

RESULTS ON THE EFFECTIVENESS OF PLANT PROTECTION PRODUCTS TESTED AT THE FRUIT GROWING RESEARCH AND DEVELOPMENT STATION IAȘI, ROMANIA

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ABSTRACT. During 2010-2011, at the Fruit Growing Research and Development Station (FGRDS) Iași, Romania, were carried out research on testing the effectiveness of plant protection products. The experiment was conducted in experimental polygon, in an apple orchard, the variety Idared. Pests on which observations were made were: *Cydia pomonella* L., *Adoxophyes reticulana*, *Panonychus ulmi*, *Phyllonorycter* spp., and the products tested were: Affirm SG 095 and Voliam Targo SC 063. The products Affirm SC 095 was tested against the apple skin moth (*Adoxophyes reticulana*) and apple codling moth (*Cydia pomonella* L.), and the product Voliam Targo SC 063 was tested against red mites (*Panonychus ulmi*) and the leaves miners (*Phyllonorycter* spp.) apple codling moth (*Cydia pomonella* L.). As standard products Coragen and Vertimec 1.8 EC were used at the rates of 0.15 l/ha and 0.75/ha respectively.

Key words: Pests; Control; Insecticides; Efficacy; Biology.

REZUMAT. Rezultate privind eficacitatea unor produse pentru protecția plantelor testate la Stațiunea de Cercetare-Dezvoltare pentru Pomicultură Iași. În perioada 2010-2011, la Stațiunea de Cercetare-Dezvoltare pentru Pomicultură Iași s-au efectuat cercetări cu privire la testarea eficacității unor produse pentru protecția plantelor. Experiența s-a desfășurat în poligonul experimental, pe o plantație de măr, la soiul Idared. Dăunătorii asupra cărora s-au efectuat observații au fost *Cydia pomonella* L., *Adoxophyes reticulana*, *Panonychus ulmi*, *Phyllonorycter* spp., iar produsele testate: Affirm SG 095 și Voliam Targo SC 063. Produsul Affirm SG 095 a fost testat pentru combaterea viermelui merelor și a moliei pielței fructelor, iar Voliam Targo SC 06, pentru combaterea acarienilor, minatoarelor și a viermelui merelor. Ca produse de comparație (standard), s-au utilizat insecticidele Coragen, în doză de 0,15 l/ha, pentru viermele merelor și minatoare, și Vertimec, 0,75 l/ha, pentru acarieni.

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Cuvinte cheie: dăunători; combatere; insecticide; eficacitate; biologie.

(Beșleagă *et al.*, 2009; Cârdei, 1995; Cârdei and Rominger, 2000).

INTRODUCTION

Apple fruits have a high content of vitamins, minerals, carbohydrates, fatty, all this is very important in human nutrition. In apple orchards, the number of phytopathogens and pests is very high, it makes that the losses are estimated at 28.8%, worldwide (Oltean *et al.*, 2000; Toncean *et al.*, 2000).

Among the pests which can cause important damages in the apple orchards, the following species can be evidenced: apple codling moth (*Cydia pomonella* L.), apple skin moth (*Adoxophyes reticulana*), red mites (*Panonychus ulmi*) and the leaves miners (*Phyllonorycter* spp.) (Sumedrea, 2004).

Reduction of the damages caused by the above mentioned pests and high quality fruits productions can be achieved only using a complex of measures of integrated management. Among the control measures, the most important and used is the use of insecticides. More over, is well known that substantial advantages may be obtained when the less polluting insecticides are used, by choosing the less toxic ones for the fruit production and for the environment. In this sense, at Fruit Growing Research and Development Station Iași, Romania, during 2010-2011, was organized an experience was organized to control the main apple pests form our area, using two new plant protection products

MATERIALS AND METHODS

Researches were carried out in our experimental device, in a bearing apple orchard, on the 'Idared' cultivar, planted in 1992, planted at 3x4 m, in four replicates, each variant including 15 trees.

