip irrigation with fixed system or micro-sprinklers. Irrigation in land is done by aspersion as well as in urban areas. In this case the irrigation systems must be fixed with underground devices.

Technological progress for irrigation has as objective: increasing the watering efficiency, improvement of distribution uniformity and reducing water and energy consumptions. In the same time, has been studied and implemented measures for different irrigation scheduling in irrigated areas, tacking into account

the differences between texture and hold capacity for water, infiltration and natural drainage capacity.

The aim of paper is to analyze technologies to implement precision irrigation which responds both spatial non-uniformity above indicated and temporal non-uniformity, determined by randomized regime of precipitations.

2. PRECISION IRRIGATION'S CONCEPTS AND THE ELEMENTS OF AUTOMATION SYSTEMS

Precision irrigation is part of precision farming. It induces a certain conception by structuring for irrigation systems and an adequate management of watering. Irrigation scheduling in this case must tack into account by three questions: when must be done a new irrigation rate, what volume of water will be used and where will be distributed.

Irrigation regime is established for different areas from irrigation arrangements related by hydric balance of soil for each of this. This assures major water and energy reduction, avoid over irrigation, leaching fertilizers and pesticides, assures crop enhanced than uniform irrigation, which considers the mean conditions from watering areas.

Precision irrigation needs also automation systems and differentiated technology related to irrigation method and equipments used. In this way are emphasized two situations: a. fixed system for drip and sprinklers and b. sprinkler irrigation systems with mobile self-propelled.

Automation system could be closed or open loop. Automation system's components are: sensors for monitoring of irrigation demands, transmissions cables, and conversion interfaces from analogical to digital signals, controllers or PC, control interface, cables for commands transmitting and local devices for command running. Cables for data transmitting could be replaced using wireless technology.

3. SPATIAL VARIATION IN WATER REQUIREMENTS

In fixed irrigation systems, density, sensors number and cables for data acquisition and transmitting commands, depends by of soil conditions and water table variability. Thus, is necessary an analysis of these before designing of a distribution network (layout) for establishing the sub zones with similar conditions. Each sub zone will have the own sensor and a solenoid valve for turn water on and off. The solenoid valves are placed to entry in tertiary pipes, the water volume being regulated according to opening time of these devices.

In sprinklers irrigation systems with self propelled equipments, this irrigation's method is in incipient stage. Variation's variability in water requirements could be monitorized with fixed or mobile sensors (placed on watering equipments). Signal transmissions from fixed sensors to PC or controller are done through radio waves.

4. SENSOR'S TYPE

The sensors used in irrigation systems directly monitories the soil moisture or plant water status or water consumption through evapotranspiration, staring watering at trigging value [4]. They could be used also to assure feedback of controller when soil moisture is to a certain level and watering stopped. The soil moisture sensors for real time automated irrigation control are: tensiometers, gypsum blocks, Watermark granular matrix and dielectric sensors.

Tensiometers are used only for soil moisture more than -80kPa, thus there are no recommended for clay.

Gypsum blocks could be used if range of water soil tension is from 30 up to 1500 kPa, thus there are no indicated for sands. They are good in case of soils with fine texture, are cheeps but must be replaced yearly.

Watermark sensors determines the electric resistance of soil like gypsum blocks, but offers better precision for a range of soil moisture form 10 up to 200kPa. They could be calibrated related to salinity soil level.

Dielectric sensors through electromagnetic waves, directly determines soil permeattivity, which is correlated with soil moisture. The measurements are in real time continuous, if the sensors are included into the automated irrigation system.

Moisture sensors are layout pair in the same place. The first is placed at the medium of root maximum development depth and it indicates the starting watering. The second one is placed at the bottom of root zone and it indicates the end of watering. The moisture sensors are strictly necessary for management of regulated deficit or partial root zone drying irrigation. Both these management irrigation methods are used in Australian viticulture and they assure majors water economy and an upper production especially from qualitative point of view.

Sensors for physiological plant status are infrared thermometers type or infrared thermocouples [1,2,3]. They are easily to connect at a PC, data logger or controller. Both of them determine the temperature at leafs surface and the environment. Differences between them represents an indicator of water stress used for water scheduling. The triggering value of temperature depends on crops and vegetation phase but for watering starting it must also be defined the daily period in which this value are maintained. For example, in Georgia (USA) this period is up to 5 hours.

Water scheduling based on temperature measurements use crop water stress index (CWSI):

$$CWSI = \frac{(T_c - T_a) - T_i}{T_n - T_i},$$

where: T_c represents the plant temperature;

T_a – environment temperature;

T_n – the difference (T_c-T_a) when plant resistance to water loses is infinite (when stomata are closed thus there are no loses through transpiration);

T_i - the difference (T_c-T_a) when plant resistance to water loses are zero (optimal hydric conditions).

The values T_c and T_a are measured in the warmest day period and the values T_n and T_i are done in literature for each culture.

Other kinds of sensors for physiological plant status are based on radiation measurement on red band (range from 0.61 up to 0.68 μm) and near red (range from 0.79 up to 0.89 μm). With measurements obtained from the two sensors it could be calculated normal difference vegetative index (NDVI), which are closely correlated with leaf area index (LAI).

These together sensors were been used to command precision irrigation at self-propelled pivot center.

Sensors for monitoring evapotranspiration consumption have a large applicability to landscape irrigation. Practically, the meteorological stations are equipped with some kinds of sensors for monitoring of: air and soil temperature, relative humidity of air, insolation or solar incident energy, intensity of active solar radiation, and precipitation. Data from these sensors transmitted to a PC or controller with adequate software are used to compute evapotranspiration, daily hydric balance, and also indicate the watering dates. The controllers calibrate daily water scheduling for each deserved zone related to weather conditions.

The results of evapotranspiation monitoring from a local automated meteorological station could be loaded on a website and then downloaded by the farmers. With these downloaded data, the farmers could realize their own water scheduling. After that, the farmers could transmit the command to the controller through the modem, for turn on or off the solenoid valves. If the irrigation system has the own pumping station, the controller has to manage also this objective. Some municipalities from Italy use the MAXICOM software packages in automated management of irrigation for landscapes, having a PC linked through telephone cables with local control stations.

5. REGULATION METHODS OF WATER RATE

The energy consumption in these conditions is more appropriate to relate at surface unit (hectare):

In case of automated fixed irrigation system with fixed local control station, the water rate is regulated function by opening time of solenoid valves from these stations. Its maximum opening permits to transit a certain discharge.

In case of sands, because of the moisture front advances relative rapidly, the water rate calibration is done by moisture sensors feedback.

In case of irrigated system equipped with self propellers, the water rate is regulating in the first instance through modifying of traveler velocity of equipment because of velocity is inverse proportional with water lay depth.

Thus, the hose self traveler equipment produced by certain firms has controllers which assure: time delay of watering and movement at the ends of irrigated zones, variability of water lay depth on part of watered zone, turn off the

water in case of precipitations or strong wind. Into advanced automation stage the controller could receive information from sensors situated on the carriage, regarding physical plant status.

At self propelled center pivot and linear move irrigation system it could be regulated the intensity of irrigation depth too in length of equipment through modify the working regime of sprinklers. Information regarding location of installation to any moment is done by a GPS located at downstream end.

6. PERFORMANCE OF EQUIPMENT FOR PRECISION IRRIGATION

The energy consumption in these conditions is more appropriate to relate at surface unit (hectare):

In table 1 is shown a comparative analyze of possibilities to investment recovery for precision irrigation equipments, considering a specific water volume for irrigation season about 1500 m^3/ha.

Table 1

Possibility to recover of supplementary investment due to precision irrigation through water economy and reduction of water tariff on 10 years

System	Features	Minimum surface of irrigation systems (ha)	Specific invest-ment (RON/ha)	Water saved (%)	Tariff reduction per 10 years (RON/m^3)		
					ANIF tariff		Urban tariff
					0.15	0.30	1.20
Controller with meteorological station, regulating vanes, cables link (for landscape, vegetables, orchards, viticulture drip or micro sprinkler irrigated)	Regulating valves density						
	1/0.5 ha	15	725	30	675	1300	5400
	1/1 ha	30	580				
	1/2 ha	60	510				
	1/5 ha	150	470				
Controller GPS, infrared sensor of temperature, regulating valves (for self propelled center pivot and linear move irrigation system)	3 regulating valves for each sector of irrigation equipments	40-50	700	20	450	900	3600

Evaluating criteria refers to costs, to monitoring and regulating precision, to feasibility and length of service, to maintain service, to water and energy economy and increased production realized.

Previous experiments and evaluating shows precision irrigation assures great water economy, especially for vegetables [5]. Thus, for tomatoes in Florida (USA), using tensiometers placed at 15 cm depth in sand soil and set for starting watering for retaining water tension about 10 and about 15 kPa, it was reduced the water consumptions without effect on production. In the same conditions a irrigation controller associated with a dielectrical sensor transiting electrical signals correlated with soul humidity, achieved a reduction of water consumption about 70 % at tomatoes drip irrigated.

CONCLUSIONS

Precision irrigation has more and more applicability to fixed drip and sprinkler irrigation systems but also to self-propelled irrigation systems.

There are many types of sensors who monitoring either soil moisture, either plant water status or evapotranspiration. They are the most important elements into automated system. Their choice taking into account by: soil and cultures conditions, accuracy and speed to sensing of monitorised factors variation, easy to install, in situ calibration needs, operation and maintenance, costs etc.

The actual technology for precision irrigation use computers and controllers with adequate software, which realize the irrigation scheduling for a large variety of soils water ground and cultures conditions.

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EFFICIENCY OF SOME MEASURE TO REDUCE ENERGY AND WATER DEMANDS FOR IRRIGATION, IN ARRANGEMENTS FROM PRUT RIVER BASIN

EFICIENȚA UNOR MĂSURI PENTRU REDUCEREA CERINȚELOR DE ENERGIE ŞI DE APĂ PENTRU IRIGAȚII, ÎN AMENAJĂRILE DIN BAZINUL HIDROGRAFIC PRUT

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Abstract. *The analysed arrangements needs rehabilitation and modernisation works in order to reduce energy and water consumptions. To reduce the specific energy consumption related to 1000 cubic meters water distributed to AUAI, has been analysed increasing of efficiecy to base and re-pumping stations, also rehabilitation of main canals. Specific energy reduction in distribution network comprise rehabilitation measures in distribution network, modernisation of methods and watering instalation, water scheduling, emphasizing the limits of each measure.*

Rezumat. *Amenajările analizate necesită lucrări de reabilitare şi modernizare cu scopul de a reduce consumul de energie şi apă. Pentru a reduce consumul specific de energie raportat la 1000m^3 apă distribuită AUAI, se analizează eficiența îmbunătățirii randamentului energetic al stațiilor de pompare de bază şi repompare şi reabilitarea îmbrăcăminților canalelor de aducțiune. Reducerea consumului specific de energie în rețeaua de distribuție cuprinde măsuri de reabilitare a rețelelor de distribuție (ploturi), modernizarea metodelor şi instalațiilor de udare şi programarea udărilor.*

INTRODUCTION

In Prut River land and its adjacent zone were realized before 1989, irrigation arrangements on 75000 hectares approximately, spread in Botosani, Iasi, Vaslui and Galati counties. Also, there are smaller irrigation arrangements in hydrographic basins of Prut River tributaries, which use water from lakes.

Irrigation necessity is done by precipitations temporary variability and by frequency and intensity increasing of droughts in this part of country, due to global climatic change. The irrigation's profit is determined by several factors as well as commercial value of crops increase (related to quality and quantity of agricultural products), by irrigation costs – in which water costs are included etc. From profitable point of view, the greatest part of these irrigation arrangements is occupied by vegetables cultures.

In actual arrangements, the relative great expenses for energy consumptions and water pumping, affects farmer profitability and make irrigation unprofitable for crops with smaller economic value. Therefore, is interesting for specialists from National Irrigation Agency, also for farmers from AUAI, to know the factors

who influence consumptions and measures for its reduction corresponding for each involved. Therefore are interesting establishing the competence's domain, possibility of actions and its successive in time interventions. The analyses that were done refer to these aspects, in specific conditions of some representative arrangements from zone.

These measures represent the objectives of rehabilitation and modernization program with other measures as well as sustainable irrigation (soil and underground water pollution risk reduction).

SPECIFIC ENERGY CONSUMPTION IN ACTUAL ARRANGEMENTS

Part of these arrangements has more pumping steps in land zone also, function by topographic conditions another 1-2 pumping steps on Prut river terraces and inter basins platforms.

Specific energy consumption could be analyzed per unit water volume at entrance into the farm or per surface irrigated unit.

The first way of expression is:

$$C_{Sp} = \frac{9.81 \cdot H_p}{3600 \eta_p \eta_t} \text{ (Kwh/1000 water cubic meter),}$$

where: H_p represents total pumping head; η_p - energetic efficiency of pumping stations; η_t – hydraulic efficiency of transport network of irrigation systems.

$$\eta_t = \eta_a \, \eta_d$$

where: η_a represents main network efficiency; η_d – distribution network efficiency (buried pipes under pressure).

The main objective of irrigation systems administration is reduction of this consumption. This consumption depends by energetic efficiency of pumping station, also by hydraulic efficiency of main canals. Specific consumption is affect by canals utilization degree, considered as a ratio between effective discharge and maximum capacity of canal. This is due to that in exploitation, canals are maintained with higher water levels indifferent by discharge, in this situation the water loses from canal doesn't depends by effective discharge.

Hydraulic efficiency of main network directly depends by water loses from canal and discharge, by relation:

$$\eta_a = 1 - \frac{Q_p}{Q_{tr}}$$

where: Q_p represents discharge of water loses from main canal (by filtration); Q_p – transition discharge.

The values of specific consumption in actual conditions, considering as a medium η_p = 0.7 and filtration water loses as 400 l/m^2 and day (measured in Sud Solonet irrigation system) [1], are shown in table 1.

It is remark that a utilization degree more than 20-25 % is more important for specific consumption diminishing, especially on higher pumping steps.

Table 1

Specific energy consumption (Kwh/1000 water cubic meter), on arrangements, pumping steps and different utilization degree [2]

Irrigation system	Pumping step	Surface (hectares)	Utilization degree (%)				
			10	25	50	75	100
Stanca Ripiceni	I	610	0.58	0.48	0.46	0.46	0.45
	II	2415	4.10	1.12	0.91	0.86	0.84
Nord Solonet	I	3390	0.58	0.58	0.58	0.58	0.58
	II	2588	0.84	0.84	0.84	0.84	0.84
Sud Solonet	I	2541	1.32	0.68	0.61	0.59	0.58
	II	1739	2.27	1.15	1.01	0.98	0.96
Lunca Trifesti Sculeni	I	7288	0.39	0.33	0.32	0.32	0.32
Albita Falciu subsistemul Bumbata	I	4193	0.36	0.31	0.29	0.28	0.28
	II	910		0.83	0.53	0.49	0.48
Campia Covurlui	I	5545	0.25	0.24	0.24	0.24	0.24
	II est	3066	4.37	1.69	1.39	1.32	1.29
	III est	2769	15.23	3.12	2.25	2.04	1.95
	II vest	47232	0.95	0.36	0.34	0.33	0.33
	III vest	25929	1.93	1.09	0.87	0.83	0.82

MEASURES FOR ENERGY AND HYDRAULIC CONSUMPTION DIMINISHING IN PUMPING INFRASTRUCTURE AND WATER TRANSPORT

Due to length of service and wear, the energetic efficiency of pumping and re-pumping station components has small values (0.6 and less in some cases). By replacement with new components could be increased the energetic efficiency up to 0.8, which permit energetic consumption diminishing up to 25 % by actual consumptions.

In other wise it is interesting to study rehabilitation of canal lining. The most canals are into a critical physic and functional stage due to of lack maintenance. Rehabilitation is justified to those canals and part of canals with higher utilization degree. It could be approached step by step from upstream to downstream. The recommended materials are plastic membranes by synthetic rubber or by bentonite composite cover with ground, or concrete guniting.

The opportunity rehabilitation from economic point of view results from comparison between costs of new lining and saved water. The economic calculus shows that the geomembrane cover with ground could be a solution for canals situated on the pumping step with pumping head more than 20 meters, if the yearly utilization of canal is 100 days and for pumping steps with pumping head more than 33 meters if utilization time is 60 days yearly (life time for lining is considered 20 years). The concrete lining is more expensive but has a lifetime

greater than geomembrane (50 years). This solution is justified for pumping heads higher than 30 meters for a yearly utilization of canal up to 100 days and for pumping head more than 50 meters (60 days).

These elements were established taking into account that actual water loses are 300 l/m^2 and day and after rehabilitation decreases to 30 l/m^2 and day.

The actual physic stage of lining differs from an arrangement to anther, which impose measurements in specific conditions for each irrigation system. After that, we could establish the rehabilitation efficiency and the specific solution to use.

In some cases are necessary only few operating repairs of joints and settlement of some discharge valve on the end of drains if degradation of lining is due to rise of water table ground.

MEASURES TO REDUCTION OF WATER AND ENERGY CONSUMPTION IN PLOTS

The energy consumption in these conditions is more appropriate to relate at surface unit (hectare):

$$C_{Sp} = \frac{9.81 \cdot H \cdot M}{3600 \cdot \eta_p \cdot \eta_d \cdot \eta_u}$$

where: H represents pumping head at SPP; M – yearly effective water rate; η_p – energetic efficiency of SPP; η_d – hydraulic efficiency of distribution network; η_u – watering efficiency.

Performance of watering is defined as follows:

$$E_a = E_d \cdot E_u$$

where: E_d represents performance of irrigation method and technique and depends by amount of water loses through percolation, evaporation and flooding; E_u – performance related to non-uniformity of water distribution.

Mean value of E_d is 60-90 % for surface irrigation (maximum values are for cablegation installation with intermittent supplying or water recirculation); 65-70 % for irrigation with mobile installations; 60-70 % for irrigation with traveling sprinkler; 75-90 % for irrigation with pivot center linear-moving system; 70-85 % for irrigation with fixed microsprincklers; in mean 90 % for drip irrigation [4].

Performance of watering from sprinklers increase during the night.

E_u depends by uniformity watering coefficient (Cu):

$$E_u = 0.5 \cdot \left(1 + \frac{CU}{100}\right)$$

In some conditions E_u could decrease: higher wind velocity for sprinklers (more than 8 km/h), great shape of land (more than 12%), if watering intensity exceed soil infiltration capacity.

In the last decades the farmers acquired new drip and sprinklers installations with higher performance.

It could be obtain a 23% reduced energy in case of use hose-drawn travelers with low pressure (medium performance 85%) instead of the old sprinkler laterals (medium performance 65%). In the same time, the better performance of new irrigation equipments is reflected in reduction of irrigation demands (defined as ratio M_{net}/E_a). In fact, improvement of water distribution give more water and energy economy because of the non-uniform watering constrains the farmers to increase watering duration in order to obtain a amount of water at least equal with water rate on the whole surface. In this case result an exceeding water amount on the most part of irrigated surface.

a. Water scheduling

Water scheduling used in this aim could become an approach to reduce water energy consumptions. The used method is monitoring of hydric balance of soil, which needs a daily evaluation of evapotranspiration differentiated on zones uniforms from pedoclimatic conditions and crops point of view. In several countries there are web sites where farmers could obtain information about evapotranspiration evolution and software for download.

A problem with major implication in irrigation water consumption reduction is degree of utilization of natural precipitations. Although quantitative precipitation forecast is not possible, in software is necessary to be included precipitation with some probabilities for the time interval considered.

Other measure is to stop the watering when in soil is recorded a humidity level at 85-90 % from water field. In this case, the water rates will be reduced (300-350 mc/ha for a soil depth 0.5 m). In this way is assured a soil space reserve used for increasing degree of availability for unexpected precipitations, which could occurs after watering.

b. Succession of measures implementation

Some measures regarded the system administration and other by AUAI and farmers. All of them are components of rehabilitation and modernization program for irrigation systems. Before initiating of these programs is necessary to implement the institutional reforms and constituting AUAI, respectively.

Approach agenda is related to utilization degree, which is recorded on each pumping step and plots.

Anyway, the first actions are refers to base pumping station. Function by plots located areas with minimum utilization degree is necessary to modernize the main canal, repumping station, and of course, SPP and distribution networks from plots.

Energy consumption at SPP could be reduced by many ways:

- by replacement of some components with new ones with great efficiency;
- pressure at SPP could be reduced especially for high zone with less water demand;

- could be reduced the working pressure at hydrant to 2-3 bar, instead of 4 bar in present, if it is replaced the actual irrigation equipment.

In condition of some plots where location of irrigated crops differs from year to another, is more efficient to abandon the actual network and SPP and to irrigate directly from main canals using thermic aggregates with supra terrain lines (from drip and microirrigation or from traveling sprinkler irrigation)[2].

Acquisition of performing irrigation equipments is main interest for farmers from actual irrigation arrangements. In order to minimize the risk of utilization of actual infrastructure, farmers could use an alternative water sources (lakes etc).

CONCLUSIONS

Measures to reduce water and energy consumption in irrigation arrangements from Prut River basin, must approached in associated way, taking into account that transport and water distribution is done by pumping.

The main objective represents reduction of energy consumptions that has great values especially in case of less utilization degree of main canals. Therefore, before starting rehabilitation and modernization program, is necessary institutional reform.

Possibilities with great impact in reduction of energy consumption for pumping and transport infrastructure are: pumping equipment replacement and lining rehabilitation with cheap solutions (geomembranes covered by ground).

In plots, the energetic efficiency could be improved by replacement pumping equipments from SPP, revise of distribution network and acquisition by performed irrigation equipments.

Implementation of water scheduling as a component of irrigation management with considering weight of precipitations, assure an important reduction of water demands and water taxes for farmers. Also this measure will reduce energy consumptions at arrangements level and soil levigation phenomena and underground water pollution with chemical substances.

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ANALYSE DE LA VARIATION DE L'HUMIDITE D'UN SOL BRUN LUVIQUE

ANALIZA UMIDITATII UNUI SOL BRUN LUVIC

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Abstract. *Understanding and description of the hydraulic and physical phenomenon which take place in soil and at the soil-atmosphere border, in presence or not of the vegetation, is important for an adequate management of the soil-plant-atmosphere environment.*

In this context, the soil moisture variation influences the evaporation, infiltration and runoff processes. The soil moisture variation may influence the climate change through the flux variation at the soil-atmosphere border. For example, the evapotranspiration can be limited by the water content in soil. In general, if the soil has less water content, the soil will be more affected by the climate change.

In this context, the objective of this paper is to analyze the soil moisture variation in relation with precipitation and evaporation and thus to establish the hydraulic regime. To achieve this objective, we had analyzed the hydraulic and physical properties of a brown luvisols.

INTRODUCTION

La compréhension et la description des phénomènes physique et hydriques qui se déroulant dans les sols aussi bien qu'à leur interface avec l'atmosphère, en présence ou non de végétaux, paraissent indispensables à une gestion adéquate de ce milieu. L'humidité du sol est une variable clef du cycle hydrologique. De sa variabilité dépendent les processus d'évaporation, d'infiltration et de ruissellement et vice versa. La variation de l'humidité du sol peut, d'une manière significative, influencer le climat, en variant les flux à la frontière inférieure de l'atmosphère. Par exemple, l'évaporation peut être limitée par la quantité d'eau contenue par le sol, c'est-à-dire son humidité. Il faut toutefois noter que ces tendances sont à moduler suivant la composition du sol. En général, moins un sol peut contenir d'eau, plus il sera sujet aux variations dues au changement climatique. La fréquence et l'intensité du gel peuvent influer la capacité d'un sol à contenir de l'eau. La baisse de la fréquence et de l'intensité du gel, c'est la tendance actuelle dans les pays tempérés à cause du changement climatique, réduit la quantité d'eau que peuvent contenir les sols et donc son humidité et pourrait augmenter la quantité d'eau qui circule en surface. L'évolution à la baisse de l'humidité du sol entraînerait un besoin accru en irrigation.

En conséquence, l'objective de notre étude est de caractériser la variabilité de l'humidité du sol en relation avec la pluie et l'évapotranspiration, en vue d'établir le bilan hydrique.

MATERIAUXS ET METHODES

Pour attendre les objectives sous mentionnés, la méthodologie concerné est Sélection et équipement d'une parcelle (40m²) pour étudier la variabilité de l'humidité du sol en relation avec d'autres paramètres du sol et le régime météorologique ; Caractérisation des propriétés physique du sol (texture, densité, porosité) ; Caractérisation de la variabilité de l'humidité du sol à pas de temps journalier pendant la période culturelle au sein de la parcelle sélectionnée ; Caractérisation de la variabilité des propriétés hydrodynamiques du sol: conductivité hydraulique, courbe de rétention, teneur en eau caractéristiques; Caractérisation le régime pluviométrique et l'évolution de l'évapotranspiration.

La parcelle étudiée de 40m^2 a les caractéristique suivante : une pente de 13% et un sol de type brun luvique très podzolé développé sur des sables et loess argileux. Elle est équipée d'un pluviographes à siphon de type Junkalor avec une bague de 250 cm² fonctionnant avec volume de siphonage de 10 mm. La période d'étude et 1997-1998.

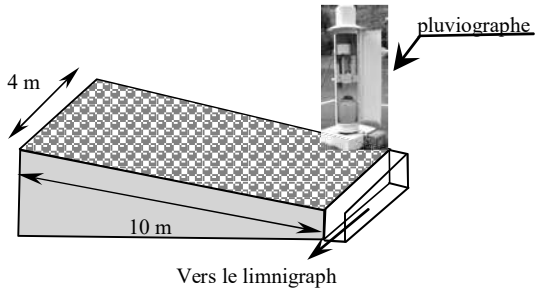


Fig. 1 - Parcelle experimentale

Les propriétés physique du sol déterminées : sont la texture, la densité réelle, la densité apparente sèche et la porosité. L'analyse granulométrique a été faite par la méthode de l'analyse discontinue à l'aide d'un aréomètre. Pour determiner la texture du sol, nous avons utilisé le logiciel TAL (Texture AutoLookup). Ce logiciel utilise plusieurs triangles texturale mais donne la possibilité de l'utilisateur de introduire son propre schéma. La réalisation d'un schéma se fait par redéfinition des noeud du chaque polygone qui encadre une classe texturale. Par les modifications faites, le logiciel fourni la classe texturale roumaine et le diagramme correspondant dans la variante du Chirita (Stefan P., 1986). Le pycnomètre à eau permet de déterminer la densité réelle, ρ_s, d'un échantillon du sol. La densité apparente sèche du sol, ρ_{as}, est déterminée sur des échantillons non remaniés. La mesure directe de la teneur en eau pondérale (w) s'effectue simplement par pesée avant et après étuvage, ces deux valeurs correspondant respectivement à la masse totale et à la masse de sa fraction solide. La teneur en eau volumique (θ) et la teneur en eau sont liées par la relation : $\theta = w \cdot \rho_{as} / \rho_w$ (cm^3/cm^3), où ρ_w est la densité de l'eau (g/cm^3). La conductivité hydraulique à saturation a été évaluée sur des carottes cylindriques de sol non remanié avec un perméamètre à charge constante sans succion. Pour construire les courbes de rétention -courbes caractéristiques d'humidité- h(θ) on a besoin de valeurs du potentiel de pression. L'extracteur à plaque poreuse est un appareil qui permet d'effectuer des mesures du potentiel de pression. Les mesures ont effectuées a -1, -4, -10, -20, -40, -70, -100, -330, et -1000 cm de pression. Cette relation joue un rôle capital dans la description des écoulements de l'eau dans le milieu non saturé, mais ne facilite pas la planification, et la gestion d'aménagements hydro agricole. C'est la raison pour laquelle on classe l'eau dans le sol en différentes catégories, chaque catégorie étant délimitée par des teneurs en eau caractéristique du sol, indice hydrique du sol ou bien taux remarquable d'humidité du sol : teneur en eau à

saturation, θ_s (C_s), l'eau occupe la totalité des pores du sol, correspondant à un pF égal à zero ; teneur en eau à la capacité du champ θ_c (C_c) représente la capacité de rétention maximale du sol mesuré in situ. On admet régulièrement que cette valeur se produit à un pF égal à 2.5 ; le point de flétrissement ; cette valeur de la teneur en eau du sol représente le taux d'humidité au moment où la force de succion des plantes égale la force de rétention de l'eau par le sol. On admet en général une valeur moyenne de 4.2 en pF. Parce que l'extracteur utilisée permet des déterminations seulement jusqu'à 1000cm de pression (3 pF), la valeur du point de flétrissement on le détermine à l'aide d'une formule qui tienne compte de contenu d'argile : $\theta_f(CO) = 0.05 + 0.350 \cdot A$ (% poids) où A représente le contenu d'argile en pourcentage ; La limite inférieure de la disponibilité de l'eau est caractérisé par une teneur en eau réduite appelée point de hygroscopicité, correspondant a un pF de 6-7. Ce concept ne présente en général que peut d'intérêt.

Les précipitations ont été estimées à l'aide des pluviographes à siphon de type Junkalor et l'évapotranspiration avec la relation Penman-Monteith.

RESULTATS ET DISCUTIONS

Le profil du sol s'organise en trois horizons: E (éluvial), Bt (alluvial) et C. Les résultants d'analyse granulométrique et les clases texturales déterminé par le logiciel TAL modifié sont portés dans la fig. 2 et 3.

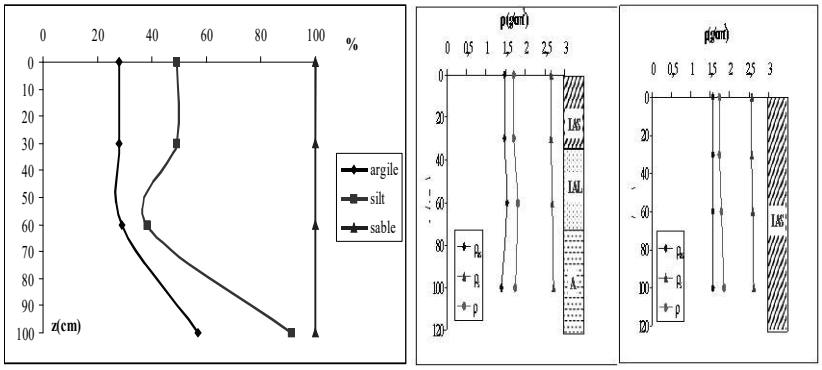


Fig. 2 - Variation granulométrique sur le profil Fig. 3. Variation ρ sur le profil

Le sol de la zone supérieure (jusqu'à 30 cm) peut être classé dans la catégorie du sol « lœss argileux sableux » (LAS). Le sol trouvé entre 30 et 60 cm est un sol « lœss argileux limoneux » (LAL) et le sol de 60 à 100 cm entre dans la catégorie « sol argileux » (A). La distribution des densités sur le profil est présentée dans la fig. 3. Dans la partie supérieure du profil, jusqu'à 60 cm, le contenu d'argile est de 28–29%, mais dans la partie inférieure du profil, nous observons une accumulation en argile qui atteint la valeur de 57%. Le contenu de silt varie de 9% à 34% et le contenu de sable de 9% à 62% (fig. 2). Les valeurs de la masse volumique réelle varient entre 2,65 et 2,70 g/cm^3. La masse volumique apparente sèche, ρ_{as}, varie de 1,39 à 1,53 g/cm^3. On en déduit la porosité du sol, elle varie de 42% à 48% sur le profil. Les valeurs de la conductivité hydraulique à saturation varie de 1.82 à 0.22 cm/j. En étudiant la relation conductivité à saturation – profondeur, nous observons deux tendances pour le profil étudié: une pente forte de décroissance de la valeur de la conductivité à saturation ce qui signifie un drainage rapide suivie d'une pente

beaucoup plus faible de la courbe correspondant à un drainage lent (fig. 4). Dans la zone non saturée du sol le potentiel de pression est une caractéristique du sol liée à la teneur en eau, les deux paramètres variant simultanément. La courbe de rétention en eau, $h(\theta)$, et présentée dans la fig. 5. Les valeurs remarquables de la teneur en eau sont portées dans la fig 6. On observe que θ_s diminue brusquement dans l'horizon LAL et puis la valeur reste constante. La capacité du champ diminue uniformément avec la profondeur et le point du flétrissement augmente beaucoup pour l'horizon A. On observe aussi que la réserve utile (θ_s-θ_c) d'eau diminue avec la profondeur.

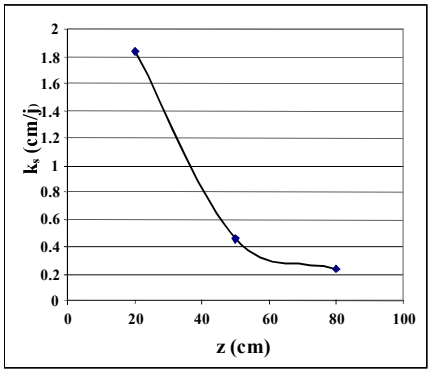


Fig. 4 - Variation Ks-depth

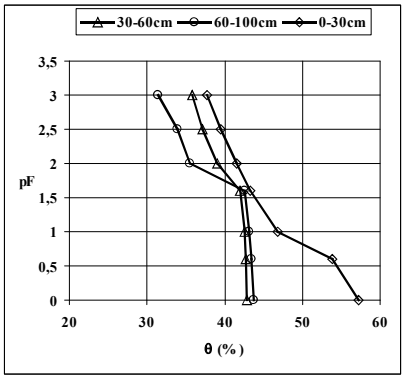


Fig. 5 - Courbe de rétention en eau

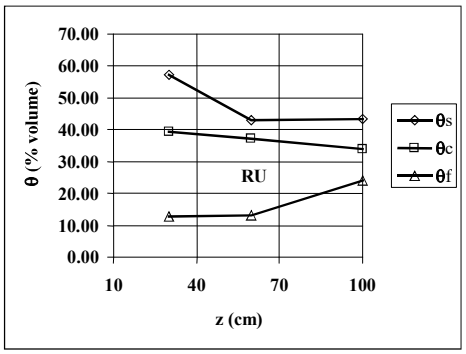


Fig. 6 - Eau contenue dans le sol selon l'horizon

En ce qui concerne la variation de l'humidité on présente quelques profils hydriques suivis en 1997 et 1998 et les enveloppes minimales et maximales des profils, définies comme les valeurs minimales et maximales à chaque profondeur (fig.7). On constate que pendant la période mai-octobre la teneur en eau varie de 0,14 à 0,73 cm^3/cm^3 en surface (0-2cm) en 1997 et de 0,14 à 0,84 cm^3/cm^3 en 1998. A cette profondeur, la plus grande amplitude est constatée en août de 0,55 cm^3/cm^3 1997, avec la même valeur en août 1998. En général le front d'infiltration descend vite jusqu'à une profondeur de 35-40 cm en gardant une valeur constante au-dessous de cette profondeur. Cela montre soit qu'il n'y a plus d'infiltration au-delà, soit que le coefficient d'infiltration diminue considérablement. Nous observons forte décroissance de la teneur en eau pour les mois de septembre et d'octobre, parce que les averses d'été ne peuvent pas maintenir une valeur stable de la teneur en eau reprise par évaporation. En s'intéressant aux courbes enveloppes, nous constatons une petite augmentation (au maximum 0,10 cm^3/cm^3) à la profondeur de 80-100 cm.

Cette situation est liée à l'horizon Bt qui provoque une accumulation temporaire de l'eau. De plus, la couche d'argile peut provoquer une remontée de la frange capillaire. Cette remontée se traduit par une augmentation de la teneur en eau pour la tranche 80-100 cm.

En dressant un bilan simplifié de la pluie par rapport à l'évapotranspiration, nous observons que la période étudiée est dans son ensemble déficitaire. Les valeurs d'évapotranspiration journalière sont bien distribuées et pratiquement constantes au cours des mois concernés par notre étude (fig. 8). En revanche la distribution de la pluie et très variable dans le temps.

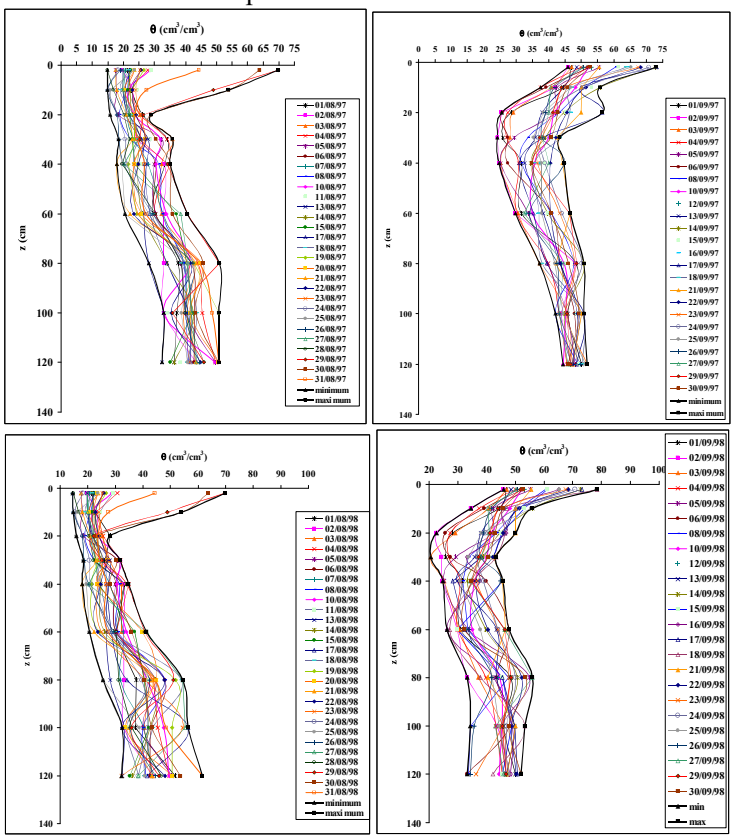
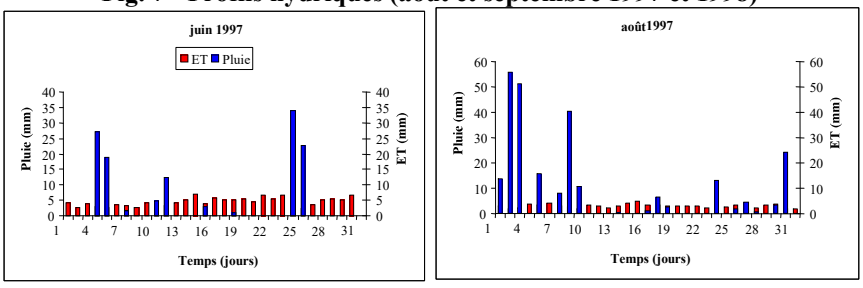


Fig. 7 - Profils hydriques (août et septembre 1997 et 1998)



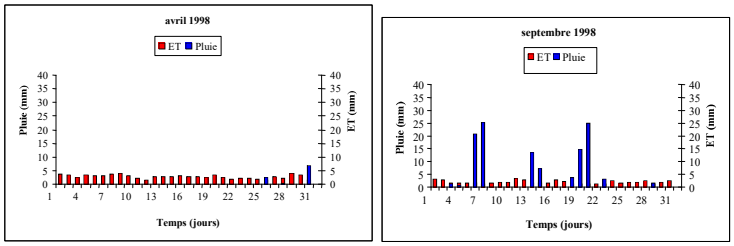


Fig. 8 - Distribution de la pluie et de l'évapotranspiration journalière

La période d'avril à octobre 1998 (-41,5 mm) est moins déficitaire que la même période 1997 (-118,8 mm). En 1997, avec une valeur de +160,7, le mois d'août est le plus excédentaire en observant la pluie tombée le 02/08/97 représente 42% du cumul mensuel. En 1998 nous observons trois mois excédentaires, le mois d'avril (+36,5 mm), le mois de septembre (+59,8 mm) et le mois d'octobre (+52,5 mm). Donc, généralement, ET>P pour la période d'étude. Avec un IAR<26 (en moyenne) on peut établi que le régime hydrique et non percolatif et donc le sol nécessite l'irrigation.

CONCLUSIONS

Le sol de la parcelle étudie présente une variation brutale en texture entre 30 et 60 cm de profondeur où on constate la présence d'un horizon Bt (illuvial) qui peut influencer le fonctionnement hydrodynamique du sol. L'analyse de l'humidité montre qu'il n'y a pas d'infiltration au-delà de 30-40 cm de profondeur ou que le taux d'infiltration diminue considérablement. Nous constatons une petite augmentation de l'humidité à la profondeur de 80-100 cm. Cette situation est due à l'horizon Bt qui provoque une accumulation en eau. De plus la couche d'argile trouvée à 1 m de profondeur peut provoquer une remontée de la frange capillaire. Les courbes de rétention en eau montrent une microporosité prononcée dans des conditions normales d'approvisionnement en eau. La relation conductivité hydraulique – profondeur montre un drainage rapide de la partie supérieure du sol suivi d'un drainage lent en profondeur. Nous admettons que, dans ces conditions, l'écoulement superficiel a un poids significativement plus important dans la dynamique de l'écoulement sur la parcelle étudiée, par rapport aux autres composantes. L'analyse pluie-évapotranspiration montre que les périodes les plus déficitaires en eau vont d'avril à mai et de septembre à octobre. Toutefois les deux années étudiées sont plutôt humides lorsqu'on les replace dans le contexte interannuel régional. Un tel régime hydrique nécessite une irrigation.

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EVOLUTION OF THE GEOMETRIC AND HYDRAULIC PARAMETERS OF THE CHANNELS OF THE ROTOPĂNEŞTI-RĂDĂŞENI-FÂNTÂNA MARE DRYING-DRAINING SYSTEM OF SUCEAVA COUNTY, AFTER 27 YEARS OF OPERATION

EVOLUȚIA PARAMETRILOR GEOMETRICI ŞI HIDRAULICI AI CANALELOR, DUPĂ 27 ANI DE FUNCȚIONARE, DIN SISTEMUL DE DESECARE-DRENAJ ROTOPĂNEȘTI-RĂDĂŞENI-FÂNTÂNA MARE, JUDEȚUL SUCEAVA

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Abstract. *Among the main limiting factors of the agricultural production, which occur depending on the local pedoclimatic conditions, we could mention excessive humidity, floods, low permeability and soil compaction, erosion, sliding and others. In order to achieve a maximum production capacity of the agricultural land and especially of the arable land, which stretches in Suceava county on an area of 178,502 ha (20.8% of the agricultural area), drying, damming-regulation, underground drainage, soil erosion control etc. works have been performed over time (Moca V. et al, 2000). According to the data from A.N.I.F., Suceava county enjoys an area of 44,904 ha with drying works, of which 27,455 ha with draining works. The drying channel network is 1875 km long, while the undergound draining network, which includes suction drains and collecting drains, is 11,909 km long. Over the 27 years of operation of the drying channel network, there have occurred changes in their geometric and structural parameters (depth, width at the bottom, slope coefficient and channel light).*

Rezumat. *Dintre principalii factori limitativi ai producției agricole ce se manifestă în funcție de condițiile pedoclimatice locale se menționează excesul de umiditate, inundațiile, permeabilitatea redusă şi compactarea solurilor, procesele de eroziune, alunecările şi altele. Pentru valorificarea capacității de producție a terenurilor agricole şi, în mod special, a suprafețelor de teren arabil, care ocupă în județul Suceava o suprafață de 178.502 ha (20,8% din suprafața agricolă) s-au amenajat în decursul timpului lucrări de desecare, de îndiguire-regularizare, de drenaj subteran, de combatere a eroziunii solului şi altele (Moca V. şi colab., 2000). După datele A.N.I.F., în județul Suceava există o suprafață de 44.904 ha cu lucrări de desecare, din care 27.455 ha cu lucrări de drenaj. Rețeaua de canale de desecare are o lungime de 1875 km, iar rețeaua de drenaj subteran formată din drenuri absorbante şi drenuri colectoare, are o lungime totală de 11.909 km. Prin funcționarea şi exploatarea rețelei de canale de desecare, timp de 27 ani, s-a produs o modificare a parametrilor geometrici şi constructivi ai acestora (adâncimea, lățimea la fund, coeficientul de taluz şi lumina canalului).*

MATERIAL AND METHOD

The Baia-Rădăşeni-Fântâna Mare drying-draining system is located on the left side of the Moldova river and includes its meadow and terraces, as well as its tributary streams Şomuzul Băii and Şomuzel. The surface of this system has a longish shape along the Moldova river and an average width of about 5 km and a length of 15 km.

The first land development works were performed in 1959-1960 and included the regulation of the Şomuzul Băii and Şomuzel streams and the drying of an area of 1697 ha. The regulation of the Şomuzul Băii stream was carried out on a 10.2 km long area, between the Cotu Băii and Cornu Luncii villages, being designed for a flow of 6.8 m^3/s at a speed of 1.5 m/s, while the regulation of the Şomuzel stream, tributary to Şomuzul Băii, was performed on a 8.2 km long area. The drying of the 1697 ha was performed by means of an open 21 km long channel network, the channels being located at 400-600 m from one another.

Between 1978-1980, in order to improve excessive precipitation and subsoil water removal, there were carried out works designed to complete the existing ones, namely new drying-draining and main collecting drain reshaping works. Therefore, drying works were performed on an area of 5,527 ha, of which 1,806 ha were fitted with underground draining facilities.

The whole drying network, both the one completing the existing one and the newly designed one, materialized in a systematic 168.10 km long drying and discharge channel network, the channels being located at 300-400 m from one another, which also included the regulation-drying network.

The actual drying channel network includes main collecting channels, secondary collecting channels, sector collecting channels and belt channels.

When designing the main and secondary collecting channels, there was considered the best use of the existing small waterfalls, valleys, depressions and network. The mean depth of the channels is 1.8 m, depending on the depth of the sector or draining network that open in them.

The sector collecting channel network has a less regular shape, depending on the configuration of the land, and the channels are routed approximately parallel with the level lines, at variable distances and depths, depending on the drained and undrained areas. In the drained areas, the distance between the channels is 400 m and the mean depth is 1.50 m, depending on the draining depth, so that the discharge openings be located above the highest channel level, while in the undrained areas, these are located at 300-350 m from one another at a mean depth of 1.30 m.

The belt channels are located at 20-50 m from the foot of the slopes, at depths between 1.5-2.0 m, and their role is to protect the dried-drained surface by intercepting the flows from the upper neighboring areas.

The cross-section of the drying channels is trapezoid shaped, with slopes of 1:1.25 for the channels, 1:1.5 for the Şomuzel stream and 1:2.0 for Şomuzul Băii, depending on the nature of the land (clay-bearing or lute-clay-bearing) and on their depths.

The sizing of the upper channels was achieved on sections, depending on the slope and the flow collected in that sector. The flows carried by the channels were determined depending on the area they served and on the specific drying flow, which was set to be 2.17 l/s/ha for the drying network and 9.40 l/s/ha for the belt channels.

In order to determine the geometric and hydraulic parameters of the drying network, high-accuracy geometric levelling topographic measurements were performed by the radiation method and by traversing combined with the radiation

method. The level-related observations were performed by a medium-accuracy Zeiss Ni-030 level and centimeter surveying rods, while the level differences were determined based on two horizons of the level device.

Based on the data gathered, longitudinal and cross-section profiles were designed for the various size channels of the drying network, and result interpretation was achieved by comparing the channel profiles after 27 years of operation with the ones designed and performed upon their building.

RESULTS AND DISCUSSIONS

In the Rotopăneşti-Rădăşeni-Fântâna Mare drying-draining system, the Şomuzel channel has the main collecting role and was built by the reshaping of the natural river bed in 1978-1980. The building technical specifications show that the reshaping was performed on a 6975 m long area, the sizing being calculated on sections, in order to ensure a gravitational collection of the water flows with a 10% ensurance, coming from the collecting channel network and from the collecting and suction drain network.

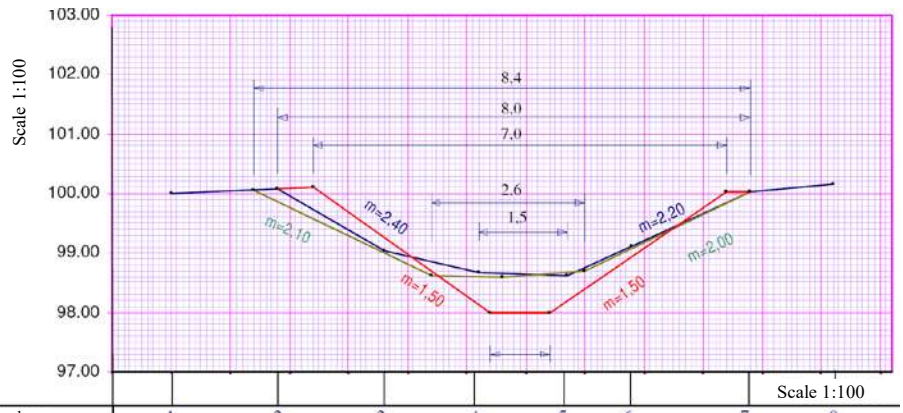
The following mean values of the building items were used for the reshaping of the Şomuzel stream on the studied section:

- channel depth H = 2.00 m;
- width at the bottom of the river bed b = 1.00 m;
- bank slope = 1/1.5;
- collecting channel light = 7 m.

In the studied section, located at about 1 km downstream from the origin of the channel collecting the waters on an area of about 80 ha, the following items, shown in figure 1, were determined by measurements in 2005:

- channel depth H = 1.40 m;
- width at the bottom of the river bed b = 1.50 m;
- slope of the left bank m_s = 2.40 and slope of the right bank m_d = 2.20;
- B collecting channel light = 8.00 m.

Further to these determinations, we found a 0.60 m silting, which resulted into an increase in the width at the bottom of the channel from 1.00 m to 1.50 m. At the same time, the bank erosion was found to be more marked on the left side (0.60m), since this side of the channel collects the surface water and the water from accidental spills from the CC_1 belt channel, located upstream, on the border of the dried area, located 400 m away. Bank erosion resulted into changes of the slope coefficient from 1.5 to 2.4 and 2.2, respectively, and also to an increase in the channel light from 7 to 8 m. As a consequence of these phenomena, the channel carrying capacity in this section decreased from 8 m^2 to 6.65 m^2.



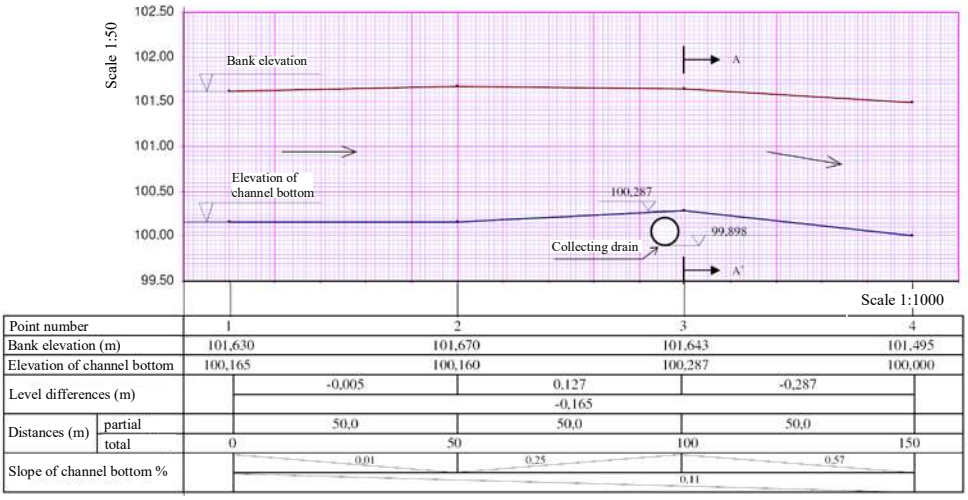
Point number		1	2	3	4	5	6	7	8
Elevation 2005 (m)		100,000	100,080	99,027	98,658	98,607	99,118	100,032	100,165
Elevation 2007 (m)		100,000	100,011	98,621	98,604	98,698		100,039	100,167
Level difference (m)	2005		0,080	-1,053	-0,369	-0,051	0,505	0,920	0,133
	2007		0,011	-1,390	-0,017	0,094	1,341		0,128
Partial distances (m)	2005		1,8	1,8	1,6	1,5	1,1	2,0	1,4
	2007		1,4	3,0	1,2	1,4	2,8		1,4
Slope %	2005		4,4	58,5	23,1	3,4	45,9	46,0	9,5
	2007		0,8	46,3	1,4	6,7	47,9		9,1

Figure 1 – Cross-section in the „Şomuzel" main collecting channel

Based on the observations and measurements carried out in 2007 in the same location, we found significant changes to the shape of the cross-section, namely an increase of the width at the bottom from 1.5 to 2.6 m and of the channel light from 8.00 to 8.40 m. The changes occurred on the left side of the channel, since on this side continued the interceptions of the surface water flows from the upper neighboring areas discharged in the same CC_1 channel, which is unable to collect and discharge these flows.

In the longitudinal profile performed upstream and downstream from the cross section of this channel section (figure 2), we noticed a change in the longitudinal slope caused by channel silting, which produced a 0.25% and 50 m long counter-slope. Downstream from the section, the longitudinal slope increased to 0.57% due to the unevenness caused by the counter-slope. Due to this counter-slope, a hygrophilic vegetation grew upstream caused by stagnant water for a longer period of time. On the 150 m of the studied channel section, a mean flowing slope of 0.11% is however maintained, designed to provide water flow transfer along the channel during high-flow seasons.

In this section we noticed a discharge opening of a collecting drain with a nominal diameter of 200 mm, with the lower generator located at a depth of 0.39 m below the current level of the bottom of the collecting channel, in which it was actually supposed to discharge (photo 1 and 2). This obstruction of the collecting drain occurred because of the silting of the bottom of the channel further to the high flows of its 27 years of operation. Therefore, we may estimate a mean silting rate of about 2.4 cm/year, which would lead to the onset of the unsilting, cleaning and renewal works on the carrying section, after about 25 years of operation.



Point number		1	2	3	4
Bank elevation (m)		101,630	101,670	101,643	101,495
Elevation of channel bottom		100,165	100,160	100,287	100,000
Level differences (m)			-0,005	0,127	-0,287
			-0,165		
Distances (m)	partial		50,0	50,0	50,0
	total	0	50	100	150
Slope of channel bottom %			0,01	0,25	0,57
			0,11		

Figure 2 – Longitudinal section through the „Şomuzel" main collecting channel

Photo 1

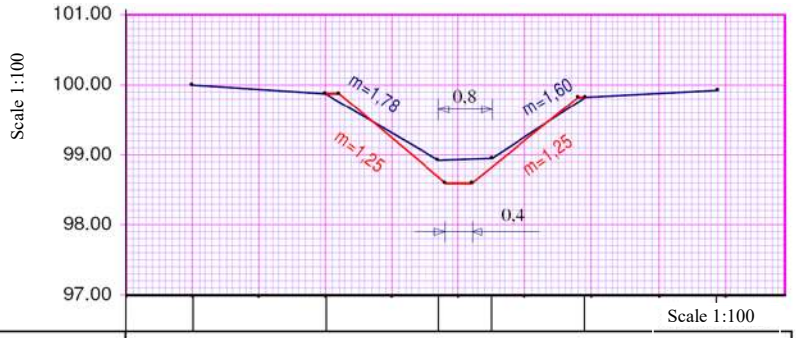
Photo 2

The ($CCst_9$) sector collecting channel is designed to collect the water flows discharged by a network of suction drains, on an area of 42.40 ha.

The geometric and structural parameters of this channel upon its building (figure 3), were: length = 1400 m, width at the bottom b = 0.40 m, slope coefficient m = 1.25, mean depth = 1.52 m (upstream = 1.30 m to ensure the discharge of the suction drains, and downstream = 1.74 m).

After 27 years of operation, the cross section in the A-A´channel section in figure 3 shows that a silting of about 35 cm also occurred here, which led to changes in the width at the bottom from 40 to 80 cm, and the slope coefficient changed from 1.25 to 1.78 on the left side slope and from 1.25 to 1.60 on the opposite (right) side. Due to collecting channel silting, the upstream discharge openings of the suction drains on this channel were completely covered, while downstream, due to the greater channel depth, the discharge openings are silted only partially and the water stagnates in the draining pipes.

Excessive humidity caused by precipitations extends both in the vegetation season and at its beginning, when spring land farming works are delayed, which led to hygrophilic vegetation areas in the dried-drained zone.



Point number		1	2	3	4	5	6	
Land elevation (m)		100,000	99,882	98,930	98,954	99,827	99,820	
Level differences (m)			-0,118	-0,952	0,024	0,873	0,007	
Distances (m)	partial		2,0	1,7	0,8	1,4	2,0	
	total	0,0	2,0	3,7	4,5	5,9	7,9	
Slope %			5,9	56,0	3,0	62,4	0,3	

Figure 3 – Cross section through the ($Ccst_9$) sector collecting channel

CONCLUSIONS

1. The operation and use of the drying-draining systems led to bank erosion and channel bottom silting. Therefore, we estimated a mean silting rate of about 2-4 cm/year, which would lead to the onset of the unsilting, cleaning and renewal works on the carrying section, after about 25 years of operation.
2. Channel silting and hygrophilic vegetation growths determine changes to the longitudinal slope, which has various values along the channels, sometimes even counter-slopes.
3. On dried-drained surfaces used as grazing fields, bank erosion and drying channel silting are more obvious, that is their mean annual rate is almost double as compared to that of the channels on the surfaces used as arable land and hayfields.
4. The silting and obstruction of a channel or a section of a channel lead to a higher excessive humidity in depressions and an inadequate operation of the neighboring drying network.

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ASPECTS SUR LE COLMATAGE DES RETENUES

ASPECTE PRIVIND COLMATAREA LACURILOR DE ACUMULARE

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Abstract. *The process of silting of the reservoirs, as a result of the reduction of the water speed in lakes represents a very important geophysical phenomenon due to the direct and indirect effects, influencing the environment, but especially the economical and social areas.*

The paper presents important aspects of this phenomenon and, eventually,gives solutions to reduce its negative effects.

Eventually, there are suggested a series of efficient measures to maintain the capacity of the reservoir: measures for reducing the alluvial deposits; measures for diminuating the decantation in the lake; measures for retrieving the silted volume.

Rezumat. *Procesul de colmatare a rezervoarelor, rezultat al reducerii vitezei apei în lacuri, constituie un efect geofizic de primă importanţă, prin amploarea efectelor directe şi indirecte, afectând în egală măsură domeniul ecologic, dar mai cu seamă pe cel economico-social.*

Lucrarea îşi propune să abordeze aspecte esenţiale ale acestui fenomen şi, în final, să ofere soluţii pentru reducerea efectelor sale negative.

Se propun, în final, o serie de măsuri eficiente pentru menţinerea capacităţii lacului de acumulare la un nivel rezonabil: măsuri pentru diminuarea aportului solid; măsuri pentru diminuarea decantării în lac; măsuri pentru recuperarea volumului colmatat.

INTRODUCTION

La maîtrise des ressources en eau passe généralement par la construction d´un barrage qui permet de pallier à la irrégularité des apports hydriques en accumulant des réserves.

Mais, la retenue artificielle, comme les lacs, est condamnée inexorablement au comblement, même si ce comblement intervient sur des durées très grandes.

Or, la création d´un barrage entraîne le plus souvent un bouleversement du tissu socio-économique local avant d´induire les richesses dont il est porteur.

De plus, la localisation et la perception de ces richesses seront variables selon le bu dévolu au barrage.

Il est de toute manière certain que la création d´une retenue engendre directement ou indirectement une transformation du milieu naturel, social et économique.

Il est donc évident que le comblement d´une retenue serait intolérable pour les acteurs de la transformation si par impéritie du décideur il devait se réaliser prématurément. Le comblement, puisque comblement il y aura, doit être prévu,

contrôlé et se faire à un rythme qui permet une reconversion quasi imperceptible de l´activité qu´il a engendrée.

Le calcul de la sédimentation dans une retenue est considérée comme étant un outil de prévision lors de la planification, la conception et l´exploitation d´un ouvrage hydraulique.

MÉTHODES DE PRÉSERVATION DE LA CAPACITÉ TOTALE D´UNE RETENUE

I. Méthodes pour minimiser la sédimentation dans une retenue

a. La conservation des sols comme moyen de minimiser la pénétration de matériaux solides dans une retenue

Deux méthodes de conservation des sols utilisées pour freiner l´érosion et la pénétration des matériaux solides dans une retenue sont l´implantation de structures anti-érosion et l´aménagement des sols dans le bassin versant.

On peut construire plusieurs types de structures dans le bassin: par, exemple, des bassins de rétention conçus soit pour retenir les matériaux solides définitivement pendant la durée de vie de l´ouvrage, soit pour stoker les matériaux solides provenant du ruissellement créé par un certain nombre d´orages entre des vidanges périodiques; des ouvrages d´entonnement et de canalisation des rapides et des cascades pour la réduction du ravinement; le revêtement des berges pour réduire leur érosion, et des seuils ou des déversoirs pour la stabilisation du lit.

Parmi les d´aménagement des sols destinées à éviter l´érosion du bassin versant, on peut citer l´amélioration des sols, l´introduction de meilleures méthodes agricoles, l´utilisation du terrain par bandes de niveau, la culture en terrasses et l´assolement.

Si le bassin versant en question n´est pas très grand, les effets de la conservation des sols se feront sentir très rapidement après. Dans certaines expériences réalisées aux Etats – Unis, on peut réduire l´érosion des sols de jusqu´à 95% en employant, exclusivement les méthodes traditionnelles de culture (Holeman, 1980). Mais s´il s´agit de vastes zones où les conditions naturelles sont mauvaises, l´efficacité des méthodes de conservation des sols ne sera pas si rapide.

Cette efficacité ne peut pas être estimée avec précision pour les grands bassins versants.

b. Le blocage et la rétention des matériaux par un écran de végétation

Un écran de végétation peut servir de façon efficace à empêcher les matériaux solides de pénétrer dans une retenue. L´instalation de tels écrans, qu´ils soient artificiels ou naturels, à l´entrée d´une retenue, diffuse l´écoulement entrant, réduit sa vitesse et encourage la sédimentation. Ainsi, on peut capter une

grande quantité de matériaux solides à l'entrée de la retenue et les empêcher d'aller plus loin.

c. La dérivation des écoulements turbides

La construction de canaux ou de conduites de dérivation est une des principales méthodes utilisées pour freiner l'entrée de matériaux solides dans une retenue. En general, les plus fortes quantités de matériaux sont transportées par la rivière pendant les crues, surtout dans des régions arides ou semi-arides. Donc, par la dérivation d'une grande partie de ces écoulements turbides à travers un canal ou une conduite, on peut éviter un envasement rapide de la retenue.

II. Méthodes pour évacuer le maximum de matériaux solides

a. Le contrôle de l'écoulement pendant les crues

Le contrôle de l'écoulement pendant les crues a pour but d'évacuer un maximum de matériaux solides en utilisant la capacité de transport des crues. Généralement, on régule l'écoulement en évacuant les crues à travers les vidanges de fond, de façon contrôlée (avec une ouverture partielle des vannes) ou de façon non-contrôlée (ouverture totale).

Lorsque le niveau d'eau d'une retenue est en hausse suite à une crue, le débit solide sortant de la retenue est toujours inférieur au débit solide entrant, grâce à l'effets de remous et à la diminution consécutive de la vitesse d'écoulement des eaux de crue.

Inversement, pendant la période d'abaissement de la retenue, dans l'absence d'un effet de remous, le débit solide sortant est souvent supérieur au débit solide entrant, grâce à l'érosion qui se produit dans la retenue.

L'écoulement et la circulation des matériaux solides dans une retenue de maîtrise des crues ressemblent à ceux des retenues où l'eau et les matériaux solides sont évacués pendant la saison des crues.

Dans une retenue à sec, dont le barrage sert uniquement à maîtriser les crues, on assiste souvent à la naissance de houles. Lorsque le niveau d'éau monte, des houles se créent, et les matériaux solides sont déposés suite à l'effet de remous. Quand le niveau d'eau commence à baisser, la vitesse de l'écoulement augmente et ces sédiments sont érodés. On appelle ce type d'érosion dans une retenue une érosion régressive, car l'érosion progresse toujours vers l'amont pendant un abaissement rapide du niveau d'eau.

Lors de ce phénomène, la majeure partie des sédiments déposés auparavant à l'amont du barrage sont érodés, ou la majeure partie des matériaux entrants sont transportés à travers la retenue et évacués immediatement.

b. La chasse par vidange

La vidange d´une retenue est une méthode fréquemment employée pour freiner la sédimentation ou pour encourager une érosion des sédiments afin de récupérer du volume.

Cette méthode est notamment utilisée pour des retenues destinées à la production d´électricité.

L´efficacité de la chasse des sédiments dépend de la situation topographique de la retenue, de la capacité d´évacuation des vidanges, de la hauteur des vidanges, des caractéristiques des matériaux solides entrants, du type d´exploitation, de la durée de l´opération de chasse, du débit de la chasse etc.

c. Les courants de densité comme moyen de chasse

L´évacuation des courants de densité est considerée depuis longtemps comme une méthode efficace pour diminuer le taux d´envasement d´une retenue.

La quantité de matériaux déposée par un courant de densité dépendra de la morphologie de la retenue (qui a une influence sur la largeur du courant de densité), du débit solide entrant et de la nature des matériaux qúil contient, de la hauteur des vannes de vidanges, du débit de chasse, de la cote de la retenue pendant la période de chasse, de la longueur de la retenue, ét d autres facteurs encore. Dans les premières années d´exploitation d´un barrage les courants de densité suivent l´ancient lit de la rivière. Puis, suite au comblement de l´ancien lit, les courants de densité s´étendent sur une surface du fond plus large. Le débit par unité des courants de densité est inférieur à celui des premières années d´exploitation.

D´une façon générale, une plus grande quantité de matériaux sera évacuée de retenues courtes, ayant: de forts débits entrants, des courants de densité fortement concentrés, des vidanges qui sont grandes et basses, et de forts débits sortants.

III. Vidanges de fond

Dans chaque retenue menacée par le problème de la sédimentation, il est souhaitable lors de la conception du barrage d´envisager évacuation des matériaux solides par des vidanges de fond. Il faut également prendre en compte les méthodes d´exploitation de la retenue. Parmi toutes les méthodes employées pour évacuer des matériaux, l´utilisation des vidanges de fond semble être la plus efficace.

1. Les vidanges de fond peuvent être utilisées pour évacuer une crue, ou pour vidanger une retenue dans des cas d´urgence où une vidange très rapide est nécessaire.

2. Les vidanges de fond peuvent également servir à chasser des sédiments, en abaissant le niveau d'eau afin de chasser des dépôts de limon, de sable et de graviers, qui sont donc érodés par la force tractrice de l'écoulement. D'une façon analogue, on peut évacuer des courants de densité de retenues servant au stockage.
3. Quand les vidanges de fond sont situées en-dessous des prises d'eau, elles empêchent les matériaux solides de pénétrer dans la prise d'eau, et elles minimisent ainsi l'usure des turbines.

IV. La récupération de la capacité

On peut avoir recours à des vidanges totales périodiques dans des petites retenues qui perdraient leur capacité, utile après quelques années d'exploitation. Puisqu'une grande partie de la capacité utile d'une petite retenue est située près du barrage, les sédiments peuvent être chassés par écoulement d'une crue, à condition que les vanes de vidanges restent ouvertes pendants un certain temps. Le lit ainsi creusé par ces chasses s'incorpore dans la capacité de la retenue.

Des opérations de vidange et de chasse sont utiles dans des retenues où il n'est pas possible d'équilibrer la sédimentation et l'érosion seulement en chassant les sédiments pendant la saison des crues et en chassant les sédiments pendant la saison des crues et en stockant l'eau plus claire pendant les autres saisons.

a. Le dragage

On a recours au dragage pour enlever les sédiments d'une retenue si:

1 - les opérations de chasse ne sont pas eficances;
2 - le construction d'une galerie de dérivation est impossible;
3 - l'abaissement de la retenue pour la chasse est impossible pour des raisons de conservation de l'eau;
4 - le barrage est irremplaçable et ne peut être surelevé:
5 - la quantité d'énergie requise pour réduire l'envasement en vidageant la retenue représente une trop grande perte économique.

D'une façon générale, le dragage constitue une méthode de récupération de capacité qui coûte cher, à moins que les sédiments puissent être recyclés de façon intéressante.

Certains sédiments grossiers peuvent être récupérés pour les besoins des travaux publics.

b. Extraction par siphonnement

Les siphons évacuateurs sont également employés pour extraire des sédiments de retenues. Ils différent du dragage par aspiration en ce qu'ils utilisent la différence de cote à l'amont et à l'aval du barrage comme sour ce d'énergie motrice.

CONCLUSIONS

Un barrage est un ouvrage qui doit être l'objet d'études qui doivent être engagées en amont de la décision définitive. C'est une des œuvres humaines où la mise en œuvre des méthodes d'analyse de système devra être la plus vigoureuse.

Le maître d'œuvre encore plus qu'un décideur devra être le coordinateur d'une équipe pluridisciplinaire, soudée et motivée, ouverte sur les différents aspects et buts de l'ouvrage et qui devra prendre en compte la lutte contre la sédimentation qui constitue le plus grand fléau des barrages.

Le grand barrage, du fait de la pénurie croissante des sites, ne peut être considéré comme un ouvrage à buts multiples qui devra, par une conception optimale maximiser les profits et minimiser les inconvénients.

C'est une véritable opération d'aménagement du territoire.

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UTILISATION DE L´ANALYSE FRÉQUENTIELLE POUR SOLUTIONNER QUELQUES PROBLÈMES EN HYDROLOGIE

UTILIZAREA ANALIZEI FRECVENȚIALE PENTRU REZOLVAREA UNOR PROBLEME ÎN HIDROLOGIE

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Abstract. *The frequential analysis, as a statical method, can be applied to any type of data; in hydrology it is used especially to solve problems related to extreme events.*

This paper presents the most important techniques to adjust a frequential model such as: the graphical method; the method of the moments; the Gumbel method.

Rezumat. *Analiza frecvențială, ca metodă statistică, se poate aplica oricărui tip de date; în hidrologie se folosește, în special, pentru rezolvarea problemelor legate de evenimentele extreme.*

În această lucrare sunt prezentate cele mai importante tehnici de ajustarea a unui model frecvențial, printre care: metoda grafică; metoda momentelor; metoda Gumbel.

Se face o comparație între aceste metode, folosind diferiți parametri, şi se stabilesc principalele criterii pentru alegerea uneia dintre ele.

L´ANALYSE FRÉQUENTIELLE

Prévision et prédiction

Deux approches fort différentes des événements futurs sont utilisées en hydrologie. D´une part les *prévisions* à relativement court terme et, d´autre part, les *prèdictions*, généralement à plus long terme. Cette distinction correspond à des approches différents, mais aussi à des problèmes différents.

Dans le premier cas il s´agit d´un problème de *gestion* d´ouvrage ou de système d´ouvrages, alors que dans le second il s´agit de problème de *planification* d´aménagements et de dimensionnement d´ouvrages.

L´analyse fréquentielle est une méthode statistique de prédiction consistant à étudier les événements passés, caractéristiques du processus donné (hydrologique ou autre), afin d´en définir les probabilités d´apparition future.

Cette prédiction repose sur la définition et la mise en œuvre d'un *modèle fréquentiel,* qui est une équation décrivant (modélisant) le comportement statistique d´un processus.

Ces modèles décrivent la probabilité d´apparition d´un événement de valeur donnée.

La loi GUMBEL est l´exemple le plus commun de méthode fréquentiel utilisé en hydrolgie:

$$F(x) = e^{-e^{\frac{x-a}{b}}} \quad (1)$$

Dans ce modèle $F(x)$ est la fonction de répartition, ou *fréquence cumulée*, alors que *a* et *b* sont les deux paramètres du modèle de GUMBEL.

La probabilité annuelle d´observer un événement supérieur ou égal à la valeur *x* vaut $p(x) = 1 - F(x)$. On parle de *probabilité de dépassement* ou encore de *probabilité au dépassement.*

En hydrologie on utilise volontiers la notion de *temps de retour* défini par:

$$T(x) = \frac{1}{p(x)} = \frac{1}{1 - F(x)} \quad (2)$$

Cela signifie que, considérant une très longue période, l´événement d´amplitude *x* ou supérieure se produit, *en moyenne*, une fois toutes les $T(x)$ années.

Il convient de noter:

- que la notation de *temps de retour* n´implique aucune régularité dans la survenance des événements: ils n´apparaissent pas régulièrement toutes les $T(x)$ années, ce n´est qu´une valeur moyenne sur une longue période.
- que la probabilité de survenance d´un événement supérieur ou égal à la valeur *x* au cours d´une période donnée doit se calculer en utilisant la loi binomiale.

L´ajustement du modèle, ou encore son *calage* ou sa *spécification* permet de définir les valeurs prises par ses paramètres (a,b,..). Il sera dès lors possible d´exploiter le modèle, par exemple pour déterminer la valeur x correspondant au temps de retour choisi.

L´analyse fréquentielle puisse s´appliquer à n´importe quel type de données. L´hydrologie applique cette méthode statistique pour traiter un problème très important: les événements extrêmes.

AJUSTEMENT DU MODÈLE FRÉQUENTIEL

La loi GUMBEL se prête particulièrement bien à la modélisation des événements extrêmes, les pluies notamment.

1. Présentation de la loi de GUMBEL

La loi de GUMBEL est un cas particulier de la loi de JENKINSON.

- Fonction de dénsité

$$f(x) = \frac{1}{b} \cdot e^{\frac{x-a}{b}} \cdot e^{-e^{\frac{x-a}{b}}} \tag{3}$$

- Fonction de répartition

$$F(x) = e^{-e^{\frac{x-a}{b}}} \tag{4}$$

- Paramètres

a – paramètre de position;
b – paramètre d´échelle ou de dispersion

- Variable réduite u

$$u = \frac{x-a}{b} \tag{5}$$

La fréquence cumulée est donnée par les relations pratiques suivantes:

$$\begin{aligned} F(x) &= e^{-e^{-u}} \\ u &= -\ln[-\ln F(x)] \end{aligned} \tag{6}$$

- Expression d´un quantile

Pour trouver la valeur x_q (quantile), correspondant à la fréquence cumulée $F(x_q) = q$, en fonction des deux paramètres a et b il suffit d´inverser la relation (5):

$$x_q = a + b \cdot u_q \tag{7}$$

puis de remplacer u_q par son expresion (6-b).

2. Techniques d´ajustement

Méthode graphique

La méthode graphique repose sur le fait que l´expresion d´un quantile (7) correspond à l´équation d´une droite. En conséquence, dès lors que les points de la série à ajuster peuvent être reportés dans un système d´axes x - u, il est possible de tracer la droite qui passe le mieux par ces points et d´en déduire les deux paramètres a et b de la loi (fig.1).

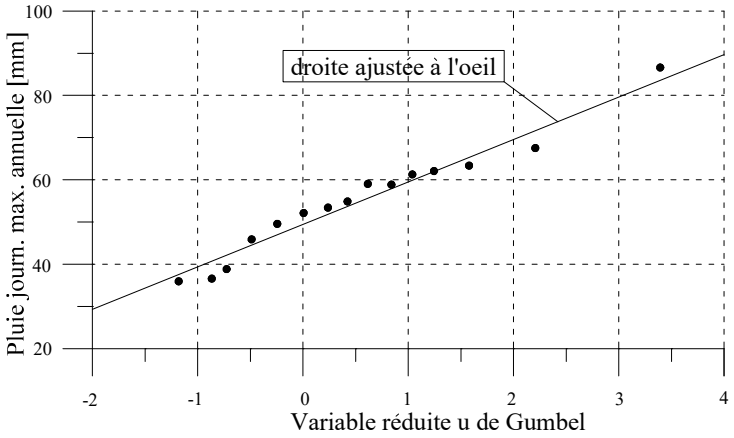

Figure 1 Principe de la méthode d´ajustement graphique

Dans la mesure où les points x_i sont connus (ils font partie de la donnée du problème), il suffit de définir les coordonnées u_i correspondant à chaque point pour pouvoir le positionner dans le graphique.

Ces coordonnées se déterminent à partir de la relation inverse de la fonction de répartition qui donne u en fonction de la fréquence cumulée $F(x)$. Il s´agit donc essentiellement d´estimer la probabilité de non dépassement $F(x_i)$ qu´il convient d´attribuer à chaque valeur x_i.

Il existe de nombreuses formules d´estimation de la fréquence cumulée $\hat{F}(x)$: Formules de *positionnement du point figuratif* ou formule d´évaluation de la *fréquence empirique.*

Elles reposent toutes sur un tri de la série par valeurs croissantes (ou décroissantes), permettant d´associer à chaque valeur son rang r. Ces formules peuvent pratiquement toutes être résumées par une relation générale qui garantit la symétrie autour de la médiane:

$$\hat{F}(x_{[r]}) = \frac{r - \alpha}{n + 1 - 2\alpha} \tag{8}$$

où: n est la taille de l´échantillon ;

$x_{[r]}$ - la valeur de rang r ;

α - un coefficient compris entre 0 et 0,5.

Le choix de la formule ne fait pas l´unanimité.

Méthode des moments

La méthode des moments consiste à utiliser l'estimation « classique » $\hat{\mu}$ et $\hat{\sigma}^2$ des deux premiers moments de la population, basées sur les caractéristiques de l'échantillon $\overline{x}$ et s :

$$\hat{\mu} = \overline{x}; \quad \hat{\sigma} = s \cdot \sqrt{\frac{n}{n-1}} \tag{9}$$

Compte tenu des caractéristiques de la loi de GUMBEL :

$$\begin{aligned} \mu &= a + b \cdot 0{,}5772 \\ \sigma^2 &= 1{,}645 \cdot b^2 \end{aligned} \tag{10}$$

les formules relatives à l'estimation par la méthode des moments s'obtiennent facilement:

$$\begin{aligned} \hat{b} &= 0{,}7797 \cdot \hat{\sigma} \\ \hat{a} &= \hat{\mu} - \hat{b} \cdot 0{,}5773 \end{aligned} \tag{11}$$

Méthodes des moindres rectangles ou de GUMBEL

La méthode des moindres rectangles consiste à «numériser» la technique de l'ajustement graphique. Elle a été introduise par GUMBEL.

La solution des *moindres rectangles* conduit à trouver la droite bissectrice des solutions classiques de la régression par moindres carrés de y en x d'une part et de x en y d'autre part. Elle a l'avantage de ne pas faire intervenir les produits croisés (soit la covariance entre les deux variables). Il s'agit donc d'une solution particulièrement simple pour l'écuation de la droite $y = a + b \cdot x$:

$$b = \frac{s_y}{s_x} \qquad a = \overline{y} - b \cdot \overline{x} \tag{12}$$

Application à l'espace u-x pour la loi de GUMBEL

Dans le cas présent, l'axe x est remplacé par l'axe u de la variable standardisée de GUMBEL et l'axe y est remplacé par celui de la variable hydrologique étudiée que nous notons ici x .

Nous aurons donc:

$$\hat{b} = \frac{s_x}{s_y}; \quad \hat{a} = \bar{x} - \hat{b} \cdot \bar{u} \tag{13}$$

GUMBEL a remarqué que, si la taille n de l'échantillon est connue, toutes les positions u_i sont connues. Il est donc possible de calculer une fois pour toutes les valeurs $\bar{u}$ et s_u en fonction de r.

En effet nous avons :

$$u_i = -\ln\left[-\ln\frac{r_i - \alpha}{n + 1 - 2\alpha}\right], \quad \forall i = 1,...n \tag{14}$$

Il est donc facile de tabuler les grandeurs que nous noterons $\bar{u}(n)$ et $s_u(n)$.

Finalement les estimateurs sont donnés par les deux relations :

$$\hat{b} = \frac{s_x}{s_u(n)} \quad \text{et} \quad \hat{a} = \bar{x} - \hat{b} \cdot \bar{u}(n) \tag{15}$$

COMPARAISON DES MÉTHODES, CRITÈRES DE CHOIX

Il est toujours délicat de recommander l'utilisation de telle ou telle méthode.

- Pour un calcul manuel on recommande la méthode des moindres rectangles (avec un coefficient $\alpha = 0{,}5$).
- Pour un calcul informatisé on recommande la méthode du maximum de vraisemblance.
- La méthode de moments est plus sensible à une éventuelle autocorrélation de la série de données que les autres.

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MICROMYCETES PRESENT ON CEREAL SEEDS FROM STORAGE AND THEIRE EFFECT ON QUALITY DECREASE OF THE PRODUCTS

MICROMICETE PREZENTE PE SEMINTELE DE CEREALE DEPOZITATE SI EFECTUL LOR IN DIMINUAREA CALITATII PRODUSELOR

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Abstract. *The degradation of agricultural products after the harvest is provoked by numerous factors that influence the growth and development of the deposit micromycetes. It is very well known that, because of the high degree of products humidity, of the high atmospheric temperature, the lack of aeration during the depositing and the presence of harmful substances, favorable conditions for the growth and development of saprophyte microorganisms that alter the quality until the accentuated degradation of seeds are created.*

Since, in our country, the number of deposits with controlled atmospheric conditions is reduced, the producers are confronted today with great problems regarding the deposit of seeds. The great number of saprophyte fungi met on the deposited seeds, make them suffer from qualitative depreciations.

Rezumat. *Degradarea produselor agricole dupa recoltare este provocata de numerosi factori care influenteaza cresterea si dezvoltarea micromicetelor de depozit. Este bine cunoscut faptul ca din cauza gradului ridicat de umiditate a produselor, a temperaturii atmosferice ridicate, lipsa aeratiei in timpul depozitarii si prezenta daunatorilor, se creaza conditii favorabile pentru cresterea si dezvoltatea microorganismelor saprofite care altereaza calitatea pana la degradarea accentuata a semintelor.*

Deoarece, la noi in tara, numarul depozitelor cu conditii atmosferice controlate este redus, producatorii se confrunta astazi cu mari probleme legate de depozitarea semintelor. Numarul mare de ciuperci saprofite intalnite pe semintele depozitate, fac ca acestea sa sufere deprecieri calitative.

In the last years, the farmers are confronted with great problems issued by the degree of attack of these microorganisms. Because of the fact that through the evolution of these pathogen agents, the commercial value of the cereal products decreased, the agricultural producers lost a lot from this phenomenon, and great quantities of degraded product could not be used not even for the food of animals, because of the enzymes and toxins eliminated by these fungi.

It is very important to know the fact that the corn kept at a beans humidity higher than 14%, and at a temperature higher than 2-3^{o}C, inevitably leads to major depreciations, otherwise the wheat caryopsis deposited with a humidity higher than 16-18% and a relative humidity of the air over 80%, determines the qualitative decrease of products, especially if they were deposited without a previous aeration.

MATERIAL AND METHOD

In order to identify the saprophyte microorganisms from the cereals, we studied the seeds from the household deposits, represented by stores and bins, in which the cereals, especially the wheat (Triticum aestivum) and corn (Zea mays), were deposited, for a period of one and respectively two years.

The all-level samples were assayed from the quantity of deposited products and were brought to the laboratory for carrying out specific phytopathological and mycological analyses, in view of establishing with exactitude the number and the species of micromycets present on the seeds of deposited cereals.

The analysis of samples was carried out by putting the caryopses in Petri recipients with PDA nutritive medium and medium with Malt extract and then followed by their incubation at a temperature of 22^0C, for determining the increase and development of the existent mycoflora.

RESULTS AND DISCUSSIONS

Beginning with the moment of the introduction in the deposits, the products were subject to the danger of rodents, insects and mites, to a series of saprophyte fungi, and also to the danger of some bacteria. The saprophyte fungi met on the deposited cereals whose evolution depreciates their quality, are cited in the specialty literature, by several researchers. These micromycetes are:

- *Alternaria tenuis*, Ness;
- *Cladosporium herbarium* (Pers.)Link.;
- *Chaetomium sp*.;
- *Epicoccum purpurascens*, Ehren;
- *Trichoderma viride*, v. Teigh;
- *Acremoniella atra* (Corda) Sach;
- *Trichotecium roseum* (Pers) Link;
- *Aspergillius sp*.;
- *Rhyzopus sp*.;
- *Mucor sp*.;
- *Stachybotrys atra*. Corda;
- *Stemphylium graminis* (Corda)Bonord;
- *Papulaspora sp*.;
- *Curvularia lunata*. (Walker) Boedijin.
- *Drechslera sp.*

After the mycological and phytopathologic analyses made in the laboratory, we ascertained the presence of saprophyte fungi of the type:

- *Fusarium sp*., that was emphasized in all the analyzed samples, under the form of a white and pink mycelium; in a rather high proportion, but especially on the wheat sample for a period of two years, (fig. 9).

- The genera of the species *Penicillium*, were developed in a high proportion on all the analyzed samples, and especially on the wheat seeds on a Malt nutritive medium, (fig. 5).

- *Alternaria s*p, was identified in all the samples, and the average proportion was of 45%, (fig. 2).

- *Rhyzopus sp.* Was present in all the analysis samples, beginning even from the first day if incubation, unlike the fungi in the *Mucor* genus, which were encountered on the samples in a smaller percentage

- *Cladosporium herbarum* (Pers.) Link; was present only in the samples with nutritive medium of malt extract, (fig. 3 and 7).

- *Stemphylium graminis* (Corda) Bonord, the percentage of this fungus in the analyzed samples was reduced, being encountered only wheat caryopsis two years storages. (fig. 8).

- *Drechslera* – found on the wheat samples, in a higher proportion on the caryopses found on malt-agar nutritive medium, than on those situated on PDA medium. (fig. 4).

- *Rhyzoctomia*- a rather rare species encountered on the cereal caryopses, but in our samples it was identified in a smaller proportion but only on the mediums with malt extract. (fig. 6).

The psychopathological and mycological analysis permitted us to identified micromycetes species which picture could be seen bellow:

Fig.1 - *Aspergillus sp*

Fig.2 - *Alternaria alternata*

Fig.3 - *Cladosporium*

Fig.4 - *Drechslera sp*

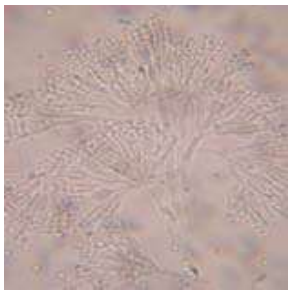

Fig.5 - *Penicillium*

Fig.6 - *Rhyzoctonia*

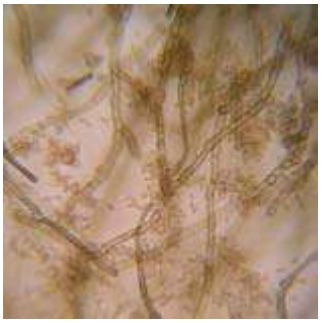

Fig.7 - *Cladosporium şi Rhyzoctonia*

Fig.8 - Stemphylium graminis

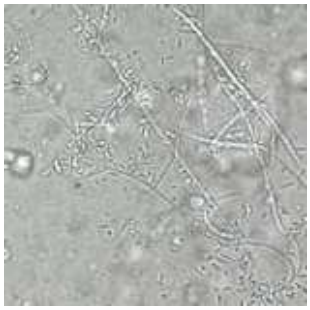

Fig.9 - *Fusarium sp*

CONCLUSIONS

From the performed analysis, the following conclusions occur:

- Among the saprophytic micromycetaes, which are likely to grow on deposited wheat caryopsis, no matter of storing conditions and all-level samples, just a few appeared.

From the 15 types mentioned by the researchers in the past, only 10 types are met in our samples.

- There were identified 7 types of fungi on wheat samples with storing periods of 1 year and 2 years, respectively; among those only *Drechslera* type is pathogenic and the rest of them are saprophytic micromycetaes which lowers the quality of the wheat.

- Species of *Fusarium sp., Penicillium sp.* and *Rhyzoctonia sp*. types were found in the samples although there are rarely mentioned in the specialty literature

-Species of *Penicillium sp., Aspergillus sp.* and *Fusarium sp* types are funguses which produce damaging mycotoxines for humans and animals, so optimum storing conditions must be created in order to prevent the growing and developing of such micromycetaes.

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MICROMYCETES PARASITIC AND SAPROPHYTIC ON *GLYCINE HISPIDA* (Mnch.) Max.

MICROMICETE SAPROFITE ŞI PARAZITE PE *GLYCINE HISPIDA* (MNCH.) MAX

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Abstract. *The area cultivated with soybean has increased significantly in the last few years and with this many pathogenically agents and saprophytic micromycetes that settle on different plant organs during vegetation have made their presence felt.*

Both the micromycetes on classical soybean and those on genetically modified soybean, which we are obliged to give up in the future, have been studied.

Considering the signalize crops damages in Moldavia area, the researches had been extended on both types of soybean.

Rezumat. *Suprafaţa cultivată cu soia a crescut simţitor în ultimii ani şi odată cu aceasta s-a făcut simţită şi prezenţa mai multor agenţi patogeni şi micromicete saprofite care se instalează pe diferite organe ale plantelor în timpul vegetaţiei.*

Au fost luate în studiu micromicetele apărute pe soia clasică cât şi pe cea modificată genetic la care suntem obligaţi să renunţăm pe viitor.

Având în vedere pagubele semnalate în culturi, în zona Moldovei, cercetările au fost extinse asupra celor două tipuri de soia.

MATERIAL AND METHOD

The observed soybean crops presented a lot of classical symptoms of disease under the conditions of years 2005-2006.

The stems, pods, seeds and roots gathered from the field were brought to the laboratory, where they were subjected to the specific mycological tests until the genus and species of the micromycetes that induced the attack symptoms were correctly determined.

The microscope samples and the attack symptoms were photographed in view of presenting them and the materials were included in the Moldavian Mycological Herbarium "C. Sandu-Ville".

RESULTS AND DISCUSSIONS

The most cultivated classical types in the area were Danubiana and Columna, and from the genetically modified types AG.0801 or S.2254 RR, recommended and sold by the Monsanto Company.

In the last few years the following micromycetes have been spotted on soybean in Moldavia:

- *Peronospora manshurica* (Naumov) Syd. – on classical and genetically modified types;

- *Gibberella zeae* (Schw.) Petch. – on classical and genetically modified types;
- *Sclerotinia sclerotiorum* (Lib.) de By.- on the classical and genetically modified types;
- *Sclerotium bataticola* Taub. – on the classical and genetically modified types;
- *Diaporthe phaseolorum* (Cke. et Ell.) Sacc. *var.soja* (Lehm.) Welm. – particularly on the genetically modified types;
- *Melanospora leucotricha* Corda – on the genetically modified types;
- *Fusarium acuminatum* Ellis and Everhart – on classical types;
- *Fusarium oxysporum* (Schlecht) Sn. f. *tracheiphilum* (E.F.Smith.) Sn. ert Hansen – on classical and genetically modified types;
- *Vermicularia dematium* (Pers.) Fr. – on classical types;
- *Trichotecium roseum* Lk. – on the genetically modified types;
- *Corynespora Casseicola* (Berk. et Curt.) Wei. – on the genetically modified types;
- *Gliocladium penicilliodes* Corda – on the genetically modified types;
- *Epicoccum neglectum*-Desm. – on classical types;
- *Epicoccum purpurascens* Ehrenberg – on classical types;
- *Torula herbarum* (Lk.) – on classical types;
- *Colletortrichum glycines* Hori – on classical types;
- *Ascochyta sojaecola* Abramov - on classical types;

As the cultivation of genetically modified soybean has much extended in the last few years, an alarming increase in the attack of *Peronospora manshurica, Gibberella zeae, Sclerotinia sclerotiorum* and *Melanospora leucotricha* on the surface parts of the plants has been noticed, and also the formation of resistance organs, oospores and perithecium during the winter period, with ample attack possibilities in the following year.

