

ECOLOGICAL STUDIES ON FRUIT FLIES ON DIFFERENT HOSTS AT FAYOUM GOVERNORATE, EGYPT

SAAFAN, M. H., S. M. FODA AND A. A. MOHAMMED

Plant Protection Research Institute, ARC, Egypt

(Manuscript received 28 February 2005)

Abstract

The population dynamics of Mediterranean fruit fly (MFF), *Ceratitidis capitata* (Wied.) and peach fruit fly (PFF), *Bactrocera zonata* (Saund.) was studied in peach, guava and fig orchards at Sinuris and Ibshaway districts, Fayoum Governorate, during the two successive seasons 2003 and 2004. In the same time, rate of infestation in peach, guava and fig fruits with MFF and PFF together and separately were estimated. During the two successive seasons, MFF population was low compared with PFF population. During the 1st season, captured per trap per day "CTD" for MFF ranged between 0.1-8.4 flies with mean of 1.91 flies in peach orchards, 0.14-0.61 fly with mean of 0.33 fly in guava orchards, and 0.0 - 0.24 fly with mean of 0.07 fly in fig orchards. During the 2nd season, the respective "CTD" for MFF ranged between 0.0 - 8.57 flies with mean of 3.62 flies, 0.0 - 0.14 fly with mean of 0.02 fly, and 0.0 - 0.14 fly with mean of 0.02 fly in peach, guava and fig orchards. The "CTD" of PFF ranged between 12.2-107.3 flies with mean of 34.21 flies; 7.14 - 54.29 flies with mean of 19.87 flies in peach orchards; 28.57 - 60.72 flies with mean of 50.90 flies; 8.48-37.95 flies with mean of 20.45 flies in guava orchards; and 0.0-16.67 flies with mean of 8.28 flies; 0.12 - 27.43 flies with mean of 8.44 flies in fig orchards during the two successive seasons, respectively.

During the 1st season, the total percentage of infestation with MFF and PFF together reached 29.24, 49.54 and 3.37 % in peach, guava and fig, respectively. During the 2nd season, the total percentage of infestation with MFF and PFF together reached 36.91 % in peach, 41.13 % in guava and 2.75 % in fig. During the 1st season, percentages of infestation with MFF was 15.23, 0.02 and 0.12 % in peach, guava and fig, respectively. During the 2nd season, percentages of infestation with MFF was 10.99 % in peach, 0.11 % in guava and 0.19 % in fig. Percentages of infestation with PFF during the 1st and 2nd seasons were 14.01, 49.52 and 3.25 %, and 25.92 and 41.02 and 3.56 % in peach, guava and fig, respectively.

INTRODUCTION

The Mediterranean fruit fly, *Ceratitidis capitata* (Wied.) (Diptera: Tephritidae) is a major pest all over the world, as many as 200 tropical and subtropical fruit species are attacked (Christenson and Foote, 1960). In the Mediterranean basin, the pest attacks citrus, deciduous fruits (mainly stone fruits) and other cultivated hosts. Crop

production is extremely affected and fruit infestation is as high as 80 % (Cramer, 1967).

The pest causes considerable damage which inflicts significantly economic losses to peach, apricot, guava, mango, fig and citrus all over the governorates of Egypt (Awadallah *et al.*, 1974, Saafan, 1986 and Saafan *et al.*, 1989).

During the 90's of the last century, the Egyptian ecosystem attacked by one of the most harmful pests, the peach fruit fly, *Bactrocera zonata* (Saund.) to be a new record in the north of Africa. Peach fruit fly was recorded in Egypt 80 years ago (Efflatoun, 1924), but it hasn't any distribution before 90's of 20th Century.

PFF infests different fruit and vegetable hosts, *e. g.* mango, peach, fig, guava, apple, citrus, tomato, .. etc. (Narayana and Batra, 1960 and Kapoor and Agarwal 1982). El-Minshawy *et al.* (1999) mentioned that larvae of PFF were found seriously damaging guava fruits in Alexandria. Hashem *et al.* (2001) mentioned that PFF infested mango, apple, guava and citrus in Egypt, and the population increased gradually with fruiting and ripening. In North Sinai Governorate, Hashem *et al.* (1992) found that MFF adults were much abundant during the fruit season (June and July) (CTD : 32 - 40 flies).

