

SUSCEPTIBILITY OF THE OLIVE VARIETIES FOR THE INFESTATION AND THE POPULATION DENSITY OF OLIVE FRUIT FLY, *Bactrocera oleae* (GMELIN), (DIPTERA: TEPHRITIDAE) AT EI-SHARKIA GOVERNORATE

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ABSTRACT

The present work investigated the effect of certain weather factors (daily mean temperature, daily range of temperature, mean of relative humidity and mean of wind velocity) on population fluctuations of olive fruit fly (*Bactrocera oleae*) in newly reclaimed area in Egypt (Al-Adlia-Belbies, El-Sharkia Governorate) and comparison study between the level of infestation with *B. oleae* on six olive varieties. The obtained data showed that, one peak of trapped olive flies (adults) was observed in March during the two successive years as the emergence of most flies from the pupal stage, which under ground and attracted directly to the "lure"-traps specially during the period of the absence of olive fruits. The increase of air temperature affected the main role in this point of view. The highest infestation *B. oleae* fly was recorded on "Picual" variety with an average of 30.50 & 26.62 flies/trap and followed by "Egazy", "Tuffahy", "Manzanillo", "Mission" varieties. The lowest one was on "Kalamata" variety 3.77 & 397 flies/trap during 2006 & 2007 seasons respectively. The mean number of larvae in the fruits of olive varieties, showed the same trend also.

INTRODUCTION

The olive fruit fly *Bactrocera oleae* (Gmelin) (Diptera : Tephritidae) is considered as one of the most serious insect pest attacking olive fruits (*Olea europea*, Oleaceae). It is one of the monophytophagous insect pests in Egypt, Helal (1979). Moreover, this olive insect is wide spread in different parts of the world. It is, in some years, able to nullify quantitatively the entire production. The damage done by this key pest is very important on olive yield and oil quality as a remarkable increase in degrees of acidity in extracted oil from infested fruits, Lazovic *et al.* (2007).

Population estimation of *Bactrocera oleae* (Gmelin), was carried out by using the yellow sticky panels and dry yellow bottom "McPhail" traps, Gaily *et al.* (2007). Mass trapping for insect adults was used by Eco-trap, Caleca *et al.* (2007), the ammonia-based attractants and a synthetic female sex pheromone traps, Cristofaro *et al.* (2007). The usage of resistant olive varieties were used for regulating the population of the olive fruit fly. The aim of the present word investigated the effect the olive varieties and certain weather factors on the population fluctuations of *B. oleae* in newly reclaimed area at El-Sharkia Governorate.

MATERIALS AND METHODS

The present investigation was carried out throughout the period extended from January, 2006 to December, 2007 on olive (*Olea europea* L.) orchard located in Belbies, El-Sharkeia Governorate.

The selected orchard did not receive any chemical control for two years before and during the period of study. All trees received the same routine horticultural practices.

Five trees were selected from different six varieties i.e. "Egazy", "Tophahy", "Manzanillo", "Picual", "Mission" and "Kalamata", to carry out these studies. Selected trees for investigation were similar in size, shape, height and vegetation.

A- Population fluctuations of *B. oleae* adults on the different olive varieties :

Fly "lure"-traps (McPhail trap) were used to catch the attracted flies, in order to determine the density of olive fruit flies per trap on the previously mentioned olive varieties. Traps were hocked on the tree branches at the northern side by pieces of wire surrounding its neck. The attractant solution contained 3% diammonium hydrogen phosphate was used, (Awadallah 1973 , Caleca *et al.*, 2007 and Iannotta *et al.*, 2007). It was changed every week. Five traps were used for each variety as replicates, (one trap per tree). The captured flies per trap were counted and recorded weekly.

B- Population fluctuations of *B. oleae* larvae on the different olive varieties :

Throughout the olive fruiting season of 2006 (from July to October) and 2007 (from July to November), samples were examined weekly. The sample comprised five replicates of 25 fruits each, from every variety. The date of infestation appearance as well as the mean number of presence of larvae in fruits in each variety were recorded.