On the soybean roots left in the field the following fungus were spotted, in the case of the genetically modified types: *Corynespora Casseicola, Trichotecium roseum, Gliocladium penicilliodes* and *Fusarium oxysporum* (Schlecht) Sn. f. *tracheiphilum*.

At the request of some Agricultural Societies in Moldavia, Roundup-Ready soybean seeds have recently been analysed, which displayed whitish beans to an extent of 20%, as a result to the attack of *Peronospora manshurica* (Naumov) Syd. The surface of the beans displayed a flour-like film made up of mycelium and numerous oospores, which are the resistance organs of the micromyceta. The same spores were also spotted on the inside walls of pods (fig. 1 and 2).

After that it was precede the incubation of soybean beans at a temperature of 22 °C, by placing them in Petri dishes with a PDA medium. After performing the mycological and phytopathological analyses, the presence of many micromycetes was noticed, such as:

- *Alternaria atrans* Gibson (Fig. 3, 4);

- *Cladosporium herbarum* (Pers.) Lk. (Fig. 3);
- *Sporotrichum sp.* (Fig. 3)

If the first two micromycetes (*Alternaria atrans* (Gibson) and *Cladosporium herbarum* (Pers.) Lk) are cosmopolitan, saprophytic, we cannot say the same thing about the *Sporotrichum* genus which is parasitic on plants and animals. Among the soybean seeds sclerots of *Sclerotinia sclerotiorum* (Lib.) de By were also found, which means that there was an attack of white mould in the field in that cultivation year (2005-2006), either because of the practice of soybean one-crop system, or because of the fact that soybean followed after a sunflower crop that was strongly attacked by this micromycete.

Our mycological and phytopathological analyses spot only the micromycetes, for which we also annex the images photographed from Petri dishes and from the microscope.

Fig. 1 - Soybean hulls atacked by *Peronospora manshurica*

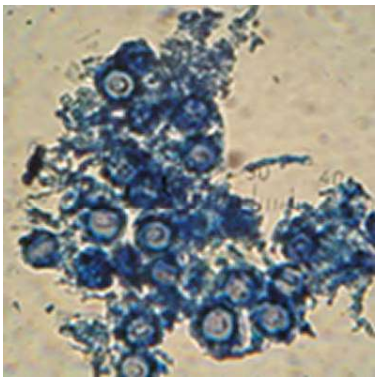

Fig. 2 - *Peronospora manshurica* Oospores on berried

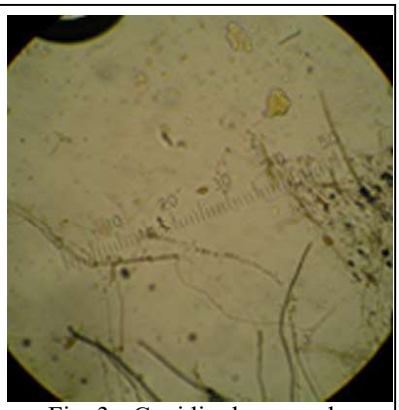

Fig. 3 - Conidiophores and conidia of *Sporotrichum, Cladosporium* and *Alternaria*

Fig. 4 – Conidia of *Alternaria atrans*

Fig. 5 - Soybean berries germinated and infested by some micromicetes

Fig. 6 - Soybean hulls atacked by micromicetes mycelia

CONCLUSIONS

As a result of the synthesizing of the data from the last few years, and also as a result of the performed analyses, the following conclusions emerge:

- a number of 7 micromycetes were spotted on the classical types, 5 on the genetically modified ones, and other 5 micromycetes were encountered both on the classical and on the genetically modified types;
- the total number of micromycetes spotted in Moldavia in the case of soybean crop was 17, to which other 3 micromycetes identified on the seeds on which the analyses were performed are added;
- from the micromycetes spotted on the analysed seeds, the greatest damages were produced by *Peronospora manshurica* (Naumov) Syd, where the frequency of the attacked seeds was about 20%.

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NEW PARASITIC AND SAPROPHYTIC MICROMYCETES ON CULTIVATED HORTICULTURAL PLANTS FROM MOLDAVIA

NOI MICROMICETE PARAZITE ŞI SAPROFITE PE PLANTELE DE CULTURĂ HORTICOLE DIN MOLDOVA

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Abstract. *The results of the mycological research during 2005 – 2006 made by the authors on different cultivated horticultural plants, pointed out the appearance of new micromycetes for Romania, or new host-plants for already known micromycetes or rarely described micromycetes in Moldavia.*

The authors studied the frequency of the pathogenic agents on cultivated horticultural plants reporting 1 new micromycete for Romania, 1 new micromycete for Moldavia, 4 new host-plants for already known micromycetes and 3 micromycetes rarely described in Romania or Moldavia.

Rezumat. *Rezultatele cercetărilor micologice din perioada 2005-2006 făcute de autori asupra diferitelor plante horticole cultivate sau spontane scot în evidență apariția de noi micromicete pentru România, sau plante gazde noi pentru micromicete deja cunoscute sau rar descrise în Moldova.*

Autorii studiază frecvența agenților patogeni pe plantele horticole cultivate sau pe plantele din flora spontană raportând 1 micromicetă nouă pentru România, 1 micromicetă nouă pentru Moldova, 4 plante gazdă noi pentru micromicete deja cunoscute şi 3 micromicete rar descrise în țară sau în Moldova.

The mycological researches during 2005-2006 pointed out the appearance of new micromycetes or new host-plants for already known micromycetes or rarely described micromycetes in Moldavia.

The appearance's observation of culture plants or plants from spontaneous flora diseases is made year by year by our collective for emphasize the micromycetes that can pass from plants from spontaneous flora on cultivated plants or saprophyte micromycetes which in certain medium condition can become parasitic.

MATERIAL AND METHOD

The pursued horticultural cultures presented in the conditions of years 2005-2006 an innumerability classical symptoms of disease. The material pointed out as ill, was harvested from field and brought into the laboratory where it was submitted to specific mycological testing, until it comes to the correct determination of micromycetes kinds and species which inducted the symptoms of attack.

The microscopic sample's image and symptoms of attack were pictured, for presentation in scientific sessions.

RESULTS AND DISCUSSIONS

1. Alternaria alternate (fr.) Keissler, Beih. Bot. Zbl., 29, p. 434 (l912); Ellis, Dematiaceous Hyphomycetes, p. 465, fig. 330 (L971).

Sin: *Torula alternata* Fr.

Alternaria tenuis C. G. Nees.

On the stem of *Levisticum officinale* Koch., harvested in Iaşi, on 10th and 30th of October 2006, there were noticed ashy zones on which it appears an efflorescence composed from brown conidiophores of 75 µm height and 5 µm width. The conidiophores support brown conidia, of 30 - 42 x 12 µm, which have a short pedicel of 3 µm.

The micromycete is cosmopolitan, but in Romania was cited just once by Aurelia Crişan in Cluj in 1976, so the fungus is new for Moldavia.

***2. Torula herbarum*(Pers.) Link.,** *Spec. Pl. I, ex S.F. Gray, Nat. Arr. Br. Pl. p. 557 (1821); Thüm., Pilz. Fl. Sibes. No. 665 (1878); Sacc. Syll. Fung. IV, p. 256(1886); Ellis, Dematiaceous Hyphomycetes, p. 337, fig. 231 (1971).*

Sin: *Monilia herbarum* Pers.

On the dry stem of Levisticum officinale Koch., harvested in Iaşi, on 10th of October 2005, appears black powdered zone, with short mycelium hypha with septa, from which it raised groups of conidia. The chains of conidia of 6-7 µm are composed from 4 -7 rounded olive colored cells. The wall cell is warty, fine echinat.

The fungus is often met on different substrate but, *Levisticum officinale* Koch. is a new host for Romania.

3. Torula herbarum(Pers.) Link.

On the underground part of the stem of *Petroselinum hortense* Hoffm harvested in Iaşi on 10 th of October 2006, there were noticed cracks full with a black dust composed by a concretion of tetra cell conidia, strangulated and with septa, brown - black, of 67 µm, which were detached from the very short conidiophores.

Petroselinum hortense Hoffm. is a new host for this micromycete in Romania

4. Epicoccum purpurascens Ehrenb., Sylv. Myc. Bero, 112(1818); Ehrenb. Ex Schlecht, Synop. Pl. Crypt., p.136(1824); Sacc. Syll. Fung., IV, p.736 (1886); Lindau, Rab. Kr. Fl. Deutsch., IX, p.595(1910); Migula, Kr. Fl. Deutsch., Pilze III, 4/2, p. 536, tab. CLXIV, fig. 10-11(1934); Ellis, Dematiaceous Hyphomycetes, p. 72, fig. 38 (1971).

Sin: *Epicoccum nigrum* Link.;

Epicoccum vulgare Corda.

The stems were harvested on 10 th of October 2005 in Iaşi. On these stems appear sporodochium as far as 2 mm in diameter composed from mycelia and conidiophores that support the conidia. The conidiophores measure 5 - 15 x 3

- 6 µm and the conidia have 15 - 25 µm, at first smaller and to maturity comes up to 50 µm in diameter.

The micromycete was cited on lovage just once in the country by Dobrescu and co., in 1963 so we point it out as a rare fungus met in Romania.

5. Septoria levistici West., ., Bull. Acad. Roy. Sci. Belg., XII, nr. 7 (1845); Sacc. Syll. Fung., III, p.531(1884); Allesch., Rab. Kr. Fl. ,VI, p.805(1901); Săvul. şi Sandu-Ville, Hedwigia, vol. 73,p.92(1933); E. Rădulescu, Sept. from Romania, p.172 (1973).

The micromycete is cited more than once in the country, on the leaves of *Levisticum officinale* Koch. but in Moldavia was cited just once in Huşi.

We point out as novelty and aberrance from normal locations, the presence on stems of brown blackish pycnidia, with a pore of 5 µm from which come out hyaline picnidiospores, smaller as in classical diagnosis, of 17 - 19 x 1-1, 5 µm.

The micromycete harvested in Iaşi on l0 th of October 2005 is rarely met in Moldavia.

6. Acremonium humicola (Onions end Barron) Gams, Cephalosporium artige Schimmelpilze (Hyphomycetes), fig. 64, p. 99 (1971).

Sin: *Paecilomyces humicola* Onions end Barron.

The dry stems of *Levisticum officinale* Koch. harvested in Iaşi on 30 th of October 2005 present a gray blackish color in the medullar tissue due to multiple conidia that have a black color.

The conidiophores that appear at the end or intercalary zone on mycelium are brown, of 3,5 -5 µm in diameter. The fialides are solitary, brown, of 17 - 25 x 1, 5- 2 µm. The conidia appear in short chains, are ovoid as far as subglobose, smooth, hyaline of 2,6 - 2, 8 x 2 µm.

The micromycete is new for Romania.

7. *Humicola grisea* Traaen, Nyt. Mag. Naturvid., 52, p. 34 (1914); Gilman, A Manual of Soil Fungi, p. 325 (1959); Ellis, Dematiaceous Hyphomycetes, p. 60, fig. 29 B (1971).

The stems of *Petroselinum hortense* Hoffm. harvested in Iaşi on 10 th of October 2006 present in their basal part, zones of gray color due to the infections with *Humicola grisea.*

The basal part of stems has the tissues covered by brown mycelium, on which appear pyriform or spherical conidia, which compose a compact dark aggregation. The spherical conidia have double walls, are brown and measure 12 - 15 µm in diameter.

The micromycete is cited by Ioachimescu Marilena in 1978 as a fungus that degrades the wood from mine and in 1973, Viorica Iacob quotes it as a saprophyte on the vegetable remainders from the corn and wheat monocultures so that *Petroselinum hortense* Hoffm. is a new host for this micromycete in Romania.

8. *Gymnosporangium sabinae* (Dicks.) Wint., Rabenh., Kr. Fl. Deutsch., I, 1, p. 232 (1884); Sacc. Syll. Fung. VII, p. 739 (1884); Fischer, Ured. D. Schweiz., p. 309, fig. 279 (1904); Bontea Vera, Bull. Sec. Sc. Acad. Roum.,

XXIV, no.5, p.324 (1941) Săvulescu Tr., Uredinales monography, p.546, fig. 275-277 (1953).

The leaves of *Pirus sativa* Lam. et DC. harvested in Iaşi on 16 th of September 2006 present discoloration spots that evolves in orange - red spots. On the superior face of the leaves limb the spots that reaches 1,5 - 2 cm in diameter presents fine punctuation, black, represented by the micromycete pycnidia. On the underside of leaves limb are found aecidium of *Roestelia cancelata* Rebent type that have up to 3 - 4 mm height, with a whitish skinny capuchin.

The rust of the pear is cited by several authors from the south of the country between years 1941 - 1957. In Moldavia it was found just *Pirus elaegrifolia* Pall., so *Pirus sativa* Lam et DC. is a new host for Moldavia.

9. Erysiphe heraclei DC., Fl. Frankly., VI, p. 107(1815); Eugenics Eliade, Monografia Erysiphaceelor from Romania, p. 327(l990).

The leaves of *Anethum graveolens* L. harvested in Iaşi on 16 th of September 2006 are covered with a whitish mycelium ectoparasite which has a powdery appearance due to conidia of *Oidium* type. The cylindrical conidia has 25 - 45 x 12 - 20 µm. On the harvest date, the cleistothecium wasn't ripe.

Fig. 1 - *Alternaria alternata* on the stem of *Levisticum officinale*

Fig. 2 - *Torula herbarum* on the stem of *Levisticum officinale*

Fig. 3 - *Torula herbarum* on the stem of *Petroselinum hortense*

Fig. 4- *Epicoccum purpurascens* on the stem of *Levisticum officinale*

Fig. 5 - *Septoria levistici* on the stem of *Levisticum officinale*

Fig. 6 - *Acremonium humicola* on the stem of *Levisticum officinale*

Fig. 7 - *Humicola* on the stem of *Petroselinum hortense*

Fig. 8 - *Gymnosporangium sabinae* on the leaves of *Pirus sativa*

Fig. 9 - *Erysiphe heraclei* on the leaves of *Anethum graveolens*

The micromycete was harvested for the first time in 1963 in Craiova and then it was signalized in cultures from the south of the country and from Suceava but we consider it rarely cited in Moldova.

CONCLUSIONS

The researches made in the agricultural years 2005 and 2006 emphasized the extension of pathogenic agents known on another host, but also the appearance of new agents, pathogens or saprophytes.

In this paperwork there were described:

1. One new micromycete for Romania,
2. One new micromycete for Moldavia,
3. Three new host plant for the country for some already known micromycetes,
4. A new host plant for Moldavia of some known micromycetes,
5. Three micromycetes rarely cited in the country or Moldavia.

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ASPECTS EN CONCERNANT LA PRÉVENTION ET LE COMBAT DE L`ATTAQUE DU CHAMPIGNON *PSEUDOPERONOSPORA CUBENSIS*, QUI PRODUIT LE MILDIOU DES CUCURBITACÉES, AU MELON, DANS LES CONDITIONS DE LA PLAINE BARAGAN PENDANT LES ANNÉES 2003 ET 2004

ASPECTE CU PRIVIRE LA PREVENIREA ŞI COMBATEREA ATACULUI CIUPERCII *PSEUDOPERONOSPORA CUBENSIS* CE PRODUCE MANA CUCURBITACEELOR, LA PEPENELE GALBEN, ÎN CONDIŢIILE CÂMPIEI BĂRĂGANULUI (2003 ŞI 2004)

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Abstract. *One the most dangerous pathogenic agents that affect the melons is the fungus Pseudoperonospora cubensis wich produces the cucurbitaceae manna.*

The pathogenic agent appears every year with various intensities and rates, first of all depending on the climatic factors. In the view on decreasing the damage brought about by this pathogenic agent, the factor wich encourage the appearance and development of its attack have been reaserched. Some charts of integrated fighting against this pathogenic agent have been worked out, too. In this respect the efficiency of some phytosanitary products have been tested. A special attention has been given particularly to deciding upon the best moment of providing the first tratament, wich is the most important of all. Great attention has been given to the evolution of the meteorological factors. Following the tests made in 2003(a draughty year) and in 2004(rainy year), good results have been obtainted providing an extremely practical help to the farmers of melons. There haven been obtained obvious differences between the treated variants and the untreated witness as regards the attack rate of the disease, especially in 2004 wich was a very favourable year for the appearance of manna.

Rezumat. *Unul din cei mai periculoşi agenţi patogeni, care afectează pepenii galbeni, este ciuperca P. cubensis care produce mana cucurbitaceelor.*

Patogenul apare în fiecare an cu intensităţi şi grade de atac diferite, în primul rând în funcţie de factorii meteorologici. În scopul reducerii pagubelor provocate de acest patogen, s-au studiat factorii care favorizează apariţia şi evoluţia atacului. S-a urmărit elaborarea unor scheme de combatere integrată a patogenului. În acest scop a fost testată eficacitatea unor produse de uz fitosanitar specifice combaterii manei. O importanţă deosebită, a fost acordată mai ales stabilirii momentului optim de aplicare a primului tratament, care este cel mai important. Pentru aceasta, a fost urmărită cu mare atenţie evoluţia factorilor meteorologici. În urma experienţelor executate în anii 2003(an secetos) şi 2004(an ploios) s-au obţinut rezultate ce prezintă o importanţă practică deosebită pentru cultivatorii de pepeni galbeni. Între variantele tratate şi martorul netratat s-au obţinut diferenţe clare în ceea ce priveşte GA de atac al bolii mai ales în anul 2004 care a fost deosebit de favorabil apariţiei manei.

Dans notre pays, le mildiou des cuurbitacées a été observé pour la première fois de Traian Savulescu et mentionnée dans L` état Phytosanitaire pendant les années 1928-1929 à la courge(*Cucurbita pepo).*

Sur le plan mondial la dispersion du pathogène contient un vaste région aréique, la même que celle de culture des plantes cucurbitacées maîtresses.

Par conséquent, il est signalé comme parasite sur les concombres en 70 pays, sur les melons en 50 pays, sur le courge en 40 pays, et sur les pastèques en 25 pays, pays positionés sous 30 degré.

Les attaques produites dans tout le monde sont les principales causes des pertes spécialement aux concombrs et aux melons.

La maladie apparaît seulement sur les feuilles, sans égard à la phase phénologique dans laquelle sont les plantes.

Sur la partie supérieure des feulles on observe des taches sous la forme couverte d` aspérités, jaunâtre, delimitées par les nervures des feulles secondaires qui dans les évolutions suivants devient bruns. En face des taches, sur la partie inférieure des feulles on forme un duvet cedré-violacé formé parmi les condies(zoospores caduqus) et le siphon du champignon.

Dans les conditions favorables pour l`attaque les taches s`élargissent et confluent en enveloppant complètement la surface du limbe des feuilles, qui séche, et les plantes sont défoliées rapidemment.

OBJECTIF ET MÉTHODE

Les expériences ont été fait à Braila. On a été utilise les variétés de melon Titus en 2003 et la sorte Fondant en 2004.

Ces expérieces ont été créé avec l`angagement strict de la technologie de culture spécifiquement au melon.

Á la collection, analyse et interprétation des dates météorlogiques on a utilisé le système ,,Agroexpert,, de l` Unité Phytosanitaire du Départament d`Agriculture Braila.

L` apparition et l`évolution de l`attaque du champignon *Pseudoperonospora cubensis* a été observé à la variété: temoin sans traitement.

Pour l`évaluation de l`attaque on a été utilisé le sytème de notation qui exige le calcul suivantes valeurs: F%(la fréquence de l`attaque) I%(l`intensité de l`attaque) et G.A.(le degré de l`attque).

Pour le calcul des valeurs signalées, on a été analysées par 21 de feuilles à la chaque parcelle expérimentée.

On a été exécuté échelonement les récoltes sur chaque sorté en partie, à maturité parfaite des fruits. La production a été exprimée à l`hectare.

Les expériences on a été formées chacun par 5 variétés (4 produits fongicides +1 temoin sans traitement). Celles-ci on a été positionnées en 3 répétitions conformément à la technique experimentale.

Les résultats pilotes on a été interprétés aussi conformément à la technique experimentale, par l`analyse statistique (la méthode de différences limits- DL 5 % et DL 1 %.

Les variantes de traitement étudiées en 2003 et 2004 ont été:

-V1- Temoin sans traitement

-V2-Manoxin Total 60 P.U.(mancozeb + oxiclorure de Cu + oxadixyl) – 0,25%

-V3- Exp 11047(fosetyl de Al + propamocarb) – 0,20%
-V4- Kif W.D.G.(pyraclostrobin) – 0,15%
-V5- Electis 75 W.G.(mancozeb + zoxamide) – 0,20%

En 2003 un nombre de 3 traitements ont été executes aux dates: au mois de 21 juin, au mois de 11 juillet et au mois de 29 juillet.

En 2004 un nombre de 5 traitements ont été executes aux dates: au mois de 14 juin, au mois de 23juin au mois de 5 juillet, au mois de 15 juillet et au mois de 25 juillet.

Le moment de l`exécution du premier traitement, le nombre et l`intervalle entre celles-ci on été établi en fonction de facteurs météorologiques favorables: température, l`humidité moyenne d`air, rosée et précipitations.

RÉSULTATS ET DISCUTIONS

L`attaque du mildiou des cucrbitacees s`est manifestée en 2003 commencant le 28 juillet, plus tard que les années précédentes, le degré de l`attaque en étant 1,15%. Ce fait est dû au fait de la sécheresse excessive qui s`est manifestée dans le mois de mai-35 l /mp seulement dans la III-ème décade (dans la première décade et la deuxième décade zéro précipitations) et au mois de juin seulement 14 l /m^2 le mois etier.

De plus les nombres d`heures avec rosée a été plus petit – 96 heures dans le mois de mai et 100 heures au mois de juin, ce valeurs en étant trop petites que l`habitude.

Á cause de raisons mentionées, à la fin du mois d`août, le degré de l`attaque de la maladie a eu la plus petite valeur – 5,5% en comparaison de la période similaire les autres années, dans laquelle l`evolution de l`agent pathogène a été étudiée aux melons et notamment: 2002, 2004 et 2005.

L` attaque de champignon *Pseuperonospora cubensis* aux melons en 2004 a commencé au mois de 23 juin. L`apparition du mildiou a été la plus précoce dans ces 4 ans d`observations (en 2002, 2003, 2004 et 2005), du cet agent – ci pathogène. Le degré de l`attaque du pathogène au début a été de 0,80%.

L`apparition plus précoce comme d`habitude on peut être dû comme causes que on peut énumérer :

- Le mois de mai et mois de juin ont été plu pluvieux comme d`habitude. On avient enregistré 70 l/ $m^2$de précipitations tant que le mois de mai et aussi qu`au mois de juin. Les plus pluvieuses décades des ces mois-ci a été la troisième décade du mois mai (36 l /m^2) et la deuxiéme décade au mois de juin 35 l

- Dans ces mois-ci on avaient enregistré de températures moyennes très favorables de l`attaque de *Pseuperonospora cubensis* comme exemple pendant les décades: la première, la deuxième et la troisième du mois mai, quand on avaient enregistré de températurea moyennes de 19,4°C, 18,1°C, et 19,8°C, et au mois de juin on avaient enregistré dans les mêmes décades de témperatures moyennes de 21,3°C, 23,5°C, et 24,6°C.

Á cause des températures moyennes plus baissés comme d`habitude(23°C) enregistrées dans la deuxième décade au mois de juillet et quelques-unes précipitations abondantes(35l/m^2) dans la troisième décade au mois de juillet,

l`attaque d`agent pathogène a été évoluée rapidement à la fin du mois juillet et au début au mois d`août, en arrivant à la valeur du degré de l`attaque de 18,83 %, dans la première décade au mois d`août. Par cette raison a enore participé le nombre assez grand d`heures de la rosée de la deuxième et de la troisième décade au mois de julliet, respectivement 75 heures et 81 heures.

L` évolution de l`évolution de l`agent pathogène au mois d`août, a été plus rapide que pendant les années précedentes ainsi que les précipitations plus d`abondantes enregistrées dans la troisième décade au mois d`août – 148 l/m^2 ont déterminé l`enregistrement d`un degré de l`attaque plus grand(85,6%) à la fin du mois d`août et au début du mois de septembre la culture en étant pratiquement compromete.

La perte principale dans ce cas a été aussi d`ordre quantitatif tant que d`ordre qualitatif, plus de 80% par les friuts formés en étant plus avec 30-35% comme d`habitude et privés par tot goût et arôme.

Table 1

L'efficacité des combinaisions de fongicides pour combattre le champinion*t Pseudoperonospora cubensis* (variété Titus - 2003)

Nr	Le produit	Le degree de l`attaque (G.A)%	La différence vis-à-vis du temoin sans traitement %	La production (t/ha)	La différence vis-à-vis du temoin sans traitement (t/ha)
1	Temoin sans traitement	4,53	-	17,2	-
2	Manoxin Total 60 P U – 0,25 %	1,60	2,93**	19,3	2,1*
3	Exp 11047 A 0,20 %	1,86	2,67**	20,3	3,1**
4	Kif W.D.G. 0,15 %	1,90	2,63**	20,5	3,3**
5	Electis 75 WG 0,20 %	1,50	2,97**	19,0	1,8*

L`analyse statistique pour le degré de l`attque(G.A.%):
Sd = 2,64 (la transformation arc sin $\sqrt{}$procent)

DL 5% = 2,64 x 2,31 = 6,1 = 1,0%- * différence signicative
DL 1% = 2,64 x 3,36 = 8,9 = 2,5%- ** différence précise signicative

L`analyse statistique pour la production.:
Sd = 0,54

DL 5% = 0,54 x 2,31 = 1,24 t/ha - * différence signicative
DL 1% = 0,54 x 3,36 = 1,81 t/ha - ** différence précise signicative

Table 2

L'efficacité des combinaisions de fongicides pour combattre le champinion*t Pseudoperonospora cubensis* (variété Fondant - 2004).

Nr.	Le produit	Le degree de l`attaque (G.A.)%	La différence vis-à-vis du temoin sans traitement %	La production (t/ha)	La différence vis-à-vis du temoin sans traitement (t/ha)
1	Temoin sans traitement	47,36	-	9,4	-
2	Manoxin Total 60 P U– 0,25 %	12,60	34,76**	11,7	2,3**
3	Exp 11047 A – 0,20 %	12,76	34,60**	11,6	2,2*
4	Kif W.D.G. – 0,15 %	13,03	34,33**	11,4	2,0*
5	Electis 75 WG – 0,20 %	13,10	34,26**	11,9	2,5**

L`analyse statistique pour le degré de l`attaque (G.A.%):
Sd = 2,25 (la transformation arc sin √procent)
DL 5% = 2,25 x 2,31 = 5,20 = 0,9 % - * différence signicative
DL 1% = 2,25 x 3,36 = 7,56 = 1,0 % - ** différence précise signicative

L`analyse statistique pour la production:
Sd = 0,67
DL 5% =0,67 x 2,31 = 1,54 t/ha - * différence signicative
DL 1% =0,67 x 3,36 = 2,25 t/ha - ** différence précise signicative

CONCLUSIONS

Après les présesentations, on peut conclure que l`intervale de temp le plus probable d`apparition de l`attaque du chapignon *Pseudoperonospora cubensis* dans le district Braila est détermine par les valeurs des causes météorologiques favorables enregistrées au mois de mai t les premières deux décades au mois de juin.

Pendant les années de sécheresse, par exemple 2003, le mildiou a les apparitions plus tardives même si la température se situe en valeur propice.

En 2003, le mildiou a eu une évolution très lente et les valeurs ont été plus petites du degré de l`attaque en comparaison les années précédentes, en conséquence, en résultant une diminution à la source d`inoculution pour les infections pour l`année pochaine.

Pendant les années où l`humiditéme et la température ont les valeurs propices, par exemple 2004, même s`ils siuvent les années de sécheresse moins favorables au champignon (comme exemple 2003), peuvent apparaître des infections prématures, qu`en peuvent provoquer des préjudices sourtout aux melons.

Ce fait prouve qu`une source reduite d`inoculation, dans les conditions favorables à la croissance du champignon peut provoque des importantes infections, ainsi qu`en 2004.

Pour cette raison, l`intervalle propice pour l`application du premier traitement pour combattre le mildiou, pendant les ans favorables, c`est la deuxième décade au mois de juin.

Pendant les ans défavorables de l`attaque du champignon, le premier traitement on peut exécuter à la fin du mois de juin ou au début du mois de juillet. Après cela, le nombre et l`intervalle des traitements on établir en fonction de l`évolution de la température et surtout de l`humidité d`air et des précipitations. L` apparition des nuits avec la rosée c`est plus importante dans l`évolution de l`attaque du mildiou.

Pendant les années de sécheresse (2003 et 2006), seulement 2-3 traitements sont nécessaires, avec fermeté, contre le mildiou.

Pendant les temps pluvieux (2004 et 2004) sont nécessaires le moins 5 traitements contre le mildiou surtout aux variétés et aux hybrides plus sensibles.

Tous les produits utilisés, on prouve être effissaients à la diminution de l`attaque du champignon *Pseudoperonospora cubensis* en comparaison sans traitement (tab 1, tab 2).

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ESTABLISHMENT OF THE OPTIMUM MOMENTS FOR TREATMENTS APPLYING AGAINST THE *CYDIA FUNEBRANA* TR. (*LEPIDOPTERA, TORTRICIDAE*) PEST IN THE CLIMATIC CONDITIONS OF DÂMBOVIȚA COUNTY IN THE YEARS 2005-2006

STABILIREA MOMENTELOR OPTIME DE APLICARE A TRATAMENTELOR ÎMPOTRIVA DĂUNĂTORULUI *CYDIA FUNEBRANA* TR.(*LEPIDOPTERA, TORTRICIDAE*) ÎN CONDIȚIILE CLIMATICE ALE JUDEȚULUI DÂMBOVIȚA, ÎN PERIOADA 2005-2006

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Abstract. *Cydia funebrana Tr. is a dangerous pest for the plum trees orchards producing damages that reach 50-80% of entire production for the IInd generation (Ghizdavu and contrib. -1997). For successful control actions against the plums worm, warning of the optimum moments for treatments applying has a great importance. As a consequence of the registered captures in the AtraFUN synthetic sexual pheromones traps, it was recomended to apply treatments as following:*

- in the year 2005, from 17th to 22nd May and from 27th May to the 1st of June against the Ist generation, from 16th July to 21st and from 26th July to 31st against the IInd generation;

- in the year 2006, from 18th to 23rd May and from 28th May to 6th June against the Ist generation, from 22nd to 27th June and from the 1st to 6th of July against the IInd generation;

Rezumat. *Cydia funebrana Tr. este un dăunător periculos al plantațiilor de prun, pierderile înregistrate la generația a II-a putând ajunge la 50-80% din producție (Ghizdavu şi colab.-1997).Pentru reuşita acțiunilor de combatere a viermelui prunelor avertizarea momentelor optime de aplicare a tratamentelor are o mare importanță. În urma capturilor înregistrate în capcanele cu feromoni sexuali sintetici AtraFUN, tratamentele au fost recomandate a se efectua după cum urmează:*

-în anul 2005, pentru combaterea generației I, în perioadele 17-22.05 şi 27-01.06, iar împotriva generației a II-a, în perioadele 16-21.07 şi 26-31.07;

- în anul 2006, pentru combaterea generației I, în perioadele 18-23.05 şi 28-03.06, iar împotriva generației a II-a, în perioadele 22-27.06 şi 01-06.07.

Cydia funebrana Tr. is a dangerous pest for the plum trees orchards (Ghizdavu and contrib., 1997). The insects of the Ist generation produce falling of the damaged fruits from plum trees resulting 4 to 12% losses in crops for the early

cultivars (Victoria Şuta, 1980). Even bigger losses, of 50 to 80% of the crops, are produced by the IInd generation.

The most efficient methods to control this pest are chemical and biological, all treatments beeing applied on warning (Paşol and contrib., 2007). Therefore, the establishment of the optimum moments to apply insecticides has a special importance.

MATERIAL AND METHOD

Observations were effectuated in the years 2005 and 2006 into the plum trees orchards from the Phytosanitary Unit of Dâmbovița county.

The moment of eggs laying, the dynamics of males flight after the pheromonal captures and the sum of effective temperature degrees were allowed for establishment of the optimum moments to control the plums worm.

RESULTS AND DISCUSSIONS

Using this method, the following rule was respected for each generation: the Ist treatment was warned on the date when the first eggs were laid and the IInd treatment was warned 10 to 20 days after the Ist; it was recomended to apply the first treatment 2-3 days after the eggs laying and the second treatment, according to the remanence of the insecticide, during the period of maximum flight. Starting from this rule, we present further the warnings we established in the years 2005 and 2006.

Table 1

Biological fact sheet for the *Cydia funebrana* Tr. pest in the year 2005

Generation	Developmental stage	Date		∑(t_n-9)	
		of first appearances	of last appearances	at the begining	at the end
Ist	larva	-	14.05.2005	-	212,9
	pupa	19.04.2005	05.06.2005	10,3	421,1
	adult	05.05.2005	12.06.2005	103,9	523,0
IInd	egg	14.05.2005	24.06.2005	212,9	664,9
	larva	31.05.2005	02.07.2005	369,3	777,2
	pupa	10.06.2005	10.08.2005	492,2	1267,0
	adult	20.06.2005	22.08.2005	622,5	1426,6
Ist	egg	13.07.2005	02.09.2005	973,0	1578,1
	larva	10.08.2005	spring	1267,0	spring

Treatments warning for the year 2005 was established as follows:

- for the Ist generation control, the warning bulletin was released on 14th May , when the adults of the Ist generation started the eggs laying, the first treatment beeing recommended to be applied between 17th and 22nd May (2-3 days after the warning), the second treatment 10-12 days after the first (according to the remanence of the insecticide), between 27th May and 1st June, period which corresponds with the maximum of the flight curve for the adults of the Ist generation.
- for the IInd generation control, the warning bulletin was released on 13th July (when the first eggs were laid by the adults of the IInd generation), the third treatment beeing recommended to be applied between 16th and 21st June (period which corresponds with the maximum of the flight curve for the adults of the IInd generation); the fourth treatment followed 10 days after the third, but it was necessary only in case of a strong attack because the third treatment included both the apparition of the first larvae belonging to the IInd generation and the maximum of the adults flight curve.

According to case, the treatment scheme to control the plums worm, *Cydia funebrana* Tr., in the year 2005 was 2+1 or 2+2 (table 1).

The sum of effective temperature degrees, at which warning of the optimum moments for treatments applying was done, corresponding to the start of eggs laying, was of 212,9°C for the Ist generation and of 973,0°C for the IInd generation.

Table 2

Biological fact sheet for the *Cydia funebrana* Tr. pest in the year 2006

Generation	Developmental stage	Date		$\sum(t_n-9)$	
		of first appearances	of last appearances	at the begining	at the end
Ist	larva	-	20.05.2006	-	215,8
	pupa	18.04.2006	22.06.2006	98,1	558,8
	adult	02.05.2006	25.06.2006	153,3	604,7
IInd	egg	16.05.2006	27.06.2006	197,0	711,8
	larva	27.05.2006	15.07.2006	302,0	910,1
	pupa	12.06.2006	09.09.2006	452,4	1770,6
	adult	20.06.2006	23.09.2006	548,4	1821,0
Ist	egg	19.07.2006	27.09.2006	1212,1	1862,8
	larva	07.08.2006	spring	1480,2	spring

Treatments warning for the year 2006 was established as follows:

- for the Ist generation control, the warning bulletin was released on 16th May, when the adults of the Ist generation started the eggs laying. First treatment was recommended to be done between 18th and 23rd May and the second between 28th May and 3rd June.

- for the IInd generation control, the warning certificate was released on 19th July (the moment of first eggs laying for the adults of the IInd generation), the third treatment beeing recomended to be applied between 22nd and 27th June, period that corresponds also with the adults maximum flight. This fact made the fourth treatment not to be obligatory 10 days after. In the situation of a high degree of attack this treatment was recomended though between 1st and 6th July.

From the data presented above it results that the treatment scheme to control the plums worm in the year 2006 was, similar with the year 2005, 2+1 or 2+2 according to case (table 2).

The sum of the effective temperature degrees, corresponding with the start of eggs laying, for which warning of optimal moments to apply treatments was done, was of 197,0°C for the Ist generation and of 1212,1°C for the IInd generation.

CONCLUSIONS

1. *Cydia funebrana* Tr. is a dangerous pest for the plum trees orchards which is able to produce damages of 50-80% of the crop for the IInd generation (Ghizdavu and contrib. -1997).

2. The most efficient methods to control this pest are chemical and biological, all treatments beeing done on warning (Paşol and contrib., 2007), reason for which the establishment of the optimum moment to apply the insecticides has a great importance.

3. For each generation the following rule was respected: Ist treatment was warned on the date of the first eggs laying and the IInd treatment 10-12 days after the first. It was recomended to apply the Ist treatment 2-3 days after the start of the eggs laying and the IInd one during the period of maximum flight, according to the remanence of the insecticides used.

4. In the climatic conditions of Dâmbovița county, the sum of the efective temperature degrees, corresponding with the start of eggs laying, on which treatments warning was done, was of 212,9°C for the Ist generation and of 973,0°C for the IInd generation in the year 2005 respectively of 197,0°C for the Ist generation and of 1212,1°C for the IInd generation in the year 2006.

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COMPARATIVE ANALISYS OF TWO TIRE WHEEL TRACTION MODELS

ANALIZA COMPARATIVĂ A DOUĂ MODELE PENTRU TRACȚIUNEA ROȚII CU PNEU

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Abstract. *The paper presents some comparative results for two wheel traction models and experimental data. Complete soil rebound was taken into account for the first model and incomplete soil rebound was considered for the second model. A variable shear area, depending upon wheel slip, was also taken into account for some variants. A comparative analysis between the calculated net traction force and traction efficiency and experimental data has shown that the best fit with experimental data is given by the first model, when variable shear area is taken into account.*

Rezumat. *In cadrul lucrarii sunt dezvoltate doua modele de baza pentru tractiunea rotii cu pneu, aplicate tractorului U-650M; modelele permit determinarea fortei de tractiune si a randamentului tractiunii. Sunt luate in calcul mai multe moduri de repartizare a presiunii de contact pneu-sol, precum si modificarea ariei petei de contact in functie de patinarea rotii motoare. Rezultatele furnizate de catre modele au fost comparate cu rezultate experimentale, obtinute in cadrul lucrarii de arat executate cu agregatul tractor U-650 + plug P2V.*

TRACTION MODELS

The first traction model is based on the schematics shown in Figure 1. The model assumes that, under the vertical load (G), the wheel sinks into the soil, reaching depth (z_c) and the load induces tire deflection (z_p). As a result, the radius of the contact patch becomes r_d ($r_d > r_0$), and the circular length of the contact patch is:

$l_c = 2\cdot\beta\cdot r_d = 2\cdot\alpha\cdot r_0$ (1)

From Figure 1 we get: $z = r_d \cdot \left[\cos(\beta - \varphi) - \cos\beta\right]$.

Using the Bekker equation [3] and assuming the tire is perfectly elastic, we finally obtain:

$$k \cdot \int_0^{2\beta} r_d^{n+1} \cdot \left[\cos(\beta - \varphi) - \cos\beta\right]^n \cdot d\varphi + \frac{4}{3} q_p \cdot \beta^3 \cdot r_d^2 = \frac{4}{3} \cdot q_p \cdot \alpha^3 \cdot r_0^2. \quad (2)$$

and also:

$$z_c = r_0 - z_p - r_0 \cdot \cos\beta \quad (3)$$

$$z_p = r_0 \cdot (1 - \cos\alpha) - r_d \cdot (1 - \cos\beta) \quad (4)$$

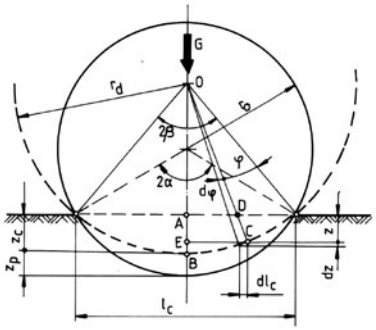


Figure 1 - Schematics of the first traction model

The system consisting of equations (1), (2), (3) and (4) is solved through an iteration process. Each calculation step begins with a guess value for the contact patch length l_c. Following the work of Upadhyaya & Wulfsohn [8], the contact patch is assumed to have an elliptical shape, with l_c the major axis and l_w the minor axis.

Tractor drive tires are lugged. Knowing the length of the contact patch and the distance between lugs, the following items are calculated:

- the lug-soil contact area A_{pr};
- the undertread-soil contact area $A_{br} = A_t - A_{pr}$.

A wheel on soft soil penetrates the ground until the resultant ground pressure equals the wheel vertical load. The general pressure-sinkage equation for this action is:

$$p = k \cdot z^n \quad [\text{kPa}], \tag{5}$$

where p is the tire-ground pressure. Depending on wheel load and soil condition, one of the following situations may occur:

- assuming that $p = \frac{G}{A_{pr}}$, from (7) we get $z < h_p$; in this case we conclude that there is incomplete lug penetration and there is no contact between the undertread and the soil.
- assuming that $p = \frac{G}{A_{pr}}$, from (7) we get $z \geq h_p$; in this case, we conclude that both the lugs and the undertread have contact with the soil and the normal pressure for the lugs (p_{pr}), for the undertread (p_{br}) and the effective wheel sinkage (z) must be calculated.

At the end of each calculation step the following condition is checked:

$$| z_c - z \ | \leq 0{,}001 \tag{6}$$

If the condition (5) is satisfied, it means that the true values for l_c, z_c and z_p were found; if it is not, the length l_c of the contact patch is increased with 1 mm and the calculation process is resumed.

It was assumed that the maximum traction force of the tire was limited only by the soil maximum shear strength τ_{max}. In order to evaluate the overall maximum shear strength the following formula was used [2]:

$$\tau_{max} = \frac{A_{pr}}{A_t} \cdot \tau_{max\,p} + \left(1 - \frac{A_{pr}}{A_t}\right) \cdot \tau_{max\,b} \tag{7}$$

According to Wulfsohn& Upadhyaya [7, 9] and Lach [5], the shear stress developed at the interface between the vehicle tire and the terrain is a function of shear displacement J.

$$\tau = \tau_{max} \cdot \left(1 - e^{-\frac{J}{K}}\right) \qquad J = \int_0^t v_P \cdot dt = r_0 \cdot \left[2 \cdot \beta - (1 - s) \cdot \sin 2\beta\right] \quad (8)$$

The traction force is given by the relation:

$$F_t = \tau \cdot A_t \quad \text{[kPa].} \quad (9)$$

According to ASAE S296 [10], the net traction force is:

$$F_{t,ef} = F_t - R_r \quad \text{[kPa],} \quad (10)$$

where R_r is the rolling resistance of the wheel.

According to ASAE S296, the traction efficiency is:

$$\eta_{tr} = \frac{F_{t,ef} \cdot v_r}{F_t \cdot v_t} = (1 - s) \cdot \left(1 - \frac{R_r}{F_t}\right) \cdot \quad (11)$$

Some authors [1], [4] consider the shear area as a function of slip:

$$A_{sh} = A_t \cdot \left[1 - (1 - s) \cdot e^{-Y}\right], \quad (12)$$

where $Y = c_1 \cdot l_c^{m_1} \cdot s^{m_2}$, with the values of the constants c_1, m_1 and m_2 depending upon the nature of the ground surface.

The second traction model uses the schematics shown in Figure 2, taking into account an incomplete soil rebound behind the wheel; the pressure – sinkage relation finally becomes [1]:

$$r_d = \frac{q_p \cdot l_c^2 \cdot (\cos\gamma)^{n+2}}{\frac{q_p \cdot l_c}{r_0} \cdot (\cos\gamma)^{n+2} - 6 \cdot k \cdot z_0^n} \quad (13)$$

In the meantime we have:

$$x = r_0 - z_p - r_0 \cdot \cos\beta \Rightarrow z_0 = \cos\gamma \cdot (r_0 - z_p - r_0 \cdot \cos\beta), \quad (14)$$

$$y = r_0 \cdot (1 - \cos\alpha) - r_d \cdot (1 - \cos\beta) \Rightarrow z_p = \cos\gamma \cdot [r_0 \cdot (1 - \cos\alpha) - r_d \cdot (1 - \cos\beta)], \quad (15)$$

$$tg\gamma = \frac{z_1}{l_c},\ z_1 = \frac{k}{k_u} \cdot z_0^n,\ \alpha = \frac{l_c \cdot \cos\gamma}{2 \cdot r_d}, \quad \beta = \frac{l_c \cdot \cos\gamma}{2 \cdot r_0} \quad (16)$$

The system consisting of equations (13)…(16) is solved using an iteration process.

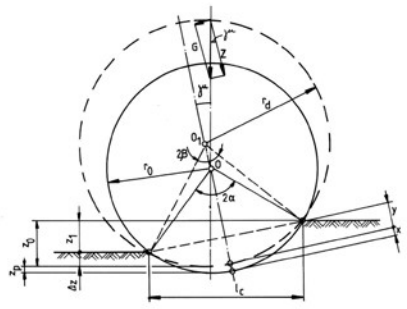


Figure 2 - Schematics of the second traction model

The contact patch area is calculated using the same equations as in the first model; the contact pressure is assumed to be constant on the surface of the lugs, while a parabolic distribution is taken into account for the undertread surface:

$$p(x) = a \cdot x^2 + b \cdot x + c, \quad x \in [0, l_c], \tag{17}$$

EXPERIMENTAL SETUP

For this work the Romanian U-650 tractor was modeled. Field experiments were conducted using the U-650 tractor, equipped with the P2V plow. Variation of plow width and depth allowed different traction forces and drive wheel slips to be obtained.

During the experiments, drive wheel slip and net traction force $F_{t,ef,r}$ were measured directly. The gross traction force and traction efficiency ($\eta_{tr,e}$) were determined assuming that $F_t = F_{t,ef,r} + R_r$, with a formula derived from ASAE S296 standard.

Soil characteristics for the test field are shown in Table 1. The theoretical calculations were performed using computer programs, for the variants summarized in Table 2.

RESULTS AND DISCUSSIONS

The calculated results concerning wheel sinkage and average pressure on lugs and undertread are shown in Table 3; the results concerning the traction force and traction efficiency are shown in Figure 3.

Table 1

Characteristics of the test soil

Item		Value
Soil deformation modulus, K [m]		0.05
Coefficients for the sinkage equation	k	55
	n	1.3
Soil cohesion, c [kPa]		25
Angle of internal friction, φ [^{0}]		32
Cone penetrometer index, CI [kPa]		970

Table 2

Working variants

Variant no.	Model no.	Pressure distribution on the undertread	Variable shear area
1	2	constant	no
2	2	parabolic	no
3	2	parabolic	yes
4	1	-	no
5	1	-	yes

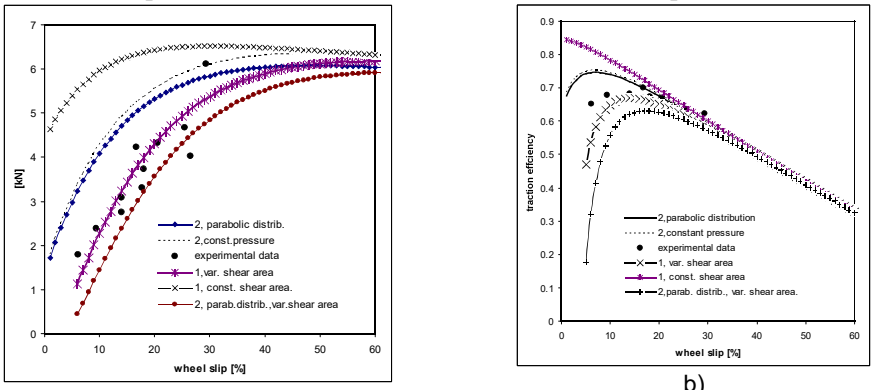
Table 3

Comparison of calculated results

Var.	l_c [m]	r_d [m]	p_{pr} [kPa]	p_{br} [kPa]	τ_{pr} [kPa]	τ_{br} [kPa]	τ_{max} [kPa]	z_c [m]
1	0.622	1.203	304.41	71.93	215.1	69.9	120.54	$3.72 \cdot 10^{-2}$
2	0.622	1.203	304.41	71.93	215.1	52.93	116.16	$3.72 \cdot 10^{-2}$
3	0.622	1.203	304.41	71.93	215.1	52.93	116.16	$3.72 \cdot 10^{-2}$
4	0.598	0.941	312.63	77.85	220.23	73.61	124.33	$3.806 \cdot 10^{-2}$
5	0.598	0.941	312.63	77.85	220.23	73.61	124.33	$3.806 \cdot 10^{-2}$

From Figure 3 it is clear that variant no. 5 (first traction model, with variable shear area) gives the best fit with the experimental results (for both traction force and traction efficiency), at least for 8….30% wheel slip. The average differences between calculated and measured data did not exceed 0.25…0.4 kN for the traction force and 4…5% for the traction efficiency.

According to variant no. 5, the maximum traction efficiency is reached when wheel slip is comprised between 10 and 17%; these predictions were confirmed by the experimental data (Figure 3b). Referring to the traction force (Figure 3a), the best fit between model and experimental data is also achieved when wheel slip is within the above mentioned range. In the meantime, variant no.5 leads to the higher values of the tire-ground pressure, shear strength and sinkage into the soil (Table 3). Lower values for the contact patch area are achieved when wheel slip is within the tested range; for 10…17% wheel slip, the contact patch area has values between 0.0286 and 0.0405 m^2, compared to 0.0618 m^2 for the constant area assumption.



a) b)

Figure 3 Comparison between experimental and calculated data
a-traction force; b-traction efficiency

Both experimental and calculated data show that the maximum traction efficiency is reached for traction forces between 2.5and 3.7 kN (Figure 4).

The tire – ground contact pressure profile for variant no. 5 is shown in Figure 5; obviously, a parabolic pressure distribution may be assumed (see the trendline).

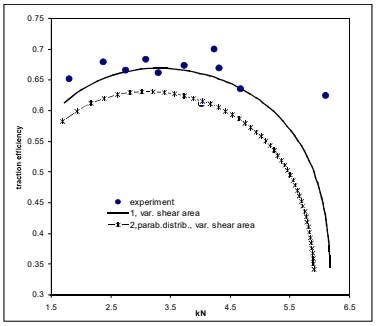


Figure 4 Traction efficiency vs. traction force

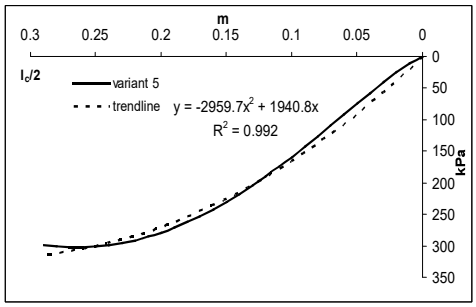


Figure 5 Tire-ground contact pressure

CONCLUSIONS

1. Two models for off-road tire traction were developed; for the both models, tire deflection under load was taken into account by replacing the real wheel with an imaginary one, with a larger radius.

2. The resultant systems of equations were solved using computer programs, through iterative processes.

3. The models were applied to the driving wheel of a Romanian tractor and were compared with the experimental results.

4. The first model (complete soil rebound behind the wheel) with variable shear area (variant no.5) gave the best fit between model and experimental data, for 8….30% wheel slip, while the tire-ground contact pressure may be assumed to have a parabolic distribution.

5. Both the experimental and calculated data show that the maximum traction efficiency of the drive wheel is achieved for 10…17% wheel slip.

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THE INFLUENCE OF SOME UNCONVENTIONAL FERTILIZATION METHODS ON BELL-PEPPER CROP IN THE PROTECTED SPACE

INFLUENȚA UNOR METODE NECONVENȚIONALE DE FERTILIZARE LA CULTURA DE ARDEI GRAS-GOGOŞAR ÎN SPAȚIU PROTEJAT

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Abstract. T*he supply of market with fresh agricultural products is a particular problem, because a various set of vegetables should be assured all the year. This is the reason to produce sufficient quantities of high quality vegetables. To satisfy these needs, one of the main ways is the cultivation of vegetables in protected spaces. This paper refers to bell pepper grown in greenhouse (INCDPAPM-ICPA, Bucharest) by an alternative fertilization method. Bell pepper represents a basic product in human food, being consumed under both fresh and canned condition. The great number of bell pepper cultivars and varieties constitutes the raw material for producing a large range of culinary products. In this context, the research on the influence of fertilization using a new kind of liquid fertilizers applied in soil and on the plant leaves was carried out. The research carried out in the last years on the unconventional fertilization methods and means puts the problem on some new methods to prevent chemical pollution of vegetal production environment. Research results presented in this paper demonstrate that the fertilization with liquid fertilizers permit to achieve some important objectives of vegetal production.*

Rezumat. *Aprovizionarea pieţelor cu produse proaspete este o problemă deosebită, deoarece trebuie asigurat un sortiment variat de legume pe tot parcursul anului. De aici nevoia de a produce legume în cantităţi suficiente şi cu calităţi superioare. Pentru a răspunde acestor cerinţe se cultivă legume în spaţii protejate.*

Lucrarea de faţă se referă la cultura ardeiului gras în casa de vegetaţie a INCDPAPM-ICPA, Bucureşti, prin metode neconvenţionale de fertilizare. Ardeiul gras reprezintă un produs de bază în alimentaţia omului, putând fi consumat atât în stare proaspătă cât şi în stare conservată. Numărul mare al soiurilor şi varietăţilor constituie materia primă pentru prepararea unei game variate de sortimente de preparate culinare. În acest context s-au efectuat cercetări asupra influenţei fertilizării cu un sortiment de îngrăşăminte lichide aplicate atât la sol cât şi pe cale foliară. Cercetările efectuate în ultimii ani în legătură cu metodele şi mijloacele de fertilizare neconvenţională au atras atenţia asupra unor noi metode de prevenire a poluării chimice a mediului ambiant al producţiei vegetale. Rezultatele cercetărilor prezentate în lucrarea de faţă demonstrează că fertilizarea cu îngrăşăminte lichide permite atingerea unor importante obiective ale producţiei vegetale.

The vegetable crop growing technologies in protected spaces must be applied with the highest care to assure a health growing and development environment that may be achieved by attentive fertilization carried out on the basis of the permanent chemical soil testing, aiming at avoidance of both the depletion and excess of nutrients. These can

determine not only the yield loss, but also the particular damage of vegetable quality, that is the assurance of vegetable health.

Under the modern technologies, the fertilization during the growing season is carried out with liquid fertilizers applied by fertigation and foliar application.

The fertilization with liquid fertilizers begins after a week from planting of vegetable seedlings and is performed in several applications (3-5) up to 1-1.5 months before harvesting. With the crops having a particular harvesting plan, the fertilizer applications will be programmed in such a way to assure an interval of 8-10 days from the last fertilization to the harvesting.

Under the classic system, the vegetable fertilization is carried out with completely soluble solid fertilizers: ammonium nitrate, calcium nitrate, potassium nitrate, and potassium metaphosphate. The rates of fertilizers are established on the basis of soil testing. Among these systems the foliar fertilization is the most used being applied as a supplementary fertilization mean.

The foliar fertilization consists in fine spraying (pulverization on plants) of liquid fertilizer solutions with concentration of 0.1-2% (depending on the fertilizer concentration) and at a volume of 1,000-2,000 litters/hectare for each treatment. Depending on the biological and technological features of cultivated species, 3-5 treatments can be applied.

MATERIAL AND METHOD

The influence of unconventional fertilization methods applied to bell pepper was observed in the I.C.P.A. greenhouse. The experiments were organized in Mitscherlich pots with 20 kg of soil per pot.

The experiment soil material was Fundulea Phaeoziom topsoil.

The experiment included two kinds of prepared soil material, that is:

A1 - topsoil plus: N-300 mg/kg of soil, P_2O_5-300 mg/kg of soil, K_2O-300 mg/kg of soil, and 30 g peat/kg of soil; and

A2 - topsoil plus: N-300 mg/kg of soil, P_2O_5-300 mg/kg of soil, K_2O-300 mg/kg of soil.

The used test plant was bell pepper, Cornel cultivar.

Applied treatment fertilizers included: NEB-26, STIMUSOIL for application in soil, and KELPAK, BIONAT for application on plant leaves in three splittings.

The three foliar fertilizations were carried out as follows:

- the first fertilization after 10 days from the plantation;
- the second and the third fertilization at every 7-8 days between them.

The chemical composition of tested fertilizers is presented in the Table 1. The used solution concentration was 1% and the applied quantity was 30 ml solution/pot for each treatment. Treatments included: V_1 - control, V_2 - Neb-26, V_3 - Stimusoil, V_4 - Kelpak and V_5 - Bionat.

RESULTS AND DISCUSSIONS

Table 2 presents the yield increases obtained with applied fertilizers, A1. Thus, it can be observed that the yield increases are between 30.5 and 30.9% in

the case of soil fertilization treatments, and 100.9 and 150.5% in the case of foliar fertilization treatments.

Table 3 presents the yield increases obtained with applied fertilizers, A2, where, as compared with the control, Neb 26 assured yield increases up to 50.70%, and Stimusoil up to 47.57%, while the treatments with Kelpak and Bionat recorded yield increases up to 110.35% and 119.66%, respectively.

The productions obtained in the pots receiving also peat are higher as compared to the pots receiving only N, P and K.

Table 1

The chemical composition of fertilizers

Components	KELPAK*	BIONAT*	STIMUSOIL	NEB - 26
	conc./UM			
N org	0.4%	1.28%	0.125%	-
N tot	0.04%	1.28%	0.125%	-
P_2O_5	0.03%	1.37%	0.175%	0.355%
K_2O	0.61%	0.24%	0.278%	0.108%
Fe	2.2 ppm	0.152%	$7.8 \cdot 10^{-4}$ %	14 ppm
Cu	1.8 ppm	0.215%	0.025%	0.048%
Zn	0.9 ppm	0.195%	$6.9 \cdot 10^{-5}$%	2.1 ppm
Mg	56.4 ppm	0.2%	0.03%	0.025%
Mn	0.8 ppm	0.078%	-	1.7 ppm
B	3.2 ppm	-	$7.3 \cdot 10^{-4}$%	2.5 ppm
Mo	-	-	$8.2 \cdot 10^{-6}$%	0.033 ppm
Sodium	0.16%	-		0.017%
Ca	0.02%	-	0.042%	0.03%
Growing stimulators (regulators)	auxin 10.7 ppm citokinone 0.03 ppm	-	-	-
protein	0.2%	-	0.78%	0.233%
Amino acids	0.1%	-	-	-
Other organic substances	carbohydrates 1.0%	salicylic acid 1% organic extract from plants 10%	20.87%	11%

* - Amounts of organic substances are those declared by the producer

Table 2

The yield increases obtained with tested fertilizers (Neb 26, Stimusoil, Kelpak, Bionat) applied to bell pepper, Cornel cultivar grown in ICPA greenhouse, experiment A1

No.	Treatment	No. applications	Solution conc. %	Quantity of used fertilizer ml/pot		Fruits yield (g/pot)	Yield increase	
				one application	Total		(g/pot)	%
1	Control	-	-	-	-	311.46	-	-
2	Neb 26	-	1.0	30	30	406.46	95.0	30.5
3	Stimusoil	-	1.0	30	30	407.66	96.2	30.9
4	Kelpak	3	1.0	30	90	625.76	314.3	100.9
5	Bionat	3	1.0	30	90	780.23	468.5	150.5

Table 3

The yield increases obtained with tested fertilizers Neb 26, Stimusoil, Kelpak, Bionat, applied at bell pepper, Cornel cultivar grown in ICPA greenhouse, experiment A2

No.	Treatment	No. applications	Solution conc. %	Quantity of used fertilizer ml/pot		Fruits yield (g/pot)	Yield increases	
				one application	Total		(g/pot)	%
1	Control unfertilized	-	-	-	-	260.35	-	-
2	Neb 26	-	1.0	30	30	392.36	132.01	50.70
3	Stimusoil	-	1.0	30	30	384.21	123.86	47.57
4	Kelpak	3	1.0	30	90	547.65	287.30	110.35
5	Bionat	3	1.0	30	90	571.90	311.55	119.66

Table 4

The influence of tested fertilizers on content and accumulation of N in bell pepper fruits, Cornel cultivar

Treatment	Yield (g/pot)	N (%)	N (g/pot)
A1			
Control	311.46	0.181	0.56
Neb 26	406.46	0.197	0.80
Stimusoil	407.66	0.205	0.83
Kelpak	625.76	0.203	1.27
Bionat	780.23	0.223	1.73
A2			
Control	260.35	0.198	0.51
Neb 26	392.36	0.240	0.94
Stimusoil	384.21	0.243	0.93
Kelpak	547.65	0.270	1.47
Bionat	571.90	0.258	1.47

Table 5

The influence of tested fertilizers on content and accumulation of P in bell pepper fruits, Cornel cultivar

Treatment	Yield (g/pot)	P (%)	P (g/pot)
A1			
Control	311.46	0.090	0.28
Neb 26	406.46	0.091	0.36
Stimusoil	407.66	0.111	0.45
Kelpak	625.76	0.084	0.52
Bionat	780.23	0.103	0.80
A2			
Control	260.35	0.086	0.22
Neb 26	392.36	0.072	0.28
Stimusoil	384.21	0.092	0.35
Kelpak	547.65	0.080	0.43
Bionat	571.90	0.108	0.61

Tables 4, 5 and 6 show the variation of content of macronutrients in bell pepper fruits depending on the applied treatments. Thus, in the A1 experiment, the content of macronutrients has lower values as compared to the A2. As concerns the effect of applied treatments on the nitrogen content, it may be observed that in the both cases (A1 and A2) they determined the increase of nitrogen content in fruits. A general tendency is also observed with respect to the increase of P and K contents, especially in the case of Stimusoil and Bionat fertilizers. As concerns the fertilizer application effect on accumulation of macronutrients (NPK) in bell pepper fruits, it is observed that this generally has an increasing tendency.

Table 6

The influence of tested fertilizers on content and accumulation of K in bell pepper fruits, Cornel cultivar

Treatment	Yield (g/pot)	K (%)	K (g/pot)
A1			
Control	311.46	0.214	0.66
Neb 26	406.46	0.293	1.19
Stimusoil	407.66	0.323	1.31
Kelpak	625.76	0.234	1.46
Bionat	780.23	0.299	2.33
A2			
Control	260.35	0.279	0.72
Neb 26	392.36	0.273	1.07
Stimusoil	384.21	0.298	1.14
Kelpak	547.65	0.255	1.39
Bionat	571.90	0.265	1.51

CONCLUSIONS

Generally, the applied fertilizers strongly influenced the increase of the content of the macronutrients in the bell pepper fruits.

Fertilization with the above mentioned fertilizers determines important yield increases with the bell pepper, these being between 30.5%, in the case of Neb product and 150.5%, in the case of Bionat product. A positive aspect is revealed in connection with nitrogen content which in the case of pots receiving peat is somewhat lower, favoring the ecological quality of fruits.

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THE INFLUENCE OF LEAF AND ROOT FERTILIZATION ON SOME VALUABLE LARGE-PEPPER CROP PRODUCTION, CULTIVATED IN VEGETATION VESSELS SYSTEM

INFLUENȚA FERTILIZĂRII FOLIARE ŞI RADICULARE ASUPRA PRODUCȚIEI UNOR CULTIVARE VALOROASE DE ARDEI GRAS, EXPERIMENTATE ÎN SISTEMUL VASELOR DE VEGETAȚIE

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Abstract. *To satisfy the new quality exigencies which are a necessity for modern agriculture, specialists must to develop new cultivation systems, depending on natural mechanisms, which must guarantee the environment protection, but to also satisfy the humanity food supplies demands.*
For this reasons, this scientifically work is about the production variation of some new, valuable hybrids pepper cultivated in vegetation vessels system in the specifically conditions of Iasi area, using mineral fertilizers (15-15-15 C) and leaf fertilizers (Folisof 221, Kristalon Verde, Fertcomplex C., Biostar).

The results certify the fact that satisfactory productions are obtained using both fertilization systems, even if some important incensements are record only by using leaf fertilization.

Rezumat. *Pentru a satisface noile exigențe de calitate impuse agriculturii moderne, specialiştii trebuie să dezvolte noi sisteme de cultivare, bazate pe mecanisme naturale, care să asigure protecția mediului, dar să satisfacă totodată şi cerințele de hrană ale omului.*

Din aceste considerente, lucrarea de față urmăreşte dinamica producției unor cultivare valoroase, noi de ardei gras, cultivate în sistemul vaselor de vegetație în condițiile specifice zonei Iaşi, folosind fertilizatori minerali (complex 15-15-15) şi foliari (Folisof 221, Kristalon Verde, Fertcomplex C., Biostar).

Datele obținute certifică faptul că producții satisfăcătoare se obțin prin utilizarea ambelor tipuri de fertilizare, chiar dacă se înregistrează sporuri uneori semnificative şi la aplicarea numai a fertilizării foliare.

Regarding the economical and feeding importance of pepper, the growth study of some new plants in some specials conditions, using different fertilization systems, is one of the main domain for specialists, to recommend the moast efficient practical solutions, for specifically area conditions.

MATERIALS AND MEANS OF RESEARCH

The experiment was carried out on the premises of the experimental field of the Agrochemical discipline of "Ion Ionescu de la Brad" University of Agricultural Sciences and Veterinary Medicine, Iasi, in vegetation vessels, using mineral fertilizer (complex 15-15-15) and leaf fertilizers (F_{221}, Fertcomplex, Green Kristalon and Biostar) in the large-pepper crop and monitoring the effect these two combined have on the production.

The experiment organized in vegetation vessels in 2006 is bifactorial, following the randomized blocks method.

A factor (leaf fertilization, non-mineral fertilization)

a1 - F_{221}
a2 - Fertcomplex
a3 - Green Kristalon
a4 - Biostar
B factor (leaf fertilization + mineral fertilization – complex 15-15-15):
b1 - F_{221} + $N_{80}P_{80}K_{80}$
b2 - Fertcomplex + $N_{80}P_{80}K_{80}$
b3 - Green Kristalon + $N_{80}P_{80}K_{80}$
b4 - Biostar + $N_{80}P_{80}K_{80}$

The complex fertilizer 15-15-15 contains 50% ammoniacal nitrogen, 50% nitric nitrogen, phosphorus 98% soluble in citric acid, 60% soluble in water, potassium 45% total active agent, humidity 1%, granulation 1-4 mm 90%, free acidity maximum 3%. This is a chemical fertilizer with well balanced basic elements (N, P, K), used in ecological doses (minimum) recommended for large-pepper crop ($N_{80}P_{80}K_{80}$).

Table 1

Composition and Characteristics of used leaf fertilizers

Leaf fert.	**CSA %**	**pH**	**N g/l**	**P g/l**	**K g/l**	**B G/l**	**S g/l**	**Mn g/l**	**Mg g/l**	**Zn g/l**	**Cu g/l**	**Fe g/l**	**Mo g/l**
F221	16	6,5-7	70	70	48	0,2	9	0,2	0,5	0,1	0,05	0,2	-
Fert.	16	6.5	80	80	75	0,3	0,4	0,4	0,04	0,04	0,1	0,3	0,03
Kris.	16	6,6	180	180	180	0,025	-	0,04	-	0,025	0,01	0,07	0,004
Ecol. fert.	**pH**	**Nt %**	**Norg %**	**Mat or %**		**Polizahar., polipept, prot.**					**Vitamins**		
Bios	5,8	2	2	12		13,5					B1, B6, PP		

Recommended concentrations for organic leaf fertilizer are: 0,2-0,3% (Biostar) and between 0,5 -1% for the chemical ones, while recommended doses are 2-3 l/ha for leaf organic fertilizers and between 7-8 l/ha for the chemical ones.

The biological material used was represented by four hybrids of Capsicum annuum: Albatros, Belladonna, Gypsy, Shy Beauty.

Albatros F1 is a very early indeterminate hybrid with extremely high yield potential. The plant is vigorous, with short internodes. Fruits are tapered, 3-4-lobed. The fruit color is white with yellow undertone, becoming bright red at biological ripeness. Fruits are 100-120 g in weight, 6-7 cm in diameter, 10-12 cm in length, with a wall thickness of 5-6 mm. This variety features an outstanding fruit-setting ability and intermediate heat resistance. Recommended for very early greenhouse and open-field production

Belladonna F1 is a very early-maturing hybrid. The plants are vigorous, with a compact, indeterminate plant habit allowing very easy harvest. Produces a high percentage of 4-lobed, thick-walled (6-7 mm) fruit. The blocky bell-shaped fruit average 9-10 x 8-9 cm in size and 160 - 200 g in weight and are very uniform. The fruit color varies from ivory at industrial ripeness to yellow at complete physiological ripeness. Resistant to tobacco mosaic virus (Tobamo virus P0). Particularly suited for early spring, summer and autumn production in glasshouses, as well as for cultivation in plastic film greenhouses, under plastic cover and in the open field for fresh market.

Gypsy F1 is a very early and extremely productive hybrid. Matures 60 days after transplanting. Plants have a compact growth habit and a height of 45-55 cm. Fruits measuring 10x6 cm, have a great flavor and are light-yellow at industrial ripeness and red at biological ripeness. Resistant to tobacco mosaic virus. Recommended for very early production in glass greenhouses, plastic film greenhouses and in the open field

Shy Beauty F1 is early-maturing hybrid with vigorous plants and excellent yield potential. Fruits are blocky, thick-walled. The fruit color is ivory at industrial ripeness and red at biological ripeness. Suitable for fresh market and processing. Resistant to tobacco mosaic virus (Tm2) and bacterial spot. Recommended for cultivation in glass greenhouses, plastic film greenhouses and in the open field.

Mineral fertilization with the complex fertilizer 15-15-15 was carried out on May 23, 2006, one week before plantation.

Leaf fertilization was accomplished in three steps: the first fertilization before blooming, on July 4,2006; the second fertilization in the immediately following period, on July 12,2006; and the last fertilization during blooming, on July 18,2006.

RESULTS AND DISCUSSIONS

The results obtained after weighing the production of each plant (in grams) were transformed in t/ha, taking as cultivation density 60.000 plants/ha as presented in table 2.

Table 2

Large-pepper production (t/ha)

Variants/ Hybrids	Gypsy		Albatros		Belladonna		Shy Beauty	
	t/ha	Increase t/ha	t/ha	Increase t/ha	t/ha	Increase t/ha	t/ha	Increase t/ha
Unfert.	17,940	0	18,960	0	19,320	0	17,820	0
F1	21,420	3,480	22,920	3,960	23,940	4,620	22,140	4,320
F2	21,660	3,720	22,980	4,020	24,300	4,980	22,080	4,260
F3	21,900	3,960	23,940	4,980	25,020	5,700	22,560	4,740
F4	19,920	1,980	21,120	2,160	21,240	1,920	18,420	0,600
M+F1	30,480	12,540	34,380	15,420	35,460	16,140	33,780	15,960
M+F2	31,200	13,260	33,900	14,940	34,920	15,600	32,400	14,580
M+F3	31,800	13,860	35,400	16,440	35,640	16,320	35,160	17,340
M+F4	29,880	11,940	31,200	12,240	30,900	11,580	29,160	11,340

M = unfertilized; F1 = leaf fertilization with F_{221}; F2 = leaf fertilization with Fertcomplex; F3 = leaf fertilization with Green Kristalon ; F4 = leaf fertilization with Biostar; M+F1 = leaf fertilization with F_{221} + $N_{80}P_{80}K_{80}$; M+F2 = leaf fertilization with Fertcomplex+ $N_{80}P_{80}K_{80}$; M+F3 = leaf fertilization with Green Kristalon + $N_{80}P_{80}K_{80}$ şi M+F4 = leaf fertilization with Biostar + $N_{80}P_{80}K_{80}$

The agrochemical calculations on the soil pointed to the following indices: 6,8-7,2 ph, SB = 28,3 me/100 g soil, Ah = 0,4 me/100 g soil, V% = 95%, C organic = 2,01%, Nt = 0,197%, C/N = 12,01, P2O5 = 72 ppm, K2O = 342 ppm, I.N. = 2,83.

Analyzing the production data from table 2, we can easily notice that the genetic production potential of the Belladonna hybrid is the highest, being followed by the Albatros hybrid, then Gypsy and Shy Beauty.

Using leaf fertilizers brings rather large production profits (from 0,600 t/ha to 5700 kg/ha) for each large-pepper hybrid, but without significant variations when compared to the applied leaf fertilizer. This demonstrates that each hybrid reacts well to the fertilizers, the difference in production being given by the genetic potential of the hybrids.

Significant benefits as compared to the unfertilized (the unfertilized variant) are registered by the variants fertilized in combination (mineral and leaf) keeping the same rule of the genetic potential of each hybrid.

Thus, Belladonna registers a maximum increase in production with the mineral fertilized variant ($N_{80}P_{80}K_{80}$), together with the foliar Green Kristalon (16320 kg/ha), the fertilizer with the highest content of NPK (180 g/l). This demonstrates the fact that the crop depends on the plants good provision of P and K.

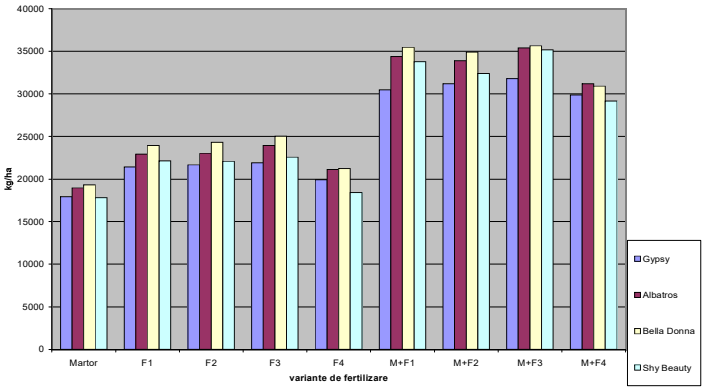

Figure 1 - The variation of the production according to fertilization

The first three leaf fertilizers bring production benefits superior to the Biostar fertilizer, an ecological fertilizer that brings a smaller amount of accessible nutritional elements to the plants. The only strong point of this fertilizer could be the vitamin content, but that hasn't brought crops to the same level as the chemical leaf fertilizers. This shows that mineral substances with small molecules are more easily absorbed at the leaf level, to the detriment of the organic ones.

When applying combined fertilization (mineral+leaf) the production benefits are considerable, varying from 11580 kg/ha to 35640 kg/ha as compared to the unfertilized variant.

CONCLUSIONS

A determining factor in calculating the large-pepper production is the genetic potential of the hybrid. Important production benefits may be obtained through unilateral fertilizing using leaf fertilizers. In this case, the best response comes from using chemical fertilizers rather than 'ecological' ones.

The hybrids employed in this study are highly productive, but the maximum may be obtained only by using fertilizers.

Combined fertilization (root + leaf) has proved to be the optimal variant, bringing considerable production increases.

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THE DETERMINATION OF ALLELOPATHIC EFFECT OF THE COMPOST MADE FROM MUSHROOMS CULTIVATION SUBSTRATUM, ON FIGHTING THE MAIN HERBAGE AND FUNGUS FROM SUNFLOWER FIELDS

DETERMINAREA EFECTULUI ALELOPATIC AL COMPOSTULUI PROVENIT DIN SUBSTRATUL DE CULTIVARE AL CIUPERCILOR, ASUPRA COMBATERII PRINCIPALELOR BURUIENI ŞI AGENȚI FITOPATOGENI DIN CULTURA DE FLOAREA-SOARELUI

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Abstract. *Modern agriculture requires new technologies, more productive, more efficient from the point of view of environment protection. That's why plant's auto protection, using allelopathic substances is one of the most important way to reduce costs, resources and to improve the quality of our environment. Results prove that in some specifical conditions plants have the ability to make this allelopathic substances, and this way, to reduce the attack of pests.*

Rezumat. *Lupta împotriva diferiților dăunători a fost una dintre preocupările principale ale fermierului, deoarece este bine cunoscut faptul că aceştia pot provoca pagube de până la 100%, pagube care se pot întinde pe mai mulți ani. În ultima perioadă se vorbeşte tot mai intens de combaterea integrată a buruienilor, agenților fitopatogeni, dăunătorilor, iar din cadrul acestui sistem se deosebeşte combaterea pe cale biologică.*

Capacitatea plantelor de a se autoproteja este cunoscută din cele mai vechi timpuri, însă numai cercetările recente demonstrează o parte din mecanismele care acționează în această privință.

O serie de cercetători au demonstrat deja capacitatea florii-soarelui de a secreta ergoni. Noi ne propunem, să arătăm că în anumite condiții (fertilizare organică), floarea-soarelui îşi poate spori această capacitate şi poate lupta eficient împotriva factorilor de stres biotic.

The plants ability for self protection it is known from the eldest times, but only recent research are able to explain the mechanisms which are involved here.

Several researchers have been proven the sunflower capacity to secrete ergoni. Our purpose is to prove that in some conditions (organic fertilization), sunflower may increase its function and it can fight efficiently against biotic stress factors.

MATERIALS AND MEANS OF RESEARCH

The experiment has been developed in Agro chemistry's experimental field, of University of Agricultural Sciences and Veterinary Medicine "Ion Ionescu de la Brad" Iaşi, Ezareni farm. We used three organic fertilization variants (0 t/ha – unfertilized, 20 t/ha şi 30 t/ha), at sunflower crop, using as organic fertilizer (compost) the substratum used for cultivate mushroom *Agaricus bisporus* (white mushroom of garbage). After Agrochemical determination on compost, reveled this characteristics: at a humidity of 40% we have 8-9 nitrogen kg/t, 120 kg organic carbon /t compost, 10-11 kg phosphorus/t compost and 10-12 kg potassium/t compost.

We have determined the intensity, frequency and attack point of main plant's pests *Sclerotinia sclerotiorum, Botrytis cinerea, Plasmopara helianthi* and also the attack per cent (% fro square meter) of main harmful herbs: one year monocot.: *Avena fatua,* evergreen monocot.: *Cynodon dactylon* and *Sorghum halepense*, one year dicot.: *Amaranthus retroflexus*, evergreen dicot.: *Cirsium arvense*.

The determinations were made during the firs sunflower vegetation stage, when the plant is highly sensitive to harmful herbs, during the bloom stage and at physiological maturity of sunflower crop, using direct field observations and statistics.

RESULTS AND DISCUSSIONS

Attack level has been calculated for each pest agent, multiplying attack intensity with frequency and divide the result to 100. The dates are included in table no. 1.

Tabele 1

Pest agents attack depending on organic fertilization, at sunflower crop

Pest agent		0 t/ha - Unfertilized	20 t/ha	30 t/ha
Sclerotinia sclerotiorum	I%	9,7	8,3	8,4
	F%	5,5	6,1	5,8
	A.L.	**0,5**	**0,5**	**0,5**
Botrytis cinerea	I%	12.5	13,9	13,7
	F%	15,7	13,7	14,2
	A.L.	**2,0**	**1,9**	**1,9**
Plasmopara helianthi	I%	33,2	31,1	30,9
	F%	37.5	36,3	35.9
	A.L.	**12,5**	**11,3**	**11,1**

It can easily be observed the fact that the attack level on every variants is low. Obvious odds are registered only for Plasmopara attack level (odds from unfertilized variant for 10%), this attack falls down.

To determine the harmful herb's attack level were count each plant species from a square meter, in 5 variations, on each variant. By calculating the average, we obtained the next results (table 2).

Tabelul 2

Harmful herb's attack level depending on organic fertilization, at sunflower crop

Harmful herbs		0 t/ha - Unfertilized	20 t/ha	30 t/ha
One year monocot.				
Avena fatua	No.	2	9	7
Evergreen monocot.				
Cynodon dactylon	No.	3	2	3
Sorghum halepense	No.	6	3	5
One year dicot.				
Amaranthus retroflexus	No.	6	0	2
Evergreen dicot.				
Cirsium arvense	No.	15	3	5
Total	No.	**32**	**17**	**22**

Thus, towards the organic unfertilized variant, harmful herb's attack on 20 t compost/ha fertilization variant has been reduced with 53% and on 30 t compost/ha variant with 31%.

Harmful herb's distribution is changing depending on compost spreading. Thus, at unfertilized variant, the domination is for one year and evergreen dicot., in 60% proportion and monocot. herbs, only 34%. From this ones, *Cirsium arvense* have the highest proportion 47%, flowed by *Sorghum halepense* 19%, *Amaranthus retroflexus* 19%, etc.

To 20 t compost/ha fertilization variant, the proportions are changing and so, one year monocot. Are winning 53%, evergreen ones 29% and evergreen dicot. 18%. It is obvious that the attack rate of *Cirsium* and *Sorghum* is falling, especially at 20 t compost/ha fertilization variant.

All this dates prove the fact that it is possible the existence of some allelophatic substance, which can be obtained by the sunflower plant's roots, by soil useful micro flora, helped by the compost used as organical fertilizer, or by reason of previous plant cultivated, or by reason of all this facts.

CONCLUSIONS

It is well known the fact that sunflower has the capacity to generate ergoni, coline category substances, which plays an important role in plants self protection.

We can see that the attack of plant pests and harmful herbs is falling, one of the explication is probably the using of compost.

The *Plasmopara Helianthi* attack is reduced with 10% towards unfertilized variant.

The harmful herbs number is falling while we use the organic material.

The most important odds is at 20 compost/ha variant.

Using the compost induce the variability ratio of monocot. and dicot. harmful herbs.

This dates indicate the probable presence of allelopathic substance.

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ASPECTS REGARDING THE INFLUENCE OF LEAF AND MINERAL FERTILIZATION ON GRAPES QUALITY CHARACTERISTICS AS PART OF COPOU-IAŞI VINEYARD

ASPECTE PRIVIND INFLUENȚA FERTILIZĂRII FOLIARE ŞI MINERALE ASUPRA UNOR ÎNSUŞIRI DE CALITATE A STRUGURILOR DIN CADRUL PODGORIEI COPOU-IAŞI

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Abstract. *In this paper it is followed the application eficiency of foliar fertilization on two agrofunds: $N_0P_0K_0$ and $N_{50}P_{25}K_{90}$ (ecological doses) with a view to obtain some qualitative productions and that has a role to protect the environment. In this purpose they're were used seven leaf fertilizers, from which five chemical: F_{221}, Folvifer, Fertcomplex C, Kristalon green, Poly-Feed and two biological: Maxiroot şi Biostar, applied on these two agrofunds, that contributed to improve the quality characteristics of the grape productions. From the researches made it has been estabilished that the variants leaf fertlized with: Maxiroot and Folvifer had acumulated the bigest quantities of sugars both in the case of the unfertilized agrofund but also in the case of the one fertilized in ecological doses. Also the leaf fertilizers: Biostar and Poly-Feed have favourised the acumulation of some big quantities of sugars and an equilibrated acidity especially when it had as a support the mineral agrofund.*

Rezumat. *În vederea satisfacerii cerințelor de hrană a viței-de-vie, plantă mare consumatoare de elemente nutritive, pe lângă fertilizarea minerală, un rol important îl deține şi fertilizarea foliară cu implicații pozitive asupra producției de struguri.*

Lucrarea de față are în vedere efectul aplicării a şapte sortimente de îngrăşăminte foliare, pe două agrofonduri: $N_0P_0K_0$ şi $N_{50}P_{25}K_{90}$ (doze ecologice), cu rol în sporirea producției cantitative.

În urma cercetărilor efectuate se constată sporuri de producție, atât la variantele fertilizate foliar pe un agrofond nefertilizat mineral şi mai ales la variantele fertilizate combinat (foliar si mineral), față de varianta martor. Dintre acestea variantele care au fost fertilizate cu sortimentele foliare:F_{221} şi Folvifer de pe agrofondul fertilizat mineral au dus la obținerea celor mai însemnate sporuri de producție.

By mineral and foliar fertilization of the grape vine it is followed to obtain some productions that are superiorly quantitative and qualitative. In this purpose by applying leaf fertilizers that towards the macroelements with NPK base, they also contain microelements, it is favourised a quick absorbtion of mineral elements that stimulates the growth and bear of the grape vine with an impact over the qualitative production and avoiding the environment poluation.

MATHERIAL AND METHOD

The studies were made at the farm Copou of S.C. VINIFRUCT S.A COPOU-IAŞI and followed the foliar fertilizers application influence on two agrofunds $N_0P_0K_0$ and $N_{50}P_{25}K_{90}$ over some quality characteristics (the content of sugars and total total acidity) at the grape vine.

The experience organised in year 2006, is bifactorial, settled after the method of the randomized blocks.

Factor A – assortiment of extraradiculary fertilizer

a_1 – Folisof F_{221}
a_2 – Folvifer 3021
a_3 – Fertcomplex C
a_4 – Kristalon green 18:18:18 Plus
a_5 – Poly-Feed 19:19:19
a_6 – Maxiroot
a_7 – Biostar

Factor B – the doses of mineral fertilizer

b_0 – N0P0K0 (unfertilized)
b_1 – N50P25K90

As mineral fertilizer were used: complex fertilizer C 15:15:15, ammonium nitrate 34,5% and potassium sulphat 50%.

The mineral fertilization with complex fertilizer C 15:15:15 and the potassium soulphat has been realised in autumm and the ammonium nitrate has been administrated in spring, before the begining of vegetation, by spread and incorporation in the soil.

The biological matherial was represented by the race of grape Petit Sauvignon grafted on the portgraft Kober 5 BB. The index ring of the leaf has an pale green colour, twisted to the superior face. The grapes are middle, cylindro-conical, single or biwinged allthough in beans. The bean is little, spherical, with fin peel, juicy pulp with specific flavour. It presents middle period of vegetation (165-175 days), middle vigour of growth and good fertility, 60-70% for the fertil offshoots. The growth is realised at 2-3 weeks towards the race Chasselas doré (fourth epoque). The grape productions that are obtained are of 6-8 t/ha. It accumulates sugars in quantities of 195-200 g/l and the total acidity of the moust is of 4.5-5.5 g/l H2SO4. The main characteristics of foliar fertilizers used are presented in tables 1 and 2.

Table 1

The composition and the characteristics of foliar fertilizers (chemicals)

Foliar fertilizer	F221	Folvifer	Fertcomplex C	Kristalon green	Poly-Feed
CSA %	16	17	16	16	16
pH	6,5-7	5,6-6,6	6,5-6,6	6,6	5-6
N g/l	70	90	80	180	190
P g/l	70	-	80	180	190
K g/l	48	40	75	180	190
B g/l	0,2	0,2	0,3	0,025	0,2
S g/l	9	15	0,4	-	-
Mn g/l	0,2	0,08	0,4	0,04	0,04
Mg g/l	0,5	1,5	0,04	-	-
Zn g/l	0,1	0,08	0,04	0,025	0,02
Cu g/l	0,05	0,08	0,1	0,01	0,01
Fe g/l	0,2	30	0,3	0,07	0,07
Mo g/l	-	-	0,03	0,004	0,04

The concentration recommended for leaf fertilizers are of 0,2-0,3 % for the organic ones (Maxiroot and Biostar) and content between 0,5-1 % for the chemical ones but the doses are of 2-3 l/ha for the organic leaf fertilizers and content between 7-8 l/ha fot the chemical ones.

Table 2

The composition and the characteristics of foliar fertilizers (ecological)

Foliar fertilizer	Maxiroot	Biostar
pH	5,3	5,8
N_{total} %	2,46	2
$N_{organic}$ %	2,46	2
Aminoac. free %	3	-
Oranic matter %	37	12
K_2O	4,9	-
Fe	0,42	-
Zn	0,34	-
Polisugars., protins, polipeptides, etc	22,3	13,5
vitamines	-	B1, B6, PP

The leaf fertilization was made in three rounds: the first fertilization -before blooming, the second after blooming and the third fertilization at ten days after the second one (7 june 2006, 28 june 2006, respectively 8 july 2006).

In the time of the vegetation period were made several observation and measurments and finally was weiged the grape production and was determined in laboratory conditions the content of sugars and the total acidity of the must for each experimental variant.

In the view to establish the content of sugars from the must was read on the refractometter the procent of dry substance corected at 20º C. The method is simple and consisted of squeezing several beans at each variant and obtaining some average test. Depending on the procent of dry substance readed in the refractometter with the help of the correspondence tables was established the content of sugars from the must (g/l) and the probably alcoholic power of the must (%vol).

The total acidity was determined by titrading with hydroxid sodium and was expressed in g/l H_2SO_4.

RESULTS AND DISCUSSIONS

As a result to the process of the main dates concerning the content of sugar and total acidity of the must it can be noticed the influence of leaf and combined fertilization over these quality characteristics of grapes. The values were obtained by eliminating the repetitions, making the average on each variant (table 3).

The content of grapes in sugar has values content between 170-235 g/l. The variants fertilized with foliar fertilizers: Maxiroot and Folvifer acumulated the bigest quantities of sugars both in the case of unfertilized agrofund and in the case

of the one who was fertilized with ecological doses and certain quantities of 220-235 g/l for Folvifer and 226-233 g/l for Maxiroot. Also the leaf fertilizers: Biostar, Poly-Feed and Folisof F_{221} had favourized the acumulation of some big quantities of sugars when they had the mineral agrofund as a support (fig.1).

Table 3

The content of sugar and total acidity of the moust at the race Sauvignon

Variant	Content of sugar from the moust (g/l)	Probably alcoholical power of the moust (%vol.)	Total acidity of the moust g/l H_2SO_4
Mt	170	10	4.39
F1	173	10.2	4.59
F2	220	12.9	4.88
F3	185	10.9	4.49
F4	172	10.1	4.54
F5	206	12.1	5.42
F6	226	13.3	4.29
F7	198	11.6	4.59
F1+ NPK	209	12.3	5.27
F2+NPK	235	13.8	5.37
F3+NPK	192	11.2	4.34
F4+NPK	196	10.2	4.44
F5+NPK	219	12.9	4.64
F6+NPK	233	13.7	5.12
F7+NPK	231	13.6	5.42

The diferrences reguarding the quantities of sugar acumulated of the variants that were leaf and combined fertilized towards the control variant are content between 2-63 g/l (table 4).