The "CTD" of PFF ranged between 2.3 - 114.3 flies on mango trees (Ahmed, 2000). At Sohag Governorate, Mohamed (2002) recorded that the caught of PFF concentrated at August, September and October, while in rest of year the flies disappeared or in a few numbers.

Amin (2003) mentioned that at Fayoum governorate, the weekly mean of PFF ranged between 24.79 and 73.82 flies.

The aim of the present study was to gain more information about :

- Population dynamics of MFF and PFF in peach, guava and fig orchards at Sinuris and Ibshaway districts, Fayoum Governorate during two successive seasons (2003 and 2004).
- Percentages of infestation with MFF and PFF together and with MFF and PFF separately on peach, guava and fig fruits.

The present investigation is one of serial investigations carried out in mango, citrus and apricot orchards as well as peach, guava and fig orchards.

MATERIALS AND METHODS

Studies were carried out in peach, guava and fig orchards at Sinuris and Ibshaway districts, Fayoum governorate during the two successive seasons; 2003 and 2004.

Sites of studies. Twenty peach trees were chosen in one location at Sinuris district, 5 - 10 guava trees in three locations at Sinuris & Ibshaway districts, and fig trees in one location at Dair El-Ramad, Fayoum district.

Population studies. To study MFF and PFF population fluctuation, one Jackson sticky traps (Harris *et al.*, 1971) baited with trimedlure (pheromone of MFF), and another one trap baited with methyl eugenol (pheromone of PFF) were distributed in every location in every selected orchard. Traps were inspected weekly, replaced the sheets, replenished by pheromone and counted the captured male flies. The "CTD" was calculated and recorded to compare MFF and PFF population fluctuation.

*** Fruit incubation and rate of infestation**

Because the symptoms of infestation by MFF or PFF can't be detected separately, the following procedures were conducted. In peach and guava orchards, four trees were determined and marked in every location. All fruits on every tree were counted. A cloth bag was hung on every tree for gathering the fallen fruits, also a label was hung neighbouring the cloth bag for recording number of fallen fruits.

In fig orchards, a square area (10 x 10 trees) was determined in every orchard and the same procedures in peach and guava for fallen fruits were conducted.

Fallen fruits from every location were transferred weekly to Plant Protection Research Institute (PPRI) at Cairo for fruit incubation in a special wood cages. The produced pupae were counted and reserved in plastic tube until flies emergence. The emerged flies were identified to males and females of MFF and PFF.

The percentages of infestation with MFF and PFF were estimated depending on the whole counted fruits on the determined trees and the fallen fruits.

Now, we had the total percentages of infestation with MFF & PFF together, but how can estimate percentages of infestation with every fly separately (MFF or PFF).

The data obtained from incubation fallen fruits were :

- Number of emerged adults of MFF and/or PFF (B).
- Total percentages of infestation with MFF and PFF together (C).
- Total number of emerged adults (MFF and PFF together) (D).
- The percentages of infestation with MFF or PFF separately (A) were estimated according to the following equation :

$$A = (B \times C) / D$$

Degrees of temperature and relative humidity for Fayoum governorate were obtained from Central Laboratory for Agricultural Climate, ARC, and the correlation coefficient between "CTD" values of MFF and PFF and degrees of temperature and relative humidity were calculated during the period of population dynamics studies on peach, guava and fig trees.

RESULTS AND DISCUSSION

A- Population fluctuation. Population fluctuations of MFF and PFF represented by the mean male catches per trap per day "CTD" were studied in peach, guava and fig orchards at Sinuris and Ibshaway, Fayoum governorate during the two successive seasons, 2003 and 2004.

1- In peach Orchards :

a) MFF population fluctuation. Data in Table 1 indicated that, during the 1st season (2003), MFF population was very low compared with PFF population. Mean "CTD" ranged between 0.1 - 8.4 flies with grand mean of 1.9 flies. It was noticed that the population was low during the period early April - late May (CTD: 0.1 - 0.7 fly), then increased during the period late May - early June (CTD: 1.9 - 8.4 flies). There were significant positive correlation between "CTD" values of MFF and degrees of temperature and insignificant negative correlation between "CTD" values and R.H. % Table, 1.