Data of weather factors assumed to affect *B. oleae* population (i.e. daily range of temperature and daily mean temperature, daily mean relative humidity and the mean of wind velocity) were obtained for the Ismailia area from the internet (www.wunderground.com). The effect on *B. oleae* population changes was assumed to be the reflection of the effect of the weather factors prevailing during the past seven days before samples of larvae, except the case of wind velocity it was taken in the date of inspection.

Statistical analysis of the obtained data was followed using ANOVA and regression procedures in SAS. (Statistical Analysis System). The differences between the mean numbers of insects were conducted by using Duncan multiple range test in SAS.

RESULTS AND DISCUSSION

The experiments were conducted at Belbies area, El-Sharkeia Governorate in order to obtain precise information about the population fluctuation of *B. oleae* on different olive varieties. The results were recorded weekly from January 4th 2006 until December 26th 2007.

A- Population fluctuation of *B. oleae* adults on the different olive varieties :

The obtained results presented in Tables (1&2) showed the weekly means of *B. oleae* adults trapped on the olive varieties during the years of 2006 and 2007. The data indicated that the trend of the captured flies on

these varieties did not vary with the different olive varieties. The catch started in 1st week of Jan. in both seasons. The catches reached its peak during March in both seasons. The mean numbers gradually decreased until August and September. A sudden drop in the captured flies occurred in December, possibly due to the decrease in prevailing temperature. The same trend was obtained in both years. The same trend recorded by Awadallah, 1973 and Helal 1979 when they studied the ecological factors affecting the population density and the seasonal fluctuation of the insect. While Topuz and Durmusoglu (2008) in Turkey stated that (the level of *B. oleae* adults population was low during July and August and reach the highest level at the end of October) these differences in the activity of the insect may be due to the difference in geographical location.

The catch started on the 4th of Jan. with 7.3 flies/trap in 2006 season (Table 1) and it was 5.5 flies/trap on the 3rd Jan. of 2007 season (Table 2). The daily range of temperature and the daily mean of temperature, were 12.6 C°, 9.4C° & 15.7 C°, 11.4C° respectively. The relative humidity percentages were 71.9% & 71.0% and wind velocities were 7.6 & 9.1 Km/h. during the seasons of 2006 & 2007 respectively.

One peak was observed in the 4th week of March with general mean 81.0 trapped flies when the daily range of temperature and daily mean of temperature, was 13.9C° & 19.6C° respectively and relative humidity percentage of 54.7% and wind velocity 11.0Km/h in 2006. In the year of 2007 the peak of trapped flies was also recorded in the 4th week of March with mean number of 90.2 flies, when the daily range of temperature and daily mean temperature, was 12.7C° & 17.8C° respectively. The relative humidity percentage was 58.0% and wind velocity was 11.0Km/h.

The population of *B. oleae* flies during the season of 2006 was relatively higher 18.81 flies in average than that achieved in the following season of 2007 with 17.12 flies/trap in average.

The effect of weather factors on population fluctuation of trapped flies:

Table (3) shows that the relation between population density of trapped adults and the daily range of temperature is non significant positive relation in both 2006 and 2007, correlation coefficient of simple correlation values (r.) were 0.1455 and 0.1288 respectively. This relation in the case of daily mean temperature is also non significant but it was negative one in 2006 and 2007, correlation coefficient values were -0.2118 and -0.2047 in 2006 and 2007 respectively. The relative humidity had insignificant negative effect on adult population in 2006, (r.= -0.2338), while in 2007 this relation was negative and highly significant (r.= -0.4037). The relation between population density of trapped adults and the wind velocity is significant positive in 2006, (r. = 0.3174) and it was highly significant positive relation in 2007, (r.= 0.4708). The exactly effect of the different tested meteorological factors could be seen by the results of partial regression values in Table (3). These partial regression results showed the same trend recorded by simple correlation results and the "F" values for the two tested seasons of 2006 & 2007 were highly significant Table (3). From that table the daily mean temp.

Table (1) Weekly mean numbers of trapped olive fruit fly (adults/trap) from Jan. to Dec. during 2006 season at (Belbies area- Al- sharkeia Governorate).