Tabelul 4

The differences of sugar acumulated of the fertilized variants

Variant	Sugar quatity acumulated towards the control variant (g/l)	Variant	Sugar quatity acumulated towards the control variant (g/l)
Mt	0	Mt	0
Folisof F_{221}	3	Folisof F_{221}+NPK	39
Folvifer	50	Folvifer+NPK	65
Fertcomplex C	15	Fertcomplex C+NPK	22
Kristalon green	2	Kristalon verde+NPK	26
Poly-Feed	36	Poly-Feed+NPK	49
Maxiroot	56	Maxiroot+NPK	63
Biostar	28	Biostar+NPK	61

The most little quantities of sugar in the grapes were acumulated at the variants that were leaf fertilized, with the assortiments Folisof F_{221} and Kristalon green (173 g/l şi 172 g/l) on the agrofund mineral unfertilized, values that were inferior to the potential of this race (195-220 g/l).

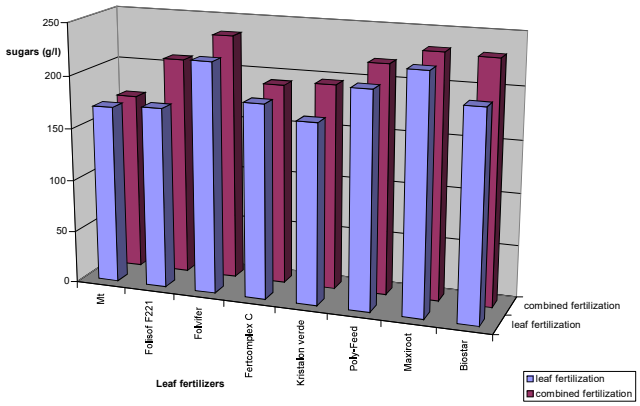

Fig. 1 - The influence of leaf and mineral fertilization over the sugar content of the grapes at the race Sauvignon

The alcoholical power probably acquired established with the help of the interpretation tables on the base of the sugars content on the grapes has values included between 10-13.8 %vol. alcohol. The alcoholical power rise at once with the content of the sugar from the grapes.

The total acidity of the must expressed in g/l H2SO4 is equilibrated at most of the variants having values content between 4,5-5,42 g/l H_2SO_4. A low acidity was registered in the case fertilizer Maxiroot on the agrofund unfertilized mineral (figure 2).

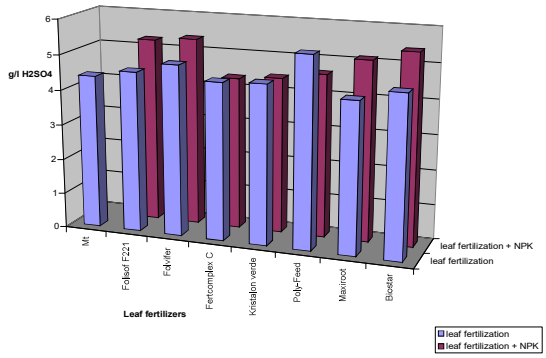

Fig. 2. – The influence of leaf and mineral fertilization over the total acidity of the grapes at the race Sauvignon

CONCLUSIONS

1. The application of leaf fertilizers on the two agrofunds ($N_0P_0K_0$ şi $N_{50}P_{25}K_{90}$) had a positive action over the quality characteristics of the grapes (the content of sugar and total acidity) and a favourable effect over the maintaining of an unpoluated environment.

2. The sugar quantities acumulated were higher at the variants fertilized with leaf fertilizers: Maxiroot (226-233 g/l) and Folvifer (220-235 g/l), both in the case of unfertilized agrofund but also in the case of fertilized agrofund in ecological doses, and the variants fertilized with leaf fertilizers: Biostar, Poly-Feed and Folisof F_{221} but only when the agrofund was fertilized.

3. The differences concerning the sugar quantities acumulated by the variants leaf and combined fertilized towards the control variants are content between 2-63 g/l.

4. The leaf and combined fertilization of the race Sauvignon had a positive influence over the total acidity of the must, remaining equilibrated with values content between 4,5-5,42 g/l H_2SO_4.

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INFLUENCE OF LEAF AND MINERAL FERTILIZATION ON GRAPE VINE PRODUCTION IN COPOU IAŞI VINEYARD SPECIFICS CONDITIONS

INFLUENȚA FERTILIZĂRII FOLIARE ŞI MINERALE ASUPRA PRODUCȚIEI VIȚEI-DE-VIE ÎN CONDIȚIILE SPECIFICE PODGORIEI COPOU – IAŞI

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Abstract. *With a view to satisfy the nourishment demands of the grapevine, plant known as a big consumer of nutritive element, busides the mineral fertilization, an important role owns the leaf fertilization with positive implications over the grape production. The present paper has in the view the effect of seven leaf fertilizer application, on two agrofunds:* $N_0P_0K_0$ *and* $N_{50}P_{25}K_{90}$ *(ecological doses),with a role in yield's quantitative increase. As a result of the investigations made is ascertain increases of the production, both variants leaf fertilized on an mineral unfertilized agrofund and especially at the variants combined fertilizated (leaf and mineral), towards the control variant. From all these, the variants that have been fertilized with leaf assortiments:* F_{221} *and Folvifer from the agrofund mineral fertilized have led to the obtaining of the most significant production increases.*

Rezumat. *Prin această lucrare se urmăreşte eficiența aplicării îngrăşămintelor foliare pe două agrofonduri:* $N_0P_0K_0$ *şi* $N_{50}P_{25}K_{90}$ *(doze ecologice) în vederea obținerii unor producții calitative şi cu rol în protejarea mediului ambiant.*

În acest scop s-au folosit şapte îngrăşăminte foliare, din care cinci chimice: F_{221}*, Folvifer, Fertcomplex C, Kristalon verde, Poly-Feed şi două biologice: Maxiroot şi Biostar, aplicate pe cele două agrofonduri, care au contribuit la îmbunătățirea însuşirilor de calitate a producției de struguri.*

Din cercetările efectuate s-a stabilit că variantele fertilizate foliar cu fertilizatorii: Maxiroot şi Folvifer au acumulat cele mai mari cantități de zaharuri atât în cazul agrofondului nefertilizat cât şi în cazul celui fertilizat în doze ecologice. De asemenea îngrăşămintele foliare: Biostar şi Folvifer au favorizat acumularea unor cantități mari de zaharuri şi o aciditate echilibrată mai ales atunci când au avut ca suport şi agrofondul mineral.

For the obtaining of some constant quantitative and qualitative productions of grapes, year by year, it is necessary the fertilization of the grape vine. By the mineral fertilization, essential and indispensable, a determinative role for obtaining increases of production is own by the leaf fertilization that thanks to the surplus of fertlizating elements, especially of the microelements that creates optimal conditions for growth and development and struggle against the stress factors.

MATHERIAL AND METHOD

This experience has achieved in the viticole plantation as part of the Copou farm S.C. VINIFRUCT S.A. COPOU-IAŞI using seven assortiments of leaf fertilizers (five chemicals and two organics) that have been applied on two agrofunds: $N_0P_0K_0$ and $N_{50}P_{25}K_{90}$, following the application influence of those on the quantitative production of grapes.

The experience organized in year 2006, is bifactorial, settled after the randomized blocks method.

Factor A – the assortiment of extraradiculary fertilizer

a_1 – Folisof F_{221}
a_2 – Folvifer 3021
a_3 – Fertcomplex C
a_4 – Kristalon green 18:18:18 Plus
a_5 – Poly-Feed 19:19:19
a_6 – Maxiroot
a_7 – Biostar

Factorul B – the dose of mineral fertilizer

b_0 – $N_0P_0K_0$ (unfertilized)
b_1 – $N_{50}P_{25}K_{90}$

As mineral fertilizer were used: the complex fertilizer C 15:15:15, ammonium nitrate 34,5 % and potassium soulphat 50 %.

The concentration recommended for leaf fertilizers are of 0,2-0,3 % for the organic ones (Maxiroot and Biostar) and contained between 0,5-1 % for the chemical ones and the doses are of 2-3 l/ha for organic leaf fertilizer and contained between 7-8 l/ha for the chemical ones.

The biological material used was represented by the race Petit Sauvignon grafted on the potgraft Kober 5BB. The leaf's limb was pale green coloured, twisted to the superior face. The grapes are middle, cylinder-conical, single or bewigged, although in beans. The bean is little, spherical, with thin peel, juicy pulp with specific flavour. It presents middle period of vegetation (165-167 days), middle vigour growth and good fertility, 60-70 % fertile offshoots. The growth is achieved at 2-3 weeks towards the race Chasselas doré (fourth epoch). The productions of grapes that are obtained are 6-8 t/ha. It accumulates sugars in quantities of 195-200 g/l and the total acidity of the must is by 4,5-5,5 g/l H_2SO_4.

The mineral fertilization with complex fertilizer C 15:15:15 and potassium soulphat has been done in autumn and the ammonium nitrate has been administrated in spring, before the beginning of vegetation, by spread and incorporation in the soil.

The leaf fertilizer has been done in three rounds: the first fertilization – before blooming, the second after blooming and the third fertilization at ten days after the second one (7 June 2006, 28 June 2006, respectively 8 July 2006).

In the time of the vegetation period have been made diverse observations and measurements and at the end was weiged the production of grapes for each experimental variant.

RESULTS AND DISCUSSIONS

The manufacture of primary data obtained as a result of weiging the productions from each experimental variant, consisted in eliminating the repetitions, making the average on the variant and the report of data at the surface unit (table 1).

The productions of the grapes in the case of all experimental variants are superior to the control variant (5,9 t/ha), these ones being more arised at the variants mineral and leaf fertilized (contained between 7-8,25 t grapes/ha) comparative with those only leaf fertilized (6,14-6,86 t/ha) (figure 1).

Analising the data from the table it is ascertain that the production increases are more significant in the case of the variants combined fertilized (radiculary and leaf) and in this case are contained between 0,99-2,35 t/ha. The most rised production increases have been obtained at the variants that were fertilized with leaf fertilizer Folisof F221 and Folvifer on the agrofund mineral fertilized in ecological doses, namely 2,35 t/ha and respectively 2,0 t/ha.

Production increases have been also obtained in the case of only leaf fertilizated variants, these ones being between 240-960 kg/ha towards the control variant. In the case of the agrofund unfertilized mineraly, the most significant increases of production were obtained at the variants that were foliar fertilized with: Folisof F221 and Folvifer (960 kg/ha and respectively 710 kg/ha).

From the significant difference of the efficiency of production obtained at the variants combined fertilized (mineral and leaf) towards the variants fertilized only foliar, results the importance of applications of the mineral fertilizer, unable to be replaced with the foliar fertilizer, in the view to obtain higher quantitative productions.

Table 1

The production and the efficiency of production obtained at the race Sauvignon

Variant	Production t/ha	Efficiency of production kg/ha	Efficiency of production %
Mt	5.9	0	100
F1	6.86	960	116.3
F2	6.61	710	112
F3	6.43	530	108.9
F4	6.48	580	109.8
F5	6.21	310	105.2
F6	6.14	240	104
F7	6.22	320	105.4
F1+ NPK	8.25	2350	139.8
F2+NPK	7.91	2001	134
F3+NPK	7.43	1530	125.9
F4+NPK	7.32	1420	124
F5+NPK	7.25	1350	122.8
F6+NPK	7	1100	118.6
F7+NPK	6.89	990	116.7

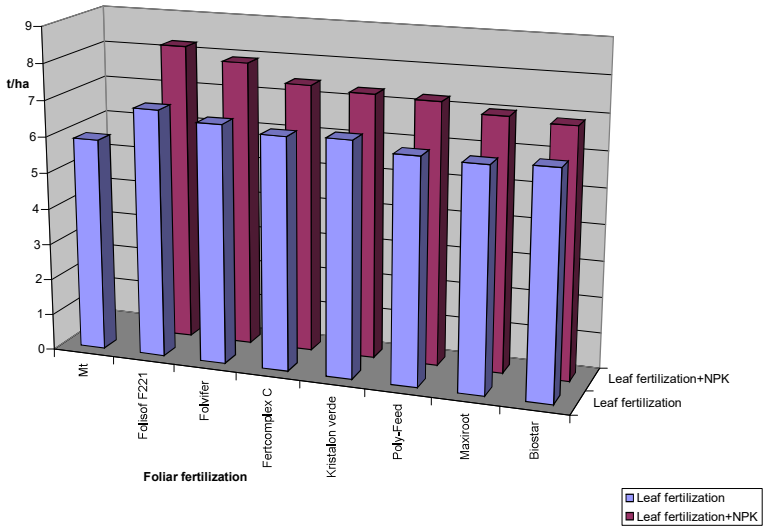

Fig. 1 – Influence of leaf and mineral fertilization on production of grapevine at the race Sauvignon

CONCLUSIONS

1. By foliar and mineral fertilization of the grapevine it can be observed a quantitative increase of the grapevine production.

2. The increases of production were more rised in the case of the variants fertilized combined (mineral and leaf) these being between 0.99-2.35 t grapes/ha comparative with the variants that were fertilized only foliar (0,24-0,96 t/ha).

3. The biggest increases of production were obtained at the variant that were fertilized foliar with Folisof F_{221} and Folvifer on the agrofund mineral fertilized in ecological doses, respectively of 2,35 t/ha and 2 t/ha.

4. From the differences between the increases of production obtained at the variants combined fertilized towards the variants fertilized only foliar is noticing the importance of mineral fertilization, in the view to obtained some rised quantitative productions , that can't be replaced with the foliar fertilization.

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THE MONITORING OF NITROGEN COMPOUNDS CONTENT IN THE HORTICULTURAL PRODUCTS FROM THE TIMIS COUNTY

MONITORIZAREA CONȚINUTULUI DE COMPUȘI CU AZOT ÎN PRODUSELE HORTICOLE PROVENITE DIN JUDEȚUL TIMIȘ

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Abstract. *The present study followed the monitoring of nitrate, nitrite and ammonium content in horticultural products (salad, spinach and cabbage) from rural localities near Timisoara, establishing correlations between the content of nitrogen compounds in analyzed species and genetic potential of plant, vegetation stage and agro-tehnique conditions. The experimental results show a nitric content which is situated in allowed limits by the intern and international standards, the growing accumulation tendency of nitrate in analyzed species, in order: cabbage, spinach, salad, as well as the decrease of nitrate content once with plant maturing and the finalized proteinogenesis process.*

Rezumat. *Studiul de față a urmărit monitorizarea contaminării apei freatice de suprafață şi adâncime din localitati rurale invecinate municipiului Timisoara, stabilindu-se corelații între nivelul conținutului de compuşi cu azot, cloruri, sulfați si fosfati, în apa freatică şi condițiile geomorfologice, pedologice şi climatice ale zonei analizate, precum şi activitățile agro-zootehnice practicate în arealul analizat. Au fost analizate 10 puncte de prelevare, rezultatele experimentale indicand o crestere a continutului de compusi cu azot, fosfati, cloruri si sulfati in punctele de prelevare situate in arealul deponeului de reziduuri menajere.*

Nitrate and nitrite are natural soil compounds, are proceed from organic, nitrogen substances mineralization. Nitrogen mineralization depends of the microorganisms that are in soil. A part of the nitrates and nitrites, is absorbed by the plants root and is a main material for protein synthesis and other compounds with nitrogen, and on the another way is trained by the surface waters on the one that travels the earth, until to the rivers, lakes or under waters. Natural, between nitrates and nitrites from soil, water and plants, it established a balance that can be broken by the intensive use in agriculture or horticulture of the natural organic or synthetic fertilisers. Their degradation products riches the soil and it can be accumulated in crops level for the consumers.

High concentration of nitrate, nitrite, and ammonium in vegetables have a series of negative effects on the human and animal body, i.e.: irritating, congestive effect on the digestive mucous, irritant action on the kidneys, noxios action on endocrine glands, hepatotoxic and neurotoxin action. The most important consequence of the high supply of nitrate is the formation or cancer-inducing substances, i.e. formation of nitrosoamine, which are strong cancer-inducers [1].

MATERIAL AND METHOD

In 2006 have been taken from the agro-feed markets in Timisoara, vegetable species salad, spinach and cabbage, with the purpose to determinate the content of nitrogen compounds (nitrate, nitrite). The nitrate, nitrite and ammonium content in salad and spinach, have been persuade for spring and autumn species, and for cabbage, summer species.

The nitrate, nitrite and ammonium content in salad, spinach and cabbage was done with the help of rapid tests AQUA MERCK, with the Spectrophotometer SQ 118 at a wavelength of 515, 525 and 690 nm for nitrate, nitrites and ammonium. Minimum detection limits according to work method are: 1 mg/l for nitrates, 0,02 mg/l for nitrites and 0,1 mg.

Maximum limit allowed for nitrates in analyzed species, in accordance with the *Official Monitor,* February 28, 2002, regarding contaminants in food are: for spinach harvested in period 1.11-31.03 is 3000 ppm, and in period 1.04.-31.10. is 2500 ppm, for green salad harvested in period 1.10-31.03. is 4500 ppm and in period 1.04.-30.09. is 3500 ppm, for cabbage the limit is 900 ppm [5].

RESULTS AND DISCUSSIONS

The experimental results are shown in tables 1-5.

The transformation that the nitrate it suffers in plants, in the first phase, leads in to two successive reduction, under the influence of the nitrite-reduction and nitrite-reduction micro-systems. This enzymes contain oligoelements (nitrate-reduction contain molibden and nitrite-reduction contain iron and cooper).

The nitrate reduction is influence by the light intensity and by the presence of the molibden, which gives the needed electrons for the reduction reaction. How the molibden quantity is lower so the nitrate content in plant is higher.

Determination of nitrogen compounds (nitrate and nitrite) have been achieved for vegetable species salad, spinach and cabbage according to genetic potential of these, which predispose the species to excessive nitric accumulation.

The difference in nitrate and nitrite accumulation appears because the existing in these plants of low quantities of nitrate-reduction enzymes, this happened in vegetable species from *Chenopodiaceae* family (spinach, beet, radish, etc.) and *Umbelliaferae* (carrot, parsley, etc.) and oligoelements vacuity which participate to reduction enzymes activity can lead to nitrate accumulation in plant because of the inhibition of reduction reaction [3].

Table 1

NO_3(ppm), content in salad from localities near Timisoara, 2006

Period	Fratelia	Săcălaz	Diniaş	Sânandrei	Utvin	Cenad	Dudeşti	Jimbolia	Gelu
Spring 2006	142	167	170	192	189	129	175	127	140
Autumn 2006	123	112	110	133	157	112	139	110	132

Table 2

NO_2 (ppm) content, in salad from localities near Timisoara, 2006

Period	Fratelia	Săcălaz	Diniaş	Sânandrei	Utvin	Cenad	Dudeşti	Jimbolia	Gelu
Spring 2006	0,34	0,65	0,43	0,40	0,28	0,22	0,51	0,53	0,41
Autumn 2006	0,21	0.42	0,39	0,26	0,18	0,20	0,32	0,25	0,16

Table 3

NO_3 (ppm) content, in spinach from localities near Timisoara,

Period	Topolovăț	Orțisoara	Şag	Sânandrei	Utvin	Cenad	Dudeşti	Jimbolia	Gelu
Spring 2006	187	168	157	196	162	175	159	156	177
Autumn 2006	153	142	119	153	145	162	112	137	149

Table 4

NO_2 (ppm) content, in spinach from localities near Timisoara, 2006

Period	Topolovăț	Orțisoara	Şag	Sânandrei	Utvin	Cenad	Dudeşti	Jimbolia	Gelu
Spring 2006	0,71	0,48	0,49	0,69	0,74	0,40	0,46	0,35	0,47
Autumn 2006	0,42	0,23	0,22	0,41	0,50	0,16	0,22	0,23	0,19

Table 5

NO_3^- (ppm) si NO_2^-(ppm) content, in cabbage from localities near Timisoara, 2006

Compounds	Localities from which cabbage was taken.							
	Utvin	Jebel	Cenad	Dudeştii Noi	Topolovăț	Orțişoara	Şag	Gelu
Nitrite (ppm)	0,61	0,03	0,14	0,09	0,04	0,10	0,30	0,52
Nitrate (ppm)	192	152	179	240	173	123	185	196

The values registered, regarding nitrate content in salad species, are low, and are between 127 ppm in Jimbolia and 192 ppm, in Sanadrei, for spring samples and between 110 ppm in Jimbolia and 157 ppm in Utvin for autumn samples (table 1). For nitrite have been establish following values in 2006: 0,22 ppm in Cenad and 0,65 ppm in Sacalaz for spring samples, and for autumn samples the values have been between 0,16 ppm Gelu and Dinias 0,39 ppm (table 2).

The nitrate content in spinach was also low, beeing between 156 ppm in Jimbolia and 196 ppm in Sanandrei, for the spring sample and between 112 ppm in Dudesti and 162 ppm in Cenad (table 3). The nitrite values in spinach were between 0,35 ppm in Jimbolia and 0,71ppm in Topolovat for spring samples, and 0,16 ppm Cenad and 0,50 ppm Utvin, for autumn samples (table 4).

Regarding nitrate content in cabbage from the markets (table 5), was not registered values above maximum limit for this culture (900 ppm). In 2006 nitrate content was higher in Dudesti Noi (240 ppm), and lower in Orțișoara (123 ppm).

The nitrate content in plant at the one point is the result of the account between the absorbtion quantity and the quantity used in proteinogenesis procces. Any factor that intervenes in methabolic chain, which assure the nitric nitrogen transformation in aminat nitrogen and proteic nitrogen, can influence the free nitrate quantity in plant [1].

An important role in the nitrate content accumulation has the nitrogen dose of the apply fertilisers. The large interval of the nitrate content that was found in some vegetables (salad, spinach) it depends of the nitrogen nutrition and climate conditions.

The over-fertilising, with doses that are higher than nitrogen maximum level allowed for plant in the period of the maximum consumance, goes to nitrate content increased in plant. The low values, under maximum limit allowed, in 2006, in vegetable species analyzed lead to the conclusion that in analysed, haven't been made excessive administrations with nitrogen fertilisers [4].

Climate conditions (temperature, rainfalls, light intensity) can determine the level of nitrate content in plants because of the conditions in which the reduction take place. The light intensity, has an important role, because interferes like the source that brings energy in the reduce process in plant (nitrate-nitrite-amonium-aminoacid).

The nitrate content values in vegetable species that were establish early spring are higher than the cultures establish summer and harvested autumn. [2]. This happens because in the year months (may-september) , in which the day light duration, respectively the light intensity is maximum, we can obtain vegetables with a lower nitrate content, because the reduction process is favourised, and in winter months the nitrate content grows in plants[2].

The nitrite content in vegetable species, is lower than nitrate content. This is the result of the transformation process of the nitrates in plants, the nitrites stage is provisional: on the extend that the nitrites are formed under the influence of

nitrate-reduction enzymes, they are reduce further with the same speed by the nitrite-reduction enzymes in nitrogen oxids [4].

The nitrites are more toxic than the nitrates. They can be found in little amounts in food, and their exogenous contribution is reduced. Their concentration can grow only that as far as the dangerous limit grows, through micro-organisms reduction act, about nitrates with the help of nitrate-reduction enzymes. The nitrate reduction can be in progress already in the oral cavity, in bread-baskets zone and bowels and likewise in the pathes urination [1].

The nitrites found in cabbage from the markets had low values. The most higher have been registered in Gelu (0,52 ppm), and the most lower in Topolovăț (0,04 ppm), in 2006 (table 5).

CONCLUSIONS AND RECOMANDATIONS

The experimental results lead to following conclusions:

♦ The nitrate and nitrite content, in samples taken from the markets, doesn't register values above maximum limit allowed, for either of the analysed species.

♦The absence of the nitrate and nitrite contamination of vegetable species is because of the right administration of nitrogen fertilisers, and also the actual trend of genetic engineering orientation to new competitive vegetable types enrich with enzymatic equipment on the base of molibden, which favorise the nitrate reduction in plant.

♦The nitric compounds accumulation in plants is realised in different ways depending by the vegetation period and harvesting time, climatic conditions and most by the light intensity, lead to nitrate reduction in plants and the nitrate content diminish in harvested products.

♦With the purpose to assurance the vegetable species with low nitric content and the obtaining of vegetable products according with European Union requirement, in concern of food safety, it impose the implementation of some measures of reduction and forestall of contamination, thus:

♦ Monitoring sequel of vegetable products quality distribute on agro-food markets, with the purpose of diminish nitrogen compounds contamination.

♦ The right administration of nitrogen fertilizers according with the nitrogen need of plant and nitrogen content in soil;

♦ Respecting culture techniques and the pause lane between the fertilizers administration and harvesting moment;

♦ Avoiding culture stages and the harvesting time in low light conditions, it recommends according with the importance of the intensity and light duration in reduction process of nitrates in plants;

♦ Contract achievement between preserves industry and vegetable and fruits producers which to regulate the use of natural and synthetic fertilises on soils.

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RESULTS CONCERNING THE POSSIBILITY OF DETERMINING BY CHEMICAL ANALYSIS THE PENETRATION OF NUTRIENT ELEMENTS FOLIARLY APPLIED IN SOME VEGETABLES SPECIES

REZULTATE PRIVIND POSIBIITATEA DETERMINĂRII PRIN ANALIZĂ CHIMICĂ A PĂTRUNDERII ÎN PLANTE A UNOR ELEMENTE NUTRITIVE APLICATE PE CALE FOLIARĂ LA CÂTEVA SPECII LEGUMICOLE

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Abstract. *In order to elaborate of a new methodology by cuantification of the nutrient elements penetration applied by foliare way, through the leaves teguments and of their translocation in others organs of plants were organised some experiments in the green house of ICPA. As the plants test were used some vegetables (tomatoes and peppers). The data obtained confirm the possibility created by to study and determine the penetration of mobile nutrient elements from foliar nutrient 's solutions in plants the influence of nitrogen chemical sources and of the pH of their diluted solutions on the penetration of mineral nutrients in the organs of some vegetables plants; the increase of the content of nutrient elements in the opposite untreated leaves with CFF is more substantial and easier to be analyticaly emphasised in plants.*

Rezumat. *În ideea elaborării unei metodologii de cuantificare a pătrunderii elementelor nutritive, aplicate pe cale foliară, prin tegumentele frunzelor şi translocării acestora în organele plantelor au fost organizate în casa de vegetaţie a ICPA experienţe, care au avut ca plante test unele specii legumicole.Datele obţinute confirmă posibilitatea creată de studiul şi determinarea pătrunderii elemetelor nutritive mobile din îngrăşămintele complexe foliare în plante: influenţa naturii chimice a surselorde azot şi a pH-ului soluţiilor diluate asupra pătrunderii elementelor nutritive în plantele de legume; creşterea conţinutului de elemente nutritive, în frunzele opuse celor tratate cu îngrăşăminte complexe foliare, este mai substanţială şi mai uşor de evidenţiat pe cale analitcă.*

MATERIAL AND METHODS

-Plants test: the tomatoes and the peppers**.**

-Soil: unfertilized cambic chernozem from Oltenita: humus 3,0 %, pH_{H2O} 6,5; available P and K; 45 ppm P and 250 ppm K (ammonium lactate acetate extraction), clay 30 %.

-Treatments and experimental design:

-Nitrogen source: $CO(NH_2)_2$ (0,377 g / 1000 ml solution); $(NH_4)_2SO_4$ (0,817 g/1000 ml solution); KNO_3 (1,25 g/1000 ml solution); NH_4NO_3 (0,51 g/1000 ml solution)

-pH of the 1,5% diluted solutions: 5, 6, 7 and 8.

The experimental schemes were:

-for the tomatoes crop

1. Control
2. CFF +$CO(NH_2)_2$ (0,377 g / 1000 ml solution)
3. CFF + $(NH_4)_2SO_4$ (0,817 g/1000 ml solution)
4. CFF +KNO_3 (1, 25 g/1000 ml solution)
5. CFF +NH_4NO_3 (0, 51 g/1000 ml solution)

-for the peppers crop

1. Control
2. CFF with the pH of the diluted solution - 5
3. -//- -//- - 6
4. -//- -//- - 7
5. -//- -//- - 8

-CFF application: the 1, 5% CFF diluted solutions were applied 5 times (5 day between 2 treatments) on the same 3 developed leaves of the plants, leaving all the rest untouched.

-Plant sampling and analyses: after all the 5 treatments, it was sampled from each plant 3 leaves untouched with CFF solution (the opposite leaves of the treated ones). It was determined the N, P,K, Ca, Mg, Zn, Cu, Mn, Fe content of these plant organs.

-Statistical processing of the data: analysis of variance (Fischer method, 1958); test of the lowest significant differences, LSD (Tukey test). All data are relative values as compared with the control (treated only with water) considered equal 100 %.

RESULTS AND DISCUSSIONS

The absolute data concerning the content of the fresh and the dry matter content and the content of the nutrients elements in the opposite leaves (untreated leaves) of the tomatoes plants are given in table 1. Generally, the leaves of the treated plants with CFF accumulate more quantity of the fresh and dry matter than the control treated only with water. Also, the absolute values from the table 1 show an increase in the nutrients concentrations in the opposite leaves as compared with the control.

The absolute data reveal that the most efficient nitrogen source was NH_4NO_3, which added in the solution of CFF (0,51 g/1000 ml solution) had a positive influence on nutrients elements concentration in the untreated (the opposite leaves) leaves of the tomatoes plants, the differences against control, generally being statistically significant to a 5% level.

The penetration of the potassium in the untreated leaves of the tomatoes plants was more evident as effect of the influence of different source of nitrogen from the diluted solution of CFF, the differences against control being statistically significant to a 5% level to all the sources of N treatments.

Table 1

The effect of local application on certain leaves of the solution 1,5 % on fresh and dry matter and on nutrients elements concentration in the untreated leaves of tomatoes plants after 5 foliars CFF applications depending on the chemical form of the nitrogen (source)

Experim. variant	Contro	CFF+ urea	CFF + $(NH_4)_2SO_4$	CFF + KNO_3	CFF+ NH_4NO_3	DL 5 %
Fresh matter (g)	48,99	49,47	54,53	58,60	56,97	13,50
Dry matter (g)	9,08	9,03	11,99	9,14	10,30	3,28
N (% s.u.)	2,16	2,31	2,38	2,59	2,95*	0,75
P (s.u. %)	0,15	0,17	0,16	0,20	0,18	0,06
K (s.u. %)	0,65	1,17*	0,91	1,23*	1,34*	0,30
Ca (s.u. %)	5,42	3,18	5,67	5,82	5,24	1,63
Mg (s.u. %)	1,02	0,74	1,04	1,05	1,07	0,33
Zn(ppm s.u.)	33	26	39	36	32	12
Cu (ppm s.u.)	6,21	6,16	8,05	7,83	8,51	2,99
Mn (ppm s.u.)	142	107	151	182	162	56
Fe (ppm s.u.)	287	2,99	346	354	329	115

The nutrients concentrations analytically determinated in the dry matter of the vegetal materiel were multiplied by the value of the ratio between the fresh matter of the treated and the fresh matter of the untreated leaves, the values obtained revealing more clear how much accumulated for each element, as effect of 5 foliars CFF applications depending on the chemical form of the nitrogen source (table 2).

Table 2

The effect of local application on certain leaves of the solution 1,0 % on nutrients elements accumulation in the untreated leaves of tomatoes plants after 5 foliar CFF application depending on the chemical form of the nitrogen (source)

Experim. variant	Control	CFF+ urea	CFF + $(NH_4)_2SO_4$	CFF + KNO_3	CFF+ NH_4NO_3	DL 5 %
N (mg/100)	196	207	287	248	287	143
P (mg/100)	13,60	14,90	18,77	18,97	18,80	11,21
K (mg/100)	59	104	109	116	140*	60
Ca (mg/100)	492	289	680	559	541	309
Mg (mg/100)	92	67	125	101	110	61
Zn (mg/100)	0,30	0,24	0,47	0,34	0,33	0,22
Cu (mg/100)	0,05	0,05	0,10*	0,08	0,08	0,05
Mn (mg/100)	1,29	0,95	1,82	1,75	1,67	0,99
Fe (mg/100)	2,60	2,77	3,92	3,40	3,17	2,28

The relative data show the positive influence on the accumulation of the nutrients elements in the opposite leaves after 5 foliars CFF applications

depending on the chemical form of the nitrogen. The ammonium ion from NH_4NO_3 and $(NH_4)_2\ SO_4$ has been shown the most efficient nitrogen sources,

the relative data values being among the greatest. This demonstrate that the nutrients absorption through the leaf teguments of the tomatoes plants is an active process, controlled metabolically and the nutrients are translocated in the organs of plants. The addition of NH_4NO_3 and $(NH_4)_2\ SO_4$ in the diluted solution of CFF generally determine the highes accumulations of the nutrients in the opposite leaves, especially the potassium element.

As regards the pH influence on the penetration and accumulation of nutrients elements, the data show a change place of the optimum area from slowly acid (ph 6) to slowly alkaline (pH 8), the concentrations and the accumulations of the nutrients in the opposite leaves of the pepper plants, decreasing with the pH decrease (tabele 3 and 4).

Table 3

The effect of local application on certain leaves of the CFF solution 1,5 %, with the different levels of pH, on nutrients elements concentration in the untreated leaves of the pepper plants after 5 foliar CFF application

Experim. variant	Control (apa)	pH 5	pH 6	pH 7	pH 8	LSD 5%
Fresh matter (g)	15,24	11,64	18,84	18,0	17,13	4,3
Dry matter (g)	3,21	2,57	4,10	3,80	3,64	0,98
N (%su)	4,04	3,56	4,99*	5,05*	5,02*	0,48
P (% su)	0,24	0,21	0,27*	0,27*	0,26	0,03
K (% su)	3,58	2,92	4,15*	4,87*	4,84*	0,26
Ca (% su)	3,27	2,81	4,18*	4,28*	3,03	0,50
Mg (% su)	0,77	0,63	0,91*	0,96*	0,73	0,14
Zn ppm su)	36,33	35,00	40,00	42,33	40,00*	7,04
Cu (ppm su)	9,89	9,97	9,52	11,04	13,05*	1.34
Mn (ppm su)	184	122	217	223*	131	37
Fe (ppm su)	209	189	278*	252*	212	37

The highest absorptions and accumulations were obtained in the treatments when the pH of the CFF solutions foliarly applied were between the 6 and 8 levels. The absolute and relative values registered in the 3 and 4 tables show an increase of the nutrients elements at the 6 and 8 pH levels of CFF solutions. These levels of pH seems to favorise the penetration and absorption of the nutrients in the opposite leaves of the pepper plants, the concentrations increasing with the increase of pH solution. The pH 5 of the CFF solution determine a decrease of the absolute and relative values of the nutrients in the opposite leaves of the pepper plants, the values obtained being smaller than the value obtained in the control variant.

Table 4

The effect of local application on certain leaves of the CFF solution 1,5 %, with the different levels of pH, on nutrients elements accumulation in the untreated organs of the pepper plants after 5 foliar CFF application

Experim.variant	Control	pH 5	pH 6	pH 7	pH 8	LSD 5%
N (mg/100)	129	109	164	161	175	47
P (mg/100)	7,51	6,17	8,95	8,58	7,87	1.93
K (mg/100)	114	92	134	156	147	26
Ca (mg/100)	119	84	136	137	91	46
Mg (mg/100)	23,90	18,90	29,03	30,77	22,00	8,98
Zn (mg/100)	0,11	0,11	0,14	0,14	0,12	0,03
Cu (mg/100)	0,03	0,03	0,03	0,03	0,04	0,01
Mn (mg/100)	0,53	0,36	0,66	0,90	0,40	0,21
Fe (mg/100)	0,66	0,58	0,92	0,81	0,60	0,24

The absolute and relative data obtained in this experiment showed that from the total amount of elements contained by plants, a very considerable proportion is represented by the elements penetrated by leaves as a result of the foliars treatments.

In the table 5 were calculated the relative increases realised in the opposite leaves of the pepper plants as effect of local application on some leaves of the CFF diluted solutions, with the differents leveles of pF.

Table 5

Nutrient elements increases (mg) obtained in untreated organs of ardei plants as effect of local application of the CFF dilution solution (1,5%), with the different pH levels

Experim.variant	pH 5	pH 6	pH 7	pH 8
N (mg/100)	-20	35	32	46
P (mg/100)	-1,3	1,44	1,07	0,36
K (mg/100)	-22	20	42	33
Ca (mg/100)	-35	17	18	-28
Mg (mg/100)	-5	5,1	6,9	-1,9
Zn (mg/100)	0	0,03	0,03	0,01
Cu (mg/100)	0	0	0	0,01
Mn (mg/100)	-0,17	0,13	0,17	-0,13
Fe (mg/100)	0,08	0,26	0,15	0

The data show that the acide reaction of the CFF solution had a depressive effect on the absorption and the accumulation of the nutrients in the opposite leaves, the values obtained being smaller than in the control variant. The increase of the pH solution favorise the penetration and accumulation of the nutrients elements. The data emphasize an increase of the elements accumulation with the pH increase toward slowly alkaline. As for N, P and K, the optimum pH

of the CFF solutions is neuter to alkaline level, the accumulation increasing with the neuter pH.

CONCLUSIONS

The absolute and relative data obtained in this experiment showed that from the total amount of elements contained by plants, a very considerable proportion is represented by the elements penetrated by leaves as a result of the foliars treatments.

The addition of NH_4NO_3 and $(NH_4)_2\ SO_4$ in the diluted solution of CFF generally determine the highes accumulations of the nutrients in the opposite leaves, especially the potassium element.

The highest absorptions and accumulations were obtained in the treatments when the pH of the CFF solutions foliarly applied were between the 6 and 8 levels.

The pH 5 of the CFF solution determine a decrease of the absolute and relative values of the nutrients in the opposite leaves of the pepper plants, the values obtained being smaller than the value obtained in the control variant. In practice, the pH have not to be decreased to much, because it can produce necroses on plants.

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THE SEASONAL EVOLUTION OF THE NITRATES IN SOIL AND PLANT, AT *CAPSICUM ANNUUM* L. CONV.GROSSUM, IN THE CONDITIONS OF VEGETATION'S VESSELS EXPERIENCES

EVOLUȚIA SEZONIERĂ A NITRAȚILOR ÎN SOL ŞI PLANTĂ, LA *CAPSICUM ANNUUM CONV.GROSSUM,* ÎN CONDIȚIILE UNOR EXPERIENȚE ÎN VASE DE VEGETAȚIE

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Abstract. *The nitrogen represents one of the most disputed element concerning the presence and the effect, in plants environment and chemical composition. Accumulation in active soil stratum of the radicular system over the normal limits can create the induction of some luxury consumption phenomena and even toxicity at crop plants and level fruits. In this context a serious control of nitrates must be done in both two environments, soil-plant, keeping an equilibrium which can insure the normality and to avoid toxicity and pollution phenomenon.*

Rezumat. *Experiența demarată în cadrul disciplinei de Agrochimie a UŞAMV Iaşi în sistemul semicontrolat al vaselor de vegetație, face parte dintr-un studiu amplu, în care urmărim evoluția unor factori biologici, de producție şi agrochimici asupra culturii de ardei gras.*

Lucrarea de față face referiri asupra evoluției nitraților din sol, dar şi din plantă, atunci când se aplică fertilizarea chimică radiculară, precum şi cea combinată (radiculară şi foliară).

Evoluția nitraților din sol depinde de tipul de sol, sortimentul de îngrăşământ chimic folosit precum şi de condițiile climatice din timpul perioadei de vegetație. Prezența nitraților în plantă este influențată în mod direct de concentrația acestora din sol, însă aceasta beneficiază şi de aportul asigurat de îngrăşămintele foliare.

The experience in the context of Agrochemistry discipline at UŞAMV Iaşi in one semi-controlled system of vegetation' vessels is included in a high research in which we follow the evolution of biological and agrochemical factors of production towards pepper crops.

The present study makes references towards the evolution of the nitrates in soil and in plant when the chemical radicular fertilization is applied as well as the combined one (foliar and radicular).

Evolution of nitrates from soil depends upon the soil type, the used fertilizer and the climatic conditions during the vegetation period. The presence of nitrates in plants is directed influenced by their concentration in soil, but they benefit of contribution assured by the foliar fertilizer.

MATERIAL AND METHOD

The experiment had been realised the vegetation house of agrochemical discipline belonging to the University of Agricultural Science and Veterinary Medicine "Ion Ionescu de la Brad Iaşi. At the basic fertilization it was used the complex 15-15-15, but for the phasial fertilization, foliar fertilizer F_{221}, Fertcomplex, Green Kristalon and Biostar, at pepper crops.

The purpose of this study was to follow the evolution of nitrate content in soil at the beginning and at the end of vegetation and the impact of simple and combinated fertilization toward the nitrate accumulation in vegetative device as the index of a normal assurance statement of this element in citiric consumption fenophase .

The experiment organised in vegetation vessels in 2006 is three-factorial arranged after the randomised blocks method.

A Factor (foliar fertilization, mineral unfertilized):

a1 - F_{221}

a2 - Fertcomplex

a3 – Kristalon verde

a4 - Biostar

B factor (foliar fertilization, mineral unfertilized – complex 15-15-15):

b1 - F221 + $N_{80}P_{80}K_{80}$

b2 - Fertcomplex+ $N_{80}P_{80}K_{80}$

b3 - Kristalon verde + $N_{80}P_{80}K_{80}$

b4 – Biostar + $N_{80}P_{80}K_{80}$

C factor (hibrid)

c1 – Gypsy

c2 – Albatros

c3 – Belladonna

c4 – Shy Beauty

Table 1

The composition and characteristics of used foliar fertilizer

Foliar fertiliz	**CSA %**	**pH**	**N g/l**	**P g/l**	**K g/l**	**B g/l**	**S g/l**	**Mn g/l**	**Mg g/l**	**Zn g/l**	**Cu g/l**	**Fe g/l**	**Mo g/l**
F221	16	6,5-7	70	70	48	0,2	9	0,2	0,5	0,1	0,05	0,2	-
Fert.	16	6.5	80	80	75	0,3	0,4	0,4	0,04	0,04	0,1	0,3	0,03
Kris.	16	6,6	180	180	180	0,025	-	0,04	-	0,025	0,01	0,07	0,004
ecol. fertiliz	**pH**	**Nt %**	**Nor g %**	**witness %**		**Polizahar., polipept, prot.**					**Vitamins**		
Bios	5,8	2	2	12		13,5					B1, B6, PP		

For the organic foliar fertelizer the concentrations of 0,2-0,3 % (Biostar) and 0,5-1 % were used for the chemical ones and the doses are of 2-3 l/ha . For the organic foliar fertilizer and 7-8 l/ha for the chemical ones.

The basic fertilization was made on 23 of may 2006, one week before planting.

Foliar fertilization was made in three periods: first fertilization before, at 4 july 2006; the second in the immediate period at 12 july 2006; and the last during the blossoming, at 18 july 2006 .

During the period of vegetation tests from soil were taken (at the beggening and the end of vegetation) and tests of vegetative device – leafstalk (the beginning of blossoming which were prepared and supposed to analyse. The nitrates dosing method was the spectophotocolorimetrical method.

RESULTS AND DISCUSSIONS

Fertilization influenced soil feritilization statement and the degree of pepper plants supply through determining a favorable nitrates evolution in both two medium

Table 2

The evolution of nitrogen on the depth of 0-20 cm

Variants/ Hibrids	C1		C2		C3		C4	
	* $N\text{-}NO_3$ ppm	** $N\text{-}NO_3$ ppm	* $N\text{-}NO_3$ ppm	** $N\text{-}NO_3$ ppm	* $N\text{-}NO_3$ ppm	** $N\text{-}NO_3$ ppm	* $N\text{-}NO_3$ ppm	** $N\text{-}NO_3$ ppm
Unfert.	4,5	1,5	4,5	1,8	4,5	1,3	4,5	1,6
a1	4,3	1,4	4,2	1,6	3,9	1,3	4,3	1,4
a2	4,2	1,2	4,2	1,4	3,8	1,1	4,1	1,5
a3	4,4	1,3	4,1	1,1	4,0	0,9	4,1	1,3
a4	4,3	1,1	4,2	1,0	3,9	0,8	4,0	1,5
b1	12,0	7,1	11,5	6,2	11,6	5,8	11,4	6,0
b2	11,9	6,8	12,3	7,5	11,9	4,9	12,3	6,9
b3	12,1	6,5	11,9	6,4	10,7	3,5	11,9	5,5
b4	14,1	8,1	12,1	7,1	10,9	4,4	11,2	6,8

* $N\text{-}NO_3$ ppm = the beginning of vegetation ** $N\text{-}NO_3$ ppm = the tehnological maturity

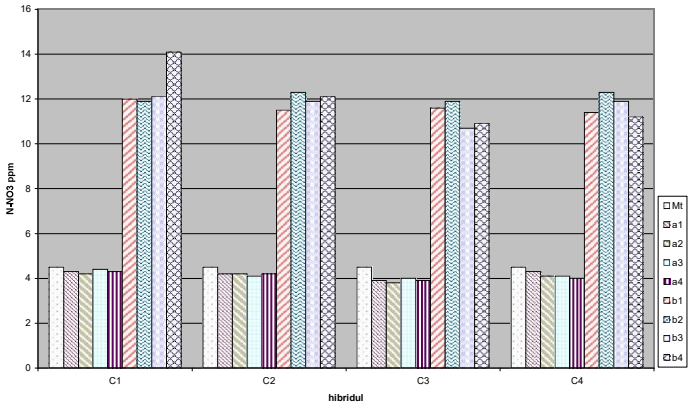

Fig. 1 – Soil nitrate content at the beginning of vegetation

Analisying the evolution of the nitrogen in soil (tab.2) we remark that in all variants of fertilization this situates in medium to large , at the beginning of vegetation period and goes lower step by step at the end of vegetation because of the specific plants consumption on one way and levigation and denitrification phenomena which take place during a vegetation season.

From this point of view, variants C_1b_4, C_2b_2, C_3b_2 and C_4b_2 followed maximal values at the nitrates insurance statement, at the beginning of vegetation period, including in normal insurance class for this determination period and having values between 11,9 and 12,3 ppm. It has been found out for the same variants at the end of vegetation period, – soil nitrate content goes lower with a half , through values under 10 ppm .

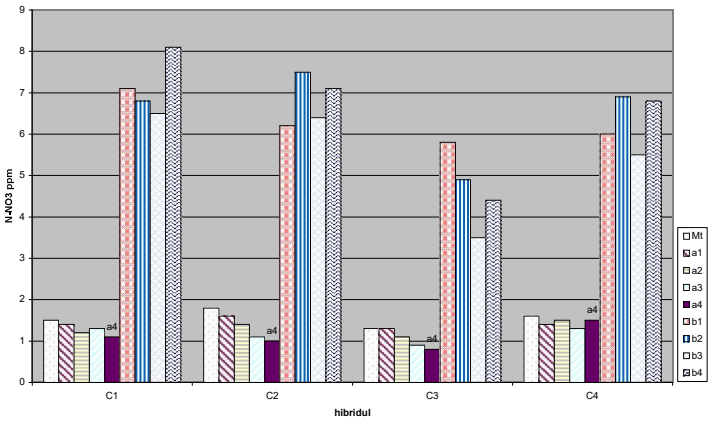

Fig. 2 — Soil nitrate content at the end of vegetation

In foliar fertilized variants, soil nitrate content is low at the beginning of vegetation an goes on lower proportionaly, at the end of vegetation through minimal values, in form of marks (1,1ppm N-NO_3 - var C_1a_4 , C_3a_2 and 0,8 ppm N- NO_3 var C_3a_4 basic and suplimentar fertilization).

The administration of fertilizer as well as a foliar and combinated solutions (basic and suplimentar fertilization) drives to improvement of nitrates plants enssurance statement towards the unfertilized witness.(tab 3).

Table 3

Evolution of nitrogen in pepper leafstalk

Variants/ Hibrids	C1		C2		C3		C4	
	N-NO_3 ppm	%	* N-NO_3 ppm	%	* N-NO_3 ppm	%	* N-NO_3 ppm	%
Unfert.	2500	100	2600	100	2800	100	2650	100
a1	4400	176	4900	188,5	4800	171,4	4700	177,4
a2	4500	180	4700	180,8	4800	171,4	4750	179,3
a3	5050	202	5200	200	5550	198,2	5150	194,3
a4	3700	148	3850	148,1	3900	139,3	3900	147,2
b1	5800	232	6100	234,6	6000	214,3	5950	224,5
b2	5700	228	5900	226,9	6200	221,4	6100	230,2
b3	6200	248	6700	257,7	6700	239,3	6600	249,1
b4	5250	210	5500	211,5	5400	192,9	5350	201,9

The determination of nitrates insurance statement through the analyse of foliar diagnosis, reprezents an analysing test of evolution in soil fertilization, shows the efficiency of the foliar fertilizers appliance, in completing the basic ones.

Nitrates content in leafstalk gets to maximal values in C_2b_3 and C_3b_3 variant of 6700 ppm N-NO_3 and a little lower at C_4b_3 (6600 ppm) and C_1b_3 variants (6200 ppm), which marks a normal nitrates insurance statement of the vegetativ device for the fenophase before blossoming.

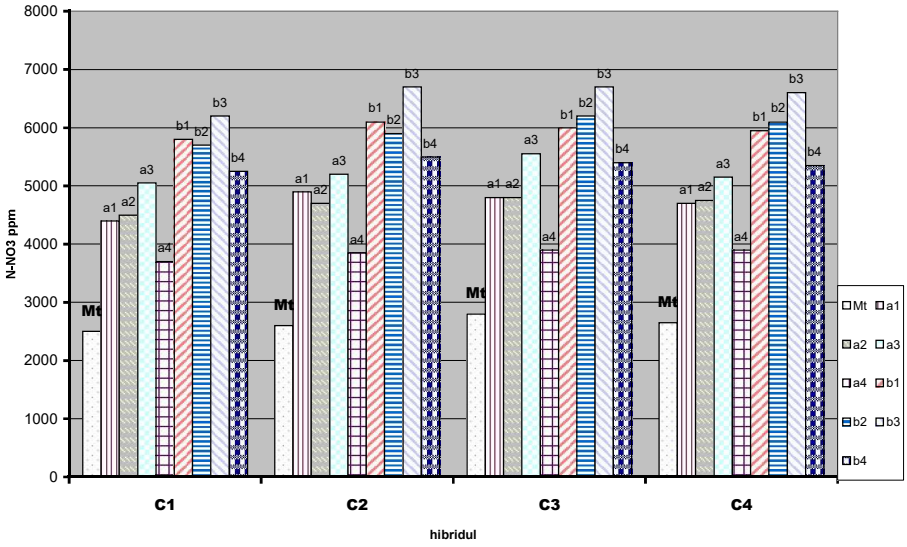

Fig. 3 – Nitrates content in pepper plants

In simple fertilized variants using only foliar products, it remarks an important growing comparing with unfertilized witness, observing that only Kristalon foliar (a_3) can attract an improvement of nitrates plants enssurance statement between normal limits (over 5000 ppm N - NO_3) , the rest of variants , keeping nitrates under optimal values .

CONCLUSIONS

1. Basic fertilization (at soil) assured through complementary with that of foliar protection, represents an viable solution for the manifestation of a normal nitrate fertilization statement in soil.

2. At the beginning of vegetation , the soil nitrates enssurance was situated between normal limits (10 and over 10 ppm N-NO_3) and unpolluted fertilized at variants combined and goes lower step by step during the vegetation , because of plants consumption and because processes which take place in soil (elutriation , denitrification) , under the influence of different agroecopedological factors.

3. The most reprezentative variants under the fertlization aspects impact over the evolution of the nitrates in soil are those which assure NPK agroground completing with Fertcomplex foliar (12,3 ppm N-NO_3).

4. The obtained results through foliar diagnosis at the leaf stalk, in fertilized variants combinated, show a positive relation establish between soil-plant-fertilizer, respectivly nitrates evolution in nourishing medium translocation, metabolism and their presence in plants as the effect of a complete fertilization .

5. The researches and studies, even made over one year period show a surefact , fertilization with solid and liquid products at soil on the foliation device , in minimal quantities, assure normal level of nitrates in soil, unpolluted and without riskc of toxicity for plants.

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THE DIFFERENCE MADE BY THE SEEDS AND THE DISTANCE BETWEEN ROWS PER HECTARE ON THE PRODUCTION OF THE "ORKAN" RAPE

INFLUENȚA ASUPRA PRODUCȚIEI A CANTITĂȚII DE SĂMÂNȚĂ LA HECTAR ŞI A DISTANȚEI DINTRE RÂNDURI, LA SOIUL DE RAPIȚĂ ORKAN

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Abstract. *As an experiment, on a local farm's testing field in Braila County, in the 2005-2006 agricultural year was planted "Orkan" rape, emphasizing on the seed quantity and the distance between rows per hectare. The sowing was made in five periods: August the 31st, September the 5th, September the 10th, September the 15th, and October the 2nd, with a quantity of between 2 and 12 Kilograms of seed depending on the distance between rows. Only the results obtained on the September the 5th sowing variants were taken into account. It was noticed that the more the sowing is delayed, the less dense the plants become, and the production surplus is bigger in the first period with over 800 kg/ha than the average and an even bigger surplus (1600 kg/ha) than the last period.*

Rezumat. *Experienta a fost amplasata in campul experimental al unei societati agricole din judetul Braila in anul agricol 2005 – 2006, urmarindu-se cantitatea de samanta la hectar si distanta intre randuri asupra productiei, la soiul de rapita Orkan. Semanatul s-a efectuat in cinci epoci, si anume : 31 august, 05 septembrie, 10 septembrie, 15 septembrie si 02 octombrie, cu o cantitate de samanta ce a variat intre 2 si 12 kg, in functie de distanta intre randuri (12,5 cm, 25 cm, 37,5 cm si 50 cm).*

S-a remarcat faptul ca, cu cat se intarzie semanatul, densitatea plantelor rasarite se diminueaza, iar sporul de productie este mai mare in prima epoca asigurandu-se un spor de peste 800 kg/ha, fata de media experientei si un spor mai mare de 1600 kg/ha fata de epoca tarzie.

MATERIALS AND METHOD

Previous to the experiment the field had been sown with winter wheat.

After harvesting the wheat, the field was cleared with a disc harrow on July the 25th, and then it was ploughed for the summer at 25 cm depth on August the 2nd.

The field was prepared for sowing on September the 3rd using a disc harrow.

It was sown in five periods: August the 31st, September the 5th, September the 10th, September the 15th, and October the 2nd.

The quantity of seed used varied between 2 and 12 Kilograms per hectare.

The land had been fertilized in spring using N81P52.

At the sprout and in spring we counted the number of plants per square meter for each of the established row distances.

At the harvest we analyzed the production kg/ha physically and STAS, the degree of moisture (0%), the specific weight (MH) and the weight of 1000 seeds.

RESULTS AND DISCUSSIONS

Table 1

The experiment's diagram

Distance between rows	A1 Sq/ha	A2 Sq/ha	A3 Sq/ha	A4 Sq/ha
12.5 cm	7.0	8.7	10.2	12.0
25.0 cm	3.7	4.5	5.4	6.3
37.5 cm	2.7	3.3	4.0	4.6
50.0 cm	2.0	2.5	3.0	3.4

Because the 2005-2006 agricultural year was draughty in the Braila plains area, the plants' rising was delayed until early October.

Table 2

At the sprout the plant density per square meter was

Dist. betwen rows	A1	A3	A5	A7	Average dist. row
	Pl.nr.	Pl.nr.	Pl.nr.	Pl.nr.	
12.5 cm	332	406	329	371	359
25.0 cm	180	204	152	188	181
37.5 cm	63	93	84	47	72
50.0 cm	80	70	68	70	72
Av.Sq/ha	164	193	158	169	171

At the sprout, the distance between individual plants per square meter was strongly influenced by the distance between rows, so that the biggest density was obtained with a distance between rows of 12,5cm, with an average number of plants of 359/mp, then 181/mp with a 25 cm distance and 72/mp with a 50 cm distance.

Table 3

In spring the plant density per square meter was

Dist. betwen rows (cm)	A1	A3	A5	A7	Average dist. row
	Pl.nr.	Pl.nr.	Pl.nr.	Pl.nr.	
12.5	176	108	116	136	134
25.0	84	152	68	92	99
37.5	88	140	112	92	108
50.0	72	60	62	64	65
Average Sq/ha	105	115	90	96	102

It has been noticed that the plant density per square meter in spring was 40% smaller than in sprout. At the plants sown at a 12,5cm and 25 cm distance the diminishing was from 52.8% to 62% of plants that perished during winter. In the case of the plants sown at a 37,5cm and 50 cm distance 10% the plants perished during winter.

During harvesting it was remarked that the production is influenced by the distance between rows.

Table 4

The results obtained at harvesting

Distance between rows	Qs/ ha	SUP qs	Physical prod. (kg/ha)	U (%)	S.C %	MH (Kg)	MMB (g)	STAS Prod. (kg/ha)
12.5 cm	7.0	A1	3111	6.5	1.5	67.6	4.1	3360
	8.7	A3	3333	7.5	0.7	67.7	4.4	3595
	10.2	A5	3333	6.0	0.4	67.8	4.3	3653
	12.0	A7	2984	6.2	0.5	67.3	4.4	3261
25.0 cm	3.7	A1	2667	6.0	1.1	67.1	4.2	2904
	4.5	A3	2648	6.2	0.7	67.2	4.1	2889
	5.4	A5	2540	6.1	1.2	67.2	4.3	2761
	6.3	A7	2540	6.0	0.5	67.5	4.4	2781
37.5 cm	2.7	A1	2394	6.1	0.7	67.8	4.0	2614
	3.3	A3	2546	6.0	0.5	67.2	4.3	2788
	4.0	A5	2603	6.2	1.0	67.1	4.4	2832
	4.6	A7	2476	6.2	2.0	66.9	4.0	2669
50.0 cm	2.0	A1	2432	6.1	1.1	67.0	4.3	2646
	2.5	A3	2260	6.2	0.7	66.8	4.3	2465
	3.0	A5	2197	6.2	0.6	66.8	4.4	2399
	3.4	A7	1841	6.3	1.0	66.9	4.1	2001
Aver	x	x	2619	6.2	0.9	67.2	4.3	2851

It is noticed that production is influenced by distance between rows so that:

Plants sown at 12,5cm, production increases by 22,3% compared to the plants sown at 25 cm, and the production of the plants sown at 37,5 cm and 50 cm decreases by 16-31% compared to the ones sown at 25 cm between rows.

Table 5

		50 cm	37,5 cm	25,0 cm	12,5 cm	%
C.S ha	2,0	2646				93,0
	3,7		2904			102,5
	4,0			2832		100,0
	8,7				3595	126,9
	%	93,4	102,5	100	126,9	

CONCLUSIONS

After the analysis of the experiment it was noticed that:

- at sprout the density of the plants per square meter is strongly influenced by distance between rows;
- the quantity of seed per hectare influences the production;
- the amount of plants that perish during winter is larger in the case of the plants sown at distances of 12,5 cm and 25 cm;
- the amount of plants perished during winter is 10% in the case of the plants sown at a distance of 37,5 cm and 50 cm.

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INFLUENCE OF THE NITROGEN AND PHOSPHORUS DOSES ON SOME PHYSILOGICAL PROCESSES OT THE CROP HYBRID OLIMP

INFLUENȚA DOZELOR DE AZOT ŞI FOSFOR ASUPRA UNOR PROCESE FIZIOLOGICE LA HIBRIDUL DE PORUMB OLIMP

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Abstract. *The present work enumerates some of the physiological processes which take place in the case of Olimp maize hybrid and the interaction between hybrid within the irrigated and non-irrigated crop, as well as the application of NP fertilizers.*
Key words: *physiological processes, respiration, transpiration, photosynthesis, assimilation, carotene, hybrid*

Rezumat. *Studiul a fost efectuat pe un hibrid de porumb Olimp, la aparitia celor 8 frunze complet formate, cultivat în N-V judetului Dolj, la Sarbatoarea, pe un sol faeoziom, in sistem neirigat, dupa o cultura premergatoare de grau in anul 2004 si s-au efectuat analize fiziologice, in scopul semnalarii modificarilor intervenite in compozitia chimica a plantelor la aplicarea diferitelor doze de NP.*
Cuvinte cheie: *procese fiziologice, respirație, transpirație, fotosinteză, asimilație, caroten, hibrid*

INTRODUCTION

In our country, the maize crop (culture) occupies an important area of the arable land and it represents one of the main cereal crops because of its importance in nourishment, feeding the animals and in industry.

The demographic growth of the population as well as the animal effectives imposed an extension of crop areas and a growth of production/ area; these two aspects were possible by an intensification of maize crop by using chemical fertilizers and irrigation systems.

Because maize culture is the most extended culture in the world, not only in our country, research into discovering new productive and qualitative hybrids have been performed, for human beings, animals and also industry, and different properties and processes were had in view. The present work enumerates some of the physiological processes which take place in the case of Olimp maize hybrid and the interaction between hybrid within the irrigated and non-irrigated crop, as well as the application of NP fertilizers.

MATERIAL AND METHOD

The study was performed using an Olimpia maize hybrid, when the 8 full-grown leaves became visible and this hybrid was cultivated in the north-western part of Dolj District, at Sarbatoarea, on chernozem, and both irrigated and non-irrigated

systems were a used, after a precursory wheat culture in 2004, and physiological analysis were performed in order to point out the changes of the chemical composition of plants when applying different dosage of NP. Analysis were performed by using variants disposed in four repetitions having as an example one row graduated multi-staged plots of land method. The sowed area of the variant is of 22.4 m², and its density is of 50,000 plants/hectare. Analyses of soil were effectuated at 0-25 cm and 23-34 cm. depth.

Table 1

Chemical properties of the argic chernosiomus from the Sărbătoarea-Dolj

Orizontul genetic	Adâncime a (cm)	Valoarea Ph (H_2O)	S.B. m.e/100g	S.H. m.e	Humus %	N total %	P p.p.m.	K p.p.m.
Ap1	0-25	7,01	24,36	3,42	2,79	0,140	22,6	166,7
Ap2	25-34	7,18	26,84	2,31	29,19	0,132	28,1	172,8

FIELD RESEARCH METHOD

Establishing an optimum fertilization system which positive influences the quantity and the quality of the culture and which implies an improving of the soil fertility potential represents an important way of increasing the economic efficiency. The influence of chemical fertilizers upon the maize culture is related to physiological processes which take place at a plant level in certain moments of its growth.

The experiment has in view two important factors:

Factor **A**: irrigating system

B1 – irrigated

B2 – non-irrigated

Factor **B**: applying the dosage of fertilizer

Within the experimental filed an important moment was followed, respective the 8 full-grown leaves phase, and lab tests were kept in order to perform physiological determinations.

Table 2

Influence of the nitrogen and phospoorus on some physiological processes of the crop hybrid Olimp, moment I, 20 june non irrigated system 2005

Varianta	Fotosinteza mgCO/cm^2	Respirația mgCO^2/100g m.v.	Capacitatea de absorție g apă	Forța de sucțiune atm	Pigmenții clorofilieni			
					Clorofila A mg/dm^2	Clorofila B mg/dm^2	Caroten mg/dm^2	Totalmg/dm^2
N_0P_0	228,7	183,5	5,88	4	0,362	0,169	0,198	0,729
$N_{60}P_{40}$	253,4	189,7	5,93	4,1	0,368	0,172	0,2	0,74
$N_{80}P_{60}$	256,5	201,3	5,86	4,12	0,367	0,174	0,204	0,745
$N_{100}P_{80}$	260,8	210,4	6,02	4,12	0,371	0173	0,201	0,745
$N_{120}P_{100}$	253,4	206,5	5,94	416	0,376	0,171	0,206	0,752

Table 3

Influence of the nitrogen and phospoorus on some physiological processes of the crop hybrid Olimp, moment I, 20 june irrigated system 2005

Varianta	FotosintezamgCO_2/cm^2	Respirația mgCO^2/100g m.v.	Capacitatea de absorție g apă	Forța de sucțiune.atm	Pigmenții clorofilieni				
					Clorofila A mg/dm^2	Clorofila B mg/dm^2	Caroten mg/dm^2	Totalmg/dm^2	
N_0P_0	239,7	186,5	6,01	4,1	0,375	0,176	0,211	0,762	
$N_{60}P_{40}$	262,4	192,3	6,1	4,18	0,38	0,178	0,218	0,776	
$N_{80}P_{60}$	268,3	205,4	6,21	4,2	0,386	0,181	0,22	0,787	
$N_{100}P_{80}$	270,5	215,7	6,15	4,2	0,388	0,187	0,227	0,802	
$N_{120}P_{100}$	276,8	220,4	6,23	4,26	0,379	0,185	0,224	0,788	

After lab determinations of physiological processes which took place in the case of this hybrid in two different systems and after applying different doses of fertilizers, the results where also graphically represented.

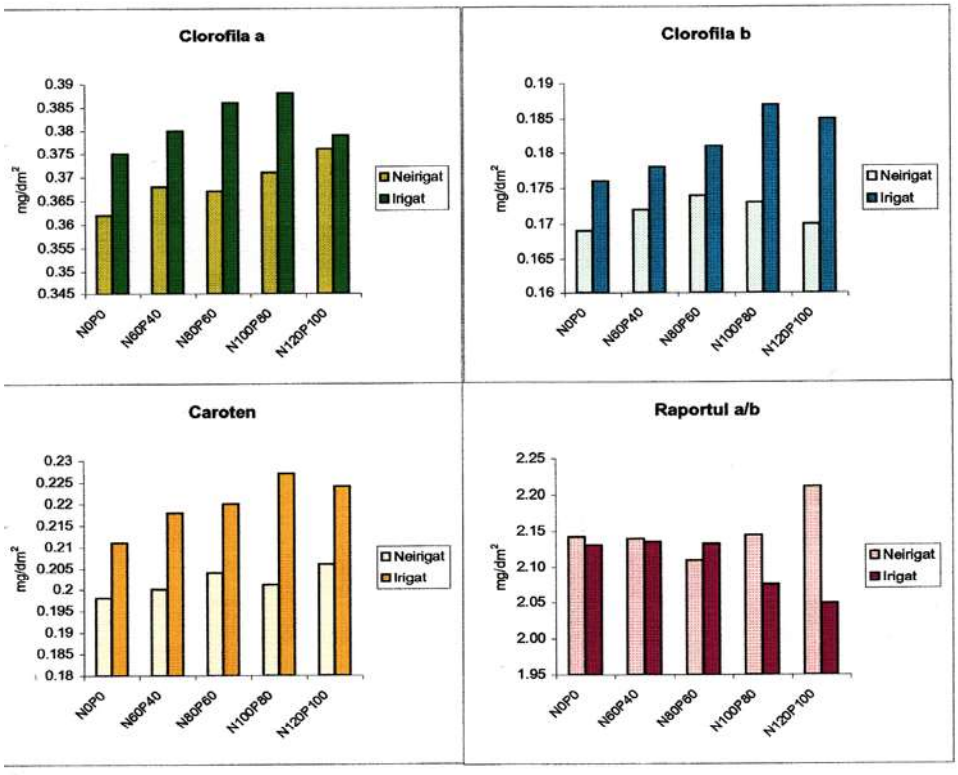

Fig. 1 - Influence of the nitrogen and phosphorus doses on some physiological processes ot the crop hybrid Olimp- moment I- year 2005

The chlorophyll pigments represented by 'a' and 'b' chlorophyll and carotene are very influenced by irrigated variants compared to non-irrigated ones (Fig. 1.)

An increase of the content of chlorophyll 'a' in the case of the irrigated system is noticeable, no matter what dose of fertilizer was applied, significant values are observed when applying N100P80 and N120P100.

Chlorophyll 'b' has values that have a weak fluctuation no matter what dose of fertilizers was applied, an import factor in this case is the irrigating the area which led to a significant increase of this assimilative pigment.

The content of carotene has significant values towards the control, compared to variants where fertilizers were applied. Irrigating, when applying N100P80 and N120P100, led to an important increase of this pigment.

Combined irrigation and applying moderate dose of fertilizers (N100P80) led to a maximum carotene quantity.

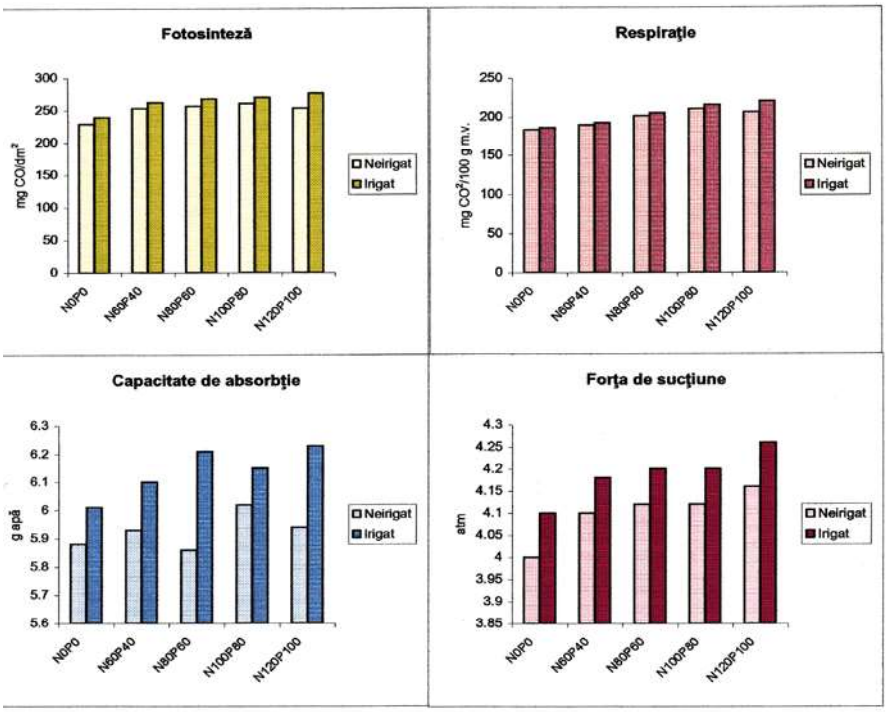

Fig. 2 - Influence of the nitrogen and phosphorus doses on some physiological processes ot the crop hybrid Olimp- moment I-year 2005

The evolution of photosynthesis (Fig. 2 and 3) expressed by mg CO/dm² that was determined in the first moment, that is the 8 full-grown leaves, has an important increase when comparing the non-irrigated and the irrigated variants, and also within the same variant.

Thus, a 20% increase of the photosynthesis intensity towards the control in the case of irrigated variant towards the non-irrigated control is noticeable.

The optimum dose, as it is noticed in diagram 2, was recorded in the case of the irrigated variant, when using N120P100, compared to the non-irrigated variant where better results were obtained when applying a dose of N100P80.

Regarding the respiration process, expressed as mg CO2/100 g.m.v., significant values on June, 20 are ascertain within the irrigated system as well as the non-irrigated system as well, the quantity of eliminated CO2 being significant in the case of the studied variant.

The capacity of absorption, g/H2O, has minimum values in the case of non-irrigated variants, excepting the N100P80 variant which has the highest value, that is 6.02 g/H2O.

Within the irrigated variants, the difference is important and it is static assured once the content of fertilizer in the case of N120P100 variant increases.

The suction force (Fig. 2d), expressed as atmospheres, has a tendency of slow increase in the case of the first non-irrigated variants, after which it starts to increase and it reaches from 4 to 4.16 atmospheres. In the case of variants where irrigation was applied, the most evident suction force was registered when applying a N120P100 dose.

CONCLUSIONS

- The combined influence between hybrid and culture technology (irrigation and applying the right dose of fertilizers) determines modifications of the main physiological processes which lead to obtaining maximum production when rationally applying dose of fertilizers.
- The studied hybrid acted differently from the culture technology point of view, the registered values from the physiological point of view were different, each of them using the right quantity of fertilizer.
- The effects of simultaneously applying variable doses of fertilizers and irrigation were studied and its effect upon the main physiological processes which depend on them.
- All analyzed physiological processes lead us to the conclusion that the Olimp hybrid has a high physiologic and biochemical potential, and the acquired information situates it among the most productive hybrids that have been studied.
- The combined influence of culture system (irrigated non-irrigated) as well as the applied doses of fertilizers determined, from the quantitative point of view, remarkable differences in the case of all qualitative features of the Olimp hybrid.
- We highly recommend Olimp hybrid for production, when using an irrigated system and applying a maximum dose of N120P100 and N100P80 for an economic efficiency.

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THE CORELATION BETWEEN THE DOSES OF NITROGEN AND PHOSPHORUS APPLIEND ON THE NON IRIGATED SYSTEM AND PHYSILOGICAL PROCESSES OT THE CROP HYBRID OLIMP

CORELAȚIA DINTRE DOZELE DE AZOT ȘI FOSFOR APLICATE ÎN SISTEM NEIRIGAT ȘI UNELE PROCESE FIZIOLOGICE LA HIBRIDUL DE PORUMB OLIMP

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Abstract. *The importance of fertilizers within maize culture logically come from the great production capacity of this culture for which important quantities of nutritive elements extracted from soil are necessary. The research that too place in the last two years emphasized the powerful impact of chemical fertilizers combined with applying an adequate technology upon the carried out physiological processes, that is assimilating and dissimilating and the repartition of dry substance in the plant.*

Key words: *correlation, research, interaction, graphic representation, respiration, transpiration, photosynthesis, assimilation, carotene.*

Rezumat. *Importanta deosebita a ingrasamintelor la cultura porumbului deriva, in mod logic, din capacitatea mare de productie a acestei culturi pentru care sunt necesare cantitati importante de elemente nutritive extrase din sol. Cercetarile intreprinse in ultimii ani au scos in evidenta puternicul impact al ingrasamintelor chimice combinate cu aplicarea unei tehnologii adecvate asupra desfasurarii proceselor fiziologice respectiv asimilatiei si desimilatiei si repartitiei substantei uscate in general in planta.*

Cuvinte cheie: *corelație, cercetare, interacțiune, reprezentare grafică, respirație, transpirație, fotosinteză asimilație, caroten.*

Among the main cultures, very important is the maize culture which is compared to 'cultures that have golden beans'. Maize is considered nowadays one of the most important cultivated plants for the agriculture of our country, as well as on a global scale because of the significant area that maize holds as well as high productions/hectare that are obtained. Because of its high capacity of adaptation to soil and climate conditions as well as because of the ample improvement process, maize culture has a spreading area that guarantees the satisfaction of all requirements of every county in our country, and, in many counties – mainly the southern and the western ones – may accomplish important availability in the case of our national economy.

The present work tries to establish the role of irrigation and applying variable doses of Nitrogen and Phosphorous, it also tries to ground, from the physiological point of view, the contribution of each factor in achieving high quantitative and qualitative productions. Within the experimental filed an important moment was followed, respective the 8 full-grown leaves phase, and lab tests were kept in order to perform physiological determinations. After lab determinations of physiological processes which took place in the case of this hybrid in two different systems and after applying different doses of fertilizers, the results where also graphically represented.

MATERIAL AND METHOD

The study was performed using an Olimpia maize hybrid, when the 8 full-grown leaves became visible and this hybrid was cultivated in the north-western part of Dolj District, at Sarbatoarea, on chernozem, and both irrigated and non-irrigated systems were a used,, after a precursory wheat culture in 2004, and physiological analysis were performed in order to point out the changes of the chemical composition of plants when applying different dosage of NP. Analysis were performed by using variants disposed in four repetitions having as an example one row graduated multi-staged plots of land method. The sowed area of the variant is of 22.4 m², and its density is of 50,000 plants/hectare. Analyses of soil were effectuated at 0-25 cm and 23-34 cm. depth.

MATHEMATICAL CALCULATION OF EXPERIMENTAL RESULTS

When presenting the experimental results, the analysis of variation represent the first important systemizing information, distinguishing different contribution of sources of variability.

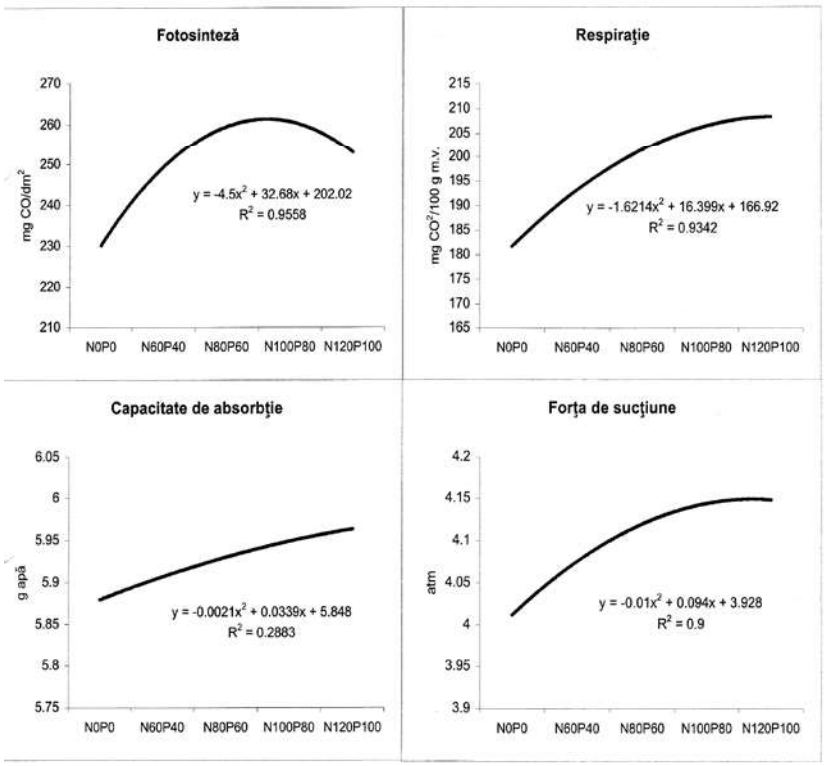

Fig. 1 - Correlation between doses of Nitrogen and Phosphorous that were applied within non-irrigated system and some physiological processes of the Olimp hybrid (year 2005)

The study of the relation between variables may be performed when using modern statistic methods such as correlation, simple linear regression, square regression etc. The correlation coefficient is relative; it doesn't depend on measure units that are used for the respective variant. Except an analysis of variation and the calculation of square regression, graphic representation was used – column diagrams.

In the case of the irrigated variant, the intensity of photosynthesis increases and it reaches a higher value than 270 mg CO/dm² when applying the same doses of fertilizers above. The correlation coefficient, instead, is of 0.9558 (fig. 1. a).

The respiration process is assured by the regression coefficient, but it is 0.9342 static assured, and the curve reaches the maximum value when using N120P100 within non-irrigated system (fig.1.b). In the case of non-irrigated system, that is picture 1.c, a slow increase of absorption capacity is noticeable once the mineral fertilizers content increases, R=0.2883, compared to irrigated variants where the absorption capacity is maximum in the case of N100P80 variant, the correlation coefficient is of 0.8414.

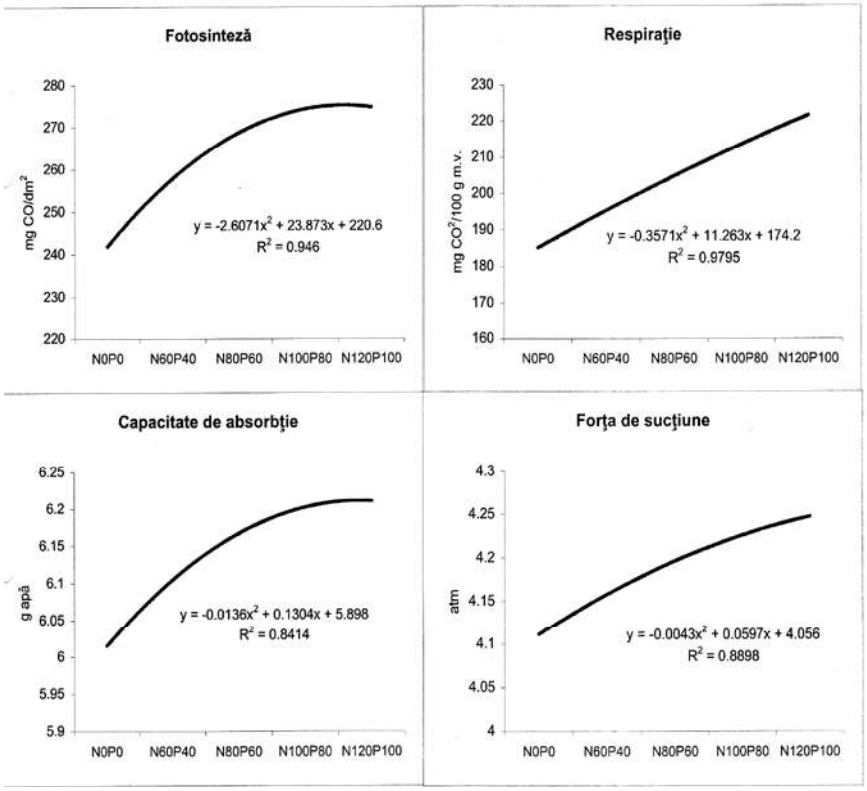

Fig. 2 - Correlation between doses of Nitrogen and Phosphorous that were applied within irrigated system and some physiological processes of the Olimp hybrid in the year 2005.

The regression coefficient is static assured and it is descending in the case of the non-irrigated system (Fig.1.d), the suction force has high values when applying an N120P100 dose.

In the case of the irrigated variant, the intensity of photosynthesis increases and it reaches a higher value than 270 mg CO/dm² when applying the same doses of fertilizers above. The correlation coefficient, instead, is of 0.946 (Fig. 2. a).

In the case of the irrigated system, the regression curve has a linear tint, and the coefficient is static assured R=0.9795 (Fig. 2.b).

In the case of irrigated variants, the difference is significant and it is static assured once the content of fertilizers increases (Fig. 2. c), R=0.8414.

The suction force has a descending tint, in the case of irrigation and application of maximum doses of fertilizers, R=0.8898. (Fig. 2.d).

The physiological processes which determine the chlorophylls, the following results are obtained:

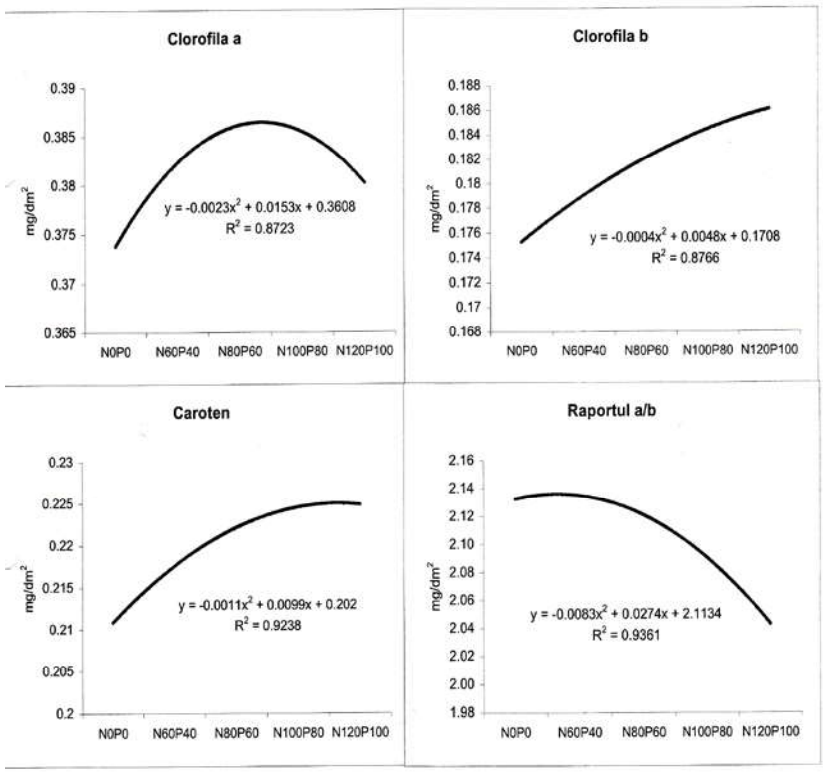

Fig. 3 - Correlation between doses of Nitrogen and Phosphorous that were applied within irrigated system and some physiological processes of the Olimp hybrid in the year 2005

The regression coefficient, in the case of the irrigated variant, is 0,8723 static assured (Fig. 3.a), and the curve of chlorophyll ‘a’ has a descending tint, which record maximum values when applying the dose of N100P80.

Chlorophyll ‘b’ reaches the maximum of its curve when applying a dose of N80P60, after that the values decrease and R^2=0.8766 (Fig. 3. b).

The carotene is represented by an ascendant curve; its maximum values are recorded when applying an N120P100 dose (Fig. 3.c).

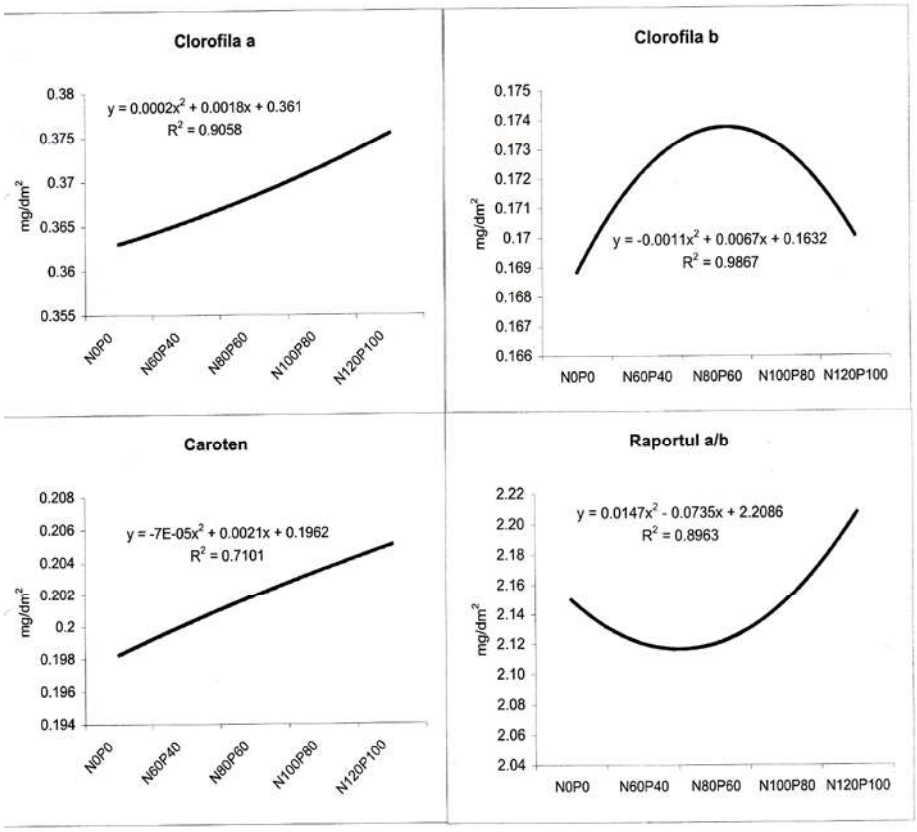

Fig. 4 - Correlation between doses of Nitrogen and Phosphorous that were applied within non-irrigated system and some physiological processes of the Olimp hybrid (year 2005)

The physiological processes which determine the chlorophylls, the following results are obtained:

The regression coefficient, in the case of the non-irrigated variant, is 0.9058 static assured (Fig. 4.a), and the curve of chlorophyll ‘a’ has a descending tint, which record maximum values when applying the dose of N120P100.

Chlorophyll ‘b’ reaches the maximum of its curve when applying a dose of N80P60, after that the values decrease and R^2=0.9867 (Fig. 4. b).

The carotene is represented by an ascendant curve; its maximum values are recorded when applying an N120P100 dose (Fig. 4.c).

Regarding the relation between a and b, it is noticeable a sudden decrease when applying the dose of N80P60 dose, after that it increases until applying a dose of N120P100 and then it reaches high values.

CONCLUSIONS

- The main purpose of using fertilizers is obtaining important productions when the expenses are minimally. The cost of fertilizers increased a lot in the last decades because the fertilizers are obtained by high consumption of fossil energy, and that is why it's of great interest the way of administrating the production process in order to obtain a maximum efficiency.
- The fertilization that uses Nitrogen and Phosphorous creates a stable balance of the soil elements.
- Phosphorous and Potassium as well applies the brake to the acidification of soil by Nitrogen. These two elements, especially Potassium, intensify the absorption of Nitrogen and balance the ionization report within the plant.
- It is necessary that, when applying fertilizers correctly depending on the provision soil degree in assimilable substances and plant needs, the soil reserve of macro-elements and sometimes microelements, to be complete.
- The best results are obtained when using an irrigated system of culture and variable doses of Phosphorous and Nitrogen fertilizers, the maximum supply being of N120P100.

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THE TOBACCO QUALITY IMPROOVEMENT BY FERMENTATION PROCESS

ÎMBUNĂTĂȚIREA CALITĂȚII TUTUNULUI PRIN PROCESUL DE FERMENTAȚIE

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Abstract. *For obtaining a tobacco with improved physical-chemical and smokable qualities, it is processed through fermentation. After this process, the raw material for cigarettes, finalizes its typical qualities for a smokable product. This work includes the stages of fermentation of the tobacco using different diagrams, conducting the temperature of the air, of the tobacco and the relative dampness. The result of this process is the tobacco good for smokin*g.

Rezumat. *În scopul obținerii unui tutun cu calități fizico-chimice şi fumative îmbunătățite, acesta s-a supus procesului de fermentare. În urma acestui proces materia primă pentru țigarete îşi definitivează însuşirile specifice pentru un produs fumabil. Această lucrare include etapele fermentării tutunului utilizând diferite diagrame, conducând temperatura aerului, a tutunului şi umidității relative. Rezultatul acestui proces este tutunul bun pentru fumat.*

Importance and necessity

By fermentation is also obtained the quality keeping of the tobacco, of a constant quality and chemical composition. The fermentation process is an oxidation process catalyzed by enzymes. In order to realize a correct process of fermentation we have to take in count the characteristics of the tobacco that follow to process. So, the bright color tobaccos, Oriental and Virginia need a light fermentation where reduced transformation take place, but they are imperious for improving the smokable quality. [1].

The brown and rifle green tobaccos need a more intense fermentation, with profound transformation in the tobacco leaf. The technological process of fermentation can be made by the natural way and the industrial way. [2].

The natural fermentation method is adopted when the climatic conditions assure the needed temperature and dampness parameters to this process. This method is known also under the name of a seasonal method because only in a certain season, in our country being in spring, the climate assures the optimal parameters for fermentation. [3].

In this way, the natural condition environment, the heat necessary in fermentation results from the exotermic reactions that take place in the tobacco leaf. In this purpose, the tobacco is laid on tables or bales placed in packs, they auto heat and the temperature crows. [4].

In order to assure differential temperatures according to the variety and the quality class, the dimension of the packs is increased or reduced. The natural fermentation is especially applied in countries with warm climate and they require a large volume of work. [5].

