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VIERMELE PRUNELOR (*GRAPHOLITA FUNEBRANA*, TR.): MONITORIZAREA ŞI STUDIUL DINAMICII CURBEI DE ZBOR AL MASCULILOR ADULŢI ÎN RELAŢIE CU FACTORII CLIMATICI LA SCDP BISTRIŢA 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 develoment of adult moths. There were used specific ATRAFUN pheromonal traps buyed from ICCRR 'Raluca Ripan' Institute, the atractant 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 2016it 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: adulţi 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-il acetateand E8 dodecen 1-il 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.

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Tables and figures

Fig. 1. Adult plum fruit moths (*Grapholita funebrana*,Tr.)

Table 1. Number of captures of adult plum fruit moths in year 2016

2016					
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	4
	09.06.2016	3	2	3	
JUNE II	13.06.2016	2	1	2	2
	17.06.2016	4	2	3	
JUNE III	22.06.2016	10	13	12	15
	27.06.2016	22	16	19	
JULY I	01.07.2016	5	12	9	8
	08.07.2016	12	4	8	
JULY II	12.07.2016	5	7	6	6
	19.07.2016	4	6	5	
JULY III	22.07.2016	4	5	5	5
AUG I	05.08.2018	3	4	4	4
AUG II	12.08.2018	3	4	4	4
AUG III	22.08.2016	12	1	7	7
	29.08.2016	12	2	7	
SEPT I	08.09.2016	13	1	7	7

Table 2. Number of captures of adult plum fruit moths in year 2017

2017					
Decade	Data	No. of captures/trap 1	No. of captures/trap 2	Average/trap	Average/ decade
MAY I	05.05.2017	1	1	1	2
	09.05.2017	2	2	2	
MAY II	12.05.2017	5	7	6	7
	18.05.2017	6	8	7	
MAY III	22.05.2017	13	12	13	14
	26.05.2017	15	14	15	
IUN I	02.06.2017	14	11	13	13
	09.06.2017	13	12	13	
JUNE II	12.06.2017	10	9	10	10
	16.06.2017	9	13	11	
JUNE III	22.06.2017	6	8	7	7
	28.06.2017	7	8	8	
JULY I	03.07.2017	8	9	9	8
	07.07.2017	6	7	7	
JULY II	14.07.2017	8	11	10	11
	18.07.2017	11	12	12	
JULY III	24.07.2017	15	14	15	16
	31.07.2017	16	17	17	
AUG I	02.08.2017	7	6	7	8
	07.08.2017	8	9	9	
AUG II	11.08.2017	5	5	5	4
	18.08.2017	4	3	4	
AUG III	22.08.2017	4	3	4	3
	30.08.2017	1	2	2	
SEPT I	04.09.2017	2	1	2	2

Table 3. Number of captures of adult plum fruit moths in year 2018

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	
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	2
	27.07.2018	2	2	2	
AUG I	03.08.2018	3	3	3	3
	08.08.2018	3	2	3	
AUG II	13.08.2018	4	2	3	3
	17.08.2018	3	2	3	
AUG III	21.08.2018	2	2	2	2
	27.08.2018	2	2	2	
SEPT I	05.09.2018	2	2	2	1

