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OBSERVATIONS ON THE BIOLOGY OF SPECIES *Cydia pomonella* (WORM APPLE) IN AN ORCHARD IN THE TOWN SIBIEL, SIBIU COUNTY IN 2014 YEAR

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Abstract

In this paper, it was researched the biological and ecological orchard apple worm in the Sibiel Village, Sibiu County in terms of 2014 year. Given the increasing damage caused in recent years by the worm Cydia pomonella of apples in the orchard studied, two methods were used: through mass capture of adults with sexual attractant pheromone traps and stage of the study included minimum threshold temperature tracking the insect and by this, calculate the approximate insect biology and ecology on the average daily temperature, precipitation and humidity, for the application of effective treatments consistent with environmental protection is therefore necessary detailed knowledge of the biology of this insect for forecasting and warning treatments. As a conclusion, the use of pheromone traps proved the following advantages: reducing the pest population within the economic threshold, reducing the amount of insecticides for crop protection in some cases even their exclusion, environmental protection and getting ecologically clean agricultural production, keeping useful entomofauna.

***Key words*:** *apple orchard, Cydia pomonella, Sibiel village*

INTRODUCTION

Given the increasing damage caused in recent years by the worm moth *Cydia pomonella* especially in apple orchards and attacking other trees such as walnut. For the application of effective treatments consistent with environmental protection required detailed knowledge of the biology of this insect for forecasting and warning treatments. The most important and effective treatment should be applied in neon larva phase (between hatching and penetration fruit flesh). For this treatment to be effective it is necessary to know the precise maximum adult flight period of mating and oviposition by the female in order to accurately determine hatching and larval migration during the fruit to be attacked.

The investigations conducted so far found that in Europe and North America, experts have concluded that this pest has I-III generations per year in exceptionally favorable years could reach IV, V generations.

It was found that the life cycle of different species reported by the host plant, being different one on pomaceous (apple, pear) at the amigdalacee (appricot, peach) or nuts [11,12].

Apple worm presents in our country but also in the study area Sibiel village near Sibiu two generations per year and over winter in the larval stage fully developed in a cocoon of winter (hibermaculum) under the bark of trees. The larvae turn into pupae spring [8,9,10].

Pupated duration is closely linked to temperature, humidity, cocoons exhibition, ranging on average between 20-30 days [4,5,6].

MATERIALS AND METHODS

Tracking insect biology orchard was done on an area of 1,120 ha, from the edge of the village Sibiel located 22 km from the city of Sibiu [14]. The orchard is made up of local varieties of apple (Boicăn, Gustav, Pătul, Florin), with an experience of over 80 years

who have adapted the climatic conditions of the area.

To witness the biology of this insect I acted in two ways: through mass capture of adults with sexual attractant pheromone traps attractor type capsules purchased from the Institute of Chemistry at Cluj-Napoca, mounted with adhesive traps and regular reading capture curve to achieve maximum flight time and then calculating adult pre ovipozitar period, ovipozitar and submitting a clutch to be able to accurately calculate the time of hatching (larval stages during the period and neon).

Photo 1. Apple tree orchard in Sibiel (original photo)

The second stage of the study included minimum threshold temperature tracking the insect and by this, calculate the approximate insect biology and ecology on the average daily temperature, precipitation and humidity. Weather disk data were obtained from automatic weather station near Sibiu Airport.

Comparing the data obtained by the two methods of observation: pheromonal traps and insect evolution based on the calculation of the minimum temperature and compare that forecast and warning bulletins issued by Phytosanitary Unit Sibiu this data practically overlapped.

It shows that the biology of the insect does not depend directly phenological development phases of apple but only an average daily temperature, precipitation and humidity of the current year.

The conditions studied apple orchard in the village of Sibiel, Sibiu county, in 2014, the biology of the species was observed using pheromone traps, sexual Attractant capsules by capturing males, to establish maximum flight curve adults in order to determine the optimum moment treatment against codling.

Photo. 2. Attractant capsule (original photo)

Monitoring using pheromone traps is the most advanced and accurate than visual more research. Pest detection 5-7 days before the flight. Mass capture as a way to combat pest preclude the use of insecticides and other toxic agents [7].

For this purpose were installed three capsules attractant traps in different areas of the orchard about a trap about 400 m^2, on 26 April 2014. And reading was done in two days, so three readings per week.

RESULTS AND DISCUSSIONS

The first seizures were recorded on May 6, 2014 when the air temperature recorded was 18°C. Flight of the first generation of research and observations spread over a period of 38 days. For the second generation, the maximum flight curve was during 8 to 10 August 2014, at an interval of 37 days maximum flight to the first generation. In the analyzed phenological observations were made on 4 varieties: Boicăn, Gustav, Pătul, Florin, varieties that have not performed chemical treatments.

Beginning May 15, 2014 flight coincided with the beginning of the phenology of apple fruit had a diameter of 0.3 cm all varieties analyzed.

Maximum flight for the first generation

orchard analyzed (27 to 29 June 2014) corresponded phenology period when fruit varieties analyzed had a diameter of 1.2 cm.
Maximum curve flight II generation varieties taken under observation were classified into the period when apple fruit were 2.7 to 3 cm in diameter.

CONCLUSIONS

Weather appearance of the insect is drawn up taking into account reserve hibernating caterpillars. To this end, in August belts can be installed on trees trap the mites in diapause retire. In late autumn some of girdles rises and analyzed. Normal density (DN) is hibernating caterpillars media [1,2,3,4].

Photo 3. Installing traps in the apple (original photo)

If there is 5-6 caterpillars per tree DN can be said that the flight whose progeny will cause an attack of medium density.
Treatments warning is biological and ecological criterion. If biological criteria, determining the intensity of butterflies flying in both generations is done using pheromone baited traps attract capsule type produced by the Institute of Chemistry Raluca Ripan in Cluj-Napoca.
These traps were installed in trees crown and daily noted that the number of male butterflies were glued to the substrate trap. The intensity of butterfly flight gave us information on the number of offspring in each generation, on the other hand, the maximum catch is the maximum adult flight, settling egg mass filing date. After warning the first biologic treatment criterion is the maximum record clutch or when the first eggs laid are under red ring [15,16,17].
The second treatment is 10-12 days warns saddle and the second generation of the actual temperature is 975^{o}C summation [5,6].
In practical terms, warning first estimates for both treatments is to determine the number of days of laying the formula:

$$X_n = \frac{K}{t_n - 9} + \frac{56}{t_n - 9}$$

Or when tn-9 = 56^{o}C (counted from the filing first eggs) thermal constant of development codling (K) is 624^{o}C, the lower threshold of development (t) is 9^{o}C. The threshold for prolificacy (0) is 15^{o}C and thermal optimum (0t) is 30.5^{o}C. Lower threshold humidity (40%) is 15%, limits moisture favorable to the lower (40) and upper (Ho) being 55% and 75% [11,12,13].
As a conclusion of the study was conducted using pheromone traps proved that impact has the following advantages: reducing the pest population within the economic threshold, reducing the amount of insecticides for crop protection in some cases even their exclusion, environmental protection and getting ecologically clean agricultural production, keeping useful entomofauna.

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