

MONITORING OF SOME *LEPIDOPTERA* SP. FROM APPLE ORCHARDS WITH THE HELP OF PHEROMONE TRAPS, IN CONDITIONS OF 2019 IN THE NORTH EAST AREA OF ROMANIA

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Abstract

The experience was organized within the Research Station for Fruit Growing Iasi, at Fălticeni Development Center, into intensive apple plantation. As varieties were taken in account Jonathan, Golden delicious and Starkrimson grafted on MM106, planted at distances of 4 x 2.5 meters, as a form of crown shape palmette type. For the monitoring of the pests, traps with synthetic sex pheromones such as atraPOM, atraRET, atraBLANC were used for three Lepidoptera sp. from the apple plantation, namely: *Cydia pomonella* L., *Phylonorichter blancardella* F., *Adoxophyes reticulana* Hb. The first two monitored species showed large peaks of flight curves between May and August. The first hibernating larvae of *Adoxophyes reticulana* Hb were observed in the crown of trees of Golden and Starkrimson varieties, at April 14, during the leafing period. The first flight of the species *Cydia pomonella* L. was registered on May 9 and the flight of *Phylonorichter blancardella* F., butterflies was registered in mid-June. Insecticides were very effective in controlling these pests: Mospilan-0.03% (0.45kg / ha) for the pink bud phenophase (BBCH 57) and Reldan 22EC -0.15% (2.2l / ha) for fruit with a diameter 1 cm (BBCH 71) for the biological reserve of *Adoxophyes reticulana* Hb., larvae; Calypso - 0.02% (0.3l / ha) and Coragen 0.15 l / ha for the second generation of *Cydia pomonella* L.

Keywords: *Adoxophyes reticulana* Hb., Apple, *Cydia pomonella* L., *Phylonorichter blancardella* F.

1. INTRODUCTION

Being one of the most important species of fruit trees, an extremely large number of pests and pathogens have been found, with almost 80 diseases caused only by viruses, mycoplasmas, bacteria, fungi and other physiological imbalances. Added to these diseases, there are 64 species of insects and mites, along with 8 species of nematodes and at least 2 species of rodents (Filipescu et al., 2001). *Cydia pomonella* L., *Phylonorichter blancardella* F. and *Adoxophyes reticulana* Hb. they are the most important Lepidoptera spp. that attack apple plantations around the world, that's why they have been very studied in recent years.

2. MATERIALS AND METHODS

The experience was organized within the Research Station for Fruit Growing Iasi, at Fălticeni Development Center, into intensive apple plantation. As varieties were taken in account Jonathan, Golden delicious and Starkrimson grafted on MM106, planted at distances of 4 x 2.5 meters, as a form of crown shape palmette type. For the monitoring of the pests, traps with synthetic sex pheromones such as atraPOM, atraRET, atraBLANC is presented in the figure 1, were used for

three *Lepidoptera* sp. from the apple plantation, namely: *Cydia pomonella* L., *Phylonorichter blancardella* F., *Adoxophyes reticulana* Hb..

The traps were installed on May 5, the distance between the traps being 20 meters, they are located at a height of 1.5 meters in the tree. Pheromones being changed monthly, and supports as many times as needed (even once a week, when a large number of catches were recorded).

The dynamics of catching butterflies with the help of traps with synthetic sex pheromones, in the conditions of 2019, is presented in the figure 2.

