VIERMELE PRUNELOR (GRAPHOLITA FUNEBRANA, TR.): MONITORIZAREA ȘI STUDIUL DINAMICI CURBEI DE ZBOR AL MASCULILOR ADULTI ÎN RELAȚIE CU FACTORII CLIMATICI LA SCDP BISTRITĂ IN PERIOADA 2016-2018

PLUM FRUIT MOTH (GRAPHOLITA FUNEBRANA, TR.): MONITORING AND STUDY OF FLIGHT CURVE DYNAMICS OF ADULT MALE MOTHS IN RELATION WITH CLIMATIC FACTORS AT RSFG BISTRITA IN THE PERIOD OF 2016-2018

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Abstract

The main objective of the study was the monitoring of flight curve of adult plum fruit male moths (Grapholita funebrana, Tr.) analyzing scientific data from an interval of 3 experimental years (2016-2018). The aim of the study was to find out the maximum of flight curve, the study of the biology and development of adult moths. There were used specific ATRAFUN pheromonal traps buying from ICCRR ‘Raluca Ripan’ Institute, the attractant was Z8 dodecen 1-Il and E8 dodecen 1-Il acetate, traps were plased in an older plum orchard planted with Stanley, Renclod Althan and other cultivars grafted on Myrobalan. In the experimental years 2016-2018 adult male moths appeared relatively close in time, in May (30.05.2016, respectively 24.05.2017, and in 22.05.2018 in the year 2018). In 2016, in the period of maximum flight, the number of adult male moths captured was between 1-22 moths/trap and in year 2017 between 12-19 moths/trap. It was observed that in rainy periods in the moths June-July 2016-2017 and especially in 2018, when there were registered high rainfall amounts in May and June; the number of adult moths captured was lower in comparison with warm, sunny days. In the year 2018 at the beginning of observation period (at the end of May) there were captured in average 12-17 adult moths. At the beginning and the middle of June when the temperatures were favorable, when was registered the maximum flight for 2018, there were registered 13-17 adult moths / trap. At the end of month June there were registered high amounts of rainfall and lower temperatures, thus the development and flight of the pest was more reduced. July 2018 was characterized as a cold, rainy month, there were registered a much lower flight (2-5 adults /trap). If we analyze the maximum flight curve of the three experimental years than the conclusion is that in 2016 it was registered the maximum in, decade III of moth June, capturing 22 adults. In 2017 the maximum flight curve was registered in decade III of July with 16 adults and in 2018 the maximum was in the middle of June, decade II, with 17 adult male moths registered. These scientific dates are very important in order to identify the maximum flight curve and to find those periods when the phytosanitary treatments have the greatest efficiency.

Cuvinte cheie: adulți masculi, capcană, feromoni, curbă de zbor
Keywords: male adults, trap, pheromones, flight curve

1. Introduction

The plum fruit moth is one of the most dangerous pests in plum culture, high amount of yield is affected by the migration of larvae in the fruits flesh and consuming the inner part of them, organoleptically and visually fruits are damaged. The biological cycle (Charmilot, 1979) of the pest is influenced also by the level of biological reserve and dynamics of environmental and climatic factors (Ivan H., 1996). Lately it is a known fact that the climate is changed, thus the pests adapted on these changes and there is an urgent demand to study and find methods to fight against these pests (Snejana Damianov, 2017). In the integrated pest management technique one of the key element is represented by the study of the biological life cycle development of the pest and the knowledge of the maximum flight curve of adult moths, in order to find the proper moment to effectuate phytosanitary treatments.

The main objective of the study was the monitoring of flight curve of adult plum fruit male moths (Grapholita funebrana, Tr.) in year 2018 and the analyzing of scientific data of an interval of 3 experimental years (2016-2018). The aim of the study was to find out the maximum of flight curve, the study of the adult moths biology and development.
2. Material and methods

The experiment was conducted at RSFG Bistrita in an older classical plum orchard planted with Stanley, Renclod Althan and other plum cultivars grafted on Myrobalan, during 2016-2018. There were used specific ATRAFUN pheromonal traps bought from ICCRR ‘Raluca Ripan’ Institute, the attractant was Z8 dodecen 1-ol acetate and E8 dodecen 1-ol acetate. Adult fruit plum moths captured on traps were counted weekly and meteorological data was registered in order to assess the interrelation of flight dynamics with climate data.