Var. Dat	Picual	Egazy	Toffahy	Manzanillo	Mission	Kalamata	Total	General Mean numbers	Tem.		R.H %	W. (km/h)
									d.r.	d.m.		
4-Jan-06	10.6	9.6	8.6	7.0	6.2	1.8	43.8	7.3	12.6	15.7	71.9	7.6
11-Jan	12.4	11.0	9.4	6.6	7.4	2.6	49.4	8.2	10.3	11.4	73.1	9.4
18-Jan	15.6	12.8	11.8	8.4	8.6	1.4	58.6	9.8	11.7	11.1	71.1	6.9
25-Jan	14.8	12.4	12.8	9.4	8.4	2.2	60.0	10.0	10.0	12.9	63.3	10.4
1-Feb	21.4	19.4	16.4	11.0	9.4	2.4	80.0	13.3	11.7	12.4	66.3	11.1
8-Feb	26.2	24.4	21.8	14.8	13.0	5.4	105.6	17.6	12.9	13.0	57.7	11.4
15-Feb	32.8	28.6	25.4	16.2	15.4	4.4	122.8	20.5	8.9	12.7	71.0	10.6
22-Feb	38.4	34.6	30.8	18.6	16.4	5.4	144.2	24.0	11.6	15.9	69.9	9.3
1-Mar	51.4	47.0	38.8	37.0	23.8	8.8	206.8	34.5	11.7	16.7	67.7	9.0
8-Mar	79.0	69.0	46.0	42.4	37.0	7.0	280.4	46.7	9.9	14.9	57.0	12.6
15-Mar	116.0	106.0	83.0	78.0	64.0	17.0	464.0	77.3	12.4	16.1	58.7	10.1
22-Mar	123.0	118.0	86.0	76.0	68.0	15.0	486.0	81.0	13.9	19.6	54.7	11.0
29-Mar	118.4	91.6	82.4	66.6	60.8	12.6	432.4	72.1	11.3	16.6	66.1	7.0
5-Apr	112.0	74.0	78.0	60.0	55.4	9.0	388.4	64.7	11.0	17.9	64.9	14.3
12-Apr	88.0	63.0	61.0	48.0	36.0	3.6	299.6	49.9	12.7	20.1	60.0	14.1
19-Apr	54.0	39.0	36.0	32.0	17.0	2.4	180.4	30.1	13.1	21.9	57.6	11.3
26-Apr	32.0	27.0	25.0	22.0	15.0	2.4	123.4	20.6	12.0	21.7	52.4	17.6
3-May	34.0	30.0	29.0	24.0	18.0	3.0	138.0	23.0	12.1	21.9	62.4	12.0
10-May	29.0	23.0	21.0	19.0	12.0	1.6	105.6	17.6	11.1	21.0	56.3	13.4
17-May	24.0	21.0	19.4	16.6	11.0	3.0	95.0	15.8	10.7	20.7	63.2	7.7
24-May	30.0	26.0	24.0	19.0	15.0	5.0	119.0	19.8	14.4	26.1	58.1	8.4
31-May	27.6	23.2	20.4	17.0	11.8	3.8	103.8	17.3	15.3	26.5	52.0	9.1
7-Jun	25.0	19.0	21.0	18.0	12.0	3.4	98.4	16.4	12.4	24.9	57.4	9.1
14-Jun	29.0	26.0	23.0	22.0	9.6	1.6	111.2	18.5	12.6	24.1	60.7	11.0
21-Jun	25.0	21.4	20.6	19.4	10.6	2.2	99.2	16.5	13.7	27.6	56.9	9.3
28-Jun	36.0	33.0	29.0	26.0	17.0	5.8	146.8	24.5	12.3	28.1	62.1	8.3