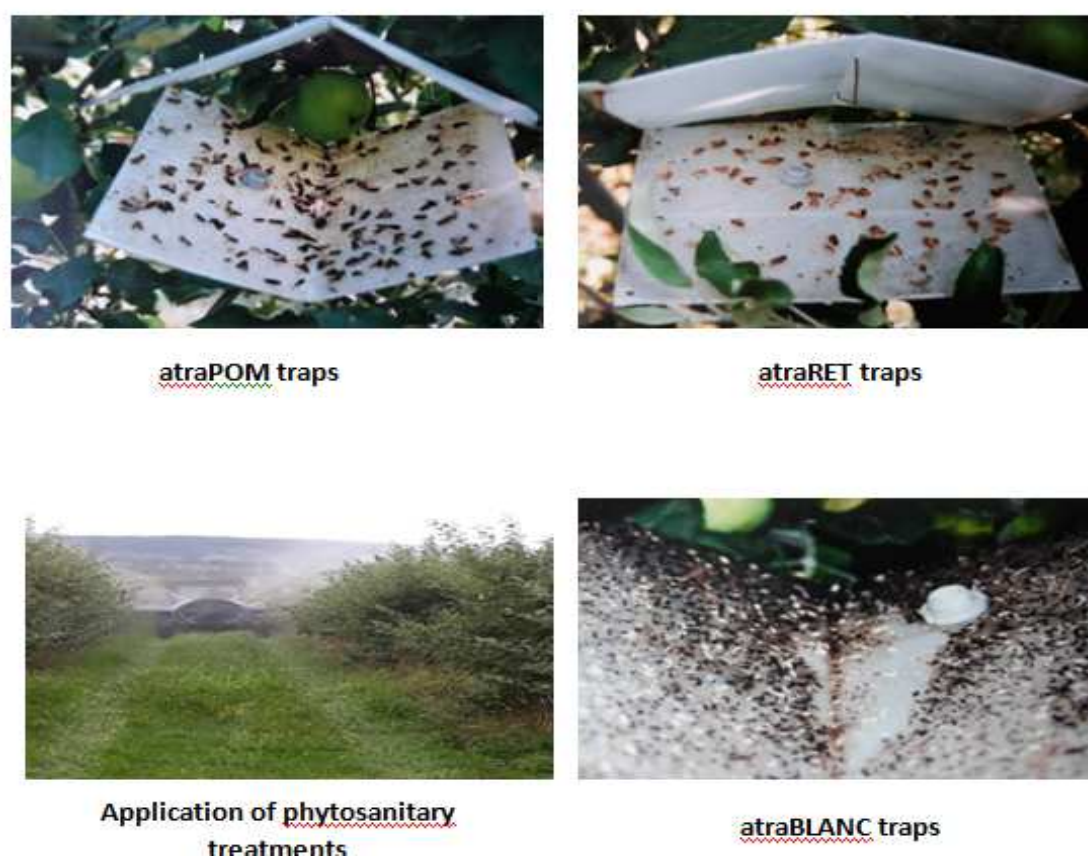


Figure 2. Pheromone traps and application of phytosanitary treatments

3. RESULTS AND DISCUSSIONS

The conditions of 2019 were favorable for the development of pests in apple plantations (table 1): *Cydia pomonella* L., *Phylonorichter blancardella* F. and *Adoxophyes reticulana* Hb. The first two monitored species showed large peaks of flight curves between May and August.

The first hibernating larvae of *Adoxophyes reticulana* Hb. were observed in the crown of trees of Golden and Starkrimson varieties, at April 14, during the leafing period.

The study period was characterized by low precipitation (deviation from the multiannual average being - 66.6 l /mm) distributed unevenly, with hail droughts with prolonged drought periods in March (- 64.0 mm), April (-7.8 mm), June (-29.7 mm) and July (-49.7 mm), being considered

deficient months from this point of view, and in January, May, August, September and October there was a excess of precipitation, the values of deviation from the multiannual averages being between + 5.8 mm and + 28.9 mm (table 1). It should be noted that although June registered a deficit in terms of rainfall compared to the multiannual average, they were unevenly distributed.

Table 1. The evolution of the climatic conditions of the studied period (temperatures, precipitations, humidity)

Month	Multiannual average temperature 2005 – 2015 (°C)	Temperature 2019 (°C)			The deviation from the multiannual average (°C)
		mean	high	low	
I	-1.9	-3.0	10.1	-14.8	-4.9
II	-1.2	1.9	17.6	-8.5	0.7
III	4.7	7.4	23.2	-6.2	-2.7
IV	11.4	10.5	26.3	-0.3	0.9
V	17.0	15.8	28.5	2.7	1.2
VI	20.5	21.6	34.4	9.7	-1.1
VII	22.4	20.9	35.4	9.1	1.5
VIII	21.9	21.8	35.0	9.3	0.1
IX	16.8	16.9	34.6	1.6	-0.1
X	10.3	11.5	26.3	1.0	-1.2
XI	5.4	8.29	24.4	-4.4	+2.9
XII	0.1	2.71	16.8	-6.4	+2.6
Mean	10.2	11.3	35.4	-14.8	+1.2
Month	Multiannual average precipitation 2005-2015 (mm)	Rainfall 2019 (mm)	Deviation	Number days with rainfall	Humidity 2019 (%)
I	35.5	47.6	+12.1	13	87
II	32.1	28.2	-3.9	8	79
III	71.2	7.2	-64.0	6	55
IV	51.4	43.6	-7.8	12	60
V	71.1	86.6	+15.5	13	75
VI	82.9	53.2	-29.7	13	77
VII	64.7	15.0	-49.7	7	67
VIII	50.8	56.6	+5.8	8	22
IX	36.5	65.4	+28.9	10	63
X	2.4	28.6	+26.2	10	82
XI	33.4	6.8	-26.6	7	80
XII	30.6	12.2	-18.4	9	85
Amount	562.6	451	-111.6	116	66.7

The average temperature recorded during the period studied (January-December) ranged from -3.0 ° C (in January) to 21.8 ° C (in August) (Table 1). The lowest value was recorded on January 8, 2019 (-14.8 ° C), and the highest value was 35.4 ° C recorded on July 2.