The products tested were Affirm SC 095 and Voliam Targo SC 063. The product Affirm SC 095 was tested against the apple skin moth (*Adoxophyes reticulana*) and apple codling moth (*Cydia pomonella* L.), and the product Voliam Targo SC 063 was tested against red mites (*Panonychus ulmi*) and the leaves miners (*Phyllonorycter* spp.) apple codling moth (*Cydia pomonella* L.).

The experiences variants were: V1 Affirm SG 095 – 3.0 kg /ha; V2 Affirm SG 095 – 4.0 kg/ha; V3 Voliam Targo SC 063 – 0.75 l/ha; V4 Voliam Targo SC 063 – 1.1 l/ha; V5 – untreated control. As standard products, Coragen and Vertimec 1.8 EC were used at the rates of 0.15 l/ha and 0.75/ha respectively.

To achieve a high efficacy, the phytosanitary treatments must be carried out in accordance with the insects biology, the trees phenology and are influenced by the climatic conditions dynamic. During the vegetation periods of 2010 and 2011 were registered very favorable conditions for the development of the studied pests (*Table 1*).

Among the climatic factors, an important role is played by the temperature and precipitations. In this sense, from the *Table 1* analysis can be observed that in April the mean temperature values were 12.6°C in 2010 and 10.0° C in 2011, but in June the highest temperatures rise to 35.0° C in

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2010 and 33.5° C in 2011, being very favorable for the pests development.

As regard the precipitations, in May and June of 2010, their level was 231.0 l/m² respectively 77.2 l/m² in May and 153.8 l/m² in June. In the same period of 2011 the registered amount of

precipitations was 137.4 l/m² respectively 39.0 l/m² in May and 98.4 l/m² in June. Assessing the rainy days number per month, in 2010 there were three consecutive months (May, June and July) with 15 rainy days, but in 2011 fewer rainy days were registered.

Table 1 - Climatic characterization of the years 2010-2011

Month	Temperature, °C						Precipitations, mm		Days with precipitations, no.	
	Mean		High		Low					
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
I	-6.4	-2.2	-10.4	10.4	-26.0	-16.2	35.6	15.8	11	17
II	-1.1	-2.6	12.6	17.1	-12.6	-13.3	22.6	6.0	12	5
III	4.5	3.5	22.6	23.3	-7.5	-10.5	16.2	13.2	8	10
IV	12.6	10.0	23.3	23.7	2.0	1.5	28.0	81.2	10	11
V	17.3	15.8	28.1	30.1	6.5	2.3	77.2	39.0	15	12
VI	19.8	19.6	35.0	33.5	8.2	9.4	153.8	98.4	15	14
VII	21.8	22.6	33.7	34.1	11.4	9.6	25.6	69.2	15	7

RESULTS AND DISCUSSION

Regarding the experimented insecticides in control of the main apple pest, the results are presented in the *Tables 2 and 3*.

The product Affirm was tested to control two pest *Adoxophyes reticulana* (Fig.1) as *Cydia pomonella* L.(Fig.2), using as standard product the insecticide Coragen, at a rate of 0.15 l/ha. Two treatments were

carried for each generation of the pests, and the water volume used for the treatments was 1500 l/ha.

After treatment applications, the product Affirm SG 095 reveals a pretty good efficacy in control of apple codling moth and good efficacy in control of apple skin moth, especially in V2 (4.0 kg/ha) compared with the untreated control variant (*Tabelul 2*).



Figure 1 – *Cydia pomonella* L.



