RESULTS REGARDING THE EFFICIENCY OF SOME INSECTICIDE PRODUCTS IN CONTROLLING *CYDIA POMONELLA* IN MĂRĂCINENI AREA BETWEEN 2014-2015

LAURENŢIU BĂLONIU[1]*, RODI MITREA[1]

[1] University of Craiova, Biology Department, 13, A.I.Cuza Street, 200583
**Corresponding author, e-mail: belo_boy85@yahoo.com*

Keywords: codling moth, insecticid, results, treatments

ABSTRACT

The present paper analyzes the results recorded after application of some scheme treatments with insecticide products to control Cydia pomonella.

The researches were made between 2014-2015 years with different climate conditions. The observations revealed the concordance between meteo parameters variation, codling moth eco-biology, date and treatments number, duration of its and also the efficiency of treatments.

INTRODUCTION

Along with phytopathogenic agents, the pests represents an important segment in terms of damage for apple crop.

It is somewhat difficult to analyze in paralle the damage caused by pathogens and pests. In some cases a pest attack can facilitate a pathogen infection or the symptoms appeared on different plant organs can create confusions regarding the responsible damage agent .

Therefore, in a treatment program, in apple culture case, most of the time, will be applied both insecticides and fungicides.

The effectiveness of some of the new insecticide active substances means today large combat spectrum, sistemicity, longer protection and selectivity for the useful entomofauna, the research in this area being advanced.

An example is the active substance called spirotetramat. It is not harmful for insects but inside plant is transformed in spirotetramat-enol, a fatal substance for insects, in this way being affected only those insects who attack the plant organs. A special character is the double sistemicity of the substance, this circulating in the plant both through xilem and phloem, being protected all plant organs, including the new increases portions.

Data about ‘‘friendly pesticides‘‘ in *Cydia pomonella* control published Teodorescu G. and Trandafirescu M., 2002.

Knight A.L. and Flexner L., 2007 analyzes the efficiency of the insecticide substance called rynaxypyr in codling moth control while data about this for the orchards in Romania are described by Sumedrea M. et. all., 2009.

Along with chemical control, a number of other measures are necessary in the pests control process, aspect known as „integrated control”.

The last researches in apple culture protection target the increase of biological combat measures that complete the chemical ones (Drosu S. şi colab., 2007, Mitrea I. şi colab., 2010, M. Sumedrea et. all, 2012).

MATERIAL AND METHOD

The observations and determinations were made in an apple culture, on Idared variety, trees planted in 1992, at a distance of 3,5 x 2,5 (1842 trees/ha).

Along with the insecticide products for *Cydia pomonella* control, the treatment scheme included products for control also the other pests present during the vegetation period, these overlapping in many cases: *Quadraspidiotus perniciosus*, *Phyllonorycter blancardella, Dasineura mali, Adoxophyes reticulana, Aphis* spp., *Panonychus ulmi*, *Tetranichus urticae*.

In some products case the effect is complementary for more pests.

Table 1

The insecticide products used and the target are presented in table 1.
Insecticide products applied in pest's control

Product	Active substance	Target
Calypso 480 SC	tiacloprid 480 g/l	***Cydia pomonella*** *Quadraspidiotus perniciosus* *Phyllonorycter blancardella*
Confidor Oil SC 004	imidacloprid 4 g/l	*Quadraspidiotus perniciosus*
Decis Mega 50 EW	deltametrin 50 g/l	***Cydia pomonella*** *Quadraspidiotus perniciosus*
Envidor 240 SC	spirodiclofen 240 g/l	*Panonychus ulmi* *Tetranichus urticae*
Movento 100 SC	spirotetramat 100 g/l	*Quadraspidiotus perniciosus* ***Cydia pomonella***
Proteus OD 110	deltametrin 10 g/l + tiacloprid 100 g/l	***Cydia pomonella***

The chemical treatments were applied with OSELLA 1000 pump, auctioned by U-650 DTC tractor, the solution volume being of 1000 l/ha.