The industrial or artificial way consists in tobacco fermentation in an area named fermentation room, in which the parameters of temperature and relative dampness are conducted by specific installations. [6].

The method can be applied in every season of the year and is called the extra sensorial method. The tobacco heating at the necessary temperature can be assured by air streams and rarely, by electric way.

For the Virginia tobacco at an indirect fire, the treatment in Redrying installations is practiced, followed by aging.

Generally, the technological process of fermentation consists in 3 main stages:

- stage I or heating, consists in increasing the temperature and dampness from air to the specific parameters level of each tobacco breed and quality class;
- stage II or stabilization, consists in maintaining these parameters on a determined period of time, until the physic-chemical processes are finalized in tobacco;
- stage III or cooling, consists in reducing the tobacco temperature level to the room temperature.

The total fermentation duration vary according to the tobacco breed and class between 8-13 days. After the fermentation, the tobacco is stored to aging in specific areas for this purpose. The fermentation process is conducted on the base of fermentation diagrams as follows:

Table 1

Fermentation diagrams

Breed	Stage	Parameters	Duration
Virginia F. I	Heating	Rd: 55-60%	2 days
	Stabilization Cl. S+I+II Cl. III+IV	Tt: 44-46 Rd: 60-65% Tt: 50-52 Rd: 70-75%	5 days
	Cooling	Rd: 70-75%	2 days
	Heating	Rd: 55-60%	2-3 days
Burley	Stabilization Cl. I Cl. II Cl. III+IV	Tt: 50-52 Rd: 60-65% Tt: 53-55 Rd: 75-80% Td: 57-58 Rd: 60-65%	5-6 days
	Cooling	Rd: 70-75%	2-3 days

The physico-chemical transformations from the tobacco leaf during the fermentation

During the fermentation, the tobacco suffers important changes: physical, chemical and biochemical.

The physical changes concern the color, resistance, elasticity and the hygroscopicity. So, the color becomes lightly darker and is homogenized, the resistance and elasticity of the foliar tissue is decreased and so the hygroscopicity.

The weight losses of the fermented tobacco are due the water elimination and the consumption of dry matter, these losses could be to 9%.

The chemical changes are due the enzymes, which determine the physiological and biochemical processes in the tobacco leaves.

Carbon hydrates, a positive element in quality determination, present a decrease of the qualitative level, as a consequence of the dry matter consumption. By their degradation, caloric energy, water and carbon dioxide is released. A part of sugars, through non-enzymatic reactions with Maillard type amino-acids finally lead to maloidynes formation, compounds they compete at the homogenization of the tobacco leaf color.

So, from a yellow tobacco with 15% soluble carbon hydrates, by fermentation can decrease with 3% from dry matter. [8].

The starch is completely hydrolyzed during the fermentation. The pectin substances can be transformed in carbon hydrates, being turned even into monosaccharoses, a process that leads to elasticity and resistance decreasing of the tobacco leaves.

The nitrous substances are degraded with the release of ammonium. The proteolytic degradation of the albumins can reach to poly-peptides, dy-peptides and even to amino-acids. The content in total nitrogen decreases during the fermentation between 0.8 and 2.6%. [10].

Nicotine is quantitatively decreasing by fermentation due the oxidation, the microbiological degradation and can result due the conversion in nornicotine, nicotinic acid and oxy-nicotine.

The organic acids, especially the malic acid and citric acid, break into simpler acids, but in the same time the oxalic acid content is increasing.

Poliphenols tend to decrease as a consequence of oxidations and their combination with amino-acids, leading to a darker color of the tobacco leaves.

The pitches and etheric oils maintain their levels and present a high level in bright tobaccos, submitted by the Redrying treatment.

The ash is in a larger amount in the fermented tobaccos comparative with the unfermented tobaccos.

CONCLUSIONS

Consequently the fermentation process applied and correctly leaded from the scientific point of view leads to a series of chemical and biochemical transformations, in the purpose to fix the qualitative characteristics, especially color and taste.

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THE STUDY OF SOME HEAVY METALS FROM TOBACCO

STUDIUL UNOR METALE GRELE DIN TUTUN

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Abstract. *The tobacco plant assimilates mineral substances from soil, water and air, pollution's degree of mineral substances having influence on the composition of those plants. The pollution agents include some chemical elements from the environment or administrated, as a consequence of the agricultural technologies applied. Especially, the pollution is due some pesticides, have metals and radioactive elements. These elements were determined in some Romanian tobaccos and Italian tobaccos. The effectuated determinations show values that could be integrated into normal values. A permanent control is necessary for every crop and thermic treatment for tobacco with a higher level, than accepted in international norms.*

Rezumat. *Planta de tutun asimilează substanțe minerale din sol, apă şi aer, gradul de poluare al substanțelor minerale având influență asupra compoziției acelor plante. Agenții poluanți includ anumite elemente chimice din mediul înconjurător sau sunt administrate, ca o consecință a tehnologiilor agriculturale aplicate. Poluarea se datorează, în special unor pesticide, care posedă elemente cum ar fi metale grele sau elemente radioactive. Aceste elemente au fost determinate în câteva tutunuri româneşti şi italiene. Determinările efectuate arată valori care pot fi cuprinse în valorile normale. Este necesar un control permanent a fiecarei culturi şi tratament termic pentru tutunul care are un nivel mai ridicat decât cel acceptat în normele internaționale.*

Pesticides

The tobaccos pollution with different remanent amounts of pesticides, presents a special importance as long as pesticides exert their toxic action not only on diseases and pests, but also on animals and useful insects and there really is the risk to be affected even the human being, due the toxic residuals ingested with the food.

By treatments, in plants pass considerable amounts of pesticides, also, a part of them falling on the soil, accumulates and act positively or negatively (especially those that have cumulative remanence). The contact pesticides and the systemic ones, by their nature itself permeate in tobacco plants; some of them are metabolized and degraded in secondary and tertiary products, compounds that contain some chemical radicals or some elements that can generate secondary toxicological phenomenon. In the tobacco case, the pesticides residuals are transferred from tobacco in the smoke and from here to the smoker's body.[1].

It was determined that from the pesticides residuals existing in tobacco, in smoke pass in average of 10%, the variations being between 0% and 20%. In our country, at tobacco, in the diseases and pests treatment a number of chemical substances are used of which reminiscence is different. In the effectuated determinations, the detection of the organ-chlorinated, organ-phosphoric, carbonates, de-thio-carbanates pesticides residuals in the dry tobacco samples were traced, as well as the integration way in the maximal admitted limits.[2].

At Romanian tobaccos, a low content of pesticides residuals is dignified (table no. 1).

Table 1

The pesticides residuals content at the Romanian tobacco comparative with the tobacco from Italy (mg/kg)

No	The active substance name	Romanian tobacco	Italian tobacco	RFG norms
1	Organ-chlorinated	0.2-2.0	0.59-1.80	11
2	Aldrin	-	0.01-0.08	10
3	Organ-phosphoric	1.0-3.0	-	0.3-3.0
4	Carbanates	1.0-2.0	-	20
5	De-thio-carbanates	1.0-50.0	-	50.0

Also, the made analysis at a few imported tobacco breeds show moderate pesticides residuals levels integrating in the provided norms existing in different countries. The organ-phosphoric compounds are known as the most toxic from the insecticides, but that disintegrate in short time, especially if they are exposed at sunlight. The organ-chlorinated substances are more dangerous because of their long persistence and present a bio-concentration potential. So, one of these were forbidden and others have a reduced utilization.[3].

Heavy metals

The soil has the capacity to store the chemical elements, including heavy metals, and also the capacity to directly reset in circulation the respective elements, on the absorption of the plant or the migration of a part to the ground waters. When the soil charging with heavy metals is high, and the physco-chemical attributes of soils congregate the conditions of an intense mobilization, an excess transfer from soil in plants and waters takes place and from these to animals and people, sometimes at toxic levels for consummators.

The heavy metals present in soil and plant can act as microelements, some of them having a positive effect on the tobacco development, sometimes can be phyto-toxic according to the level of them or they can negatively influence the smoking taste. The main heavy metals with importance in the tobacco cropping are: Cu, Zn, Co, Pb, Mn, As, Hg, Cs, Li, Fe, Cd, Ni, Cr.

From a series of effectuated experiments, is confirmed the fact that the tobacco easily absorbs the metal and moves it into the leaves. Also, the heavy metals content was determined (Cd, Cr, Co, Cu, Ni, Pb) at some Romanian tobaccos and at some Italian breeds (table 2). Is ascertained at the Romanian tobacco, variability limits determined of metals comparable with the variability limits for the tobaccos from Italy.[4].

The content in heavy metal variations are according to the tobacco breed, the development stage of the plant, the crop technology, the crop area, the type of the soil, etc.

Mentionable is that the tobacco being cropped in acid soils (5.5-6.5), this facilities the metal leach and a better absorption takes place. For these reasons, on the tobacco soils is recommended adding moderate amounts of calcium carbonate, that can determine the pH reduction with at least an unit, parallel with the 50% detraction of the Cd content from leaves.

Table 2

The heavy metals content at some Romanian and Italian tobaccos (mg/kg)

No	Name	Romanian tobaccos			Italy tobacco
		Virginia	Burley	Oriental	
1	Cadmium	1-3	1.7-5.1	0.1-0.7	3.5-5.3
2	Cobalt	0.9-1.54	0.55	-	-
3	Chrome	0.9-1.54	0.9-1.54	-	1.42-1.8
4	Copper	14.0-21.0	14.0-21.0	-	-
5	Nickel	4.52	7.83	-	-
6	Lead	11.8-16.2	11.8-16.2	-	5.6-7.6

Generally, for the tobacco crop the fields close to the high ways, factories of plastics, chemical fertilizers and earth oil manufacture are avoided.

Radioactivity

Generally, the radioactivity level is determined only in case of nuclear accidents. According to the international norms recommended by FAO/OMS/AIEA concerning the consumption and sale of agro-alimentary products, for the first and following years from a major accident are accepted: 50 Bq/kg for Cs 134 and 100 Bq/kg for Cs 137.

The global radioactivity analysis and Cs 134 and Cs 137 at some Romanian and Italian tobaccos show values that integrate in the natural radioactivity found limits, for K 40, and for Cs, the level is under the admitted limits (table 3).

Table 3

The radioactivity levels at Romanian and Italian tobaccos (in Bq/kg)

No	Radioactivity	Romanian tobacco	Italian tobacco
1	Global radioactivity	Under 5.7	5.7-23.2
2	Global radioactivity	Under 79.5	6.8-18.5
3	Cesium	Under 18.5	6.8-19.4
4	Cesium	Under 16.5	3.0-16.8

CONCLUSIONS AND RECOMMENDATIONS

The used pesticides in the tobacco cropping must be biodegradable and to not present a phyto-toxicity risk. A control of the pesticides content is necessary at each harvest and the thermic treatment of tobaccos with pesticides content above the admitted limit, extinction in cropping of some breeds with d=genetic resistance of different diseases and pests and avoiding acid and very acid soils in tobacco cropping, that allows the absorption of heavy metals.

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ENZYMOLOGIC STUDY UPON SOIL RESOURCES OF TROTUS VALLEY FORESTRY ECOSYSTEMS

STUDIU ENZIMATIC ASUPRA RESURSELOR DE SOL DIN ECOSISTEME FORESTIERE SITUATE PE VALEA TROTUŞULUI

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Abstract. *This paper presents the experimental pedobiological results of the analyses carried out in the oak grove perimeter of Paltinata and Heltiu-Caiuti Bacau, from the Trotus Valley, that form the core of a CEEX research contract.*

Soil resources fall into two categories – cambic soils and luvisoils. The degree of favourability of the factors and ecologic determiners (climatic and pedologic) is predominantly an average one. The pedobiological, physiologic (respiration and cellulosic potential) and enzymatic study of soil resources (catalasic, sugary, and total phosphatasic potential) for the vegetation period, within the horizon of bioaccumulation highlights an average biologic activity with a view to transforming the organic remaining and mineralization of humus.

Rezumat. *În lucrarea de faţă prezentăm rezultatele experimentale pedobiologice din pădurile de gorunete (Cvercineae) Păltinata şi Helţiu Căiuţi, Bacău, situate pe valea Trotuşului, obţinute în cadrul unui proiect de cercetare CEEX.*

Resursele de sol sunt încadrate în clasele Luvisolurişi Cambisoluri. Gradul de favorabilitate al factorilor şi determinanţilor ecologici (climatici şi pedologici) pentru gorunete este predominant mijlociu. Studiul pedobiologic şi fiziologic (potenţial de respiraţie şi celulozolitic) şi enzymatic al resurselor de sol (potenţial catalazic, zaharazic, meazic şi fosfatazic total) pentru perioada de vegetaţie la nivelul orizontului de bioacumulare evidenţiază o activitate biologică mijlocie în direcţia transformării resturilor organice şi a mineralizării humusului.

INTRODUCTION

In normal qualitative and quantitative conditions, soil constitutes an essential component of the terrestrial ecosystems, but it also represents a fundamental condition of soil functioning, since soil is a living organism and its whole activity of formation, development and evolution occurs under the action and influence of the biologic factor (Birescu, 2001, Stefanic, 1994).

Fertility represents the essential quality of soil, accounting for the presence of nutritive elements in balanced quantities that provide for plant nutrition (Cârstea, 2003). According to Jack, 1963, soil natural fertility is a biologic phenomenon, rather than a physical-chemical one. Soil is an enzymatic system, in which the accumulated enzymes, alongside the enzymes of the proliferating microorganisms, play an important contribution to plant nutrition and soil natural fertility (Birescu, 2001, Kiss and col., 1991, Stefanic and col., 1998). Soil biologic potential characterizes its fertility state as well as the influence of perturbing microbiotic agents upon soil (Ardelean and col., 2001, Drăgan-Bularda and col., 2001).

MATERIAL AND METHOD

Researching the potential of the enzymatic activity in laboratory conditions, and the level of the potential of enzymatic activity must be interpreted as level of soil population of organisms in a span of time prior to drawing soil samples (Birescu, 2001, Stefanic, 1994; Stefanic and col., 1998).

The potential of catalasic activity is assessed with the catalapmetre designed by Stefanic (1984), that measures the level of the oxygen given off during the reaction. The invertase potential is assessed by using the Stefanic method (1972), measuring the enzymatically-hydrolysed sugar content (glucose and fructose). The measic activity is assessed with the 1994 Stefanic method by means of measuring the ammonium content. The principle of assessing the soil-water activity, according to Stefanic 1999 consists in introducing glucose in a soil-water blend, with a view to combining it with the phosphate ions, enzymatically given off, thus assessing the glucose content left unused that eventually turns into phosphorus.

RESULTS AND DISCUSSIONS

The pedobiological research presented in this paper belongs to a series of complex and multidisciplinary ecological research that form the core of a CEEX research project circumscribed to an oak grove area.

The analysed natural soil resources edged by the Paltinata-Heltiu forestry ecosystems belong to luvisoils and cambic soil category. The ecologic study upon the main 20 factors and ecologic, pedologic and climatic determiners is presented in table 1.

From a quantitative point of view, we have analysed the main 8 classes of ecologic size, while, from a qualitative point of view we have analysed the main 6 classes of ecologic favourability, 5 climatic ecologic factors, 3 development pedoecologic factors, 2 space and time factors, 2 negative pedologic factors, 5 pedoecologic determiners and 3 representative synthetic indicators.

The majority of factors and ecologic determiners fit into middle ecologic and favourability class category. Mention must be made about the low values of the nutritive elements (second class small size – Heltiu forest UA 18 – lithic luvisoil and third class middle-small size – Heltiu forest UA87 stagnic districhambosoil and Paltinata UA73).

Table 1

The ecological specific card of some cvercinee forest ecopedotypes from Trotuş valley

Ecological factors	Measure classes of ecological factors								Favourability classes of ecological factors					
	0…m	I	II	III	IV	V	E_1	E_2	N…m	FS	S	M	R	FR
RAISING FACTORS														
Natrium total			●	○X							○●	X		
Phosphorus mobile			●	○X							○●	X		
K (K_2O)			●	○X							○●	X		
CLIMATICAL ECOLOGICAL FACTORS														
Annual medium temperature (T^oC)					○●X									○●X
Annual medium rain (Pmm)				○●X								○●X		
Windy regime (Vt)				○●X								○●X		
Summer rain (Pe)			○●X								○●X			
Summer air relative humidity (Uer)			○●X								○●X			
ECOLOGICAL FACTORS SPACE-TIME														
Edaphyc volume (Ve)				○●X								○●X		
Bioactive period length					○●X									○●X
NEGATIVE ECOLOGICAL FACTORS														
Alkalinity - Acidity			○●X										○●X	

Summer consistency							○●X			○●X					
ECOLOGICAL DETERMINANTS															
Humus		●	○	X						●	○	X			
Texture				○●X								○●X			
Aeration porosity			○●X							○●X					
Soil reaction				○●x							○●	X			
Base status			●	○X							○●	X			
SYNTHETICALLY BIOLOGICAL INDEX															
Biological activity			●	○X						●	x	○			Favourability
SYNTHETICALLY PEDOLOGICAL INDEX															
Potential trophicity			○	●	x					●	○	x			
Effective trophicity			○●	x						●	○	x			

○Paltinata UPV; UA 73 (Iuvosol stagnic litic);
● Heltiu UPVI; UA 18 (Iuvosol litic);
x Heltiu UPVI; UA 78 (districambosol stagnic)

Climatic factors during the aestival season record low rainfall levels, and high atmospheric humidity that account for a low favourability level. The same aestival season is characterised by low values of soil aeration, degree of saturation with bases, humus content, soil reaction and biologic activity.

Forest soil acidity, low aeration, reduced level of edaphic humus determine a account for low parameters of enzymatic potential, humification and mineralization processes of organic remainings. The level of enzymatic potential in the 3 ecotypes presented in this paper was assessed in the bio-active area of 0-60 cm. One notices average values during the first 20 cm that halve at a depth of 40 cm, and reach a percentage of 30% at 60 cm depth. The enzymatic potential records lower values in the Heltiu UPVI, UA18 ecosystem – lithic luvisoil and low towards average values in the Heltiu UPVI, UA87 ecosystem – stagnic districhambosoil and Paltinata UA73.

Table 2

The enzymatic activity potential of soil resources in some cvercinee forester ecosystems from Trotuş valley

Forester ecopedotop	Depth (cm)	Catalasis cmc 02/ 100 g SU	Zaharasis mg glucose/ 100 g SU	Ureasis mg NH_4/ 100 g SU	Phosphates Mg P/ 100 g SU
Paltinata UPV: UA73 Luvosol stagnic litic	0- 20	275	819	8,12	3,28
	20- 40	141	372	1,69	1,16
	40-60	100	103	0,73	0,41
Heltiu UPVI; UA 18 Luvosol litic	0- 20	181	691	6,52	2,43
	20- 40	106	151	2,32	0,99
	40-60	56	74	1,01	0,33
Heltiu UPVI; UA78 districambosol stagnic	0- 20	201	554	5,85	1,93
	20- 40	88	162	2,67	0,61
	40-60	39	105	1,35	0,27

Thus, the catalasic potential records low values on the 0-60 cm interval, that rank between 275-100cmc02/100g SU in the Paltinata UA73 ecosystems, 181-56cmc02 in the Heltiu UPVI, UA18, and 201-39cmc02 in the Heltiu UPVI, UA87 ecosystem.

The level of sugary potential records low values due to anaerobic processes that diminish the mineral and organic matter. The lowest values of the sugary potential is recorded by the Heltiu UPVI, UA18 ecosystem, ranking between 554-105 mg glucose/100 g SU. Slightly higher values, but still ranking low towards average characterise the other two analysed forestry ecosystems (691-74 mg glucose in the Heltiu UA18 ecopedotype and 819-103 mg glucose in the Paltinata UA73 forest). The ureasic potential reaches low towards average values:

recording lower values in the Heltiu UPVI, UA87 – 5.85-1.35 NH4/100 g. SU, in strict correlation with low humus and nutrients content. The total phosphatic potential is low, correlated as it is with the local edaphoclimatic peculiarities of the three analysed forests, the lowest values (1.93-0.27 mgP (0-60cm) belonging to the Heltiu UPVI, UA87 forest, while the other two ecosystems record similar values, slightly higher (0-20cm).

CONCLUSSIONS

High acidity of soil resources together with a deficient aero-hydric regime and low edaphic volume lower, stress and limit the biologic, enzymatic activities within the local ecologic context.

The bio-pedo-climatic peculiarities provide an average favourability for the oak groves of the analysed perimeters.

Low levels of enzymatic potential (catalasic, measic, sugary and total phosphatic) are recorded by the first 20 cm, just to drop to some 50% at the depth of 40 cm and to 30% at a depth of 60 cm.

Low values of the enzymatic potential, during the vegetation period, determine a reduced speed of transformation of organic remaining (via acid and predominantly anaerobic phenomena).

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ECOPEDOLOGICAL STUDY OVER SOIL RESOURCES FROM FOREST ECOSYSTEMS IN MOLDOVA PLAIN

STUDIU ECOPEDOLOGIC ASUPRA RESURSELOR DE SOL DIN ECOSISTEME FORESTIERE DIN CÂMPIA MOLDOVEI

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Abstract. *The ecopedological study proves, from a quantitative and a qualitative point of view, the way in which qualities and the imperfections of the trophic potential show themselves, within the zonal and the local ecological context. The main twenty determinant ecological, climatic and pedological factors are analysed from a quantitative point of view (in eight ecological classes) and from a qualitative point of view (in six ecologic classes of favourability), following a specific ecological criteria. The formula of the ecological diagnosis of the soil following its own features analyses the trophic potential, in a zonal and a local ecological context.*

Rezumat. *Studiul ecopedologic evidenţiază, din punct de vedere cantitativ şi calitativ, modul de manifestare a fondului de calităţi şi lipsuri ale potenţialului trofic, în context ecologic zonal şi local. Principalii 20 de factori şi determinanţi ecolologici, climatici şi pedologici, sunt analizaţi din punct de vedere cantitativ (prin încadrarea lor în 8 clase de mărime ecologică) şi din punct de vedere calitativ (în 6 clase de favorabilitate ecologică), prin fişa de specific ecologic. Formula diagnozei ecologice a solului după caractere proprii analizează potenţialul trofic al solului în context ecologic zonal şi local.*

INTRODUCTION

The ecopedological study analyses the main qualitative features of the soil, showing the ecological specifics of the pedotop and the favourability of the different factors and of the pedological and the climatic determinants for the plants requierements (Chiriță, 1974; Bireescu, 2004). This analytical study takes into account the excessive presence or lock of the indexes factors and ecological determinant. This factors and ecological determinants should be improved in order to develop partially or totally, their favourability (Bireescu et al., 2005).

Analysing, on the one side the ecological complex of the research station and on the other side the trophic potential of soil we can observe where (on which factors) and how would be necessary in the process of ensuring the best edaphic and nutritional conditions (Bireescu, 2005; Teodorescu et al, 2007).

MATERIAL AND METHODS

The soil samples were taken from the soil profiles of different genetic horizons, they were analysed in field and laboratory by specifically methods (after ICPA). We selected 20 factors and ecological determinants: 15 pedo-ecological factors (growing factors, the pedological determinants, the negative ecological factors, the negative eco-pedological factors, the pedological indexes and pedo-biological synthetic indexes) and 5 zonal and local climatic factors. These factors have been characterized from a quantitative point of view (in 8 ecological classes) and qualitative (in 6 ecological classes of the favourability) following a specific ecological criteria. Then we made the ecological diagnosis synthetic formula of the soil (DE) which analyses how is put to good use the trophic potential of soil in the zonal and local ecological conditions.

RESULTS AND DISCUSSIONS

The results of this ecopedological study were made within the Biostar – Nucleus National Research Project.

A. The main features of soil profile

In table no 1 features the quantitative analyse of the main indexes of the soil profile (stagnic preluvisols) in natural forest from Copalau Botosani and the cambic chernozem profile soil from the forest ecopedotop from Roscani Iasi (Moldova Plain).

a. The forest ecopedotop from Copalau Botosani

- the soil texture has moderate profile differences (medium silt – LL symbol) within the first 20 cm and it is fine deep inside (clay silt – within 20 - 40 cm, T symbol and medium clay silt into 40 - 60 cm deeply – TT symbol); the difference texture index (Idt = 1.505) indicates a strong at the textural on the profile. The percentage of the colloidal clay varies between 28.7% at the top and 43.3 % at the Bt horizon.
- summer consistency of the dry soil is hard and very hard deep inside;
- soil aeration has small values between 8 % at the top and 5 % deep inside;
- exchange base sum (SB) has low values, between 12,7 me at the top and 17,3 me deep inside;
- cation exchange capacity (T) has small values, between 14,9 me at the top and 19,7 me deep inside;
- soil reaction is moderate acid, the values varies between 5,5 and 5,8 pH units;
- humus content has middle values in the bioaccumulation horizon (4,217 %);
- total N content has small values, between 0.128 % and 0.061%;
- P mobile content has middle values at the top (20 ppm) and small values deep inside (15 ppm);
- mobile K content has middle values within profile, between 157 and 136 ppm;
- base saturation level has middle values, between 75 % and 87 %; the soil is mezzo-basic;

- the synthetic index of potential trophicity (TP) measures 105 points, which it means an eutrophic soil;
- the synthetic index of effective trophicity, in the local and zonal climatic context, penalizes, during droughty summer, the trophic potential, with 27 points; which results a value of 78 effective points (mezzo - trophic soil).

b. the forest ecopedotop from Prisecani Iasi

- the the soil texture has little profile differences (Idt = 1.103) on the soil profile. It is fine (silt clay dusty – Tp) with values between 35,1 % and 38,7 % colloidal clay;
- summer consistency of the dry soil is hard and very hard deep inside;
- soil aeration has middle values between 18 % and 15 % and deep inside has small values (11 %);
- exchange base sum (SB) has middle values into profile, from 22.1 me to 18.3 me;
- total cation exchange capacity (T) has middle values, from 23.6 me to 19.8 me;
- soil reaction is a little acid, the values varies between 6.3 and 6.8 pH units;
- humus content has middle values in the accumulation horizon and low values deep inside;
- total N content has medium values into profile, between 0.261 % and 0.154%;
- P mobile content has middle values, between 31 ppm and 16 ppm;
- mobile K content has great values, between 242 ppm and 173 ppm;
- base saturation level has higher values, between 87 % and 98 %; the soil is eubasic;
- the synthetic index of potential trophicity (TP) measures 159 points, which means a mezzo-trophic soil;
- the synthetic index of effective trophicity, in the local and zonal climatic context, it penalizes, during droughty summer, the trophic potential with 34 points resulting a value of 125 effective points (eutrophic soil).

B. The specific ecological file of the ecopedotop

For the ecological interpretation of the qualitative features of the soil in zonal and local ecological context, we have selected 20 important factors and ecological edapho-climatic determinants: 5 ecological climatic factors, 3 pedological growing factors, 2 pedo-ecological factors depending on time and space; 2 negative pedo-ecological factors, 5 ecopedological determinants, 1 pedo-biological determinant and 2 synthetic pedological determinants. They have been analyzed according their values and arranged criteria from a quantitative point of view (8 ecological classes) and a qualitative (6 ecological classes of favourability for vegetation) through specific ecological file of the ecopedotop (table no. 2).

The specific ecological criteria shows an analytical and synthetical image of point of view research station the soil and of its ecosystem; it shows also the factors and the ecological edapho-climatic determinant limiting through their absence or excess and the “qualities” content of the biotope potential. The ecological study shows the ecological specific of the pedotop and the trophic favourability content which are really and objectively influenced by climate.

The analysis of the complex ecological indexes through a specific ecological criteria shows us the following:

a. The forest ecopedotop from Copalau

- the majority of the factors and edapho-climatic determinants are classified into the medium size (III and IV) and medium favourability classes;
- into the small size class (II) are classified through their absence: total N content, the low summer precipitations, the summer atmospheric humidity, the air porosity and the biological activity of soil;
- into the big size class (V) are classified the useful edaphic volume of soil and the bioactive period;
- into the excessive class E1 is classified through its excess, the hard summer consistency of the dry soil;
- into the low favourability class for the forest vegetation are classified the diminished content of N, low level of the summer precipitations, hard summer consistency, soil aeration and the low biologic activity in the bioaccumulation horizon.

b. The forest ecopedotop from Roscani

- the majority of the factors and ecological edapho-climatic determinants are classified into the medium size and medium favourability classes;
- into the small size class (I and II) are classified the low level of summer precipitations, summer atmospheric humidity, low air porosity and soil reaction;
- into the big size class (V) are classified the great K content, the useful edaphic volume, the bioactive lengh period, the potential trophicity;
- in the excessive class E1 are classified through excess the summer consistency of the dry soil;
- in the very low and low favourability classes are classified the low summer precipitations, the night summer consistency of soil and low level of soil aeration.

C. The ecological diagnosis of the soil (ED)

This general synthetic index shows the conditions for the manifestation of the trophic potential of the soil in the zonal and the local edapho-climate ecological conditions. This index is presented in the following formula:

$$ED = \frac{Tp \times Te}{(Ve \times Tx \times C \times O)(pH \times H \times V \times Nt)(T \times P \times Pe) \times Bio}$$

ED = ecological diagnosis of soil

a) fertility index

Tp = synthetic index of the potential trophicity of soil

Te = syntetic index of the effective potential trophicity of soil

b) pedological physical-mechanical indexes

Ve = edaphic volume

Tx = soil texture
C = summer consistency of soil
O = soil aeration

c) chemical pedological indexes

pH = coil reaction
H = humus content
V = base saturation level
Nt = total N content

c) ecological climatic indexes

T = annual average temperature
P = annual average precipitations
Pe = summer precipitations

d) the biological synthetic index

The biological bio – activity of soil

By using the formula for the analyzed local forest ecopedotop, it results the following:

- for the forest ecopedotop from Copalau – Botosani:

$$ED = \frac{Tp_{105} \times Te_{78}}{(Ve_V \times Tx_{III} \times C_{E1} \times O_{II})(pH_{III} \times H_{III} \times V_{III} \times Nt_{II})(T_{IV} \times P_{III} \times Pe_{II}) \times Bio_{II}}$$

- for the forest ecopedotop from Roscani Iasi:

$$ED = \frac{Tp_{159} \times Te_{125}}{(Ve_V \times Tx_{III} \times C_{E1} \times O_{II})(pH_I \times H_{III} \times V_{IV} \times Nt_{IV})(T_{IV} \times P_{III} \times Pe_{II}) \times Bio_{III}}$$

The analyses of the synthetic index represented by the ecological diagnosis of soil, following its own features, shows that the trophic background has medium values (eutrophic) at Copalau and higher values (mezzo-trophic) at Roscani.

In the zonal and the local ecological context this trophic potential is not fully capitalized mainly in the dry summer season. The night summer consistency, the low soil aeration and the fine soil texture inside the B horizon represent stressing factors and ecological determinants for the evolution of the forest vegetation.

Table 1

Main Physical And Chemical Features From Forest Ecopedotops From Copalau - Botosani And Roscani – Iasi

Ecopedotop	Depth (cm)	Colloidal clay (%)	Textural class	Summer consistency	Soil aeration	C/N	SB (me)	T (me)	Humus content (%)	pH_{H2O}	P_{Al} ppm	K_{Al} ppm	V (%)	Potential trophicity (Tp points)	Effective trophicity (Te points)
Forest from Copalau - Botosani	0-20	28.7	LL	hard	8	14	12.7	14.9	4.217	5.5	20	157	75	63	78
	20-40	35.3	T	hard	6	13	15.1	17.8	1.751	5.7	19	141	83	29	
	40-60	43.2	TT	very hard	5	11	19.7	5.8	0.754	5.8	15	136	87	13	
Forest from Roscani - Iasi	0-20	35.1	TP	hard	18	12	22.1	23.6	4.612	6.3	31	242	87	80	125
	20-40	36.2	TP	hard	15	13	20.7	21.7	3.011	6.5	25	181	93	54	
	40-60	38.7	TP	very hard	11	10	18.3	19.8	1.407	6.8	16	173	98	25	

Table 2

The specific ecological file of the ecopedotop

Ecological and edapho-climate factors and determinants	Size classes of ecological factors								Favourability classes of ecological factors					
	0…m	I	II	III	IV	V	E1	E2	N…m	FS	S	M	R	FR
Growing factors														
Total N content (Nt)			○		●						○	●		
Mobile P content (P_2O_5)				○	●							○●		
K assimilation (K_2O)				○		●						○	●	
Ecological climate factors														
Annual average temperature (T°C)					○●									○●
Annual average precipitations (Pmm)				○●								○●		
Winds (Vt)				○●								○●		
Summer precipitations (Pe)			○●								○●			
Summer relative humidity (Uer)			○●								○●			
Ecological factors: the space and the time														
Edaphic volume (Ve)						○●							○●	
The bioactive length period (LPB)						○●								○●
The negative ecological factors														
Alkalinity and acidity (Alc-Ac)				○●								○●		
The summer consistency (Con)							○●			●	○			
The ecological determinants														
The humus content (H)				○●								○●		
The soil texture (Tx)				○●								○●		
The the air porosity (Pa)			○●							●	○			
The soil reaction (pH)		●		○							○		●	
The base saturation level (V%)				○	●							○	●	
The synthetic biological indexes														
The biological activity (Bio)			○	●							○	●		
The synthetic pedological indexes														
The potential trophicity (Tp)					○	●						○	●	
The effective trophicity (Te)				○	●							○	●	

CONCLUSIONS

- the complete ecological study of soil shows the biotope the qualities and the imperfections in the zonal and the local ecological context;
- through specific ecological criteria it shows the main factors and ecological edapho-climatic stressing determinants through their absence or their excess: the summer drought, the fine texture of soil, the hard summer consistency, the low porosity of aeration, the low to medium biological activity from the forest ecosystems;
- ecological diagnosis of soil shows a medium value trophic background into the Copalau – Botosani forest and a higher trophic background into the Rascani – Iasi forest, which couldn't fully capitalized during the droughty summer season and during the moistly seasons when the rain water stagnates at the level of the Bt and Bv horizons, due to the fine texture of their soil.

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NITROPHYLL FLORA FROM DIFFERENT SOIL TYPES

FLORA NITROFILĂ DE PE DIFERITE TIPURI DE SOL

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Abstract. *Soils are influenced to a great extent by the vegetal and animal organisms. In the soil survey activity, it was necessary to describe the soil cover plants. The modification of the chemical and physical soil properties was indicated by spontaneous plants species. In order to describe soil units, it was very useful to know plant indicators of soil properties, such are pH, nitrogen and soluble salts content, soil moisture, and soil compaction. In that paper, we presented some plants species, which belonged to the same biotope, but developed in soils with high nitrogen content.*

Rezumat. *Formarea solurilor este condiționată de organismele vegetale şi animale. Întocmirea studiilor pedologice impune cunoaşterea aprofundată a speciilor şi a asociaților de plante din cadrul covorului vegetal care determină formarea şi evoluția solului. Modificarea unor însuşirifizice şi chimice ale solurilor este ilustrată în mod frecvent de speciile de plante din flora spontană. La descrierea unităților de sol este utilă cunoaştewrea unor specii de plante indicatoare ale însuşirilor solurilor precum pH –ul, conținutul de azot, săruri solubile, umiditatea, starea de compactare etc. În această lucrare se prezintă plante nitrofile care se dezvoltă în anumite condiții de sol şi biotop.*

Plants from spontaneous flora may give frequently additional information on some soil characteristics. The frequent presence of some plant species and associations on soils with certain characteristics gave them the name of *indicator plants.* Although most of indicator plants reflect only the characteristics of soil surface (0-50 cm), their knowledge allows an estimate characterization of soil units, sometimes better than data obtained from present determinations of easily changeable soil characteristics. There are indicator plants that develop only when the parameters of some characteristics are within a restraint interval of values, such as high ecological amplitude plants.

Nitrophyll (nitrogen-liking plants) species grow and develop only on well-supplied soils in nitrogen. They are found on fertile soil fields, with high nitrate content, on the edge of ditches and roads, surrounding the haystacks from gardens, which remained uncultivated, on ruderalized sites, fertilized with manure, in pits with composted organic materials, etc. In most of cases, the nitrophyll plants are good indicators of other soil characteristics. Thus, *Amaranthus retroflexus* grows well on dry calcareous soils, while *Chenopodium polyspermum* is found on neuter, moderately moist soils; *Chenopodium album* is indifferent to soil reaction, but requires a moderate moisture, while *Bidens tripartita*, which is indifferent to soil reaction, grows on soils affected by moisture excess (Chirilă, 2001). This paper presents nitrophyll plants, which develop under certain conditions of soil and biotope.

MATERIALS AND METHODS

Soil studies require the profound knowledge of soil classification, of typified units of clime, relief, rock and plant species and associations from canopy, which determine soil formation and evolution. The most important element from the point of view of soil mapping is the floristic area (climatic and edaphic), because it allows obtaining practical and synthesis deductions of zonal, inter-zonal and azonal soil distribution. The floristic area is a limited field (lower or greater), where the same ecological conditions (climatic and edaphic) dominate. The climatic ecology is characterized by a local microclimate, which influences some soil characteristics. Between the climatic ecology and the edaphic one, there is an interdependence, which is solved by the domination of one over the other. Their spatial expansion is adjusted by micro relief units and subunits and reflected by floristic area (Bucur 1949).

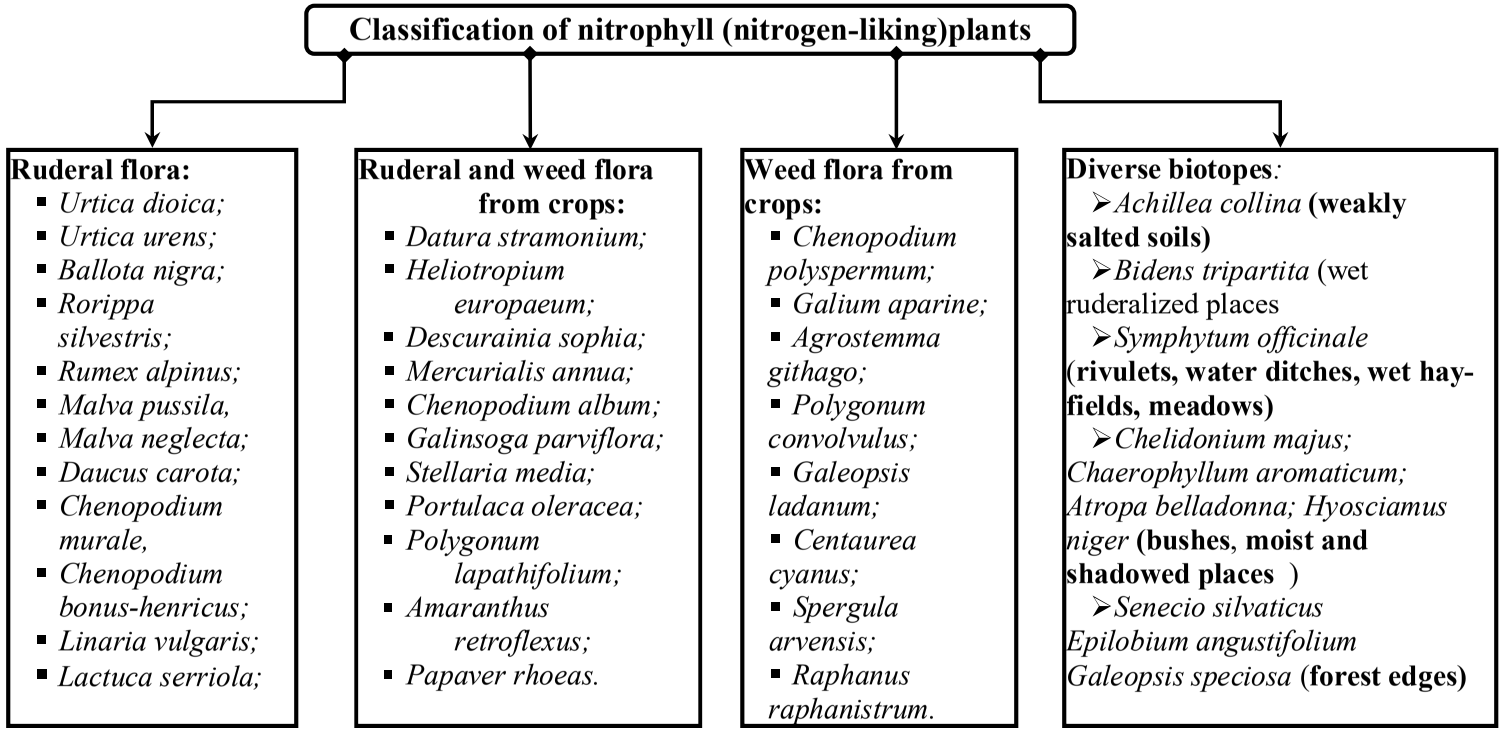
Instructions concerning the soil surveys (Florea et al., 1987) foresee the elaboration of a chapter on natural environment conditions and vegetation. In the morphological characterization cards for each soil unit, the type of present vegetation type and the species of indicator plants are mentioned. When describing vegetation, the determination on species of plants is required, because, within the same genus there are species, which develop on soils with very different physical, chemical and morphological characteristics (Filipov and Slonovschi, 2006).

It is necessary to present both plant species, found in the studied area, and their abundance and dominance. Because there is a tight correlation between plant height, their abundance and nitrogen content, the knowledge of nitrogen-liking plants from different biotypes is important for the assessment of the degree of soil supply in nitrogen. The nitrogen compounds are easily soluble, which explains their annual and even month dynamics, especially in easily permeable soils, or with a very good drainage. The indicator plants of nitrogen rich soils may be found on soils moderately supplied with this nutritive element, but their development and frequency are reduced.

RESULTS AND DISCUSSIONS

Among the plant species indicating over-fertilized soils, there are *Sambucus ebulus, Urtica dioica, Urtica uren, Chelidonium majus ,Datura stramonium*, *Chaerophyllum aromaticum, Ballota nigra, Rubus caesius ,Solanum nigrum , Epilobium angustifolium ,Atropa belladonna ,Rorippa silvestris, Senecio silvaticus, Rumex alpinus , Achillea collina, Malva pusilla, Malva neglecta ,Amaranthus retroflexus ,Bidens tripartita ,Heliotropium europaeum, Descurainia (Sisymbrium) sophia, Daucus carota ,Hyosciamus niger ,Mercurialis annua, Symphytum officinale, Chenopodium polyspermum, C. album ,C. murale, C. bonus – henricus*, *Galeopsis speciosa, Galinsoga parviflora, Stellaria media,, Portulaca oleracea, Polygonum lapathifolium, etc.* (Slonovschi et al., 2001, Prodan, 1939, Bucur 1949).

Because the nitrophyll species live in different biotypes with different characteristics, we present their classification in Diagram 1.



Scheme 1- Indicator plants for well-supplied soils in nitrogen

The nitrogen-liking species *Urtica dioica* (fam. *Urticaceae*) can be easily observed on moderate fertility soils, after cattle grazing. From the nettle seeds, which sprout on sites filled with manure, tall plant (1-2 m) and vigorous plants grow, which fructify abundantly. While the nitrogen source diminishes, the plants height decreases until their death. The diminution in nitrogen content is associated to gradual replacement of *Urtica dioica* plants by other species with lower demands for nitrogen from soil (Slonovschi et al. 2001).

Sambucus ebulus belongs to family *Caprifoliaceae,* and is a perennial plant, with unpleasant odour, mesophyte, mesoterm, which develops on soils with weakly acid , neuter or weakly alkaline reaction, and a great nitrogen content. It is frequently found on plains and hilly areas, and rarely, in the mountainous area, where manure is deposited, next to sheepfolds, on the edge of roads and channels, on less compacted fertile soils. The dwarf elder has a thick rhizome of 2-3 cm, of which roots develop. *Sambucus ebulus* phytocenoses form bunches of variable sizes, under the shape of 1-2 m high bushes, which are not grazed by animals, because their smell is unpleasant. They form associations named *Sambucetum ebuli*. Besides the edifying species of the association, in dwarf elder bunches, different plant species are found, such as *Urtica dioica, Arctium lappa, Daucus carota, Ballota nigra, Rubus caesius, Achillea collina* and many other species , which frequency is lower than 1%. *Chelidonium majus,* from family *Papaveraceae,* is another perennial, mesophyte, mesoterm, sciophyll plant, which is found in shadowed places from forests, bushes, gardens, close to fences, buildings, and human dwellings. We find it from plains to the mountainous region, at maximum heights of 800-1000 m. Its requirements towards soil moisture are modest, but it does not bear excess moisture. Being a shadow plant, the common celandine is found on fertile soils with high content in organic matter. A specific trait of this species is the presence of yellow-coloured latex, which, in contact with air, becomes brown; it is the only species from Romania, which has yellow-coloured latex. *Chenopodium album* (fam. *Chenopodiaceae*) is a common annual plant, which grows especially on moderately salted soils, mesophyll to xerophyll, mesoterm, more heliophyll than sciophyll, neohalophyll. Its tolerance is from weak to very high. It develops on various mediums, and grows better on moist, fertile , ruderalized or cultivated, often salted soils. It is a summer and autumn plant, with less deep roots, fleshy leaves, and grows on fertile soils. It is of various ecotype, from isolated samples to dense bunches. It grows in crops or ruderalized places, slightly fallow, and it is rarely spread in fallow pastures and hayfields, with a great nitrogen content and slightly salinized.

Bidens tripartita L. belongs to family *Compositae*. It is a summer annual plant, with a height until 80 cm, and which flowers during July-September. It has yellow flowers and forms about 250 fruits. It grows on the bank of lakes, marshes, on temporary flooded fields. The soils on which these plants develop are affected by temporary moisture excess, caused by ground waters, (gleyc subtypes of alluvia-soils, phaeozems, preluvosoils) or rainfall (stagnic subtypes of luvosoils, preluvosoils). It is an eutrophic , mesohygrophyll-higrophyll species.

Bur marigold is an edifying species of the association *Bidentetum tripartite,* which is found on the bank of waters, marshes, moist places, small depressions with slightly salinized soils, affected by moisture excess in spring, and well supplied in nitrogen. This association is annual, heliophyll, and mesohygrophyll. The edifying species *Bidens tripartita* is accompanied by species *Polygonum hidropiper, Polygonum lapathifolium, Ranunculus sceleratus, Rumex limosa, Heleochloa alopecuroides, Veronica anagallis – aquatica* , etc.

Atriplex tatarica is an annual, mesophyll to xerophyll, mesoterm to megaterm, neohallophyll species, with weak to high tolerance. It develops well on places with many nutritive substances, very ruderalized by camping of cattle, which are manure fertilized, moist or dry. Then, it can bear a greater salinity. We find it as isolated samples on salted marl and coast saline soils. It is a summer plant, with deep root, very succulent, which turns red after white frost falling. The plant develops in bunches, but also as isolated individuals, on fallow soils, frequently in the plain. It forms annual nitrophyll phytocenoses, identified on vacant fields with compost stores. Its height does not exceed 30 cm, because long stems of 100 (150) cm creep on soil surface, which it covers at a rate of 60-100%. The most frequent species, to which *Atriplex tatarica* associates – the edifying species of association *Atriplicetum tataricae,* are *Chenopodium album, Polygonum aviculare, Descurainia (Sisymbrium) sophia, Ballota nigra, Tripleurospermum (Matricaria) inodorum*.

Malva pusilla is a annual grass species, with thin tap root, branched stem at base, long of 10-15 cm, lodged or erect. The long-petiole leaves have an uneven shape, cordate at base, and 5-7 lobed, non-regulated toothed leaves. It flowers from July to September. It grows in ruderal places, in crops, near roads, fences, in yards, and on sandy fields poor in calcium bicarbonate. It likes dry-moist (xero-mesophyll) soils. The plant is spread through all the continents.

Malvetum pussilae association is annual, nitrophyll and populates the fields with soil rich in nitrates, the edge of ditches and roads, yards, cattle sheds, poultry houses, and around haystacks from gardens.

Malva pussila forms open associations, under the shape of different size bunches, covering soil at a rate of 30 – 90%. The plants from this association have a low height, not exceeding 15-25 cm. The great number of plants adapted to satisfying soil moisture gives a mesophyll trait to this association. Soil dryness accelerates the flowering of edifying species *Malva pussila* and *Malva neglecta*. *Malva neglecta* association reaches maturity in summer months (July-September). Among the constant species of this association, there are *Polygonum aviculare, Lolium perenne* and *Tripleurospermum (Matricaria) inodorum*. After the diminution of nitrates from soil, *Malvetum pusille* evolves towards *Polygonetum avicularis*. On clayey soil, this association passes to *Lolio – Plantagenetum majoris*.

Rumex alpinus is a perennial species, with thick, multi-headed creeping rhizome, of which aerial stems of 1-2 m high emerge. Radical leaves are very large, with long petiole, and the limb deeply cordate, long of 35-50 cm and broad

of 10 – 25cm. Inflorescence is small and without bracts. It flowers during July-August and is spread in the mountainous and sub alpine floor, at the height of (900) 1200 – 1500 (1800) m.

This species is tightly correlated to the great content of nitrates from sheep faeces, as it "moves" together with sheep. In the ex sheepfolds, this species is no longer found in case of the significant diminution of nitrogen content.

It forms the *Rumicetum alpini* association on the place of ex sheepfolds. The dominant species, characteristic to the *Rumex alpinus* association, is accompanied by some species typical of coast and depression weeds (eutrophe and nitrophyll species) and from surrounding phytocenoses (*Urtica dioica, Carduus personata, Chaerophyllum aromaticum, Dactylis glomerata, Geum rivale, Stellaria nemorum, Trifolium pratense, T. repens, Capsella bursa – pastoris*, etc.).

CONCLUSIONS

1. The knowledge of nitrophyll plants from different biotopes is important in estimating the degree of soil supply with nitrogen, because there is a tight correlation between plants height, their abundance and nitrogen content. On weakly nitrogen supplied soils, plant height is low.

2. The delimitation of areas with nitrophyll plants is useful, too, to determine the sites for soil sampling, in order to carry out nitrogen analyses and draw fertilization plans.

3. The recognition of nitrophyll weed flora from crops is important, because it gives additional information on the uniformity of nitrogen supply on soil from experimental plots.

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RESEARCES CONCERNING THE MAIN AGROCHEMICAL CHARACTERISTICS OF THE SOILS FROM THE NORTHERN AREA OF BUCHAREST (SCDP BANEASA AREAL) AND THEIR SUITABILITY FOR THE APRICOT AND PEACH GROWING

CERCETĂRI PRIVIND PRINCIPALELE CARACTERISTICI AGROCHIMICE ALE SOLURILOR DIN ZONA DE NORD A BUCUREŞTIULUI (AREALUL SCDP BĂNEASA) ŞI PRETABILITATEA ACESTORA PENTRU CULTURA CAISULUI ŞI PIERSICULUI

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Abstract. *This investigation has for an object the knowledge of the agrochimical characteristics of the soils from SCDP Baneasa, regarding the optimum exploitation of fruit-growing plantations and represents a support for the organisation of the horticultural production , the emplacement of the experiments and properly explanation of the results.The fruit-growing crops most satisfy both the exigences by quantitative order and espicially qualitative order of the customers emphasizing, moinly on the respecting of the specific conditions of a durable agriculture. As a result, the using of the fertiliers must be done so that their applications must respect the trees requirements and the natural equilibrium between the properties of the soils and the administrating echological conditions for excludes the soil pollution.*

Rezumat. *Prezentul studiu are ca scop cunoasterea caracteristicilor agrochimice ale solurilor din cadrul SCDP Baneasa, in vederea exploatarii optime a plantatiilor pomicole si constitue un sprijin pentru organizarea productiei horticole, amplasarea experientelor si interpretarea justa a datelor obtinute. Recoltele pomicole trebuie sa satisfaca atat exigentele de ordin cantitativ dar mai ales de ordin calitativ ale consumatorilor, punându-se accent pe respectarea conditiilor specifice agriculturii durabile. Ca urmare, folosirea de amendamente si ingrasaminte trebuie facuta astfel incat aplicarea lor sa respecte cerințele pomilor, echilibrul natural intre însuşirile solurilor cat si conditiile ecologice de administrare pentru excluderea poluarii solului.*

MATERIAL AND METHOD

For the soil characterization it has been proceed at sampling soil from the lots of the fruit plantation of the SCDP — Baneasa during 2006. Taking the elementary samples as well as the chemical analysis of these samples have been made with the compliance of the agrochemical carting methodology elaborated by ICPA — Bucharest. pH has been determined in aqueous extract in a soil water ratio of 1 2,5 through the potentiometric method; Humus (H %) has been determined through wet

oxidation after the Waleley Black-Gogoasa method and titrimetrical dosage; Nitric nitrogen (N-NO_3) has been determined through the potentiometric method using electrodes with membrane ion selective for nitrate in K_2SO_4 0,1 n solution; The accessible potassium has been performed in AL ammonium after the Egner-Riehm method through flame photometration; The phosphates easy soluble determined in AL ammonium extract, colorimetric, after the Egner-Riehm method; The hydrolytic acidity (Ah) and the amount of changeable bases (SB) have been made titrimetrical after the Kappen method; The level of saturation with bases ($\mathbf{V_{Ah}}$) has been determined through the total cationic exchange capacity (T) and through SB and Ah respectively; The assessment of the supply with potential assimilable nitrogen has been done depending on the soil's nitrogen index (IN). JN is expressed through the relation between the humus and the level of saturation with bases IN=H% x V_{Ah}% /100.

RESULTS AND DISCUSSIONS

From the analysis of the soil samples taken from lots planted with fruit trees (apricot, peach) results have been obtained, results which in general match the limits in which the plant grows normally. We present below the average values of some important characteristics in the nutrition and growth of the mentioned plants. The average values have been calculated based on the agrochemical results obtained through sampling from different lots of the SCDP Baneasa area. Based on the agrochemical analyses done at SCDP Baneasa in this paper is presented the state of supply with nutrients of the soil. Since the root system and the useful edafic volume are placed at high depths (as far as 100 cm) the results of the two depths (0-20 and 20-40) from which the analyzed samples have been taken are presented in (table 2) from below as minimum and maximum values.

SOIL REACTION (expressed as pH units) — represents for the cultivated plants in general an ecologic factor with major implications on the growing and bearing fruits processes. In the culture of the fruit types, the plants which grow and develop on the same place over more years, among other aspects arises the problem of the role of soil reaction, this being an edafic factor with long term effects over the nutrition processes and over the production implicitly. The soil reaction is influenced by certain factors of climate and soil, edafic factors with long term effects (rainfall, gleization state, texture the level of erosion). Thus taking into account just the pH isn't enough and needs to be taken into account and the others physical and chemical properties of the soil. **pH** — (expression of soil reaction) is very important because it influences the whole complex of soil characteristics, a part of physical properties and also the chemical reactions and what is the most important it influences also the biological properties of the soil. In direct connection with the microorganisms, the pH and the soil's humidity condition either aerobic processes or anaerobic processes (oxidative reactions or reduction reactions). As an outcome, from these reactions results accessible chemical forms for the plants, for example nitrates (NO_3^-) or toxic fonns, for example nitrites (NO_2^-). The apricot is the most sensitive species at the acidic reaction medium. The apricot as well as the peach

is a type of tree which expresses it's preferences in the neutral to alkaline reaction medium. The partial results obtained directly from on the analyzed samples refer to the apricot and peach plantations from SCDP Baneasa taking into account that these species are more difficult as far as the soil conditions, the humidity, the illumination, the aerohydric regime, the soil reaction are concerned. The pH values of the lots placed around the 6,9 value. The extreme values have been about 5,7 and 7,2. Maintaining the optimal pH range especially for the apricot and peach types as well as for trees in general is a necessary condition in the success of the normal growth of a tree culture and in obtaining a high productions quantitatively as well as qualitatively.

HUMUS (H %) — is as far as the soil's fertility is concerned, 'a very important fertility indicator. The humus content is protected on the soils with clay content >2 μ and heavy saturated with bases, which constitutes this way the clay-humic complex. The soil in the SCDP Baneasa area has superior properties than the sandy soils due to its clay texture (A horizon). However, on the one hand because of the long exploitation of the field with apricot and peach plantations and because of the partial fertilization administration the humus content has decreased, framing itself in the category "low-middle content" textural class clay. The extreme values obtained are 2,17 % and 3,90 %. The humus content is important because it releases nutrients gradually (with its help is calculated the potential state of supply with nitrogen (IN)).

POTASSIUM is important in the development of the vital intracellular processes of the plants. This enters in the structure of the enzymes and is implicated in the cellular division in the acid-base balance and also in the plant's metabolism. It moves under the form of ions in the conductive vessels of the plant, in the tissues with intense metabolism and fast growing, taking part among others at the adjustment of the tissues permeability, of the perspiration and cells turgescence. At SCDP Baneasa the state of supply with assimilable potassium is good with extreme values of 161,5 ppm and 441,0 ppm.

PHOSPHORUS takes part in the composition of some organic substances of vital importance from the living tissues for example the nucleoproteins, lecithins, phosphatides but it is found in inorganic form as ortophosphates. Phosphorus takes part in the composition of the nucleotides with macroergic groups participating to the phosphorilation reactions in a series of major physiological processes as the photosynthesis, Krebs cycle, in glycolisis. Phosphorus manifests with priority in the processes regarding root growing, in the blooming, ripening processes of the fruits and in the differentiation of the buds from the fruits. Like potassium phosphorus has an important role in the fruit keeping capacity (long term storage) in correlation with K, Cu and Ca. At SCDP Baneasa the state of supply with phosphorus isn't homogenous from a lot to another recording values from 52,42 ppm 250,3 ppm which is explained by the enhanced diminution of the initial content through intensive exploitation of the plantation.

The **HYDROLITIC ACIDITY** — has encountered very wide variation

limits between 0,35-2,5 m.e./l00 g dry soil, lots being considered not homogenous from this point of view.

The **NITROGEN INDEX** — expresses the potential of assimilable nitrogen from soil and has a great importance because nitrogen is the main element of the growth having a plastic organogen role in the constitution of the chlorophyll proteins, of the enzymes, of some vitamins and vegetal hormones. The mineral nitrogen content (NO_3^- and NH_4^+) expresses at the same time soil's microbiological activity which is dependent to the aerohydric regime as well as to the clay presence <2 μ (soil texture). For the assessment o1 mineralized organic matter content from soil and the one of mineralized nitrogen from this one it was determined the nitrogen index (IN). The SCDP Baneasa area's soil frames in the class of middle supply regarding the nitrogen content.

INCREASING THE FERTILITY — soil fertilization is a decisive measure for good quality crops and resistant to storage and at the same time for the differentiation of floral buds which will bear fruits the next year. This ensures by the application of a complex of agrotechnical measures (land farming, fertilizers application and culture irrigation). These measures focus on maintaining and enhancing the nutrition capacity of the plants without damaging the soil. In general, where is the case, the fertilizers application will be done for the adjustment of acidic soils (pH under 5,5 or V_{Ah} under 65%). It is recommended the application of organic fertilizers and the chemical ones should be administrated only fenophasic in addition to the nutrition necessary. The fertilizers effect ensures an optimal pH which influences decisive active the soil micro flora as well as the good nutrition with nitrogen. Among organic fertilizers the manure ensures a complex combination of NPK nutrients and microelements which have a catalytic role in the biochemical reactions which are at the base of the development of all the vital processes from the plant (photosynthesis, respiration, dry substance accumulation). The rational and efficient application of fertilizers from an ecological point of view can be done only based on the detailed knowledge of the soil's physico-chemical conditions as an active sub layer for the fruit trees growing. Paying attention to the abiotic environmental factors (land fanning, aerohydric regime and fertilizers application) as well as to the biotic factors (optimal microbial activity) it can be achieved the optimal fertility level which can ensure a good nutrition to the trees and a good resistance at specific diseases and pests.

Table 2

The main chemical characteristics of the soil decesive in the growing and fructification of the apricot and the peach at SCDP Băneasa

LOT / TYPE	*pH($_{H2O}$) 0–40 cm*	*Humus% 0-40 cm*	***NO_3^-*** *ppm*	*K accesibil ppm*	*P accesibil ppm*	*SB m.e./ 100g*	*Ah m.e./100 g*	*V%*	*IN*
702 APRICOT (X	*6,8 - 7*	*2,17 – 3,16*	*115,5*	*328,1 -441,7*	*52,4 -157,2*	*8,16-12*	*0,35 -0,88*	*92,7-97,0*	*2,02 - 2,93*
703 APRICOT (VIII)	*6,75-6,8*	*2,94 – 3,3*	*106,3*	*161,5 -299,7*	*150,4 - 224,8*	*8,6 - 19*	*0,87 -1,05*	*89,9 - 95,7*	*2,68 - 2,98*
705 APRICOT (IV	*7 - 7.2*	*2,98-3,2*	*103,5*	*261,9 - 367,5*	*136,9 - 214,7*	*11,4-20,4*	*0,43 -0,7*	*94,2 - 97,94*	*2,81 - 3,19*
645 APRICOT (Colectie)	*6.91-6,9*	*4.17-3,9*	*147- 84*	*369.6 -439,0*	*220.5 - 201,7*	*59.28 58,52*	*0.75 - 1,55*	*98.75 - 98,44*	*4.12-3,88*
674 APRICOT (cult. concurs)	*6.0-6,12*	*2.25-2,5*	*99.7-98*	*310 - 312,2*	*62.2 -75,5*	*18.61 18,96*	*2.13 - 1,37*	*89.72 - 93,26*	*2.0 - 2,33*
671 APRICOT (collection)	*5,7-6,0*	*3,75-3,90*	*120 -116*	*325 -294,0*	*250 -227,.5*	*64,6 -54,2*	*0,43 -2,5*	*99,42 - 99,12*	*3,73 - 3,87*
Normal limits C.	**6,6-7,6**	**3,5-4,5**		**319,2-480,0**	**247,6-329,7**			**93-100**	**4,1-6**
704 PEACH(VII	*7,1–7.2*	*2,74–3,18*	*97,6-99,3*	*420,1-593,0*	*109,9-228,3*	*19,0-23*	*0,52 - 0,7*	*95,0-97,81*	***2,68 - 3***
PEACH(pilot)	*6.3-6,45*	*2.98-1,96*	*98-97,6*	*234- 320*	*49.96-96,64*	*11.4-18,78*	*0.7-1,22*	*94.2-93,9*	*2.8-1,84*
686 PEACH	*6.4-6,7*	*3.07-2,5*	*99,3-98,0*	*430.0-3,50*	*156.2-100,7*	*23.1-4,1*	*0.76-0,61*	*96.8-97,52*	*2.97-2,44*
670PEACH $_{LTV}$	*6.73-7,2*	*3.64-4,40*	*84-114*	*370.9-290*	*157.5-200*	*56.6-57,62*	*2,16-2.49*	*95.8-96,39*	*3.4-4,24*
Normal limits P.	7,0-8,0	3,5-4,5		319,2-480,0	247,6-329,7			96-100	4,1-6

NOTE: IN= NITROGEN INDEX OF THE SOIL = (H% X VAH %) / 100 WERE H = THE AMOUNT OF HUMUS OF THE SOIL (%) AND V = THE LEVEL OF SATURATION *WITH BASES OF THE SOIL (%)*

CONCLUSIONS

Soil management has to precede the actual set up of the plantations. This begins with the choosing of the fields regarding the structure, the texture, the level of the aquifer. In principle has to be taken into account the climate criteria and the geological ones in which is included the relief conditions and the climate (the field angle, the temperature variations from the months January, February and March which lead to the buds decalition and their breakage, action which can constitute a barrier in the way of the maximum rentability). It appears that the main agrochemical characteristics of the soils from the SCDP Baneasa area are satisfactory regarding their suitability for the apricot and peach growing (of middle and late season but less for the ones with early aging).

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ECOPEDOLOGICAL RESEARCHES ON ECOLOGICAL IMPACT OF THE BIOTOPE IN SOME PROTECTED PRATICOLE ECOSYSTEMS FROM MOLDAVIAN PLATEAU

CERCETĂRI ECOPEDOLOGICE ASUPRA IMPACTULUI ECOLOGIC AL BIOTOPULUI ÎN UNELE ECOSISTEME PROTEJATE DIN PODIŞUL MOLDOVEI

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Abstract. *The researches were done for the National Research Programme Nucleus Biostar. In this study are presented the main local and zone factors ecologically determining from the quantitative and qualitative point of view, with an ecological impact on biocenosi'ss structure and functionality from some protected areas.*

Rezumat. *Cercetările experimentale au fost realizate în cadrul Programului Naţional Nucleu-Biostar. În lucrarea de faţă prezentăm principalii factori şi determinanţi ecologici zonali şi locali, din punct de vedere cantitativ şi calitativ, cu impact ecologic asupra structurii şi funcţionalităţii biocenozelor din unele arii protejate.*

INTRODUCTION

Biocenosis productivity is conditioned by pedological, pedobiological and climatic factors of the biotope from the ecosystems (Chirița, 1974; Birescu and col, 2005; Teodorescu and col., 1999, Birescu, 2001). The soil and vegetal resources protection, amelioration and superior valuation represent an important element of sustainable development strategies (Blum, 1998; Cârstea, 2003; Parr and col., 1990; Răuță and col., 1997).

MATERIAL AND METHOD

Ecopedological studies on the ecological impact of the biotope, on the structure and functionality of the ecosystems biocenosis, were done for the National Research Programme Nucleus- Biostar.

Analysed areas from the ecopedological point of view correlated with the ecological specific, are placed in the Floristic Reservation Rupturii Coast – Tanacu, Vaslui. There were dug soil profiles on genetic horizons in 2 representative points: Tanacu hill and Tanacu valley which were analysed both in the field and in laboratory. Natural soil resources are analysed and expound through edaphically and climatic treats from the ecopedological record card and ecological soil diagnosis. There have been analysed 20 factors and edaphic – climatic determinants from the quantitative (ecological measure class) and qualitative (ecological favourable class) point of view, being noticed the limitative and stressing factors (missing or in excess) of ecological impact.

The ecological diagnosis formula analyses the utilisation way of fertility potential of soil resources in an ecological context. The main factors of biotope ecological impact (geologic, climatic, pedologic, antrophic) have been analysed from qualitative point of view.

RESULTS AND DISCUSSIONS

Analyse of the main physic-chemical treats of soil resources (Cernisoluri class, vertic cernisol soil type, gleic chermozem) are presented in **table no 1**.

The Floristic Reservation of pasture is placed on damaged field (with no enclose) with specific geomorphologic elements for moderate pluvial erosion:

- Soil texture is fine (clay loam, marked with T) with 35,5- 33,4% colloidal clay on the slope top stationary and 36,7- 34,2% on the bottom slope stationary;
- Aestival consistency represents an negative factor: very hard in both stationeries;
- Aeration porosity has low values in both stationeries. This is an limitative physical treat being marked as missing;
- Base exchange materials has middle values on the slope top stationary and large values on the slope bottom stationary;
- Exchangeable cations total capacity has middle values in both pedological stationeries;
- Soil reaction is neutral on the hilly stationary and alkalescent on the valley stationary;
- Humus content is decreased on the hill because of the pluvial erosion process and increased on the valley (the cumulative zone);
- Nutrient content id medium with increased values on the slope bottom stationary;
- Base status is increased;
- Potential trophicity has middle values; entrophyc soil on the top of the slope and megatrophyc soil on the bottom of he slope. Because of the erosion process and excessive drought, the trophicity potential is not enough valuated by the vegetation.

In **table 2** is presented the ecologic specific card for the both pedological stationeries, being analysed from the quantitative and qualitative point of view, fond qualities and soil resources types and the zone and local specific ecologic.

It is noticed that most of the ecologic and edapho-climatic factors and determinants are placed in the middle and favourably class for the practicol vegetation.

On the low class and decreased favourability (which is limited and stressing) are placed: low level of the aestival rainfalls, low air humidity in the aestival period and low aeration porosity.

In excessive E1 class is placed the negative pedologic factor of aestival soil hard consistency.

Table 1

The main physico- chemical traits of the protected praticol ecopedotype from Ruptura Tanacului Coast, Vaslui

Ecopedo logical stationaries	Depth cm	%	Texture class	Summer consistency	Aeration porosity %	C/N	BS me	T me	pH H_2O	Humus %	Nt %	P_{AL} ppm	K_{AL} ppm	V%	Potential troficity (points)	Effective troficity (points)
Hilly pasture Tanacu – vertic chernozem	0- 20	35,5	T	moderate cohesive	15	11	23,2	25,1	6,8	3,812	0,189	35	159	89	68	
	20- 40	34,4	T	moderate cohesive	14	9	17,1	18,3	6,9	2,514	0,157	31	147	95	47	
	40- 60	33,4	T	heavy	13	7	16,7	16,7	7,1	1,423	0,145	27	138	98	26	121
Valley pasture Tanacu – gleic chernozem	0- 20	36,7	T	moderate cohesive	13	12	33,5	32,4	8,1	4,824	0,254	58	201	98	87	
	20- 40	35,5	T	heavy	11	10	28,5	28,5	8,2	2,915	0,213	45	188	100	52	
	40- 60	34,2	T	very heavy	10	9	25,1	25,1	8,5	1,721	0,185	39	168	100	31	142

Table 2

The ecological specific card of the protected praticol ecopedotype from Ruptura Tanacului Coast, Vaslui

ECOLOGICAL FACTORS	Measure classes of ecological factors								Favourability classes of ecological factors						
	…m		I	I	V	V	1	2	N…m	FS	S	M	R	FR	
RAISING FACTORS															
Natrium total (N_t)				•	Δ							•Δ			
Phosphorus mobile (P_2O_5)					•	Δ							•Δ		
K asimilable (K_2O)				•	Δ							•Δ			
CLIMATICAL ECOLOGICAL FACTORS															
Annual medium temperature (T°C)														•Δ	
Annual medium rain (Pmm)				•Δ								•Δ			
Windy regime (Vt)				•Δ								•Δ			
Summer rain (Pe)			•Δ							•Δ					
Summer air relative humidity (Uer)			•Δ							•Δ					
ECOLOGICAL FACTORS SPACE- TIME															
Edaphyc volume (Ve)				•	Δ							•Δ			
Bioactive period length						•Δ								•Δ	
NEGATIVE ECOLOGICAL FACTORS															
Alkalinity - Acidity			•Δ										•Δ		
Summer consistency							•Δ			•Δ					
ECOLOGICAL DETERMINANTS															
Humus				•	Δ							•Δ			
Texture				•Δ								•Δ			
Aeration porosity			Δ	•							Δ	•			
Soil reaction		•		Δ								Δ	•		
Base status						•Δ							•Δ		
SYNTHETICALLY BIOLOGICAL INDEX															
Biological activity				•	Δ							•	Δ		
SYNTHETICALLY PEDOLOGICAL INDEX															
Potential trophicity					•	Δ							•Δ		
Effective trophicity					•Δ							•	Δ		

• - hill; Δ - valley.

Soil ecologic diagnosis emphasises a high trophyc potential (the potential trophicity index Tp 143 points on the top of the slope and Tp 170 points on the bottom of the slope):

- Rupturile Tanacu hill Coast

$$DE = \frac{Tp.143.Tc121}{(Ve_{III}.T_{xIII}(E_1O_{III})(pH_I.H_{III}.V_V.Nt_{III})(T_{IV}.P_{III}.Pe_{II}).Bio_{III}}$$

- Rupturile Tanacu valley Coast

$$DE = \frac{Tp170.Tc143}{(Ve_{IV}.T_{XIII}.CE1.O_{II})(pH_{III}.HIV.V_V.Nt_{IV})(T_{IV}.P_{III}.Pe_{II}).Bio_{IV}}$$

This trophyc potential is not enough valuated, especially because of the excessive and extended aestival drought and of the pluvial erosion and degradation process.

In table 3 the ecologic impact matrix shows that main biotope ecologic factors and determinants, restrictive and limitative for the biocenosis structure and functionality.

Table 3

The biotope ecological impact matrix on the protected biocenosis

Biotope ecological impact factors and determinants restrictive or limitative	NEGATIVE ECOLOGICAL EFFECTS						
	Biodiversity reduction	Soil biological activity reduction	Soil effective trophicity reduction	Natural biocenosis productivity reduction	Vegetation ruderalisation	Settling and destroying soil structure	Modification of the vegetal associations structure and perturbation of the phytocenosis optimal functionality
Surface and depth pluvial erosion	●	□	●	Δ	□	□	Δ
Aestival humidity deficit and excessive drought	●	●	Δ	●	●	●	Δ
Soil non uniformity	□	□	□	□	□	□	□
Aestival soil hard consistency	●	●	●	●	□	□	●
Low aeration porosity	●	●	●	●	□	●	●
Fine texture	●	●	●	●	□	●	●
reduced edaphyc volume because of the slope process	●	□	Δ	□	□	□	□
Anthropic impact (animal circulation and not bounded fields).	Δ	●	□	Δ	●	Δ	●

The impact intensity: □ - minor;
● - major;
Δ - excessive

There have been identified the biotope ecologic factors and determinants of negative impact, on the structure and functionality of the protected biocenosis, as well as the 7 main negative ecologic effects.

The main ecologic impact elements are: sheet and gully erosivity and slopes; aestival humidity deficit and excessive drought; not uniform ground, aestival soil hard consistency; low aeration porosity; fine texture; reduced edaphic volume because of the slope process and antrophic impact (animal circulation and not bounded fields).

The main negative ecological effects are: floristic biodiversity reduction; soil biological activity reduction (with negative influence) in assuring the trophyc conditions); soil effective trophicity reduction; biocenosis productivity reduction; vegetation ruderalisation; settling and destroying soil structure; modification of the vegetal associations structure; perturbation of the phytocenosis optimal functionality.

The action intensity of the ecological factors and determinants of negative impact is different, but it is necessary to be shown their complex and cumulative action effect in time on the protected phytocenosis. Helped by a judging scale in 3 degrees it is estimated the intensity quality of the negative impact: minor impact, major impact and excessive impact.

CONCLUSSIONS

Ecopedological studies on the soil natural resources and the impact of the environment natural factors on the protected biocenosis emphasizes the complexity of the ecological specific and the real background of biotope types and qualities.

Ecological specific card emphasizes through size and ecological favourability classes, the main ecological factors and determinants edapho-climatically which are stressing and limitative being in absence or in excess: excessive summer drought, hard soil consistency, low aeration porosity, edaphically volume limited by the erosion process.

Soil ecological diagnosis finds out the presence of a raised trophyc fund, which is not enough valuated in the zone and local ecological context.

Biotope ecological impact matrix on the protected biocenosis emphasizes 7 main negative ecological factors and determinants (ecological, climatically, pedological and anthropic) and 7 main negative ecological effects. Also, it is emphasised the necessity to protect the reservation through ground enclosing and slowing or stopping the erosion degradation of the biotope and biocenosis.

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RESEARCHES CONCERNING DEEP AND SURFACE WATER QUALITY FROM RURAL LOCATIONS NEAR TIMISOARA AREA

CERCETĂRI PRIVIND CALITATEA APELOR DE SUPRAFAŢĂ ŞI ADÂNCIME DIN LOCALITĂŢILE RURALE LIMITROFE TIMIŞOAREI

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Abstract. *This study has in view the monitorising of the contamination of deep and surface groundwater from villages coterminous to Timisoara county establishing correlations between the level contents of nitrogen, chlorines, sulphates and phosphates compounds and geomorphological, pedological, climatic conditions of analysed areas as well as agrozootehnical activities. There was analysed 10 points of prelevation, experimental results indicating an increase of the content of nitrogen, chlorines, sulphates and phosphates compounds in the prelevation points located in the neighbourhood area of the house wastes deposition.*

Rezumat. *Studiul de faţă a urmărit monitorizarea contaminării apei freatice de suprafaţă şi adâncime din localitati rurale invecinate municipiului Timisoara, stabilindu-se corelaţii între nivelul conţinutului de compuşi cu azot, cloruri, sulfaţi si fosfati, în apa freatică şi condiţiile geomorfologice, pedologice şi climatice ale zonei analizate, precum şi activităţile industriale si agro-zootehnice practicate în arealul analizat. Au fost analizate 10 puncte de prelevare, rezultatele experimentale indicand o crestere a continutului de compusi cu azot, fosfati, cloruri si sulfati in punctele de prelevare situate in arealul deponeului de reziduuri menajere.*

The environmental pollution, knowing the disturbing factors of the ecological equilibrium and the working out of the strategies concerning the reduce of biotic contamination factors representing prior topics of the interdisciplinary research (agriculture-ecology-chemistry) promoted at a national and international level in the domain of the environment protection. In this way, the monitorising of the quality of the ground waters and the establishment of the causes which lead to their pollution represents a special scientific and practical interest.

The International Organization of Health stilulates a limit interval for a series of substances and from this one they can adopt different countries standards expressed by maximum concentration admitted [4]. In our country, actual diferential quality standards depending on nature of water, surface, irrigation or underground watters. The underground waters have in general a composition close to the drinking water needs, except their loading with mineral elements, presenting at the same time smalll variations in their composition. Unlike the underground waters, the surface waters lack of any

natural protection, are intensely polluated, and the concentrations variation of the different chemical substances are very big.

This study had in view the monitorization of the surface and deep groundwater contamination from the rural locations coterminous to Timisoara, analysing 10 points of prelevation, for which the content of nitrogen, chlorines, sulphates and phosphates compounds were determined.

MATERIAL AND METHOD

To monitorising the quality of the surface and deep groundwater 10 samples of particular fountain and drillings water have been prelevated in the locations situated at a distance of 5-10 km on the SW direction from Timisoara. There were anlysed both drillings situated in the immediate neighbourhood of the house wastes deposition which serve the Timisoara city (prelevation points 1-3), and those comming from the village fountains located in Sanmihaiul Roman, Utvin, Parta (prelevation points 4-7), the drilling depth being of 5-10 m. There was also analysed the depth ground water stratum (prelevation points 8-10) situated at a bigger than 20 m depth and which represents the centralised drinking water source, supplied by the councils of the investigated locations.

The water samples were prelevated in four stages along the 2006 year.

The prelevation and stocking of the water samples were done according to SR ISO 5667-10, SR ISO 2852. The determination of the chlorides has been done according to the Standard SR ISO 9297/01 [6]. The determination of the phosphates has been done according to the SR-EN 1189-2000 [7] standard. The content of nitrates, nitrites and ammonium was determined colourimetrically using quick tests AQUA MERCK, at the spectrophotometre SQ 118 at the lengh : 515, 525 şi 690 nm for nitrates, nitrites and ammonium. The used tests were SPECTROQUANT NITRATE 14773, SPECTROQUANT NITRITE 14776 şi SPECTROQUANT AMMONIUM 14752. The determination of the sulphates has been done according to the Standard USA 95 method. [5]

RESULTS AND DISCUSSIONS

The analysis of the obtained experimental results are presented in tables 1-7. The analysis of the obtained experimental results points to the fact that the exceeding of the maximum admitted limit, related to the 0,5 mg/l ammonium drinking water is recorded in 2006 in two of the analysed samples, in Sanmihaiul Roman 0,7 mg/l and the taken water samples from the drilling F3 situated in the immediate neighbourhood of the house wastes deposition [1-2].

Table 1

The analysis of the organic and anorganic chemical compounds from the 1 drilling point, PARŢA

Analysed compound	Month				CMA (mg/l)
	January	April	July	October	
Ammonium	0,26	0.32	0.08	0.12	**0,5**
Nitrate	0,45	0.2	0.02	0.06	**0,5**
Nitrite	9,51	36.1	16..9	5.8	**50**
phosphate	1,13	0.44	0.8	0.04	**0,5**
Cloride	42,3	32.4	54	24.1	**250**
Sulfate	24,5	25.1	94	20.0	**250**

Table 2.

The analysis of the organic and anorganic chemical compounds from the 2 drilling point PARȚA

Analised compound	Month				CMA (mg/l)
	January	April	July	October	
Ammonium	0,4	0.3	0.4	0.2	**0,5**
Nitrate	0,45	0.15	0.1	0.05	**0,5**
Nitrite	12,2	21.5	1.8	3.4	**5**
phosphate	1,10	0.5	1.9	0.04	**0,5**
Cloride	23,3	14.2	19	22	**250**
Sulfate	34,5	22.4	20	1.6	**250**

Table 3.

The analysis of the organic and anorganic chemical compounds from the 3 drilling point Sânmihaiul Roman

Analised compound	Month				CMA (mg/l)
	January	April	July	October	
Ammonium	0,7	0.02	0.5	1.4	**0,5**
Nitrate	0,35	0.1	0.08	0.69	**0,5**
Nitrite	10,4	1.75	4.5	0.67	**50**
phosphate	0,5	0.1	0.1	0.06	**0,5**
Cloride	45	53	25.6	19.4	**250**
Sulfate	32,1	164	120	16..3	**250**

Table 4.

The analysis of the chemical compounds from the 4 drilling point Utvin

Analised compound	Month				CMA (mg/l)
	January	April	July	October	
Ammonium	0,02	0.05	0.4	0.2	**0,5**
Nitrate	0,03	0.02	0.1	0.03	**0,5**
Nitrite	4,5	15.6	26.5	10.8	**50**
phosphate	0,5	0.5	0.2	0.4	**0,5**
Cloride	25	42	15.4	19.8	**250**
Sulfate	11,4	26.3	10.5	30.4	**250**

Table 5.

The analysis of the chemical compounds from the 5 drilling point, near to deposition

Analysed compound	Month				CMA (mg/l)
	January	April	July	November	
Ammonium	1.2	1.8	0.9	0.5	**0,5**
Nitrate	0.9	0.6	0.3	0.4	**0,5**
Nitrite	15.5	28.9	25.5	6.3	**50**
phosphate	0.9	0.8	0.4	0.05	**0,5**
Cloride	7.1	7.0	7.1	7.2	**6,5-8,5**
Sulfate	281	254	125	87	**250**
Ammonium	144	120	106	52	**250**

Table 6.

The analysis of the chemical compounds from the 6 drilling point, near to deposition

Analysed compound	Month				CMA (mg/l)
	January	April	July	October	
Ammonium	0.5	0.7	0,2	0.3	**0,5**
Nitrate	0.4	0,05	0,08	0,3	**0,5**
Nitrite	25,5	23.5	11.25	10.5	**50**
phosphate	2.5	1.2	1.7	1.0	**0,5**
Cloride	7,0	6.68	7,0	6.8	**6,5-8,5**
Sulfate	68.7	51.2	45.3	87.5	**250**
Ammonium	125	65.4	58.2	69.5	**250**

Table 7

The analysis of the chemical compounds from the 7 drilling point, near to deposition

Analysed compound	Month				CMA (mg/l)
	January	April	July	October	
Ammonium	0.02	0.1	0.1	0.2	**0,5**
Nitrate	0.5	0.6	0.5	0.5	**0,5**
Nitrite	4.8	8.5	10.5	9.51	**50**
phosphate	2.1	1.25	0.5	0.5	**0,5**
Cloride	7.0	7.2	7.0	6.8	**6,5-8,5**
Sulfate	125.3	42.7	87.5	104	**250**
Ammonium	89	75.4	102	90.2	**250**

The contents of nitrites exceeds the 0,5 mg/l maximmum admitted limit at the F3 and Sanmihaiul Roman drilling too [3]. The content of nitrates are framed in the admitted limits.

As far as the evolution of the nitrogen compounds content depending on seasons, is viewed, the highest values are recorded in the winter and autumn months when the level of the rainings is high, that favourizes the levigation of the nitrogen compounds and their accumulation in the ground water.

The lack of the vegetation that absorbs radicularly the nitric nitrogen in this period of the year also determines the increase of the contamination.

♦ The content of phosphates is supplementary, exceeding the maximum admitted limit of 0.5 mg/l in a proportion of 42,85% from the analysed samples. The drillings located in the neighbourhood of the house wastes deposition recorded the highest values in view phosphates contents. The phosphates increasing is the cause by the decompounding of the organic substances after the leaking of the agricultural products, detergents or excreta, this increasing being proportional with the quality of the deposited wastes.

♦ The chlorides ussually have concentrations under 10mg/l in unarid regions. The taste of water is salty at concentrations over 100 mg/l g. The water with excesses of chlorides is not adequate for human usage, having bad effects in health. The maximmum content of chlorides admitted is that of 250 mg/l, this value being exceeded in 2006 in a proportion of 16,6%, at one of the drillings from house wastes deposition neighbourhood. His increasing is caused by the industrial pollution and from excreta.

♦ The sulphates are present in concentration bellow 1000 mg/l in waters. Concentrations over 250 mg/l are not admitted to be used in industry. In 2006 haven't been registered extra values at this parameters.

Maximum values admitted were reported for the drinking water for which only the toxic effect and organoleptic one taken into consideration. For the surface waters the ecological and biological criterium appears as very important, especially according to the influence over the capacity of selfpurification of water. On this basis, the standards of different usage of categories, are strictly applied to the place of use and don't include large territories or entire rivers even if their lenght is short.

♦ The quality of the levigated chemical compounds in the groundwater depends on the structural soil characteristics. The soil structure in the deposition area, done profile of 13 m depth, indicates a structure of half permeable rock of type : dusty, clay, sandy clay, and dusty sandy clayey ones, and the stratum which carries the water is very sandy, waterless, a mixture of small stones, sandy but dusty clays. The levigation intensity, increases together with the sand and small stones fraction in the soil, being stopped by the clayey stratum of the soil. Medium values regarding the quantity of nitrogen compounds in the ground water stratum of the deposition is in accordance with geological structure of the soil, which is partially permeable for the nitrogen chemical contaminants.

♦ The depth analysed drillings, done by the local councils which supply the neccessary drinking water, centralised at the rural locations level are framed between normal limits of the analysed parametres.

CONCLUSIONS

This study regarding the quality of the ground water in the Timisoara neighbourhood rural area, which includes the agricultural zone, particular drillings in the nearby houseworks, but also the house wastes deposition, lead to the following conclusions:

♦ Particular drillings in the analysed area in which intense agriculture is practised, as well as from the houseworks which didn't respect the standards of protection of water sources, record exceeding of the maximum admitted limits as far as the nitrogen compounds are viewed;

♦ The phosphates and chlorides content is exceeding especially in the house wastes deposition neighbourhood. The increase of the phosphates content is caused by discomposition of the organic substances after the impurification with agricultural products, detergents and offals, this increase being proportional with the quantity of the deposited wastes;

♦ The content of the sulphates doesn't exceed the maximum admitted limit of 250 mg /l in the industrial usage.

♦ The interpretation of the chemical compounds values depending on the rainings quantity points an increase of the levigation capacity and infiltration, in the ground water, of the nitrogen compounds as well as of phosphates and sulphates together with the increase of the raining quantity.

♦The quantity of levigated chemical compounds in the ground water depends also on the structural characteristics of the soil being in concordance with the geological structure of the soil, made up of waterproof rocks like dusty, sandy, clay, clayey dusts partially permeable for the analysed chemical contaminants.

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RESEARCHES CONCERNING THE EVOLUTION OF THE MAIN PHYSIQUE AND CHEMICAL QUALITIES THAT CROP ROTATION AND FERTILIZATION INFLUENCE

CERCETĂRI PRIVIND EVOLUȚIA PRINCIPALELOR ÎNSUȘIRI FIZICE ŞI CHIMICE ALE SOLULUI SUB INFLUENȚA ROTAȚIEI CULTURILOR ŞI A FERTILIZĂRII

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Abstract. *The agricultural activity modifies in time physical, chemical and biological properties of the soil, causing the apparition of direct effects, that are better know (draining the soil of organic matter and nutritious substance, the lack of nutritious elements in plants), but also indirect effects, "physiological costs", difficult to understand, that influence plants, animals and peoples capacity to fight and to resist to biotic and abiotic factors of the environment.*

Knowledge of the influence of environment factors and of the crop technologies over soil durable productivity permits managing its fertility and the evaluation of economic impact on long term agricultural activities.

Rezumat. *Activitatea agricolă modifică în timp proprietății fizice, chimice şi biologice ale solului determinând apariția unor efecte directe care sunt mai bine cunoscute (secătuirea solului în materie organică şi substanțe nutritive, carența plantelor în elemente nutritive), dar şi efecte indirecte, denumite şi „costuri fiziologice", mai greu de sesizat şi care şi care influențează capacitatea plantelor, a animalelor şi a oamenilor de a lupta şi rezista la factorii biotici şi abiotici din mediu înconjurător.*

STUDY AND RESEARCH METHOD

The experiments were performed in the antierosion agrotechnics field on the farm of Comercial and Agricultural Company Podu-Iloaiei Iaşi, witch hydrographic belongs to the inferior basin of Bahlui. In this area we can find soils characteristic to high grass region, represented by chernozems in different stages of degradation, that have earth-clay texture and different content of humus, depending on the degree of erosion, from 2,5 to 3,38%. The content of mobile phosphorus is also differentiated from 14 to 148 ppm, and the content of mobile potassium varies from 162 to 369 ppm.

The researches directed to the influence of crop rotation and its structure over physique and chemical qualities of the soil.

The crops were passed to wheat-corn rotation, whereat experienced different doses of organo-mineral fertilization.

RESULTS AND DISCUSSIONS

Obtained results have proven that the amount of vegetale grout (radicular system and aerial organs), that represents the main source of organic substance of the soil, depends on the development of vegetale mass and on the crop size. Introducing the rotation that match to the crops and implementing the eighth doses of fertilizers drove to the increase of the production and of the vegetale mass (vegetale grout).

The contribution of organic matter associated with a long period from reaping preliminary plants up to sowing, assure in this dry zone the maintain of a favorable structural state of the soil.

Thereby, to the wheat crop, placed in different rotations, the percent of hydrostable units were less influenced by rotation but more by applied fertilizers. The biggest percent of hydrostable unit was recorded to the fertilization with doses of N100P100 or N40P40 + 30 tones of garbage and in the case of location the wheat in crop rotation with ameliator plants.