Moreover, during the 2nd season (2004), data in Table 2 indicated that MFF population was low compared with PFF population. Mean of "CTD" ranged between 0.0 - 20.0 flies with grand mean of 3.62 flies during the inspection periods. It is noticed that the population was low during April to the 1st half of May (CTD: 0.0 - 0.43 fly), then increased during the 2nd half of May to early June (CTD: 5.71 - 20.0 flies). There were insignificant positive correlation between "CTD" values of MFF and degrees of temperature and insignificant negative correlation between "CTD" values and R.H. %.

b) PFF population fluctuation. Data in Table 1 showed that during the 1st season (2003), PFF population was very high. Mean "CTD" ranged between 12.2 - 107.3 flies with grand mean of 34.21 flies. The population was relatively low during the period from early April to late May (CTD: 12.2 - 23.4 flies), while it increased sharply during the period early June (90.2 - 107.3 flies). There were significant positive correlation between "CTD" values and degrees of temperature and insignificant negative correlation between "CTD" values and R. H. % (Table 1).

However, during the 2nd season (2004), data in Table 2 showed that, PFF population was high compared with MFF population, where mean of "CTD" ranged between 3.86 - 54.29 flies with grand mean of 19.87 flies during the inspection period. The population was high during the period early to first half of April (CTD: 28.57- 54.29 flies), then the population decreased sharply during 26/4 - 25/4/2004 (CTD: 3.86 - 5.14 flies). The population was relatively low during the period early May to early June (CTD: 7.14 - 21.43 flies). There were insignificant negative correlation

between "CTD" values and degrees of temperature and insignificant positive correlation between "CTD" values and R. H. %.

2- In guava Orchards

a) MFF population fluctuation Data in Table1 indicated that, mean "CTD" ranged between 0.14 - 0.61 fly with grand mean of 0.33 fly during the 1st season (2003). The population was low during late August , early to late September and early October (CTD: 0.18, 0.25, 0.14 and 0.14 fly, respectively), while it was relatively high during the periods mid-August , 1st and mid and the 3rd week of September (CTD: 0.32, 0.54, 0.47 and 0.61 fly, respectively). There were insignificant negative correlation between "CTD" values of MFF and degrees of temperature and insignificant positive correlation between "CTD" values and R. H. %.

During the 2nd season (2004), the mean of "CTD" ranged between 0.0 - 0.14 fly with grand mean of 0.02 fly. There were insignificant positive correlation between "CTD" values of MFF and degrees of temperature and insignificant negative correlation between "CTD" values and R. H. %.

b) PFF population fluctuation Data in Table 1 indicated that, mean of "CTD" ranged between 28.57 - 60.72 flies with grand mean of 50.9 flies during the inspection periods. The population was high during all the inspection periods (48.22 - 60.72 flies) except early September and early October, where CTD was 37.50 flies and 28.57 flies, respectively. There were insignificant positive correlation between "CTD" values and degrees of temperature and insignificant positive correlation between "CTD" values and R. H. %.

ECOLOGICAL STUDIES ON FRUIT FLIES ON DIFFERENT
HOSTS AT FAYOUM GOVERNORATE, EGYPT

Table 1. Mean "CTD" for MFF and PFF by pheromone traps distributed in peach, guava and fig orchards at Sinuris and Ibsahway districts, Fayoum Governorate during the 1st season, 2003.