3. Results and Discussions

In the experimental years 2016-2018, adult male moths appeared relatively close in time, in May (30.05.2016, respectively 24.05.2017, and in 22.05.2018 in the year 2018). In 2016 in the period of maximum flight, the number of adult male moths captured was between 1-22 moths/trap and in year 2017 between 12-19 moths/trap.

It was observed that in rainy periods in the moths June-July 2016-2017 and especially in 2018 when there were registered high rainfall amounts in May and June, the number of adult moths captured was lower in comparison with warm, sunny days. In the year 2018, at the beginning of observation period (at the end of May) there were captured in average 12-17 adult moths.

At the beginning and the middle of June, when the temperatures were favorable, it was registered the maximum flight for 2018, there were registered 13-17 adult moths / trap. At the end of month June there were registered high amounts of rainfall and lower temperatures, thus the development and flight of the pest was more reduced. July 2018 was characterized as a cold, rainy month and there was registered a much lower flight (2-5 adults /trap).

If we analyze the maximum flight curve of the three experimental years, than the conclusion is that in 2016 was registered the maximum, in decade III of month June, capturing 22 adults. In 2017, the maximum flight curve was registered in decade III of July with 16 adults and in 2018 the maximum was in the middle of June, decade II, with 17 adult male moths registered.

4. Conclusions

According to the researches effected at RSFG Bistrita in period 2016-2018, between decade III June (2016) and decade III (2017) decade II-June (2018)- it is situated the maximum of adult plum male moth captures / trap / decade. These data are very important in order to find the maximum of flight curve and to find those periods in which the applying of phytosanitary treatments they have the greatest impact.

References

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Tables and figures

Fig. 1. Adult plum fruit moths (Grapholita funebrana,Tr.)
| Decade  | Data            | No. of captures/trap 1 | No. of captures/trap 2 | Average/trap | Average/decade |
|---------|-----------------|------------------------|------------------------|--------------|----------------|
| MAY III | 30.05.2018      | 3                      | 2                      | 3            | 3              |
| JUNE I  | 06.06.2018      | 5                      | 6                      | 6            |                |
| JUNE II | 09.06.2016      | 3                      | 2                      | 3            | 4              |
| JUNE III| 13.06.2016      | 2                      | 1                      | 2            |                |
| JUNE III| 17.06.2016      | 4                      | 2                      | 3            | 2              |
| JUNE III| 22.06.2016      | 10                     | 13                     | 12           |                |
| JUNE III| 27.06.2016      | 22                     | 16                     | 19           | 15             |
| JULY I  | 01.07.2016      | 5                      | 12                     | 9            |                |
| JULY I  | 08.07.2016      | 12                     | 4                      | 8            | 8              |
| JULY II | 12.07.2016      | 5                      | 7                      | 6            |                |
| JULY II | 19.07.2016      | 4                      | 6                      | 5            | 6              |
| JULY III| 22.07.2016      | 4                      | 5                      | 5            | 5              |
| AUG I   | 05.08.2018      | 3                      | 4                      | 4            |                |
| AUG II  | 12.08.2018      | 3                      | 4                      | 4            |                |
| AUG III | 22.08.2016      | 12                     | 1                      | 7            | 7              |
| AUG III | 29.08.2016      | 12                     | 2                      | 7            | 7              |
| SEPT I  | 08.09.2016      | 13                     | 1                      | 7            | 7              |

