

PHYTOSANITARY CONTROL OF APPLE TREE - QUALITY AND ECONOMIC EFFICIENCY

FITOPROTECȚIA MĂRULUI - CALITATE ȘI EFICIENȚĂ ECONOMICĂ

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Abstract. Works to prevent and control pathogens and pests of fruit trees is an important sequence in fruit growing technology. Although the means of control have multiplied in recent times the chemical processes it is more responsibility. The quantity and quality of fruit such apple culture and economic efficiency are highly dependent on plant protection products in plant protection programs. In the years 2007-2009 at SCDP Iasi have used new products, with new principles of action based on apple pests, with new active substances, which were placed in sound programs afforded very good results.

Key words: pesticides, control, frequency, intensity

Rezumat. Lucrările de prevenire și combatere a patogenilor și dăunătorilor pomilor fructiferi reprezintă o secvență importantă în tehnologia pomicolă. Deși mijloacele de combatere s-au diversificat în ultimul timp – procedeele chimice îi revine cea mai mare responsabilitate. Cantitatea și calitatea fructelor precum și eficiența economică a culturii mărului sunt dependente în foarte mare măsură de produsele de protecția plantelor din cadrul programelor fitosanitare. În anii 2007 – 2009 la SCDP Iași s-au utilizat produse noi, cu principii noi de acțiune asupra dăunătorilor mărului, pe bază de noi substanțe active, care introduse în programe judicioase au dat rezultate foarte bune.

Cuvinte cheie: pesticide, combatere, frecvență., intensitate

INTRODUCTION

Works to prevent and combat pathogens and pests of fruit trees is an important sequence in fruit growing technology. Although combating have diversified more recently chemical process bears the greatest responsibility. Fruit quality and quantity and efficiency of the apple crop is heavily dependent on plant protection products in protection programs. In the years 2007-2009 at SCDP Iasi new products were used with new principles of action on the apple pest, based on new active substances, which were introduced in protection programs judicious view to obtaining as the product ad. Similar studies have been undertaken both in our unity and the country alike (Beșleagă Ramona ș.a, 2009; Cârdei E.,1995; Cârdei E.,2007; Istrate M., ș.a,2006; Petre Gh., 2006.).

MATERIAL AND METHODS

Experiments on control apple pests and pathogens were conducted in 2007-2009 in two apple varieties: Idared and Jonagold. Trees have been grafted on MM 106 and were planted in 2001, led palmetto arm as oblique support systems. Soil

between rows of trees was grassy plant material is mechanically chopped 2-3 times per summer and left as mulch, row of trees and soil was worked with wheel mechanical stylus. Fertilization was achieved with foliar fertilizer only version Fertifol five interventions by 4 l / ha.

Climatic conditions were monitored period showed the presence of higher levels to normal, in terms of temperature. Thus, it appears that the highest monthly average temperatures were recorded in 2007, when maximum temperatures in may-august were 36,5°C-40,0°C. The other two years as both average and maximum temperatures were higher than the multi, but lower than those of 2007 (table 1).

Table1

Climate data 2007-2009

Mont hs	Average temperature			Maximum temperature			Precipitations		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
III	8,1	7,3	3,7	21,6	22,4	19,5	26,2	43,4	18,8
IV	11,0	11,4	12,1	24,7	23,5	25,8	29,6	124,0	1,2
V	19,6	15,9	16,0	38,8	29,0	31,8	33,4	94,4	36,6
VI	23,1	20,6	20,2	36,5	32,2	34,1	22,0	87,8	68,6
VII	25,2	21,4	22,4	40,0	32,2	37,5	45,0	164,2	35,6
VIII	22,5	22,2	21,1	37,1	35,7	36,7	112,0	66,0	30,8
IX	16,0	14,1	17,3	26,7	32,5	33,1	87,8	48,6	10,2
Total							356,0	628,4	201,8

In terms of rainfall in 2008 was the richest there were 628,4 l/m in march-september period, compared to only 201,8 liters per square meter in 2009 and 356,0 liters per square meter in 2007 the same period. In april 2008 fell to 124,0 l/m, number of rainy days is 14, in 94.4 l/m in 12 days in june and 87,8 l/m in 9 days. Apple pathogens in these climatic conditions, especially brown staining of leaves of apple (*Venturia inaequalis*) had the most favorable opportunities for development. Apple pests found more favorable conditions in 2007 and 2009.

To prevent and combat pests and pathogens to reduce or eliminate damage in 2007-2009 fitosanitare treatments have been applied on the basis of previously established programs and in which they were introduced the latest and most effective plant protection products. For example, treatment program in 2009 to two apple varieties was following (table 2).