Pheromone traps and flight tracking curve helped in improving the accuracy of the optimum time for applying insecticides.

In the research period the products were applied using some treatment scheme treatment (tables 2 and 3), treatments data and number being different, in concordance with pest's eco-biology.

Table 2

Treatment scheme in 2014

Treatm.	Date	BBCH	Target	Products applied and dose/ha
1	21.03	51	*Q. perniciosus*	Confidor Oil SC 004 22,5 l/ha
2	28.03	55	*Adoxophyes reticulana*, defoliators	Decis Mega 50 EW 0,225 l/ha
3	9.04	57	*Adoxophyes reticulana*, defoliators	Calypso 480 SC 0,3 l/ha
4	23.04	65	aphids	Decis Mega 50 EW 0,225 l/ha
5	29.04	69	wasps, aphids	Calypso 480 SC 0,3 l/ha
6	7.05	71	aphids, ***Cydia pomonella* G1**	Proteus OD 0,75 l/ha
7	19.05	71-72	aphids	Proteus OD 0,75 l/ha
8	6.06	72-73	aphids, ***Cydia pomonella* G1**	Calypso 480 SC 0,3 l/ha
9	13.06	73	mites	Envidor 240 SC 0,6 l/ha
10	23.06	73-74	aphids, ***Cydia pomonella* G1**	Decis Mega 50 EW 0,225 l/ha
11	4.07	75	aphids, ***Cydia pomonella* G2**	Calypso 480 SC 0,3 l/ha
12	16.07	77	aphids, ***Cydia pomonella* G2**	Calypso 480 SC 0,3 l/ha
13	8.08	79	aphids, ***Cydia pomonella* G2**	Movento 100 SC 1,875 l/ha

Table 3

Treatment scheme in 2015

Treatm.	Date	BBCH	Target	Products applied and dose/ha
1	24.03	51	*Q. perniciosus*	Confidor Oil22.5 /l/ha
2	16.04	55	*Adoxophyes reticulana*,defoliators	Decis Mega 0.225 kg/ha
3	22.04	57	*Adoxophyes reticulana*,defoliators	Decis Mega 0.225 kg/ha
4	2.05	66	aphids	Calypso 480 SC 0,3 l/ha
5	12.05	71	aphids, ***Cydia pomonella* G1**	Proteus OD 0.75 l/ha + Movento 100 SC 1.875 l/ha
6	19.05	72	aphids, ***Cydia pomonella* G1**	Decis Mega 0.225 kg/ha
7	26.05	74	mites	Envidor 0.6 l/ha
8	5.06	75	aphids, ***Cydia pomonella* G1**	Movento 100 SC 1.875 l/ha
9	23.06	76	aphids, ***Cydia pomonella* G2**	Calypso 480 SC 0.3 l/ha
10	6.07	77	aphids, ***Cydia pomonella* G2**	Decis Mega 0.225 kg/ha
11	16.07	78	***Cydia pomonella* G2**	Calypso 480 SC 0,3 l/ha

RESULTS AND DISCUSSIONS

In 2014, 13 treatments were necessary for pests keeping under control. Six of them had *Cydia pomonella a*s target, 3 treatments being applied for each generation.

Efficiency of treatment released from Abbot formula, E% = 1 - (T/M) x 100:

E%=efficiency,

T= attack frequency on fruits in the experience (%),

M= attack frequency of fruits in the untreated.

For highlighting the experimental results, it was calculated the average of determination and compared with the untreated. Correlation between pest eco-biology and weather parameters is visible in treatments data, these being different more or less in the two generations cases.

In 2014, treatments for G_1 control were applied between 07 May-23 June (T_2 at 06 June), the maxim fly on 17 May while for G_2 control, treatments were applied between 04 July-08 August, with maxim fly on 27 July (tables 2 and 4 and figure 1).

