

## TECHNOLOGICAL AND ECONOMIC RESULTS IN APPLE CULTURE

### REZULTATE TEHNOLOGICE ȘI ECONOMICE ÎN CULTURA MĂRULUI

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**Abstract.** *The set of technological steps applied to an apple plantation from SCDP Iași 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 Iași în anul 2006 a scos în evidență rolul și importanța fiecărei secvențe (factori) tehnologice în parte. Astfel soiul, vârsta pomilor, distanța de plantare, forma de coroană, nivelul fertilizării și nu în ultimul rând tratamentele fitosanitare concurează la obținerea rezultatelor privind cantitatea și 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 Iași 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 trees 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**

<b>No. crt.</b>	<b>Pheno-phase Date of effectuation</b>	<b>Pathogen agents and pests fought against</b>	<b>Pesticides used</b>	<b>Dose/ha L; kg</b>
1	Budding April 5	Mite eggs, San Jose louse, flower ladybird, apple skin moth, bark diseases, mildew	Oxicupron + Oleocarbotox 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; Envirdor 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	1 <sup>st</sup> quality	2 <sup>nd</sup> 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 for 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 profitability 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.

## REFERENCES

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