Date of inspection	Peach orchards						Guava orchards						Fig orchards						
	CTD			Average of			CTD			Average of			CTD			Average of			
	MFF	PFF	°C	°C	R. H. %	R. H. %	MFF	PFF	°C	°C	R. H. %	R. H. %	MFF	PFF	°C	°C	R. H. %	R. H. %	
8/4/2003	0.5	23.4	27.0	27.0	53.0	53.0	0.32	60.72	32.5	32.5	54.0	54.0	0.00	14.76	26.3	26.3	55.5	55.5	
15/4/2003	0.1	20.6	22.0	22.0	56.5	56.5	0.18	58.93	32.5	32.5	54.0	54.0	0.14	12.86	28.5	28.5	55.5	55.5	
22/4/2003	0.1	19.1	23.5	23.5	54.5	54.5	0.54	60.72	32.0	32.0	55.0	55.0	0.00	8.57	25.7	25.7	53.5	53.5	
29/4/2003	0.1	17.9	24.0	24.0	47.5	47.5	0.25	37.50	31.5	31.5	52.0	52.0	0.09	15.71	25.7	25.7	58.0	58.0	
6/5/2003	0.5	15.7	27.5	27.5	52.0	52.0	0.47	58.93	27.5	27.5	58.5	58.5	0.05	13.33	23.6	23.6	55.0	55.0	
13/5/2003	0.3	12.2	30.0	30.0	55.0	55.0	0.61	48.22	26.5	26.5	57.0	57.0	0.00	16.67	21.9	21.9	53.5	53.5	
20/5/2003	0.7	13.9	29.0	29.0	52.5	52.5	0.14	53.57	26.3	26.3	55.5	55.5	0.00	7.62	24.1	24.1	56.5	56.5	
27/5/2003	1.9	21.8	30.5	30.5	46.0	46.0	0.14	28.57	27.5	27.5	55.5	55.5	0.00	6.43	20.6	20.6	58.0	58.0	
3/6/2003	6.5	107.3	30.5	30.5	52.5	52.5							0.09	8.33	18.6	18.6	54.5	54.5	
10/6/2003	8.4	90.2	30.6	30.6	52.0	52.0							0.24	4.52	19.2	19.2	53.0	53.0	
													0.09	5.95	18.2	18.2	61.0	61.0	
													0.09	1.05	13.6	13.6	60.0	60.0	
													0.14	0.14	17.1	17.1	57.0	57.0	
													0.00	0.00	17.2	17.2	58.0	58.0	
Mean	1.91	34.21					0.33	50.90					Mean	0.07	8.28				
MFFY			0.596		-0.104		MFFY		-0.067		0.487		MFFY				-0.224		-0.076
PFFY			0.465		-0.002		PFFY		0.335		0.211		PFFY				0.789*		-0.416

Table 2. Mean "CTD" for MFF and PFF by pheromone traps distributed in peach, guava and fig orchards at Sinuris and Ibsnaway districts, Fayoum Governorate during the 2nd season, 2004.

Date of inspection	Peach orchards						Guava orchards						Fig orchards					
	CTD			Average of			CTD			Average of			CTD			Average of		
	MFF	PFF	°C	R.H.%	°C	R.H.%	MFF	PFF	°C	R.H.%	°C	R.H.%	MFF	PFF	°C	R.H.%	°C	R.H.%
5/4/2004	0.29	28.57	27.0	72.8	11/8/2004	0.14	24.43	29.3	51.5	4/10/2004	0.00	14.38	28.1	56.7				
12/4/2004	0.29	31.15	20.2	46.8	21/8/2004	0.00	10.23	29.3	61.3	11/10/2004	0.01	17.04	25.9	56.3				
19/4/2004	0.14	54.29	20.2	56.0	28/8/2004	0.00	8.48	27.9	56.9	18/10/2004	0.01	1.66	22.9	56.3				
26/4/2004	0.00	5.14	21.1	52.0	4/9/2004	0.01	15.24	27.1	58.2	25/10/2004	0.00	1.57	26.3	58.0				
4/5/2004	0.43	3.86	20.7	50.9	11/9/2004	0.01	18.00	26.6	60.7	1/11/2004	0.07	20.71	25.2	64.5				
11/5/2004	0.29	18.57	26.8	51.3	18/9/2004	0.00	24.93	23.7	58.4	8/11/2004	0.01	27.43	24.4	63.7				
18/5/2004	0.43	7.14	23.3	56.0	24/9/2004	0.00	37.95	27.3	49.1	21/11/2004	0.01	16.05	24.0	67.7				
25/5/2004	20.00	21.43	23.5	46.9	2/10/2004	0.00	15.81	28.2	56.7	28/11/2004	0.14	1.57	25.2	69.3				
1/6/2004	5.71	11.43	25.0	47.9	9/10/2004	0.01	29	25.9	56.3	5/12/2004	0.00	0.24	15.2	67.0				
8/6/2004	8.57	17.14	26.2	46.8						13/12/2004	0.01	0.29	17.9	62.2				
										20/12/2004	0.00	0.19	13.9	62.0				
										27/12/2004	0.00	0.12	15.6	62.9				
Mean	3.62	19.87			Mean	0.02	20.45			Mean	0.02	8.44						
MFFY			0.191	-0.416		MFFY			0.413		MFFY			0.310				0.523
PFFY			0.465	0.248		PFFY			-0.370		PFFY			0.591				-0.017