5-Jul	27.0	23.0	22.0	13.0	9.0	2.4	96.4	16.1	10.4	27.2	60.1	10.1
12-Jul	21.0	18.0	17.0	8.4	6.4	1.4	72.2	12.0	11.6	27.2	59.4	11.6
19-Jul	18.8	16.4	11.4	7.0	5.4	3.0	62.0	10.3	12.1	27.4	64.6	12.0
26-Jul	21.4	18.6	12.4	8.6	6.8	2.8	70.6	11.8	12.6	27.6	61.6	7.7
2-Aug	19.0	17.4	11.4	7.8	5.6	2.6	63.8	10.6	13.4	28.4	64.1	8.6
9-Aug	19.4	18.4	12.4	8.2	6.4	3.4	68.2	11.4	10.9	27.7	63.0	8.6
16-Aug	12.6	11.4	10.2	6.0	4.2	1.8	46.2	7.7	12.1	29.2	66.9	9.3
23-Aug	10.6	8.4	8.4	5.0	3.8	1.4	37.6	6.3	12.6	30.0	64.1	8.0
30-Aug	9.0	8.0	8.2	4.4	3.8	1.8	35.2	5.9	11.4	27.1	62.0	9.0
6-Sep	8.4	7.8	7.4	4.2	3.0	1.0	31.8	5.3	11.7	27.0	58.7	8.0
13-Sep	11.2	9.8	8.2	5.0	3.6	1.8	39.6	6.6	11.0	26.4	67.9	11.6
20-Sep	8.4	6.4	5.2	3.4	2.2	1.4	27.0	4.5	11.4	26.1	64.9	6.7
27-Sep	7.8	6.2	5.8	3.8	3.2	2.4	29.2	4.9	13.0	26.9	61.7	10.1
4-Oct	8.2	6.4	5.2	3.0	2.6	1.8	27.2	4.5	11.4	24.3	64.6	6.7
11-Oct	4.2	3.4	2.6	1.8	1.2	0.0	13.2	2.2	12.0	25.4	55.1	10.0
18-Oct	5.0	5.2	3.4	2.2	3.8	0.6	20.2	3.4	11.4	22.3	60.0	8.6
25-Oct	8.6	7.8	5.0	4.4	3.4	1.8	31.0	5.2	10.7	20.9	67.9	7.1
1-Nov	12.8	11.0	8.4	6.2	5.8	3.4	47.6	7.9	10.6	20.4	55.7	12.0
8-Nov	17.0	14.4	11.4	8.4	5.2	5.0	61.4	10.2	9.0	16.5	63.1	10.6
15-Nov	25.2	20.8	13.6	11.4	8.4	7.2	86.6	14.4	11.6	16.4	69.4	4.6
22-Nov	12.4	19.4	12.8	11.2	7.8	5.8	69.4	11.6	11.9	16.4	71.3	3.1
29-Nov	22.0	20.4	11.2	10.0	7.4	4.0	75.0	12.5	13.0	15.4	68.3	5.6
6-Dec	20.4	18.8	10.2	9.0	6.4	2.2	67.0	11.2	11.9	14.8	71.0	5.9
13-Dec	19.4	16.4	8.4	6.2	4.2	1.8	56.4	9.4	10.1	13.8	68.4	6.1
20-Dec	18.4	11.8	9.0	5.4	4.8	1.4	50.8	8.5	12.6	13.3	67.7	5.9
27-Dec	12.2	10.4	7.8	5.0	5.2	1.2	41.8	7.0	9.3	10.6	69.6	8.3
Total	1586.00	1346.00	129.60	904.00	708.40	196.20	5870.20	978.37	611.95	1080.45	3283.74	487.81
Mean	30.50 a	25.88 b	21.72 c	17.38 d	13.62 e	3.77 f	112.89	18.81	11.77	20.78	63.15	9.38