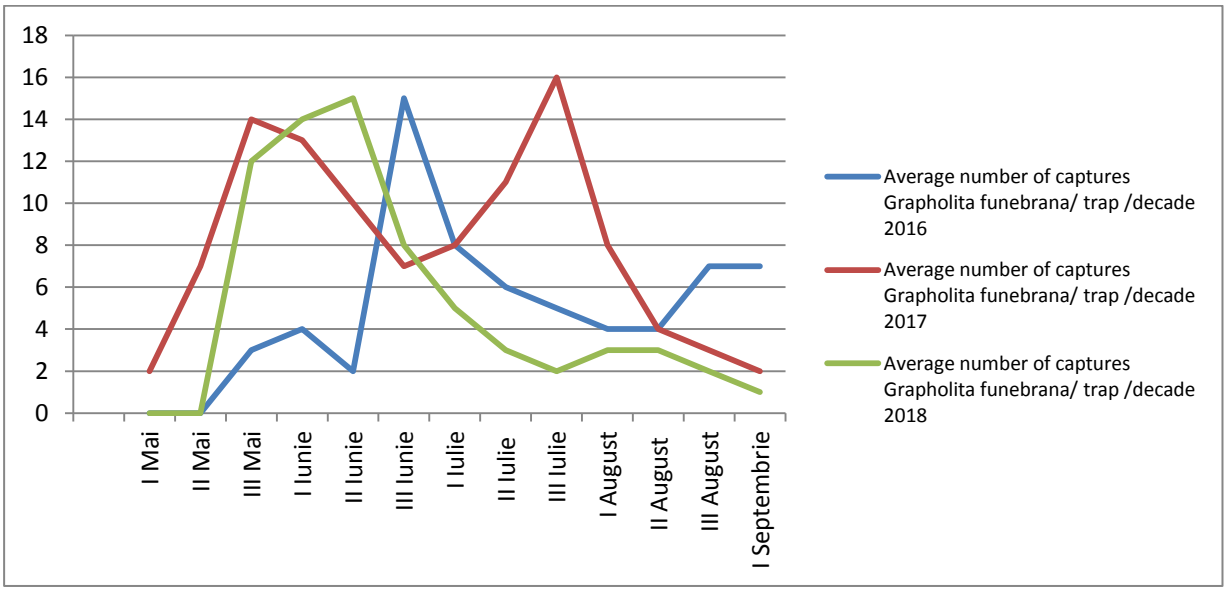

Fig. 2. Average number of adult male moth captures (*Grapholita funebrana*, Tr.) /trap/decade at RSFG Bistriţa, in period 2016-2018

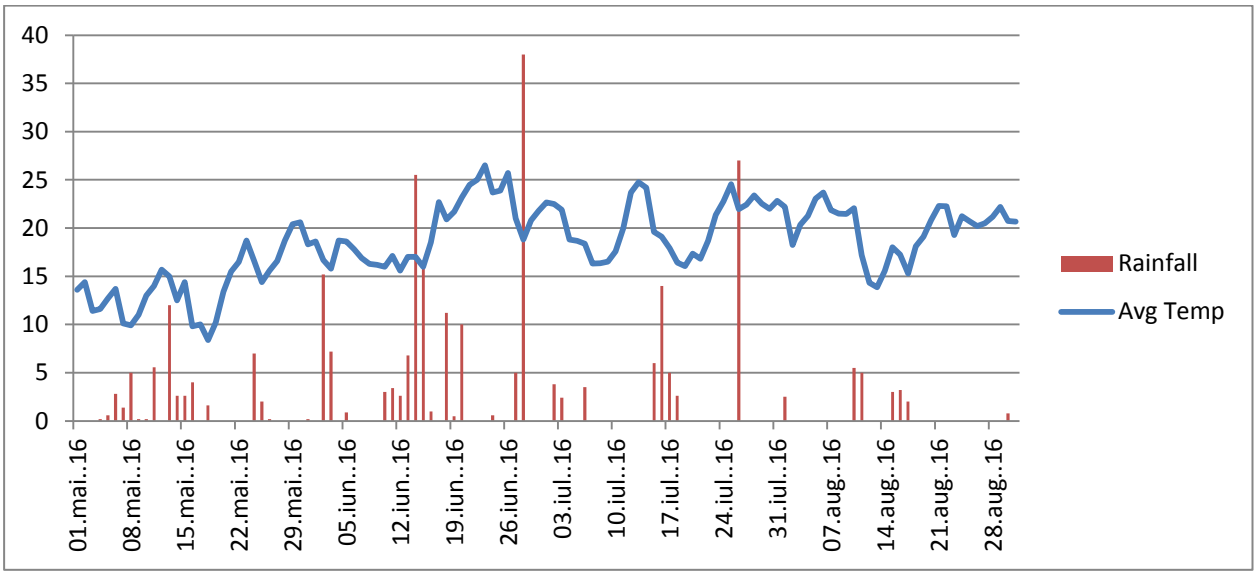

Fig. 3. Main meteorological factors-average temperatures (˚C) and rainfall (mm) at RSFG Bistriţa in the year 2016

