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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