On the other hand, during the 2nd season, data in Table 2 showed that, mean of "CTD" ranged between 8.48 - 37.95 flies with grand mean of 20.45 flies during the inspection periods. PFF population fluctuated between high, moderate and low levels. There were insignificant negative correlation between "CTD" values and degrees of temperature and insignificant negative correlation between "CTD" values and R. H. %.

3- In fig orchards :

a) MFF population fluctuation. Data in Table 1 indicated that, mean of "CTD" ranged between 0.0 - 0.24 fly with grand mean of 0.07 fly during the first season (2003). The population was low during early October and late November (CTD: 0.0 - 0.14 fly), while it was relatively high during very early and very late of December (CTD: 0.09 - 0.24 fly). There were insignificant negative correlation between "CTD" values of MFF and degrees of temperature and insignificant negative correlation between "CTD" values and R.H.

Concerning the 2nd season (2004), data in Table 2 showed that mean of "CTD" ranged between 0.0 - 0.14 fly with grand mean of 0.02 fly. MFF population was relatively higher during November, 2004 (CTD: 0.01 - 0.14 fly) compared with October and December, 2004 (CTD: 0.0-0.01 fly). There were insignificant positive correlation between "CTD" values of MFF and degrees of temperature and significant positive correlation between "CTD" values and R.H. %.

b) PFF population fluctuation. Data in Table 1 showed that, mean of "CTD" ranged between 0.0-16.67 flies with grand mean of 8.28 flies during the 1st season (2003). The population was high during early October to end of December (CTD : 6.43-16.67 flies), while it decreased during early October to early January (CTD : 0.0-5.95 flies). There were significant positive correlation between "CTD" values and degrees of temperature and insignificant negative correlation between "CTD" values and R.H. %.

As for the 2nd season, data in Table 2 indicated that, mean of "CTD" ranged between 0.12-27.43 flies with grand mean of 6.71 flies. PFF population was high during the 1st 20 days of November (CTD : 16.05-27.43 flies), but it was moderately during early October (CTD : 14.38-17.04 flies), while it was low during late November to late December (CTD : 0.12-1.57 flies). There were significant positive correlation between "CTD" values and degrees of temperature and insignificant negative correlation between "CTD" values and R.H. %.

Data in Tables 1 and 2 illustrated that MFF population was low compared with PFF population in peach, guava and fig orchards during the two seasons. In the same time, PFF population was high during the 1st season than the 2nd season in peach, guava and fig orchards. Also, it was noticed that MFF and PFF populations were low in fig orchards compared with peach and guava orchards during the two seasons.

B- Fruit sampling and rate of infestation. Table 3 illustrates data about incubation of fallen fruits of peach, guava and fig during the first season (2003). Total number of fruits on four peach and guava trees were 872 and 3300 fruits, respectively. For fig orchard, it was 14500 in limited square. Total number of fallen fruits were 255, 1635 and 489 fruits for peach, guava and fig trees, respectively. Total percentages of infestation with MFF and PFF together were 29.24 % for peach, 49.54 % for guava and 3.37 % for fig. Total number of produced pupae, emerged flies and percentages of emergence were 1968 pupae and 1133 flies (57.57 %) for peach; 28643 pupae and 22104 flies (77.17 %) for guava and 214 pupae and 108 flies (50.47 %) for fig. Total number of MFF and PFF adults were 590 flies and 543 flies for peach, 11 flies and 22093 flies for guava and 4 flies and 104 flies for fig.

Table 4 clarifies the percentages of infestation with MFF and PFF together, total number of emerged flies and the emerged MFF and PFF flies separately during the 1st season (2003). The percentages of infestation with MFF was 15.23 % and 14.01 % with PFF for peach orchard, 0.02 % and 49.52 % for guava orchard and 0.12 % and 3.25 % for fig orchard.