Table 4

Eco-biology of *Cydia pomonella* in 2014

Year	Data	Day degree necessary	Day degree calculated	Event
2014	06 January	0	0	
2014	17 May	181	181	fly maxim G1
2014	27 July	817	812	fly maxim G2

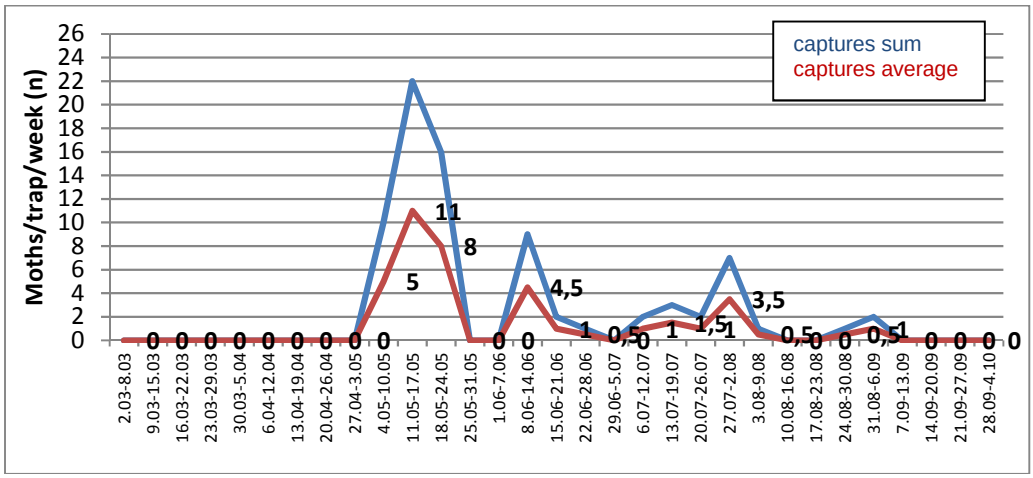

Figure 1. The adults fly dynamic of *Cydia pomonella*, at the untreated variant in 2014

In 2014, regarding the attack presence (fig.2), is visible a significant difference between the experience and the untreated variant.

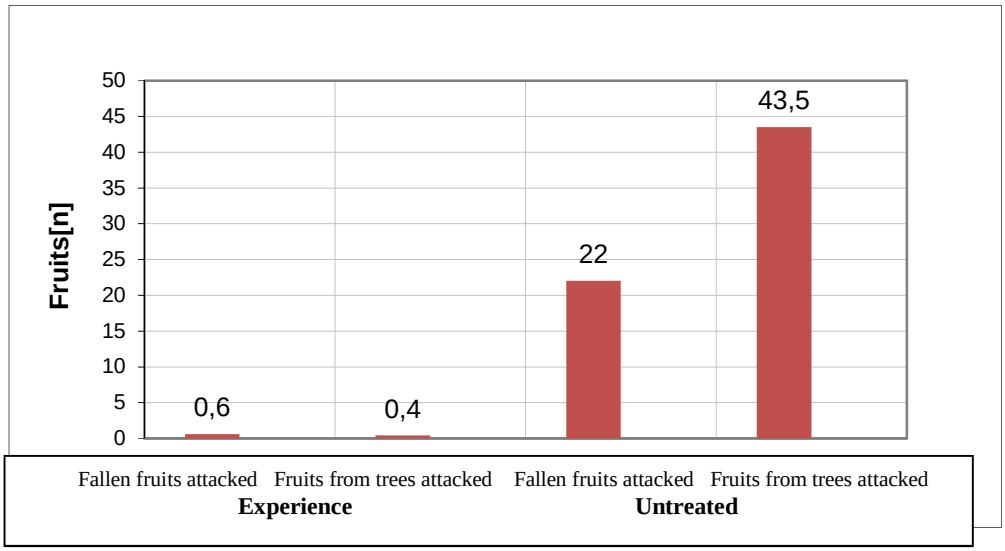

Figure2. Frequency attack of *Cydia pomonella* at ICDPP-Mărăcineni in 2014

Regarding the efficiency of the treatment program, it was more than 97% in case of fallen fruits attacked and more than 99% in the case of fruits from trees (figure 2).