L.S.D.value=3.674

"F" value=4.2010 P. 0.0055

E.V. value = 26.34%

Table (2) Weekly mean numbers of trapped olive fruit fly (adults/trap) from Jan. to Dec. during 2007season at (Belbies area - Al-sharkeia Governorate).

Var. Dat	Picual	Egazy	Toffahy	Manz.	Mission	Kalam.	Total	General	Tem.		R.H %	W (km/h)
								Mean numbers	d.r.	d.m.		
3-Jan-07	11.2	8.8	5.4	3.8	3.4	0.6	33.2	5.5	9.4	11.4	71.0	9.1
10-Jan	10.8	8.4	5.0	4.2	3.8	1.2	33.4	5.6	10.9	11.8	69.9	7.3
17-Jan	12.2	9.2	5.8	4.6	6.4	1.6	39.8	6.6	11.9	11.9	74.6	6.4
24-Jan	8.4	7.0	3.2	3.6	5.4	1.4	29.0	4.8	13.6	13.5	71.9	4.7
31-Jan	8.8	8.0	5.2	4.2	6.8	2.0	35.0	5.8	8.6	12.0	67.3	14.4
7-Feb	10.6	8.6	7.4	4.6	7.4	2.2	40.8	6.8	9.6	12.2	69.9	11.7
14-Feb	14.4	13.0	8.8	7.0	5.8	2.6	51.6	8.6	10.9	15.3	64.3	11.1
21-Feb	22.8	19.4	15.6	11.4	8.4	3.6	81.2	13.5	11.6	16.9	62.9	12.7
28-Feb	30.4	26.6	23.2	16.4	12.6	8.4	117.6	19.6	12.6	15.6	65.0	7.0
7-Mar	53.0	47.2	42.4	35.2	29.8	9.6	217.2	36.2	12.7	16.5	61.3	8.9
14-Mar	117.0	102.0	65.0	59.0	62.0	19.0	424.0	70.7	9.0	14.2	66.1	15.9
21-Mar	122.0	118.0	97.0	81.0	76.0	25.0	519.0	86.5	11.6	18.4	52.9	14.0
28-Mar	126.4	116.0	110.0	87.0	79.0	23.0	541.4	90.2	12.7	17.8	58.0	11.0
4-Apr	117.0	102.2	95.0	77.0	59.4	11.4	462.0	77.0	13.9	20.4	56.4	17.6
11-Apr	83.4	76.4	64.6	54.2	38.4	8.4	325.4	54.2	11.4	17.3	61.3	12.4
18-Apr	62.0	56.2	57.4	40.4	35.4	5.0	256.4	42.7	14.3	20.9	52.4	13.3
25-Apr	33.4	26.4	25.4	23.6	18.4	2.8	130.0	21.7	12.3	19.9	60.7	11.1
2-May	26.4	22.8	14.4	17.2	12.8	3.8	97.4	16.2	14.9	22.7	54.9	13.6
9-May	29.0	26.2	20.4	18.4	16.4	5.0	115.4	19.2	12.3	25.7	51.5	16.8
16-May	23.6	19.6	18.6	17.2	14.2	3.4	96.6	16.1	15.7	24.9	53.4	10.4
23-May	19.4	16.8	15.2	13.6	10.4	2.2	77.6	12.9	12.7	24.1	60.4	14.1
30-May	18.0	14.2	11.8	11.4	9.8	3.0	68.2	11.4	12.9	25.4	56.1	14.3
6-Jun	16.6	13.0	11.4	10.2	8.6	2.6	62.4	10.4	14.0	25.9	55.6	11.4
13-Jun	18.6	16.4	14.2	12.4	10.8	1.8	74.2	12.4	11.3	24.9	59.3	10.0