The first flight of the species *Cydia pomonella* L. was registered on May 9 and the flight of *Phylonorichter blancardella* F. butterflies was registered in mid-June.

Cydia pomonella L. recorded for the first generation two flight maxima, respectively of 43 and 57 butterflies on a trap at a reading in May and June. And for the second generation, there were two flight highs, respectively 45 per trap in July and 24 butterflies per trap in August.

Insecticides were very effective in controlling these pests: Mospilan-0.03% (0.45 kg/ha) for the pink bud phenophase (BBCH 57) and Reldan 22EC -0.15% (2.2l / ha) for fruit with a diameter 1 cm (BBCH 71) for the biological reserve of *Adoxophyes reticulana* Hb. larvae; Calypso -0.02% (0.3l / ha) and Coragen 0.15 l / ha for the second generation of *Cydia pomonella* L..

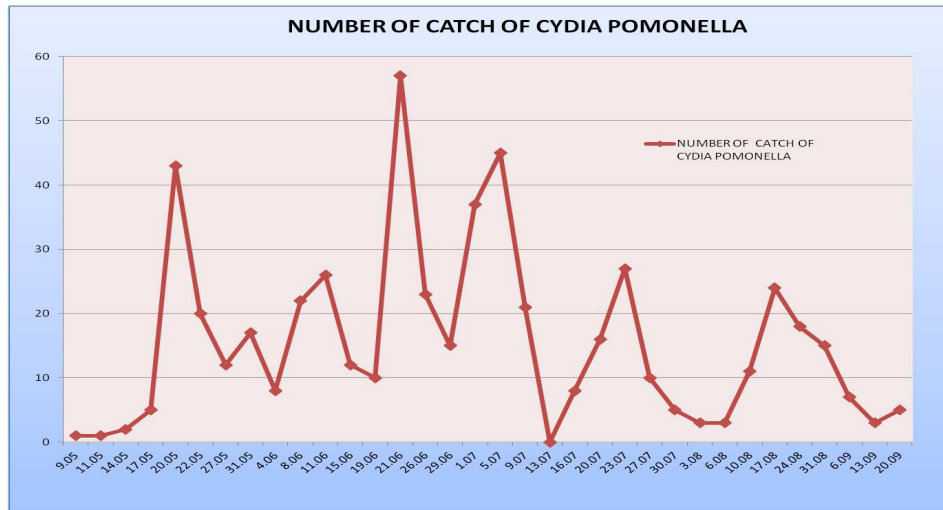


Figure 2. Analysis of flight curves of *Cydia pomonella* L

Butterflies of the first generation of *Adoxophyes reticulana* recorded a short flight, lasting about two weeks, at the end of May, with 2-7 butterflies on a trap at one reading, which is a low density compared to the large reserve of hibernating larvae.