Table 1

The influence of rotation and fertilizers over hydric stability of soil units to wheat crop (Hydrostable units-% 0,25 mm Ø)

Doses	Depth -cm -	One-crop system	2 years rotation	3 years rotation	4 years rotation
N_0P_0	0 ÷ 10	32,3	38,2	39,6	41,8
	10 ÷ 20	37,4	38,4	49,8	48,9
	20 ÷ 30	40,8	42,4	51,2	50,4
Average	0 ÷ 30	36,8	40,0	46,9	47,0
$N_{70}P_{70}$	0 ÷ 10	34,4	36,9	41,2	41,5
	10 ÷ 20	38,2	42,3	48,4	49,9
	20 ÷ 30	40,9	43,9	58,2	56,2
Average	0 ÷ 30	37,8	41,0	47,3	48,2
$N_{100}P_{100}$	0 ÷ 10	36,8	35,2	43,8	43,2
	10 ÷ 20	40,2	38,8	48,6	48,9
	20 ÷ 30	40,6	40,9	53,9	59,2
Average	0 ÷ 30	39,2	38,3	50,1	50,4
$N_{40}P_{40}$ + 30 t garbage	0 ÷ 10	38,6	41,2	44,2	43,9
	10 ÷ 20	40,8	42,6	58,2	56,3
	20 ÷ 30	44,2	43,9	49,4	58,2
Average	0 ÷ 30	41,2	42,6	50,6	52,2

To the corn crop, the differences regarding the percent of hydrostable units between one-crop system and 3 and 4 years rotations were more stressed. Thereby, for the corn one-crop and for the wheat – corn rotation, the percent of hydrostable units swing from 36,8 to 42,6, and by introducing the ameliator plants in crop rotation, their value grew to 46,9 – 52,2 (Tab.1)

The effectuated makes regarding the apparent density of the soil emphasized that for the wheat crop its value swing, depending on rotation and

administered fertilizers doses, from 1,29 to 1,37 g/cm^3. The biggest values were recorded for wheat – corn rotation (1,32 ÷ 1,37 g/cm^3), fact that reflects a small degree of settling (2 ÷ 2,5% of volume). (Tab 2)

To the corn crop, situated in different rotations, the biggest values for apparent density were registered for the corn one-crop and for the wheat – corn rotation (1,34 ÷ 1,39 g/cm^3), where the settling degree (calculated depending on the minimum necessary porosity and the total porosity) grew to 3 ÷ 5 of volume (Tab 3).

The researches concerning the influence of crop rotation and fertilizers over the evolution of the main agrochemical index of the soil cued important changes.

Thus, for all the rotations and for all the administered doses of fertilizers, the soil Ph values swing from 6,1 to 7,3 (weak acid - neutral). The smallest values were registered for the corn one-crop, for the wheat-corn rotation and for a long use of $N_{100}P_{100}$ doses. For the wheat one-crop and for the rotations with ameliator plants, the decrease of the ph value, by administering fertilizers with acidifiant effect (ammoniac azotate) was considerably diminuated.

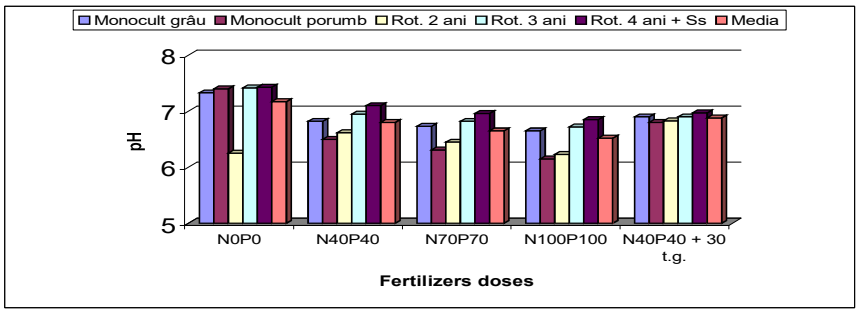
By analyzing the influence of crop rotation and fertilizers about the content of humus in the soil it was discovered that its highest values have been recorded to the 3 and 4 years rotations, and the lowest values for the corn one-crop system.

Table 2

The influence of fertilizers and rotation over the apparent density of soil to wheat crop - g/cm^3-

Doses	Depth -cm -	One-crop system	2 years rotation	3 years rotation	4 years rotation
N_0P_0	0 ÷ 10	1,30	1,32	1,32	1,29
	10 ÷ 20	1,32	1,35	1,34	1,30
	20 ÷ 30	1,34	1,37	1,34	1,32
Average	0 ÷ 30	1,32	1,34	1,33	1,30
$N_{70}P_{70}$	0 ÷ 10	1,30	1,32	1,30	1,30
	10 ÷ 20	1,32	1,36	1,32	1,30
	20 ÷ 30	1,34	1,36	1,34	1,32
Average	0 ÷ 30	1,32	1,34	1,32	1,31
$N_{100}P_{100}$	0 ÷ 10	1,32	1,30	1,30	1,30
	10 ÷ 20	1,32	1,34	1,30	1,30
	20 ÷ 30	1,34	1,36	1,30	1,30
Average	0 ÷ 30	1,33	1,33	1,30	1,30
$N_{40}P_{40}$ + 30 t garbage	0 ÷ 10	1,30	1,30	1,29	1,29
	10 ÷ 20	1,32	1,32	1,29	1,29
	20 ÷ 30	1,32	1,34	1,30	1,30
Average	0 ÷ 30	1,31	1,32	1,29	1,29

The obtained results cued that by annual use of fertilizers doses up to $N_{70}P_{70}$ for the wheat and corn one-crop system and up to $N_{40}P_{40}$ for the ameliator plants rotations, the content of humus in the soil decreased with 0,4%, for the wheat one-crop and with 0,85% for the corn one-crop.

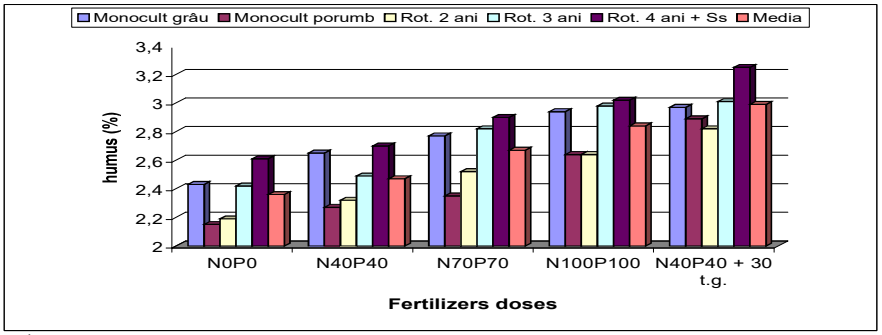


1st Figure - The influence of fertilizers and rotation over the soil reaction to the medium cambic erodated chernozem in SCDA Podu Iloaiei

Table 3

The influence of fertilizers and rotation over the apparent density of soil to corn crop - g/cm^3-

Doses	Depth -cm -	One-crop system	2 years rotation	3 years rotation	4 years rotation
N_0P_0	0 ÷ 10	1,34	1,34	1,32	1,29
	10 ÷ 20	1,38	1,36	1,34	1,32
	20 ÷ 30	1,44	1,38	1,36	1,34
Average	0 ÷ 30	1,39	1,36	1,34	1,32
$N_{70}P_{70}$	0 ÷ 10	1,32	1,32	1,30	1,30
	10 ÷ 20	1,36	1,36	1,32	1,32
	20 ÷ 30	1,42	1,38	1,34	1,34
Average	0 ÷ 30	1,37	1,35	1,32	1,32
$N_{100}P_{100}$	0 ÷ 10	1,31	1,32	1,32	1,29
	10 ÷ 20	1,36	1,36	1,32	1,30
	20 ÷ 30	1,42	1,38	1,34	1,32
Average	0 ÷ 30	1,36	1,35	1,33	1,30
$N_{40}P_{40}$ + 30 t garbage	0 ÷ 10	1,30	1,30	1,29	1,29
	10 ÷ 20	1,32	1,32	1,32	1,30
	20 ÷ 30	1,36	1,36	1,34	1,32
Average	0 ÷ 30	1,33	1,33	1,32	1,30



2nd Figure - The influence of fertilizers and rotation over the contain of humus to the medium cambic erodated chernozem in SCDA Podu Iloaiei

Table 4

The evolution of the main agrochemics index of the soil on the influence of different rotations and doses of fertilizers

Rotation	Fertilizers doses	Ph (H_2O)	Humus %	N total %	P-AL ppm	K-AL ppm	Ca^{2+}	Mg^{2+}
							Mg / 100 g soil	
Wheat one-crop	N_0P_0	7,33	2,43	0,134	19	196	11	4,86
	$N_{40}P_{40}$	6,82	2,65	0,137	37	190	12	4,53
	$N_{70}P_{70}$	6,75	2,77	0,142	41	202	13,5	4,25
	$N_{100}P_{100}$	6,65	2,94	0,151	43	226	12,3	3,77
	$N_{40}P_{40}$ + 20 t. g.	6,90	2,97	0,153	39	245	13,5	4,77
Average		**6,89**	**2,75**	**0,143**	**35,8**	**211,8**	**12,5**	**4,44**
Corn one-crop	N_0P_0	7,4	2,15	0,126	12	189	7	3,95
	$N_{40}P_{40}$	6,50	2,27	0,125	29	189	8	3,98
	$N_{70}P_{70}$	6,31	2,35	0,136	35	196	8	4,25
	$N_{100}P_{100}$	6,15	2,64	0,141	39	196	9	4,75
	$N_{40}P_{40}$ + 20 t. g.	6,80	2,89	0,145	42	238	9	3,85
Average		**6,57**	**2,46**	**0,135**	**31,4**	**201,6**	**8,2**	**4,16**
Wheat-corn rotation	N_0P_0	6,25	2,19	0,120	13	194	7	3,95
	$N_{40}P_{40}$	6,62	2,32	0,125	27	183	8	4,25
	$N_{70}P_{70}$	6,45	2,52	0,131	45	189	6	4,25
	$N_{100}P_{100}$	6,23	2,64	0,131	48	186	9	4,86
	$N_{40}P_{40}$ + 20 t. g.	6,83	2,82	0,154	50	274	7	4,95
Average		**6,48**	**2,50**	**0,132**	**36,6**	**205,2**	**7,4**	**4,45**
Pea-wheat-corn rotation	N_0P_0	7,42	2,42	0,130	14	135	11,5	4,17
	$N_{40}P_{40}$	6,95	2,49	0,134	33	168	9,5	4,25
	$N_{70}P_{70}$	6,82	2,82	0,143	52	172	13	4,25
	$N_{100}P_{100}$	6,72	2,98	0,145	61	195	13	5,47
	$N_{40}P_{40}$ + 20 t. g.	6,9	3,01	0,162	53	254	10	5,78
Average		**6,96**	**2,74**	**0,143**	**42,6**	**184,5**	**11,4**	**4,78**
Pea-wheat-corn –sun flower + grass sole rotation	N_0P_0	7,43	2,61	0,134	16	191	11	5,17
	$N_{40}P_{40}$	7,10	2,70	0,144	29	183	11	5,15
	$N_{70}P_{70}$	6,96	2,90	0,149	41,5	181	10,5	5,17
	$N_{100}P_{100}$	6,85	3,02	0,156	46,5	191	11	6,08
	$N_{40}P_{40}$ + 20 t. g.	6,97	3,25	0,158	49	291	11,5	5,86
Average		**7,06**	**2,90**	**0,148**	**36,4**	**207,4**	**11**	**5,49**

By using $N_{100}P_{100}$ or $N_{40}P_{40}$ + 30t/ha garbage doses, the content of humus in the soil increased from 2,43 to 2,97% for the wheat one-crop and from 2,61 to 3,25 % in ameliator plants rotations.

By administrating for a long time the $N_{100}P_{100}$ doses for the wheat one-crop and for the wheat – corn rotation, the content of humus in the soil mantained to its initial value, and by organic-mineral fertilization ($N_{40}P_{40}$ + 30t/ha garbage), the content of humus increased very little(0,15%).

The values registered to the other macroelements (N,P,K,Ca, Mg) shows that the provisioning of the soil can be considered as being normal, against the requirements of the agricultural crops(Tab 4).

CONCLUSIONS

The main limitative factor is the erosion of the soil, witch determine the removal of levels with humus, small settling of the level to the depth of 15 ÷ 20 cm (hardpan in formation) and the degradation of the structure to the surface of the soil, pursuant to the technologic fluxes and to practicing of the one-crop of corn or of the wheat-corn rotation.

By compressing the results obtained can be found that on acclivous fields where the soil-cultivating conditions are less favorable to the crops, through organizing the rotations and long using of $N_{100}P_{100}$ doses or $N_{40}P_{40}$ + 30t/ha garbage, the main agrochemical indexes maintained in favorable limits to evolution and development of the plants.

On acclivous fields, with a small content of humus, is enforced the organic fertilization, witch assures a part of the nutritive substance necessary for the plants (one tone of stable garbage causes the productive re-using the plants of 3,5 kg N, 2,0 kg P_2O_5 ÷ 6 kg CaO and 2 kg MgO). The same quantity of stable garbage also contains the meaned amount of microelements (4 ÷ 5 g boron, 20 ÷ 25 g zinc, 7 ÷ 9 g copper, 45 ÷ 60 g manganese and 90 ÷ 180 g iron) and conduces to the cumulation of the humus substances from soil.

These results demonstrate that for sustaining the fertility of the acclivous fields it is necessary assuring the equilibrium of the humification and mineralizing process that presupposes the evaluation and the control of the nutritive elements in the soil which suffer modifications much more fast that plan fields, by reason of applied technologies and the erosion process.

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RESEARCHES CONCERNING THE INFLUENCE OF THE LETTERED ROTATION AND FERTILIZATION OVER THE PRODUCTION AND OF THE EROSION OF SOILS IN LONG LASTING EXPERIENCE FROM MOLDOVA'S PLAIN

CERCETĂRI PRIVIND INFLUENȚA ROTAȚIEI CULTURILOR ŞI A FERTILIZĂRII ASUPRA PRODUCȚIEI ŞI EROZIUNII SOLULUI ÎN EXPERIENȚELE DE LUNGĂ DURATĂ DIN CÂMPIA MOLDOVEI

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Abstract. *The amplitude of the process of erosion is owed as much to the aggressiveness of the climatic conditions but also to the antropic factor, through fragmentation of the categories of use grounds in territorial little units, improperly oriented on versants, concomitantly with the diminution of concernments to the antierosion measures, that should carry to can the capacity of production of the acclive grounds. Loss of the productivity due to erosion and to other forms of degrade of the soils are the main sources of food and economic unsafety of one region [6 , 7].*

Knowledge the influence of the environment factors and of the culture technologies over durable productivity of soils permits managing the soil fertility and the evaluation of the economic impact on long term of the agricultural activities [1 , 5 , 8]. The decrease of production potential affects food safety, and during the years with unfavorable climatic conditions can cause the increase of prices to the agricultural products and undermine economic and politic stability of a certain region.

One of the most economic method for efficient use of fertilizers, pesticides and other production costs is applying a diversify culture system that, through the time, are proving to be less vulnerably to the disturbances of physical, chemical, biologic and social environment and don't affect the structure of production.

Rezumat. *Amploarea luată de procesele de eroziune se datorează atât agresivității condițiilor climatice, cât şi factorului antropic, prin fragmentarea categoriilor de folosință a terenului în unități teritoriale mici, orientate necorespunzător pe versanți, concomitent cu diminuarea preocupărilor pentru măsurile antierozionale care să conserve capacitatea de producție a terenurilor în pantă. Pierderile de productivitate, datorate eroziunii şi altor forme de degradare a solului, sunt principalele surse de insecuritate alimentară şi economică a unei regiuni.*

Study and research method

The experiments were performed in the antierosion agrotechnics field on the farm of Commercial and Agricultural Company Podu-Iloaiei Iaşi, witch hydrographic belongs to the inferior basin of Bahlui.

In this area we can find soils characteristic to high-grass region, represented by chernozems in different stages of degradation, that have earth-clay texture and different content of humus, depending on the degree of erosion, from 2,5 to 3,38%. The content of mobile phosphorus is also differentiated from 14 to 148 ppm, and the content of mobile potassium varies from 162 to 369 ppm. The study of the aquatic leakages and soil through erosion was accomplished by using the auditorial plots located for different crops and by dint of a hydrologic section rigged with run-over, limnograph and devices for the take-off proofs of soil (2, 4). The surface of the reception catchment where the studies were made is of 159 hectare and is antierosion fitted out from 1983, and there were practicated culture in bands systems with covered with grass bands. The medium slope of hydrografic basins is of 11%, the medium height of 119,4 m, and the medium length of versants of 250m.

RESULTS AND DISCUSSIONS

By analyzing the influence of crop rotation about the corn production into the whole period of investigation (2001 - 2004), it was found that this caused, against the one-crop, an increase with 30% of the crop (700 kg / ha) in the rotation of 3 years (pea, wheat and corn), and an increase with 34% of the crop (790 kg / ha) in the rotation of 4 years (pea, wheat, corn and flower sun + hurdler plot of vegetables and evergreen cereal crops). The increase of production obtained due to the doses of fertilizers administered and that oscillated between 51 and 156% (620 – 1900 kg / ha).

Table 1

The influence of crop rotation and of the fertilizers over wheat production (Average 2001 - 2004)

Fertilizer dose	One - crop: wheat				Wheat - Corn rotation			
	Production		Difference	Meaning	Production		Difference	Meaning
	kg/ha	%			kg/ha	%		
N_0P_0	1220	100	mt		1220	100	mt	
$N_{40}P_{40}$	1940	159	720	xxx	1840	151	620	xxx
$N_{70}P_{70}$	2410	198	1190	xxx	2350	193	1130	xxx
$N_{100}P_{100}$	2800	230	1580	xxx	2790	229	1570	xxx
$N_{40}P_{40}$ +30t garbage	3160	259	1940	xxx	3120	256	1900	xxx
Average	**2310**				**2260**			
Rotation								
Fertilizer dose	**Pea, wheat and corn rotation**				**Pea, wheat, corn, flower sun and legume ,evergreen cereal crops rotation**			
	Production		Difference	Meaning	Production		Difference	Meaning
	kg/ha	%			kg/ha	%		
N_0P_0	1680	100	mt		1730	100	mt	
$N_{40}P_{40}$	2670	159	990	xxx	2720	157	990	xxx
$N_{70}P_{70}$	3170	189	1490	xxx	3290	190	1560	xxx
$N_{100}P_{100}$	3590	214	1910	xxx	3740	216	2010	xxx
$N_{40}P_{40}$ +30t garbage	3940	235	2260	xxx	4020	232	2290	xxx
Average	**3010**				**3100**			

DL 5% = 238; DL 1% = 328; DL 0,1% = 378

Concerning the wheat crop, between 2001 – 2004, the increase of production achieved due to rotation was of 25% (700 kg / ha) in the rotation of 3 years (pea, wheat and corn) and of 30% (790 kg / ha) in the rotation of 4 years (pea, wheat, corn and flower sun + hurdler plot of legume and evergreen cereal crops), and the fertilization made the production increase with 30 – 119% (910 – 3000 kg / ha) (tab 2).

Analyzing the wheat crops, during the wheat – corn and wheat – ameliator plants rotation, it could have been seen that the simplification of rotation causes also the diminution of production. (fig 1)

Table 2

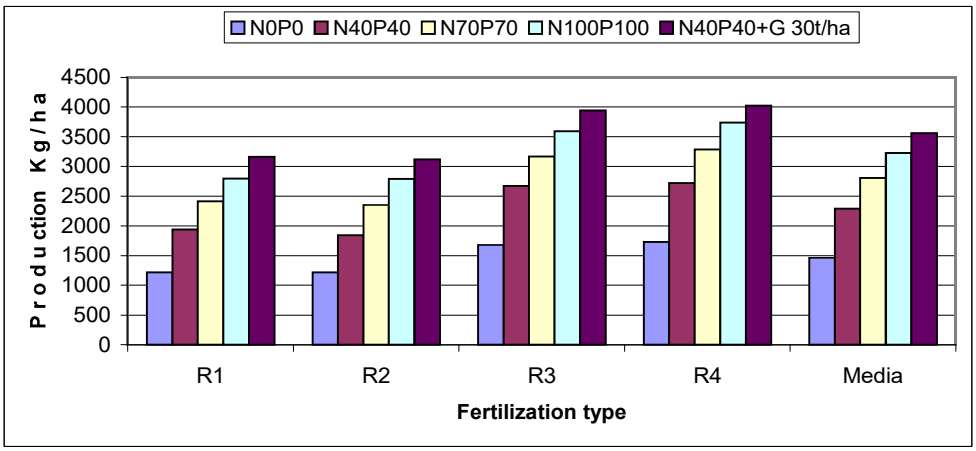
The influence of crop rotation and of the fertilizers over corn production (Average 2001 - 2004)

Fertilizer dose	One - crop: corn				Wheat - Corn rotation			
	Production		Difference	Meaning	Production		Difference	Meaning
	kg/ha	%			kg/ha	%		
N_0P_0	2520	100	mt		2990	100	mt	
$N_{40}P_{40}$	3560	141	1040	xxx	3900	130	910	xxx
$N_{70}P_{70}$	4790	190	2270	xxx	5360	179	2370	xxx
$N_{100}P_{100}$	5440	216	2920	xxx	5940	199	2950	xxx
$N_{40}P_{40}$ +30t garbage	5520	219	3000	xxx	6020	201	3030	xxx
Average	**4370**				**4840**			
Rotation								
Fertilizer dose	**Pea, wheat and corn rotation**				**Pea, wheat, corn, flower sun and legume ,evergreen cereal crops rotation**			
	Production		Difference	Meaning	Production		Difference	Meaning
	kg/ha	%			kg/ha	%		
N_0P_0	3470	100	mt		3590	100	mt	
$N_{40}P_{40}$	4780	138	1310	xxx	4980	139	1390	xxx
$N_{70}P_{70}$	5910	170	2440	xxx	6220	173	2630	xxx
$N_{100}P_{100}$	6580	190	3110	xxx	6840	191	3250	xxx
$N_{40}P_{40}$ +30t garbage	6620	191	3150	xxx	6840	191	3250	xxx
Average	**5470**				**5690**			

DL 5% = 325; DL 1% = 445; DL 0,1% = 618

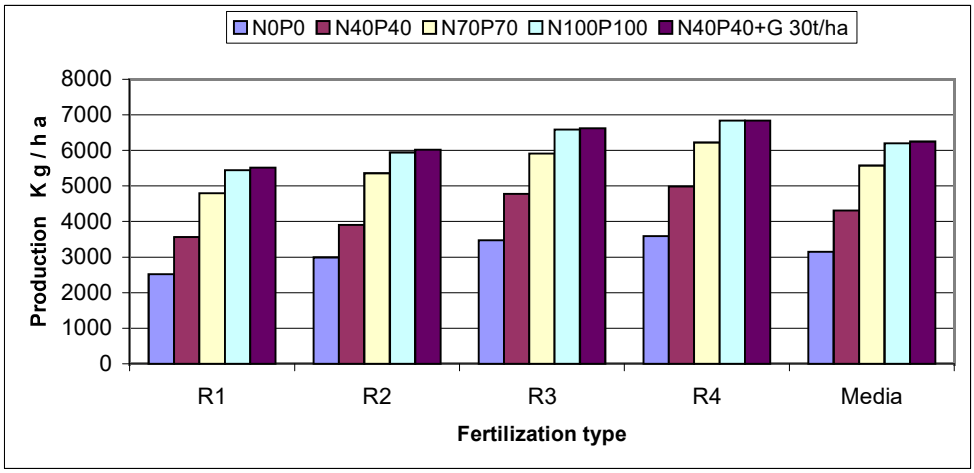
Concerning the corn crop, rotation impact was smaller, the increase of production achieved between 2001 – 2004 being only of 17,5% (850 kg / ha, and the fertilizers administered in most propitious doses have doubled the production in the rotation wheat – corn and increased it with 91% (3250 kg / ha) in 3 and 4 years rotation. (fig 2)

In wheat – corn rotation and in no fertilization conditions, average of the production achieved between 2001 – 2004 was of 1220 kg / ha for wheat and of 2990 kg / ha for corn (fig. 1 , 2).



1st Figure - Wheat production achieved to different rotations and dose fertilizers (The Gabriela variety), average 2001 – 2004

The integration of these crops in rotation with ameliator plants and practicing the most propitious fertilizers, determined achieving of a medium production of 4020 kg / ha for the wheat crop and of 6840 kg / ha for the corn crop.



2nd Figure - Corn production achieved to different rotations and dose fertilizers (HS - OANA), average 2001 – 2004

The accentuation of the erosion process causes the embitterment of the hidric and nutritional system of the soil but the consequences of this process are reflected over the majority of sectors of activity, producing ecologic unbalances, which favor the bold deterioration of people's conditions of life.

Table 3

Water and soil loss through erosion to the different agricultural crops in the Moldova's plateau

Year	2001	2002	2003	Average
Precipitations	640,2	559,8	433,9	544,6
Precipitations that determine water and soil leakages	275,3	285,5	258	272,9
Water leakages (m^3/ha)				
Cultivated field	141,2	127,2	91,8	120,1
Sun flower	115,5	102,3	80,3	99,34
Grass - 1st year	69	72	55,7	65,6
Grass – 2nd year	29,1	18,9	50,2	32,73
Corn	115,5	100,8	80,8	99
Pea	95,6	65,6	68,6	76,6
Wheat	59,6	47,4	57,7	54,9
Bean	106,6	97,8	74,3	92,9
Loss soils (t / ha)				
Year	2001	2002	2003	Average
Cultivated field	1,943	2,941	2,893	2,592
Sun flower	1,35	2,065	1,852	1,756
Grass - 1st year	0,407	0,555	0,721	0,561
Grass – 2nd year	0,047	0,03	0,217	0,098
Corn	1,234	1,823	1,623	1,56
Pea	0,84	1,032	1,029	0,967
Wheat	0,289	0,556	0,389	0,411
Bean	1,051	1,715	1,574	1,446

The researches undertaken to Commercial and Agricultural Company Podu-Iloaiei concerning the settlement of the ground's degradation rhythm through erosion, to different structures and successions of crops, have a continuance of experimentation of over 30 years, fact that confers a special value to the obtained results, that through the years brought a series of new aspects, profoundly important for both science and practice.

The results obtained in the research period demonstrated that a lot of pedoclimatic and antropic factors determine erosion, but decisive for the biggest variability of erosion is the vegetation.

The apparition of freshets in the first part of the year (April - June), when the crops barely protect the ground, and the apparition of droughts from certain part of year enforce the measures and agricultural works to be made as to determine the protection of the soil against erosion and to facilitate the restraint of water in the soil.

By analyzing the results achieved on the whole period of research can be found great loss of soils to scuffler crops that have negative consequences on fertility of the soil. (tab. 3)

CONCLUSIONS

During the process of soil protection against erosion, the vegetation, the settlement of crop range and it's structure, the practice of proper doses of organic and mineral fertilizers produce a diminution of erosion and a superior fructifying of aslope grounds.

The results achieved for the acclive grounds in Moldova's plain, where this kind of grounds represents over half from the arable surface, shows that the integration of 3 and 4 year crop rotation causes an increase of production representing 30 – 34% (700 – 750 kg / ha) for the wheat crops and a 25 – 30% increase (700 – 900 kg / ha) for the corn crops.

The medium wheat crop achieved in the investigatory period in one-crop kind to different levels of fertilization was of 2310 kg / ha, and the integration of this crops rotations of 3 and 4 years caused the increase of production of 30 – 34% (700 – 790 kg / ha).

In 3 and 4 year rotation with ameliator plants, the medium corn production achieved in without fertilization condition was of 3470 ÷ 3590 kg / ha, and using different doses of $N_{40}P_{70}$ or of $N_{40}P_{70}$ + 30 tones / ha garbage, determined obtaining an increase of 73 ÷ 90% (2630 ÷3250kg / ha).

Annual soil medium loss through erosion registered to different crops during this period was of 0.967 t / ha for pea, 0.411 for wheat, 1.56 for corn, 1.756 for sun-flower and 0.098 for evergreen grass in the second year of vegetation.

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INFLUENCE OF IRRIGATION AND CROP ROTATION COMBINATION ON THE ENZYMATIC ACTIVITIES IN A BROWN LUVIC SOIL

INFLUENȚA IRIGAȚIEI ȘI ROTAȚIEI CULTURILOR ASUPRA ACTIVITĂȚII ENZIMATICE DINTR-UN SOL BRUN LUVIC

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Abstract. *Soil enzyme activities (actual and potential dehydrogenase, acid and alkaline phosphatase) were determined in the 0-10-, 10-20- and 20-30-cm layers of a brown luvic soil submitted to a complex irrigation and crop rotation (2- and 3-crop rotations) experiment. Non-irrigation - in comparison with irrigation - resulted in significantly higher soil phosphatase activities in the 0-10-, 10-20- and 20-30-cm layers, whereas dehydrogenase activities were significantly higher in irrigated soil. The soil under wheat or maize was more enzyme-active in the 3- than in the 2- crop rotation and in the monoculture. Each activity in both non-irrigated and irrigated soil under wheat and maize crops was higher in the intermediate layer than in the upper, respectively deeper layers.*

Rezumat. *S-au urmărit efectele irigației şi rotației culturilor asupra activității microbiene globale reflectată prin activitatea dehidrogenazică şi asupra activității enzimatice: fosfataza acidă şi alcalină, la trei adâncimi în solul brun luvic:0-10-, 10-20- şi 20-30-cm. Activitatea dehidrogenazică este semnificativ mai mare în solul irigat, atât sub cultura de grâu cât şi sub cultura de porumb, în timp ce activitatea fosfatazică acidă şi alcalină prezintă valori mai ridicate în solul neirigat. Toate activitățile enzimatice studiate sunt mai ridicate sub culturile de grâu şi porumb din rotația de 3 culturi, în toate straturile analizate. Activitățile dehidrogenazică actuală şi potențială şi fosfatazică acidă şi alcalină prezintă valorile cele mai mari în stratul intermediar (10-20-cm) atât în solul irigat cât şi în solul neirigat.*

INTRODUCTION

Soil enzymes are important for catalyzing innumerable reactions necessary for life processes of microorganisms in soils (Pulford and Tabatabai, 1988) decomposition of organic residues, cycling of nutrients and formation of organic matter and soil structure (Dick, 1992). Although enzymes are primarily of microbial origin it can also be originate from plants and animals (Zelles et al., 1997). These enzymes are constantly being synthesized, could be accumulated, inactivated and/or decomposed in the soil, assuming like this, great importance for the agriculture for their role in the recycling of the nutrients (Balota et al.,2004; Bandick and Dick, 1999).

Soil enzymes activities have successfully discriminated between a wide range of soil management practices (Lovell et al., 1995; Samuel et al., 2005).

In order to obtain new data on the soil enzymological effects of management practices we have determined some enzymatic activities in a brown luvic soil submitted to a complex irrigation and crop rotation experiment at the Agricultural Research and Development Station in Oradea (Bihor county).

MATERIAL AND METHODS

The ploughed layer of the studied soil is of mellow loam texture, it has a pH value of 5.5, medium humus (2.32%) and P (22 ppm) contents, but it is rich in K (83 ppm).

The experimental field was divided into plots and subplots for comparative study of irrigation and non-irrigation and rotations of 2- and 3-crops. Each plot consisted of two subplots representing the irrigation and non-irrigation variants. The plots (and subplots) were installed in three repetitions.

In October 2006, soil was sampled from 0-10-, 10-20- and 20-30- cm depths of the subplots under wheat and maize crops. The soil samples were allowed to air-dry, then ground and passed through a 2-mm sieve and, finally, used for enzymological analyses.

Actual and potential dehydrogenase activities were determined according to the methods described in Drăgan-Bularda (1983). Dehydrogenase activities are expressed in mg of triphenylformazan (TPF) produced from 2,3,5-triphenyltetrazolium chloride (TTC) by 10 g of soil in 24 hours.

For determination of phosphatase activities, disodium phenylphosphate served as enzyme substrate (Drăgan-Bularda, 1983; Öhlinger, 1996). Phosphatase activities are expressed in mg phenol/g soil/2 hours.

The activity values were submitted to statistical evaluation by the two *t*-test (Sachs, 1968).

RESULTS AND DISCUSSIONS

Results of the enzymological analyses are presented in Table 1, and those of statistical evaluation are summarized in Table 2.

The effect of irrigation on the enzymatic activities in soil. Actual and potential dehydrogenase activities were significantly higher (at least at $p<0.05$) in the three soil layers analysed of the non-irrigated soil, excepting potential dehydrogenase activity in the deeper layer which was unsignificantly higher ($p>0.05$). These findings are valid under each crop.

The effect of crop rotation on the enzymatic activities in soil. For evaluation of this effect, the results obtained in the three soil layers analysed in the two subplots of each plot were considered together.

The soil enzymological effect of the same crop in the two rotations. As wheat and maize were crops in monoculture and both rotations, it was possible to compare the soil enzymological effect of the monoculture and of the 2- and 3-crop rotations. In the soil under wheat, the enzymatic activities were significantly higher in the 3-crop rotation than in the 2-crop rotation and monoculture. In the soil under maize, each activity was significantly higher (at least at $p<0.05$) in the 3-crop rotation.

The soil enzymological effect of different crop in the same rotation.

The monoculture. Potential dehydrogenase activity measured in the wheat soil exceeded significantly ($p<0.02$) the corresponding activities recorded in the maize soil, whereas actual dehydrogenase activity was unsignificantly higher ($p>0.05$) in the wheat soil. Acid and alkaline phosphatase activities were higher under maize.

Table 1

The effects of soil management practices on enzymatic activities in a brown luvic soil

Soil enzymatic activity *	Soil depth (cm)	Monoculture**		Rotation of 2 crops		Rotation of 3 crops	
		Wheat	Maize	Wheat	Maize	Wheat	Maize
		N I	N I	N I	N I	N I	N I
ADA	0-10	7.84	7.28	8.96	7.84	9.00	8.00
	10-20	8.40	8.14	11.08	8.84	11.26	8.96
	20-30	8.54	8.68	9.03	9.12	10.08	11.20
		11.40	9.52	12.40	11.20	12.80	11.40
		8.22	8.68	9.00	8.94	9.96	11.72
		11.20	8.24	11.20	9.80	11.52	9.96
PDA	0-10	23.52	24.08	25.64	29.80	29.28	30.36
	10-20	31.60	29.60	32.40	31.20	35.20	32.96
	20-30	33.60	29.04	35.48	33.44	38.28	37.04
		34.00	35.12	37.40	36.09	38.96	38.68
		28.00	25.16	35.20	32.79	38.04	36.43
		33.88	31.08	36.88	32.17	37.88	37.07
AcPA	0-10	0.159	0.163	0.167	0.176	0.173	0.189
	10-20	0.120	0.129	0.135	0.144	0.143	0.179
	20-30	0.179	0.180	0.191	0.187	0.190	0.195
		0.140	0.155	0.168	0.185	0.161	0.188
		0.165	0.174	0.189	0.180	0.189	0.190
		0.125	0.144	0.141	0.173	0.152	0.185
AlkPA	0-10	0.061	0.065	0.073	0.071	0.076	0.083
	10-20	0.050	0.053	0.067	0.062	0.070	0.068
	20-30	0.084	0.082	0.089	0.083	0.091	0.095
		0.079	0.071	0.082	0.077	0.085	0.080
		0.067	0.071	0.078	0.077	0.083	0.087
		0.055	0.066	0.070	0.070	0.075	0.076

* ADA - Actual dehydrogenase activity.
PDA - Potential dehydrogenase activity.
AcPA - Acid phosphatase activity.
AlkPA - Alkaline phosphatase activity.

**N - non-irrigation.
I – irrigation.

The 2-crop rotation. Each enzymatic activity measured in the wheat soil exceeded significantly (at least at $p<0.05$) the corresponding activity recorded in the maize soil, excepting acid phosphatase activity which was higher under maize.

The 3-crop rotation. Significant ($p<0.005$ to $p<0.001$) and unsignificant ($p>0.05$ to $p>0.1$) differences were registered in the soil enzymatic activities, depending on the kind of enzymatic activities and the nature of crop.

Dehydrogenase activities are considered as indicators of the global and respiratory activity of soil, whereas phosphatase activities are related to the P cycling in soil. Dehydrogenase activities were significantly higher (at least at $p<0.01$) in the wheat soil, while phosphatase activities were higher in the maize soil.

Table 2

Significance of the differences between enzymatic activities in a brown luvic soil submitted to different management practices

Management practices	Soil enzymatic activity*	Soil depth (cm)	Mean activity values in management practices a b a - b	Significance of the differences
1	2	3	4 5 6	7
Irrigation (a) versus non-irrigation (b)	ADA	0-10 10-20 20-30	8.15 9.45 -1.30 9.44 11.45 -2.01 9.42 10.32 -0.90	0.01>p>0.002 0.02>p>0.01 0.01>p>0.002
	PDA	0-10 10-20 20-30	27.11 32.16 -5.05 34.48 36.16 -2.23 32.60 34.83 -2.23	0.01>p>0.002 0.05>p>0.02 0.10>p>0.05
	AcPA	0-10 10-20 20-30	0.171 0.141 0.030 0.187 0.166 0.021 0.181 0.153 0.028	0.001>p>0.0001 0.02>p>0.01 0.02>p>0.01
	AlkPA	0-10 10-20 20-30	0.071 0.061 0.010 0.087 0.079 0.008 0.077 0.057 0.020	0.001>p>0.0001 0.01>p>0.002 0.001>p>0.0001
The same crop in the two rotation Wheat in monoculture (a) versus wheat in 2-crop rotation (b)	ADA	0-40	9.27 10.28 -1.01	0.05>p>0.02
	PDA		30.77 33.83 -3.06	0.05>p>0.02
	AcPA		0.148 0.165 -0.017	0.01>p>0.002
	AlkPA		0.066 0.076 -0.01	0.01>p>0.002
Wheat in monoculture (a) versus wheat in 3-crop rotation (b)	ADA	0-40	9.27 10.77 -1.50	0.01>p>0.002
	PDA		30.77 36.27 -5.50	0.05>p>0.02
	AcPA		0.148 0.168 -0.02	0.001>p>0.0001
	AlkPA		0.066 0.080 -0.014	0.002>p>0.001
	ADA	0-40	10.28 10.77 -0.49	0.05>p>0.02

Wheat in 2-crop rotation (a) versus wheat in 3-crop rotation (b)	PDA		33.83 -2.44	36.27	0.002>p>0.001
	AcPA		0.165 -0.003	0.168	0.05>p>0.02
	AlkPA		0.076 -0.004	0.080	0.02>p>0.01
Maize in monoculture (a) versus maize in 2-crop rotation (b)	ADA	0-40	8.42 -0.87	9.29	0.02>p>0.01
	PDA		29.01 -3.57	32.58	0.05>p>0.02
	AcPA		0.157 -0.017	0.174	0.01>p>0.002
	AlkPA		0.068 -0.005	0.073	0.01>p>0.002
Maize in monoculture (a) versus maize in 3-crop rotation (b)	ADA	0-40	8.42 -1.79	10.21	0.01>p>0.002
	PDA		29.01 -6.41	35.42	0.01>p>0.002
	AcPA		0.157 -0.03	0.187	0.002>p>0.001
	AlkPA		0.068 -0.013	0.081	0.002>p>0.001
Maize in 2-crop rotation (a) versus maize in 3-crop rotation (b)	ADA	0-40	9.29 -0.92	10.21	0.50>p>0.10
	PDA		32.58 -2.84	35.42	0.05>p>0.02
1	2	3	4 6	5	7
Maize in 2-crop rotation (a) versus maize in 3-crop rotation (b)	AcPA	0-40	0.174 -0.013	0.187	0.05>p>0.02
	AlkPA		0.073 -0.008	0.081	0.01>p>0.002
Different crops in the same rotation *Monoculture* Wheat (a) versus maize (b)	ADA	0-40	9.26 0.84	8.42	0.10>p>0.05
	PDA		30.76 1.75	29.01	0.02>p>0.01
	AcPA		0.148 -0.009	0.157	0.01>p>0.002
	AlkPA		0.066 -0.002	0.068	0.02>p>0.01
2-crop rotation Wheat (a) versus maize (b)	ADA	0-40	10.28 0.99	9.29	0.05>p>0.02
	PDA		33.83 1.25	32.58	0.01>p>0.002
	AcPA		0.165 -0.009	0.174	0.05>p>0.02
	AlkPA		0.076 0.003	0.073	0.05>p>0.02
3-crop rotation Wheat (a) versus	ADA	0-40	10.77 0.56	10.21	0.001>p>0.0001
	PDA		36.27 0.85	35.21	0.01>p>0.002

maize (b)	AcPA		0.168 -0.019	0.187	0.05>p>0.02
	AlkPA		0.080 -0.002	0.082	0.02>p>0.01

* ADA - Actual dehydrogenase activity.
PDA - Potential dehydrogenase activity.
AcPA - Acid phosphatase activity.
AlkPA - Alkaline phosphatase activity.

CONCLUSIONS

1. Non-irrigation - in comparison with irrigation - resulted in higher phosphatase activities, whereas dehidrogenase activities were higher in irrigated soil.

2. The 3-crop rotation - as compared to the 2-crop rotation and monoculture - led to higher enzymatic activities in the soil layers under maize or wheat.

3. The soil enzymatic activities under wheat and maize crops in both non-irrigated and irrigated soil were higher in the intermediate layer than in the upper, respectively deeper layers.

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INFLUENCE OF THE CHANGES OF THE GEOMETRIC AND STRUCTURAL PARAMETERS OF THE DRYING NETWORK, ON THE REMOVAL OF EXCESSIVE WATER, IN THE ROTOPĂNEŞTI-RĂDĂŞENI-FÂNTÂNA MARE SYSTEM IN SUCEAVA COUNTY

INFLUENȚA MODIFICĂRII PARAMETRILOR GEOMETRICI ŞI CONSTRUCTIVI AI REȚELEI DE DESECARE ASUPRA ELIMINĂRII EXCESULUI DE APĂ, ÎN SISTEMUL ROTOPĂNEȘTI-RĂDĂȘENI-FÂNTÂNA MARE, JUDEȚUL SUCEAVA

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Abstract. *The drying-draining facilities were built to remove excessive water from the land surface and from the upper layers of the soil, that is precipitation water, subsoil water and surface flows from the higher neighboring areas. Given the wet climate conditions of the Rădăşeni-Fântâna Mare-Baia depression, and given the low water consumption through evaporation and perspiration, the heavy precipitations fallen during 1 to 5 days in a row are the main source of excessive humidity in the hardly permeable soils (Nitu T. et al, 1985). Precipitations are unevenly distributed throughout the year, as there are high amounts of water fallen in just 24 hours or after long rains, which leads to surface flows, soil particle carrying, higher bank erosion and implicitly channel clogging.*

Rezumat. *Amenajările de desecare-drenaj au fost executate pentru a elimina excesul de umiditate de la suprafața terenului şi din orizonturile superioare ale solului, provenit din precipitații, apa freatică şi din scurgerile de suprafață de pe zonele limitrofe mai înalte. În condițiile climatului umed din depresiunea Rădăşeni-Fântâna Mare-Baia, precipitațiile abundente căzute în 1-5 zile consecutive, în regimul unui consum redus prin evapotranspirație, constituie principala sursă a excesului de umiditate din solurile greu permeabile (Nitu T. şi colab., 1985).Regimul precipitațiilor prezintă o repartiție neuniformă în timpul anului, înregistrându-se cantități însemnate în 24 ore sau în urma ploilor de lungă durată, ceea ce determină apariția scurgerilor de suprafață, antrenarea particulelor de sol, intensificarea eroziunii de mal şi, implicit, colmatarea canalelor.*

MATERIAL AND METHOD

The Baia-Rădăşeni-Fântâna Mare drying-draining system is located on the left side of the Moldova river and includes its meadow and terraces, as well as its tributary streams Şomuzul Băii and Şomuzel. The surface of this system spreads on 5527 ha, of which 1806 ha with underground draining works, and has a longish shape along the Moldova river and an average width of about 5 km and a length of 15 km.

The natural climate conditions of the Baia piedmont plain favor the occurrence and maintenance of excessive humidity in the soil and on the surface. The meadow of the Moldova river and its terraces of the shape of strips and with a mean width of 1.5 km, almost parallel with the bed of the Moldova river, oriented on a North-West to South-East direction, with mild 1-5% slopes, plane areas and many small depressions, facilitate water stagnation.

The actual drying channel network includes main collecting channels, secondary collecting channels, sector collecting channels and belt channels.

When designing the main and secondary collecting channels, there was considered the best use of the existing small waterfalls, valleys, depressions and network. The mean depth of the channels is 1.8 m, depending on the depth of the sector or draining network that open in them.

The sector collecting channel network has a less regular shape, depending on the configuration of the land, and the channels are routed approximately parallel with the level lines, at variable distances and depths, depending on the drained and undrained areas. In the drained areas, the distance between the channels is 400 m and the mean depth is 1.50 m, depending on the draining depth, so that the discharge openings be located above the highest channel level, while in the undrained areas, these are located at 300-350 m from one another at a mean depth of 1.30 m.

The belt channels are located at 20-50 m from the foot of the slopes, at depths between 1.5-2.0 m, and their role is to protect the dried-drained surface by intercepting the flows from the upper neighboring areas.

The sizing of the upper channels was achieved on sections, depending on the slope and the flow collected in that sector. The flows carried by the channels were determined depending on the area they served and on the specific drying flow, which was set to be 2.17 l/s/ha for the drying network and 9.40 l/s/ha for the belt channels.

In order to determine the geometric and hydraulic parameters of the drying network, high-accuracy geometric levelling topographic measurements were performed by the radiation method and by traversing combined with the radiation method. The level-related observations were performed by a medium-accuracy Zeiss Ni-030 level and centimeter surveying rods, while the level differences were determined based on two horizons of the level device.

In order to emphasize the efficiency of excessive water removal, field observations were performed, following the precipitations fallen during 1-5 consecutive days, and after the sudden snow melting.

RESULTS AND DISCUSSIONS

During the studies performed, we noticed that the CC_1 belt channel of the Rotopăneşti-Rădăşeni-Fântâna Mare system filled up due to the slope flows after heavy rains of 48 to 72 hours, as well as after snow melting (photo 1).

After 27 years (1980-2007) of operation and especially in the last 17 years, the original section of the CC_1 channel was silted by about one meter, with a mean depth silting rate of 3.7 cm/year (figure 1).

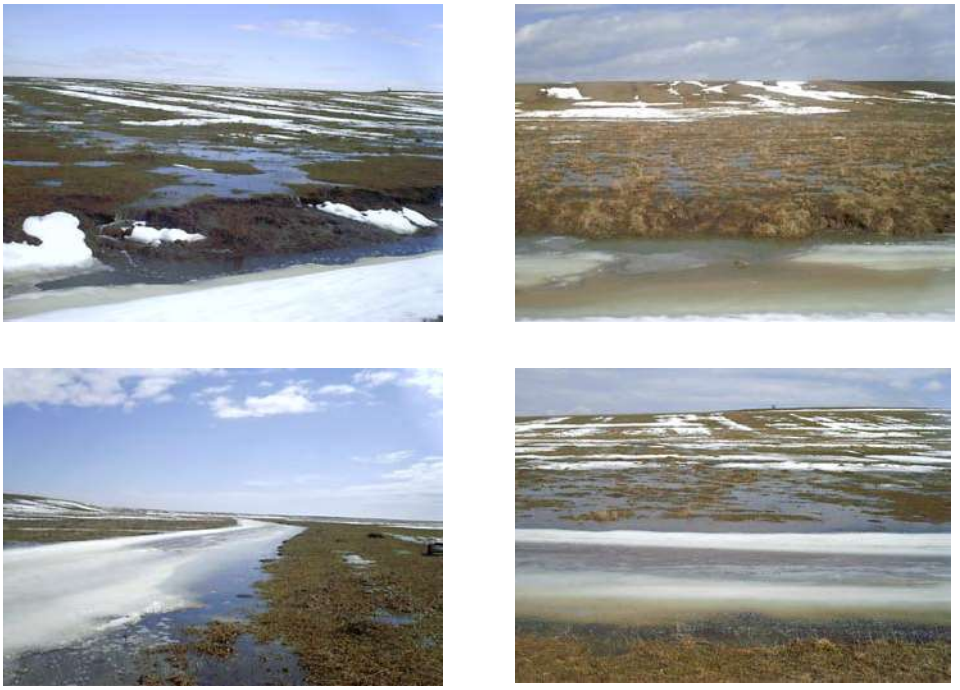
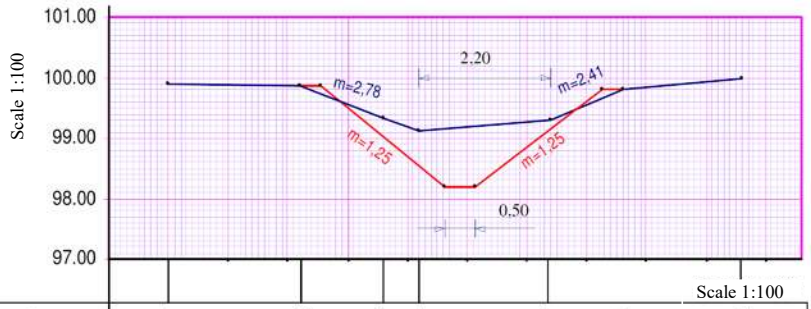


Photo 1- CC_1 belt channel filling up



Point number		1		2	3	4	5	6	7
Land elevation (m)		99,902		99,854	99,333	99,134	99,307	99,804	100,000
Level differences (m)			-0,048	-0,521	-0,199	0,173	0,497	0,196	
Distances (m)	partial		2,2	1,4	0,6	2,2	1,2	2,0	
	total	0,0		2,2	3,6	4,2	6,4	7,6	9,6
Slope %			2,2	37,2	33,2	7,9	41,4	9,8	

Figure 1 – Cross section through the CC_1 belt channel

The analysis of the flowing section of the channel shows that it originally had a value of 4.41 m^2 and it has now reached 2.28 m^2, which means a decrease of the collecting and carrying capacity of about 50%. The one meter channel silting in this section is caused both by the higher reception surface and the water flowing from it, and by the smaller longitudinal slope of the channel as compared to the upstream section.

Due to the silting of the bottom of the channel with silts brought by the slope water flows and by the bank erosion they cause, and due to the presence downstream of a footbridge whose pipe section is silted (photo 2), the belt channel in no longer able to carry the water to the Şomuzel collecting channel, which means water spills and flooding of the neighboring areas (photo 3). Therefore, the CC_1 belt channel can no longer protect the dried-drained surface; on the contrary, it collects large amount of water on its right side, which are collected by the Şomuzel collecting channel, the latter having in this sector a route approximately parallel with the CC_1.

Photo 2- Channel section and silted footbridge

Photo 3 – Spills and flooding of the neighboring land

This water spills from the CC_1 belt channel, and also the heavy precipitations in the last 24 hours and/or in the last 1-5 consecutive days, result into a higher surface water flowing speed (photo 4), which accelerates the bank erosion phenomenon of the Şomuzel main collecting channel (photo 5) and also drags along sediments and soil particles that clog the bottom of the channel.

Photo 4 – Collection of the water spills from the ,,Şomuzel" channel

Photo 5 – Slope erosion and channel bottom silting

CONCLUSIONS

1. The bank erosion aggression and channel silting of the Rotopăneşti-Rădăşeni-Fântâna Mare drying-draining system are influenced by the slope coefficient, by the grass grown on the slope and by the use of the land dried by the channel.

2. During study performace, we found a highly marked bank erosion and channel silting in the areas where the dried-drained land was used as grazing field. In these areas, there is little or no grass grown on the slopes, due to inadequate grazing and to the fact that the animals are allowed to cross the channels, which is harmful especially during excessive humidity seasons. The slopes of the channels in the areas used as arable land, have much grass grown on them, which, on the one hand, diminishes bank erosion and, on the other hand, in time, if this grass is not cut, it facilitates hygrophilic vegetation and bush growing, which disturbs water flowing and accelerates silting.

3. The degradation of a channel section may determine spills of the water collected by it, the flooding of the neighboring land, longer excessive humidity periods and hygrophilic vegetation growing.

4. Even the smallest deficiency in the operation of a component of the drying-draining systems should be fixed immediately, to prevent degradation acceleration in time, or their placing out of operation.

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ATMOSPHERIC DEPOSITION OF TRACE ELEMENTS IN SOUTHERN AND WESTERN CARPATHIANS STUDIED BY THE ANALYSIS OF MOSS SAMPLES USING NAA AND AAS

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Abstract: *In a study of the atmospheric deposition of trace elements in Southern and Western Carpathians samples of the moss Hylocomium splendens were analyzed with respect to 47 elements. The determination of Cd, Cu and Pb was carried out by atomic absorption spectrometry and the others were determined by neutron activation analysis. In samples from Western Carpathians, a considerably higher concentration was found for elements such as Cr, Fe, Zn, Cu, As, Mo, Cd, Sb, Br, U and Th than in samples from Southern Carpathians. The results indicate that sources, which are to the Western Carpathians, contribute significantly to regional elemental atmospheric deposition in Romania.*

From a human health perspective, the main outstanding air pollution problems are tropospheric ozone, climate change and soil acidification. A substantial part of the emissions of hazardous air pollutants in Romania results from the manufacture, processing, use, or waste management of toxic chemicals and their compounds.

The necessity to monitor the annual emissions of air pollutants has resulted in national and international environmental programmes in all continents.

Data on anthropogenic emissions from individual countries are compiled and held by international environmental agencies coordinating joint monitoring programmes at the European level. Examples are European Environment Agency/European Monitoring and Evaluation Programme EEA/ EMEP, Economic Commission for Europe/United Nations Environmental Programme ECE/UNEP, Nordic Environmental Finance Corporation/Atmospheric Heavy Metal Deposition –Estimation Based on Moss Analysis in Europe and UNECE ICP Vegetation/Air Pollution and Vegetation. The international programme "Atmospheric Heavy Metal Deposition in Europe –Estimation Based on Moss Analysis, documents the atmospheric deposition of heavy metals in more than 30 European countries, including Romania.

The moss technique is based on some characteristics of mosses, as the absence or strong reduction of a cuticle, thin and close-set leaves, and weakly developed conductive tissues, which all are leading to efficient accumulation of airborne substances and small direct uptake from substrata. Mosses from the epigeic species are used as biomonitors of air pollution due to their high capacity to retain several trace elements.

The wide spreading of these plant species in the Southern and Western Carpathians facilitates the network sampling. In addition, as other European states present similar spreading of these species, they are used in the simultaneous surveys performed in different countries.

The concentrations of chemical elements in the moss samples totalize the three year average elemental content at the specific, corresponding geographic locations.

The goal of this biomonitoring study is to characterize the trace element deposition patterns in mosses regarding the possible sources of air pollution.

The monitoring studies provide large sets of data that are used as input to the multivariate statistical models. In many situations, factor analysis models are used in the prediction of deposition types and later for identification of the main air pollution sources. The results of factor analysis are completed by studies based on enrichment factors in interpreting the spatial trends found in emissions of trace metals.

MATERIAL AND METHODS

Sampling and sample preparation

The moss samples were collected at 85 network sites based on a regular monitoring network (16 km x 16 km) of 34,000 sq. km (Figure1).

The sampling sites were located at 300 m from main roads and populated areas and at 100 m from any small road or single house. On each sampling site 5 to 10 samples were taken within a 50 m x 50 m area and combined to one collective sample. The upper three fully developed segments of each *Hylocomium spendens* plant, representing the last 3 years growth, were cleaned from the extraneous material and prepared for analysis. No further homogenization of the samples was performed[14]. The samples were dried at room temperature for one month and then kept at 40°C for 48 hours in thermostat until constant weight. The same material was subjected both to neutron activation analysis and flame atomic absorption spectrometry.

The lichen L-336 (IAEA, Vienna) reference material prepared for intercalibration of the analytical results of 1995 European survey was used in analyses.

Neutron activation analysis

Moss samples were analyzed by neutron activation analysis (INAA), at the pulsed fast reactor IBR-2, which is equipped with two irradiation channels for neutron activation purposes.

Samples of 0.3 g and relevant reference materials were heat-sealed in polyethylene bags for short-term irradiation and packed in aluminum cups for long-term irradiation. To determine the elements which have short half-life nuclides such as Mg (^{27}Mg), Al (^{28}Al), Cl (^{38}Cl), Ca (^{49}Ca), V (^{52}V) and Mn (^{56}Mn), the samples and standards were irradiated for 3 min with thermal neutrons. Gamma-ray spectra were measured twice after 3-5 min of decay for 3 and 20 minutes, respectively, using high-resolution HPGe detector systems. The elements which have medium half-life nuclides such as Ca (^{47}Ca), As (^{76}As), Br (^{82}Br), La (^{140}La), Sm (^{153}Sm) and U (^{239}Np),

and long half-life nuclides such as Sc (^{46}Sc), Cr (^{51}Cr), Fe (^{59}Fe), Co (^{60}Co), Ni (^{58}Co), Zn (^{65}Zn), Se (^{75}Se), Sr (^{85}Sr), Ag (^{110m}Ag), Cs (^{134}Cs), Ce (^{141}Ce), Hf (^{181}Hf) and Th (^{233}Pa) were determined by irradiating the samples and standards for 4-5 days with epithermal neutrons. After cooling for 4 to 5 days (for medium half-lives) and for 14 to 20 days (for long half-lives), the gamma-ray spectra were measured for 40-50 min and 2 h 30 min - 3 h, respectively. The element concentrations were determined by conventional relative standardization using software developed in FLNP, JINR.

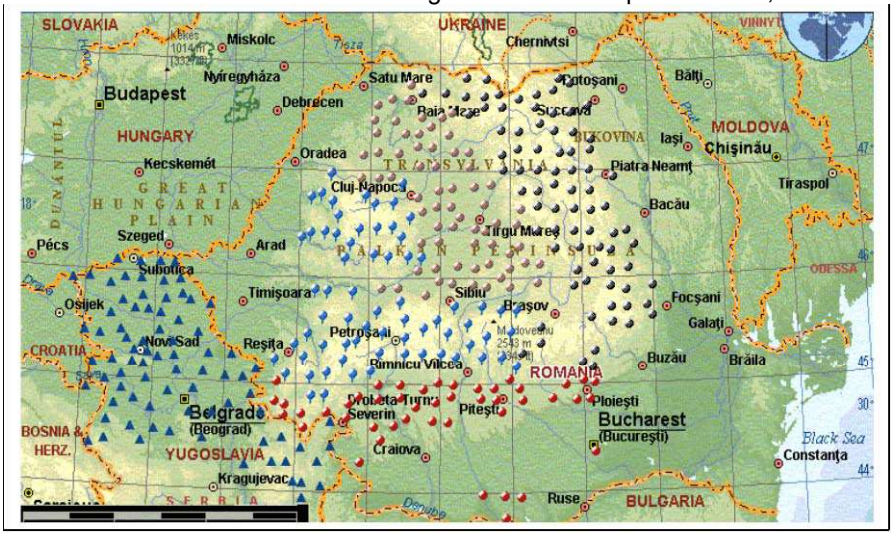

Fig 1. Regional European moss sampling network showing the moss sampling in Southern and Western Carpathians (blue points)

Flame atomic absorption spectrometry

Copper, lead and cadmium were determined by flame atomic absorption spectrometry (FAAS) at Norwegian University of Science and Technology in Trondheim, Norway and Mining Research and Design Institute in Baia Mare, Romania. The moss samples of 0.5 g (d. w.) were digested with 6 ml concentrated nitric acid at 120 ^{0}C for 6 h. After cooling to room temperature the samples were filtered and distilled water was added up to 50 ml.

RESULTS AND DISCUSSIONS

Descriptive statistics

The data were evaluated by using the statistical package SPSS 10. Table 1 shows mean (including standard deviations), median, minimum and maximum concentrations of chemical elements determined in moss samples.

The descriptive statistics analysis of elemental concentrations contains few extremely high or extremely low score loadings, than the mean is biased by these outermost values and the median was further chosen to define and compare the representative pollution levels in the studied region.

A rural site west of the Southern Carpathians was evaluated to represent background conditions most closely. The absolute ratios of median values in different regions of Romania for the main pollutants were computed

Vanadium and iron showed comparative levels in all areas as both are accumulated in mosses from industrial dust associated with mineral particles. Chromium values are 5 times lower in Southern and Western Carpathians than those in the other areas, whereas nickel concentration is much larger in Southern part of Romania than in the other regions. Except for relative higher zinc concentrations in Transylvania Basin, it showed in general lower values, expressed as medians. Cobalt, copper, arsenic, cadmium and antimony levels in moss were 1.3/2.5/3, 5.9/6.4, 1.4/1.7/2.3, 1.4/2.9 and 1.5/1.7/2.6, respectively, times higher in Transylvania Plateau, compared with other regions.

In order to generate the factors from correlation matrices, several computer runs by R-mode factor analysis method were carried out for the moss data. The factors obtained were subjected to orthogonal rotation by the varimax method. The factor loadings and explained variances from the optimum run established for the data set are given in Table 2. Factor scores were used to eliminate the outliers and to identify the single source samples in the data set subjected to principal component analysis.

When applying the R-mode factor analysis to the Southern and Western Carpathians data set, after the first run one removed two outliers as follows: a sample was consistently contaminated by soil dust and the other contained background levels for almost all elements. The results from the second run for the optimum set of 30 elements show that 78.6 % of the total variance in the data can be explained by the 4 factors.

The first factor is most loaded with Fe, Sc Sm, Hf, Al, U, Th, La, V, Ce, Mg, Cr, Cs, Co Na, Ni, Ba, Rb and Ca and small amounts of As, Sb, Zn and Cd. It can be interpreted as a crustal factor with some contributions from anthropogenic sources. The second factor show highest scores for Sb, As, Cu, Pb, Zn, Cd and Ca and may be explained by local anthropogenic character of the elements concerned. The third factor is most loaded with Mn, Sr, Rb and Cs and can be interpreted as a vegetative factor. The fourth factor has I, Br and Se as main contributors and represents a marine component.

CONCLUSIONS

On the basis of factor analysis we were able to classify moss samples according to deposition types and to known pollution sources as in the followings.

1) crustal elements reached in mosses by winblown dust: Fe, Sc, Th, Sm, Hf, V, Cs, La, Na, U, Ce, Mg, Rb, Al, Ba, and Co;
2) long-range atmospheric transport of pollutants (LRTP) from the strong anthropogenic sources of the areas monitored: Pb, Cd, Zn, Cu, As, Sb and Ca;
3) local stationary sources of airborne pollutants: Ni, Co, Cu;
4) marine elements of atmospheric transport of sea-salt: Br, I, Cl and Se;

5) vegetative elements of foliar leaching: Rb, Cs, Sr, (Zn), Ba, and K;

This behaviour of the air toxics is related to the specific industrial activities of the two regions, i.e. oil activity and non-ferrous industry, respectively.

Table 1

Concentrations of 40 elements (μg/g d. w.) in mosses collected from Southern and Western Carpathians

Region	Southern and Western Carpathians			
Statistics	*Mean conc. (μg/g)*	*Median conc. (μg/g)*	*Min. conc. (μg/g)*	*Max. conc. (μg/g)*
Na	1212 ± 97	839	181	3731
Mg	2752 ±181	2145	528	7537
Al	6259 ± 430	4434	1377	19550
Cl	332 ± 14	289	171	999
K	5185 ± 163	5009	347	11110
Ca	5044 ± 308	4785	1594	21840
Sc	0.39 ± 0.03	0.32	0.08	1.46
V	11.2 ± 0.7	8.8	3.3	28.8
Cr	6.4 ± 0.3	5.5	1.6	15.4
Mn	268 ± 16	243	41	657
Fe	3627 ± 242	2579	843	10940
Co	0.74 ± 0.05	0.57	0.12	2.77
Ni	1.08 ± 0.05	0.96	0.32	2.62
Cu*	13.7 ± 1.1	10.4	2.2	79.9
Zn	87 ± 5	68	25	235
As	1.5 ± 0.07	1.24	0.35	3.37
Se	0.60 ± 0.02	0.56	0.17	1.18
Br	6.41 ± 0.17	6.16	3.22	11.48
Rb	22.7 ± 1.1	20.9	5.8	47.8
Sr	32 ± 2	29	6	94
Zr	102 ± 9	82	14	484
Mo	0.42 ± 0.02	0.40	0.08	0.99
Ag	0.26 ± 0.02	0.21	0.02	0.85
Cd*	1.39 ± 0.10	1.26	0.21	5.11
Sb	0.69 ± 0.04	0.52	0.27	1.72
I	2.11 ± 0.07	2.03	0.89	4.45
Cs	0.65 ± 0.04	0.55	0.13	1.88
Ba	82 ± 4	75	22	182
La	2.93 ± 0.19	2.38	0.1	8.3
Ce	6.4 ± 0.4	5.1	1.2	18.6
Sm	0.56 ± 0.04	0.38	0.03	1.83
Tb	0.11 ± 0.008	0.09	0.02	0.41
Yb	0.30 ± 0.02	0.21	0.05	0.85
Hf	1.94 ± 0.15	1.31	0.35	6.4
Ta	0.18 ± 0.01	0.14	0.04	0.51
W	0.37 ± 0.02	0.32	0.09	1.66
Au	0.0066 ± 0.0004	0.0054	0.0012	0.023
Pb*	34 ± 2.5	30	6.2	157
Th	1.01 ± 0.06	0.83	0.2	3.14
U	0.26 ± 0.01	0.21	0.05	0.71

Table 2

Factor loadings for the Western and Southern Carpathians data set

Factor no./ Component	1	2	3	4
Fe	**0.934**	0.208	0.097	0.081
Sc	**0.933**	0.165	0.165	0.015
Sm	**0.932**	0.180	0.031	0.020
Hf	**0.919**	0.219	0.178	0.001
Al	**0.918**	0.096	0.186	-0.023
U	**0.905**	0.135	0.175	-0.017
Th	**0.901**	0.153	0.249	0.016
La	**0.890**	0.213	0.168	0.016
V	**0.887**	0.252	0.006	0148
Ce	**0.865**	0.275	0.175	0.012
Mg	**0.828**	0.184	0.159	0.262
Cr	**0.822**	0.320	0.190	0.186
Cs	**0.787**	0.001	**0.460**	-0.003
Co	**0.780**	0.127	-0.148	0.208
Na	**0.777**	0.288	0.293	0.276
Ni	**0.752**	0.266	0.136	0.268
Ba	**0.744**	0.158	0.518	-0.052
Sb	**0.406**	**0.694**	0.111	0.245
As	0.506	**0.577**	0.188	0.261
Cu	0.157	**0.887**	0.195	0.137
Pb	0.106	**0.882**	0.161	0.096
Zn	0.499	**0.582**	**0.346**	0.174
Cd	0.460	**0.566**	0.103	0.295
Ca	0.449	**0.540**	-0.266	-0.122
Mn	0.111	0.051	**0.819**	0.093
Sr	0.280	0.283	**0.717**	0.078
Rb	0.534	0.172	**0.539**	0.114
I	-0.040	0.067	0.102	**0.896**
Br	0.120	0.002	0.123	**0.891**
Se	0.024	0.299	-0.035	**0.686**
Explained variance	14.5	3.9	2.6	2.5
Explained variance %	48.5	13.1	8.7	8.5
Cumulative variance %	48.5	61.5	70.1	78.6

Rotation converged in 6 iterations.

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DANUBE POLLUTION CONTRIBUTING TO EUTROPHICATION OF THE ROMANIAN BLACK SEA COAST

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Abstract: *The trace metal concentrations in green algae Sea lettuce collected on the Romanian Black Sea coast near the Sulina channel (a branch of Danube river) mouth were determined. The concentrations of Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, V and Zn were determined through atomic absorption spectrometry and neutron activation analysis. The concentrations of trace metals in Sea lettuce samples were about 2.5 times higher compared to corresponding concentrations in the Eastern part of the Black Sea. The results obtained show that Sea lettuce may be used as a bioindicator for trace metal contamination of the coastal waters.*

It is well known that the macroalgae (as green algae *Chlorophyta*) can absorb and store nitrogen, phosphorus and heavy metal ions from water. Some green algae (Chlorophyta) species are potentially good biomonitors for water pollution. Earlier studies have determined that pollutant accumulation in macroalgae have gradually increased in Black Sea coastal waters.

Danube is the Europe's second biggest river and the world's 26th, with almost 2,900 km of length, a basin of over 800,000 sq.km, populated by some 80 million inhabitants in 8 countries. Pollutants poured into the rivers waters, including toxic metals, agrochemicals and radionuclides are released mainly via rivers draining out of Central and Eastern Europe. The factors of pollution are associated mainly with oil hydrocarbons, airborne pollutants (As, Cd, Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb, V, Zn) released by different types of industries located in the Danube Basin and implicitly in Black Sea Basin, urban raw sewage, pesticide residues and other chemicals from farms.

Some algae species are potentially good biomonitors for water pollution monitoring studies. Earlier studies have determined that heavy metal accumulation in macroalgae have gradually increased in Black Sea coastal waters. Additionally, increased river supply of 'nutrients' such as phosphate, ammonium and nitrogen feed excessively algae communities that proliferate, causing an overproduction of the phytoplankton, which block the light reaching the sea grasses and algae. The bacteria quickly consume all the oxygen and the sea is virtually dead below a depth of about 180 m. Because the replenishment of the bottom waters with new seawater from the Mediterranean takes hundreds of years, the Black Sea remains the biggest natural anoxic basin in the word.

The present study was carried out in the framework of the project "The assessment of environmental pollution in the Southern part of Romania" (2000 - 2005) agreed between the Faculty of Physics of University in Bucharest and Frank Laboratory of Neutron Physics of the Joint Institute for Nuclear Research. This paper reports the heavy metal levels in the green algae *Sea lettuce* collected on the Romanian Black Sea coast.

MATERIAL AND METHODS

The *Sea lettuce* samples were collected on the Romanian Black Sea coast near the Sulina channel. The map comprising the algae sampling is shown in Fig. 1.

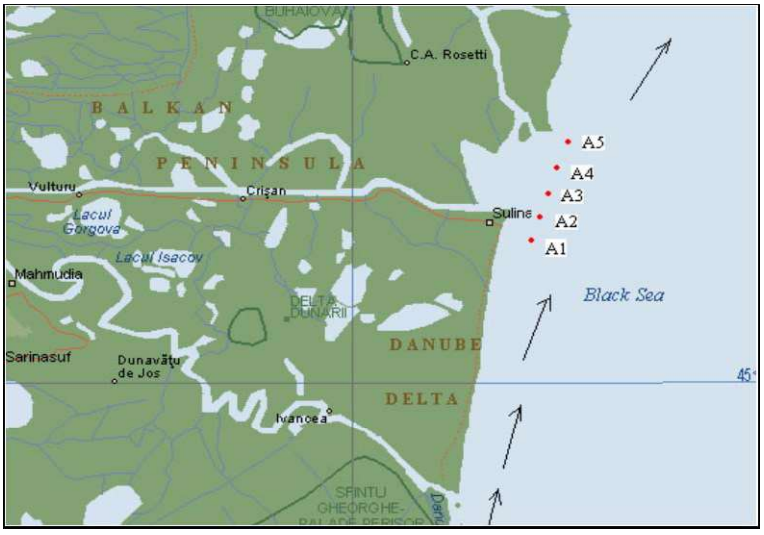

Fig. 1. – Map showing the sampling sites

At five sampling sites, samples were recorded in $1m^2$ quadrates placed 20 m apart along belt transects for sampling. Prior to analysis the *Sea lettuce* samples:

- were carefully cleaned from all shells, dead material and attached litter;
- washed with distilled water ;
- were let to dry at room temperature on a filter paper;
- were kept at 40^0C for 48 hours in thermostat until constant weight;
- were finely powdered in an agate mortar.

The same material was subjected both to neutron activation analysis and flame atomic absorption spectrometry. By this combination of methods was determined an amount of 36 elements in the *Sea lettuce* samples analyzed.

The characteristics of irradiation channels for neutron activation analysis can be seen in Table 1.

The elements were measured as follows: Mn and V by their short half-lived radioisotopes, As by its medium half-lived isotope and Co, Cr, Fe, Ni, Zn by their long half-lived radioisotopes.

Table 1

The number of samples of different moss species collected

Irradiation channel	Neutron flux density 10^{12} x(n/cm^2 s)			T (°C)	ϕ channel (mm)	L channel (mm)
	E=0–0.55 eV	E=0.55–10^5 eV	E=10^5–25.10^6 eV			
Ch1 (Cd-screened)	0.023 ± 0.002	3.31 ± 0.3	4.23 ± 0.4	70	28	260
Ch2	1.23 ± 0.1	2.96 ± 0.3	4.1 ± 0.4	60	28	260

The elements Cd, Cu, Hg and Pb were determined by acroalga samples of 0.5 g (d.w.) were dissolved in 6 ml HNO_3 at 120^{0}C during 6 h. After cooling at room temperature, the samples were filtrated and distilled water was added up to 50 ml.

RESULTS AND DISCUSSIONS

The element concentrations are presented in Table 2.

Table 2

Elemental concentrations in algae samples, mg/kg (d.w.)

***Element*/Site**	**A1**	**A2**	**A3**	**A4**	**A5**	**EBS* (1995)**
As	12.3	29.0	27.5	17.6	15.8	
Cd	1.5	3.5	2.6	1.9	1.8	0.5
Co	3.4	11.1	9.0	8.0	7.7	0.05
Cr	0.8	8.4	3.2	1.4	1.1	<0.05
Cu	9.4	21.7	17.8	13.1	11.3	3.5
Fe	204	351	339	321	258	106
Hg	0.05	0.17	0.14	0.08	0.06	
Mn	16	83	26	21	18	23
Ni	0.48	1.03	1.05	0.61	0.58	2.3
Pb	1.1	18.3	13.7	3.1	2.9	<0.1
V	19.7	55.2	41.8	30.3	20.2	
Zn	15	22	21	19	19	59

*IAEA BULLETIN, 42/4/2000

The trace element concentrations for the samples A2 and A3 exceed considerably the values obtained for the last three samples. At the sample map it can be seen that these two samples are located in the middle of the transition zone between coastal and estuarine waters. From this follows that pollutants originate mainly in Danube River waters draining in the Black Sea. The general behavior of the values recorded shows a gradient along the marine current. This fact proves once more that the microelements are transported to Black Sea by Danube waters.

The concentrations of some trace metals exceed the corresponding values from 1995 recorded in the eastern part of the Black Sea by a factor of 7 to 15 times, excepting Pb concentration, that exceeds the 1995 value by 2 orders of magnitude, and also Ni and Zn, that present lower values compared with 1995 (Fig. 2).

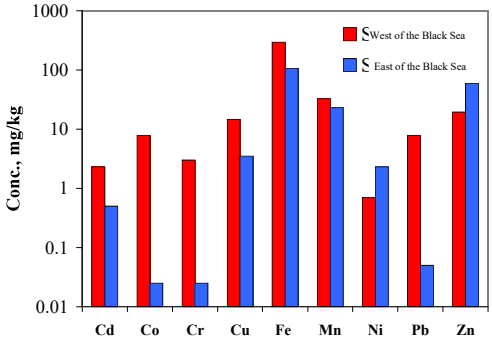

Fig. 2. – Comparison of the metal concentrations in western part of the Black Sea (Romanian coast) with corresponding values in the eastern part

CONCLUSIONS

The heavy metal content in green macroalgae samples from the Romanian Black Sea coast was studied for the first time. These results show that *Sea lettuce* is a reliable bioindicator for heavy metal pollution of the coastal waters. Data reported in this study suggest that a greater amount of pollution comes from Danube Basin. Also the results obtained proved once more that Europe is the dominant source of anthropogenic metals in the Black Sea environment.

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THE RADIOCHEMICAL STUDIES OF MOSS PLANTS AND SOIL USING INAA AND AAS

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Abstract: *This report presents the results of a regional survey of chemical contents of moss species and related topsoil, where the moss plants are growing, and uses them to derive estimates of atmospheric deposition. The moss and soil samples were analysed using the atomic absorption spectrometry and neutron activation analysis. Mean elemental concentrations varied between moss species sampled. This was partly due to the different locations from which they were sampled, and partly due to species differences in the rate of elemental uptake. Comparison of results with matched sites and moss species from the previous survey showed significant reductions in heavy metal concentrations of both Pleurozium schrebery and Hypnum cupressiforme.*

The epiphytic mosses were tested to monitor the atmospheric deposition on a regular network in Europe from 1990s years and now are regularly used for monitoring purposes. Such mosses present enough reliable biomonitor qualities since they have a poor root system and then obtain most of their mineral nutrients as particulates and in solution directly from the atmosphere. Also they pose a great capacity to retain many chemical elements, to a large diapason of concentrations. Incipient studies of the heavy metal uptake by moss *Hylocomium splendens* done by Swedish scientists A. Ruhling and G. Tyler in 1970s years showed that the accumulation rates of the heavy metals followed this order: Cu, Pb>Ni>Co>Zn, Mn. The other Swedish scientist, H.B. Ross, determined in 1990 the uptake efficiencies in moss *Hylocomium splendens* for some elements presented in Table 1. A Norwegian scientist, E. Steinnes, determined in 1985 a large suite of heavy metal uptake efficiencies in mosses *Hylocomium splendens* collected in Southern Norway (Table 1).

Table 1

Uptake efficiencies of moss *Hylocomium splendens*

Element	**V**	**Cu**	**Cr**	**Zn**	**As**	**Se**	**Cd**	**Sb**	**Pb**
Uptake efficiency (%) by Ross	40-60	50-85		46-70			40-50		
Uptake efficiency (%) by Steinnes	54		84	41	32	46	65	50	~100

The aim of the present study is to provide extended knowledge about correlations between chemical content in mosses and adjacent topsoil, in order to evaluate for which constituents mosses are reliable as biomonitors and to which extent. For this purpose the mosses belong to a moss survey done in Oradea's Plane in 2003 year were used. The chemical content of moss plants sampled was determined by neutron activation analysis and flame atomic absorption spectroscopy analytical methods.

This research is part of the project "Survey of Atmospheric Heavy Metal Deposition in Transilvania using moss biomonitoring technique" (2003-2009), applied by one of the authors (i.e. C. Oprea) in Bihor County.

MATERIAL AND METHODS

For sampling the guidelines reported in the protocol ***Monitoring of Atmospheric Heavy-Metal Deposition in Europe Using Bryophytes 2000/2001*** were used. Sampling was carried out during the summer of 2003 year. The moss species sampled were *Pleurozium schrebery* and *Hypnum cupressiforme.* The green part of the plant was separated and used further in the experiment.

The corresponding surface soils where the moss plants are growing in their natural habitat were sampled at the 0- to 5 cm depth.

The chemico-physical preparation of samples for analysis and the analysis procedures in the earlier studies of the author Oprea C. were detailed described.

A total of 39 chemical constituents were determined in analysed samples using both analytical methods.

Rahn. K.A. has proposed a graphical method for distinguishing plant material and soil from atmospheric deposition in biomonitors in 1997 and in 1999 applied it with success for determining major sources of elements in a mixed aerosol. We applied this method also to separate the moss component than that of soil nature and to characterize the main sources of elements in surveyed moss samples.

The definition of the enrichment factor for an element is the following:

$$EF = (X/Sc)_{moss} / (X/Sc)_{soil}$$

where X denote the element and Sc is the usual soil reference element.

RESULTS AND DISCUSSION

Graphical technique moss to soil

The results obtained by application of graphical technique to average moss and soil concentrations have selected between the best indicators sources of chemical element other than soil contribution (Fig. 2).

The element factors close to unity show geochemical similarities of these elements with sampled topsoil. The best indicators of non-soil sources are that of EF>3 and they correspond to chemical moss compounds as I, Cl, Cd, Br, As, Pb, Zn, Mn, Sb, Cu, Mo, K, Na, Ni, V, Ca, Hf and Sr, in that order.

According to their main origin sources, those elements can be divided by groups as follows:

1) I, Cl, Br, K, Na, Mg (long-range atmospheric transport from ocean environment);

2) Cd, As, Pb, Zn, Mn, Sb, Cu, Mo, Ni, Ca (regional general pollution due to anthropogenic activity (industry, urbanization, agriculture, tourism);

3) Ni, V (regional pollution due to oil industrial activity);

4) Cd, As, Pb, Zn, Mn, Sb, Cu, Mo, Ni, V, Ca, Hf (long-range atmospheric transport from Europe);

5) Sr, Cs, Ba, Rb, Zn, Cu, Ca (vegetal component transferred from living or dead vascular plants).

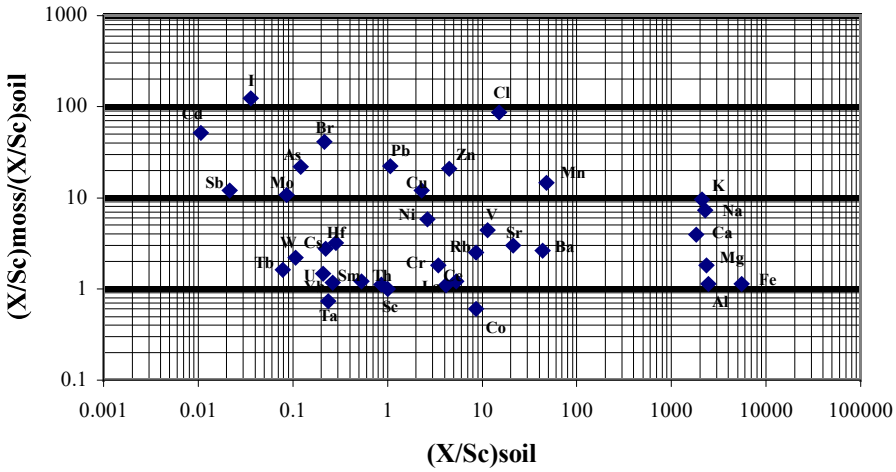

Fig 1. Enrichment factor of elements in mosses versus soil

Moss species comparison

When it was possible, in some locations were recorded both *Pleurozium schreberi* and *Hypnum cupressiforme* species and this survey allowed a comparison between the two species elemental content. The moss concentrations were normalized and then the interspecies moss concentration ratios (R=c*(PS)*/c*(HC)*) were calculated and compared with those of previous surveys (Table 2). The R ratio varies between 0.6 and 1.1 for Mg, K, Ca, Cr, Fe, Co, Br, Rb, Sr, I, Ba. The most pollutants elements in the region as Cd, As, Zn, Pb, Ni, V, and Cl, were highly loaded in *Pleurozium schreberi* then *Hypnum cupressiforme. Hypnum cupressiforme* moss showed high loadings for the elements Mn, Sb, Mo and Sr.

Table 2

R ratio for chemical element of the two sampled moss species

R	Elements
R<0.6	Mn, Sb, Mo, Sr
0.6<R<1.1	Mg, I, Br, Cu, K, Na, Ca, Cr, Fe, Co, Ba, Hf, Rb, Se, U, Th, Cs, L, Ce, Sm, Ta, Tb, Yb, W
R>1.1	Cd, As, Zn, Pb, Ni, V, Cl

CONCLUSIONS

The chemical content in epiphytic mosses *Pleurozium schreberi* and *Hypnum cupressiforme* living in surveyed area was determined to an extent of 39 inorganic constituents. The pollution tendencies that influenced the regional environment were reflected by the analysed moss and even soil samples. The most polluting elements occur in the moss from both local emissions as well s as a result of long-range atmospheric transport. The element concentrations in the two moss were compared and was established the best biomonitor of different elements, belonging to different origin sources.

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THE MAIN DISEASES OF FLOWERS CULTURES FROM THE GREENHOUSES OF ADP PITESTI

PRINCIPALELE BOLI ALE CULTURILOR FLORICOLE DIN SERELE A.D.P. PITEŞTI

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Abstact. *Greenhouse conditions that favor plant growth also favor the rapid build-up and spread of insects and diseases. Potential disease problems include root rots, powdery mildew, fungal leaf spots.*

Rezumat. *Condiţiile existente în sere favorizează creşterea plantelor, dar creează şi un mediu optim pentru propagarea dăunătorilor şi patogenilor. Principalele aspecte patologice includ putrezirea rădăcinilor,făinări, mane, pătări ale frunzelor.*

The ornamental plants be favorite hosts for a series of pathogens and pests, in conditions in which, in greenhouses Pitesti gathered favourably conditions for growth and reproduction of these. Common insect pests include thrips, aphids and white flies. Prevention and careful monitoring are the keys to insect and disease control. Weed control in and around the greenhouse will also help reduce insect pests and disease problems.

Our presents study explores the incident to appearances the main disease which affected the flowers cultures from the greenhouses ADP Pitesti.

MATERIALS AND METHODS

The studies were conducted at the greenhouses of APD Piteşti. The biological material was collected in different the vegetation periods of ornamental plants.

The observations and determination of the fungi was realized by the optic microscope.

RESULTS AND DISCUSSIONS

Trialeurodes vaporariorum West.

Adult is very pale yellow, about 1 mm long. The wings held relatively flat when in repose, coated with pure white waxy bloom. Egg has a conical shape, pedicellate, 0,25 mm long, yellowish-white when laid, it becomes purplish-grey after two days. Eggs are laid in a circle on smooth leaves. The pupa is whitish, shaped like a small, oval box, with short marginal wax processes and long waxen dorsal tubes, sometimes absent on certain host. This whitefly is responsible for very severe damage: production of honeydew and the consequent formation of sooty moulds (fig. 4).

Tetranychus urticae Kokh

Direct damage is duet o feeding punctures: the leaves become spotty, and then dry aut (fig. 2). If attacks are heavy, the plant may die. Spider mites are extremelly small, barely visible with the naked eye as reddish or greenish spot son leaves and stem; the adults measure about 0,5 mm. The females is about 0,4 mm in lenght with an elliptical body that bears 12 pairs of dorsal setae. The male is elliptical with the caudal end tapering and smaller than the female.

Taeniothrips sp. is a common pest of greenhouse grown plants. Unlike many thrips species, the greenhouse thrips openly feeds on the lower surface of leaves first, rather than on blossoms, buds, or growing shoots. Thrips scrape the surface of the leaves and petals, and suck the sap, leaving a white mottled appearance on leaves.

Mycosphaerellla dianthi (Burt.) Jorst.

The fungus is common an widespread on leaves and sometimes inflorescences. Conidial state is *Cladosporium* with colonies effuse, olivaceous grey, conidiophores brown, up to 200 x 8-10 µ, conidia pale or mid pale brown or olivaceous brown, mostly 2- to 4-septate, 25-50 x 10-15 µ. Plants are sometimes completely destroyed.

Stagonospora curtisii (Berk.) Sacc.

The *Stagonospora* fungi over-winter as pycnidia embedded in dead leaf. *Stagonospora* leaf spots are often confused with those produced by species of the fungus *Septoria* (fig. 1). The fungal spores must be examined microscopically to distinguish between the two pathogens. Both leaves and flower stalks attacked by the fungus. Initial symptoms are small red spot which enlarge, elongate, and become sunken. In later stages, the gray mycelium of the fungus develops in the center of the lesions while the border remains red. Pycnidia is amphigenous, immersed, up to 0,2 mm. Conidia is hialine, 1-3-septate, 11-19 x 5-6 µ.

Pestalotiopsis sp.

Disease development can be restricted to only the leaf blade (leaflets or leaf segments) or/and only the petiole and rachis. Spots will begin as very small yellow, brown or black spots. Often, the spots turn a grayish color that are outlined in black. The same type of lesions occurs on the petiole or rachis of the palm. Conidiomata is acervular, epidermal. Conidia is 4-euseptate, 11-12 x 5µ, basal and apical cells are hyaline, with 2-3 appendages, median cells are brown.

Puccinia horiana P. Henn.

Chrysanthemum white rust is caused by the microcyclic rust fungus. The rust infectious appear initially as small light green to yellow spot son the upper leaf surfaces. The pustules become white over time, followed by necrosis and abscission of diseased tissue. Telia are hypophyllous, rarely epiphyllous, compac, yellowish to gray, 2-4 mm diameter. Teliospores are oblong, 30-52 x 11-18 µ, two celled but occasionally 3- and 4-celled, slightly constricted at septum, cell wall pale yellow, smooth; pedicel hyaline, persistent, up to 45 µ long.

Uromyces caryophyllinus (Schr.) Winter

Carnation rust caused by *Uromyces caryophyllinus*. On leaves, buds and stem appear chocolate or cinnamon brown pustules, up to 2 cm long.

Botrytis cinerea Pers. ex Pers. caused leaf rot as one of the major disease of cyclamen and streptocarpus (fig. 3). The fungus is characterized by abundant hyaline conidia, 8-14 x 6-8 µ borne on grey, branching tree-like conidiophores.

Fusarium oxysporum f. sp. *dianthi* (Prill. et Delacr.) Snyd et Hans. External symptoms including yellowing or collapse of the older leaves, occur on plants more than 4 months old. Reddish to dark brown vascular discoloration occurs in the outer leaf sheaths, pseudostem, rhizome and fruit stalk.

The fungus produces three types of asexual spores: microconidia, macroconidia, and chlamydospores. Microconidia are one or two celled, and are the type of spore most abundantly and freqeuntly produced by the fungus under all conditions. It is also the type of spore most frequently produced within the vessels of infected plants. Macroconidia are three to five celled, gradually pointed and curved toward the ends. These spores are commonly found on the surface of plants killed by this pathogen as well as in sporodochialike groups.

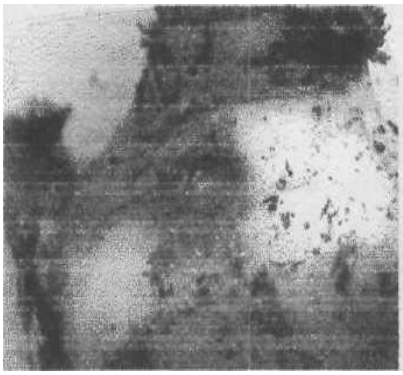

Fig. 1 - *Stagonospora curtisii*

Fig. 2 -*Tetranychus urticae*

Fig. 3 - *Botrytis cinerea*

Fig. 4 -*Trialeurodes vaporariorum*

CONCLUSIONS

The ornamental plants from greenhouses ADP Pitesti be favorite hosts for a series of pathogens of pest.

The values of the degree of attack oscillated depending on evolution climatic conditions.

The morphological and physiological modifications al to the level of the hosts pursuant the attack of pathogen have direct and indirect consequences about quality of plants material.

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THE FUNGI OF *ROSA* SPP. FROM CITY PITEŞTI

MICOZE ALE TRANDAFIRILOR ÎN CONDIŢIILE ORAŞULUI PITEŞTI

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University of Piteşti

Abstact. *The pathogenetic conspectus of the micotic nature to the plants taked under consideration figured in the protocol of thing the classic methods of take-off and remake material biologic. The pathogens were named by rule current of nomenclature and taxonomy recognized of the scientific international community.*

Rezumat. *Conspectul patogenilor de natură micotică la plantele luate în studiu au inclus în protocolul de lucru metodele clasice de prelevare şi prelucrare a materialului biologic. Patogenii au fost denumiţi conform regulilor actuale de nomenclatură şi taxonomie recunoscute de comunitatea ştiinţifică internaţională.*

Roses are subject to several disease. The most serious is rose rust (*Phragmidium mucronatum*), a species of rust fungus, which can defoliate the plant. More common, though less debilitating, are rose black spot, caused by the fungus *Diplocarpon rosae*, which makes circular black spots on the leaves in summer, and powdery mildew, caused by *Sphaerotheca pannosa*. Fungal diseases are best solved by a preventative fungicidal spray program rather than by trying to cure an infection after it is visible. After the disease is visible, its spread can be minimized through pruning and use of fungicides although actual infection cannot be reversed. Some rose varieties are considerably less susceptible than others to fungal disease. Other fungal problems are cankers, dead areas on the stem that can enlarge and eventually kill stem or even the entire plant, caused by *Phomopsis incarcerata.* Fungicides are not very effective.