Products used are generally known as having good efficacy, but of all the notes the following: Flint Plus 64 WG, and Proteus Maccani OD 110. Plus Flint 64 WG is a fungicide with preventive action and a complex activity and multi-mezosistemică siti conferred by the two active ingredients: trifloxystrobin and captan 60% 4%. Waxy layer is strongly absorbed by the leaves and thus resistant to rain and has the ability to redistribute the leaf surface through evapotranspiration processes and translaminară activity.

Table 2

Schedule for phytosanitary treatments applied in 2009 at SCDP Iasi

Nr. crt.	Phase	Fought against pathogens and pests	Plant Protection Products	Dose / ha L, kg
1	mouse ears	San Jose Scale, peel fruit moth, eggs of mites , eggs of aphids, flowers ladybug, bark disease	Champion + Oleocarbetox S	4,5+ 15,0
2	pink button	scab, powdery mildew disease, scale woolly, mites, peel fruit moth	Zato + Antracol + Reldan + Decis 25 WG	0,15 3,0 1,5 0,06
3	start shaking petals	scab,powder mildew disease , monilioze, mined, defoliator, wasp apples , aphids, mites	Flit plus+ Decis Mega 50 EW	1,9 0,24
4	fruit nut	worm apples T1G1, aphids, mined, scab, powder mildew disease	Shavit F 72+ Calypso 480 SC	3,0 0,4
5	in the previous 12 days	worm apples T2G1, defoliator, mined, scab, powder mildew disease	Clarinet+ Decis 25 WG	2,0 0,06
6	fruit ø de 2-2,5 cm	same pathogens and pests and peel fruit moth	Captan 80 + Sulf muiabil + Decis 25 WG	3,0 6,0 0,06
7	fruit ø 3,0 cm	San Jose Scale T1G1, peel fruit moth, defoliator, aphids,mites, scab, powder mildew disease	Sythane plus Reldan+ Nissorun	0,4 3,0 0,6
8	in the previous 12 days	San Jose ScaleT2G1, worm applesT1G2	Maccani + Proteus OD 110	2,0 0,8
9	in the previous 10 days	Worm applesT2G2, peel fruit moth, minator, scab, powder mildew disease, etc	Captan 80+ Sulf muiabil+ Decis 25 WG	3,0 6,0 0,06
10	almost normal size fruit	San Jose G2, mites, vworm apples, moniliozã, deposit diseaseetc	Folicur Solo + Calypso 480 SC + Seizer	

Maccani is a fungicide which constituted two active ingredients: pyraclostrobin ditanon 4% and 12% strobilurinelor first part of the group and mode of action is inhibition of mitochondrial respiration and the second having a multi-site inhibition dterminã spores. The active substance remains on the surface of leaves with a solid deposit, will enter the leaf through translaminare properties and the local system. Release the active substance is gradually giving it a long action.

Proteus OD 110 is a systemic and contact insecticide with a broad spectrum of activity on many pests including apple's. Has two active ingredients, including a "thiacloprid" and another group clronicotinele "Deltamethrin pirectroizilor group. Thiacloprid penetrate the plant relatively quickly (after about an hour), deltamethrin remains on the surface, both components act by contact and ingestion of fruit pests that bite and vegetative parts of plants. Proteus combines the action of long-term systemic shock action. Making art - oil dispersion (Oil dispersy) gives the product a grip and superior to others formulations penetrate plant.

During the growing season have made observations and measurements on: the attack of pathogens and pests, weather data, the effectiveness of plant protection products, the quantity and quality of fruit, expenditure on applied technology.

RESULTS AND DISCUSSIONS

In the three years of study of the evolution of apple pests and pathogens were found on them were very favorable conditions in 2007 and 2008 to pathogens and pests in 2007 and 2009.

Frequency of scab attack on the untreated control was very high on both leaves and fruit, so in 2007 there was 63,5% in value of 42,4% on leaves and fruit, and in 2008 to 72,5% on leaves and 54,6% (table 3 and 4).