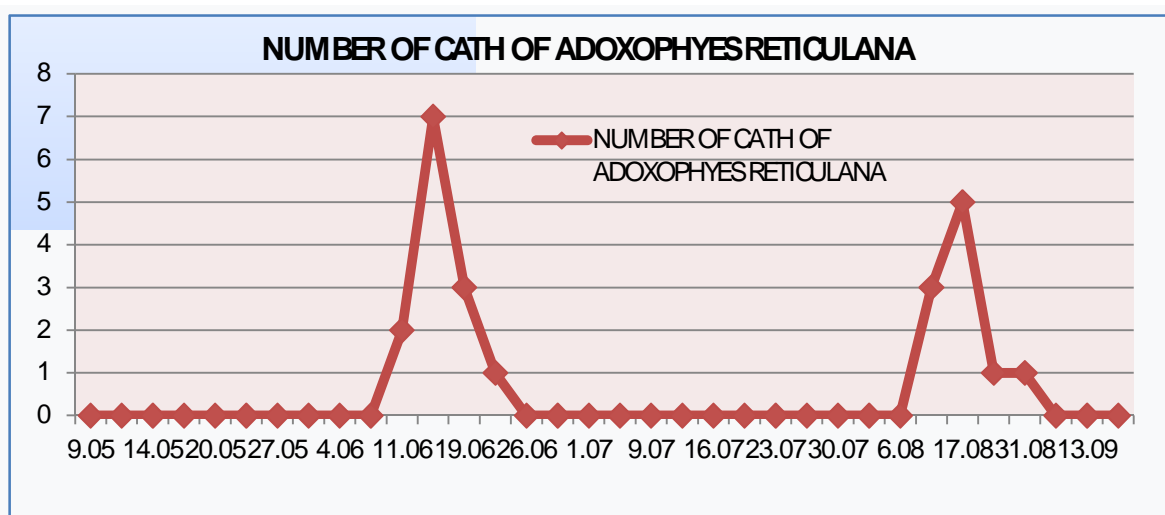


Figure 3. Analysis of flight curves of *Adoxophyes reticulana* Hb

Compared to previous years, the second generation of this pest was not reported in large numbers, following observations of pheromone traps installed in the orchard. This is due to the application of

phytosanitary treatments in combating the biological reserve of this pest and the good efficacy and wide spectrum of action of the insecticides used.

Phylonorichter blancardella F. recorded a permanent flight between May and September (figure 4), with high values for each maximum flight of the three generations, respectively of 150 butterflies on a trap at a reading in May, 300 butterflies on the trap in June and 2500 butterflies on the trap at the end of August.

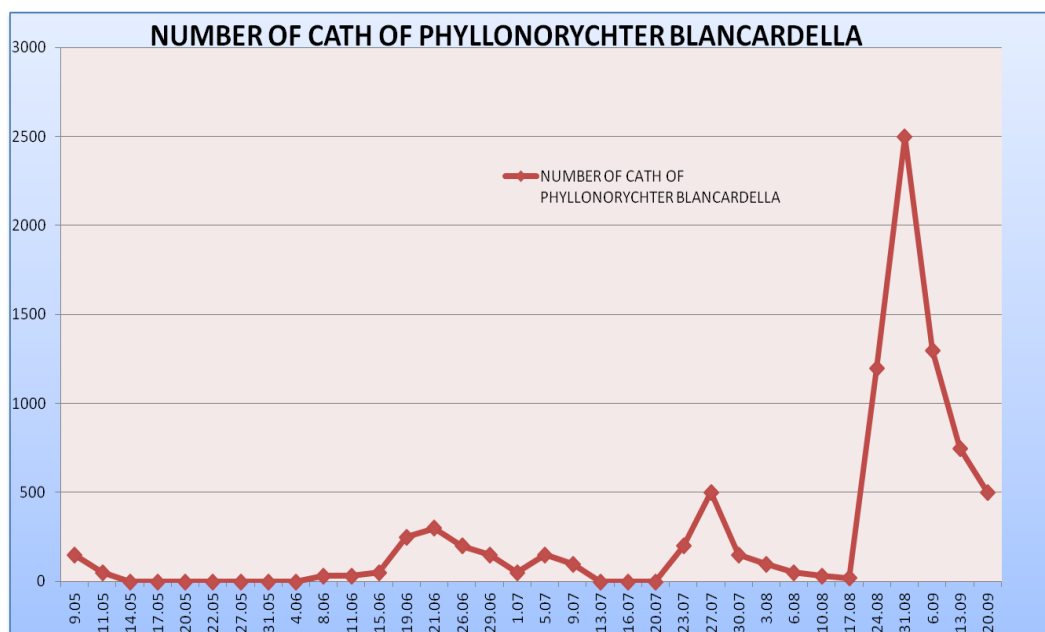


Figure 4. Analysis of flight curves of *Phylonorichter blancardella*

4. CONCLUSIONS

The conditions of 2019 were favorable for the development of the monitored apple pest species. The population density of the three lepidoptera was monitored in orchard conditions treated with the help of traps with specific pheromones, such as ATRAPOM, ATRARET and ATRABLANC. Insecticides were very effective in controlling these pests: Mospilan-0.03% (0.45 kg / ha) for the pink bud phenophase and Reldan 22EC -0.15% (2.2 l/ha) for fruit with a diameter 1 cm, for the biological reserve of *Adoxophyes reticulana* larvae; Calypso -0.02% (0.31 / ha) and Coragen 0.15 l/ha for the two generations of *Cydia pomonella* L..

The observations of the traps with sex pheromones allowed the permanent surveillance of the pest populations, depending on this, the optimal moment of applying the chemical treatments in the apple plantation was established.

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