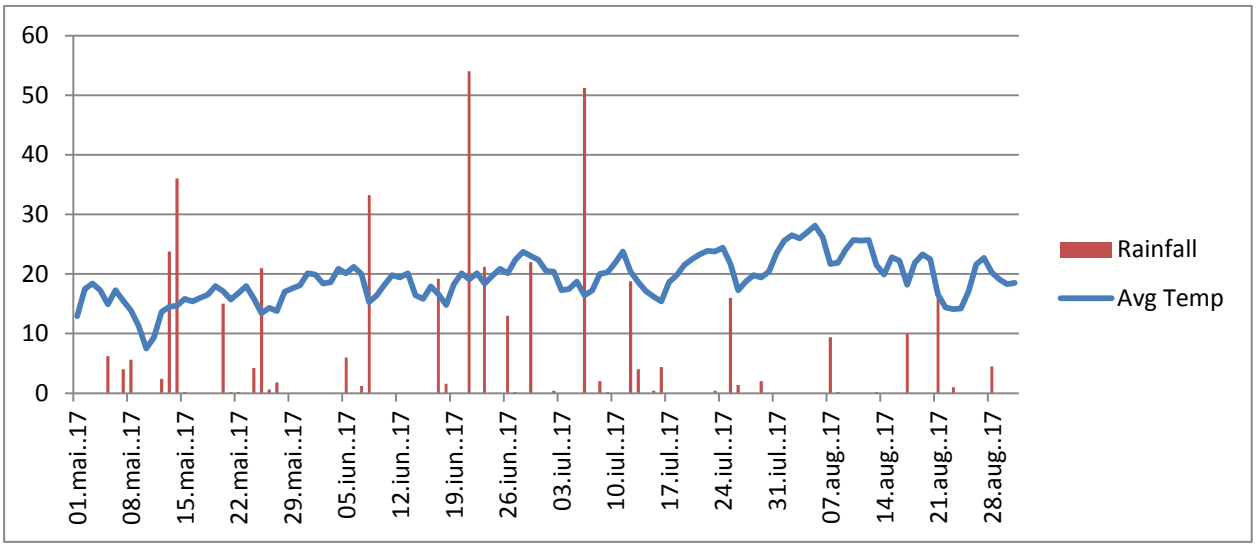

Fig. 4. Main meteorological factors-average temperatures (˚C) and rainfall (mm) at RSFG Bistriţa in the year 2017

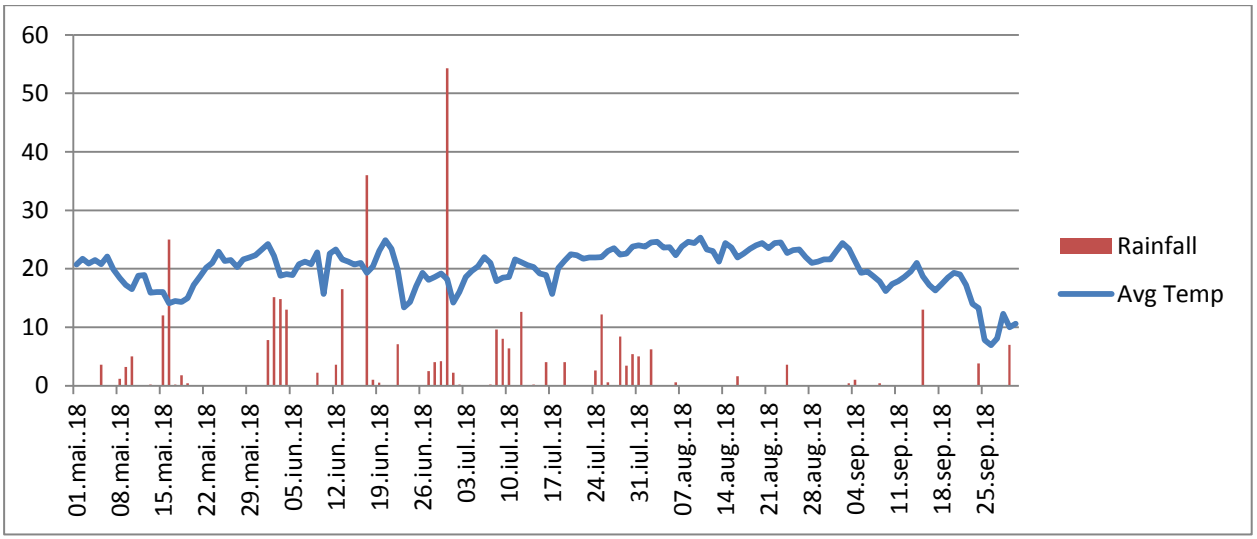

Fig. 5. Main meteorological factors-average temperatures (˚C) and rainfall (mm) at RSFG Bistriţa in the year 2018