20-Jun	21.2	19.4	17.4	13.6	14.4	3.2	89.2	14.9	14.4	27.9	58.3	9.1
27-Jun	20.6	18.4	16.8	15.4	16.2	5.4	92.8	15.5	15.0	30.4	54.0	11.0
4-Jul	14.6	12.2	10.2	8.6	5.4	0.4	51.4	8.6	12.4	27.4	61.1	11.3
11-Jul	12.4	13.4	11.4	9.4	6.2	1.4	54.2	9.0	12.1	27.8	59.6	11.6
18-Jul	17.4	14.4	12.4	8.8	9.0	1.2	63.2	10.5	13.7	28.9	59.6	11.1
25-Jul	12.4	10.2	9.4	6.2	4.4	0.6	43.2	7.2	13.1	31.0	60.6	10.9
1-Aug	12.6	11.8	8.2	5.8	5.4	2.2	46.0	7.7	11.4	29.1	62.7	13.3
8-Aug	14.2	13.4	9.4	6.2	3.8	0.4	47.4	7.9	11.4	27.1	62.7	9.3
15-Aug	6.4	6.6	5.0	3.8	3.6	0.6	26.0	4.3	11.1	27.7	63.7	11.0
22-Aug	9.4	7.8	6.2	4.4	5.0	1.4	34.2	5.7	13.0	29.5	63.7	8.1
29-Aug	8.2	7.2	6.2	4.6	5.6	1.6	33.4	5.6	11.7	29.1	66.3	7.4
5-Sep	10.2	8.4	7.4	5.0	6.8	1.8	39.6	6.6	9.7	27.9	64.1	12.0
12-Sep	11.4	9.2	7.0	6.0	4.2	1.4	39.2	6.5	10.4	25.1	60.9	11.4
19-Sep	13.8	11.0	8.4	7.4	5.6	2.4	48.6	8.1	11.0	25.8	62.9	8.9
26-Sep	10.2	8.4	7.4	5.8	4.4	1.6	37.8	6.3	11.0	24.9	68.0	10.1
3-Oct	11.4	9.6	7.8	6.4	4.2	1.8	41.2	6.9	10.9	25.6	66.1	7.3
10-Oct	8.8	7.8	7.6	5.4	4.6	2.0	36.2	6.0	10.6	24.4	70.0	7.1
17-Oct	6.6	5.4	4.2	3.6	2.4	0.4	22.6	3.8	10.9	23.1	68.7	7.7
24-Oct	7.8	5.8	5.0	4.2	3.8	0.8	27.4	4.6	11.0	23.9	66.7	5.9
31-Oct	10.4	8.2	6.8	5.8	4.6	0.8	36.6	6.1	12.9	23.7	68.9	7.0
7-Nov	12.2	10.8	8.4	7.6	5.4	1.2	45.6	7.6	12.1	21.5	57.9	7.6
14-Nov	19.6	14.8	10.6	9.4	6.2	4.8	65.2	10.9	12.0	18.3	69.1	3.3
21-Nov	23.4	18.8	12.2	10.4	9.4	6.2	80.4	13.4	8.9	16.7	66.6	11.0
28-Nov	26.8	24.2	16.2	13.4	10.4	6.4	97.4	16.2	12.0	16.7	67.9	6.0
5-Dec	22.8	22.0	12.2	10.4	9.4	2.8	79.4	13.2	10.0	15.9	59.6	9.0
12-Dec	16.4	13.8	8.6	8.2	6.6	2.6	56.2	9.4	12.8	14.6	59.9	8.7
19-Dec	12.8	8.2	5.4	3.8	3.0	0.4	33.6	5.6	9.7	13.6	78.4	6.9
26-Dec	15.0	12.4	6.2	4.4	3.8	1.4	43.2	7.2	12.4	13.8	67.0	6.6
Total	1384.40	1215.80	996.40	821.60	715.20	206.80	5340.00	890.00	617.99	1110.41	3269.79	530.03
Mean	26.62 a	23.38 a	19.16 b	15.80 cb	13.75 c	3.97 d	102.69	17.12	11.88	21.35	62.86	10.19