During the second season (2004), the incubation of fallen fruits of peach, guava and fig are shown in Table 3. Total number of fruits on four trees for peach and guava orchards were 1276 and 2400 fruits. For fig orchard, it was 13400 fruits in limited square. Total number of fallen fruits were 471, 987 and 368 fruits for peach, guava and fig orchards, respectively. Total percentages of infestation with MFF and PFF together were 36.91 % for peach, 41.13 % for guava and 2.75 % for fig. Total number of produced pupae, emerged flies and percentages of emergence were 1041 pupae and 803 flies (77.13 %) for peach and 2948 pupae, 2592 flies (87.92 %) for guava, and 69 pupae and 29 flies (42.03 %) for fig. Total number of MFF and PFF adults were 239 flies and 564 flies for peach, 7 flies and 2585 flies for guava and 2 flies and 27 flies for fig.

Table 3. Incubation of fallen fruits gathered from peach, guava and fig orchards at Sinuris and Ibhaway districts, Fayoum Governorate, during the two seasons 2003 and 2004.

Plantation	Total of fruits on four trees	Total No. of fallen fruits	Total % of Infestation (MFF & PFF)	Total No. of produced pupae	Total No. of emerge flies	%	No. of emerged MFF			No. of emerged PFF		
							Male	Female	Total	Male	Female	Total
1 st season (2003)												
Peach	872	255	29.24	1968	1133	57.57	279	311	590	268	275	543
Guava	3300	1635	49.54	28643	22104	77.17	5	6	11	11060	11033	22093
Fig on limited square 14500		489	3.37	214	108	50.47	2	2	4	54	50	104
2 nd season (2004)												
Peach	1276	471	36.91	1041	803	77.13	109	130	239	278	286	564
Guava	2400	987	41.13	2948	2592	87.92	3	4	7	1308	1277	2585
Fig on limited square 13400		368	2.75	69	29	42.03	1	1	2	13	14	27

Table 4. Percentages of infestation with MFF and PFF together and separately in peach, guava and fig orchards at Sinuris and Ibshaway districts, Fayoum Governorate, during the 1st and 2nd seasons, (2003 and 2004).

Plantations	1 st season (2004)					2 nd season (2004)						
	Total % Infestation with MFF & PFF	Total No. of emerged files	No. of emerged MFF files	No. of emerged PFF files	% Infestation with MFF	% Infestation with PFF	Total % Infestation with MFF & PFF	Total No. of emerged files	No. of emerged MFF files	No. of emerged PFF files	% Infestation with MFF	% Infestation with PFF
Peach	29.24	1133	590	543	15.23	14.01	36.91	803	239	564	10.99	25.92
Guava	49.54	22104	11	22093	0.02	49.52	41.13	2594	7	2585	0.11	41.02
Fig	3.37	108	4	104	0.12	3.25	2.75	29	2	27	0.19	2.56

Table 4 clarifies the percentages of infestation with MFF and PFF together, total number of emerged flies and the emerged MFF and PFF flies separately, during the 2nd season (2004). The percentages of infestation with MFF and PFF were 10.99 % and 25.92 % for peach orchards, 0.11 % and 41.02 % for guava orchards and 0.19 % and 2.56 % for fig orchards, respectively.

From the aforementioned data, percentages of infestation with MFF and PFF together were higher in peach and guava orchards than fig orchards during the two seasons. In peach orchards, percentage of infestation with MFF was nearly similar to percentage of infestation with PFF in the 1st season, but in the 2nd season, percentage of infestation with MFF was lower than percentage of infestation with PFF. In guava orchards, percentages of infestation with MFF was very low compared with percentage of infestation with PFF during the two seasons. In fig orchards, percentage of infestation with MFF was low compared with percentage of infestation with PFF during the two seasons.

The fore-mentioned results are in agreement with the findings of El-Minshawy *et al.* (1999) who mentioned that larvae of PFF was found seriously damaging guava fruits in Alexandria; also in agreement with Hashem *et al.* (1992) who mentioned that Medfly MFF adults were much abundant during the fruit season of peach at North Sinai governorate.