MATERIALS AND METHODS

The studies were conducted at the garden of Piteşti. The biological material was collected in different the vegetation periods of ornamental plants.

The observations and determination of the fungi was realized by the optic microscope.

RESULTS AND DISCUSSIONS

Sphaerotheca pannosa var. *rosae* (Wallr. ex Fr.) Lév.

Mycelium epiphyllous, whitish. In the *Oidium* state, hyaline, uninucleate, barrel-shaped conidia, 22-24 x 11-13 µ, with fibrosin bodies, formed in long chain on erect conidiophores. Clestothecia not observed. On leaves, young shoots, flowers and fruit of *Rosa* spp (fig. 1).

Diplocarpon rosae Wolf. (anamorph *Marssonina rosae* (Lib.) Died.)

Mycelium immersed, hyaline to pale brown, branched, septate. Conidiomata acervular, subcuticular, dark brown, separate, rarely confluent, dehiscente irregular, 56,5-156 x 14,5-45,5 μ. Conidiophores hyaline, branched irregularly, septate. Conidia hyaline, 1-septate, unequal cells, smooth, guttulate, base truncate, constricted at the septum, 15-18 x 5-7 μ, slightly curved, apex obtuse. On leaves of *Rosa* spp. (fig. 3).

Diaporthe incarcerata (Berk. & Br.) Nitschke (anamorph *Phomopsis incarcerata* (Sacc.) Höhn.)

Conidiomata pycnidial, immersed, unilocular, multilocular or convoluted, *textura angularis*. Conidiophores branched and 1-2-septate, hyaline, filiform, formed from the inner cells of the walls. α- conidia hyaline, fusiform, straight, usually one guttule at each end, aseptate, 6-8 x 2 μ (7-8 x 2 μ, Mititiuc, 1997). β-conidia hyaline, filiform, aseptate, hamate, 16-21 x 1 μ. On branched of *Rosa* spp. (fig. 4).

Camarosporium rosae Grove

Pycnidia black, separate, immersed, subperidermal, globose, unilocular, over 0,1 mm diameter. Conidiophores absent. Conidia brown, mostly with 3 transverse septa, some with 1 longitudinal septum, base truncate, apex obtuse, continuous at the septa, 12-15 x 5-6 μ. On dead stem *Rosa* spp.

Cytospora rosarum Grev.

Conidiomata eustromatic, multilocular and convoluted, subperidermal, dark brown, *textura angularis*. Conidiophores hyaline, septate, branched irregularly at the base and above, 20-47 x 1,5-2 μ, smooth. Conidia hyaline, aseptate, thin-walled, eguttulate, smooth, allantoid, 5-7 x 1 μ. On dead branched of *Rosa* spp.

Coniella sp.

Conidiomata pycnidial, semi-immersed, unilocular, separate, globose, ostiolate. Conidiophores absent. Conidia olivaceous, aseptate, base truncate, apex obtuse, smooth, eguttulate, 9-13,5 x 3 μ. On fruit of *Rosa* spp.

Hainesia lythri (Desm.) Höhn.

Conidiomata semi-immersed, finally superficial, separate, very pale brown, initially globose, later cupulate. Conidiophores hyaline, branched at the base and above, septate, filiform, long, 40 x 1-2 μ. Conidia hyaline, aseptate, allantoid, acropleurogenous, acute at each end, ± guttulate, 5-8 x 1-2 μ. On dead leaves of *Rosa* spp.

Seimatosporium lichenicola (Cda) Shöemaker & Müller

Conidiomata acervular, separate, immersed, brown, *textura angularis*, 200 μ diameter. Conidiophores cylindrical, septate, branched, hyaline, filiform, formed from the upper cells of the conidiomata, 15-20 x 1-1,5 μ (17 x 1,5-2,5 μ, Sutton, 1980). Conidia fusiform, 3-septate, septa equidistant, eguttulate, lacking appendages, median two or upper three cells darker than the basal one, 13-15 x 5 μ (13-15 x 5,5-6,5 μ, Sutton, 1980; 13-15 x 5-6,5 μ, Ellis, 1985). On branches of *Rosa* spp.

Phragmidium mucronatum (Pers.) Schl.

Uredinia hypophyllous, small, pale orange, with curved paraphyses. Spores finely echinulate, with small pores, 20-28 x 16-21 µ. Telia black, spores mostly 5- to 7- septate, 65-110 x 28-40 µ. On leaves of *Rosa* spp. (fig. 3).

Phragmidium tuberculatum J. Müller.

Uredinia small, pale yellow, with curved paraphyses; spores coarsely echinulate, with large pores, 18-28 x 16-22 µ. Telia black, spores mostly 4- to 5-septate, 70-90 x 30 µ. On leaves of *Rosa* spp.

Fig. 1 - *Sphaerotheca pannosa*

Fig. 2 - *Phragmidium mucronatum*

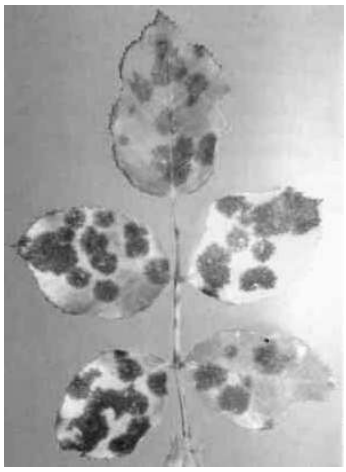

Fig. 3 - *Diplocarpon rosae*

Fig. 4 - *Phomopsis incarcerata*

CONCLUSIONS

1. *Rosa* sp. gets many diseases

2. In most growing areas, black spot is the most common fungal leaf disease on roses.

3. Other fungal problems are cankers and rust.

4. The most big weight from the fungi recognize on *Rosa* spp. belongs to the division *Deuteromycota*.

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THE INFLUENCE OF STORED PERIOD ON THE LEGUMES SEEDS IN THE CONTROLLED ATMOSPHERE UPON MICROMYCETES VIABILITY

INFLUENȚA DURATEI DE PĂSTRARE A SEMINȚELOR DE LEGUMINOASE PENTRU BOABE ÎN CONDIȚII DE MEDIU CONTROLAT ASUPRA VIABILITATII MICROMICETELOR

PLACINTA DOMNICA DANIELA, MURARIU DANELA
Suceava Genebank

Abstract. *The legumes seeds micoflora (pea and bean) which are stored the certain period in the controlled conditions (T=+4°C and relative humidity 70%) are decreased. In many cases the viability of the inocul depend of its age. The seed aging degree could generate a change in the relation parasite-seed pursuant of longevity different of the contamination micoflora. The experimental biologic material is represented by breeds and local landraces coming from different pedoclimatic areas and stored a time period at T=+4ºC. The used researchs methods were macroscopic analyze and CGA (potato-sucrose-agar). The obtained results were realized trough quantification the analyzed elements. The epiphyte and endophyte micromycets associated of the seed were evaluated trough the colonies counting and attack frequency which was estimated in percents. The effectuated analyses were processed through statistical methods in order to emphasize of some significant regressions, the study showing that of the micromycets evolution is hard influenced of the storage period increase of the analyzed seeds.*

Rezumat. *Micoflora semintelor de leguminoase pentru boabe (mazarea si fasolea) pastrate anumite intervale de timp in depozit cu atmosfera controlata (T=+4ºC si umiditate relativa a aerului 70 %) se reduce considerabil, viabilitatea inoculului depinzand in majoritatea cazurilor de virsta acesteia. Gradul de imbatrinire a semintei poate produce o schimbare in relatia cu parazitul ca urmare a diferentei de longevitate a micoflorei ce o contamineaza.*

Materialul biologic de experimentare s-a constituit din probe de seminte din soiuri si populatii locale colectate din diferite zone geografice si depozitate o perioada de timp la T=+4ºC. Metodele de cercetare aplicate au fost analiza macroscopica a semintei si metoda placilor de agar (CGA).Rezultatele obtinute s-au bazat pe cuantificarea elementelor analizate, micromicetele epifite si endofite asociate semintei s-au evaluat prin numararea coloniilor iar frecventa atacului s-a exprimat in procente. Determinarile efectuate s-au prelucrat statistic pentru evidentierea unor regresii intre diferite elemente, studiul reliefind faptul ca evolutia micromicetelor este influentata puternic de cresterea duratei de conservare a semintelor speciilor analizate.

INTRODUCTION

In our agriculture country, the bean and the pea are tradition cultivation by high nutrient value of the seeds who constitute the primary source of protein in the food of humans and animals to disposed of the majority locality of the favorable pedoclimatic conditions (Hulea A, 1973). However, the acquired productions on the big areas and on farms rural didn't upen the potential biologic level of the sorts cultured or presented fluctuations of the year at else. A one main cause of these situations may be the infection degree seeds. In the majority occurrence the existing inocul worn of the seed is viable in mayoralty of these age, on the fresh seeds been present in big percent, the infection reduced from the year at else or after many conserved years. The seed aging degree could generate a change in the relation parasite- seed pursuant of longevity different of the contamination micoflora (Raicu C, 1978). Departed from these situations this study dignifies the duration role of keeping about the micromycets longevity existing on the beans seeds and the stored peas at temperate four degrees plus certain period of time.

MATERIAL AND METHOD

The experimental biologic material is represented by breeds and local landraces who belong to two legumes species Phaseolus vulgare si Pisum sativum. Of the midst's samples of fresh seeds and the stored seeds thus took:

- a. for the bean took:- seventeen of the fresh seed which from three samples belong of the Ami, Astra, Avans breeds and fourteen locale landraces .-nine stored samples of the locale landraces.
- b. for the pea took:-twelve fresh samples and ten stored samples of the locale landraces.To make possible of this phytopatological study of mycromicets evaluation on the legumes seeds it was utilize the following research methods: the seeds macroscopic analyze; the Ulster method (Mallone; Muskett, 1964).

Beyond analyzed the macroscopic, was study seeds by Ulster method utilize the potato- sucrose- agar of the nutritive medium. The Petri dishes with seeds were incubated for 7 days at T=22°C, In the last three days was expose to bulb with fluorescent light for twelve hours per day. Beyond seven days of incubation the micromycets colonies existing on the seeds it was determine macroscopic and the conidiene forms by effectuated the microscopic slide.

RESULTS AND DISSCUSIONS

The experimental results have a statistic character indicating the isolated fungus genus with afferent regressions lines influenced by the seeds storage duration.

The studied biologic material belong of the species *Phaseolus vulgaris (table 1)* characterizing through:

-on the fresh bean seeds were identified 18 genus of the micromycets, with 592 colonies from which: 5 parasite genus: *Colletotrichum lindemuthianum, Isariopsis griseola, Sclerotinia sclerotiorum, Fusarium roseum, Rhyzoctonia solani;* 13 saprophyte genus: *Cladosporium herbarum, Alternaria alternata, Stemphylium botryosum, Epicoccum sp, Acremoniella verucosa, Acremoniella atra, Rhyzopus sp., Trichotecium roseum, Trichoderma viride, Penicillium sp., Stachybotrys atra, Papularia arundinis, Chaetomium sp.*

- on the seeds which were stored during the year 1992 were identified 6 genus of the micromycets, with 28 the colonies, such as: *Cladosporium herbarum, Alternaria alternata, Stemphylium botryosum, Epicoccum sp., Rhyzopus sp, Trichoderma viride .*

Table 1

Action mode of the pathogen and saprophyte mycromicets on the bean cultivar seeds studied in the two experimenthal conditions

The experimenthal conditions / The isolated genus of the micromycets	The fresh seeds from 2006	The stored seeds from 1992
	The number of the colonies isolated	
The parasite genus		
Colletotrichum lindemutiamum	54	0
Isariopsis griseola	27	0
Sclerotinia sclerotiorum	18	0
Fusarium roseum	19	0
Rhyzoctonia solani	5	0
The saprofite genus		
Cladosporium herbarum	9	3
Alternaria alternata	149	1
Stemphylium botryosum	30	6
Epicoccum sp.	28	2
Acremoniella verucosa	116	0
Acremoniella atra	10	0
Rhyzopus sp.	46	6
Trichotecium roseum	37	0
Trichoderma viride	26	10
Penicillium sp.	3	0
Stachybotrys atra	3	0
Papularia arundinis	9	0
Chaetomium sp.	3	0
Total	**592**	**28**

After fourteen storage years the parasite mycromicets were disappeared being identified only six saprofite mycromicets with a low colonies number: *Alternaria alternata, Cladosporium herbarum, Stemphylium botryosum, Trichoderma viride, Epicocum sp., Rhyzopus* sp. In the figure no. 1, it observe that the regressions lines shows the link between the stored period and the evolution of these six mycromucets. The action of the *Alternaria alternata* is much more influenced by the increasing of the storage period, then the action of the other micromycets.

Thus, through the increasing of the seeds storage period, the infection rate with *Alternaria alternata* is reduced much more.

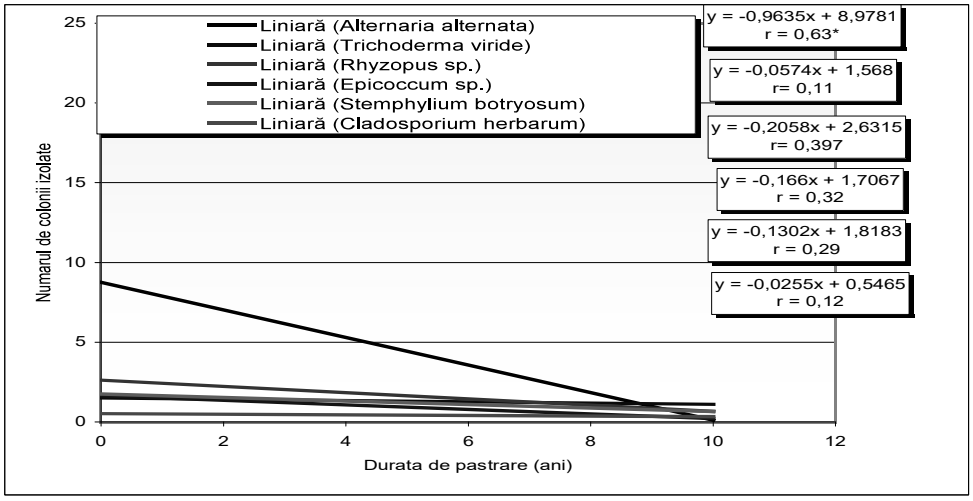

Figure 1 - Regression lines for correlation's between stored duration and isolated colonies at the identified micromicets on the analyzed bean seeds

On seeds of species *Pisum sativum* were obtained the following results (table 2):

- on the fresh seeds were identified 9 genus with 149 micromycets colonies on which: 2 parasite genus: *Ascochyta sp., Fusarium solani;* 7 saprofite genus: Cladosporium herbarum, Alternaria alternata, Stemphylium botryosum, Epicoccum sp., Rhyzopus sp, Gonatobotrys atra, Penicillium sp.

- on the stored pea seeds from year 1995 were identified: 7 saprofite genus: *Cladosporium herbarum, Alternaria alternata, Stemphylium botryosum, Epicoccum sp., Rhyzopus sp., Penicillium sp., Papularia arundinis.*

Table 2

Action mode of the pathogen and saprophyte micromicets on the pea landraces seeds studied in the two experimental conditions

The experimenthal conditions / The isolated genus of the micromycets	The fresh seeds from 2006	The stored seeds from 1992
	The number of the colonies isolated	
The parasite genus		
Ascochyta sp.	3	0
Fusarium solani	9	0
The saprofite genus		
Cladosporium herbarum	14	4
Alternaria alternata	72	13
Stemphylium botryosum	9	1
Epicoccum sp.	14	2
Rhyzopus sp.	24	5
Penicillium sp.	2	17
Gonatobotrys atra	2	0
Papularia arundinis	0	1
Total	**149**	**43**

In the wake of analyzes of the arises micromycetes on the seeds during of that two experiment periods it was observed that after 11 storage years in the environment controlled conditions the parasite mycromicetes disappeared and were reduced the number of the saprophyte colonies, such as: *Cladosporium herbarum, Alternaria alternata, Stemphylium botryosum, Epicoccum sp., Rhyzopus sp., Penicillium sp., Papularia arundinis.*

The regressions lines emphasizes that there is a negative correlation between the storage period of the seeds and the number of the isolated colonies, excepting the *Penicillium sp.* micromycete where exist a positive correlation.

It noticed, that the action of the *Alternaria alternate* (figure 2) micromycete is influenced much more by the increasing of the storage period in comparison with the action of the other four micromycets.Thus, if the storage period will increase, the infection rate with *Alternaria alternata* will be less.

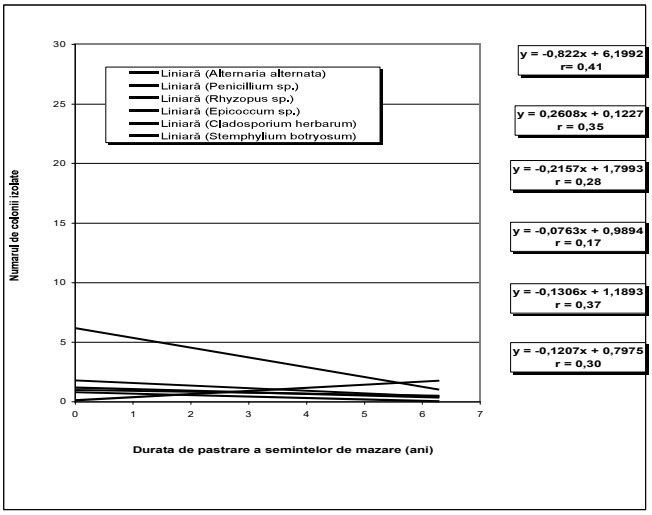

Figure 2 - Regression lines for correlation's between stored duration and isolated colonies at the identified micromicets on the analyzed bean seeds

CONCLUSIONS

The analyzes of the obtained results, emphasizes the different conduct of the pea seed samples in comparison with the bean seed samples. The number of the mycromicets genus existing both on the fresh and the stored seeds is much low at pea samples then bean samples, because of the tegument of this specie which is very hard determining the reduction of the penetration ways of the micromycets on and inside of the seeds.

At one time with increase of the storage period the viability of the some saprophyte fungous existing on the bean and the pea seeds was declined , and the viability of the parasite fungous decreased, until its total depletion.

The storage period of the seeds affected very strong the infection percent with *Alternaria alternata,* the action of the other micromycets were influenced a littler.

We recommend that the seeds destined for seed production, which do not use in the harvesting year, could use in the next years, but it is necessary to keep the seeds in the controlled atmosphere storage's and the seed germination to be over 90 % (Placinta D., 2005).

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RESEARCHES REGARDING THE TESTING OF SOME FUNGICIDES TO CONTROL THE *PLASMOPARA VITICOLA* PHYTOPATHOGEN AGENT

CERCETĂRI PRIVIND TESTAREA UNOR FUNGICIDE ÎN COMBATEREA AGENTULUI FITOPATOGEN *PLASMOPARA VITICOLA*

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Abstract. *The vine mildew together with the powdery mildew and the grey mould of the grape are considered to be the most damaging diseases of the vine. The mildew attack appears on all aerial parts of the vine: leaves, herbaceous offshoots, tendrils, flowers, bunches and grapes, the vintaging losses caused by the mildew varying between 10% and 70-80%, sometimes to the compromising of the whole vintaging.*

The strategy for fighting this pathogen is applied function of the climatic conditions of the respective year, the chemical treatment being an indispensable step. Choosing the fungicide form a very wide variety, the phytosanitary intervention moment, the number of treatments and quality of work are directly responsible for the treatment efficiency.

At S.C.D.V.V. Iasi there was tested in year 2005 - 2006 the biological efficiency of three fungicides used for fighting against vine mildew and the obtained results supports the present paper.

Rezumat. *Mana viței de vie, alături de făinare şi putregaiul cenuşiu al strugurilor, este considerată ca fiind una dintre cele mai păgubitoare boli ale viței de vie. Atacul de mană se manifestă pe toate organele aeriene ale viței de vie: frunze, lăstari ierbacei, cârcei, flori, ciorchini şi boabe, pierderile de recoltă cauzate de aceasta variind de la 10 % până la 70-80%, uneori chiar până la compromiterea întregii recolte.*

Strategia combaterii acestui patogen se aplică în funcție de condițiile climatice ale anului în curs, combaterea chimică fiind o verigă, indispensabilă. Alegerea fungicidelor dintr-o gamă foarte variată, a momentului intervențiilor fitosanitare, a numărului de tratamente şi a calității lucrării sunt direct responsabile de eficacitatea combaterii

În cadrul S.C.D.V.V.Iaşi a fost testată, în anul 2005-2006 eficacitatea biologică a trei fungicide utilizate în combaterea manei viței de vie, ale căror rezultate obținute motivează lucrarea de față.

In the vine growing plantations, the specter of the pathogen agents and of the pests is so big, that all the organs of the vineyard are attacked.

Among the pathogen agents that provoke big damage to the vineyard there are known: *Plasmopara viticola* Berk. et Curt. Berl et de Toni (mildew), *Uncinula necator* Schw., Burrill (powdery mildew) and *Botryotinia fuckeliana* De Bary Wetzhel (grey mould of the grape).

Research performed both in the country and abroad regarding the control of these pathogens revealed the importance of the yearly phytosanitary interventions, depending on the biological reserve, on the ecopedoclimatic conditions and on the sensitivity of the cultivated species.

The assortments of the pesticides agreed on for the control of the pathogen agents and of the vineyard pests is still very big in Romania, which makes that their choice imposes their acknowledgement under certain ecosystem conditions.

The results of the testing of the biological efficiency performed by the S.C.D.V.V. Iaşi for three fungicides, used in control the mildew, recommend them for the use of the control schemes.

MATERIAL AND METHOD

The researches were performed in the experimental polygon of the Laboratory of Plant Protection of the Station, during the 2005-2006 agricultural year. The experimented fungicides, the active substance, the used dosage and the origin are noted in table 1.

Table 1

The fungicide experimented in the agricultural year 2005-2006

Fungicidul	Active substance	Dosage, kg/ha	Origin
Mikal flash	fosetil de aluminiu 500g/kg +folpet 259 g/kg	3	BayerCropScience
Verita	fosetil de aluminiu 667g/kg +fenamidon 44,4 g/kg	2-2,5	BayerCropScience
Secure	fenamidon 100g/kg + mancozeb 500g/kg	1,25-1,5	BayerCropScience

The placing of the variants was performed on the Aligoté variety, in Latin rectangle, with four repetitions, of 24 grape vines on a variant. The experience imposed a witness sample, remained untreated.

The treatments were performed manually on warning, with a Cooper & Pegler device, with a capacity of 15 l. The calendar days of treatment application were: 15.06, 28.06, 12.07, 26.07, 10.08 in 2006.

The observations were performed after 10 days from the last treatment, on a number of approximately 200 leaves, that is bunches, calculating the frequency and the intensity of the mildew attack on both leaves and grapes, using a grading scale of 0 - 6, after which it was calculated the degree of attack after the current methods.

For a better emphasis of the tested fungicides the efficiency percent (E %) was calculated with the help of the Abbot formula. At the same time, there were obtained data regarding the content of carbohydrates and acidity of the grape. The varieties were chemically protected from the attack produced by powdery mildew and by the grey mould of the grape.

OBTAINED RESULTS

During experimentation, 2005-2006, the registered data on the meteorological platform of the Station, emphasize the favorable conditions for the development of the fungus *Plasmopara viticola* (table 2).

The spring of this year was excessively rainy, recording a deviation of 59% from the normal, while the monthly average temperatures had levels close to the normal ones. As a follow up of the evolutions of the climatic conditions, the starting in vegetation was delayed with almost a week, beginning around April, 26th , the blooming started on June, 4th, and the dough ripeness started around August, 15th (table 3). For the control of vine yard mildew, it was looked at the efficiency of two products with total systemy, based on aluminium fosetil

and a product with penetrating, translaminar and contact action.

Table 2

The climatic data in the vine center Copou Iaşi during the 2005-2006 agricultural year.

Month	Monthly average t º C		Maxima abs. (tº C)	Minima abs. (tº C)	Precipitations (l/m^2)		Hygroscopicity (%)		Insulation (hours)	
	Normal	2005 - 2006			Normal	2005-2006	Normal	2005-2006	Normal	2005-2006
X	10,1	10,2	25,5	-4,6	34,4	34,8	73	70	155,0	153,6
XI	4,1	3,7	14,0	-6,2	34,6	39,5	78	82	65,6	62,2
XII	-0,8	0,9	14,5	-11,0	28,9	24,1	82	79	55,9	58,4
I	-3,6	-7,0	8,6	-25,1	28,9	28,7	81	79	71,7	78,7
II	-1,9	-2,9	11,2	-17,3	27,4	5,4	79	78	72,3	92,8
III	3,3	2,1	22,2	-13,2	28,1	89,0	72	75	130,3	110,4
IV	10,1	11,1	21,6	0,8	40,3	61,4	62	64	171,3	177,9
V	16,1	15,3	32,0	5,1	52,5	42,0	62	63	220,9	227,4
VI	19,4	19,3	32,2	7,7	75,1	74,6	63	68	264,6	279,1
VII	21,3	21,5	31,0	10,9	69,2	92,2	62	65	294,4	330,5
VIII	20,6	21,0	34,5	10,1	57,6	56,5	63	69	272,0	269,2
IX	16,3	16,2	27,2	7,8	40,8	14,8	66	67	215,4	207,5

Table 3

The phenology of the Aligoté variety for the agricultural year 2005-2006

.Variety	Disprout	Blooming	Ripeness	Maturation	Leaves falling
Aligoté	26-30 IV	14-21 VI	15-24 VIII	24 VIII - 29 IX	19 X - 06 XI

The Verita şi Mikal Flash fungicides are noticed through the special preventive action on the pathogen fungi, stopping the spore germination and the development of the mycelium. Through the complete systemy, the aluminium fosetil is translocated to the new growth, to the level of the grape in the green stage. At the same time, as a result of the stimulation of the defense system of the plant, this active substance renders impossible the development of the resistance phenomena. Folpet, the contact substance insures the immediate protection before the systemic activity of the aluminium fosetil even produces itself. Fenamidon is distributed translaminary acting upon the pathogen fungi by inhibiting the mitochondrial breathing at the cellular level. The Secure fungicide acts during different stages of development of the fungus, both preventive, by blocking the spores germination, and curative, by blocking the development of the mycelium and of the spores. Depending on the pressure of the infection, Secure insures the protection of the new vine shoots and of the leaves.

The observations made on the efficiency of the fungicide tested after 10 days of the last treatment. For the untreated sample, the frequency of the mildew on leaves attack was of 100 %, with a degree of attack of GA of 54,13%, while the grapes presented a GA of 19,12%. Under these conditions, the tested fungicides protected very well both the leaves and the grapes from the attack of the Plasmopara viticola fungus.

The best efficiency presented the Secure fungicide of 99,07 % at the attack of the mildew on leaves and of 99,96 % at the attack of mildew on grapes.

Taking into consideration the good efficiency of the three fungicides, Mikal flash, Verita and Secure we recommend them for the control sample of the mildew of the vine yard (table 4).

Table 4

The efficiency of some fungicides in the control the vineyard mildew, Plasmopara viticola, in the conditions of the Vine growing Center Copou, on the Aligoté variety, during the agricultural year 2005-2006

Fungicide	Dosage kg/ha	On leaves				On grapes			
		I %	F %	GA %	E %	I %	F %	GA %	E %
Mikal flash	3	13,21	21,36	2,82	94,96	3,81	17,99	0,68	96,44
Verita	2,5	13,21	22,00	2,90	94,64	4,12	17,83	0,73	96,18
Secure	1,5	6,18	8,25	0,50	99,07	5,00	11,66	0,58	96,96
Mildew control sample	-	27,59	91,50	25,24	-	41,05	18,81	7,72	-
Untreated control sample	-	54,13	100	54,13	-	24,09	79,41	19,12	-

The fungicides that underwent the biological efficiency testing were also analyzed from the point of view of the quality of the grapes. Thus, the musts were left to ferment on the warehouse in order to see if the fungicides used on the control samples did not negatively influenced the yeast in the must, while the obtained wine was analyzed for the determination of the content of alcohol and acidity (table 5).

Table 5

The physical and chemical characteristics of the must and of the wine

Variety	Must		Wine	
	Sugar, g/l	Acidity, g/l H_2SO_4	Alcohol, % vol	Acidity, g/l H_2SO_4
Mikal flash	175	5,6	10,3	4,0
Verita	168	5,6	9,9	3,9
Secure	162	5,5	9,5	4,1
Mildew control sample	160	5,4	9,4	4,0
Untreated control sample	155	5,7	9,1	4,4

CONCLUSIONS

1. In the conditions of experimentation of the agricultural year of 2005-2006, the tested fungicide protected both the leaves and the grapes very well form the attack of the Plasmopara viticola fungus.

2. The aluminium fosetil, the common active substance of the fungicides Mikal flash and of Verita, recommends them in the protection against the mildew, during the moments of maximum sensibility of the vineyard.

3. The efficiency of the fungicide Secure recommends it for 1-2 preventive pre and post-blooming till the closing of the grape.

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INTEGRATED SYSTEM FOR VINE PROTECTION IN 2006

SISTEM INTEGRAT DE PROTECȚIE A VIȚEI DE VIE ÎN 2006

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Abstract. *The introduction and generalization of the integrated system for vine protection has as purpose the limiting of the elements that lead to the disturbance of the natural biologic balance.*

The pesticides are an indispensable element of this system and represent a way for fighting the pathogen agents and the viticultural pests. The efficient use of these includes an integrated management at the farm or lot level, function of the pests and pathogen agents profile.

A phytosanitary program performed at lot level in an exhibition lot of A.C.D.V.V. Iasi acknowledges by means of the obtained results the new tendencies for long term wine growing.

Rezumat. *Introducerea şi generalizarea sistemului integrat de protecţie a viţei de vie are ca scop limitarea factorilor care duc la dereglarea echilibrului biologic natural.*

Pesticidele, componentă indispensabilă a acestui sistem, constituie un mijloc de combatere a agenţilor patogeni şi a dăunătorilor în viticultură. Utilizarea eficientă a acestora presupune un management integrat la nivel de fermă sau parcelă, în funcţie de profilul dăunătorilor şi agenţilor patogeni.

Un program fitosanitar constituit la nivel de parcelă, în cadrul unui lot demonstrativ al S.C.D.V.V. Iaşi, confirmă prin rezultatele obţinute noile tendinţe de viticultură durabilă.

Because of the ecologic plasticity, the harmful organisms demonstrate a major evolutional potential compared to the culture plants.

The human intervention on the natural ecosystems perturbed the naturally constituted ecological equilibriums, and as a result, in order to prevent this phenomenon people use more and more the concept of integrated control.

In viticulture, the application of the new concept is based on trophic, ecologic, and technological elements of regulation and rationalization of treatments.

As a result, in the agricultural year 2005-2006, within the Polygon for the protection of plants of S.C.D.V.V. Iaşi, a demonstrative lot was organized, in which the program of pathogen agents and pests management included agro-technical, biological and chemical methods, in order to reduce and maintain the harmful organisms at a tolerant level and at the same time, to keep the environment quality.

MATERIAL AND METHOD

The experimental parcel, cultivated with Aligoté variety on a surface of 2 ha belongs to the Polygon of Plant Protection and S.C.D.V.V.Iaşi.

We executed eight phyto-sanitary treatments, on warning, using the MPSP – 300 spray pump, equipped with air nozzles MVL 10.01 type, at the pressure of 2.5 Bars. The main climatic elements were monitored (maximum, minimum air, soil, temperature; precipitations ; hygroscopicity and isolation, the dynamics of the vine shoots growth and the soil phenology were monitored)

The technological works specific to the viticulture plantations, cutting, encircling and tying cords, revising the support system, the soil maintenance, weeding and orienting the vine shoots, pinching, cutting the leaves and harvesting works were carried out in tight correlation with the development of grape vine vegetation phenophases. We made observations regarding the frequency and intensity of the attack at the main pathogen agents (mildew, powder mildew and the grey mould of grapes), pheromone traps were installed and the acarian reserve was established.

RESULTS AND DISCUSSIONS

Both from the thermal and precipitations point of view, 2006 was characterized as "normal", because of the monthly average values similar to the monthly normal values. When appreciating the moment of phyto-sanitary interventions the determinant role was represented by the precipitation distribution, March and April being "excessively rainy" and July "very rainy".(table 1)

Table 1

The climatic data in the vine center Copou Iaşi during the 2005-2006 agricultural year.

Month	Monthly average t º C		Maxima abs. (tº C)	Minima abs. (tº C)	Precipitations (l/m^2)		Hygroscopicity (%)		Insulation (hours)	
	Normal	2005 - 2006			Normal	2005-2006	Normal	2005-2006	Normal	2005-2006
X	10,1	10,2	25,5	-4,6	34,4	34,8	73	70	155,0	153,6
XI	4,1	3,7	14,0	-6,2	34,6	39,5	78	82	65,6	62,2
XII	-0,8	0,9	14,5	-11,0	28,9	24,1	82	79	55,9	58,4
I	-3,6	-7,0	8,6	-25,1	28,9	28,7	81	79	71,7	78,7
II	-1,9	-2,9	11,2	-17,3	27,4	5,4	79	78	72,3	92,8
III	3,3	2,1	22,2	-13,2	28,1	89,0	72	75	130,3	110,4
IV	10,1	11,1	21,6	0,8	40,3	61,4	62	64	171,3	177,9
V	16,1	15,3	32,0	5,1	52,5	42,0	62	63	220,9	227,4
VI	19,4	19,3	32,2	7,7	75,1	74,6	63	68	264,6	279,1
VII	21,3	21,5	31,0	10,9	69,2	92,2	62	65	294,4	330,5
VIII	20,6	21,0	34,5	10,1	57,6	56,5	63	69	272,0	269,2
IX	16,3	16,2	27,2	7,8	40,8	14,8	66	67	215,4	207,5

Under these conditions, the beginning of vegetation was delayed with approximately one week, beginning with the date of 26th of April. The blooming began on the 14th of June, and the ripeness around the date of 15th of August (table 2).

Table 2

The phenology of the Aligoté variety for the agricultural year 2005-2006

Variety	Disprout	Blooming	Ripeness	Maturation	Leaves falling
Aligoté	26-30 IV	14-21 VI	15-24 VIII	24 VIII - 29 IX	19 X - 06 XI

The vine shoots measurements began on the 18th of May, when the vine shoots had 20.8 cm length and 9 leaves (table 3).

As a result of the evolution of climatic conditions, the phytosanitary interventions were executed on the dates mentioned in table 4.

Table 3

The growth dynamics of vine shoots in the agricultural year 2005-2006

ELEMENTS	May			June					
	18	23	28	2	7	12	17	22	27
The average length of vine shoots	20.8	32.7	42.0	46.6	50.5	57.5	72.6	85.7	100.0
No. of leaves	8.7	9.9	11.2	12.1	13.0	13.6	16.2	18.8	21.2
The growth speed	-	11.9	9.3	4.6	3.9	7.0	15.1	13.1	14.3

Table 4

Program of phytosanitary interventions in the demonstrative lot and the comparative parcel, in the agricultural year 2005-2006

The phenologic moment and the date of the treatment execution	The pathogen agents an pests to control	Phytosaniatry products	Dose kg,l/ha
10.05 – vine shoots 5-10 cm	Powdery Mildew, Acarians	Polisulfura Ca + Envidor	20 + 0.4
30.05 – vine shoots 20 -30 cm	Powdery Mildew Mildew, Moths	Mikal Flash + Falcon + Proteus	3,0 + 0.3+0.4
15.06 – had begun the blooming	Mildew Powdery , Mildew	Verita + Folicur Solo	2,5 + 0,4
29.06 – end of blooming	Mildew Powdery, Mildew	Eclair	0,5
11.07 – growth of beans	Mildew Powdery Mildew, Mould	Folicur mullti + Decis 25 WG	2,5 + 0,03
19.07- pea	Mildew Powdery Mildew	Antracol + Falcon	2,5 + 0,3
01.08 – coagulated grape	Mildew Powdery Mildew	Antracol+ Folicur Solo	2,5 + 0,4
31.08 – ripeness	Mould	Mythos	3,0

We disposed of a comparative parcel, cultivated with Aligoté and of an untreated sample variant. We must mention the fact that, during 2005, the phytosanitary intervention program for the two parcels was different.

Thus, after the observations carried out regarding the main pathogen agents, mildew, powdery mildew, and grey mould of grapes, we calculated the intensity, frequency and degree of attack of the pathogens, both within the demonstrative lot, the comparative parcel and also the untreated control sample (table 5).

We notice the obvious difference between the values obtained at the attack degree of the three pathogens compared to the values registered in the untreated control sample. Also, we notice a slight difference between the values of the attack degree registered at the comparative parcel compared to the demonstrative lot. This thing attests the fact that the fungicides used within the program of combating protected very well both the leaves and the grapes, the production obtained in 2006 in the comparative parcel being of 12 t/ha. The production increase was of 2 t/ha from the variant of the demonstrative lot and, as we can notice from table 6, the grape maturation took place in the appropriate manner.

Table 5

Results regarding the intensity, frequency and degree of attack of the main pathogen agents of the vineyard in the demonstrative lot, in the comparative parcel and untreated control sample

Monitored agents	Demonstrative lot			Comparative parcel			Untreated control sample		
	I %	F %	G.A.	I %	F %	G.A.	I %	F %	G.A.
Mildew on leaves	15,91	41,60	6,61	39,07	44,44	17,36	54,33	100	54,13
Mildew on grapes	3,0	5,7	0,17	3,64	14,57	0,53	24,09	79,41	19,12
Mildew on leaves	17,91	24,81	4,44	13,67	33,15	4,53	56,52	100	56,52
Mildew on grapes	0	0	0	3,0	3,36	0,10	14,58	78,26	11,41
Grey mould on grapes	3,0	9,09	0,27	3,97	9,64	0,38	18,16	96,0	17,43
Obtained productions	*14*			*12*			-		

Because of the healthy vegetal apparatus we registered a normal but superior accumulation of reducing sugars. The reducing of the acidity during the period of maturation registered a smooth decreasing value ensuring equilibrium appropriate to the technical requirements.

Table 6

The physical and chemical characteristics of wines obtained from Aligoté variety

Variety	Production t/ha	Must		Wine	
		Sugar g/l	Acidity g/l H_2SO_4	Alcohol % vol	Acidity g/l H_2SO_4
Aligoté- demonstrative lot	14	181	5,1	10,7	4,1
Aligoté- comparative parcel	12	155	5,7	9,1	4,7

Because of a smaller biological reserve, the Acarine tetranychid and eryophite populations were maintained under control and as a result of the treatment carried out at the phonologic moment of vine shoots 5-7 cm, with the complex products Calcium polysulphide and Envidor. The flight of grape vine moths was monitored with the help of traps with pheromones, the efficacy of insecticides Proteus and Decis 25 WG ensuring the maintenance under control of pests.

CONCLUSIONS

1. Envidor acaricide, used in the interval comprised between the opening of the shoot and the completely developed inflorescence, in a dose of 0,4 l/ha maintained under control the populations of Acarine tetranychid and eryophite.

2. The efficacy of Proteus and Decis 25 WG insecticides ensured the maintenance under the economic damage threshold of grape vine moths.

3. The production of 12 t/ha obtained in the comparative parcel and the production increase of 2 t/ha in the demonstrative lot, conform the good efficacy of the products used and the importance of observing the programs of phytosanitary control.

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BIOLOGY, ECOLOGY AND INTEGRATED CONTROL OF THE SPECIES *Phyllonorycter blancardella F* (marbled ore), PEST IN THE APPLE PLANTATIONS FROM HUSI-VASLUI AREA

BIOLOGIA, ECOLOGIA ŞI COMBATEREA INTEGRATĂ A SPECIEI *PHYLLONORYCTER BLANCARDELLA* F. (MINIERUL MARMORAT), DĂUNĂTOR ÎN PLANTAȚIILE DE MĂR DIN ZONA HUŞI – VASLUI

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Abstract. *In the paper there are presented the results of the researches regarding the spreading, morphology, biology, ecology and integrated control of the species Phyllonorycter blancardella F. (marbled ore), an important pest for the apple plantations in Husi-Vaslui area.*

Rezumat. *În lucrare se prezintă rezultatele cercetărilor asupra răspândirii, morfologiei, biologiei, ecologiei şi combaterii integrate a speciei Phyllonorycter blancardella F. (minierul marmorat), dăunător important în plantațiile de măr din zona Huşi-Vaslui.*

INTRODUCTION

Phyllonorycter blancardella F. (marbled ore) is part of the Lepidoptera order, Gracilariidae family, and it is spread all over Europe, Asia, U.S.A. and Canada, the attack being from insignificant in some orchards, to strong in others, where it raises real problems for its control. In our country, the marbled ore is present at most of the rosaceae. It was quoted by Dobreanu Ecaterina (1937), Patrascu Elena (1963, 1968), Draghia I. (1966, 1968, 1970, 1971, 1974, 1976), Susea Sonica (1987, 1993, 1996) and Hetug Maria (1981, 1986, 1994).

Butterflies have sizes of 8-9 mm; the fore wings are of yellow-bronze colour, with silver spots, edged with black. The longitude basic illegible has a black edge at the fore part, and on the sides there are 3 white comma type spots. The wing fringes are very developed.

The egg is yellowish white, elliptical, flat, with soft chorion, easy reticulated, with the diameter on an average of 0,225 amd 0,325 mm.

The neon larva is apodal, dorsal-ventral flattened, yellowish white colour, with the prominent head spatula shaped, easy transparent, having on top small but robust red mandibles. The larva of second and third age are also apodal, while those of forth and fifth age are totally different from the previous ones, by the presence of the thoracic feet and the false abdominal feet, as well as by the

cylindrical form of their body. Their length at the complete growth reches to 3,4-5,0 mm; the head is prognate.

The pupa is brown-yellow and is 3,3-4,0mm length and 0,75mm wide.

RESULTS OBTAINED

The observations on the biological cycle, in the ecological conditions from Husi-Vaslui area in 2005, emphasize that *Phyllonorycter blancardella F.* has 3 generations and hibernates in the level of pupa, within the gallery (the ore), in the fallen leaves.

The butterflies appear in early spring, beween the 10.IV-12.V, at $\Sigma (t_n-t_0)$= 78,1°C and fly in daytime for 16 days. After 3-4 days from their appearance they pair, and females deposit egg isolated, on the inferior part of the leaves, in a number of 15-25 eggs for 21 days $\Sigma (t_n-t_0)$= 111,2°C.

From these eggs comes out the larva, in period 1.V-6.VI, whose evolution lasts for about 25 days at $\Sigma (t_n-t_0)$= 195°C. The larva enters the leaf, punching the egg chorion in its adhesion point on the inferior part of the leaf. The larva feeds itself with the content of the epidermis cells and the mesophyllum. While the larva grows, the gallery (the ore) prolongs more and widens easily becoming step by step a specific way of attack for this species.

At its complete growth, the larva turns into pupa, in the period 26.V-15.VI, at $\Sigma (t_n-t_0)$= °C, level which lasts for about 14 days, and after that butterflies appears, and they will lead to the 2nd generation. The butterfly leaves the pupa exuvium by breaking through the inferior epidermis; it also stimulates the pupa exuvium, and this way, all the galleries abandoned by the adults have, at one end, the inferior epidermis broken through by the pupa exuvium.

The same way happens with the butterflies from the 2nd and the 3rd generation, appreciating that the 3 generations appear as it follows: G_1-April-June; G_2-June-July; G_3-August-September. We mention that in the speciality literature the marbled ore, in some propitious conditions may develop in 4 generations per year. After the researches regarding the biological reserve of this species, in the autumns from 2004-1005 from the apple plantations in Husi, it was of 23,16% in 2004 and 25,13% in 2005. In Stanilesti city, the biological reserve was of 20,83% in 2004 and of 20,30% in 2005. (table1)

Table 1

The biological reserve of the species *Phyllonorycter blancardella F.* in various cities from Husi-Vaslui area (2004-2005)

City	Biological reserve						Mean %	
	G_1		G_2		G_3			
	2004	2005	2004	2005	2004	2005	2004	2005
Husi	21,0	18,0	25,2	25,2	23,3	20,2	23,16	25,13
Stanilesti	19,1	16,2	23,1	22,1	20,2	17,1	20,83	18,46
Munteni	18,0	15,2	20,2	24,3	19,6	21,5	19,26	20,30

The greatest biological reserve was in Husi, followed by Stanilesti and Munteni. Because of the information in this period, in all the cities where the researches were made, the recommend measures for preventing the attack of this species and its maintenance under the economical pest level (PED), which is established to 30 ores/100 leaves.

As for the attack frequence (F%) observed in the same cities from Husi-Vaslui area, in 2004-2005, they obtained the following data (table 2)

Table 2

The frequence of the attack (F%) of the species *Phyllonorycter blancardella F* in different cities from Husi-Vaslui area, in 2004-2005

City	Biological reserve						Mean %	
	G_1		G_2		G_3			
	2004	2005	2004	2005	2004	2005	2004	2005
Husi	12,4	17,2	14,6	18,2	17,6	19,2	15,40	18,20
Stanilesti	10,8	15,1	11,2	16,1	15,3	18,1	13,36	16,43
Munteni	9,6	14,2	12,1	15,4	14,6	11,8	12,10	13,80

The frequence of the attack in Husi city was of 15,04% in 2004 and of 18,2% in 2005. In Stanilesti it was of 13,36% in 2004 and of 16,43% in 2005. Also, in Munteni, the attack frequence was of 12,10% in 2004 and of 13,80% in 2005. Like the case of the biological reserve, the greatest attack frequence was registered in Husi, followed by Stanilesti and Munteni.

As for the attack way, the attacked plants are pointed out besides apple and other species as the pear and quince tree, with no great importance. In the apple plantations, on important attacks, this ore may lead to the complete shed of the trees, with impacts upon the wood lignification. The attack is specific, the larva from the first ages gnaw a gallery of about 20mm, long and narrow, easy devious, which describes an irregular oval. Further on, the larva gnaws devious galleries within this oval, till from the confluence of all the galleries comes out a great one, with an irregular spot shape, oval, limited by the leaves ribs. The larva of the 4^{th} and 5^{th} age, increase the gallery and appear on the superior epidermis, a little bulging, with the mesophyllum punctiform gnawed, in a mosaic shape, so that on the inferior face of the leaf the larva may consume the mesophyllum, the epidermis staying intact and transparent like pyelitis. These line the ores with white, thin, silky threads, which makes the galleries more wide. On the leaf we may find 1-50 ores.

The control of the species *Phyllonorycter blancardella F.* is quite difficult, if we take into account the prolification, the great number of generations, the hidden way of life, the staggered appearance of the butterflies in spring and the spreading in almost all the apple plantations, collecting in one year biological reserves reported with a quite big frequence.

For a chemical control they did treatments with 5 products (table 3), the application in lots having a surface of 540 square meters. In a variant they used traps with specific sexual ferromones (Atrablanc), 18 traps/hectare, and another variant was untreated, being used as a witness.

After the observations, they saw that the lot with the best results was that where they used ferromones Atrablanc type, where they obtained productions of 25,8 tones/hectare. Among the tested products they all were efficient, but the best results were realized with the product Calypso 480SC.

Table 3

The efficiency of some products in the control of *Phyllonorycter blancardella F.* marbled ore in Husi-Vaslui area in 2005

Num -ber	Product name	Active substance	Concen-tration (%)	Frequence %			Production t/ha
				G_1	G_2	G_3	
1	Vantex 60CS	Cihalotrin range	0,01	10,4	15,4	14,2	25,4
2	Laser 240 SC	Spinosad	0,04	9,8	14,2	13,1	25,3
3	Calypso 480SC	Tiacloprid	0,02	8,2	12,6	11,4	26,2
4	Milbeknock EC	Milbenectin	0,05	10,6	16,4	14,8	25,3
5	Pieta	Acetamiprid	0,02	9,4	13,3	12,7	25,7
6	ATRASCIT trap	18 traps/hectare	-	9,9	13,0	12,2	25,8
Untreated witness				19,6	27,3	23,2	22,3

CONCLUSIONS

1. The marbled ore (*Phyllonorycter Blancardella F*), in the ecological conditions from Husi-Vaslui area, in 2005 registered 3 generations: G_1- April-June; G_2-June-July; G_3-August-September, and hibernates in the level of pupa in the fallen leaves.
2. The biological reserve and the greatest attack frequence of this species was signaled in Husi 23,16% in 2004 and 25,13%in 2005, followed by Stanilesti, with 20,83% in 2004 and 18,69% in 2005 and by Munteni with 19,26%, in 2004 and 20,30% in 2005. It is the same thing with the attack frequence.
3. Among the tested products, the best efficiency was registered by the product Calypso 480SC (0,02%), with a production of 26,2 t/ha, as well as the traps with ferromones Atrablanc type, with a production of 25,8t/ha, realizing a benefit between 3,3-3,7t/ha.

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BIOLOGY, ECOLOGY AND INTEGRATED CONTROL OF THE SPECIES *Leucoptera scitella Zell. (*circular ore), IN THE APPLE PLANTATIONS FROM HUSI-VASLUI AREA

BIOLOGIA, ECOLOGIA ŞI COMBATEREA INTEGRATĂ A SPECIEI *LEUCOPTERA SCITELLA* ZELL. (MINIERUL CIRCULAR), DĂUNĂTOR ÎN PLANTAŢIILE DE MĂR DIN ZONA HUŞI – VASLUI

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Abstract. *In the paper there are presented the results of the researches regarding the spreading, morphology, biology, ecology and integrated control of the species Leucoptera scitella Zell. (marbled ore), an important pest for the apple plantations in Husi-Vaslui area.*

Rezumat. *În lucrare se prezintă rezultatele cercetărilor asupra răspândirii, morfologiei, biologiei, ecologiei şi combaterii integrate a speciei Leucoptera scitella Zel. (minierul marmorat), dăunător important în plantaţiile de măr din zona Huşi-Vaslui.*

INTRODUCTION

*Leucoptera scitella Zell. (*circular ore) is part of the Lepidoptera order, Lyonetiidae family, Leucopteridae subfamily, and it is spread all over Europe, being mentioned in speciality papers in Italy, Spain, the ex Iugoslavia, Bulgaria, Hungary, Polland, C.S.I. In our country, it was pointed out ever since 1957 in Suceava, Cluj and so on. Further on, this species extended also in the western orchards from our country, reaching in 1983 a maximum of pest, when ever since August it produced the leaflessness of the trees in various orchards.

Researches on biology, ecology and integrated control of this species were elaborated by Dobreanu Ecaterina (1937), Patrascu Elena (1963, 1968), Draghia I. (1986), Sandru I. (1985), Costescu C. (1986), Susea Sonica (1986); Popa P. (2000).

The egg is dirty-white, with the diameter of 0,3mm, has discoidal, bulky and bulging form, presenting though an easy central depression (Fero S.1961). The larva at its complete growth has 4-5 mm length, the body is short and bulk, easy spindle-shaped, with the latest abdominal segments narrowed, their colour is brown green, before their transformation into pupa; the head is dark, retractile, and the prothoraical board appears divided in two at all ages; presents 4 pairs of false abdominal feet, foreseen with 12 crockets. The pupa is reddish chestnut, of approximately 3 mm, sheltered in a silky, spindle-shaped cocoon, easily opened at both ends; for fixing with the substratum (bark, leaves, fruit), the larva makes and adding in form of "X". The cocoons may be disposed in groups, forming smaller or greater colonies, or they may be isolated.

RESULTS AND OBSERVATIONS

After the researches made by Dobreanu Ecaterina (1937), Patrascanu Elena (1963, 1968), Sandru I.(1985), Costescu C.(1986), Draghia I.(1986), Susea Sonica (1987), Serboiu Albertina (1988), Drosu Sonica (1993, 1996), Popa P.(2000), the circular ore can have 2-4 generations a year, more likely 3 generations and hibernates in the level of pupa in a cocoon in the fallen leaves, on the bark of the bulky branches or at the joining of 2 branches, or even in the soil under the soil clods.

In the conditions of Husi city-Vaslui, in 2004 the first adults appeared during the 16.IV-8.V period, at $\Sigma (t_n-t_0)= 87,9°C$. After their appearance, the butterflies start their activity especially during the day, being daytime; the flight is generally of 5-7 days, for the males and of 15-18 days for females.

After pairing, females deposit the eggs, isolated, on the inferior part of the leaves, adhering very well to the leaf epidermis, so that, after the hatching of eggs, the chorion of the egg remains during the entire period of the leaf evolution. On a leaf, there are deposited on an average, 50 eggs.

The hatching of the larva begins after 10-14 days, between 19.V-14.VI, for 25 days, at $\Sigma (t_n-t_0)= 223,7°C$, then they enter right into the foliar texture, at the contact point between the egg and the leaf cuticule. While the larva goes on to the leaf mesophyllum, in the egg there are deposited the faeces, which offer the abandoned egg a dark colour, fact which hides the moment of this phase development. Further on, the larva develops between the 2 epidermis, feeding itself with the texture between them. The larva evolution lasts on an average, 16 days, this being influenced by the weather conditions.

At its complete growth, larva abandons galleries going down with the help of a silky thread. The wind, or the air currents, offer them a swinging movement, helping them to fix. This way, depending on the support they run into, the larva fixes on the leaf, the fruit (especially in the pedunculate or calyx cavity), at the crossroad of the branches, under the trunk or the bulky branches bark(especially where there are wounds), on the weeds or the soil, when they developed into the leaves from the inferior branches of the trees and they did not find anything else when falling. Once the larva gets on the support, it fixes its place for good, hidden from the direct action of the sun, starts to create the cocoon, operation which lasts 1-2 days. In the cocoon, the larva transforms into pupa, level which needs 10-15 days for its growth.

In the ecological conditions from Husi city-Vaslui, *Leucoptera Scitella Zel* has 3 generations:G_1-April-June; G_2-June-August; G_3-August-September. Also, Sandru I (1983-1984) in Lovrin station, shows that this species may have 3-4 generations which come in turn from April to September.

The information obtained regarding the biological reserve of this species in the autumn of 2004-2005 from the apple plantations in the various cities from Husi-Vaslui area are shown in table 1.

Table 1

The biological reserve of the species *Leucoptera scitella Zell*. in various cities from Husi-Vaslui area (2004-2005)

City	Biological reserve						Mean %	
	G_1		G_2		G_3			
	2004	2005	2004	2005	2004	2005	2004	2005
Husi	22,6	19,8	28,2	34,2	26,5	25,1	27,30	26,36
Stanilesti	19,4	14,3	23,1	29,1	21,4	20,0	21,30	21,13
Munteni	17,2	12,1	21,0	27,0	19,2	18,0	15,13	22,03

This way, the biological reserve in Husi city was of 27,3% in 2004 and of 26,36% in 2005, and in Stanilesti and Munteni, for 2004, the registered biological reserve was of 21,30% and 21,13% respectively, and for 2005 this was of 15,13% and 22,03%

After the researches, they established that for 2004, the greatest biological reserve was in Husi (27,30%), followed by Stanilesti (21,30%) and Munteni (15,13%). In 2005, the greatest biological reserve was in Husi (26,36%), followed by Munteni (22,03%) and Stanilesti (21,33%). All these values are registered close to the economical pest limit (PED), which is of 50 ores/100 leaves.

As for the attack frequence (F%) observed in the same cities from Husi-Vaslui research area, in 2004-2005, this was as it follows (table 2).

Table 2

The frequence of the attack (F%) of the species *Leucoptera scitella Zell*. in different cities from Husi-Vaslui research area, in 2004-2005

City	Biological reserve						Mean %	
	G_1		G_2		G_3			
	2004	2005	2004	2005	2004	2005	2004	2005
Husi	12,5	17,4	14,0	15,6	13,2	16,2	13,23	16,40
Stanilesti	10,0	15,2	12,0	13,2	11,1	14,1	11,03	14,16
Munteni	8,60	13,1	10,0	11,3	9,20	12,0	9,26	12,13

The frequence of the attack of *Leucoptera scitella Zell*. in Husi city was of 15,04% in 2004 and of 17,72% in 2005, and in Stanilesti in 2004 it was of

11,03% and of 14,16%. Also, in Munteni, the attack frequence was of 9,26% and of 12,13% in 2005.

The difference of the attack frequence in the 3 cities where the researches were made, explains itself especially by the ecological conditions, which are, in a way, different (temperature, moisture, precipitations), which have a very important role in the evolution of this species, which, in some propitious conditions, may exceed the economical pest level PED.

As for the attack way, we see that it is specific for the leaves to be blighted by the larva, forming circular galleries (ores), with the diameter increasing as the larva grows, reaching to 6-7mm diameter. If many galleries are developed, these may combine covering a great part of the leaf. In a gallery there is only one larva that can grow, but there are exceptions when there can grow up to 6 larva in a gallery. At strong infestations, we may find more galleries (up to 20), where there are up to 100 larva. The ores on the leaf are greenish at the beginning, but then they become brown and they can be seen in the tree coronet, starting from the base, progressing to the top.

The integrated control of *Leucoptera scitella Zell*. Is done by agrophytotechnical, biological (parasites) measures, traps with specific ferromones, lighting and alimentary traps and by chemical measures.

- Agrophytotechnical measures: applied by collecting and burning the leaves which shelter the pupa in the cocoons during winter, followed by the autumn or spring ploughing, so to bury the leaves with pupa under the furrow. Also, measures of cultural hygiene, by scraping the trunks and the bulky branches of flacking bark where the pupa is found.
- Creating propitious conditions so to attract parasites from Hymenoptera order (Braconidae and Eriophidae), by seeding aromatic and medical plants in the orchard, plants which attract these species
- Knowing the economic pest level (PED) of this species of 30 mineson 100 leaves, we apply chemical measures. Our experiments were done with the products: Vantex 60CS(0,01%), Laser 240SC (0,04%), Calypso 480SC (0,02%), Milbeknock EC (0,05%), Pieta (0,02%) and traps with ferromones ATRASCIT type (18 traps/ha)-table 3.

The best efficiency of the chemical products used for the control of *Leucoptera scitella Zell*. were registered at the product Calypso 480SC (0,02%), leading to a production of 26,2 tones/hectare, followed by Pieta (0,02%) with a production of 25,7 tones/hectare and Vantex 60CS (0,04%), whose efficiency led to a production of 25,4 tones/hectare. Good results were also obtained with the products Laser 240SC (0,04%) and Milbeknock EC (0,05%), leading to a production of 25,3 tones/hectare but also with the ATRASCIT type traps, realizing a production of 25,8 tones/hectare, and the production benefits were between 3,3-4 tones/hectare, as opposed to their witness, where the production was of 22,3 tones/hectare.

Table 3

The efficiency of some chemical products in the control of the species *Leucoptera scitella Zell*. in 2004-2005 in Husi-Vaslui area

Product	Substance	Concen Tration (%)	Frequence %			Production t/ha
			G_1	G_2	G_3	
Vantex 60CS	Cihaltrin range	0,01	10,4	15,7	14,2	25,4
Laser 240 SC	Spinosad	0,04	9,8	14,2	13,1	25,3
Calypso 480SC	Tiacloprid	0,02	8,2	12,6	11,4	26,2
Milbeknock EC	Milbenectin	0,05	10,6	16,4	14,8	25,3
Pieta	Acetamiprid	0,02	9,4	13,3	12,7	25,7
ATRASCIT trap	18 traps/hectare	-	9,9	13,0	12,2	25,8
Untreated witness			19,6	27,3	23,2	22,3

CONCLUSIONS

1. In the ecological conditions from Husi-Vaslui area, *Leucoptera Scitella Zel*. has 3 generations: G_1- June-August; G_2-June-August; G_3-August-September, and hibernates in the level of pupa under the flacked bark of the trees, in the fallen leaves or in the soil.

2. The biological reserve for 2004 was between 19,13% in Munteni and 27,30 in Husi and in 2005, in Stanilesti it was of 21,13% and of 26,36% in Husi.All these values are registered close to the economical pest level which, at this species, is of 50 ores/100 leaves.

3. As for the attack frequence, in 2004, the greatest was in Husi (13,23%) and of 16,40% in 2005. In Munteni, for 2004, the attack frequence was of 9,62% and of 12,13% in 2005. The attack frequence is represented by the ecological conditions (temperature, moisture, precipitations) which also have a very important role in the evolution of this insect.

4. All the control, agrophytotechnical, biological measures (traps with ferromones ATRASCIT type, lighting and alimentary traps) as well as the chemical measures applied led to good results, realizing production benefits of 3,3-4,0 tones/hectare.

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DES RECHERCHES SUR LES MALADIES ET LES RAVAGEURS DE QUELQUES ESPECIES DES ARBRES ORNAMENTALES UTILISÉE DANS LES JARDIN PARTICULIERES

CERCETĂRI PRIVIND SPECTRUL DE BOLI ŞI DĂUNĂTORI ÎNTÂLNITE LA CÂTEVA SPECII DE PLANTE LEMNOASE PRETABILE PENTRU GRĂDINI PARTICULARE

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Abstract. *In the particular gardens it cultivate many species of ornamental trees. Are chooses the species with a long flourishing and the flower with powerfull perfume. There are chooses species with few deseaze and pests, be concerned minimum attendance. The species choses frequently are tilia, lilac, jasmine, honeysuckle, rose and prune. This research concerned to givet an technology of growing thease species in the particular gardens.*

Rezumat. *Lucrarea abordează studiul a şase specii de plante ornamentale, adesea cultivate în grădinile particulare şi anume: gălbenelele, crinul regal, stânjenelul,crizantema, garofiţa şi mușcata, sub aspectul principalelor boli şi dăunători care agresează aceste specii în mod curent şi sub aspectul plasticităţii ecologice a speciilor studiate. Ea reprezintă debutul unui studiu mai larg care urmăreşte observarea comportamentului celor mai utilizate specii arboricole în grădinile particulare din regiunea noastră, urmărirea complexului de boli şi dăunători şi efectuarea de recomandări tehnologice specifice.*

LE BOIS D`OUVRAGE ET LA METHODE DE RECHERCHE

Dans l`ecart située entre premier avril et 15 octobre 2006 on a observer la evolution de six especies des arbres et arbustes ornamentales qui se trouvent frecvent dans les jardin privé: le tileul- *Tilia tomentoasa* Moench., le jasmin- *Phylladelphus coronarius* L., le lilas- *Syringa vulgaris* L.*,* La chevrefeuille- *Lonicera caprifolium* L.*,* les roses- *Rosa spp.* L. et la mirabelle- *Prunus cerasifera* var. *atropurpurea* Ehrh.

Les observations ont eté realisée dans 4 jardins localisée a la extremité de ville Jassy, 2 jardin située á Bucium et les autres 2 á Valea Lupului.

La recolte d`essai á eté realisée 2 fois par mois, a distance de 15 jours.

LES RESULTEES ACCROCHEE

Les resultées de l`essai sont detalié sur chaque especie.

Le tileul - *Tilia tomentosa* Moench.

Est un arbre de grande taille, qui peut attendre 30 m de hauteur , avec la cime drué, ces feuilles sont cordiformes, les fleurs sont jaunes, plus fort odorante. Il aime les terres riches, avec beaucoup d`humidité, mais il n`aime pas les temperatures negatives.

L`especе a une grande capacité d`adaptation au movéz condition et il est pretable pour les bordures de la route, pour les parcs et pour les jardin privé.

La literature specialisée specifique quelques maladies et quelques ravageurs pour le tileul: *Maly list*, *Phyllactinia guttata* Lev.; *Capnodium salicinum*; *Mycospherella maculiformis* Sch.; *Nectaria cinnabarina* Tode., *Gnomonia leptostyla* Fr.

Les insects de *Lepidoptera*: *Lymantria dispar* L.; *Euproctis chrysorrhoea* L., *Tortrix viridana* L., *Operophtera brumata* L., *Hyphantria cunea* Drury., *Aporia crataegi* L., *Cossus cossus* L. de *Coleoptera*: *Melolontha melolontha* L., *Amphimalon solstiţialis* L., *Byctiscus populi* L., *Byctiscus betulae* L., *Ruguloscolites rugulosus* Ratz., *Ernoporus tiliae* Panz., *Cerambix cerdo* L., *Sciaphobus squalidus* Gyll., des acariens *Tetranychus urticae* Koch., *Phyllocoptella tetratrichus* Nal.

Pendant la periode d`observations on observé la presence des maladies suivantes:

-*Capnodium salicinum* a eté signalée depuis 15 juin jusque au septembre, avec l`intensité de 10-15% causée par l`attac des diverses especies de *Aphis* spp.

-*Melolontha melolontha* a eté signalée depuis 15 avril jusque a la fin de mai, dans les jardins de Bucium (13 exemplares) et rarement dans les jardin de Valea Lupului (1 exemplar);

-*Aporia crataegi* a eté signalée dans toutes les 4 jardins depuis au debut de mois mai et jusque a la fin de septembre.

-*Hyphantria cunea* Drury. a eté signalée la generation premiere entre demi mai et fin de juin, la generation secundare entre le debut d`auguste et le fin de septembre. La generation premiere a singnalé une intensité d`attach de 20% et pour la generation secundaire 40%.

-Des autres species signalé mais sans ravages *Sciaphobus squalidus* Gyll. *Byctiscus betulae* L. *Tetranychus urticae Phyllocoptella tetratrichus*

La mirabelle - *Prunus cerasifera* var.*atropurpurea*

Est un arbre avec la hauteur de 8 m, avec les feuilles ovales les fleures sont solitares, blanches.La varieté *atropurpurea* a les feuilles rouges, les fleures rose et les fruits rouges.

La literature specialisée specifique quelques maladies et quelques ravageurs pour *Prunus* spp.: Plum pox virus; *Pseudomonas syringae p.v. morsprunorum* Worm ; *Taphrina prunii* Tul., *Polystigma rubrum* D.C., *Monilinia laxa* Honey., *Tranzschelia pruni- spinosa* Diet.,

Les ravageurs presentes sont de *Homoptera*: *Parthenolecanium corni* Bouche, *Hyalopterus pruni* Geoff., de *Coleoptera: Ruguloscolytus rugulosus* Ratz., de *Lepidoptera: Cydia funebrana* Treich., de *Hymenoptera: Hoplocampa minuta* Christ., *Eurytoma schreineri* Schr.

Pendant notre recherches ont identifie 2 maladies: *Polystigma rubrum* rarement en mai-juin, et *Tranzschelia pruni- spinosa* rarement en auguste dans les jardins de Bucium et tres rare, chez un mirabella en Valea Lupului.

Les insectes sont : *Hyalopterus pruni* Geoff., signalé dans toutes les 4 jardins et *Cydia funebrana* Treich. rarement.

Jasmin - *Philladelphus coronarius* L.

Est un arbuste de 3 m hauteur, avec les feuilles ovales, de 4-8 cm, les fleures sont blanches –beiges, tres odorée, et il florisse en juin.

L`espece grandisse rapidement, est resistente au temperatures negatifes, mais elle ne resiste pas au arridité prolongé.

La literature specifique quelques maladies et ravageurs :*Agrobacterium radiobacter* Smith. And Thouse., des insects de l`ordre *Homoptera*- diverses especies des aphides.

Pendant la periode d`observation on constaté l`attac de Aphis spp., mais insignifiant pour les plantes.

Le lilas- *Syringa vulgaris* L.

Est une especе spontane dans les regions plus chaud de notre pays, avec la longueur d`un arbre de 8-10 m ou arbuste de 3-5 m. Les fleures sont simples ou doubles lilas et plus odorante. Il florisse beaucoup in avril- mai.

Les varietée cultivé sont: var. *coerulea* avec les fleures bleu- lila et la var. *alba* avec les fleures blanches.

Le lilas est utilisé comme plante solitaire ou en ansambles diverses.

La literature specifique quelques maladies et ravageurs au lilas: une virose -*Liliac ringspot virus*;une bacterieuse- *Pseudomonas syringae* von Hall., des micoses: *Phytophtora syringae* Kleb., *Mycrosphaera syringae* Schw. ,*Phyllactinia fraxini* Fuss., *Mycospherella syringicola* Lind., *Armillaria mellea* Kumm.,

Les ravageurs signalée dans la literature sont: des insectes de l`ordre *Thysanoptera - Heliothrips haemorrhoidales* Bche., *Coleoptera- Lytta vesicatoria* L., des acariens - *Tetranychus urticae* Koch.

Pendant les observations on pas signalée des maladies ou des ravageurs au lilas.

Les roses- *Rosa centyfolia*

Especе arbustive de puis 2 m; avec les fleures rouges, rose ou blanches, beaucoup odoré. Sont plantes qui aimes la lumiere, la chaleure, mais qui resiste bien au temperatures negatives.

La literature specifique quelques maladies et ravageurs au roses: des viroses- *Prunus necrotic ringspot virus*; des micoses: *Peronospora sparsa* Berk., *Sphaeroteca pannosa* Lev., *Diplocarpon rosae* Wolf., *Phragmidium mucronatum* Schl., *Coryneum microstictum* Berk., *Sphaceloma rosarum* Jenk., *Coryneum microstictum* Berk., *Botrytis cinerea* Pers., *Cercospora rosicola* Pass.

Des insects de l`ordre *Homoptera*: *Aulacaspis rosae* Bche., *Macrosiphum rosae* L., *Parthenolecanium corni* Bche., *Lepidosaphes ulmi* L., *Hymenoptera*: *Arge rosae* L., *Ardis brunniventris* Hart., *Blenocampa pusilla* Klug., *Monophadnus elongatus* Ki.,

Ardis brunniventris bipunctata Hart., *Cladius pectinicornis* Geoffr., *Coleoptera*: *Melolontha melolontha* L., *Lepidoptera*: *Scotia segetum* Den., *Mamestra brassicae* L.,*Thysanoptera*: *Heliothrips haemorrhoidales* Bche., des nematodes -*Meloidogyne incognita* Chitw.,des acariens *Tetranychus urticae* Koch.

Dans les jardins ou on fait les observatios on a signalée : *Peronospora sparsa* dans les jardins de Valea lupului, *Macrosiphum rosae* par tout, *Blenocampa pusilla* Klug., rarement mais par tout, *Melolontha melolontha* dans les jardins de Bucium.

Le chevrefeuille - *Lonicera caprifolium* L.

Espece arbustive avec la taille 2-3 m hauteur, les fleures beaucoup odorée, jaunes- blanches au interieur et rouges au exterior. Les especies de lonicera florisse bien toute l`ete.

La literature specifique ne mentione pas des maladiesou des ravageurs a lonicera. On identifie seul une insecte avec une presence plus rare –*Sciaphobus squalidus* Gyll.

CONCLUSIONS

A la fin d`une periode d`observatios, surpose a une ete nous pouvons donne quelques conclusions:

-Dans les conditions ecologiques de 2006 on a pas evoluez des maladies tres periculose pour les plant etudie, la seule exception *Capnodium salicinum,* favorisé par le developpement de quelques especies de Aphis spp. .

-Les insectes presentes on ete les especies avec un regim de nutrition polifague comme : *Melolontha melolontha, Hyphantria cunea*, *Sciaphobus squalidus*, *Tetranychus urticae* et diverses especies de Aphis spp.

-Pour le tileul une probleme et donée de *Phyllocoptella tetratrichus*et pour les roses de *Blenocampa pusilla*. Les estudies continue.

-Les estudies realisé dans toutes les quatres jardins relevent que les especes de plantes ornamentales cultivé dans notre etude sont tres comunnes et ne determine pas des problemes especiales de cultivation .Les maladies et les ravageurs determine dans ces jardins sont comunne, les maladies sont rarement presente et sans signification et les ravageurs determiné sont des insects ou de nematodes, acariens polifagues, qui sont present par tout mais determine problème seulement dans les année avec des mouvement climatiques diverses.

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RECHERCHES SUR LES MALADIES ET LES RAVAGEURS DE QUELQUES ESPECIES DES PLANTES ORNAMENTALES

CERCETARI PRIVIND SPECTRUL DE BOLI ŞI DĂUNĂTORI ÎNTÂLNITE LA CATEVA SPECII DE PLANTE ORNAMENTALE

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Abstract. *In the particular gardens it cultivate many species of ornamental trees. Are chooses the species with a long flourishing and the flower with powerfull perfume. There are chooses species with few deseaze and pests, be concerned minimum attendance. The species choses frequently are pink, chrysanthemum, calendula, iris, lily and geranium. This research concerned to givet an technology of growing thease species in the particular gardens.*

Rezumat. *Lucrarea abordează studiul a şase specii de arbori şi arbuşti ornamentali, cei mai întâlniţi în grădinile particulare şi anume: Tilia tomentosa, Phyladelphus coronarius, Syringa vulgaris, Prunus cerasifera var. Atropurpurea, Lonicera Caprifolium, Rosa spp. sub aspectul principalelor boli şi dăunători care agresează aceste specii în mod curent şi sub aspectul plasticităţii ecologice a speciilor studiate. Ea reprezintă debutul unui studiu mai larg care urmăreşte observarea comportamentului celor mai utilizate specii arboricole în grădinile particulare din regiunea noastră, urmărirea complexului de boli şi dăunători şi efectuarea de recomandări tehnologice specifice.*

LE BOIS D`OUVRAGE ET LA METHODE DE RECHERCHE

Dans l`interval de temps situé de premier avril 2006 - 15 octobre 2006 on a observer 6 espece des plants decoratives trouvée souvent dans les jardins : *Calendula officinalis* L.*., Lilium bulbiferum*, *Iris spp.., Chrysanthemum spp. Dianthus spp.* et *Pelargonium spp.*

Les observations on étè realisé dans les conditions des 6 jardins située au l`extremité de ville Jassy: au Bucium et au Valea lupului.

On fait cette recherche pour etablir le spectre des maladies et des ravageurs qui existe sur les especes estudié.

Les probes on éte prevalé a chaque 15 jour et analisée dans le laboratoire.

LES RESULTÉS ACCROCHÉE

Les resultées de l`essai sont detalié sur chaque especie.

La calendule-*Callendula officinalis* L.

Plante herbacee, anuale et vivante, on connaisent 25 especes et des nombreuses variations.

Les plants ont 50 cm hauteur, la tige droite avec un odeur penetrante, les fleurs sont blanches, jaunes ou oranges. La plante est utilisé frequemment dans les jardins et les parcs parceque elle est plus resistente au variations thermiques et d` humiditée, elle est utilisé aussi pour son usage comme plante medicinale. La floraison est etendue sur toute l`êté .

La literature specialisée specifique quelques maladies et quelques ravageurs pour la calendule: *Sphaerotheca fusca* Blum., *Entyloma calendulae* Oud., *Cercospora calendulae* Sacc. et des nematodes : *Meloidogyne* spp.

Pendant la epoque des recherches on pas signalé des maladies ou des ravageurs sur les plantes etudié.

Le lis- *Lilium bulbiferum*

Plante avec la tige droite, de 120 cm hauteur, beaucoup des fleures, les couleurs rouge- orange, ou jaune. Le lis florise au printemps ou au debut de l`éte et les fleures sont pas odorée. Le lis est utilisé dans les parcs ou jardins, seulement ou avec des autres especes.

La literature specialisée specifique quelques maladies et quelques ravageurs sur le lis: *Uromyces lilii* Kunze, *Botrytis eliptica* berk., *Botrytis cinerea* Pers., *Botrytis tulipae* Lind.

Les ravageurs sont des insects de Coleoptera: *Lilioceres lilii* Scop., *Agriotes spp., Diptera*: *Eumerus strigatus* Fall., *Thysanoptera*: *Heliothrips haemorrhoidalis* Bche.

Des acariens: *Steneotarsonemus laticeps* Halb., *Rhizoglyphus echinopus* Fum and. Rob.

Pendant la epoque des recherches chez les lis cultivé dans les jardins de Valea lupului on signalé la maladie produite par *Uromyces lilii* Kunze**.**

Le iris- *Iris spp*.

Plante perene, avec les tiges de dimensions diverses. Les plantes ont une grande plasticité ecologique, et un turnure decorative especiale. .Les fleures peut etre blanches, bleu, indigo ou jaune, simple ou avec 2-3 couleurs et avec un odore specifique.

La literature specialisée specifique quelques maladies et quelques ravageurs sur le Iris spp.: *Iris yellow mosaic virus*., *Pseudomonas iridis* Van Hall., *Puccinia iridis* Rab., *Heterosporium prunetti*- Nikolas & Agg., *Rhadinoceaea reitteri* Kon., *Scotia segetum* Den et Schiff., *Ceutorrhyncus punctiger* L, *Epicomites hirta.*

On a signalé la presence de *Ceutorrhyncus punctiger* sur 30% fruits de toutes les 4 jardins et la presence de *Epicomites hirta* sur 10% des fleures.

La chrysantheme - *Chrysanthemum.spp.,*

Est une plante de taille peut haute ou haute, avec les fleures des diverses couleurs, frequement blanches, jaunes, indigo ou rose. On se trouve dans les parcs et les jardins, comme plante solitaire au groupé en combinations florales.

La literature specialisée specifique quelques maladies et quelques ravageurs sur la chrysantheme: *Chrysantemum mosaic virus B*., *Chrysanthemum green flower*, *Erysiphe cichoracearum* Dc., *Septoria chrysantemella* Sacc., *Puccinia horiana* P.Henn, *Tetranychus urticae* Koch., *Heliothrips haemorrhoidales* Bche., *Trialeurodes vaporariorum* Westw., *Macrosiphum rosae* L., *Macrosiphum euphorbiae*, *Scotia segetum* Den et Schiff., et *Mamestra brassicae* L.

On a signalé le: *Macrosiphum rosae* L., et *Macrosiphum euphorbiae*, sur le 30% des tiges florales.

L`oillet - *Dianthus.spp.*

Plante perene de petite taille, avec de feuilles liniares, vert- gris, et les fleures petites mai plus odoré. Les fleures sont coloré diverses, blanches, rouges, rose ou jaunes. On les utilises dans les parcs et dans les jardins.

Les maladies de les oillets sont: *Carnation mosaic virus*, *Carnation ringspot virus*, *Carnation mottle virus*, *Carnation vein mottle virus*, *Pseudomonas caryophylii* Starr and Burk., *Pseudomonas woodsii* Steve*Heterosporium echinulatum* Cooke, *Uromyces dianthii* Niessl., *Heteropatella valtellinensis* Wr., *Septoria dianthi* Desm., *Fusarium oxisporum* Schlecht , *Erysiphe buhrii* Braun., *Alternaria dianthi* Steve & Hall.,

Les ravageurs sont: *Tetranychus urticae* Koch., *Neomyzus circumflexus* Buckt., *Heliothrips haemorrhoidales* Bche., *Trialeurodes vaporariorum* Westw., *Mamestra brassicae* L., *Meloidogyne arenaria* Chitw., *Agriotes* spp., L., *Scotia segetum* Den et Schiff., *Chloridea armigera* Hbn., *Gryllotalpa gryllotalpa* L., *Limax* spp, *Microtus* spp.

Pendant la epoque des recherches chez les on a signalé les maladies suivantes: *Uromyces dianthii* Niessl., rarement dans les jardins de Valea lupului et *Erysiphe buhrii* Braun rarement signalé par tout.

Les ravageurs signalé ont éte: *Gryllotalpa gryllotalpa* L., *Limax* spp, dans toutes les jardins et *Tetranychus urticae* Koch. avec *Trialeurodes vaporariorum* Westw. Signalé dans les jardins de Valea lupului.

Le geranium- *Pelargonium spp.*

Les geranium sont des plantes perenes tres adaptables, avec des feuilles cordiformes et la taille moyenne.

La plante entiere a un odeur especifique. Les fleures sont divers colorée et ont la floraison toute l`ête.

Les maladies signalé au geranium sont: - *Mosaic virus in Pelargonium*, *Xanthomonas campestris var. Pelargonii* Dye., *Agrobacterium radiobacter Pv. tumefaciens* Smith.& Tow., *Pythium de Baryanum* Hesse., *Botrytis cinerea* Pers.

Les ravageurs sont : *Trialeurodes vaporariorum* Westw., *Aphis* spp., *Scotia segetum* Den & Schiff., *Gryllotalpa gryllotalpa* L., *Limax* spp.

Pendant la epoque des recherches on signalé seules des *Aphis* spp., *Limax* spp., et *Gryllotalpa gryllotalpa* L.

DES CONCLUSIONS

A la fin d`une periode d`observatios, surposé a une étè nous pouvons donné quelques conclusions:

-Dans les conditions ecologiques de 2006 on a pas evoluez des maladies tres periculose pour les plant etudie.

-Les insectes presentes on ete les especies avec un regim de nutrition polifague comme: *Melolontha melolontha, Hyphantria cunea*, *Sciaphobus squalidus*, *Tetranychus urticae Gryllotalpa gryllotalpa* L., *Limax* spp., et diverses especies de Aphis spp.

-Les plants de notre recherche sont resistente a l`agression de diverses ravageurs.

- Les estudies realisé dans toutes les quatres jardins relevent que les especes de plantes ornamentales cultivé dans notre etude sont tres comunnes et ne determine pas des problemes especiales de cultivation .Les maladies et les ravageurs determine dans ces jardins sont comunne, les maladies sont rarement presente et sans significație et les ravageurs determiné sont des insects ou de nematodes, acariens polifagues, qui sont present par tout mais determine problème seulement dans les année avec des mouvement climatiques diverses.

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CONTRIBUTIONS TO THE BIOLOGICAL AND ECOLOGICAL STUDIES OF THE GRAPE MOTH, *LOBESIA BOTRANA* (DEN. ET SCHIFF.) (LEPIDOPTERA: TORTRICIDAE) IN SOUTHERN VINEYARDS OF ROMANIA

CONTRIBUŢII LA STUDIUL BIOLOGIEI ŞI ECOLOGIEI MOLIEI STRUGURILOR, *LOBESIA BOTRANA* DEN. ET SCHIFF. (LEPIDOPTERA: TORTRICIDAE) ÎN UNELE PODGORII DIN SUDUL ROMÂNIEI

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Abstract. *Biology of Lobesia botrana (Den. et Schiff.) was studied comparative in two vineyards from south of Romania: Ştefăneşti (AG) and Dăbuleni (DJ). There have been used pheromones traps of atraBOT type and the visual control in vineyards. In Ştefăneşti, where the climate is temperate, the grape moth has two generations, while in Dăbuleni, a dry and warm region, L. botrana has three generations. The butterflies flight is better noticed in Dăbuleni because of the high and more uniformly temperatures as those in Ştefăneşti and, subsequently, because of the growth of pest population. The microclimate in Ştefăneşti, which allows the partial development of third generation of L. botrana in autumn, is the first cause of the fact that the population density is low and, in consequence, the damages are insignificant. Thus, most of the second generation pupae will form second generation butterflies instead of forming winter generation butterflies, in spring. In Dăbuleni are necessary the pest control methods.*

Rezumat. *Biologia moliei strugurilor a fost observată în perioada 1998 – 2002 în două podgorii din sudul României: Ştefăneşti – Argeş şi Dăbuleni – Dolj. S-au folosit capcane cu feromoni de tip atraBOT şi s-au efectuat observaţii în teren. În Ştefăneşti, unde climatul este temperat, specia Lobesia botrana are două generaţii complete şi o a treia generaţie incompletă, iar în Dăbuleni, climatul cald şi uscat, permite dezvoltarea a trei generaţii complete. Zborul fluturilor este mult mai bine precizat în Dăbuleni, din cauza temperaturilor mai ridicate şi mult mai uniforme faţă de cele din Ştefăneşti. Microclimatul din Ştefăneşti, care permite dezvoltarea parţială a celei de-a treia generaţii, este principala cauză a faptului că specia L. botrana nu prezintă potenţial dăunător în această zonă geografică. Astfel, mare parte din pupele generaţiei a doua vor forma fluturii celei de-a doua generaţii, în loc să dea naştere fluturilor generaţiei hibernante, ceea ce duce la reducerea populaţiei dăunătorului în primăvară. În Dăbuleni, sunt necesare tratamente de combatere a dăunătorului.*

The biology of the grape moth *Lobesia botrana* has been representing for a long time the subject of many researches, as the result of significant damages produced in Romanian vineyards. Depending on the local climate conditions, the species presents 2-3 generations in Moldavia (Ali, 1982), 3 generations in Dobrogea (Filip, 1986), 3 generations in South Oltenia (Măcărău and colab., 1998) etc. In literature (Bovey, 1966), it is know the preference of this species for the areas with warm and dry climate.

The biological knowledge of this pest allows the efficient control of its population by adequate methods.

MATERIAL AND METHODS

Between 1998-2002, *L. botrana* Den. et Schiff. was identified and observed in two vineyards, each one of 2 ha at the Aligote sort, in Ştefăneşti vineyard (situated in the South-Central part of Muntenia) and between 2000-2001 in a vineyard of approximate 3 ha at the Roşioară sort in Dăbuleni (situated in the South Oltenia).

There have been used pheromones traps of atraBOT type (1/ha) in order to make the first butterflies coming out obvious, the flight peak, the flight ceasing and the number of generations. The visual control in vineyards allowed the approximate knowledge of the development stages appearance moment, of the damage type, of the attack stage etc. There have been made bioclimograms for the appreciation of adult population biological activity in local climate conditions and there has been calculated the effective temperature sum (Săvescu and Rafailă, 1978).

There has been calculated the attack frequency, according to the relation $F(\%) = \frac{n}{N} \times 100$, where n is the attacked organs number, and N is the observed organs number (Săvescu and Rafailă, 1978; Galet, 1982).

RESULTS AND DISCUSSIONS

A. Biological cycle

It was established the biological cycle of this species on the climate conditions of these two regions (Fig. 1 and 2).

During the observations period, in Ştefăneşti, the butterflies of the winter generation appear in the second or third decade of April, when the medium daily temperatures are above the biological inferior edge (t = 12°C) and after accumulating the sum of corresponding effective temperature. In Ştefăneşti, the earlier emerging was registered on 11.04.2001. In Dăbuleni, during 200-2001, the butterflies appeared on 12.04.2000 and on 08.04.2001 (table 1).

As for the sum of the effective temperature necessary for the appearance of the first butterflies, we have noticed that its value is depending on the thermal conditions in spring, but also on the thermal condition in last autumn (table 1).

In Ştefăneşti, the flight of the butterflies from winter generation is long, starting from the last half of April, in May and June, without existing a clear delimitation from the flight of first generation butterflies; in Dăbuleni it takes place in April and May, being will separate from the next flight (Fig. 3 and 4). The flight peak was registered during observations period the earliest on 27.04.2001 and the latest on 10.05.1999 at Ştefăneşti, and in Dăbuleni on 19.04.2000 and 09.05.2001.

According to Galet (1982) the larvae development takes place in Central Europe vineyards, from middle or end of May till end of June or beginning of July. In Ştefăneşti conditions, the larvae development produces in May, June, and in cold years, as for example 1998, in the first half of July; in Dăbuleni, the larvae development takes place in May and the first half of June.

In Ştefăneşti, the nimphosis takes place in the last part of June and in the first part of July, while in Dăbuleni, in the first and second decade of June, depending of the yearly climate conditions.

The flight of first generation butterflies starts in Ştefăneşti in the last half of June, beginning of July and is continued in July and August; the flight peak is reached at the first half of July. In Dăbuleni, the second flight takes place in June and the first half of July, with a flight peak in the second or the third decade of June. The second generation larvae will appear in July and August in Ştefăneşti, in the last half of June and in July in Dăbuleni. Pupae will appear in Ştefăneşti, starting with August and in Dăbuleni in the last half of July and the first of August.

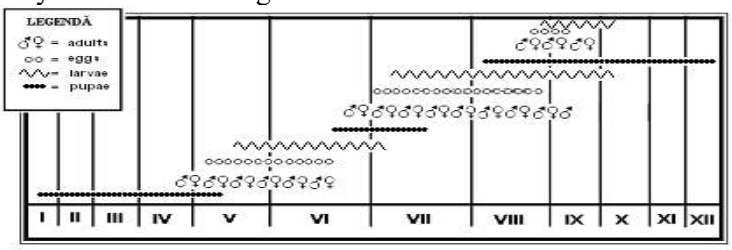

Fig. 1 -Biological cycle of *Lobesia botrana* Den. et Schiff. in Ştefăneşti-Argeş (original)

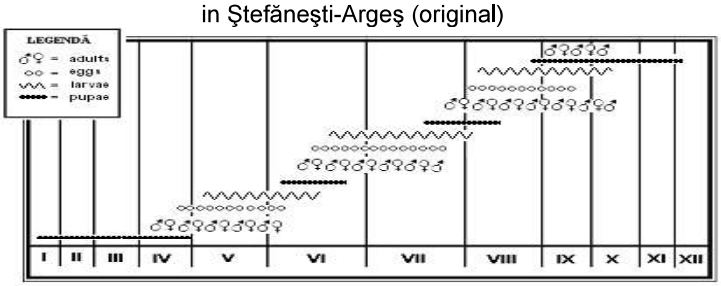

Fig. 2 – Biological cycle of *Lobesia botrana* Den. et Schiff. in Dăbuleni-Dolj (original)

Table 1

Date regarding the first *L. botrana* butterflies appearances in the pheomone traps

Locality	Year	Appearance date of first butterflies	Sum of effective temperature until appearance of first butterflies (°C)
Ştefăneşti	1998	20.04	39°C
	1999	28.04	17,2°C
	2000	14.04	11,9°C
	2001	11.04	7,4°C
	2002	18.04	21,3°C
Dăbuleni	2000	12.04	29,2°C
	2001	8.04	18°C

During all five years of observations in Ştefăneşti we noticed the third flight, more intensive in 2001 (Fig.3), but not with appropriate conditions to a complete development of the third generation.

According to Komarova's researches in 1949 (in Bovey, 1966), the generations number is conditioned by photoperiod, a pupae diapauses appearing if the day lasts under 12 hours. Geoffrion (1970) notices that in Loire Valley (France),

the third flight appears only when the conditions allow the early appearance of second generation butterflies and egg position takes places in July. During study period, the third flight began during August, the maximum flight taken place according to yearly climate conditions, in the second and third decade of August and even in September (Fig. 3).