| Decade  | Data            | No. of captures/trap 1 | No. of captures/trap 2 | Average/trap | Average/decade |
|---------|-----------------|------------------------|------------------------|--------------|----------------|
| MAY I   | 05.05.2017      | 1                      | 1                      | 1            |                |
| MAY I   | 09.05.2017      | 2                      | 2                      | 2            | 2              |
| MAY II  | 12.05.2017      | 5                      | 7                      | 6            |                |
| MAY II  | 18.05.2017      | 6                      | 8                      | 7            | 7              |
| MAY III | 22.05.2017      | 13                     | 12                     | 13           |                |
| MAY III | 26.05.2017      | 15                     | 14                     | 15           | 14             |
| IUN I   | 02.06.2017      | 14                     | 11                     | 13           |                |
| IUN I   | 09.06.2017      | 13                     | 12                     | 13           | 13             |
| JUNE II | 12.06.2017      | 10                     | 9                      | 10           |                |
| JUNE II | 16.06.2017      | 9                      | 13                     | 11           | 10             |
| JUNE III| 22.06.2017      | 6                      | 8                      | 7            |                |
| JUNE III| 28.06.2017      | 7                      | 8                      | 8            | 7              |
| JULY I  | 03.07.2017      | 8                      | 9                      | 9            |                |
| JULY I  | 07.07.2017      | 6                      | 7                      | 8            |                |
| JULY II | 14.07.2017      | 8                      | 11                     | 10           |                |
| JULY II | 18.07.2017      | 11                     | 12                     | 12           | 11             |
| JULY III| 24.07.2017      | 15                     | 14                     | 15           |                |
| JULY III| 31.07.2017      | 16                     | 17                     | 17           | 16             |
| AUG I   | 02.08.2017      | 7                      | 6                      | 7            |                |
| AUG I   | 07.08.2017      | 8                      | 9                      | 9            | 8              |
| AUG II  | 11.08.2017      | 5                      | 5                      | 5            |                |
| AUG II  | 18.08.2017      | 4                      | 3                      | 4            |                |
| AUG III | 22.08.2017      | 4                      | 3                      | 4            |                |
| AUG III | 30.08.2017      | 1                      | 2                      | 2            | 3              |
| SEPT I  | 04.09.2017      | 2                      | 1                      | 2            | 2              |
Table 3. Number of captures of adult plum fruit moths in year 2018

| Decade   | Data         | No. of captures/trap 1 | No. of captures/trap 2 | Average/trap | Average/decade |
|----------|--------------|------------------------|------------------------|--------------|----------------|
| May III  | 22.05.2018   | 12                     | 17                     | 15           | 12             |
|          | 31.05.2018   | 8                      | 10                     | 9            |                |
| JUNE I   | 05.06.2018   | 13                     | 15                     | 14           | 14             |
|          | 07.06.2018   | 13                     | 14                     | 14           | 14             |
| JUNE II  | 15.06.2018   | 12                     | 17                     | 15           | 15             |
| JUNE III | 22.06.2018   | 7                      | 8                      | 8            | 8              |
| JULY I   | 06.07.2018   | 5                      | 4                      | 5            | 5              |
| JULY II  | 13.07.2018   | 3                      | 2                      | 3            | 3              |
| JULY III | 20.07.2018   | 4                      | 4                      | 4            |                |
| AUG I    | 03.08.2018   | 3                      | 3                      | 3            |                |
| AUG II   | 08.08.2018   | 3                      | 2                      | 3            | 3              |
| AUG III  | 13.08.2018   | 4                      | 2                      | 3            |                |
|          | 17.08.2018   | 3                      | 2                      | 3            |                |
|          | 21.08.2018   | 2                      | 2                      | 2            |                |
| SEPT I   | 05.09.2018   | 2                      | 2                      | 2            | 1              |

Fig. 2. Average number of adult male moth captures (*Grapholita funebrana*, Tr.) /trap/decade at RSFG Bistrița, in period 2016-2018
Fig. 3. Main meteorological factors—average temperatures (°C) and rainfall (mm) at RSFG Bistrița in the year 2016

Fig. 4. Main meteorological factors—average temperatures (°C) and rainfall (mm) at RSFG Bistrița in the year 2017

Fig. 5. Main meteorological factors—average temperatures (°C) and rainfall (mm) at RSFG Bistrița in the year 2018