L.S.D.value=3.685

"F" value = 7.864 P. 0.0001

E.V. value = 40.09%

(one week before catch) affected significantly the variability in insect catch negatively (b. value -0.441) as seen in Table (3) during 2006 the same effect could be shown by the season 2007 with (b. value -0.722).

The statistical analysis revealed that the aforementioned factors are responsible for the captured flies with about 26.34% and 40.09% of the variability in the population of this insect in 2006 and 2007 respectively.

Table (3) Simple correlation coefficient, partial regression values and explained variance (E.V.) between weather factors and weekly mean numbers of of *B. oleae* adults per trap during 2006 & 2007.

Season	Simple correlation analysis			Multiple Partial regression analysis				
	W. Factor	r.	P.	b.	p.	"F"	Prob>F	E.V.
2006	d.r. of Temp.	0.1455	0.3035	2.119	0.077	4.2010	0.0055	26.34%
	d.m. Temp.	-0.2118	0.1318	-0.441	0.005			
	R.H.	-0.2338	0.0953	-0.806	0.335			
	W. velocity	0.3174	0.0218	2.261	0.086			
2007	d.r. of Temp.	0.1288	0.3628	1.670	0.677	7.8640	0.0001	40.09%
	d.m. Temp.	-0.2047	0.1456	-0.722	0.001			
	R.H.	-0.4037	0.0030	-1.446	0.077			
	W. velocity	0.4708	0.0004	3.190	0.065			

Susceptibility of different olive varieties to adult infestation:

The mean number of captured flies during the two successive years differed with the different olive varieties. Table (1&2) showed that the highest annual mean of 30.50 and 26.62 flies/trap was on "Picual" variety during the 1st and the 2nd season, respectively. It was followed by "Egazy", "Toffahy", "Manzanillo", "Mission" with mean numbers of 25.88, 21.72, 17.38 and 13.62 respectively in 1st season, while they were 23.38, 19.16, 15.80 and 13.75 respectively in 2nd season. However, the lowest one (3.77 and 3.97) was recorded on "Kalamata" variety. It is clear that, the "Kalamata" variety resistant for the infestation with olive fruit fly Table (1 & 2).

B- Population fluctuation of *B. oleae* larvae on the different olive varieties :

Concerning the mean number of larvae in the olive fruits varieties throughout the olive fruiting season, the recorded data in Tables (4 & 5) showed that the infestation of *B. oleae* larvae during the season of 2006 started in Jul.5th on the three olive varieties "Picual" (4 larvae/125fruits), "Egazy" (2 larvae/125fruits) and "Toffahy" variety (2 larvae/125fruits). The daily range of temperature, daily mean of temperature, relative humidity and wind velocity were 10.4C°, 27.2C°, 60.1% and 10.1 Km/h respectively. After two weeks the infestation started on "Manzanillo" variety (5 larvae/125fruits) at Jul. 19th. The daily range of temperature, daily mean temperature, relative humidity and wind velocity were 12.1C°, 27.4C°, 64.6% and 12.0 Km/h. while the infestation on "Mission" and "kalamata" varieties started at the beginning of August with 3 larvae/125fruits and 2 larvae/125fruits on "Mission" and "Kalamata" varieties respectively.

Table (4) Average of olive fruit fly larvae per 125 olive fruits during 2006 season at (Belbies area - Al-sharkeia Governorate).

Var. Dat	Picual	Egazy	Toffahy	Manzanillo	Mission	Kalamata	Total	Mean
5-Jul-06	4	2	2	0	0	0	8	1.33
12-Jul-06	4	4	3	0	0	0	11	1.83
19-Jul-06	0	6	7	5	0	0	18	3.00
26-Jul-06	14	14	11	1	0	0	40	6.67
2-Aug-06	24	22	21	4	3	2	76	12.67
9-Aug-06	27	24	22	8	7	4	92	15.33
16-Aug-06	42	39	34	14	6	7	142	23.67
23-Aug-06	39	42	35	13	9	11	149	24.83
30-Aug-06	42	37	40	11	11	7	148	24.67
6-Sep-06	45	41	37	12	16	9	160	26.67
13-Sep-06	52	47	44	27	21	16	207	34.50
20-Sep-06	63	61	57	25	19	12	237	39.50
27-Sep-06	64	52	63	27	17	11	234	39.00
4-Oct-06	68	65	62	34	22	17	268	44.67
11-Oct-06	71	62	57	29	27	0	246	41.00
Total	559.0	518.0	495.0	210.0	158.0	96.0	2036.0	339.33
Mean	37.27 a	34.53 a	33.00 a	14.00 b	10.53 cb	6.40 c	135.73	22.62

L.S.D.value = 6.333

Table (5) Average of olive fruit fly larvae per 125 olive fruits during season at (Belbies area -Al-sharkeia Governorate).