$E_1\% = 1 - [(0.60/22)] \times 100 = 97.28\%$

$E_2\% = 1 - [(0.40/43.5)] \times 100 = 99.1\%$

In 2015, because of less favorable climate conditions compared to those in 2014, was necessary a number of 11 treatments (table 3), to control *Cydia pomonella* being necessary 6.

Treatments for G_1 were applied between 12 May and 05 June (T_2 at 19 May) with a maxim fly on 16 May, first treatment including two insecticides. For G_2 the treatments period was 23 June-07 July (T_2 at 06 July) with a maxim fly on 19 July (tables 3 and 5).

Table 5

Eco-biology of *Cydia pomonella* in 2015

Year	Data	Day degree necessary	Day degree calculated	Event
2015	11 January	0	0	
2015	16 May	181	187	fly maxim G1
2015	19 July	817	808	fly maxim G2

The adults fly dynamic in the untreated variant, in 2015, is observed in figure 3.

In 2015, the efficiency of the treatment program was 94.72% in case of fallen fruits attacked and 87.91% in the case of fruits from trees (figure 4).

$E_1\% = 1 - [(0.47/8.91)] \times 100 = 94.72\%$

$E_2\% = 1 - [(0.58/4.8)] \times 100 = 87.91\%$

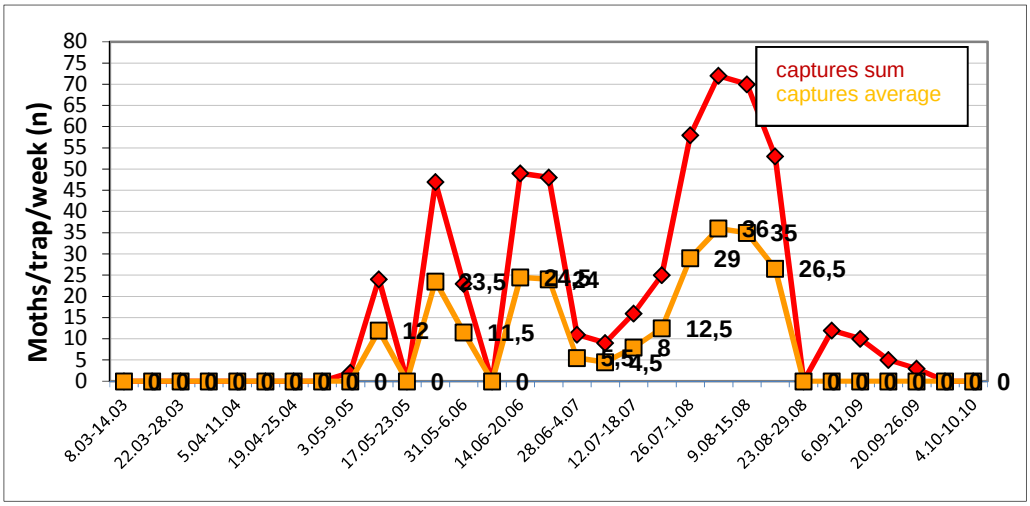

Figure 3. Adults fly dynamic of *Cydia pomonella* in 2015, in the untreated variant