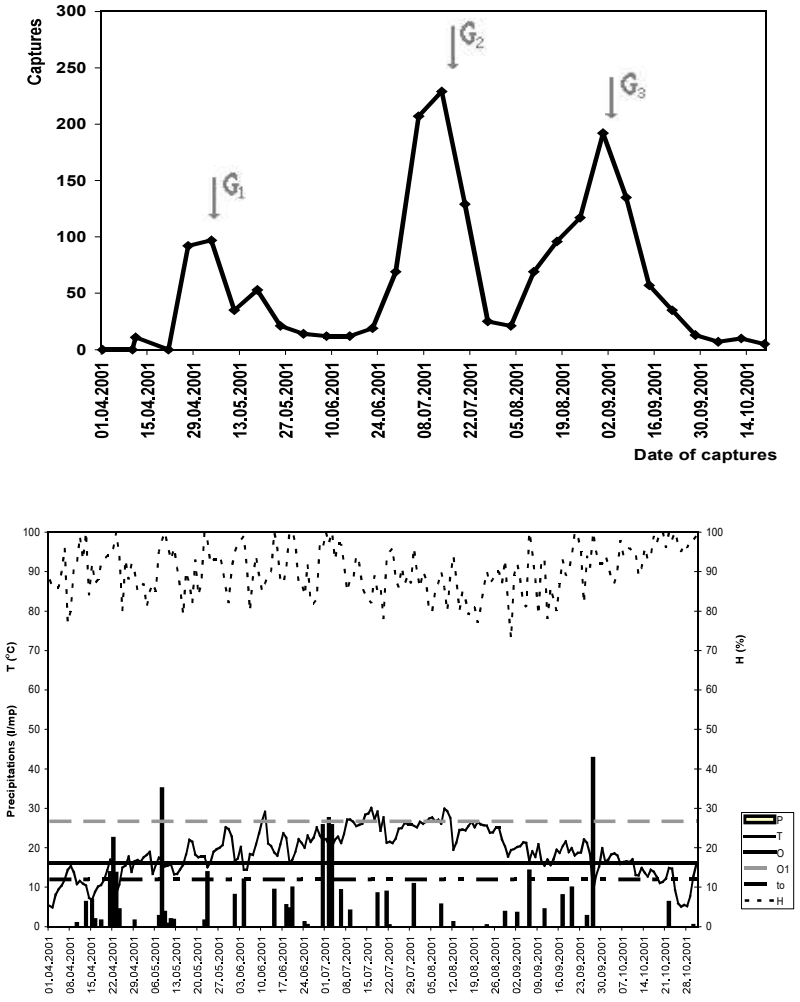

Fig. 3 - The bioclimogram of *Lobesia botrana* species in Ştefăneşti

As in Ştefăneşti, during the observation period, the temperatures in August and September during the flight are not sufficient for a complete development of a generation; the egg position should have taken place at the end of July, as mentioned by Geoffrion, situation not encountered.

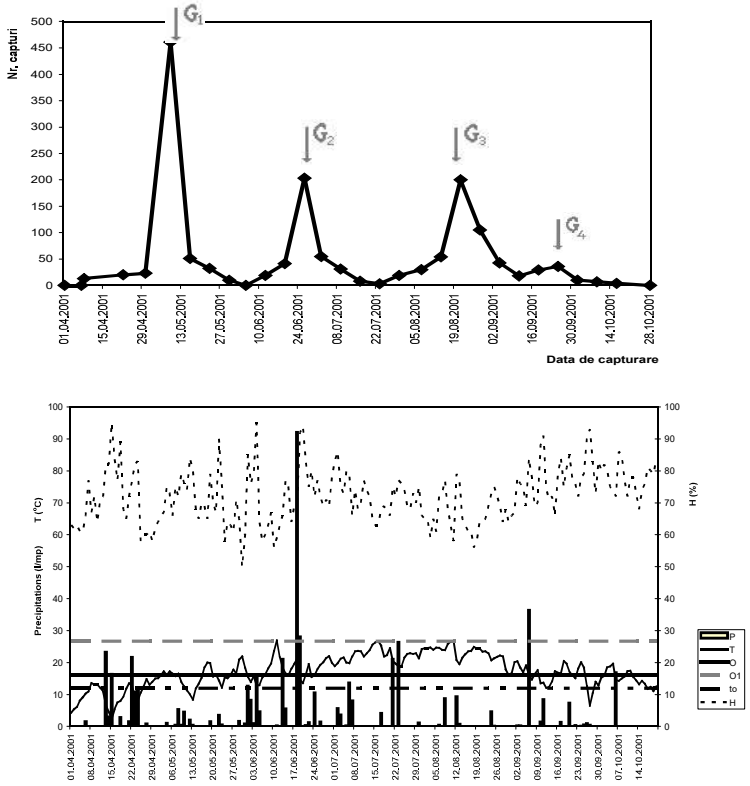

Fig. 4 -The bioclimogram of *Lobesia botrana* species in Dăbuleni

Because of the longer flight of first generation butterflies, in the last half of August and in September, second generation mature larvae and third generation young larvae are encountered.

In Dăbuleni, the third flight begins at the end of July and because of high temperatures of August (Fig.4), continuing to lower intensity till the end of September or the beginning of October. In 2001 in Dăbuleni we could notice a fourth flight, but reduced in intensity (Fig. 4) The second and third generation larvae are the most damaging, and in the wetting autumns they make conditions for development of *Botrytis cinerea*.

B. The attack frequency

Ştefăneşti

In 2000-2002 we observed the attack of L. *botrana* first and second generation larvae (table 2).We noticed small values of the attack even the years in which the treatments were absent. The reason is the small population of this pest.

Dăbuleni

In this south region, the Mediterranean climate, favorable to the development of pest, determined the increase of population and a lot of pest control methods have been used (Măcărău and co., 1998). In 2000 and 2001 we observed the attack of *L. botrana* larvae in the vineyard with three series of treatment (table 2).

Table 2

The attack frequency of *Lobesia botrana* (Den. et Schiff.) larvae

Dăbuleni					Ştefăneşti		
Treatment	**Year**	**The attack frequency F (%)**			**Year**	**The attack freq. F (%)**	
		G_1	G_2	G_3		G_1	G_2
Reldan 40 0,125%	2000	2,1	0	1,7	2000*	5,1	3,7
	2001	2,3	2,2	3,2			
Dipel WP 0,1%	2000	3,3	1,8	1,7	2001	2,3	3
	2001	2,5	3,4	3,1			
Foray 0,1%	2000	4,1	1,3	1,3	2002	3,4	1,2
	2001	3,2	4,7	4			

*) *treatments with pesticides*

We noticed low frequency of attach at Roşioară sort and this is because of the treatments done in the three larvae generations. The most efficient pesticide is Reldan 40 EC 0,125%, followed by Dipel WP 0,1%.

CONCLUSIONS

In Ştefăneşti, with temperate climate, *Lobesia botrana* has two complete generations and a third, incomplete, and in Dăbuleni, the hot and dry climate permits the development of a third complete generation.

The sum of effective temperature necessary the appearance of winter generation butterflies in spring depends on climate conditions of last autumn. The butterflies flight is better noticed in Dăbuleni because of the high and more uniformly temperatures as those in Ştefăneşti and, subsequently, because of the growth of pest population.

The microclimate in Ştefăneşti, which allows the partial development of third generation of *L. botrana* in autumn is the first cause of the fact that the population of these species remains reduce and doesn't present a damaging potential. Thus, most of the second generation pupae will form second generation butterflies instead of forming winter generation butterflies in spring.

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INTEGRATED CONTROL SYSTEM OF THE GRAPE MOTH *(LOBESIA BOTRANA* DEN & SCHIFF) IN MURFATLAR VINEYARD

SISTEM DE COMBATERE INTEGRATĂ A MOLIEI STRUGURILOR (*LOBESIA BOTRANA* DEN ET SCHIFF) IN PODGORIA MURFATLAR

FILIP I., RANCA AURORA, GULUȚĂ FLORICA
Research and Development for Wine Growing and Wine Making Murfatlar

Abstract. *The research work carried out the period 2003-2006 ai Viticultural Research Station Murfatlar and results obtained revealed a good efficiency of using biological and biotechnical methods in integrated control of grape moth. The bringing in practice of Romanian pheromone traps "atraBOT" in order to:establish the flight curve;supervise the population according to the economic threshold (100 males butterflies/trap/week) and directly control of moth by a mass capture of males with 3,6 and 9 traps/ha.The biopreparations Dipel ES at a rate of 1,0 l/ha, Ecotech-extra – 1,5 l/ha and Foray (Biobit) – 1,5 l/ha based Bacillus thuringiensis applied special for third generation of grape moth, which optained good results. Agood efficiency in chimical control of the pest Lobesia botrana were obtained with Larvin 375 at a rate of 1,0 l/ha; Bulldock 25 EC – 0,3 l/ha; Enduro 258 EC – 0,3 l/ha; Reldan 40 EC – 1,25 l/ha; Polytin 200 EC – 0,1 l/ha; Karate Zeon – 0,25 l/ha; Decis 2,5 EC – 0,3 l/ha and Total 60 EC – 1,5 l/ha. The best results in controlling this pest were obtained with new cloronicotiniles like Actara 25 WG at a rate of 100 g/ha and Calypso 480 EC at a rate of 100 ml/ha and also with mixture between Dipel ES 0,5 l/ha and Actara 25 WG – 50 g/ha or Calypso 480 EC 50 ml/ha both at a half ot its usual rate.*

Key words: *Grape moth, integrated control, pheromone traps, biopreparations, new insecticides*

Rezumat. *Cercetările s-au efectuat în perioada 2003-2006 la SCDVV Murfatlar iar rezultatele obținute au arătat o bună eficacitate a metodelor biologice şi biotehnice în controlul integrat al moliei strugurilor. Introducerea în practică a capcanelor cu feromoni tip „atraBOT" în scopul stabilirii curbei de zbor a fluturilor în vederea avertizării tratamentelor; supravegherea populației de molii prin stabilirea capturilor săptămânale, cumulate, necesare pentru determinarea pragului economic de dăunare (PED) de 100 fluturi masculi/ capcană/ săptămână şi de asemenea combaterea directă a moliilor, prin captarea în masă a fluturilor, creând vacuum de masculi în populația respectivă cu 3-6-9 capcane/ha, s-a dovedit foarte utilă. Biopreparatele Dipel ES în doză de 1,0 l/ha, Ecotech- extra – 1,5 l/ha şi Forey (Biobit) – 1,5 l/ha pe bază de Bacillus thuringiensis aplicate în special la a treia genetație de molia strugurilor au dat bune rezultate. O bună eficacitate în combaterea chimică a moliei strugurilor (Lobesia botrana Den et Schiff) s-a obținut cu insecticidele Larvin 375 în doză de 1,0 l/ha; Bulldock 25 EC – 0,3 l/ha; Enduro 258 EC – 0,3 l/ha; Reldan 40 EC – 1,25 l/ha; Polytin 200 EC – 0,1 l/ha; Karate Zeon – 0,25 l/ha; Decis 2,5 EC – 0,3 l/ha şi Total 60 EC – 1,5 l/ha. Cele mai bune rezultate în combaterea moliei strugurilor s-au obținut cu insecticidele Actara 25 WG în doză de 100 g/ha şi Calypso 480 EC în doză de 100 ml/ha şi de asemenea cu amestecurile Dipel ES 0,5 l/ha şi Actara 25 WG – 50 g/ha sau Calypso 480 EC 50 ml/ha, ambele la jumătate din doza uzală.*

INTRODUCTION

In most vineyard in the south and east of Romania the grape moth is the main pest grapevine. Losses caused by reach in some years are 30-40% of the grape yield (figure annexed). Usually, in Romanian practice 3-5 insecticide treatments are applied only to control efficiently the three gererations of the grape moth. These frequently repeated interventions, mostly using highly toxic insecticides, raise numerous and hard problems connected to main taining the equilibrum of grapevine agrobiocenosis, the risk to consumer of persistence of compounds used in grapes and wine, the resistance to treatments, etc.

Fig. 1 - Attack of graope moth at the G_2 with vizibile larva.

The solution to overcome these drawbacks is represented by the integrated control, where a particular role is played by biological and ecological investigations on the moth; progress achieved in using pheromone traps for forecast and warning and even direct control of the pest; integration of non-polluting biological measures applied (e.g. biopreparations based en *Bacillus thuriengiensis*) applied either separately or in mistures with chemical insecticide selective to useful fauna of grapevine agrobiocenosis, and reducing chemical applications in dependace of the economic damaging threshold (EDT) and implicitly of the cost price of phytosanitary interventions, and saving labor and power (Baicu and Savescu, 1978; Baicu and Savescu, 1986;; Filip,;1984;1985;1986;1990; Filip, Aurora Ranca, Florica Guluta, 2007.

METHODS OF RESEARCH

a) Use of pheromone traps. The purpose for using pheromone traps for varning treatments supervisin and biotechnical control is presented in table 1. Sex synthetic pheromone traps “atraBOT” were produces in the Romanian Institute for Chemistry Raluca-Ripan, Cluj-Napoca. The installation of pheromone traps in vine plantation was making in spring at the end of April to beginning of May.Removal of rubber capsules impregnated with the synthetic pheromone together with the adhesive lid was made at intervals of approximately one and half month.

Table 1

Use of sex pheromone traps for warning tratments, supervision and biotechnical control

Purpose	Number of traps required/ha	Surface in operation
A/Drawing up flight curve for warning chemical treatments or *Trichogramma releases.*	2 – 3 warning points with 3 traps each	100 ha
B/ Monitoring moth populations by weekly cumulated captures neaded for calculation of economic damagethreshold (EDT) amounting to 100 moths/trap/week for Eudemis.	1	For 3 – 5 ha in plots witch moth frequency
C/ Control of moths by mass capture to create a male vacuum in population (anly in completely, insolated plantations).	6-9	For 1 ha in plots with moth frequency 10 – 20 %

b) Control efficiency of *LOBESIA BOTRANA* using new insecticides and the biopreparations. The control tests for the grape moth lasted between 2002-2005 using Pinot gris cvar variant including 50 plants were tested following insecticides: Decis 2,5 EC at a rate of 0,3 l/ha; Karate Zeon – 0,25 l/ha; Bulldock 25 EC – 0,3 L/HA; Enduro 258 EC – 0,3 l/ha; Total 60 EC – 1,5 l/ha; Reldan 40 EC – 1,25 l/ha; Polytrin 200 EC – 0,1 l/ha; Larvin 375 – 1 l/ha; Calypso 480 EC – 0,1 l/ha and Actara 25 WG – 0,1 l/ha. the biopreparations Dipel ES – 0,1 l/ha, Ecotech extra – 1,5 l/ha and Thuricide 48 LV – 1,5 l/ha were experimented. Like wise mixtures with Dipel at ½ usual rate together with, Clypso 480 EC and Actara 25 WG – ½ than normal rates, were includet in tests. For each of the three generations a single application was made at warning with a " Calimax" sprayerpomp and a normal liquid volume.Some 10 days after applications frequency of attack on grapes was checked and also the number of surviving larvae, sepatately for each variant. Effectiveneces of compounds and mixtures tested was calculated from the population of surviving larvae, using the Abbott formula.

RESULTS AND DISCUSSIONS

a) Use of pheromone traps for biotehnical control

In the table 2 were presented resulte with effectiveness of mass capture of males at the polulations of grape moth de using wine traps/ha were obtaines very good results similare with chemical insecticoides the dates from. The table 2 shows that 3 traps/ha or 6 traps/ha can be good variant in differents years, but not like 9 traps/ha.

Table 2

Effectiveness of mass captures of males at the populations of grape moth different numbers of pheromone traps atraBOT in pinot gris cvar at Murfatlar during 2003-2006

Number of traps/ha	2003		2004		2005		2006	
	Average procentage of attacked	E% Abbot	Average procentage of attacked	E% Abbot	Average procentage of attacked	E% Abbot	Average procentage of attacked	E% Abbott
3 traps/ha	$5,0^{000}$	78,5	$4,0^{000}$	78,7	$6,8^{000}$	77,5	$4,8^{000}$	78,5
6 traps/ha	$4,7^{000}$	79,5	$3,9^{000}$	79,1	$6,2^{000}$	79,1	$3,7^{000}$	82,6
9traps/ha	$4,1^{000}$	81,6	$2,7^{000}$	84,5	$5,0^{000}$	82,4	$2,8^{000}$	86,2
Check with Actara 25 WG- 0,1 kg/ha	$0,7^{000}$	96,1	$0,5^{000}$	96,6	$21,0^{000}$	95,7	$0,8^{000}$	95,5
Untreated check	18,3	0,0	14,8	0,0	23,5	0,0	17,6	0,0
D.L. 5% = 2,2 D.L. 1% = 3,0 D.L. 0,1% = 3,7			0,3 0,1 0,6		1,8 2,5 3,3		1,4 1,9 2,6	

b) **Control efficiency of *LOBESIA BOTRANA* using new insecticides and the biopreparations**

Solution for diminishing autbreaks by the grape moth are treatment applications (table 3).The experiments carried out between 2003-2006 with so differents insecticides showed good results in control of grape moth. Good efficiency in chemical control of pest *Lobesia botrana* werw obtained with Larvin 375 at the rate 1,0 l/ha; Bulldock 25 EC – 0,5 l/ha; Eduro EC – 0,3 l/ha, Reldan 40 EC – 1,25 l/ha; Polytrin 200 EC – 0,1 l/ha; karate Zeon – 0,3 l/ha; Decis 200 EC – 0,1 l/ha and Total 60 EC – 1,5 l/ha.

In biological control tests at Murfatlar in 2003-2006 the best results were yielded by biopreparations Dipel ES at applications rate 1,0 l/ha, Ecotech-extra at 1,5 l/ha and Thuricide 48 LV at 1,5 l/ha ensuring affectiveness higer than 80%. Bioproducts bassed or *Bacillus thuriengiensis* were tested with a view to reducing pollution of viticultural agrobiocenosis caused by chemicals. Thus effectiveness of bioproducts Dipel ES, Ecotech-extra and Thuricide 48 LV was generally good, this fact confirmed by our previous works (Filip, 1982 and 1985).

Likewise, mixtures with Dipel ES at half a rate and Calypso 480 EC and Actara 25 WG at ½ rate showed promise. These mixtures can be caused as an extension of rate concept of integrated control in viticulture. They have the advantage of an extreme reduction of the rate chimical compounds (two time) and implicitly of treatment toxicity in grape during ripering and avoid enviroment pollution, affording a high effectiveness at a reduced cost price. Treatments thus conceived constitute a good example of integrated control in viticulture.

Table 3

Effectivenes of some chemicals and biologicals insecticides and different mixture against the grape moth in Pinot gris, cvar at Murfatlar during 2003-2006

Nr. crt.	Product and provenience	Appl rate l/ha kg/ha	2003		2004		2005		2006	
			Aver procent. of attac.	E% Abbott	Aver procent. of attac.	E% .Abbott	Aver procent. of attac	E% Abbott	Aver procent. of attac	E% Abbott
1	Decis 2,5 EC	0,3	$2,0^{000}$	89,0	$1,0^{000}$	93,2	$2,5^{000}$	89,4	$1,5^{000}$	91,5
2	Karate Zeon	0,25	$1,8^{000}$	90,0	$0,7^{000}$	95,2	$2,8^{000}$	88,0	$1,2^{000}$	93,1
3	Bulldock 25 EC	0,3	$0,9^{000}$	95,0	$0,5^{000}$	96,6	$2,0^{000}$	91,4	$1,0^{000}$	94,3
4	Enduro 258 EC	0,3	$1,0^{000}$	94,5	$0,7^{000}$	95,2	$1,5^{000}$	93,6	$1,2^{000}$	93,1
5	Total 60 CE	1,5	$1,5^{000}$	91,8	$1,2^{000}$	91,9	$1,9^{000}$	91,9	$2,2^{000}$	88,4
6	Reldan 40 EC	1,25	$1,0^{000}$	94,5	$0,8^{000}$	94,7	$3,1^{000}$	86,8	$2,5^{000}$	85,7
7	Polytrin 200 EC	0,1	$1,2^{000}$	93,4	$1,2^{000}$	91,2	$2,9^{000}$	87,6	$2,2^{000}$	88,4
8	Larvin 375	1,0	$0,5^{000}$	97,2	$0,3^{000}$	97,9	$1,1^{000}$	95,3	$1,0^{000}$	94,3
9	Calypso 480 EC	0,1	$0,9^{000}$	95,0	$0,4^{000}$	97,3	$0,7^{000}$	97,0	$0,9^{000}$	94,9
10	Actara 25 WG	0,1	$0,7^{000}$	96,1	$0,5^{000}$	96,6	$1,0^{000}$	95,7	$0,8^{000}$	95,5
11	Dipel ES	1,0	$2,0^{000}$	89,0	$1,0^{000}$	93,2	$2,8^{000}$	88,0	$1,6^{000}$	90,9
12	Ecotech Extra	1,5	$2,2^{000}$	87,9	$1,2^{000}$	91,8	$3,0^{000}$	87,2	$2,1^{000}$	88,0
13	Foray (Biobit)	1,5	$2,8^{000}$	84,7	$2,0^{000}$	86,4	$5,0^{000}$	78,7	$4,0^{000}$	77,2
14	Thuricide 48 LV	1,5	$4,0^{000}$	78,1	$2,1^{000}$	85,8	$4,0^{000}$	82,9	$3,1^{000}$	82,3
15	Dipel ES + Calypso 480 EC	0,5	$4,6^{000}$	74,8	$2,5^{000}$	83,1	$6,6^{000}$	71,9	$3,6^{000}$	79,5
16	Dipel ES + Actara 25 WG	0,5 0,5	$1,6^{000}$	91,2	$0,8^{000}$	94,5	$2,0^{000}$	91,4	$1,0^{000}$	94,3
17	Untreated check	0,5 0,5	18,3	0,0	14,8	0,0	23,5	0,0	17,6	0,0
D.L. 5% = D.L. 1% = D.L. 0,1% =			2,2 3,0 3,7		0,9 1,2 1,6		1,8 2,5 3,3		1,4 1,9 2,6	

CONCLUSIONS

- In Murfatlar viticulture, the grape moth (*Lobesia botrana*) has three generations annually, whose development stages are very extendent, partinlly in the third generation.

- Used directely in the integrated control in viticulture, the pheromone traps controlled directely the grape moth by mass capture of male with 3,6 and 9 traps/ha.

- The entomopathogenic bioproduct Dipel ES at 1,0 l/ha, Ecotech-extra – 1,5 l/ha and Thuricide 48 LV – 1,5 l/ha showed a good efficacy against grape moth.

- Likewise, positive results were obtained with mixture of Dipel ES at half of it usual rate, and Calypso 480 EC and Actara 25 WG at ½ the normal dosage, these combinations could be applied on a large scale, in order to avoid to excessive chemical pollution of vineyards.

- A good efficiency in chimical control of the pest *Lobesia botrana* were obtained with Larvin 375 at a rate of 1,0 l/ha; Bulldock 25 EC 0,3 l/ha; Enduro 258 EC – 0,3 l/ha; Reldan 40 EC – 1,25 l/ha; Polytrin 200 EC – 0,1 l/ha; Karate Zeon – 0,25 l/ha; Decis 2,5 EC – 0,3 l/ha and Total 60 EC – 1,5 l/ha.

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EFFICACY OF SOME INSECTICIDES USED TO CONTROL THE *PSYLLA PYRI* L. (*HOMOPTERA, PSYSLLIDAE*) PEST

EFICACITATEA UNOR INSECTICIDE ÎN COMBATEREA DĂUNĂTORULUI *PSYLLA PYRI* L. (*HOMOPTERA, PSILLIDAE*)

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Abstract. *Different insecticides products were tested in the years 2005-2006 to control the pear psylla - Psylla pyri L. pest in different stages of development (Dimilin 25 WP-0,03%, Decis 25 WG-0,05%, Sinoratox 35 CE-0,2%, Sumi-alpha 2,5 EC-0,04%, Faster 10 CE-0,025%, Sonet 100 EC-0,5%, Mitac 20 EC-0,3%, Carbetox 37 CE-0,5%, Insegar 25 WP-0,02% şi Fyfanon 31 R- 0,3%). Among these insecticides the greatest efficacy (over 90%) had the following: Mitac 20 EC-0,3%; Sinoratox 35 CE-0,2% şi Sumi-alpha 2,5 EC-0,04%.*

Rezumat. *Pentru combaterea puricelui melifer al părului - Psylla pyri L. s-au testat pe parcursul anilor 2005-2006, 10 produse insecticide în diferite stadii de dezvoltare ale insectei (Dimilin 25 WP-0,03%, Decis 25 WG-0,05%, Sinoratox 35 CE-0,2%, Sumi-alpha 2,5 EC-0,04%, Faster 10 CE-0,025%, Sonet 100 EC-0,5%, Mitac 20 EC-0,3%, Carbetox 37 CE-0,5%, Insegar 25 WP-0,02% şi Fyfanon 31 R- 0,3%). Dintre acestea, cea mai mare eficacitate (peste 90%) au avut-o produsele Mitac 20 EC-0,3%; Sinoratox 35 CE-0,2% şi Sumi-alpha 2,5 EC-0,04%.*

The pear psylla - *Psylla pyri* L. is the main and the most dangerous pest of pear trees as dominance (81,5 - 99,6% in the southern part of the country comparing to other species of plant lices), as frequency and density (Chirichiceanu Constantina and Hondru, 1993).

This pest colonizes the buds, leaves, flowers, sprouts and small fruits. As a consequence of larvae attack (which are the most dangerous) the attacked organs are filled with a lot of honey dew (on which develops the *Capnodium salicinum* Mont. fungus) and change colour into brown-black. Because of this, photosynthesis reduces and leaves fell prematurely. The sprouts slow down their growth and bend, the fruits stay small. The fruit trees with strong attack enfeeble and the fruit crops diminish gradually within the next years (Paşol and contrib., 2007).

MATERIAL AND METHOD

In the years 2005-2006 experiments were effectuated in order to control the pear psylla - *Psylla pyri* L. in the pear trees orchards of the Phytosanitary Unit of Dâmbovița county. Treatments were applied when the first eggs were laid, when the mobile larvae appeared and when the adults were present in the fruit trees. During the control experiments different products from different chemical groups were used: organophosphorous compounds, synthesis piretroids, carbamates, inhibitors of arthropods metamorphosis and diverses (table 1).

It was used for spraying the „STIHL" 400SR engine-pump, which ensures a high pressure.

Table 1

Tested insecticides, applied to control the *Psylla pyri* L. pest in the years 2005-2006

No.	Comercial name of product	Chemical group	Active substance	Company, Country	Toxicity group
1.	DIMILIN 25 WP	inhibitors of arthropods metamorphosis	diflubenzuron	Chemtura Netherlands BV, Holland	IV
2.	DECIS 25 WG	piretroids	deltametrin	Bayer, Germany	IV
3.	SINORATOX 35 CE	organophosphorous compounds	dimetoat	Sinteza S.A., Romania	III
4.	SUMI-ALPHA 2,5 EC	organophosphorous compounds	esfenvalerat	Sumitomo, Japan	III
5.	FASTER 10 CE	piretroids	cipermetrin	Oltchim S.A. Romania	III
6.	SONET 100 EC	inhibitors of arthropods metamorphosis	hexaflumuron	Dow Elanco U.S.A.	IV
7.	MITAC 20 EC	diverses	amitraz	AgrEvo, Germany	IV
8.	CARBETOX 37 CE	organophosphorous compounds	malation	Sinteza S.A., Romania	III
9.	INSEGAR 25 WP	carbamates	fenoxicarb	Ciba Geigy Switzerland	IV
10.	FYFANON 31 R	organophosphorous compounds	malation	Cheminova A/S Lemyig, Denmark	IV

The efficacy of the tested products was calculated using Abbot's formula:

$$E\% = \left[1 - a_2/(N - M_2)\right] \times 100$$

in which:

E = product efficacy;
a_2 = number of attacked organs for the treatment product;
N = total number of analysed organs;
M_2 = number of organs without attack for the untreated control

RESULTS AND DISCUSSIONS

Chemical products based on diflubenzuron, deltametrin, dimetoat, esfenvalerat, cipermetrin, hexaflumuron, amitraz, malation and fenoxicarb were tested in the years 2005-2006, in several periods.

Results on the efficacy of the tested insecticides in control of the pear psylla - *Psylla pyri* L. in the year 2005 are presented in table 2, 3 and 4. The experiments were done on 27th March, in the phase of buds unfolding and when

the adults were present in the tree crown, on 16th June when the mobile larvae appear and on 10th July when reserve of pests can be found.

There can be observed that the best efficacies, of over 90%, had the insecticides MITAC 20 EC, SINORATOX 35 CE and SUMI-ALPHA 2,5 EC.

Table 2

Efficacy of some insecticides in the year 2005, applied to control the *Psyla pyri* L. pest on 27th March 2005

No.	Product	Concentration (%)	Number of analysed sprouts, flowers and leaves	Number of attacked sprouts, flowers and leaves	Frequency of attack (%)	Efficacy (%)
1	DIMILIN 25 WP	0,03	100	14	14	61,11
2	DECIS 25 WG	0,05	100	9	9	75,00
3	SINORATOX 35 CE	0,2	100	2	2	94,44
4	SUMI-ALPHA 2,5 CE	0,04	100	3	3	91,67
5	FASTER 10 CE	0,025	100	11	11	69,44
6	MITAC 20 EC	0,3	100	1	1	97,22
7	CARBETOX 37 CE	0,5	100	8	8	77,78
8	INSEGAR 25 WP	0,02	100	10	10	72,22
9	FYFANON 31 R	0,03	100	11	11	69,44
10	SONET 100 EC	0,5	100	7	7	80,56
11	Untreated control	-	100	36	36	0,00

Table 3

Efficacy of some insecticides in the year 2005, applied to control the *Psyla pyri* L. pest on 16th June 2005

No.	Product	Concentration (%)	Number of analysed sprouts and leaves	Number of attacked sprouts and leaves	Number of attacked sprouts and leaves on the untreated control	Frequency of attack (%)	Efficacy (%)
1	DIMILIN 25 WP	0,03	200	26	31	13	84,62
2	DECIS 25 WG	0,05	200	22	36	11	86,59
3	SINORATOX 35 CE	0,2	200	6	115	3	92,94
4	SUMI-ALPHA 2,5 CE	0,04	200	7	121	3,5	91,14
5	CARBETOX 37 CE	0,5	200	28	41	14	82,39
6	FYFANON 31 R	0,03	200	26	35	13	84,24
7	SONET 100 EC	0,5	200	33	48	16,5	78,29

Table 4

Efficacy of some insecticides in the year 2005, applied to control the *Psyla pyri* L. pest on 10th July 2005

No.	Product	Concentration (%)	Number of analysed sprouts and leaves	Number of attacked sprouts and leaves	Frequency of attack (%)	Efficacy (%)
1	MITAC 20 EC	0,3	300	3	1	94,64
2	SINORATOX 35 CE	0,2	300	4	1,33	92,86
3	INSEGAR 25 WP	0,02	300	11	3,66	80,36
4	SONET 100 EC	0,5	300	6	2	89,29
5	DIMILIN 25 WP	0,03	300	25	8,33	55,36
6	Untreated control	-	300	56	18,66	-

In tables 5, 6 and 7 is presented the efficacy of the tested insecticides in the year 2006, applied on 16th May when it started the eggs laying, on 2nd June when the mobile larvae appear and on 3rd August when reserve of pests can be found. The best efficacy had also the same insecticides: MITAC 20 EC, SINORATOX 35 CE and SUMI-ALPHA 2,5 EC.

Table 5

Efficacy of some insecticides in the year 2006, applied to control the *Psyla pyri* L. pest on 16th May 2006

No.	Product	Concentration (%)	Number of analysed sprouts and leaves	Number of attacked sprouts and leaves	Frequency of attack (%)	Efficacy (%)
1	DIMILIN 25 WP	0,03	100	8	8	87,10
2	DECIS 25 WG	0,05	100	14	14	77,42
3	SINORATOX 35 CE	0,2	100	3	3	95,16
4	SUMI-ALPHA 2,5 CE	0,04	100	2	2	96,77
5	FASTER 10 CE	0,025	100	9	9	85,48
6	MITAC 20 EC	0,3	100	1	1	98,39
7	CARBETOX 37 CE	0,5	100	11	11	82,26
8	INSEGAR 25 WP	0,02	100	14	14	77,42
9	FYFANON 31 R	0,03	100	11	11	82,26
10	SONET 100 EC	0,5	100	21	21	66,13
11	Untreated control	-	100	62	62	-

Table 6

Efficacy of some insecticides in the year 2006, applied to control the *Psyla pyri* L. pest on 2nd June 2005

No.	Product	Concentration (%)	Number of analysed sprouts and leaves	Number of attacked sprouts and leaves	Frequency of attack (%)	Efficacy (%)
1	DIMILIN 25 WP	0,03	100	21	21	48,78
2	DECIS 25 WG	0,05	100	14	14	65,85
3	SINORATOX 35 CE	0,2	100	3	3	92,68
4	SUMI-ALPHA 2,5 CE	0,04	100	3	3	92,68
5	FASTER 10 CE	0,025	100	9	9	78,05
6	MITAC 20 EC	0,3	100	1	1	97,56
7	CARBETOX 37 CE	0,5	100	11	11	73,17
8	INSEGAR 25 WP	0,02	100	13	13	68,29
9	FYFANON 31 R	0,03	100	14	14	65,85
10	SONET 100 EC	0,5	100	11	11	73,17
11	Untreated control	-	100	41	41	-

Table 7

Efficacy of some insecticides in the year 2006, applied to control the *Psyla pyri* L. pest on 3rd August 2006

No.	Product	Concentration (%)	Number of analysed sprouts and leaves	Number of attacked sprouts and leaves	Number of attacked sprouts and leaves on the untreated control	Frequency of attack (%)	Efficacy (%)
1	DECIS 25 WG	0,05	200	16	115	8	81,18
2	SINORATOX 35 CE	0,2	450	12	274	2,67	93,18
3	SUMI-ALPHA 2,5 CE	0,04	450	17	162	3,68	94,10
4	MITAC 20 EC	0,3	450	3	236	0,66	98,60
5	CARBETOX 37 CE	0,5	450	38	121	3,11	88,45

CONCLUSIONS

1. Different insecticides products were tested in the years 2005-2006 to control the pear psylla - *Psylla pyri* L. pest in different stages of development. Among these insecticides the greatest efficacy (over 90%) had the following: Mitac 20 EC-0,3%; Sinoratox 35 CE-0,2% şi Sumi-alpha 2,5 EC-0,04%.
2. The greatest efficacy among the tested products had insecticides based on dimetoat, esfenvalerat (organophosphorous compounds) and amitraz (from diverses chemical group).

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OBSERVATION REGARDING THE APPARITON, THE BIOLOGY AND THE INTEGRATED CONTROL OF SOME PESTS OF ROSES

OBESRVAȚII ASUPRA APARIȚIEI, BIOLOGIEI ŞI COMBATERII UNOR DĂUNĂTORI DIN CULTURILE DE TRANDAFIR

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Abstract. *In the paper are presented dates regarding the apparition the biology and the integrated control of some pests from roses plantation such as:*
- roses green grub - Macrosiphum rosae L.;
- flowers' hair bug- Epicometis hirta Poda;
- rose cycorite- Typhlocyba rosae L.;
- golden bug- Cetonia aurata L.

Rezumat. *În lucrare sunt prezentate date asupra apariției,biologiei şi combaterii integrate a unor dăunători din culturile de trandafir şi anume:*
- păduchele verde al trandafirului - Macrosiphum rosae L.;
- gândacul păros al florilor - Epicometis hirta Poda;
- cicorița trandafrului - Typhlocyba rosae L;
- gândacul auriu - Cetonia aurata L.

INTRODUCTION

The rose is the flower most related with the mankind history being mentioned in legends, fair tails, customs, traditional medicine, arts literature.

By the form and elegance of the bud, the fineness of the perfume and various colours it is the most loved and wanted flower.

In roses plantations are numerous species of pests from which some are polyfags and others are specific, which attack different organs of the plant. After the attack, the foliar apparatus is damaged, the floral buds are smaller and do not open or the flowers have stained leaves, without aesthetic and commercial value.

MATERIAL AND METHOD

Observation were made in the rosarium of Iasi Botanic Garden and also in different rose plantation from Iasi City area.

The following pests were studied:

- *rose green grub – Macrosiphum rosae L;*
- *rose cycorite – Typhlocyba rosae L;*
- *flowers hair bug – Epicometis hirta Poda;*
- *golden bug – Cetonia aurata L.*

We have in view the following aspects: apparition of the pests, the intensity of the attack and was made a list of the recommended insecticides for controlling of these pests.

RESULTS AND DISCUSSIONS

The rose green grub – *Macrosiphum rosae* L. appears frequently in the years with hot and draught springs. Attack is recognized by the presence of some massive colonies on the lower side of leaves on copse and on floral buds (figure 1).Due to the attack the leave are turned over, getting an yellow colour and fall down. Copses do not develop, the tissues are dieing and at last they droop. The floral buds do not open. On the attacked organs are find the insects' dejection and a part of the non-digested glucides, which is a favourable environment for developing the *Capnodium salicinum* Sacc. fungi. Are attacked also the kind of roses with dwarf bushy nature and the climbing ones.

The chemical treatments are applied from the moments in which the first colonies of aphides are observed on leaves till the moment of the floral buds opening, using the insecticides showed in the table 1.

Table 1

The recommended insecticides used for roses garden grub - *Macrosiphum rosae* L control

No.	Chemical group of the insecticide	Action mode of the insecticide	Used product (%)
1	Organic- phosphorus	contact and swallow	Actellic 50 EC– 0,15 Carbetox 37 CE – 0,4 Novadim 40 EC – 0,1 Sinoratox 35 CE – 0,15 Zolone 35 CE – 0,2
2	Carbamics	shock effect	Pirimor 25 WG – 0,1
3	Syntesis piretroid	contact and swallow	Faster 10 EC – 0,03 Faster Forte 20 – 0,015 Polythrin 200 EC – 0,015 Supersect 10 EC – 0,03 Talstar 10 EC – 0,03
4	Others	shock effect	Chess 25 WP – 0,04

Rose cycorite – *Typhlocyba rosae* L. is a pest frequently find in the tree nurseries, parks and gardens which attack leaves of roses from the end of April till September – October.

Larvae and adults are find on the inferior side of leaves stinging and sucking the cellular juice. Due the attack on the leaves appear white spots, and in time the spots join together and will occupy great areas of limbus. The floral buds do not develop and the attacked copses do not grow and they dry.

The limitation of the attack is made by foliar treatments applied when the first larvae are observed on the leaves with one of the insecticides specified in table 2.

Flowers' hair bug – *Epicomites hirta* Poda. is a pest frequently finds in roses plantations. In the last years it was observed an increase of the biological reserve of this pest and so at the same time of the flower: stamens, ovary, pistils and sometimes sepals are chewed.

Table 2

The recommended insecticides used for roses garden cycorite - *Typhlocyba rosae* L. control

No.	Chemical group of the insecticide	Action mode of the insecticide	Used product (%)
1	Organic – chlorine	contact and swallow	Thiodan 35CE – 0,2 Thionex 35CE – 0,2
2	Organic - phosphorus	contact and swallow	Danex 80PU – 0,15 Onefon 90 – 0,15 Senthion 30CE – 0,1 Sumithion 50EC – 0,1
3	Synthesis piretroides	contact and swallow	Fastac 10EC – 0,02 Polythrin 200EC – 0,015 Sumi – Alpha 2,5EC – 0,05 Supersect 10EC – 0,03

In the invasion years flowers' hair bug is difficult because the application of the chemical treatments during blossoming time present the danger of damaging the flowers and also of the pollening insects. Must be used selective insecticides showed in table 3.

Table 3

The recommended insecticides used for flowers' Hair bug – *Epicomites hirta* Poda. control

No.	Chemical group of the insecticide	Action mode of the insecticide	Used product (%)
1	Organic - phosphorus	Contact and swallow	Zolone 35WP – 0,2 Zolone 35CE – 0,2
2	Carbamics	Contact and swallow	Sevin 85WP – 0,05
3	Synthesis piretroides	Contact and swallow	Karate Zeon- 0,015 Mavrik 2F – 0,05
4	Inhibitors of insects metamorphosis	Contact and swallow	Calypso 480EC – 0,02

Ileana (golden bug)- *Cetonia aurata* L.. is one of the most beautiful insects, which was avowed by a jury formatted by personalities from Germany the "insect

of the year". Adults are eating the flowers pollen of some bushes (rose, lilac, elder tree) without making any economic damages and larva's are eating the organic matter in decay or with the sawdust from the hollows of old trees etc.

Ileana is one of the most beautiful insect from Romania, which must be protected.

CONCLUSIONS

1. In rose plantation are find various pests and economic damage are produced by:
   - rose garden grub – *Macrosiphum rosae* L;
   - rose cycorite – *Typhocyba rosae* L;
   - flowers' hair bug – *Epicometis hirta* Poda.
2. The attack leaves copse, floral buds and also the flowers which will have a poor quality.
3. To prevent and to control foliar treatments are applied with organic-phosphorus, carbamics, synthesis, piretroides, insecticides.
4. Ileana *Cetonia aurata* L. is one of the most beautiful insect from Romania wich do not produce economic damage.

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OBSERVATIONS ON THE CYDIA POMONELLA L. ADULTS' FLIGHT BY MEANS OF THE SYNTHETIC SEXUAL PHEROMONE TRAPS OF THE TYPE ATRAPOM IN THE APPLE PLANTATIONS FROM SCDP IAŞI

OBSERVAŢII PRIVIND ZBORUL ADULŢILOR SPECIEI *CYDIA POMONELLA* L. CU AJUTORUL FEROMONILOR SEXUALI DE TIP ATRAPOM ÎN PLANTAŢIILE DE MĂR DE LA SCDP IAŞI

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Abstract. *The observations were effectuated in the period 2005-2006 on the apple plantations from SCDP Iaşi and consisted in pursuing the flight of the Cydia pomonella L. adults (apple worm), to the traps with synthetic sexual pheromones of the type AtraPOM. The results obtained were used to elaborate and to release warning reports for advising the following insecticides: Calypso 480 SC-0,02%; Decis 25WG – 0,003%, Mospilan 20SP – 0,02%, Foray 48 B – 0,05%.*

Rezumat. *Observaţiile au fost efectuate în perioada 2005-2006 în plantaţiile de măr de la SCDP Iaşi şi au constat în urmărirea zborului adulţilor de Cydia pomonella L.(viermele merelor), la capcanele cu feromoni sexuali sintetici de tip AtraPOM. Datele obţinute au fost folosite pentru întocmirea şi emiterea buletinelor de avertizare a tratamentelor fitosanitare recomandându-se următoarele insecticide: Calypso 480 SC-0,02%; Decis 25WG – 0,003%, Mospilan 20SP – 0,02%, Foray 48 B – 0,05%.*

In recent years they noticed a significant increase of the attack by the apple worm Cydia pomonella L. in the apple plantations.

The action of integrated fight against diseases and pests has a larger and larger applicability and to be as effective as possible it is necessary to know the biology and ecology of the pathogen agents and pests according to which they establish the phyto-sanitary treatments.

MATERIAL AND METHOD

The observations were effectuated in the period 2005-2006 on the apple plantations from SCDP Iaşi and consisted in pursuing the flight of the *Cydia pomonella* L. adults (apple worm), to the traps with synthetic sexual pheromones of the type AtraPOM.

The determinations effectuated highlighted the density of butterflies as well as the flight periods.

The climatic conditions influence the evolution and attack of the apple worm. Among these temperature is the most important factor. The average temperatures from 2006 were more favorable to the pest development than those from 2005.

Table 1

Climatic characterization of the years 2005-2006 (March-September)

Month	2005			2006		
	Average temp ^{0}C	Precipitations (mm)	Relative humidity %	Average temp ^{0}C	Precipitations (mm)	Relative humidity %
March	2,5	22,5	58	2,5	110,4	85,0
April	10,1	82,7	61	11,4	53,0	75,7
May	16,0	103,2	65	16,0	62,6	73,4
June	18,5	74,8	65	19,7	82,4	81,5
July	21,6	107,2	68	21,6	98,8	78,8
August	20,5	60,2	71	20,2	88,0	82,7
September	16,6	5,8	66	16,8	15,2	79,6

RESULTS OBTAINED

The dynamics of flight of the *Cydia pomonella* L adults to the traps with synthetic sexual pheromones of the type AtraPOM is presented in table no. 2.

Table 2

The number of *Cydia pomonella* L. adults to the traps with synthetic sexual pheromones of the type AtraPOM

YEAR	G I		G II	
	Date of observation	No. of adults captured	Date of observation	No. of adults captured
2005	6.05	1	20.06	2
	16.05	4	22.06	6
	17.05	3	24.06	6
	18.05	13	27.06	30
	19.05	4	29.06	8
2006	10.05	3	22.06	12
	12.05	2	23.06	10
	15.05	17	26.06	41
	17.05	6	27.06	7
	19.05	7	28.06	10

The data presented highlight a big number of captures at the pheromone traps. For example in 2005 they registered a number of 13 captures at G I (18 May) and 30 captures at G II (27 June), and in 2006, 17 captures at G I (15 May) and 41 captures at G II (26 June). These observations prove a high density of the pest and a significant potential danger for the apple production taking into account that the economic damage threshold is 3-5 butterflies/trap/week.

On account of the data registered they established the flight curves for the *Cydia pomonella* L. adults for each generation in 2005 and 2006 (fig 1, 2).

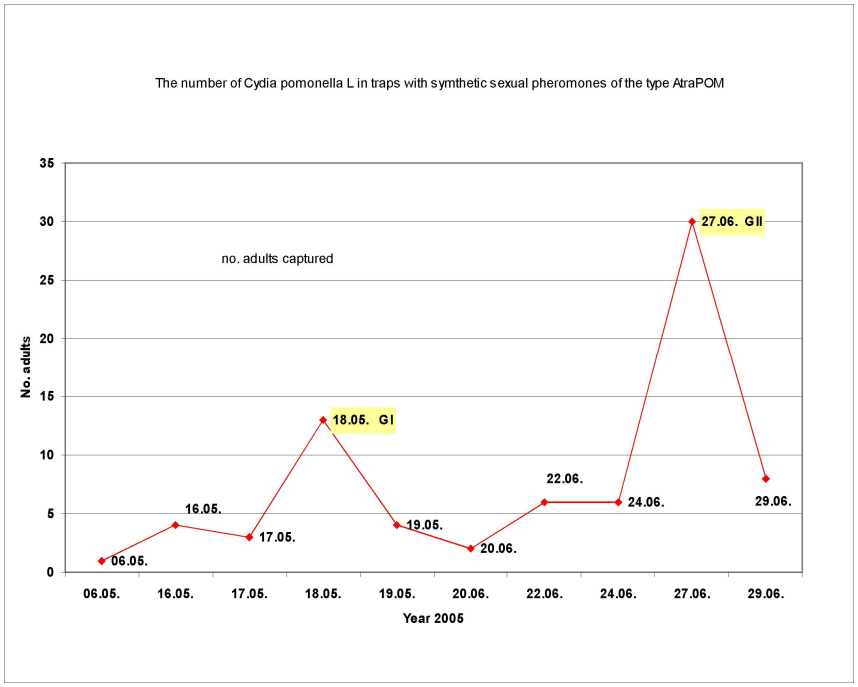

Figure 1

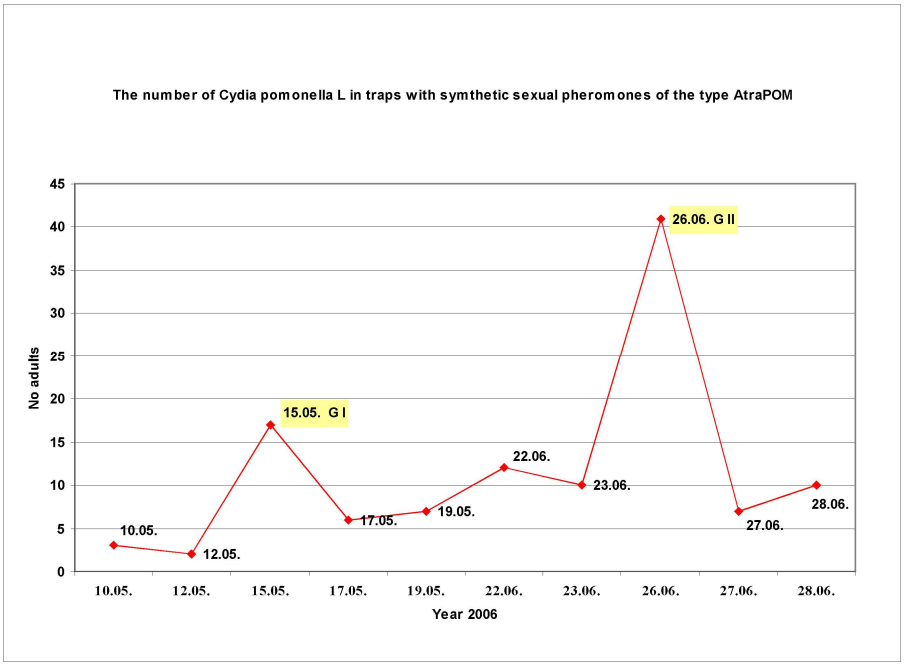

Figure 2

Correlated with the peak of the flight curve they applied phyto-sanitary treatments to fight against the pest.

In 2005 the peak of the flight curve was on 18 May for the first generation and 27 June for the second generation. The first treatment was applied on 20 May 2005 with Calypso 0,02% for G I and for G II on 28 June 2005 also with Calypso 0,02%. The second treatment for the two generations was applied after 10 days from the first one using the following insecticides: Mospilan 0,015% for G I and Malation 50 - 0,225%.

In 2006 the peak of the flight curve was on 15 May for the first generation and 26 June for the second generation, the first treatment being applied also with Calypso 0,02%. For the next treatment they used Malation 50 – 0,225%, for G I and Victenon 0,05% for G II.

After applying the treatments, the insecticides used had a good effectiveness in the fight against the apple worm and this was proved by the low percentage of wormy fruits.

CONCLUSIONS

1. The climatic conditions from the period 2005-2006 were very favorable for the evolution and attack of the apple worm.

2. In 2006 they noticed a more intense flight of the Cydia pomonella L adults than in 2005.

3. In 2005 the peak of the adult flight for G I was registered on 18 May (13 butterflies) and for G II on 27 June (30 butterflies). In 2006 the peak of the adult flight for G I was on 15 May (17 butterflies) and for G II on 26 June (41 butterflies).

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BIOLOGY, ECOLOGY AND INTEGRATED CONTROL OF THE SPECIES *Stigmella mallela Stt.* (marbled ore), PEST IN THE APPLE PLANTATION FROM NEAMT COUNTY

BIOLOGIA, ECOLOGIA ŞI COMBATEREA INTEGRATĂ A SPECIEI *STIGMELLA MALELLA* STT., DĂUNĂTOR ÎN PLANTAŢIILE DE MĂR DIN JUDEŢUL NEAMŢ

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Abstract. *The recearches carried out by the authors in the apple orchards revealed the data regarding the geographic distribution the morphology, the biology and the ecology at this pest in Neamț's county conditions.*

The also present the integrated control through agrophytotechnical methods, biological methods (the parasites), the use at traps with specific sexual pheromones of the light and alimentary ones as weel as the chemical control through selective and ecological products.

Rezumat. *În urma cercetărilor efectuate în plantaţiile de măr asupra speciei Stigmella mallela Stt., autorii prezintă date privind răspândirea, morfologia, biologia şi ecologia acestui dăunător în condiţiile judeţului Neamţ. Dea semenea, se prezintă combaterea integrată prin măsuri agrofitotehnice, biologice (paraziţi), utilizarea capcanelor cu feromoni sexuali specifici, a curselor luminoase şi alimentare, precum şi chimic cu produse selective, biologice.*

INTRODUCTION

Stigmella mallela Stt. (Lepidoptera-Stigmellidae)- liniar ore, is spread all over Europe and Little Asia, being harmful to the apple. In our country, it was pointed out in fauna by Caradja Aristide (1899) and by Alexinschi Alexei (1950).

As pest in the apple plantations it was pointed out by Dobreanu Ecaterina (1937) and biotechnological and control studies were approached by Draghia I., in various works (1966-1986); as well as Hertug Maria (1981-1986); Susea Sonica (1981); Popa Paul (2000) and so on.

Butterflies have sizes from 4 to 7 mm; the body and he wings are of dark brown colour; the fore wings are foreseen with a white median, transversal, transparent strip; the posterior wings are fringed; the body is foreseen with a tuft of little orange hair; the egg is greenish and little flat.

The larva at its complete growth has 3-4 mm length and it is yellowish (figure 1.c). The pupa has 3-4 mm length and it is protected by a yellow cocoon, which previously becomes brown.

METHOD AND MATERIAL

Leaves attacked by larva have been collected; they have made growths in the lab and observations in nature regarding biology; as well as the use of the specific sexual ferromons (Atramal), light and alimentary strokes to worn about chemical treatments, and so on.

RESULTS AND DISCUSSIONS

Our researches in biology established that the species *Stigmella mallela* Stt. Hibernates in the phase of pupa, protected, in the leaves fallen in the soil superficial layers. The first butterflies appear in the conditions of Neamt county in 2001, between 04.24 (the 24th of April) and 05.19 (the 19th of May), at $\Sigma (t_n-t_0)= 9°C$.

Typically, the appearance of the butterflies in spring is phased, and their flight is observed in the sunny days, while in the rainy days and those with lower temperatures, they shelter in the crust cracks, among herbs or soil clods.

After pairing, females deposit 30-45 eggs, isolated, on the inferior part of the leaves during period 1.V-16.V at $\Sigma (t_n-t_0)= 80°C$. After a period of incubation which may last up to 8-10 days, according to temperature, out of them comes the larva.

The evolution of larva developed during period 14.V-5.VI, for 20-22 days at $\Sigma (t_n-t_0)= 154°C$. When appearing, larva enter right into the leaves, where they feed with the mesophyllum between the two epidermis, building a specific gallery (mine) and this is where the name of "ring ore" comes from.

At its complete growth, larva does not abandon a leaf to enter another, even if the first leaf becomes insufficient to feed from, having smaller shape. At this phase, the larva abandons the leaf and goes down into soil, the the superficial layer to a depth of 0,5-1,0cm, where it transforms into pupa, in a protective silky cocoon, during period 4.VI-16.VI at $\Sigma (t_n-t_0)= 236°C$. If the soil is to wet, the making of the cocoon is impossible and the larva may die.

After 10-12 days, as the pupa phase may last, butterflies appear, and they will give birth to the second and the third generation, which grows the same way.

This way, the 1st generation (G_1) grows in May-June; the 2nd generation (G_2) in June-July, the 3rd generation (G_3) in August-September. The progressive cycle diagram of the species Stigmella mallela Stt. (original).

After our researches upon the ecology of this species, regarding the biological reserve in the autumn of 2001-2002 from the apple plantations in Piatra-Neamt was of 21,08% in 2001 and 21,45 in 2002.

In Bicaz, the biological reserve was of 10,10% in 2001 and of 11,54% in 2002. Also, in Roman city the biological reserve was of 25,22%in 2001 and of 27,86% in 2002. The greatest biological reserve was signaled in Roman city, followed by Piatra-Neamt and Bicaz. In all these cases, they recommend measures to preventing the attack of these species, to be kept under the level of PED, which is of 30 mines/100 leaves (table 1).

Table 1

The biological reserve of the species *Stigmella mallela* Stt. in various cities from Neamt county

City	Biological reserve						Mean %	
	G_1		G_2		G_3			
	2001	2002	2001	2002	2001	2002	2001	2002
Piatra-Neamt	17,8	27,42	23,78	18,09	21,25	22,45	21,08	21,45
Bicaz	8,7	10,2	12,40	16,04	9,2	8,4	10,10	11,54
Roman	21,7	32,4	28,08	24,7	25,06	25,05	25,22	27,86

As for the attack frequence (F%) observed in the same city from Neamt county in 2001 and 2002, they got to the following data (table 2).

Table 2

The frequence of the attack (F%) of the species *Stigmella mallela* Stt. in different cities from Neamt county in 2001 and 2002

City	Biological reserve						Mean %	
	G_1		G_2		G_3			
	2001	2002	2001	2002	2001	2002	2001	2002
Piatra-Neamt	14,05	19,08	16,03	16,06	15,04	18,04	15,04	17,72
Bicaz	8,04	10,04	7,02	6,03	7,02	9,01	7,36	8,36
Roman	24,02	30,50	31,01	28,04	29,05	32,08	28,02	30,20

The frequence of the attack in Piatra-Neamt city was of 15,04 in 2001 and of 17,72% in 2002.

In Bicaz it was of 7,36 in 2001 and of 8,36% in 2002. Also, in Roman it was of 28,02% in 2001 and of 30,20% in 2002.

We observe that from this point of view of the greatest frequence of the attack was in Roman, followed by Piatra-Neamt and then Bicaz.

The different behaviour of this species frequence in the 3 cities is tightly connected to the microclimates specific for the 3 cities: mountaneous (Piatra-Neamt); undermountaneous (Bicaz) and hills and fields (Roman), where the temperature, the moisture, the precipitations play a great role in the evolution of these species, which, in some propitious conditions, may exceed PED.

As for the attacked plants and the pest way, we mention that the species *Stigmella mallela* Stt., both in the world and in our country, has been siignalled only in the apple plantations. The larva, during its growth, bites a mine, first right, narrow, which gets wider then.

On a leaf we may identify 6-12 mines, and in some cases even 35 mines. If 2 mines meet a larva must enter deeper and pass under another mine.

In its way the larva passes through the secondary ribs and even through the main one, so that the leaves turn yellow, even with only 1-2 mines a leaf (figure 1.e).

The integrated control has been done by:

- Agrophytotechnical measures: collecting and burning of the fallen leaves, followed by autumn or spring ploughing, which may have a very important contribution to the biological reserve reduction (larva, pupa) of these species.
- Biological measures, by creating proper life conditions of the parasites from Hymenoptera class, Braconidae and Chalciodidae family); by tilling aromatic

and melliferous plants in the orchard, from the Umbeliferous family and so on, also by using the specific sexual ferromone ATRAMAL, or other lighting or elementary sources.

- Chemically, in 2001, in Piatra-Neamt they experimented the products Decis 2,5 EC (0,025%); Lannate 90WS (0,05%); Rimon 10 EC (0,06%); Dimilin 25 WP(0,03%) and Carbetox 37 EC (0,30%), (table 3).

The efficiency of these products was very good, leading to productions of 26,8 tones/hectare (Dimilin 25 WP-0,03%); 26,8 tones/hectare (Decis 2,5 EC-0,025%) and Rimon 10 EC-0,06%) as opposed to the witness where the production was of only 22,5 tones/hectare, realizing benefits between 4,0 and 4,3 tones/hectare.

Table 3

The efficiency of some chemical products in the control of the species *Stigmella mallela* Stt. in Piatra-Neamt in 2001

No.	Product	Dosis	F%			Production t/ha
			G_1	G_2	G_3	
1	Decis 25 EC	0,025	17,17	23,4	21,6	26,8
2	Lannate WS	0,05	16,9	22,8	20,7	26,6
3	Rimon 10 EC	0,06	17,6	23,5	21,9	26,8
4	Dimilin 25 WP	0,03	18,6	23,9	22,1	26,4
5	Carbetox 37 EC	0,30	17,3	22,1	19,9	26,7
6	Untreated witness					22,5

CONCLUSIONS

The species *Stigmella mallela* Stt., in the conditions of Neamt county has 3 year generations (G_1 April-May; G_2 in June-July, G_3 in August-September) and hibernates in the phase of pupa in the fallen leaves, in the superficial layer of the soil.

The greatest biological reserve was signaled in Roman(25,22% in 2001 and of 27,86% in 2002), followed by Piatra-Neamt with 21,08% in 2001 and 21,45% in 2002) as well as of Bicaz with 10,10% in 2001 and with 11,54% in 2002.

The greatest frequence of the attack (F%) was registered in Roman (28,02% in 2001 and 30,20% in 2002) followed by Piatra-Neamt and then by Roman.

In the integrated control they applied agrophytotechnical, biological (parasite) measures; lighting and elementary traps with ferromones. Within the chemical measures following products were experimented: Decis 25 Ec (0,025%); Lannate 90 WS (0,05%); Rimon 10 EC (0,06%); Dimilin 25 WP (0,03%); Carbetox 37 EC (0,30%), which were very efficient, leading to productions between 26,4 tones/hectare-26,8 tones/hectare, with benefits between 4,0 and 4,3 tones/hectare, as opposed to the witness which obtained a production of 22,5%.

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BIOLOGY, ECOLOGY AND INTEGRATED CONTROL OF THE SPECIES *Lyonetia clerckella L.* (sinuous mining), PEST IN THE APPLE PLANTATION FROM NEAMT COUNTY

BIOLOGIA, ECOLOGIA ŞI COMBATEREA INTEGRATĂ A SPECIEI *LYONETIA CLERCKELLA* L. (MINIERUL SINUOS), DĂUNĂTOR ÎN PLANTAȚIILE DE MĂR DIN JUDEȚUL NEAMȚ

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Abstract. *As a consequence of the researches made in the apple plantations upon the species Lyonetia clerkella L., the authors present information regarding the spreading, the morphology, the biology and the ecology of this pest in the conditions of Neamt county. It also presents the integrated pest by agrophytotechnical, biological (parasites) measures, the using of the traps with specific sexual ferromones, of the lighting and alimentary traps, as well as chemically with selective products.*

Rezumat. *În urma cercetărilor efectuate în plantațiile de măr asupra speciei Lyonetia clerkella L., autorii prezintă date privind răspândirea, morfologia, biologia şi ecologia acestui dăunător în condițiile județului Neamț.De asemenea, se prezintă combaterea integrată prin măsuri agrofitotehnice, biologice(paraziți), utilizarea capcanelor cu feromoni sexuali specifici, a curselor luminoase şi alimentare, precm şi chimic cu produse selective.*

INTRODUCTION

This microlepidoptera, *Lionetia clerkella* L. (sinuous mining), belonging to the Lepidoptera class, Lionetiidae family, is spread all over Europe, Northern Africa, Little Asia, being known as a polyphagous pest, producing damages in the apple, pear, cherry, plum, peach, quince, rose plantations.

In our country it was signaled and studied by Motas C. and Zaharescu V. (1933), then by Dobreanu Ecaterina (1937). In 1957-1959 in "The situation of the animal pest of the tilled plants" was signaled in Suceava, Ilfov (Bucharest), Cluj counties, where the damages were great. Balaj D. and Novac N. (1968) observed in the fruit-growing tank from Falticeni, attacks of 94% at the cherry and 89% at the apple. In 1972-1985 it is signaled in Hunedoara, Cluj, Brasov, Vrancea, Mures, Sibiu, Arges. Moreover, the bioecology and the control of this species were studied by Draghia I. (1968, 1972, 1982, 1985, 1986); then by Hetug Maria (1981, 1986, 1996), as well as by Susea Sonica (1987). Also, Popa Paul (2000) presents biology, ecology and the control of this species (master's degree).

The butterflies have sizes from 7,5 to 9 mm, the fore wings and the posterior ones are reduced to somenarrow blades foreseen on the edges with long, perpendicular hair, which form fringes whose breadth is bigger than that of the wings. On the illegible there is a black oval spot and where we can see 2 or 3 small black lines, more or less visible in rest status. The wings are white-silver colour, shiny, satinized, with the limits slightly brown-red; the posterior wings are light grey with fine fringes. After Bender E. (1961), the butterflies of the 3rd generation, the hibernated one, are of a brown hue .The egg is small and it is inserted in the superior epidermis of the leaf. The larva, at its complete growth, has 8-9 mm length; the body is light green, with the dark top of the feet. The pupa is sheltered in a satinized white cocoon, woven in hammock between the edges of the leaf or the bark rugosity.

RESULTS AND DISCUSSIONS

Our observations in 2002, upon the species *Lyonetia clerkella* L., in the ecological conditions of Neamt county, show that the insect hibernates in the adult phase under leaves or under the exfoliated bark of the trees. They start their activity in early spring, between the 18th of April and the 7th of May, for 24 days, at $\Sigma (t_n-t_0)=80°C$. After pairing, the females deposit the eggs before the apple blossom, between the 23rd of April and the 10th of May, for 17 days, at $\Sigma (t_n-t_0)=160°C$, on the inferior part of the leaves, isolated, in some little holes, dug with the help of the genital casing.

After 5-7 days, the larva appears, and grow between the 8th of April and the 31st of May, for 12-24 days, at $\Sigma (t_n-t_0)=249°C$, an activity which is influenced by temperature. At its complete growth, the larva abandons the leaf by a small orifice, passes on a leaf next to it and builds a satinized cocoon in a paralelipipedal shape (hammock), hanging by silk threads which turn into pupa.

The pupa level happens between the 25th of April and the 11th of June and lasts for 16 days at $\Sigma (t_n-t_0)=545°C$. After 11-21 days butterflies appear and they will give birth to the 2nd generation (G_2), and these to the 3rd generation (G_3).

In our country there were mentioned 3 generations and a partial 4th one, in the orchards located at heights of 200-300 meters in the north of Arges county; 3 complete generations at heights of 350-550 meters and 1-2 generations at heights of 750-860 meters. In Vrancea county there were 2 generations in 1979 and 3 generations in 1980 (Hertug Maria).

On the basis of the data obtained, following researches upon the ecology of the species Lyonetia clerckella L., regarding the biological reserve in the autumns of 2001 and 2002, from the apple plantations in Piatra-Neamt was of 15,40% in 2001 and of 18,26% in 2002.

In Bicaz, the biological reserve was of 8,60% in 2001 and of 10,80% in 2002. Also, in Roman, the biological reserve was of 20,03% in 2001 and of 20,90% in 2002.

The greatest biological reserve was signaled in Roman, followed by Piatra-Neamt and by Bicaz. All these results recommend preventing measures of the attack of this species, so it could be kept under the economic pest level (PED), which is of 30 mines/100 leaves (table 1).

Table 1

The biological reserve of the species *Lyonetia clerckella L.* in various cities from Neamt county in 2001-2002

City	Biological reserve						Mean %	
	G_1		G_2		G_3			
	2001	2002	2001	2002	2001	2002	2001	2002
Piatra-Neamt	14,5	19,8	16,3	16,6	15,4	18,4	15,40	18,26
Bicaz	10,2	15,7	8,4	8,5	7,2	8,2	8,60	10,80
Roman	18,0	22,7	21,5	19,4	18,2	20,6	20,03	20,90

As for the attack frequence (F%) observed in the same city from Neamt county in 2001 and 2002, they got to the following data (table 2).

Table 2

The frequence of the attack (F%) of the species *Lyonetia clerckella L.* in different cities from Neamt county in 2001 and 2002

City	Biological reserve						Mean %	
	G_1		G_2		G_3			
	2001	2002	2001	2002	2001	2002	2001	2002
Piatra-Neamt	10,2	15,0	12,4	11,5	11,2	12,6	11,26	13,03
Bicaz	6,4	11,2	6,2	5,3	6,1	5,3	6,23	7,57
Roman	12,4	17,4	14,2	13,1	14,1	14,6	13,56	15,03

The frequence of the attack in Piatra-Neamt city was of 11,26% in 2001 and of 13,03% in 2002. In Bicaz it was of 6,23 in 2001 and of 7,57% in 2002. Also, in Roman it was of 13,56% in 2001 and of 15,03% in 2002.

We observe that from this point of view, the greatest frequence of the attack was in Roman, followed by Piatra-Neamt and then Bicaz, and this is because of the various ecological growth in these cities.

As for the attack way, the galleries (mines) are very easy to be seen on the superior part of the leaves, where they present in very prolonged, thin and sinous shapes, and from here comes the name of "sinuous mining". In the mines we can see, by transparency, the larva defecations, but their tracks are missing in the end part of the mines which is occupied by the larva. When the larva intercepts a rib, a part of the foliar limb gets dry, the sap circulation being interrupted. One leaf may shelter more larvas, sometimes up to 30, but they could count, on one leaf, in case of some strong attacks, up to 10-15 galleries.

The integrated control was realized in the ecological conditions of Piatra-Neamt city, by:

- **Agrophytotechnical measures**: collecting and burning of the fallen leaves, followed by autumn or spring ploughing; trunk or compact branch scraping from the exfoliated bark, moss, lichens, where the larvas turn into pupa.
- **Biological measures**: by using the parasite species: Hymenoptera from Braconidae family or of Chalciodidae sub-family (Eulophidae), as well as the using of the specific sexual ferromone Ataclerk, of the lighting or even elementary sources.
- **Chemical measures:** in 2001, in Piatra-Neamt they experimented the products Decis 2,5 CE (0,025%); Lannete 90WS (0,05%); Rimon 10 EC (0,06%); Dimilin 25 WP (0,03%) and Carbetox 50 EC (0,03%), (table 3).

Table 3

The efficiency of some chemical products in the control of the species *Stigmella mallela* Stt. in Piatra-Neamt in 2001

Product	Substance	Concentration %	Frequence %			Production t/ha
			G_1	G_2	G_3	
Decis 2,5 EC	deltrametrin	0,025	15,9	18,8	19,1	25,4
Lannate 90 WS	metomil	0,05	15,5	17,4	18,7	25,8
Rimon 10 EC	novalorun	0,06	16,5	18,2	18,8	25,3
Dimilin 25 WP	diflubenzuron	0,03	17,2	18,8	20,5	25,5
Carbetox 50 EC	malation	0,30	18,7	18,2	19,6	25,6
Untreated witness						22,0

CONCLUSIONS

The species *Lyonetia clerckella*, in the conditions of Neamt county has 3 year generations (G_1 April-May; G_2 in June-July, G_3 in August-September) and hibernates in the adult phase under the exfoliated bark of the trunks or the more compact branches, moss, lichens, or in the fallen leaves, in the superficial layer of the soil.

In the integrated control they obtained very good results by applying agroitotechnical, biological (parasites) measures, traps with specific sexual ferromones (Atraclerc), lighting and alimentary traps.

They also experimented the products: Decis 2,5 Ec (0,025%); Lannete 90 WS (0,05%); Rimon 10 EC (0,06%); Dimilin 25 WP (0,03%); Carbetox 50 EC (0,30%), which were very efficient, leading to productions between 25,3 tones/hectare-25,8 tones/hectare, as opposed to the witness which obtained a production of 22,0% tones/hectare, with benefits between 3,3 and 3,8 tones/hectare.

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INFLUENCE OF CLIMATE FACTORS ON BIOLOGY AND BEHAVIOR OF VINE MOTH (*LOBESIA BOTRANA-DEN & SCHIFF)* IN THE "*DEALU BUJORULUI*" VINEYARDS

INFLUENȚA UNOR FACTORI CLIMATICI ASUPRA BIOLOGIEI ŞI COMPORTAMENTULUI MOLIEI STRUGURILOR (*LOBESIA BOTRANA* – DEN ET SCHIFF) ÎN PLANTAȚIILE VITICOLE DIN PODGORIA' DEALU BUJORULUI

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Abstract. *The paper presents the researches carried out at the Research and development center for viticulture and wine –Bujoru (SCDVV) in the period 1996-2006 highlighting some climate factors (temperature, precipitation) which influence the biology and virulent behavior (F,I and G A%) of the vine moth - Lobesia botrana-Den &Schiff) in the South Moldavian vineyards*

In the past few years it has been noted a change in the average climate factors (high temperatures, more frequent droughts , aridity) which may induce changers of both biology and behavior of the major vine pest in the vineyard Dealu Bujorului (vine moth or eudemis) with consequences difficult to evaluate for the integrity of the entire vine eco-system.

Rezumat. *Lucrarea prezintă analiza cercetărilor efectuate la Staţiunea de Cercetare şi Dezvoltare pentru Viticultură şi Vinificaţie Bujoru în perioada 1996-2006 a unor factori climatici (temperatură, precipitaţii etc.) care influenţează biologia şi comportamentul virulent (F, I şi G.A %) al moliei strugurilor (Lobesia botrana – Den et Schiff) asupra plantaţiilor viticole din zona de sud a Moldovei.*

In ultimii ani s-a observat o abatere a factorilor climatici de la media multianuală (temperaturi ridicate, accentuarea şi frecvenţa secetelor, aridizarea) care pot provoca schimbări de ordin biologic şi comportamental asupra principalului dăunător al viţei de vie din podgoria Dealu Bujorului (molia strugurilor sau eudemisul) si cu consecinte greu de evaluat pentru integritatea ecosistemului viticol.

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MATERIALS AND METHODS

At SCDVV-Bujoru in the period 1996-2006 observations have been made on representatives sorts (Merlot, Babească neagră, Fetească neagră, Fetească albă, Muscat de Hamburg) from the vineyards as regards the evolution of the most harmful pest (the vine moth or *Lobesia botrana)* basically due to the global warming and greenhouse effect.

Three traps/ha with synthetic sexual attractive substance , type ATRABOT, were installed in the vineyards in order to establish the population level, the best moment to apply the treatment methods and last but not least , to warn and monitor the whole process.

The captured butterflies were recorded weekly and based on the results obtained the moth flight curve was plotted; this indicates the initiation of flight, the peak flight activity, generation succession, etc. Further these data were used to determine the moments of ponta deposits, larva emerging, warning and implementation of treatment .The capsules of artificial pheromones and the adhesive valves were changed after 1, 5 months' operation.

The air average temperature (over the last 10 years) is 12, 8 °C as compared to the normal one of 11,8 °C, reaching a vegetation max. value of 27,2 °C in July and a min. value of -1,7°C in January . The low temperatures persist until late in April and sometimes even until May. In the period concerned it is noticeable a slight increase in the air temperature (Table *no. 1*). Also in the months of June and July, periods of max vegetation, temperatures frequently exceeding 32-35°C are reported, while the absolute max value reaches 40 /°C 05.07. 2000.

The sum of monthly precipitations (the average of the last 10 years) is 487,1mm as compared with 438,6 mm which is the normal value (Table no. 2). The precipitation distribution is varied, consisting of long periods of rain deficit (drought), limited by short periods of heavy rains. Most part of the precipitations in the vegetation period looks like torrents out of which 60-80% is turned into a good account. In summer, max precipitations are recorded in June (145,0mm) and the min. ones in October (4,4mm); it should be noticed the small number of snowy days and the average persistence time of the snow layer. The underground water is to be found at large depths therefore it does not influence the soil water regime.

RESULTS AND DISCUSSIONS

In the period being studies, the behavior and attack potential of the vine moth were largely influenced by the climate conditions (temperature, humidity , etc) On the surfaces of those vineyards which had been abandoned or machined without observing the technology requirements (agro-technical works, sprout growth , other specific operations, etc) and the scheme of fighting diseases and pest led to and encouraged conditions for the moth proliferation thus creating true infection focus which endanger the integrity of the neighboring plantations.

Watching closely the evolution of the vine moth at SCDVV Bujoru in the above mentioned period, a slight tendency of biological and behavioral alterations become obvious; thus in 1996,199 , 2000, 2001 and 2002, Table no 3, apart form the max flight curve recorded in August, a fourth flight emerged about one month later, having a smaller amplitude and failing to accumulate all the energy necessary for giving birth to a new generation (pseudo-generation GIV) This accounts for the presence of larva until the end September.

Therefore, in 1996 beside the three flight peaks recorded in May, July and August, there was a fourth flight peak recorded on 07. 09. 1996 (Table no 3).

The climate conditions in the hygro-thermal interval July-August 1998, when the butterfly flights were recorded, were largely unfavorable to the development of pest inhibiting its biological growth (mating, egg lying, and larva emerging).

Analyzing the data of year 2000 (Table 3) it is found that the max flight curve value at GI was recorded on 08 05 2000 and the G II a max value on 20.06. 2000, the flight continuing until the mid July, and GIII reached the max value on 15.08. 2000 and a fourth flight max value on 11 09 2000.

Table 1

The annual average temperature of the air for the period 1996 - 2006

Nr. Crt.	Year	Month average (^{0}C)												Sum	Average
		XI	XII	I	II	III	IV	V	VI	VII	VIII	IX	X		
1	1995-1996	2.0	2.6	-4.0	-3.2	-0.1	10.8	21.0	23.6	24.2	22.1	14.3	11.7	124.5	10.4
2	1996-1997	9.4	-0.2	-3.0	1.5	5.6	8.3	19.7	22.0	22.9	20.9	14.9	9.1	131.5	10.9
3	1997-1998	6.0	0.1	0.9	4.3	4.1	15.0	17.4	23.2	24.5	23.3	17.1	11.7	147.6	12.3
4	1998-1999	2.4	4.5	-0.1	1.6	6.5	13.0	16.8	23.7	25.3	22.8	18.5	11.4	137.4	11.4
5	1999-2000	4.4	2.2	-3.5	2.0	5.8	14.5	19.1	22.5	25.1	24.7	16.5	11.6	144.9	12.0
6	2000-2001	9.5	3.4	1.1	2.5	8.3	12.4	17.9	20.2	27.0	25.6	17.9	13.2	159.3	13.2
7	2001-2002	4.2	-4.2	-1.0	6.2	8.5	11.4	19.9	23.2	26.3	22.8	17.7	11.1	146.1	12.1
8	2002-2003	8.0	-5.4	-1.7	-4.5	2.5	10.5	22.3	24.5	24.4	25.2	16.9	10.5	133.2	11.1
9	2003-2004	6.9	0.7	-2.7	1.5	7.4	12.6	17.5	22.0	23.8	22.8	17.9	13.0	141.9	11.8
10	2004-2005	6.4	2.9	1.3	-0.9	4.6	11.7	18.2	20.4	24.3	23.3	19.1	11.7	143.3	11.9
11	2005-2006	5.4	2.4	-4.3	-0.5	4.6	12.3	17.5	22.3	24.2	23.5	18.1	12.5	138.0	11.5
12	Average	6.4	0.9	-1.7	1.0	5.2	12.0	18.8	24.7	27.2	25.8	17.2	11.6	149.1	12.8
13	Normal periode	4.8	1.7	-1.7	2.0	5.5	11.2	18.6	22.6	24.9	23.2	17.2	11.6	141.6	11.8

Table no. 2

The multianual average of precipitations for the period 1996-2006

Nr. Crt.	Year	Precipitation´s (mm)												Sum
		XI	XII	I	II	III	IV	V	VI	VII	VIII	IX	X	
1	1995-1996	36.4	20.7	21.6	18.4	18.5	67.4	14.2	29.1	27.1	111.2	113.1	22.4	500.1
2	1996-1997	43.4	33.6	8.2	7.0	29.1	63.7	29.9	95.1	145.0	109.7	25.1	64.5	654.3
3	1997-1998	42.7	70.7	21.6	6.9	32.0	16.2	48.1	25.4	35.6	85.0	31.4	91.3	506.9
4	1998-1999	46.7	9.5	14.3	12.1	26.0	43.0	29.0	93.4	37.0	72.3	30.2	29.7	443.2
5	1999-2000	16.9	45.3	14.5	24.5	8.6	33.4	16.7	18.1	48.7	16.2	56.5	4.6	304
6	2000-2001	51.0	7.9	5.6	12.3	24.8	45.8	30.5	103.5	10.0	0.8	84.2	7.9	384.3
7	2001-2002	11.6	23.3	2.2	5.5	43.8	43.7	4.8	42.9	98.7	122.0	10.4	61.4	407.3
8	2002-2003	67.7	5.7	30.2	20.3	8.1	18.3	28.3	7.4	38.1	13.2	47.8	38.4	323.5
9	2003-2004	5.4	8.3	24.2	16.0	22.0	43.6	41.1	32.1	99.5	44.3	59.5	4.4	400.4
10	2004-2005	38.0	18.9	14.7	31.4	25.7	18.4	59.2	74.8	98.6	26.5	14.5	17.1	437.8
11	2005-2006	66.9	26.4	27.1	10.8	40.6	54.2	40.0	77.7	31.8	92.1	34.4	7.7	509.7
	Average	-	-	-	-	-	-	-	-	-	-	-	-	487.1
	Normal	34.9	28.6	13.8	13.6	24.2	40.4	31.2	53.2	54.9	61.7	47.2	34.9	438.6

Table no. 3

Cycle development of the eudemis (Lobesia botrana – Den & Schiff) in the Dealu Bujorului vineyards for the period 1996 - 2006

Nr. Crt.	Year	Maxim curve of flight G I	Maxim curve of flight G II	Maxim curve of flight G III	Maxim curve of flight pseudogeneration	Degree of attack % Bujoru	Observation
1	1995-1996	16.05.1996	24.06.1996	16.08.1996	07.09.1996	6-10 %	Degree fleeby
2	1996-1997	22.05.1997	16.07.1997	29.08.1997	-	5-15 %	Degree fleeby
3	1997-1998	28.05.1998	05.07.1998	25.08.1998	-	7-10 %	Degree fleeby
4	1998-1999	16.05.1999	29.06.1999	20.08.1999	18.09.1999	5-10 %	Degree fleeby
5	1999-2000	08.05.2000	20.06.2000	15.08.2000	11.09.2000	6-10 %	Degree fleeby
6	2000-2001	09.05.2001	29.06.2001	22.08.2001	05.09.2001	6-12 %	Degree fleeby
7	2001-2002	20.05.2002	27.07.2002	09.08.2002	02.09.2002	10-12 %	Degree medium
8	2002-2003	14.05.2003	18.06.2002	21.08.2003	-	2-6 %	Degree fleeby
9	2003-2004	12.05.2004	05.07.2004	17.08.2004	-	1-6 %	Degree fleeby
10	2004-2005	06.05.2005	07.07.2005	28.08.2005	-	10-20%	Degree medium
11	2005-2006	19.05.2006	03.07.2006	11.08.2006	-	2-53 %	Degree extremely

The flight dynamics of the male butterflies reached a high frequency, the mean number of captures/traps/week reaching PED. In spite of this, because of the high temperatures that more often than not exceed the threshold of Q=26,7 °C (thermal optimum for laying and incubation) many eggs got dehydrated (U% below 50%), failed and the finally the attack was poor.

A particular observation was made with the flight of butterflies GIII where the adult frequency was much higher than the larva density with GII Hence in the warm periods many pupas extend their period of summer diapauses_until August-September.

Regards GIII a max. flight value was reached on 21.08.2003 at an active temperature of 1.366°C and 60 ,5 captures/trap/week .

In 2003 the high temperatures and the atmospheric drought resulted in egg dehydration and larva mortality.

To efficiently fight the vine moth it is recommended the implementation of phyto-sanitary treatments along with mass capturing of the male butterflies by means of synthetic sexual pheromone traps. (type ATRABOT), a number of 7-9 traps/ha for each generation changing the pheromone capsules and the adhesive valves every 1,5 months .By means of the above mentioned traps the level of population, the moment of applying the treatments, the plotting of the moth flight curves could be determined.

CONCLUSIONS

The climate conditions in the period 1999-2003 were generally unfavorable to the vine moth and visibly affected the attacks of all generations

The biological alterations caused by the climate are obvious with GII and GIII when there is a larva superimposition at the stage of pupa and adult while temperatures higher than 32 C causes death of young larva and egg dehydration

Under hydro stress conditions, high temperatures, the evolution of the vine moth is very affected thus decreasing the frequency, intensity and degree of attack

In the very hot periods, many pupa extend their summer diapauses period until the months of August-September (year 2000).

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COMMON AGRICULTURAL POLICY FOR A BETTER ENVIRONMNETAL PROTECTION POLICY

POLITICA AGRICOLĂ COMUNITARĂ PENTRU O MAI BUNĂ POLITICĂ DE PROTECȚIE A MEDIULUI ÎNCONJURATOR

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Abstract. *Environmental protection programs as a part of Common Agricultural Policy could include measures regarding premiums guarantees for farmers who came into this program as volunteers and on contact basis. The instruments that are normaly applied to agriculture are legislative regulations regarding agricultural farmlands exploitation modality. Farmers participation to local programs are paid in order to compensate any losses of income. Agrienvironmental measures could be designed at regional or local level as it could be adapted to any particular agricultural system form and for different environmental conditions, which are widely diversified within EU. This fact make agrienvironmental measures an precisely instrument for reaching the proposed aims.*

Rezumat. *Programele de protectie a mediului inconjurator din cadrul Politici Agricole Comunitare pot include masuri ce prevad garantarea unor premii pentru fermierii ce sunt inclusi in acest program prin voluntariat si pe baza unor contracte. Instrumentele ce sunt in mod normal aplicate agriculturii sunt reglementari legislative referitoare la modalitatea de exploatare a terenurilor agricole. Participarea fermierilor la programele zonale sunt platite in vederea compensarii pierderilor din venitul acestora. Masurile agro-protectioniste pot fi proiectate la nivel national, regional sau local in asa fel incat sa poata fi adaptate formele particulare de sistem agricol si la diferite conditii de mediu inconjurator, care de altfel variaza in limite largi in cadrul UE. Acest fapt face ca masurile agro-protectioniste sa reprezinte un instrument precis pentru atingerea scopurilor propuse.*

INTRODUCTION

Agri-environment measures are designed to encourage farmers to protect and enhance the environment. It provides payments to farmers in return for a service – that of carrying out agri-environmental commitments that involve more than the application of usual good farming practice. Farmers sign a contract with the administration and they are paid for the additional cost of implementing such commitments and for any losses of income. Agrienvironment payments are co-financed by the EU and the Member States with a contribution from the Community budget. Agri-environment measures may be designed at national, regional or local level so that they can be adapted to the particular farming systems and environmental conditions.

Agri-environmental measures have two main objectives:

- reducing environmental risks associated with modern farming;
- preserving nature and cultivated landscapes.

MATERIAL AND METHOD

Agri-environment measures are established by Member States or Regions and submitted to the Commission for approval as part of their Rural Development Plans.

Member States and Regions set up agri-environment programs and these are often subdivided into different schemes. Each program or scheme is made up of a series of measures. Programs/schemes come in many different forms.

Measures related to productive land management (European Commission, 2005):

- Input reduction: This category of measures includes reductions in fertilizers and plant protection products;
- Organic farming;
- Extensification of livestock;
- Conversion of arable land to grassland and rotation measures;
- Undersowing and cover crops, strips (e.g. farmed buffer strips) and preventing erosion and fire;
- Actions in areas of special biodiversity/nature interest;
- Genetic diversity;
- Maintenance of existing sustainable and extensive systems;
- Farmed landscape;
- Water use reduction measures.

Measures related to non-productive land management:

- Set aside, measures include both large areas of set-aside and small ones such as uncultivated field strips (European Commission, 2005);
- Upkeep of abandoned farm land and woodland;
- Maintenance of the countryside and landscape features;
- Public access.

RESULTS AND DISCUSSIONS

During the last years of pre-aderation process, Romania and other candidate countries implemented a serial of agrienvironmental measures. It would be important to point out those measures and their effect on Romanian agricultural structures.

One of the major instrument is the Nitrate Directive. The Objective of Nitrate Directive (91/676/EEC) aims to reduce agricultural induced pollution of waters with nitrates. The main emphasis is placed on the management of manure and other fertilizers. Members States are required to identify the polluted waters and the waters that could be polluted by inappropriate activities.

In Romania due to Government Decision no. 964/2000 that is implementing the policy of water protection against pollution caused by nitrates that are generated by agricultural activities and in the same time is implementing the Nitrate Directive in Romania. A negative aspect is that there is not a good agricultural practice and the Ministry of Waters and Environmental Protection and the Research Institute for Social – Science and Agro chemistry is preparing one (Network of Independent Agricultural Experts in the CEE Candidate Countries, 2004).

For agricultural soils/soil testing monitoring there are necessary facilities and structures in all member states but there are significant differences between practical applications. In Romania the Institute of Agrochemical and Soil Studies are collecting dates through their pedological and agro chemical research centres, monitors soil quality about detailed analysis of the degradation areas.

A large part of the EU space is designated as protected areas. Over 12800 different sites are identified, organized through IUCN management category or Natura 2000 sites. Within those Hungary, Slovenia, Bulgaria and Romania have a low share of 8,8 to 4,6 % on national area as protected areas. In Romania between 1998 and 2003, the amount of land classified as protected rose between 1,23 mill. Ha to 1,29 mill. Ha (Network of Independent Agricultural Experts in the CEE Candidate Countries, 2004).

The area that is designated to organic farming is increasing rapidly after 1990. This action is promoted through many programs that are designated to encourage organic farming. In Romania legislation sustains the certification methodology and the organisms that are certifying the organic agriculture (Ministry of Agriculture and Rural Development, 2003). This structure is incipiently developed, but the main problem is the lack of demand for organic products, the demand of consumers for traditional products, lack of experience regarding the inspection and certification procedures.

SAPARD program stipulate measures for environmental protection but with limited financial resources. This measures were pointed out to specific pilot areas with a clear objective to develop practical experience of agrienvironmetal implementation at both administrative and farm level.

In Romania according to the national plan for agriculture and rural development, agri-environmental measures are strongly required and is going to be launched (European Commission, 2005).

The main areas need consideration in future rural development policy were encapsulated in the conclusions of the Second European Conference on Rural Development, held in Salzburg in November 2003. The 1st pillar concentrates on providing a basic income support to farmers, who are free to produce in response to market demand, while the 2nd pillar supports agriculture as a provider of public goods in its environmental and rural functions, and rural areas in their development.

Payments under Axis 2 aim to ensure the delivery of environmental services by agri-environment measures in rural areas, and preserve land management (including in areas with physical and natural handicaps). These activities contribute to sustainable rural development by encouraging the main actors (farmers, foresters) to keep up land management so as to preserve and enhance the natural space and landscape. This means protecting and improving environmental resources, and ensuring the sustainable use of forestry resources. Such measures also help prevent the abandonment of agricultural land use through payments to compensate natural handicaps or handicaps resulting from environmental restrictions.

Co financed activities should clearly target EU priorities such as combating climate change, enhancing biodiversity and water quality, or reducing the risk or impact of natural disasters. A general condition for the measures under Axis 2 (at beneficiary level) will be respect of the relevant EU and national mandatory requirements (cross-compliance). If these requirements are not complied with, payments in some measures of Axis 2 can be reduced or cancelled.

CONCLUSIONS

During the initial years of transitions, agrievironmental issue receive less attention as the production intensification does. But the situation already changed and is going to change considerably.

Agriculture plays a determining role in all EU countries, the initiatives aimed to protect the environment. Key legislation includes: measures undertaken to protect surface water and groundwater; directives obliging Member States to protect the habitats of their wild bird populations and habitats. The Commission presented several important environmental initiatives in including the strategy on the sustainable use of pesticides', a thematic strategy for soil protection', and the strategy on the sustainable use of natural resources', all those respecting the objectives of the EU's rural development strategy.