REFERENCES

1. Ahmed, S. M. 2000. Integrated post-management of peach fruit fly, *Bactrocera zonata* (Saunders). Final Report of Project No. 476 (unpublished data).
2. Amin, A. A. 2003. Studies on the peach fruit fly, *Bactrocera zonata* (Saunders) and its control in Fayoum governorate. M. Sc. Thesis, Fac. Agric., Fayoum, Cairo Univ.
3. Awadallah, A. M.; A. G. Hashem and S. M. Foda. 1974. A trial for testing the sterile male technique as a mean of controlling the Medfly, *Ceratitis capitata* Wied. Egypt. Agric. Res. Rev., Egypt, 52: 41 - 49.
4. Christenson, L. D. and R. H. Foote. 1960. Biology of fruit flies. Ann. Rev. Entomol., 5: 171 - 192.
5. Cramer, H. H. 1967. Plant protection and world crop production. Pflanz. Nachr. Bay., 20: 1 - 6.
6. Efflaton, H. G. 1924. A monograph of Egyptian Trypanidae. Mem. Soc. R. Ent. Egypte, 2: 1 - 132.
7. El-Minshawy, A. M., M. A. Al-Eryan and A. I. Awad. 1999. Biological and orphological studies on the guava fruit fly, *Bactrocera zonata* (Saunders) (Diptera

- : Tephritidae) found recently in Egypt. Bull. 8th Nat. Conf. of Pests & Dis. of Veg. & Fruits in Ismailia, Egypt.
8. Harris, E. J., S. Nakagawa and T. Urago. 1971. Sticky traps for detection and survey of three tephritids. J. Econ. Entomol., 64: 62 - 65.
 9. Hashem, A. G., M. H. Saafan and S. M. Foda. 1992. Population fluctuation and rate of infestation of medfly, *Ceratitis capitata* (Wied.) in peach orchards at North Sinai. Al-Azhar J. Agric. Res., Cairo, Egypt, 16: 1 - 12.
 10. Hashem, A. G., S. M. Mohamed and M. F. El-Wakkad. 2001. Diversity and abundance of Mediterranean and Peach fruit flies (Diptera : Tephritidae) in different horticultural orchards. Egypt. J. Appl. Sci., 16 (1).
 11. Kapoor, V. C. and M. L. Agarwall. 1982. Fruit flies and their increasing host plants in India. Proc. CEC/IOBC Intern. Symp. Athens/Greece, 16 - 19 Nov., 1982.
 12. Mohamed, A. M. 2002. Seasonal abundance of peach fruit fly, *Bactrocera zonata* (Saunders) with relation to prevailing weather factors in Upper Egypt. Assiut J. Agric. Sci., 33 (2): 195 - 207.
 13. Narayana, E. S. and H. N. Batra. 1960. Fruit flies and their control. Indian Coun. Agric. Res., pp. 1 - 68.
 14. Saafan, M. H. 1986. Studies on the Mediterranean fruit fly, *Ceratitis capitata* Wied. with emphasis on sterile male technique (SIT) (Diptera : Tephritidae). Ph. D. Thesis, Fac. Agric., Cairo Univ., Egypt.
 15. Saafan, M. H., S. M. Foda and A. G. Hashem. 1989. Control of the medfly, *Ceratitis capitata* Wied. using partial bait spray. 3rd Nat. Conf. of Pests & Dis. of Veg. & Fruits in Egypt and Arab Countries, Ismailia, Egypt, pp. 566-580.

دراسات إيكولوجية على ذبابة فاكهة البحر المتوسط على عوائل مختلفة بمحافظة الفيوم

محمد حسن سغفان ، سلطان محمد فوده ، على أحمد محمد

معهد بحوث وقاية النباتات، مركز البحوث الزراعية، النقى - الجيزة، مصر.

تعتبر ذبابة فاكهة البحر الأبيض المتوسط من الآفات الخطيرة في العالم نظراً لتعدد عوائلها والمدى الواسع لانتشارها. وفي مصر تسبب هذه الآفة خسائر كبيرة لثمار الخوخ والجوافة وإلى حد ما التين .. كما تصيب ذبابة ثمار الخوخ كل عوائل ذبابة الفاكهة مسببة لها أضراراً كبيرة.