Table 3

Effectiveness in combating phytosanitary treatments to apple scab

Specification	Apple scab							
	2007				2008			
	Leaf		Fruits		Leaf		Fruits	
	F%	I%	F%	I%	F%	I%	F%	I%
Idared	9,4	10,5	7,4	10,0	10,3	15,0	8,7	15,3
Jonagold	11,3	10,7	8,1	10,0	14,4	15,6	10,5	20,4
Jonagolg Mn	63,5	25,0	42,4	25,7	72,5	25,0	54,6	35,7

Table 4

Effectiveness of phytosanitary treatments to combat powdery mildew on apple

Specifica tion	Apple powdery mildew disease							
	2007				2008			
	Leaf		Shoots		Leaf		Shoots	
	F%	I%	F%	I%	F%	I%	F%	I%
Idared	11,7	10,0	6,5	10,0	13,3	12,4	8,9	15,4
Jonagold	8,9	10,0	5,2	10,0	10,2	10,0	7,8	15,0
Jonagolg Mn	45,8	25,0	31,4	25,0	57,9	34,7	42,3	40,5

High values were also applied to apple powdery mildew. These high frequencies in particular highlights the effectiveness of plant protection products used in the treatment program. Ionagold variety was more sensitive to scab than Idared variety, which in turn was more sensitive to powdery mildew disease. Both scab and powdery mildew disease were present in treated plots but the frequency and intensity of significant value not significant damage occurred. Scab and

powdery mildew frequency values were at least 8-11 times lower. Situation in 2007 and 2009 leads us to believe that no pesticides can best ensure a perfect protection.

Regarding pests were monitored only three were considered the most dangerous stage: worm apples, peel fruit moth and San Jose Scale (table 5).

Table 5

Effectiveness of phytosanitary treatments in apple pest

Specificare	% attacked fruits San Jose		% attacked fruits de <i>Cydia</i>		% attacked fruits de <i>Adoxophyes</i>	
	2007	2009	2007	2009	2007	2009
Idared	0,1	0,2	3,9	4,5	2,5	2,6
Jonagold	0,2	0,2	4,2	4,7	2,5	2,8
Jonagolg Mn	36,5	40,2	71,4	75,0	39,9	46,7

Their degree of risk, the percentage of affected fruit (36,5-40,2% - San Jose, 71,4-75,0% - the worm apples-*Cydia pomonella* and from 39,9 to 46,7% - the shell moth apples- *Adoxophyes reticulana*) is a testimony of what might happen in a corresponding untreated plantation. Although insecticides used are efficacy and performance, however, contested the test plots or fruit found in different percentages (eg 3,9-4,7% 2,5-2,8% from worm to moth and apple peel). Potential hazards that may cause these insects are largely due to changing weather favorability for the purposes of development. Even in these particularly difficult conditions, the program specialist protective treatment applied in 2007-2009 was more than satisfactory by both the health of trees and the production obtained – 30917,7 kg/ha and quality.

In terms of quantity and quality of output and expenditure was found that they were different in the three years of study, but in all the years of production and quality assured expenses and a profit. For example present technical and economic data obtained per hectare in 2009:

- Production of apples per hectare: 30,917.7 kg, of which:
 - Storage: 20336,7 kg – 65,7%;
 - Industry: 10581,0 kg – 34,3%;
- Costs of production per hectare: 9934,7 lei, of which:
 - Expenses related to salaries +: 5098,3 RON – 51,2%
 - Costs of pesticides: 2966,5 RON – 29,9%
 - Cost of fuel: 580,7 RON – 5,8%
 - Other expenses: 1296,6 RON – 13,1%
- Cost price/kg: 0,32 Euro/kg
 - Price of apples from storage recovery: 0,75 Euro/kg
 - Price of apples recovery industry: 0,09 euro / kg + 0,16 euro/kg subsidies – 0,25 Euro / kg;
 - Storage expenses: 0,25 Euro/kg;
- Income/ha: 17897,8 lions that:
 - 15252,5 lions turning apples stored

- 2645,3 lei apple industry recovery

- total cost/ha: RON 15018,9

- Profit/ha: 2878,9 RON

In a precarious economy, uncertain at that time believe that the apple crop profitable.

CONCLUSIONS

1. Weather conditions were very favorable for pathogen development in 2007 and 2008 and for pests;

2. Scab attack frequency was 63,5 – 72,5% on leaves and fruit from 42,4 – 54,6% in the untreated control and from 9,4 – 14,4% on leaves and fruit from 7,4 – 10,5% in plots treated;

3. Were the most dangerous pests in San Jose Scale (36,5 t- 40,2% contested fruit) apple worm (71,4 – 75,0%) and fruit shell moth (39,9 – 46,7%) - insecticides used had a special performance (3,9% -4,7% in *Cydia pomonella*, from 2,5 – 2,8% in *Adoxophyes reticulana*)

4. Average yield was 309,7 kg / ha, 20336 kg for storage; profit for 2878 was euro / ha;

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