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ORGANIC FARMING, GOOD MARKET PERSPECTIVES AND A CLEANER ENVIRONMENT

AGRICULTURA ECOLOGICĂ, PERSPECTIVE BUNE PE PIAȚĂ ȘI UN MEDIU ÎNCONJURĂTOR MAI CURAT

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Abstract. *Organic agriculture represent a sustainable alternative to the traditional agriculture system. This system is enforced by the consumers demand for food that is produced in a natural way, excluding as much as is possible synthetic substances, and in the same time minimizing the negative impact upon the environment. The demand of such products on the market is continuously increasing, and in the same time the surfaces dedicated to this type of culture. In Romania organic agriculture is advantage by the fact that are not consumed fertilizers in large quantities comparative with European Union countries.*

Rezumat. *Agricultura ecologica reprezinta o alternativa sustenabila la sistemul traditional de agricultura. Acest sistem pune mai mult accentul pe cerintele consumatorilor pentru alimente produse in mod natural, excluzand pe cat posibil folosirea de substante sintetice, si in acelasi timp minimizand pe cat posibil efectele negative asupra mediului inconjurator. Cererea de astfel de produse pe piata comunitara este in continua crestere, la fel si suprafetele alocate pentru aceste culturi. Practicarea agriculturii ecologice in Romania este favorizata de existenta sistemelor agricole traditionale, majoritar extensive. Acest lucru se datoreaza in mare masura si faptului ca in Romania se consuma mai putine ingrasaminte chimice decat in tarile Uniunii Europene.*

INTRODUCTION

Organic farming can be defined as a method of production which places the highest emphasis on environmental protection and, with regard to livestock production, animal welfare considerations. It avoids or largely reduces the use of synthetic chemical inputs such as fertilizers, pesticides, additives and medicinal products (1c. European Communities, 2005*)*. Instead, organic production methods utilize agronomic techniques founded on the rational use of natural resources, such as crop rotations and intercropping with nitrogenfixing legumes, animal manures, green composts, biological pest control, pest- and disease-resistant plant varieties and other techniques.

What is removed from the earth must be returned to ensure that farming is sustainable. The methods used in organic agriculture are focused on maintaining soil fertility and minimizing the environmental impact. The aim is to produce food of high nutritional quality while minimizing all forms of pollution.

European co-operation on organic food and farming was kick-started at a

conference in Denmark in May 2001 which resulted in the Copenhagen Declaration. Ministers from governments all around Europe signed this declaration where all agreed on:

• Organic farming is a highly relevant tool which contains the potential to participate in solving simultaneously a range of problems relating to food production, environment, animal welfare, and rural development;
• Organic food and farming is becoming a major opportunity for food producers in Europe, due to a higher consumer interest in certified organic products;
• Organic food and farming should be further developed in Europe.

MATERIAL AND METHOD

In the EU, organic food and farming is defined under Council Regulation (EEC) 2092/91. It differentiates between organic and non-organic production on the grounds that the former is aimed at a specific market; and has its own standards, controls, certification procedures and labeling schemes. Regulation 2092/91 (Council Regulation ,1991) sets out rules governing organic farming practices, food processing, inspection requirements and food labeling. Each Member State is obliged to ensure that the organic food it produces meets baseline standards set within the EU for on-farm production, post-harvest handling, food processing and packaging. The Regulation requires producers of organic food, for instance, to be registered with an approved certification body.

Regulation 2092/91 clarifying that products labeled as containing GMOs cannot also be labeled as organic. Furthermore, the general labeling thresholds agreed for the unintentional presence of GMOs in food products should be used for organic products

RESULTS AND DISCUSSIONS

A stable and growing market for organic food in Europe is essential for the continuous development of the organic farming sector. Organic production has steadily grown over the past 20 years.

Nevertheless, the growth of the organic food market has generally been rapid and steady over the past decade, with predictions that could further increase by an annual rate of up to 20% in the coming years.

In terms of CAP objectives, organic farming can be used to improve land management in environmentally sensitive areas, to help implemention rural development schemes, to promote animal welfare, and to enhance water quality. Member States will be allowed to top-up EU aid to support producers of organic fruit and vegetables (1a European Commission, 2005*)*.

A number of benefits arising from organic farming have been demonstrated in research programs. These are predominantly environmental benefits due to reductions in pesticide usage.

Scientific evidence to demonstrate the nutritional and health-promoting benefits of organic farming, however, has been inconclusive and often controversial.

Experiments with apples, for example, have shown organic apples to be firmer and sweeter than equivalent apples from non-organic orchards, with marked differences in biochemistry (e.g. phenolic compounds). Other recent studies have reported higher levels of beneficial vitamins and minerals in organic food (e.g. tomatoes and milk), but overall the available data has been variable and inconsistent. Consequently, no scientific consensus has emerged on whether organic food tastes better or is nutritionally better than food produced through other methods (1a European Commission, 2005*)*.

The European Action Plan for Organic Food and Farming, whose objective is to facilitate the ongoing development of organic farming in the EU with 21 concrete policy measures to be implemented and were generally focused on (Commission of the European Communities, 2004):

• an information-led development of the organic food market,

• public support for organic farming more effective

• improving and reinforcing of the Community's organic farming standards, import and inspection requirements

In 2001 the EU certified organic farms account as average size at 3.2%, an seven Member States being above this number, i.e. Austria 11,3%, Finland6.7%, Denmark 6.5%, Sweden 6.2%, United Kingdom 4% and Germany 3.7% (Network of Independent Agricultural Experts in the CEE Candidate Countries, 2004 *)*.

Comparative with these numbers the latest states that acceded to EU structures are just slightly beginners in this area.

In Romania the administrative structures for organic farming are in place but in lack of manpower. The inspection system needs further strengthening, especially at regional level where supervision by the authorities is insufficient (1b European Commission, 2005*)*.

Table 1

Organic farms structures

Countries	Year of data	Number of farms	Average size (ha)	Total cultivated land		Trend in organic area
				(ha)	(% of total ag. area)	
Estonia	2002	167	53	8710	3,2	increasing
Latvia	2002	300	50	17000	0.7	increasing
Lithuania	2002	393	21	8780	0,3	increasing
Poland	2001	669	19	12862	0.1	increasing
Czech Republic	202	473	328	15544	3.6	Slow increasing
Slovakia	2002	84	595	49999	2.0	Very slight growing
Hungary	2002	538	101	54497	0.9	increasing
Slovenia	2002	412	13	5521	1.1	
Romania	2001	610	47	28800	0.2	increasing
Bulgaria	2000	50	3	175	0.003	increasing
Total		3696	92	341488	0.6	

Source: European Commission, 2005, Romania Comprehensive Monitoring Report

The area that is designated to organic farming is increasing rapidly after 1990. This action is promoted through many programs, for a period of time even through SAPARD action, that are designated to encourage organic farming. The regalement Romania legislation is covering the certification methodology and the organisms that are certifying the organic agriculture (Ministry of Agriculture and Rural Development, 2003).

CONCLUSIONS

Organic farming systems help on fulfilling the consumer demand for quality food, are recognized as one way to achieve sustainable development, and may help in delivering a range of other benefits. In terms of EU policy, for example, organic agriculture can or could deliver:

- High-quality food;
- Potentially healthier food;
- Reduced pollution from pesticides and artificial fertilizers;
- Gains in terms of sustainable agriculture;
- Improvements in water quality;
- Increased biodiversity;
- Efficient resource management;
- Reduced dependence on (non-renewable) fossil fuel imports;
- A multifunctional and diversified agriculture to aid rural development;
- Fewer problems arising from food overproduction;
- Improvements in animal health and welfare;
- Possible benefits in terms of alleviating the impacts of climate change.

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ASPECTS REGARDING THE TYPES OF PERMANENT MEADOWS FROM THE HILLY AREA OF SLĂNIC-BUZĂU HYDROGRAPHIC BASIN

ASPECTE PRIVIND TIPURILE DE PAJIŞTI PERMANENTE DIN ZONA COLINARĂ A BAZINULUI HIDROGRAFIC SLĂNIC-BUZĂU

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Abstract. *In the present paper are presented the main types of permanent meadows from the hilly area of Slănic-Buzău superior hydrographic basin.*

After the researches carried out in the 2001-2004 period, 5 types/subtypes of permanent meadows (Festuca valesiaca Schleich. - Brachypodium pinnatum (L.) Beauv., Festuca rupicola Heuff. - Agrostis capillaris L., Festuca valesiaca Schleich., Agrostis capillaris L. - Poa pratensis L., Botriochloa ischaemum (L.) Keng.) were identified. The largest area is occupied by Festuca valesiaca Schleich. - Brachypodium pinnatum (L.) Beauv. meadows.

The production of the meadows was between 925 kg/ha DM at Botriochloa ischaemum (L.) Keng. meadows and 2248 kg./ha DM at Festuca rupicola Heuff. - Agrostis capillaris L.meadows.

Rezumat. *În această lucrare sunt prezentate principalele tipuri/subtipuri de pajişti permanente di zona colinară a bazinului hidrografic superior Slănic – Buzău.*

În urma cercetărilor desfăşurate în perioada 2001-2004 au fost identificate 5 tipuri/subtipuri de pajişti permanente (Festuca valesiaca Schleich. - Brachypodium pinnatum (L.) Beauv., Festuca rupicola Heuff. - Agrostis capillaris L., Festuca valesiaca Schleich., Agrostis capillaris L. - Poa pratensis L., Botriochloa ischaemum (L.) Keng.). Cea mai mare suprafaţă este ocupată de pajiştile de Festuca valesiaca Schleich. - Brachypodium pinnatum (L.) Beauv.

Producţia pajiştilor identificate a fost cuprinsă între 925 kg/ha S.U. la pajiştile de Botriochloa ischaemum (L.) Keng. şi 2248 kg/ha S.U. la pajiştile de Festuca rupicola Heuff. - Agrostis capillaris L.

The establishment of the criteria's regarding the possibilities of identifying the types of meadows represents the result of the researches made by famous personalities in folders field of activity **(Anghel Gh., Ţucra I., Cardaşol V., Bărbulescu C., Motcă Gh. etc.)**, and starting from this base was elaborated a general paperwork for our country in 1987 under the supervision of the Institute for Research and Production of Meadows Crop Măgurele-Braşov.

In according with the elaborated methodology the criteria's for identifying the types of meadows are as fallow: floral composition, stationary conditions, meadow productivity, the applied technologic measures, vegetation evolution function of these measures.

Floral composition in considered to be the basic criteria for identifying the meadow type and the stationary conditions could influence the floral composition, productivity or the application of some technologic measures, an important role being reserved to relief and soil.

Meadows productivity, which expresses the production capacity, resulted from the quality and yield of the evaluated fodder, and technologic measures could be criteria for differentiating the types of meadows.

Under the influence of applied technologies could be produced modifications at the level of meadows stations so a modification of meadow floral composition will took place resulting another type of meadow, named derivate type, if we renounce at the requested technologic measures the derivate types of meadows come back at the basic type of the area.

MATERIAL AND METHOD

The researches were carried out in 2001-2004 period, in the hilly area of Slănic-Buzău hydrographic basin.

Vegetation mapping was made with the help of geo-botanic maps at a 1:10000 scale using the method of route mapping. Before starting the proper mapping information's regarding ecologic, technologic, economic and organizational conditions were collected from the researched area. The plats with permanent meadows were divided in sections, by drawing some perpendicular axis on the base line of relief, at distances of 2oo m.

Determination of the floral composition was made by geo-botanic method choosing test surfaces of 100 m² and inside them floral determinations was made.

The visual appreciation consists in presenting the percentage of the covered surface by the projection of the airy parts of all the plants from herbal carpet (general cover) and the main groups of plants (specific cover). At making the floral determination the species were from the following groups, in order of their domination: dominant species (with 30-40% cover rate), followed by co-dominant species (with a cover rate of 15-25%) and indicators species with a week participation into the vegetal Carpet. At establishment of the numbers of determinations from each meadow type we took in consideration the uniformity of floral composition and the numbers of species that make the vegetation.

RESULTS AND DISCUTIONS

Slănic-Buzău hydrographic basin has a total surface of 43820 ha from which around 25027 are in the hilly area and 11278 ha in the mountain area.

In the hilly area the permanent meadows occupies 6267 ha (figure 1) from which 1280 are placed on lands with a slope till10%, 2430 ha with a slope of 10-15%, 2152 ha with 15-25% slope and 405 ha on lands with a slope bigger than 25%. From the area covered with permanent meadows over 4250 ha are affected by different forms of erosion.

Till 1968 were known in the are around 220 vascular plants species and at the present time the number of known species reached 999.

Due to the geographic position the researched territory is under a strong influence of the East and South-East continental climate, if at this factor we join local conditions, different types of rocks and soils, strong erosion, the presence of salty soils, mountain approach, man's influence etc., we could found the explanation for the great and various numbers of species from the sub-Carpathian area of Slănic-basin.

At mapping the floral composition the founded species were placed in groups, in the order of their domination: dominant species, co-dominant ones and indicators species.

For vegetation study by geo-botanic method was limited the contour of phytocenoses tracking the uniformity of floral composition in according with ecologic factors, and after that the test areas were choose and inside of them floral determinations were made. To study the vegetation we started from identification of type/subtype of meadow by establishing the dominant specie and the eco-pedologic factors.

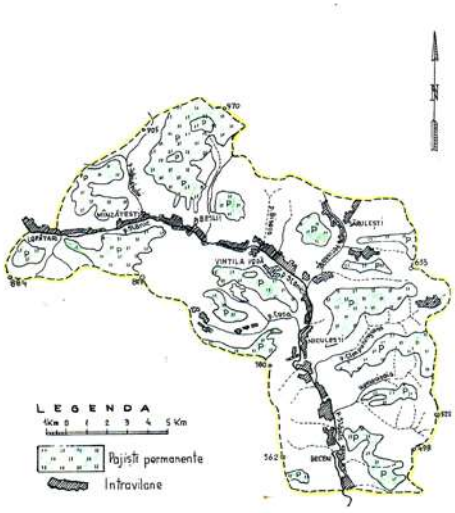

Figure 1 - Permanent meadows from the hilly area of Slănic-Buzău basin

In according with the eco-pedologic conditions 5 types/subtypes of representative permanent meadows were identified (table 1), with different floral composition, fact which influence the initial agronomical and fodder value.

The greatest areas with meadows are covered by *Festuca valesiaca* Schleich. - *Brachypodium pinnatum* (L.) Beauv. meadows (2254 ha), followed by *Festuca rupicola* Heuff. - *Agrostis capillaris* L. meadows (2120 ha), *Festuca valesiaca* Schleich. meadows (735 ha), *Agrostis capillaris* L. - *Poa pratensis* L. (461 ha).meadows and *Botriochloa ischaemum* (L.) Keng meadows (316 ha).

Also were identified other meadows types/subtypes such as the meadows from salty soils (122 ha), *Carex humilis* Leyss. meadows (126 ha) and *Stipa stenophylla* Wahlbg. meadows (133 ha).

The production of permanent meadows was determinate by mown in hay field regime, and the obtained results were function of soil fertility, meadows' type, land exposure and slope, exploitation way etc.; the average production was between925kg/ha dry matter at *Botriochloa ischaemum* L meadows to 2248 kg/ha dry matter at *Festuca rupicola* Heuff. - *Agrostis capillaris* L. meadows.

From table1 could be observed that *Festuca valesiaca* Schleich meadows are spreaded at altitudes of 300-500 m, on lands with 15-25 % slope with a south, south-west exposure, were are favorable conditions for this association (un-favorable humidity regime, compacted soil, strong evapo-transpiration). The dominant specie is associated with *Agropyron pectiniform* and *Koeleria cristata*. Legumes participate in a low proportion and are represented by species, in their great majority, with lower nutritive value. From the legumes more valuable we could mention, *Medicago falcata, Medicago lupulina, Onobrychis viciifolia*. In the herbal composition could be found plants from other botanic from families which have pour demands for water such as: *Artemisia austriaca, Galium verum, Plantago lanceolata, Stipa capillata, Astragalus austriacus* etc.

Table 1

Types/subtypes of representative meadows from hilly region

Meadows' type	Dominant and Co-dominant species	Alt [m]	Slope [%]	Occupied surface [ha]	Yield [kg/ha] DM
Festuca valesiaca	*Festuca valesiaca, Festuca rupicola,Agropyron pectiniforme, Koeleria cristata, Stipa capillata, Botriochloa ischaemum, Medicago falcata*	300-500	15-25	735	1755
Botryochloa ischaemum	*Botryochloa ischaemum, Festuca valesiaca, Stipa capillata, Stipa lessingiana, Poa bulbosa, Medicago falcata, Lotus corniculatus*	300-550	20-25 and over 25	316	925
Festuca valesiaca - Brachypodium pinnatum	*Festuca valesiaca, Brachypodium pinnatum, Poa pratensis, Dactylis glomerata, Agropyron repens, Lolium perenne, Medicago falcata, Lotus corniculatus*	500-750	5-20	2254	2230
Festuca rupicola – Agrostis capillaris	*Festuca rupicola, Agrostis capillaris, Festuca pratensis, Festuca pseudovina, Lolium perenne, Poa pratensis, Cynosurus cristatus, Trifolium repens, Trifolium pratense, Lotus corniculatus, Medicago lupulina*	300-750	1-20	2120	2248
Agrostis capillaris- Poa pratensis	*Agrostis capillaris, Poa pratensis, Alopecurus pratensis, Lolium perenne, Dactylis glomerata, Festuca pratensis, Trifolium repens, Trifolium pratense, Lotus corniculatus*	650-820	5-10	461	2160

From economic point of view, these meadows could be considered as moderate meadows with yields of 1125-2450 kg/ha DM and with a limited production potential, determinated by a weak reaction to fertilizers of the dominant specie and by its resistance to floral composition modification. Generally are closed meadows which could by a method of soil erosion damping if are rationally used.

Meadows of *Botriochloa ischaemum* (L.) Keng. are spreaded at the some altitudes, on lands with slope of 20-25% and over 25%, on the sunny side of the mountain, on pasturelands used with a great number of animals from early spring to late in autumn. Surface erosion, weak of water, decrease of the soluble nutritive substances reserve, decrease the number of plants' species from this association. The characteristic species are: *Botriochloa ischaemum, Festuca valesiaca, Stipa capillata, Poa bulbosa, Medicago minima, Plantago lanceolata, Euphorbia nicaeeusis* şi *Achillea setacea.*

The economic value of these meadows is very small with small yields of 780-1210 kg/ha DM from the surfaces studied by us. The fodder has a weak quality, the dominant specie being less consummated by animals and only in the first stages of vegetation.

The meadows of *Festuca valesiaca* Schleich. - *Brachypodium pinnatum* (L.) Beauv. are representative for the steppe and silvo-steppe areas, but due to the fact that the specie that gives that type of meadows have a great ecologic plasticity, the spreading area is much larger.

Generally are found on slope lands, frequent erodated, with low fertility.

The dominant specie, *Festuca valesiaca*, is accompanied by *Brachypodium pinnatum* specie with is co-dominant, and we also found the following species: *Dactylis glomerata, Festuca pratensis, Poa pratensis, Botriochloa ischaemum, Koeleria cristata, Cynodon dactylon, Bromus inermis, Poa angustifolia, Agrostis capillaris* etc. from gramineous; *Medicago falcata, Trifolium pratense, Onobrychis viciifolia, Coronilla varia, Trifolium montanum, Lotus corniculatus, Medicago lupulina, Medicago sativa, Vicia cracca, Astragalus onobrychis, Vicia angustifolia* etc. from legumes and *Filipendula hexapetala, Tragopogon pratensis, Teucrium chamaedrys, Hieracium pilosella, Plantago media, Prunella vulgaris, Plantago lanceolata, Leucanthemum vulgare, Inula hirta, Erigeron annuus, Centaurea scabiosa, Achillea millefolium, Knautia arvensis, Salvia verticillata, Galium glaucum, Nepeta cataria, Campanula glomerata, Eryngium campestre, Rhinanthus rumelicus, Taraxacum serotinum* etc. from others group. This floral composition is due to the areas' ecologic conditions, and also due to the fact that this type of meadow occupies a large area from the total surface of the meadows from the hilly region. The economic value of these meadows is medium with yields between 1275 and 2650 kg/ha DM.

Festuca rupicola Heuff. - *Agrostis capillaris* L. meadows can be found on plateaus and sides with small slopes from hilly area, with a 300-750 m altitudes due to soil compaction realized by sheep's pasturing. The dominant specie *Festuca rupicola* and co-dominant one *Agrostis capillaris* are together with: *Festuca pseudovina*, *Festuca pratensis, Lolium perenne, Cynosurus cristatus, Trifolium repens, Medicago lupulina,*

Lotus corniculatus etc. The most frequent species from others group are: *Potentilla argentea, Echium vulgare, Thymus pannonicus, Scabiosa ochroleuca, Leucanthemum vulgare* etc.

Those meadows have productions of over 1600 kg/ha dry matter on pastures and almost twice time bigger at hay lands, with a good reaction at fertilization and maintenance.

Agrostis capilaris L. – *Poa pratensis* L. meadows are spreaded on terraces, small slope sides and various soils, the dominant specie being adapted to less favourable nutrition conditions, at 700-900 m altitudes. From the point of view of floral composition are characterized by the domination of *Agrostis capillaris* specie which covers over 25%. This specie is accompanied by valuable gramineous such as: *Poa pratensis, Festuca pratensis, Phleum pratense, Dactylis glomerata, Trisetum flavescens, Festuca rubra* etc. The legumes are represented by many species and cover 10-15%. More frequent are species: *Trifolium pratense, Trifolium hybridum, Trifolium campestre, Lotus corniculatus* etc.

The species from other botanic families are, also, very numerous, many meadows being weeded with: *Leucanthemum vulgare, Cichorium intybus, Achillea millefolium, Knautia arvensis, Scabiosa ochroleuca, Prunella vulgaris, Plantago lanceolata* etc. (tab. 5.1). From the economic point of view these meadows could be considered good meadows with yields of over 1800 kg/ha DM.

CONCLUSIONS

1. In the research period were identify representative 5 types/subtypes of permanent meadows with various floral composition (*Festuca valesiaca* Schleich. - *Brachypodium pinnatum* (L.) Beauv., *Festuca rupicola* Heuff. - *Agrostis capillaris* L., *Festuca valesiaca* Schleich., *Agrostis capillaris* L. - *Poa pratensis* L., *Botriochloa ischaemum* (L.) Keng.)

2. *Festuca valesiaca* - *Brachypodium pinnatum* (L.) meadows and the ones of *Festuca rupicola* Heuff. - *Agrostis capillaris* L. are the most spread ones in the hilly area of Slănic de Buzău superior basin, and occupy the largest areas

3. The yield of permanent meadows was between 925kg/ha dry matter at *Botriochloa ischaemum* L. meadows and 2248 kg/ha dry matter at *Festuca rupicola* Heuff. - *Agrostis capillaris* L. meadows.

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ENVIRONMENTAL DISTURBANCE CAUSED BY THE EXTRACTION OF LEAD-ZINC ORE

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Abstract. *The extraction of lead-zinc ore in Bulgaria is done using the indoor method – using horizontal mine corridors. A lot of geological materials from the upper horizons pile up during the excavation process in the form of over burdens. The over-burdens take up large territories and are built from sterile geological materials, which can be characterized with low natural fertility. In most cases they are toxic for the direct growth of agricultural plants. This leads to their precise mapping, characterizing and application of system of events for the reclamation of the components of the environment. Samples from the over burdens, built during the underground extraction of lead-zinc ore have been investigated. The brown forest soil in the areas affected by the extracting activities has also been examined. The samples have been analyzed using a number of criteria. A number of disturbances in the components of the environment have been found as a result from the obtained data and the outdoors observations. They can be summarized with the following:*

1. Serious disturbance in the landscape in the area of the mine.

2.The over burdens built during the extraction of lead-zinc ore are an active pollutant of the components of the environment, because of the ongoing erosion and the toxic substances that are contained in the geological materials, combined with the low pH in the area.

3. The investigated areas are hard to reach and their reclamation and recultivation should be done using optimal methods. As a result the technogenous effects on the environment will be overcome and the landscape of the environment in the area will be improved.

INTRODUCTION

The extraction of lead-zinc ore on the territory of *Republic of Bulgaria* is performed with the covered method – through cutting of horizontal mine works. During the process of the surface mining activities on the external heaps there are piled geological materials from the above-ore horizons. The heaps take big territories and in practice are built by sterile species that are characterized with low natural productivity and in the most of cases are toxic for the direct planting of agricultural and forest cultures. This imposes their details carting, characterization, and application of a system from events for restoration of the environmental components.

MATERIAL AND METHODS

For the establishing of the physical and the chemical characteristics of the heaps are taken assays on depth of 0-20 cm. Each assay is composition from 9 single assays taken evenly in the center and on the perimeter of a circle with diameter of 5 m. Additionally are taken assays from the natural (non-broken) area in the region of each of the rest. The collected assays are analyzed in relation with their indicators: distribution of mechanical fractions; carbonate content; general types of nitrogen and phosphor; medium reaction (pH in water); total quantity of micro-elements; content of radioactive isotopes.

RESULTS AND DISCUSSIONS

The explored heaps, built during the extraction of lead-zinc ore are located unevenly on the territory of mine *"Sage"*. They are characterised with different size and form in dependence with the area relief, the depth of position of the ore layer, and the scheme for digging and transport of the ore. The lack of shoring activities and the lack of management of surface and slope waters has lead to the active erosion processes and additional pollution of the environmental components (waters and soils) that are expressed in the following:

The mineral content of the geological materials building the heaps raise big decreasing of the pH values of the surface waters that is a reason for the souring of soil horizons and the destruction and exporting of organic substance and the feeding elements from the soil. Additionally, there are polluted the underground waters.

The relief character, the climate conditions, the anthropogenic influences, and the lack of favourable conditions for development of grass and forest plants lead to activation of the erosion processes. In result, the heap slopes are highly furrowed and there have to be performed their secondary forming, banking and terracing.

There additionally are polluted the neighbouring to the heaps territories under the influence of wind and water erosion. In part of the reviewed objects, the pollution is with radioactive elements that is extremely dangerous and will lead to lasting and difficulty for restoration disturbances in the environmental components.

The received analytical data show that the materials building the heaps are composition of over-ore layers and are not suitable for growing of cultural plants without preliminary bettering and melioration. In the mechanic fractions, there prevail the single-part components. There is determined a minor participation of physical clay (parts < 0,01 mm) and ill (parts < 0,001 mm). It is prevailing the participation of sandy fractions and skeletons. This quantitative distribution of the mechanical elements appears determinative for the unfavourable physical and water-physical properties of the explored objects.

The content of general carbonate is changed within the range of 0,11% and 0,38% that determines the explored materials as non-stocked with feeding elements for growing of cultural plants – the general and adopted forms of nitrogen, phosphor and potassium are low represented.

The medium acidity as one of the most important factors specifying the character of the volatilisation and soil-forming processes shows the following tendencies. The explored assays from the object territory are characterized with wide ranging of pH values (*table 1*). The medium reaction (pH in water) is changing from 2,69 to 6,86, i.e. from acid to neutral. With highest meanings of the indicator are characterized the natural soils, located near the explored heaps.In this case the indicator values vary from 6.08 (natural terrain situated in proximity to heaps at horizon 668) to 4.98 (natural terrain in proximity to heaps at crosscut 13 – horizon 500). Materials from dislocation areas are characterized by significantly lower values with respect to the pH environment – within the 2,69 to 5,65 range. Some of the heap samples show indicator levels within the 6,42 – 6,85 range. The low pH values are clearly the result of the composition of the geological substrata, which has surfaced over the course of the mining and geological works. The low indicator values create

conditions for formation the oxide and hydroxide forms of heavy metals, which end up in the soil layer and are toxic to plants.

Table 1

Content of radioactive isotopes in the samples from overburdens situated on the territory of Sage Mine

№ of sampe	pH H_2O	Uranium -238 $Bq.kg^{-1}$	Radium -226 $Bq.kg^{-1}$	Thorium -232 $Bq.kg^{-1}$	Potassium-40 $Bq.kg^{-1}$	Cesium-137 $Bq.kg^{-1}$	Lead-210 $Bq.kg^{-1}$
Horizon 500 - overburden of crosscut 13							
1	3,63	87	231	92	1270	<3,5	173
2	6,86	213	223	80	1201	14	154
3	4,19	<79	266	53	1150	49	151
4	4,11	90	150	100	1130	100	135
5	4,98	95	110	100	550	825	220
Horizon 608 - overburden of crosscut 4							
6	2,69	<100	260	120	1464	<3,5	160
7	3,33	268	392	111	1438	<3,5	196
8	5,65	130	150	165	1535	3	195
9	6,05	393	316	140	1544	11	157
Overburden of horizon 663							
10	2,98	236	330	137	1928	<3	236
11	3,22	157	336	104	1508	35	348
12	6,08	117	125	98	1205	138	136
Horizon 550 – overburden of gallery 16							
13	3,01	115	135	92	1105	30	175
14	2,88	108	120	106	950	32	160
15	3,18	75	140	112	1215	300	109
16	5,01	120	150	132	1400	28	114
Horizon 515 - overburden of crosscut 8							
17	3,71	171	283	112	1712	243	283
18	3,43	157	326	104	1566	196	294
19	3,72	120	255	175	1615	7	241
20	5,07	96	103	110	610	10	70
Horizon 550 - overburden of crosscut 15							
21	3,42	105	136	96	1403	19	176
22	4,00	104	130	63	1355	39	135
23	5,19	80	92	95	1120	9	94
Overburden at SKMI							
24	6,42	275	195	185	1455	<0,5	215
25	2,63	105	220	180	1670	<0,5	189
26	2,58	<101	279	156	1733	<3,5	201
27	6,38	175	180	200	1660	<0,5	173
28	5,45	<90	131	76	1171	76	145
29	5,36	215	215	200	1483	<0,5	181
30	5,26	409	435	171	1715	<3,5	290

Upon determination of the microelements in the tested samples the regulatory basis for zinc, copper, nickel, lead, cadmium, and manganese contents at the respective environment pH (*Regulation № 3 relating to norms for the permissible contents of harmful substances in the soil*). Tests showed heightened levels of lead contents, which may be easily explained bearing in mind the geological conditions composition. The lead level determined classify materials tested as medium to heavily contaminated, which to a

large extent is predetermined by the low pH environment levels. With respect to other elements testes the territory appears uncontaminated.

The analytical results of the radio isotopic analysis carried out are represented in Table № 1. In determination of the levels of contamination with radioactive isotopes the regulatory basis detailed in the Instruction for Determination of the Type and Degree of Contamination of Farming Lands as per Locations and the regime of Use of Such lands – *Bulletin № 27 of the Ministry of Agriculture, 1999 and Radically norms for Radiation Protection, Agency for Nuclear Regulation, 2004*, has been used as well as samples from natural soil outside the limits of the area tested.

The analytical results obtained give rise to grouping the heaps tested in two groups: Group One – heaps, which have not been contaminated with radioactive isotopes – heap of crosscut 13 – horizon 500; heap of crosscut 8 – horizon 515 and heap of crosscut 15 – horizon-550. Group Two – heaps, which show heightened results as regards the contents of radio active isotopes – heap of crosscut 4 – horizon 608; heap of crosscut 663 and heap at SKMI. Samples have been detected within the second group of heaps, which are characterized by a considerably heightened uranium contents – samples №№ 7, 8, 10, 11, 12, 24, 25, 27, 28 and 30. In determination of the degree of uranium contamination the indicator levels of natural soils in the area of each individual heap, likewise relatively high, have also been taken into consideration. The rest of the isotopes tested are within the permissible limits with the exception of certain heightening of the levels of radium as compared to background indicators (natural terrain), account for investigation in the future.

CONCLUSIONS AND RECOMMENDATIONS

On the basis of the tests carried out the following major conclusions may be drawn:

Serious harm to landscape has been detected in the area of mining and geological works. The lead and zinc ore heaps in the area of "*Sage"* Mines are an active contaminator of the environment components on account of the erosion processes under way and the toxic substances such as lead and radioactive elements contained in the geologic materials, coupled with the low pH level in the environment.

The sites tested are difficult to access and their rehabilitation and re-cultivation should be carried out by activities of maximum efficiency, coupled with minimal use of mechanization and capital investment. In re-cultivating the heaps measures taken need to allow to a maximum degree the restoration of soil fertility in the site area and landscape improvement. The low bio-productive possibilities of the materials of which the heaps are composed should also be taken account.

Special attention need to be paid to the fortification of each individual heap bearing in mind the specific features of the terrain, the geological materials composition, the climate and soil features, the availability of approaches to the site .

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THE INFLUENCE OF PLOUGH TYPE, SOIL TYPE AND WORKING SPEED UPON SOILS' LOOSENING DEGREE AT SUPERFICIAL PLOUGHINGS

INFLUENȚA TIPULUI DE PLUG, A TIPULUI DE SOL ŞI A VITEZEI DE LUCRU ASUPRA GRADULUI DE AFÂNARE A SOLULUI LA EFECTUAREA ARĂTURILOR SUPERFICIALE

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Abstract. *The aim of the paper is to present what influence have the plough type, soil type and working speed soils' loosening degree when superficial ploughings are realized.*

Rezumat. *Scopul prezentei lucrări este de a stabili cum influențează tipul de plug, tipul de sol şi viteza de lucru asupra gradului de afânare a solului la realizarea arăturilor superficiale.*

Research and experiments have been performed in order to establish the most adequate types of ploughs, which will work in aggregate with the 65 HP tractors.

The main research criteria consist, on the one hand, of reaching the imposed agri-technical demands, and on the other hand, of presenting a rational usage of the energetic base.

Making the soil basic work, as ploughing is known, is in a direct connection with the soil type, which from the point of view of agriculture mechanization has various characteristics, both due to different mechanic features and variations of humidity and soil compaction.

The present paper, aims at establishing the optimal type of plough, in order to be able to perform some superficial ploughings, which will work in aggregate with the 65 HP tractor, within the current framework provided by the conditions of tending and use.

The research took into consideration the study of the types of ploughs used for superficial ploughings (at a depth of 15-20 cm) in aggregate with 65 HP tractors.

MATERIAL AND METHOD

To establish the optimal type of plough used for superficial ploughings were studied the following two ploughing units:

- aggregate formed by U-650M tractor and PP-3-30 plough;
- aggregate formed by U-650M tractor and PRP-3 reversible plough.

The experiences took place on three types of soil with different specific resistance at ploughing:

- easy soil with specific resistance at ploughing (K_0) smaller than 0.35 daN/cm^2 (tipic chernozem) (variant A);
- medium soil with specific resistance at ploughing (K_0) between 0.35-0.55 daN/cm^2 (chernozem cambic mezocalcaric) (variant B);
- hard soil with specific resistance at ploughing (K_0) between 0.56-0.75 daN/cm^2 (luvosoil) (variant C).

Working speeds, which were used during experiments, were from the IIH gear and had the following values: 4.48 km/h; 4.61 km/h; 4.85 km/h and 4.98 km/h.

The working depth was 20 cm and working width was 90 cm.

RESULTS AND DISCUSSIONS

For the four working speeds of the ploughing units, the experimental values of soil loosening degree function of soil type, plough type, and working speed of the unit are presented in tables 1, 2, 3 and 4. The ploughing work, realized by the two ploughing units was done at the depth of 20 cm on all the types of soil.

As it can be observed from the dates presented in table and figure 1 it is obvious the fact that the soil loosening degree, for all three types of soil, is superior to the imposed values

Table 1

Soil loosening degree function of soil type (V_1 = 4.48 km/h)

Working conditions	U-650M+PP-3-30			U-650M+PRP-3		
	Variant A	Variant B	Variant C	Variant A	Variant B	Variant C
Working speed (km/h)	4.48	4.48	4.48	4.48	4.48	4.48
Loosening degree (%)	22.2	26.4	35.8	23.7	27.9	36.9

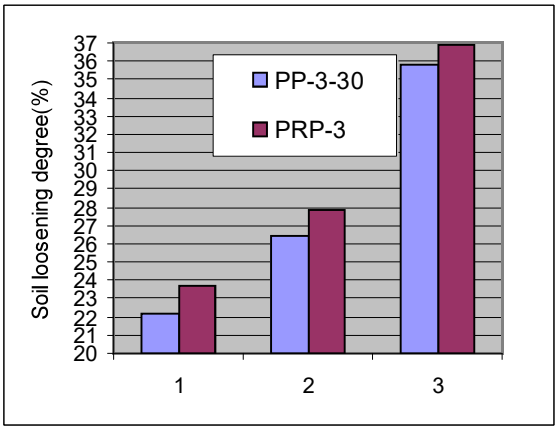

Figure 1. Variation of the soil loosening degree function of soil type (V_1 = 4.48 km/h)

For an easy soil the soil loosening degree obtained after a ploughing work made with PRP-3 reversible plough was with 1.5% better than in the case when PP-3-30 was used, having a value of 23.7% in comparison with the value of 22.2% obtained when the soil was worked with PP-3-30 plough.

On a medium soil the loosening degree recorded an improvement of 1.5% when for ploughing was used the reversible plough PRP-3 (27.9%) in comparison with the value of 26.4% obtained when the soil basic work was made with PP-3-30 plough.

The difference between the values obtained for hard soil was of 1.1% in the favour of PRP-3 plough (36.9%) while at ploughing with PP-3-30 the value of this index was 35.8%.

As can be observed from the dates presented in table and figure 2 it is obvious the fact that the values of soil loosening degree, on all three types of soil, are in according with the imposed values also when the working speed is changed from 4.48 km/h to 4.61 km/h.

The soil loosening degree of an easy soil realized after the ploughing was made with reversible plough PRP-3 was with 1.2% better then in the case of making ploughing with PP-3-30 plough, having a value of 23.0% in comparison with the value of 21.8% obtained when soil was worked with PP-3-30 plough.

On a medium soil the loosening degree recorded an improvement of about 1.1% when the ploughing work was made with PRP-3 reversible plough (27.0%) face to the value of 25.9% obtained at ploughing with PP-3-30 plough.

For hard soil the difference between the obtained values was the greatest, of 1.9% in the fovour of makig the soil basic work with a reversible plough PRP-3 (35.6%), while at making the ploughing with PP-3-30 plough the value of this index was 33.7%.

It is obvious the fact that on hard soils the ploughings must be realized with a reversible plough.

Table 2

Soil loosening degree function of soil type (V_2 = 4.61 km/h)

Working conditions	U-650M+PP-3-30			U-650M+PRP-3		
	Variant A	Variant B	Variant C	Variant A	Variant B	Variant C
Working speed (km/h)	4.61	4.61	4.61	4.61	4.61	4.61
Loosening degree (%)	21.8	25.9	33.7	23.0	27.0	35.6

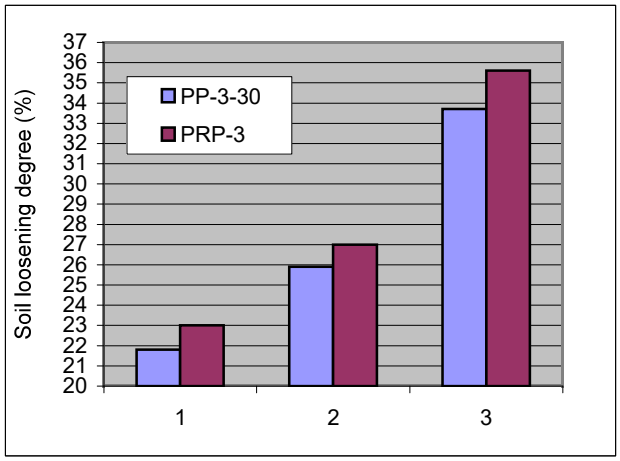

Figure 2 - Variation of the soil loosening degree function of soil type (V_2 = 4.61 km/h)

Tracking the way in which the increase of the working speed (V_3=4,85 km/h) influence the quality of ploughing realized by the two ploughing units on different types of soil it is showed the fact that at easy soils the loosening degree had the greatest values, and this ones decreasing after the soil texture but being in according with the imposed values. In table and figure 3 are presented the values of soil loosening degree on all the three types of soil.

So for an easy soil the loosening degree obtained after ploughing with PRP-3 was with 1.5% better than in the case of ploughing with PP-3-30 plough, having a value of 22.4% in comparison with the value of 20.9% obtained at ploughing with PP-3-30 plough.

Table 3

Soil loosening degree function of soil type (V_3 = 4.85 km/h)

Working conditions	U-650M+PP-3-30			U-650M+PRP-3		
	Variant A	Variant B	Variant C	Variant A	Variant B	Variant C
Working speed (km/h)	4.85	4.85	4.85	4.85	4.85	4.85
Loosening degree (%)	20.9	25.7	32.5	22.4	26.2	33.4

At the variant B (medium soil) the loosening degree recorded an improvement of 0.5% at making the ploughing work with reversible plough PRP-3 (26.2%) face to the value of 25,7% obtained when the ploughing was made with the normal plough PP-3-30.

For hard soil (variant C) the difference between the obtained values was of 0.9% for working the soil with the reversible plough PRP-3, while at working the soil with PP-3-30 plough the recorded value was of 32.5%.

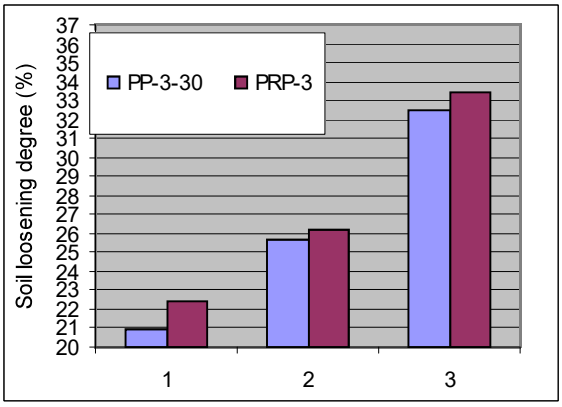

Figure 3 - Variation of the soil loosening degree function of soil type (V_3 = 4.85 km/h)

In table and figure 4 are presented the dates regarding the last working speed V_4=4.98 km/h and it is put in light the fact that the values of soil loosening degree, for all the three types of soil, are in according with the imposed values.

Table 4

Soil loosening degree function of soil type (V_4 = 4.98 km/h)

Working conditions	U-650M+PP-3-30			U-650M+PRP-3		
	Variant A	Variant B	Variant C	Variant A	Variant B	Variant C
Working speed (km/h)	4.98	4.98	4.98	4.98	4.98	4.98
Loosening degree (%)	20.5	25.3	31.6	21.1	25.9	32.1

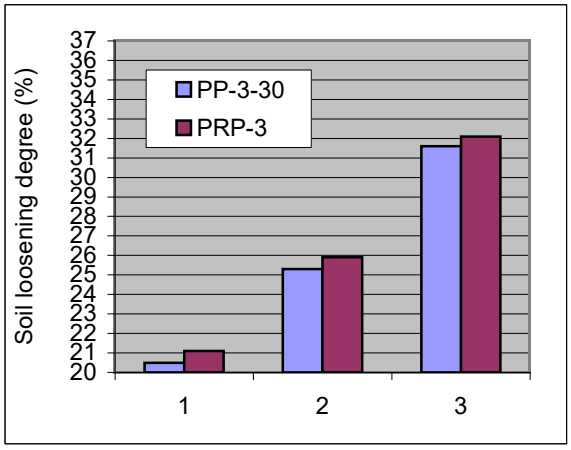

Figure 4 - Variation of the soil loosening degree function of soil type (V_4 = 4.98 km/h)

So for an easy soil the loosening degree obtained after making the ploughing work with PRP-3 plough was with 0.6% better than in the case of ploughing with PP-3-30 plough, having a value of 21.1% in comparison with the value of 20.5% obtained at ploughing with PP-3-30 plough.

Soil loosening degree in the case of a medium soil recorded also an improvement of 0.6% at ploughing with PRP-3 reversible plough (25.9%), while at ploughing with PP-3-30 plough the obtained value was of 25,3%.

The difference between the values obtained was, for hard soil, of 0.55 when ploughing was made with a reversible plough PRP-3 (32.1%) while at ploughing with a normal plough PP-3-30 the recorded value was of 31.6%.

CONCLUSIONS

From the above presented dates, result as a conclusion that in the conditions in which the working speed of the ploughing unit increase, the soil loosening degree will have more and more smaller values, the lowest values being obtained at the greatest working speeds and the higher values being recorded at the lowest working speeds.

The soil loosening degree will have the higher values when the ploughinh work is made by the aggregate formed by U-650M tractor and PRP-3 reversible plough, and the lowest values will be recorded when ploughing work is realized by the aggregate formed by U-650M tractor and PP-3-30 plough, for the same type of soil.

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THE INFLUENCE OF PLOUGH TYPE, SOIL TYPE AND WORKING SPEED UPON FUEL CONSUMPTION AT SUPERFICIAL PLOUGHINGS

INFLUENȚA TIPULUI DE PLUG, A TIPULUI DE SOL ŞI A VITEZEI DE LUCRU ASUPRA CONSUMULUI DE COMBUSTIBIL LA EFECTUAREA ARĂTURILOR SUPERFICIALE

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Abstract. *The aim of the paper is to present what influence have the plough type, soil type and working speed upon fuel consumption per hectare when superficial ploughings are realized.*

Rezumat. *Scopul prezentei lucrări este de a stabili cum influenţează tipul de plug, tipul de sol şi viteza de lucru asupra consumului de combustibil pe unitatea de suprafaţă la realizarea arăturilor superficiale.*

Thanks to the importance of ploughings, during the production processes in agriculture, an important and special role is awarded to scientific research, which must establish the most adequate ploughing units, from the technical and economic point of view.

Ploughs, which are very used units, and that have been thoroughly studied and known at an international as well as national level, have reached a high technical stage, and the essential changes of the nowadays functional and constructive principles are very hard to carry out.

So, each element that can provide even a small improvement in the quality of ploughings, an increase in labour productivity, a decrease in the direct expenditures per hectare or in fuel and metal consumption, have an important role upon the increase of economic efficiency.

MATERIAL AND METHOD

To establish the optimal type of plough used for superficial ploughings were studied the following two ploughing units:

- aggregate formed by U-650M tractor and PP-3-30 plough;
- aggregate formed by U-650M tractor and PRP-3 reversible plough.

The experiences took place on three types of soil with different specific resistance at ploughing:

- easy soil with specific resistance at ploughing (K_0) smaller than 0.35 daN/cm^2 (tipic chernozem) (variant A);
- medium soil with specific resistance at ploughing (K_0) between 0.35-0.55 daN/cm^2 (chernozem cambic mezocalcaric) (variant B);
- hard soil with specific resistance at ploughing (K_0) between 0.56-0.75 daN/cm^2 (luvosoil) (variant C).

Working speeds, which were used during experiments, were from the IIH gear and had the following values: 4.48 km/h; 4.61 km/h; 4.85 km/h and 4.98 km/h.

The working depth was 20 cm and working width was 90 cm.

RESULTS AND DISCUSSIONS

The values of the fuel consumption per hectare, in the conditions of making the ploughings on that three types of soils (easy, medium and hard), with the two ploughing units (U-650M+PP-3-30 and U650-M+PRP-3) and with the working speeds V_1=4.48 km/h, V_2=4.61 km/h, V_3=4.88 km/h and V_4=4.98 km/h, are presented in tables 1, 2, 3 and 4.

Table 1

Fuel consumption per hectare function of soil type (V_1 = 4.48 km/h)

Working conditions	U-650M+PP-3-30			U-650M+PRP-3		
	Variant A	Variant B	Variant C	Variant A	Variant B	Variant C
Working speed (km/h)	4.48	4.48	4.48	4.48	4.48	4.48
Working depth (cm)	20	20	20	20	20	20
Fuel consumption (l/ha)	26.94	27.51	28.12	26.35	27.15	27.89

In table and figure 1 are presented the dates regarding the usage of V_1=4.48 km/h speed and we observe that together with the increase of the specific resistance at ploughing the fuel consumption per hectare also increase

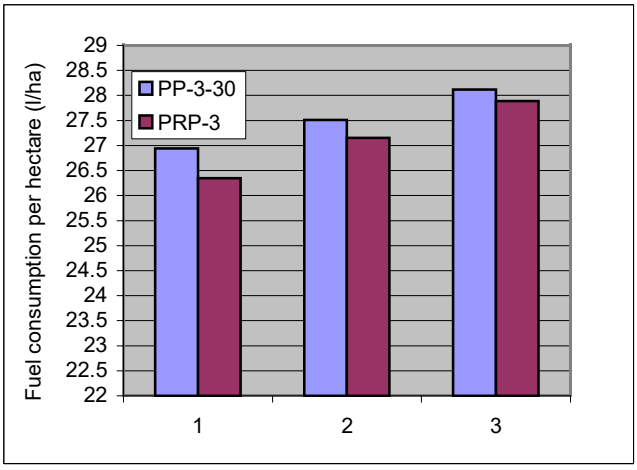

Figure 1 - Variation of fuel consumption per hectare function of soil type (V_1 = 4.48 km/h)

The bigger values were recorded when ploughing was made on hard soils (28.12 l/ha for PP-3-30 plough respectively 27.89 l/ha for PRP-3 reversible

plough) and the lowest values were obtained at ploughing on easy soils (26.94 l/ha at usage of PP-3-30 plough respectively 26.35 l/ha at usage of PRP-3 plough).

It is observed that the PRP-3 reversible plough generate a fuel consumption per hectare lower than PP-3-30 plough on all soil types were the superficial ploughing was made. So the recorded differences were of 0.59 l/ha on easy soils, 0.36 l/ha on medium soils and 0.23 l/ha on hard soils.

In table and figure 2 are presented the results regarding the fuel consumption per hectare when the working speed was V_2=4.61 km/h.

Table 2

Fuel consumption per hectare function of soil type (V_2 = 4.61 km/h)

Working conditions	U-650M+PP-3-30			U-650M+PRP-3		
	Variant A	Variant B	Variant C	Variant A	Variant B	Variant C
Working speed (km/h)	4.61	4.61	4.61	4.61	4.61	4.61
Working depth (cm)	20	20	20	20	20	20
Fuel consumption (l/ha)	25.69	26.22	27.05	25.12	25.90	27.74

Superior values were recorded when ploughing was made on hard soils (27.05 l/ha for PP-3-30 plough respectively 27.74 l/ha for PRP-3 reversible plough), and the lowest values were obtained when ploughing was done on easy soils (25.69 l/ha at PP-3-30 plough usage respectively 25.90 l/ha at PRP-3 plough usage).

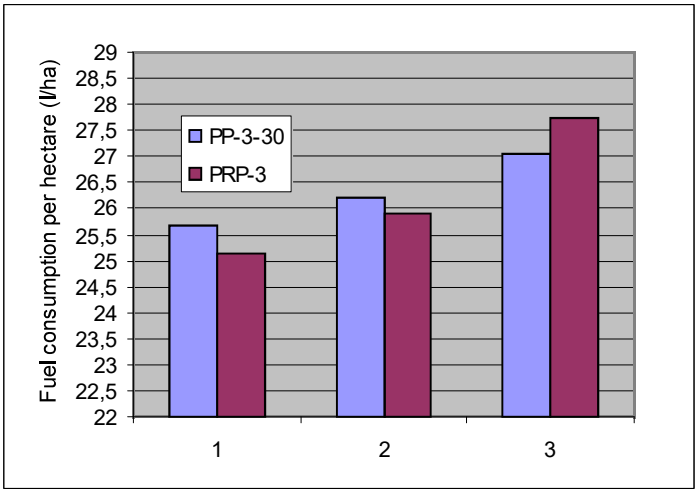

Figure 2 - Variation of fuel consumption per hectare function of soil type (V_2 = 4.61 km/h)

Also in this case it is observed the fact that the PRP-3 reversible plough generates fuel consumption per hectare lower that PP-3-30 ploughs on all of soil types where the ploughing was done. So the recorded differences where of 0.57 l/ha on easy soils, of 0.32 l/ha on medium soils and of 0.69 l/ha on hard soils.

Table 3

Fuel consumption per hectare function of soil type (V_3 = 4.88 km/h)

Working conditions	U-650M+PP-3-30			U-650M+PRP-3		
	Variant A	Variant B	Variant C	Variant A	Variant B	Variant C
Working speed (km/h)	4.88	4.88	4.88	4.88	4.88	4.88
Working depth (cm)	20	20	20	20	20	20
Fuel consumption (l/ha)	23.99	24.30	24.94	23.31	23.89	24.33

If we analyze the dates presented in table and figure 3 when it is used as speed working the speed of V_3=4.88 km/h we remark the fact that together with the increasing of the specific ploughing resistance, the fuel consumption per hectare is also increasing.

The maximum values were recorded when ploughing is done on hard soils (24.94 l/ha for PP-3-30 plough respectively 24.33 l/ha for PRP-3 reversible plough) and the minimum values were reached when the ploughing was made on easy soils (23.89 l/ha al PP-3-30 plough usage respectively 23.31 l/ha at PRP-3 reversible plough usage).

Once again we mentioned the fact that PRP-3 reversible plough generates smaller fuel consumption per hectare face to PP-3-30 plough on all soil types on which the ploughing was made.

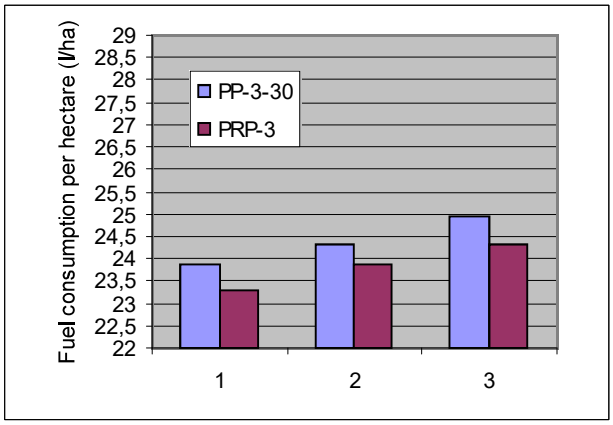

Figure 3 - Variation of fuel consumption per hectare function of soil type (V_3 = 4.88 km/h)

So the recorded differences were of 0.58 l/ha on easy soils, of 0,59 l/ha on medium soils and of 0.61 l/ha on hard soils.

In table and figure 4 are presented the dates regarding the fuel consumption per hectare when was used as working speed the speed of V_4=4.98 km/h.

Table 4

Fuel consumption per hectare function of soil type (V_4 = 4.98 km/h)

Working conditions	U-650M+PP-3-30			U-650M+PRP-3		
	Variant A	Variant B	Variant C	Variant A	Variant B	Variant C
Working speed (km/h)	4.98	4.98	4.98	4.98	4.98	4.98
Working depth (cm)	20	20	20	20	20	20
Fuel consumption (l/ha)	22.73	23.34	24.10	22.39	22.91	23.77

The experiments were made in the same conditions – soil types, working depth (20 cm), working width (90 cm), plough types as at the previous experiences.

The higher values were recorded when the ploughing was made on hard soils (24.10 l/ha for PP-3-30 plough respectively 23.77 l/ha for PRP-3 reversible plough), and the smaller values were obtained when ploughing was made on easy soils (22.73 l/ha at PP-3-30 plough usage respectively 22,39 l/ha at PRP-3 reversible plough usage).

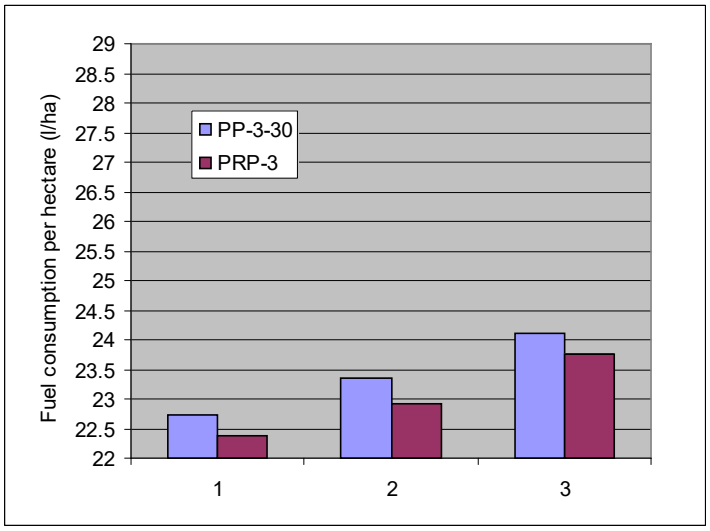

Figure 4 - Variation of fuel consumption per hectare function of soil type (V_4 = 4.98 km/h)

As in the previous cases it is observed that PRP-3 reversible plough generates a lower fuel consumption per hectare face to PP-3-30 plough on all soil types on which superficial ploughing was made.

The recorded differences were of 0.34 l/ha on easy soils, of 0.35 l/ha on medium soils and of 0.33 l/ha on hard soils.

CONCLUSIONS

From the effectuated experiences it is observed the fact that together with the increase of the specific soil resistance at ploughing is increasing also the fuel consumption per hectare.

On easy soils fuel consumption per hectare have the lowest values, and on hard soils fuel consumption per hectare record the biggest values.

Also after making all the experiments and tests, we remark the influence of the working speed on fuel consumption per hectare.

Fuel consumption per hectare decrease in the way in which the working speed increase, superior values are obtained when ploughing is made with low working speeds. In the way in which the used working speed is increased, the fuel consumption on surface unit (hectare) decreases.

The third remarked thing, after the done experiences, is the one that the usage of PRP-3 reversible plough drives to fuel economies. On a same type of soil and working with the same speed, fuel consumption per hectare is lower when the soil in worked with PRP-3 reversible plough face to PP-3-30 plough.

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OPTIMIZATION OF THE HARVESTING WORKS IN AGRICULTURE

OPTIMIZAREA LUCRĂRILOR DE RECOLTARE ÎN AGRICULTURĂ

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Abstract. *Harvesting the agricultural products from horticulture is a part which complete and finish the agricultural production process, of all the producers actions, of all the material efforts involved in work process, to create material goods.*

Harvesting machines are one of the most complex and expensive units and have as a characteristic the fact that in their componence could be found both mechanisms and special working organs to execute some particularly technologic operations of the harvesting process of a certain product, and also many auxiliary technical systems: energy source; moving or auto-moving systems, action system (mechanic, hydrostatic, electric, mix); adjustment control and automatization systems.

Rezumat. *Recoltarea produselor agricole din horticultură, constituie completarea şi închiderea procesului de producţie agricolă, a tuturor acţiunilor producătorului, a tuturor eforturilor materiale investite în procesul muncii, în scopul producerii de bunuri materiale.*

Maşinile de recoltat sunt printre cele mai complexe şi mai costisitoare şi au caracteristic faptul că, cuprind în componenţă atât mecanisme şi organe de lucru speciale pentru executarea operaţiunilor tehnologice particulare procesului de recoltare a unui anumit produs, cât şi o multitudine de sisteme tehnice auxiliare ca: sursa energetică; sistemul de deplasare sau auto deplasare; sistemul de acţionare (mecanică, hidrostatică, electrică, combinată); şi sistemele de reglare, control şi automatizare.

MACHINES FOR GRAPE HARVESTING

There are two different types of technologies:

- semi-mechanized harvesting technology;
- totally mechanized harvesting technology.

Semi-mechanized harvesting technology. The detachment of the grapes from vineyard cords is made by hand, and mechanized, is made the transport of the grapes among rows, the transport inside vineyard and the transport to the proceeding and prepacking stations.

Totally mechanized harvesting technology. Is applied only to the grapes for wine, the detachment of grapes is done mechanized and also grape collecting and their transport among rows is mechanized.

Function of the done operations, the machines used for grape harvesting are divided in the following groups:

- units for grape harvesting and grapes transport inside vineyard;
- machines for grape harvesting

Units for grape harvesting and grapes transport inside vineyard:

- machines with transversal conveyer;
- machines with sided elevators;
- installations with collecting belts;
- collecting and transporting aggregates with semi-carried trailer or with carried containers.

Machines for grape harvesting. Classification criteria based on function principle:

- machines for grape harvesting by cutting;
- machines for grape harvesting by aspiration;
- machines for grape harvesting by shaking.

Machines for grape harvesting by cutting are used only at the grape sorts with long peduncle and in plantations settled up in horizontal pergolas, so the bunches to be under the support wires of the cords. The main working organ is a cutting device which has a knife with an alternative-line up movement. The cut bunches, fell down in a stopper collector, and from here are passed by an elevator in a trailer.

Machines for grape harvesting by aspiration are made by 2-4 aspiration fittings carried by hand and connected through flexible hoses to a depression chamber connected to an exhauster. Harvesting the grapes is made after the chemical destroy of leaves was made.

Machines for grape harvesting by shaking are based on two principles:

- pneumatic shaking;
- mechanic shaking.

Machines for grape harvesting by pneumatic shaking have as the working organ, ramps with air nozzles placed on the both sides of the row. Nozzles have an alternative movement and send the air jets under pressure to the cords with bunch. The grapes fall into a collector and are conducted to a separation cyclone for leaves and from there in a collecting trailer.

Machines for grape harvesting by mechanic shaking have as the working organ metal convertible ramrods (around 5200 pieces) which have an alternative movement in horizontal plan with a frequency of 500 races per minute, or in according with figure 1, with pendulous stems which execute the beating of cords and bunches.

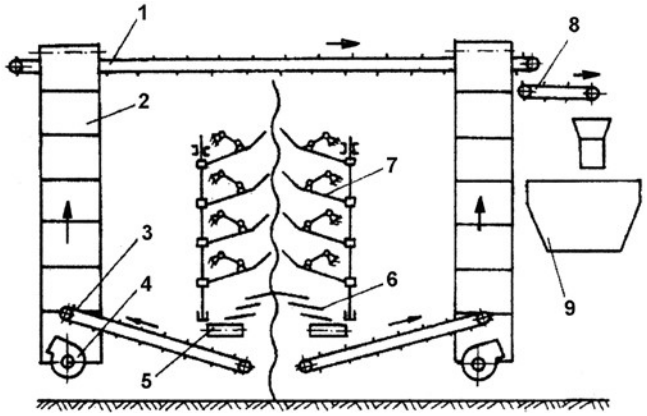

Figure 1. Machine for grape harvesting by mechanic shaking

The figure presents: beating stems (7), grape catching boards (6), longitudinal belt conveyers (5), elevators (3), cleaning fans (4), grape elevators (2), transversal conveyer (1), unloading conveyer (8), collecting trailer (9).

The stems rotation is 400-500 rot/min. The machine is carried on a 50 kW straddling tractor, working speed is 1.5-2 km/h, and the harvested surface is around 0.3-0.5 ha/hour.

MACHINES FOR FRUIT HARVESTING

Fruit harvesting is the most expensive operation from the whole production cycle.

Demands: harvesting degree must be over 98%;
fruit blight degree to be under 10%;
trees blight degree to be under 2%;
fruit losses to represent less of 0.5%.

The machines used during the process of fruit harvesting are divided, in according with their functions, in:

- auxiliary units;
- supporting and transporting units;
- machines for fruit detachment from trees;
- devices for fruit capturing;
- complex machines for fruit harvesting.

Auxiliary units are used in the case of fruits hand harvesting and are staircases and platforms. Staircases and platforms have a tripod or sledge form, to have good stability and to be easy to carry among trees.

Supporting and transporting units also named harvesting platforms could be: carried, worned and self propelled. Could have one to eight working places. After the position of working places could be: platforms with stable working

places (figure 2A) and platforms with mobile working places (figure 2B). The shaft of working places could be up to 8m on horizontal and 14m on vertical.

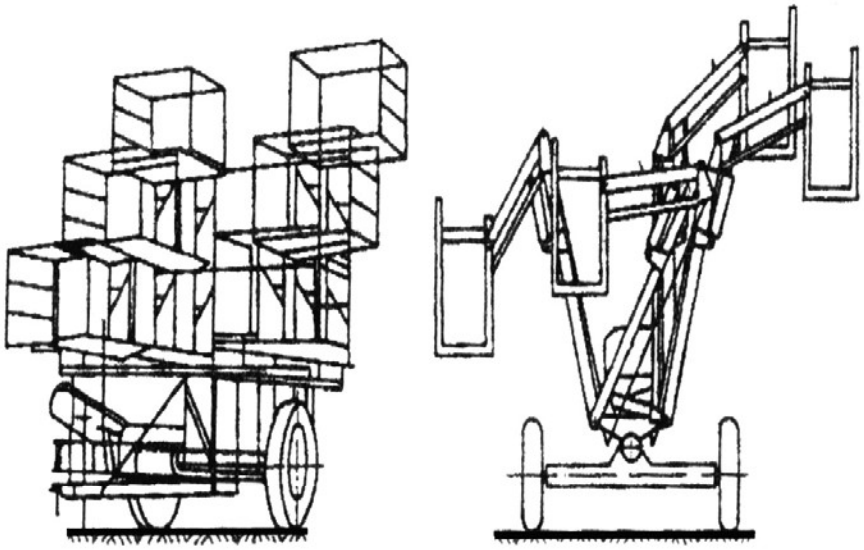

Figure 2 - Supporting and transporting units:
2A - platforms with stable working places; *2B* - platforms with mobile working places.

Machines for fruit detachment from trees. After the way in which the oscillations are produced, fruit shakers are divided in:

- mechanic shakers;
- pneumatic (or with shock) shakers.

The most outspreaded are the ***mechanic shakers***, because assures great shaking forces, oscillations with high frequency and low amplitudes, but an disadvantage is that produce a serious damage of the tree bark in the place where it is hanged.

Pneumatic (with shock) shakers have a small productivity and could be: light or weight.

The light shakers are made of: oscillations generator, shaker body, shaker arm, supporting handle.

Weight shakers are carried on a tractor, self propelled chassis or with a self drive wheels. Pneumatic cylinder have at an end a shock absorber and through it the shock is transmitted to the tree stalk with a frequency of around one beat per second.

Inertial shakers (figure 3) have telescopic arm with an alternative-lined up movement, oscillations frequency is between 3-16.5 Hz.

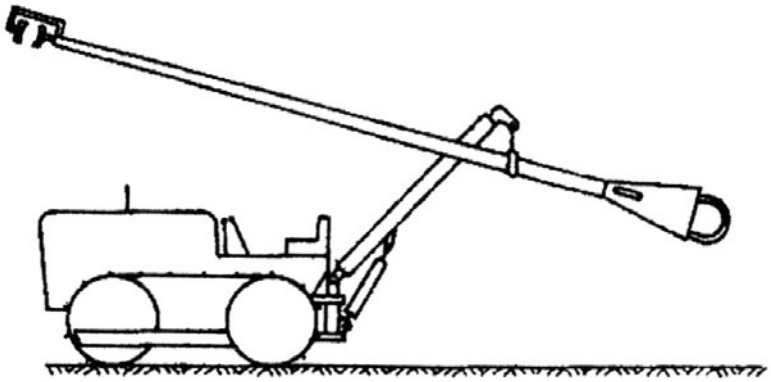

Figure 3 - Inertial shaker

In figure 4 it is presented the scheme of a shaker with a rod connecting-crank mechanism formed by: hydraulic action engine (1), fly wheel (3), bearing crankshaft (4), ball (5), knuckle (6), arm (7), stem (8), arc (9), piston (10), mobile jaw (11), fixed jaw (12).

Pneumatic shakers made fruit oscillation and their detachment by a direct action of the air stream on each fruit.

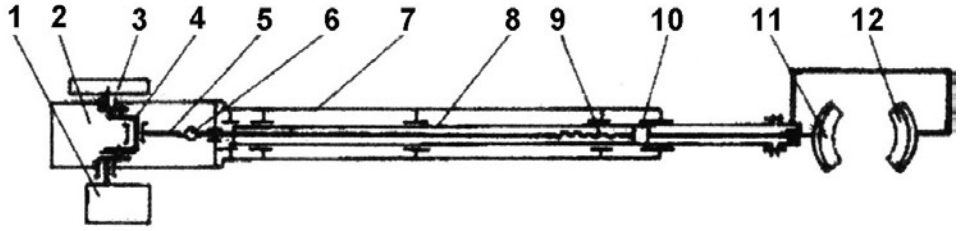

Figure 4 - Scheme of a shaker with a rod connecting-crank mechanism

Fruit picker by aspiration is done by a vacuum generator connected to a fruit collector well closed and provided with 1-4 flexible tubes equipped with nozzles.

Devices for fruit catching. Catching areas used at fruit harvesting are of many types:

- fabric hanging tarpaulin;
- fabric tarpaulin with elastic bands for amortization;
- elastic surface with amortization bands;
- elastic curly surface with amortization bands;
- conveyor belt, conveyor belt with amortization bands;
- elastic surface with blades.

Catching platforms could be fixed type (provided with supporting legs which can be put on soil and with adjustable height) and mobile type (carried or self propelled).

Devices for fruit catching

Combined fruit harvesting machines can do the main operations of the harvesting process: fruit detachment, catching, cleaning and fruit collecting.

In figure 5 it is presented the scheme of a machine with inertial shaker and conic collector formed by: catching thumbscrew (1), vibrations generator (2), hydraulic cylinder (3), stem (4), conic collector (5), pipe (6).

For the pneumatic transport, exhauster (7), commanding hydraulic cylinder (8), fruit separation chamber (9), and unloading hole (10).

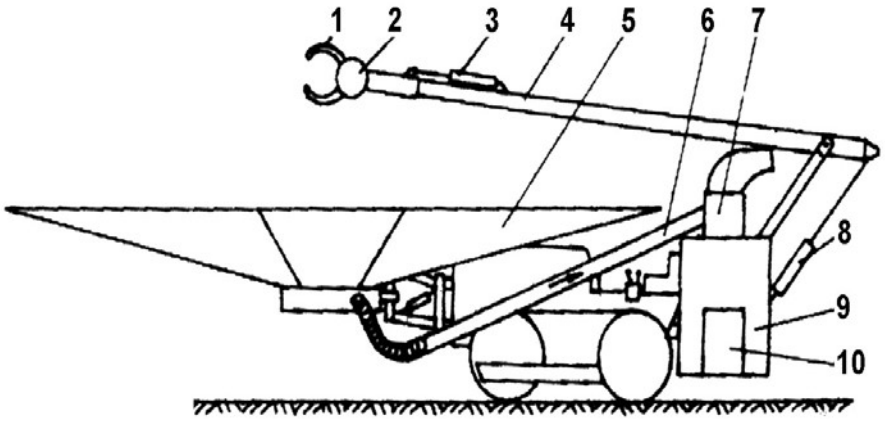

Figure 5 - Machine with inertial shaker and conic collector

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BIOMONITORING OF ATMOSPHERIC TRACE ELEMENT DEPOSITION BY MOSS AND USING ENAA: SOURCE IDENTIFICATION USING FACTOR ANALYSIS

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Abstract: *R-mode factor analysis is developed to identify and locate the emission sources of chemical elements present in mosses collected at 341 sites in Romania. Firstly, a matrix of correlation coefficients was computed for the set of observations. Factor analysis is applied to the data matrix of element concentrations. Signals for the following six sources reproducing the concentration relationships observed in mosses are identified: (1) mineral dust, (2) a Ni-Co signal that is related to both Ni-smelters and ferrous industries, (3) general pollution, (4) marine sources (I, Br and Se), (5) vegetation component (Sr, K, Cs, Rb, Ba and Zn), and (6) a Ca crustal (Ca, Mg) signal. Further an estimation of the survey's quality was proved by procedures of clean-up of the data set and source isolation. Consequently the soil contributions were removed and a second-generation data set is achieved. Additional factor analysis investigations were performed on the four origin regions related with data sets to examine the variations in regional deposition patterns from one survey to another. Then the factor score profiles of samples combined with the meteorological conditions are used to produce the probability maps of source locations. The results obtained in this paper show that air toxics released by the industrial sources speed up the pollution in all ecosystems and become a potential risk on the unpolluted regions.*

Factor analysis has been widely used in geochemical study of moss data in order to assess the atmospheric pollution over large areas. It is a well known multivariate statistical technique used in studying the interrelationships among variables which belong to large data basis and to explaining the information content in terms of a few features.

The present study was carried out in the framework of the project "The assessment of environmental pollution in Romania" (1996 - 2009) as part of the European convention *Air Pollution International Cooperative Programme on Effects of Air Pollution on Natural Vegetation and Crops.*

In this paper the application of factor analysis for identifying potential sources of elements in surveyed mosses is described.

MATERIAL AND METHODS

Sampling

The widespread epiphytic moss species suitable for biomonitoring purposes in Romania are *Hylocomium splendens*, *Pleurozium schreberi* and *Hypnum cupressiforme*. The species considered could be found almost all over the territory. It has been operating a sampling network of the three moss species, located on a regular grid (e.g. 20 x 20 km^2). The monitored area included more than 57 % of the Romanian territory. As reflected in sampling performed, *Hylocomium splendens – HS*

(found in 71 % of the sites) and *Pleurozium schreberi - PS* (found in 33 % of the sites) were more common in coniferous forests while *Hypnum cupressiforme - HC* (present in 58 % of the sites) was more abundant in mixed forests and low altitude areas (Table 1).

Table 1

Some moss surveys in Romania

Region	*HS*	*PS*	*HC*	Total samples	Sites	Period
West of Romania		21	57	78	69	Summer 2003
South of Romania	10		42	52	43	May to Sept., 2000
Transylvania Plateau	71			71	71	Summer 1999
Southern and Western Carpathians	73	56	64	193	73	May to August, 1998
Eastern Carpathians	88	34	35	157	85	Summer 1995
Total samples/sites	242	90	101	551	341	

The upper three fully developed segments of each *Hylocomium spendens* plant and corresponding green or green-brownish parts of the other moss species representing the last 2-3 years growth were prepared for the analysis following the European guidelines. The same experimental material was subjected both to INAA and FAAS. The QA and QC of the surveys and analytics were carefully accomplished.

Factor analysis

A statistical multivariant correlation analysis of each element concentration in the presence of the all others in suites of related samples was done to estimate communality of variation at different sampling sites. Then the correlation matrix was computed. Solving the eigenvalue problem, the initial factors by R-mode factor analysis were estimated. To make them more meaningful an orthogonal rotation by the varimax method was applied to minimize the medium loaded elements in the extracted factors and to maximize low and high loadings of the elements. In the last step of this procedure factor scores have to be computed between the initial values and the extracted factors.

The data sets based on biomonitor pollution approaches surveying the atmospheric deposition commonly include a number of soil associated elements (e.g. Al, Fe, Sc, Cr, Th, REEs).

The gain obtained by application of this approach on moss data consists in clean-up of the data set by removal firstly of the soil-dust component, then the vegetation component and possible sea influence, then to separate between pollution components (i.e. different types of industries, agriculture, traffic, etc.). In the last step of the procedure a second generation data set is achieved, for which new survey variances were computed. In the FA interpretation of the data, soil-associated fractions are computed and removed from the data set.

In the moss survey done, the associated general pollution factor was isolated from the survey data set and used to build the second generation specific data set.

In data interpretation various information on the monitored sites, geochemical, from local industrial activity, etc. are used.

RESULTS AND DISCUSSIONS

Signals for the following six sources reproducing the concentration relationships observed in mosses are identified: (1) mineral dust, (2) a Ni-Co

signal that is related to both Ni-smelters and ferrous industries, (3) general pollution, (4) marine sources (I, Br and Se), (5) vegetation component (Sr, K, Cs, Rb, Ba and Zn), and (6) a Ca crustal (Ca, Mg) signal. The new second generation element loadings are presented in Table 2. The R-mode factor analysis applied to the pollution component separated enough accurately between different industrial signals. There were identified following factors:

- a general pollution signal, that accounted for 55.3% of total variance and presents high loadings of Zn, Pb, Cd and Ni;
- a non-ferrous component, highly loaded with Ni, Cr and Co that explains 24.4% of variance;
- a combustion component due to high-temperature sources that signs for 15.3% of variance loaded with As, V, Sb and Se.

Table 2

Factor loadings in second generation data set

Factor / Component	F11	F12	F13
Zn	**0.80**	0.32	0.35
Pb	**0.78**	0.37	0.30
Cd	**0.74**	0.41	0.13
Ni	**0.56**	**0.75**	0.28
Cr	0.36	**0.74**	0.43
Co	0.24	**0.71**	0.49
As	0.21	0.33	**0.80**
V	0.10	0.25	**0.73**
Sb	0.24	0.51	**0.62**
Se	-0.13	0.03	**0.53**
Ba	0.47	0.21	0.35
Eigen value	6.8	3.0	2.0
Variance (%)	55.3	24.4	15.3
Cumulative Var. (%)	55.3	79.7	95.0

To add in source identification and localization the isoplets for some heavy metals were drawn and used in data interpretation (Figs. 1-4).

The general air pollution on the Romanian territory was generated mainly by local various industrial branches. For example, the spatial distribution of sources for some pollutants is described here.

Cadmium. Large-scale elevated cadmium levels were found in the following three areas in Romania. The higher values recorded in Alba district areas can be attributed to a complex ore (Cu, Pb and Zn) smelter from Baia de Aries and Cu smelters in Zlatna and Rosia Poieni.

In the northern part of the country, the pollution is mainly caused by the combustion of fossil fuel. In north and north-western part of Eastern Carpathians, the higher levels observed are connected with intensive mining of Co, Pb and Zn and Mn. A further important factor in this region is the domestic burning of coal. Local sources of airborne cadmium are the zinc-lead smelter in Copsa mica and the thermal power station in Sangeorgiu de Padure-Fantanele. The elevated levels observed in the South are related to the oil exploitation and refining from this area.

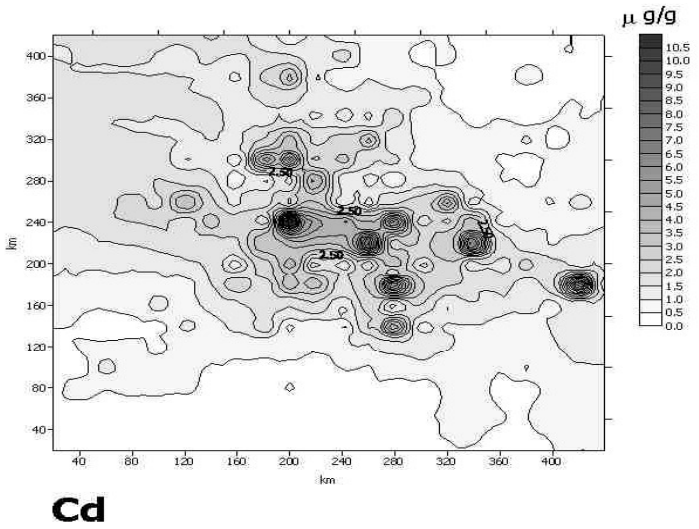

Fig. 1. – Geographical distribution of Cd concentration in moss surveys

Nickel. The iron and steel works in Resita, Otelu Rosu, Nadrag, Calan and Hunedoara emit nickel in air up to 11.3 μg/g along a large area. Elevated levels were found in Petrosani and Motru-Rovinari coal basins and in Tirgu Jiu regions and yield from coal burning. Another source of airborne nickel is the thermal power station in Rogojelu (situated down from Targu Jiu).

The highest concentrations observed in north-western part of the country are released by smelting in Baia Mare and by coal burning in the lignite Barcau Basin. The high emissions of nickel from Valea Prahovei (15.5 μg/g) and Buzau regions (13.7 μg/g) correlates strongly with that of vanadium and are related to local oil refineries.

Arsenic. The highest levels of arsenic were found in the north-western part of Romania, where there is a large number of complex ore (e.g. Cu, Pb and Zn) mines (at Baia Sprie, Baiut, Ilba, Nistru and Cavnic). The largest source of As emissions from this region is Baia Mare center, known for its traditional Cu, Pb and Zn smelting, Au and Ag processing and H_2SO_4 fertilizers manufacturing. Situated down from this region, the Barcau basin is polluted by lignite mining in Chiesd, Sarmasag, Ip, Borumiaca, Popesti, Voievozi and Varviz-Varzari.

Another area highly polluted with As in Western Carpathians region can be explained by the existence of complex ore (Cu, Pb and Zn) smelter from Baia de Aries and Cu smelters (at Zlatna and Rosia Poieni), coal burning power plants in Mintia Deva, Calan and Hunedoara, H_2SO_4 fertilizer plant in Copsa Mica and chemical plants from Turda, Ocna Mures and Tarnaveni.

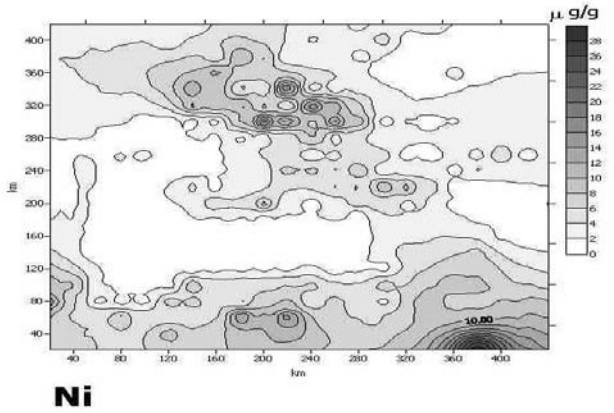

Fig. 2. – Geographical distribution of Ni concentration in moss surveys

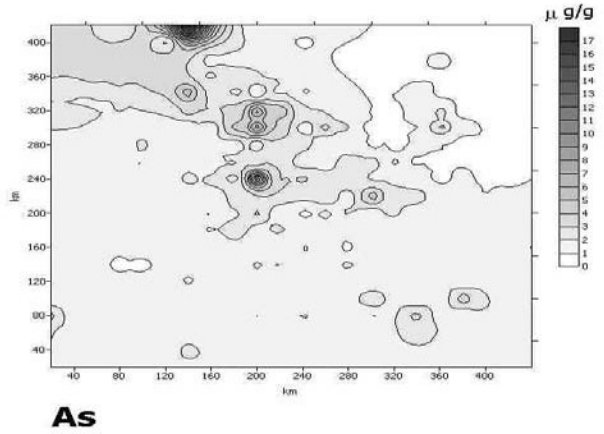

Fig. 3. – Geographical distribution of As concentration in moss surveys

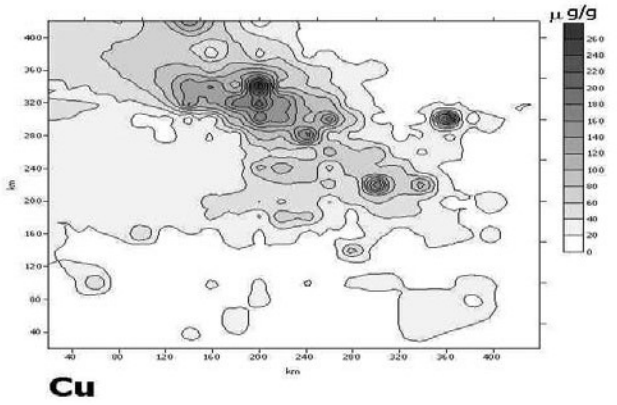

Fig. 4. – Geographical distribution of Cu concentration in moss surveys

In the north and north-western part of Eastern Carpathians several mines in Fundu Moldovei, Crucea, Lesu Ursului and Tarnita, respectively and four thermal power station situated along the Bistrita river can contribute to the high As values observed. The oil refineries in Moinesti-Darmanesti and Borzesti release into the air elevated levels of arsenic (up to 3.6 μg/g).

Copper. Airborne copper was accumulated in mosses near ore mining industry in Toroiaga, Lasu Ursului, Crucea and Fundu Moldovei in north of the country, in Balan (Eastern Carpathians) and in Rosia-Poieni, Baita, Deva, Moldova Noua and Sasca Montana in western part of the country and copper smelter in the town of Baia Mare.

CONCLUSIONS

The present research demonstrates the role of factor analysis in large -scaled surveys of air pollution based on biomonitoring approach.

Trace metal concentrations vary from region to another reflecting the initial emissions at different distances to the main sources. The highest levels signing for certain pollution sources were measured for As, Ba, Co, Cd, Cr, Cu, Fe, Ni, Se, Sb, V, and Zn on the investigated area. These trends are related to the industrial activities of the region.

The concentration values and trends in the present study are similar to those found by the other East-European countries participating in 2000 European moss survey. On the other hand, the trace metal levels were significantly higher in Romania compared with a background area in Norway.

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A STATISTICAL ANALYSIS OF MOSS DATA

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Abstract: *The qualitative estimation of atmospheric pollution by moss biomonitoring assumption supposes a grid network of sampling locations. The present study investigated the precision of the biological tool used for heavy metal mapping purposes. The variance analysis estimated the associated variability for each cell of the sampling network.*

The epiphytic mosses are very good absorbents of airborne pollutants, including anthropogenic trace heavy metals. Additionally, they are widely spread in Europe and this fact makes them the desired passive biomonitors.

In the present study, mosses are used to characterize statistical variations of selected inorganic pollutants using common statistical tools in data interpretation.

MATERIAL AND METHODS

Statistical theory applied to moss data

In the followings the main steps and measures of usual statistical analysis applied on moss data are presented and discussed.

Let suppose that we have a set of n subjects and m measured variables. The variables and the number of subjects form the Y matrix, $Y=(y_{ij})$, i=1,2,.., m, j=1,2,..,n.

The average value:

$$\bar{y}_i = \frac{\sum_{j=1}^{n} y_{ij}}{n}, \text{ i=1..m} \quad (1)$$

Standard deviation.

$$s_i = \sqrt{\frac{\sum_{j=1}^{n} (y_{ij} - \bar{y}_I)^2}{n-1}}, \text{ i=1..m} \quad (2)$$

Covariance

$$s_{ik} = \frac{\sum_{j=1}^{n} (y_{ij} - \bar{y}_i)(y_{kj} - \bar{y}_k)}{n-1}, \text{ i=1..m} \quad (3)$$

Correlation coefficients (correlation matrix R)

$$r_{ik} = \frac{\sum_{j=1}^{n} (y_{ij} - \bar{y}_i)(y_{kj} - \bar{y}_k)}{\sqrt{\sum_{j=1}^{n} (y_{ij} - \bar{y}_i)^2 (y_{kj} - \bar{y}_k)^2}} = \frac{s_{ik}}{s_j s_k}, \; i=1,2,..,m \qquad (4)$$

Standard (normated) matrix

$$z_{ij} = \frac{y_{ij} - \bar{y}_i}{s_i}, \; i=1,2,..,m, \; j=1,2,..,n \qquad (5)$$

Correlation coefficient wrote with the Z matrix elements

$$r_{ik} = \frac{\sum_{j=1}^{n} z_{ij} z_{kj}}{\sqrt{\sum_{j=1}^{n} z_{ij}^2 \sum_{j=1}^{n} z_{kj}^2}} = s_{ik} = \frac{\sum_{j=1}^{n} z_{ij} z_{kj}}{n-1} \qquad (6)$$

$$\frac{ZZ'}{n-1} = R = S, \qquad (7)$$

The main goal of factor analysis is to write any variable like a linear combination of r<m factors.

$$z_{ij} = \sum_{l=1}^{r} a_{il} p_{lj} \qquad (8)$$

The same relation in the matrix form:

$$Z=AP \qquad (9)$$

The main goal of factor analysis is to determine the A matrix (factor loading) and factor score. To obtain this matrix it is necessary to solve the eigenvalues problem for the matrix of correlation R.

$$\mathbf{R}\boldsymbol{\alpha}_l = \lambda_l \boldsymbol{\alpha}_l \text{ sau } (\mathbf{R} - \lambda_l \mathbf{I})\boldsymbol{\alpha}_l = \mathbf{0} \quad (10)$$

where $\{\lambda\}$= the set of the eigenvalues.

In practice, the data were subjected to analysis of statistical parameters by using the statistical package SPSS 4.0.

RESULTS AND DISCUSSIONS

Deposition from the atmosphere forms the input of airborne pollutants to the moss plant body. Deposition is dry as well as wet, and the sum of both parts give the real value of the moss atmospheric supply.

The moss data were computed in terms of descriptive statistics indexes (i.e. average concentration, median concentration, minimum concentration, maximum concentration, standard deviation, etc.) and further the correlation matrix of data interrelationships was calculated. All this procedure was largely described in earlier studies of the author, than we'll focus the discussion here mainly on moss bioindication. We used the bioindication index defined as

$$B_{moss} = Maxconc / Minconc \quad (11)$$

where *Maxconc* and *Minconc* are measured in μg/g,

which measure the variability in the accumulated contamination loads in mosses (Table 1). The highest concentrations were determined for Cr, Fe, Co, Ni, Cu, Zn, As, Se, Mo, Ag, Cd, Sb, Ba, W and U in Transylvania Plateau. The bioindication index (here, maximal/minimal elemental concentration) ranged from 15 to 50 in the four studied regions. These trends characterizing the corresponding differences in elemental concentrations in mosses indicate a similar variation in atmospheric pollution between regions. Much larger differences in bioindication indexes were found for atmospheric pollutants as antimony (573), silver (117), cadmium (117) molybdenum (113) and arsenic (90). Higher bioindication indexes were found also for elements like samarium (325), lanthanum (129) uranium (98) and thorium (78) that can be explained by windblown soil dust. The higher bioindication indexes found for wolfram (up to 142) can be attributed to analytical uncertainties.

The variation shown by mean concentrations of selected elements in moss samples distinguished clearly between background and impact areas.

Table 1

The bioindication indexes (Max/Min) of elements in mosses collected

Region/ Element	Eastern Carpathians	Southern and Western Carpathians	Transylvania Plateau	South of Romania
Na	44	20.6	22.6	7.7
Mg	13.1	14.3	14.3	8.6
Al	22.6	14.2	27.8	10.4
Cl	8.5	5.9	8.2	2.6
K	5.6	32.1	3.3	11.1
Ca	12.9	13.7	18.8	3.6
Sc	25.4	18.2	25	5.8
V	15.8	8.7	1.6	9.1
Cr	76.3	9.8	16.4	11.6
Mn	32	16	54.4	4.7
Fe	29.1	13	14.1	6.7
Co	20.3	22.8	19.0	4.2
Ni	18.2	5.2	31	8.7
Cu*	40.3	36.1	16.7	
Zn	11.1	9.4	20	3.7
As	90	9.6	18.3	4.2
Se	16.1	7	20.5	17.2
Br	4.2	3.6	10.3	6.7
Rb	24.5	8.3	8.7	4
Sr	81	15.5	11.3	12
Zr	67.3	33.5	47.4	6.2
Mo	52.7	12.4	15.7	113
Ag	21.3	49.2	116.7	19.5
Cd*	28	24.3	48	
Sb	573	6.4	61	3.1
I	8.2	5.0	7.3	6.8
Cs	73.5	14.4	21.2	6.4
Ba	73.3	8.2	13.3	5.9
La	129.1	87	42.1	11.8
Ce	45.6	15.6	45.7	9.6
Sm	51.2	56.8	325.4	7.2
Tb	32	21.4	75.4	5.2
Yb	73.5	15.8	35.6	5.5
Hf	66	18.4	23.3	7.7
Ta	61.7	13.4	49.4	6.5
W	141.7	19.5	75.9	6.4
Au	28.5	19.2		12.1
Pb*	8.6	25.5	26.9	
Th	78.398	16.0	19.6	8.7
U		13.3	32.4	6.8

CONCLUSIONS

The statistical methods offer a simple way to study different patterns of airborne pollutants that are deposited in mosses. Terrestrial mosses are passive, show good accumulation properties in yearly-developed segments and are easy to handle.

The results show how statistical tools can be employed to indicate depositions of airborne pollutants in terrestrial mosses. It is suggested that on the basis of a statistically selected network (for example, using neural algorithms), analysis of contaminant patterns in mosses could be used for the evaluation of the possible ecotoxicological effects of airborne pollutants on forest ecosystems.

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