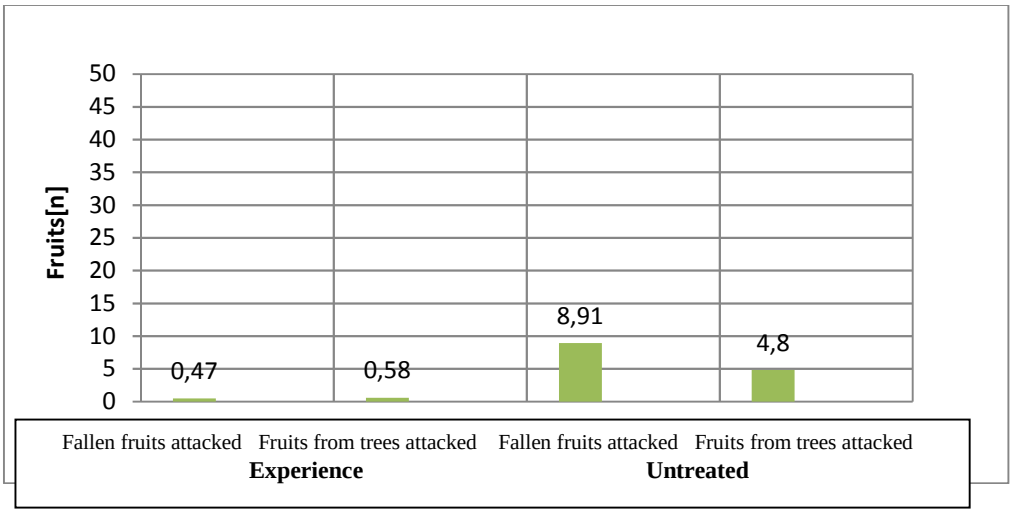

Figure 4. Frequency attack of *Cydia pomonella* at ICDPP-Mărăcineni in 2015

CONCLUSIONS

Considering the entire pests spectrum present at the experience level, year 2014 was more favorable for the attack than 2015 being necessary two more treatments.

By correlating the climate conditions, pest eco-biology and data obtained from the monitoring program were established exactly the right moments for insecticides, the efficiency increasing in this way.

The treatments period for G_1 and G_2 control differ in the two years: in 2014 for control G_1 between 07 Mai-23 June (T_2 at 06 June) and for G_2 between 04 July-08 August, while for 2015, for G_1 control treatments were applied between 12 May-05 June (T_2 at 19 May) and for G_2 treatments period was between 23 June-07 July (T_2 at 06 July).

The efficiency of treatment program is proportional with the attack frequency in the two years of observations, being 99.1% in 2014 and 92.3% in 2015.

BIBLIOGRAPHY

1. **Drosu S., Teodorescu G.,** and colab., 2007 - *Studies on the attract and kill method to control the codling moth (Cydia pomonella) in Romanian apple orchards*, European Society for New Methods in Agricultural Research, XXXVII ESNA Annual Meeting, JINR Dubna, Russia Book of abstracts ISBN 5-9530-0159-2.

2. **Knight A.L., Flexner L.,** 2007 - *Disruption of mating in codling moth (Lepidoptera: Tortricidae) by chlorantraniliprole, an anthranilic diamide insecticide*. Pest Management Science, 63 (2), 180-189.

3. **Mitrea I., Mitrea Rodi, Ţucă O., Stan C.,** 2010 – Studies regarding the biological control of the Cydia pomonella L. in the conditions of the Oltenia central area. South Western Journal of Horticulture, Bilogy and Environment. Vol.1No.1, 1-8, Craiova.

4. **Sumedrea M., Marin F.C., Teodorescu G., Paul Bădescu A., Săvulescu I., 2009 -** *Rynaxypyr a new alternative to control codling moth (Cydia pomonella) in romanian orchards*, Vol. XXV 2009, p.124-129, ISSN 1584-2231, Proceedings of R.I.F.G. Pitesti.

5. **Sumedrea, M., Marin, F.C., Călinescu, M., Iorgu, A., Sumedrea, D.,** 2012 - *Researches regarding the use of matting disruption pheromones in control of apple codling moth - Cydia pomonella L.*, International Conference of The University of Agronomic Sciences and Veterinary Medicine Agriculture For Life, Life for Agriculture, June 4-16, 2015 Bucharest Romania http://agricultureforlife.usamv.ro; Agriculture and AgriculturalScience Procedia 6 (2015) 171–178, U.S.A.M.V. Bucharest.

6. **Teodorescu G., Trandafirescu M**., 2002 - *Codling moth control (Cydia pomonella L.) using friendly pesticides* - XXVIth International Horticultura Congress, (572), Toronto.