هذا البحث هو الرابع ضمن سلسلة أبحاث أجريت في محافظة الفيوم على المانجو والموايح والمشمش خلال المواسم ٢٠٠٢، ٢٠٠٣، ٢٠٠٤. درس تذبذب تعداد كل من ذبابة فاكهة البحر المتوسط وذبابة ثمار الخوخ في حدائق الخوخ والجوافة والتين بمركزى سنورس وإيشواى بمحافظة الفيوم وذلك خلال موسمين متتاليين (٢٠٠٣، ٢٠٠٤)، كما تم تقدير نسبة الإصابة بالحصرتين معا في ثمار الخوخ والجوافة والتين، وأيضاً نسبة الإصابة بكل حشرة على حدة.

أظهرت النتائج أن تعداد ذبابة فاكهة البحر المتوسط كان قليل جداً إذا ما قورن بتعداد ذبابة الخوخ في كلا الموسمين، حيث تراوحت قيم الـ "CTD" (عدد الذباب المنجذب للمصيدة الواحدة فى اليوم الواحد) لذبابة الفاكهة ما بين ٠,١-٨,٤ ذبابة بمتوسط ١,٩ ذبابة، ٠,١٤-٠,٥٤ ذبابة بمتوسط ٠,٣٣ ذبابة، صفر - ٠,٢٤ ذبابة بمتوسط ٠,٠٧ ذبابة فى كل من حدائق الخوخ والجوافة والتين، على التوالي، فى الموسم الأول. أما فى الموسم الثانى فقد تراوحت قيم الـ "CTD" ما بين صفر - ٨,٥٧ ذبابة بمتوسط ٣,٦٢ ذبابة، صفر - ٠,١٤ ذبابة بمتوسط ٠,٠٢ ذبابة، وصفر - ٠,١٤ ذبابة بمتوسط ٠,٠٢ ذبابة فى الحدائق الثلاثة السابقة، على الترتيب. وقد تراوحت قيم الـ "CTD" لذبابة الخوخ فى الموسم الأول ما بين ١٢,٢ - ١٠٧,٣ ذبابة بمتوسط ٣٤,٢١ ذبابة؛ ٣٧,٥٠-٦٠,٧٢ ذبابة بمتوسط ٥٠,٩ ذبابة، صفر - ١٦,٦٧ ذبابة بمتوسط ٨,٢٨ ذبابة فى حدائق الخوخ والجوافة والتين، على التوالي. تراوحت قيم الـ "CTD" لذبابة الخوخ فى الموسم الثانى ما بين ٥,١٤-٥٤,٢٩ ذبابة بمتوسط ١٩,٨٧ ذبابة؛ ما بين ٨,٤٨-٣٧,٩٥ ذبابة بمتوسط ٢٠,٤٥ ذبابة؛ ما بين ٠,١٢-٢٧,٤٣ ذبابة بمتوسط ٦,٧١ ذبابة فى الحدائق الثلاثة السابقة، على الترتيب.

تراوحت النسبة الكلية للإصابة بالحصرتين معا ٢٩,٢٤ - ٣٦,٩١ % فى الخوخ؛ ٤١,١٣ - ٤٩,٥٤ % فى الجوافة؛ و ٢,٧٥ - ٣,٣٧ % فى التين فى الموسمين، على التوالي. بلغت نسبة الإصابة بذبابة فاكهة البحر المتوسط ١٥,٢٣ ، ٠,٠٢ ، ٠,١٢ % فقط فى كل من الخوخ والجوافة والتين، على التوالي، فى الموسم الأول. أما فى الموسم الثانى فقد بلغت نسبة الإصابة بذبابة الفاكهة ١٠,٩٩ % فى الخوخ، ٠,١١ % فى الجوافة، ٠,١٩ % فى التين. بلغت نسبة الإصابة بذبابة ثمار الخوخ فى الموسم الأول ١٤,٠١ ، ٤٩,٥٢ ، ٣,٢٥ % فى الخوخ والجوافة والتين، على التوالي. فى حين بلغت نسبة الإصابة ٢٥,٩٢ % فى الخوخ، ٤١,٠٢ % فى الجوافة، ٢,٥٦ % فى التين فى الموسم الثانى.