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 Iași, 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 Lepidopters 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 Iași, 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.

![traps](image1)

**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 an 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.

| 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 | 35.9 | 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 |

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.

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![Figure 2. Analysis of flight curves of Cydia pomonella L.](image)

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](image)

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

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

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