Figure 2 – *Adoxophyes reticulana* (larva)

Table 2 - Efficacy of the insecticide Affirm SG 095 experimented in apple orchards from FGRDS Iași

Variant	Rate, kg; l/ha	<i>Adoxophyes reticulana</i>		<i>Cydia pomonella</i> L.	
		2010	2011	2010	2011
damaged fruits, %					
V1 – Affirm SG 095	3,0	4.8	3.7	4.5	4.2
V2 – Affirm SG 095	4,0	4.5	3.1	3.8	3.5
V3 – Coragen	0,15	1.0	0.8	0.5	0.3
V4 – Untreated control	-	60.5	55.3	54.5	52.8

Table 3 - Efficacy of the insecticide Voliam Targo 063 experimented in apple orchards from FGRDS Iași

Variant	Rate, l/ha	Red mites/25 frunze				Leaf miners				<i>Cydia pomonella</i> L.	
		before treatment		7 days after treatment		damaged leaves, %		mines/leaf, no.		damaged fruits, %	
		2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
V1 - Voliam Targo SC 063	0.75	312	292	147	133	1.7	1.4	1.2	1.1	1.4	1.2
V2 - Voliam Targo SC 063	1.1	356	310	123	120	1.1	0.8	0.9	0.6	0.7	0.5
V3 - Vertimec 1.8 EC	0.75	425	383	54	48	-	-	-	-	-	-
V4 - Coragen	0.18	-	-	-	-	0.5	0.2	0.3	0.2	0.8	0.6
V5 - Untreated control	-	394	380	510	412	20.1	18.7	4.5	4.2	57.6	53.2

Comparing the two years of study, the best results were obtained in 2011. On the achievements of these results an important role was played by the climatic conditions, which were less favorable for the pest evolution, compared with 2010. For example, the case of the product Coragen, the percentage of the fruits attacked by *Adoxophyes reticulana*

was 1.0% in 2010, compared to 0.8% in 2011. The same situation was recorded also in the case of the *Cydia pomonella* species, when the percentage of the attacked fruits was 0.5% in 2010 and 0.3% in 2011.

The insecticide Voliam Targo SC 063 was tested to control three apple pests: red mites, leaves miners and codling moth. As regard the

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mites, the product Voliam Targo SC 063 has good effects but not as good as in the V3 variant with Vertimec 1.8 EC 0.75 l/ha, where 7 days after treatment only 54 mites were alive from the 524 counted before treatment (12.7%). In V1, variant with Voliam Targo SC 063 at a rate of 0.75 l/ha, only 147 mites from the 312 counted initially were alive (47.1%). Better results were obtained in V2 with Voliam Targo SC 063 at a rate of 1.1 l/ha where 123 mites from the 356 counted initially were found alive (34.5%).

Regarding the leaves miners, in 2011, the treatments with Voliam Targo SC 063 had a very good efficacy when compared with the untreated control. The apples leaves treated with Voliam Targo SC 063 were damaged only 0.8 -1.4% also the ones treated with Coragen were damaged only 0.2%. Comparatively, in 2010, the leaves treated with Voliam Targo SC 063 were attacked 1.1-1.7%, and the ones treated with Coragen 0.5%. The product had also a very good efficacy in control of *Cydia pomonella* L. When Voliam Targo SC 063 was applied at a rate of 1.1 l/ha, the percentage of damaged fruits was 0.7% in 2010 and 0.5% in 2011, lower than in the variants treated with Coragen. Also good results were obtained when Voliam Targo SC 063 was applied at a rate of 0.75 l/ha.

In the years of study, both of the product Affirm SG 095 and Voliam Targo SC 063 registered good results in control of the apple pests, even compared with Coragen, which had

very good efficacy in control apple codling moth.

CONCLUSIONS

The climatic conditions of the year 2010 were more favorable for the development an the attack of the apple orchards pest, comparatively with 2011.

By comparing the two years of study, the best results were obtained in the year 2011, as a consequence of the climatic conditions.

The insecticide Affirm SG 095, had a pretty good efficacy in control of the species *Adoxophyes reticulana* and *Cydia pomonella* L, comparatively with the product Coragen, which had very good efficacy especially against *Cydia pomonella* L.

The insecticide Voliam Targo applied at a rate of 1.1 l/ha was quite effective in control of *Cydia pomonella* L., but with uncloncluent effect against the leaf miner larva when was compared with the product Coragen.

The insecticides Affirm SG 095 and Voliam Targo SC 063 provided a very good percentage of high quality healthy fruits.

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