Var. Dat	Picual	Egazy	Toffahy	Manzanillo	Mission	Kalamata	Total	Mean
4-Jul	7	6	5	0	0	0	18	3.00
11-Jul	9	7	6	2	2	0	26	4.33
18-Jul	15	13	11	4	4	3	50	8.33
25-Jul	17	16	13	6	5	4	61	10.17
1-Aug	23	19	11	8	7	6	74	12.33
8-Aug	36	32	17	14	12	11	122	20.33
15-Aug	44	46	26	17	15	7	155	25.83
22-Aug	41	38	22	15	13	7	136	22.67
29-Aug	49	37	32	19	18	9	164	27.33
5-Sep	55	49	38	27	22	14	205	34.17
12-Sep	62	53	47	26	35	17	240	40.00
19-Sep	68	59	47	29	21	29	253	42.17
26-Sep	59	42	36	30	16	11	194	32.33
3-Oct	67	68	47	23	21	17	243	40.50
10-Oct	69	69	52	34	26	22	272	45.33
17-Oct	77	69	57	39	33	27	302	50.33
24-Oct	83	76	63	44	44	28	338	56.33
31-Oct	80	75	64	52	44	38	353	58.83
7-Nov	85	86	67	60	53	46	397	66.17
14-Nov	86	82	69	64	57	43	401	66.83
Total	1032.0	942.0	730.0	513.0	448.0	339.0	4004.0	667.33
Mean	51.60 a	47.10 b	36.50 c	25.65 d	22.40 d	16.95 e	200.20	33.37

L.S.D. value = 4.268

The daily range and the daily mean of temperature, were 13.4 C° & 28.4 C° respectively. The relative humidity was 64.1% and the wind velocity was 8.6 Km/h..

In 2007 season the infestation started on "Picual" var. with 7 larvae/125fruits, on "Egazy" var. with 6 larvae/125fruits, and on "Toffahy" var. 5 larvae/125 fruits in the Jul.4th. The daily range and daily mean of temperature, were 12.43 C° & 27.36 C° respectively and the relative humidity was 61.14% and the wind velocity was 11.3 Km/h. After one week at (Jul.11th) the infestation started on the other two varieties, "Manzanillo" and "Mission" by 2 larvae/125fruits and 2 larvae/125 fruits, respectively. The daily range and the daily mean of temperature, were 12.14 C° & 27.79 C°, respectively, the relative humidity was 59.57% and the wind velocity was 11.6 Km/h. one week after that the infestation started on "Kalamata" variety with 3 larvae/125fruits. The daily range and the daily mean of temperature, were 13.71 C° & 28.86 C° respectively, the relative humidity was 59.57% and the wind velocity was 11.1 Km/h.

The density of *B. oleae* larvae on the fruits of the different tested varieties gradually increased and reached the maximum density by the end of the fruiting season, at Oct. 11th in 2006 season and at Nov. 14th in 2007 season.

Susceptibility of tested olive varieties (fruits) to infestation with larvae:

Table (4&5) showed that the highest mean of larvae density (37.27 & 51.60) was recorded on "Picual" variety in the 1st and the 2nd seasons, respectively. It was followed by "Egazzy", "Toffahy", "Manzanillo" and "Mission" varieties, with larvae density averages of (34.53, 47.1) & (33.0, 36.5) & (14.0, 25.65) and (10.53, 22.4) in the 1st and the 2nd season respectively. The least mean of larvae (6.40 & 16.95) was recorded on "Kalamata" in the 1st and the 2nd season respectively. These results are in agreement with those obtained by Ahmed and El-Bassiony (2002) in Egypt they found that "Egazy Shami" was the most susceptible olive cultivar, as the infestation with olive fruit fly reached (36.95%), followed by "Manzanillo" (31.94%), and the least infestation level was on "Mission" variety (18.92%).

The population of *B. oleae* in 2006 was lower with an average of larvae of 22.62 than that achieved in the following annual season with an average of larvae of 33.37 /125 fruits. It can be explained, that the olive fruit fly larvae were abundant generally during 2007 than in the annual season of 2006 (see Tables 4 & 5).

REFERENCES

- Ahmed,-S-A and El-Bassiouny,-M-N (2002): Spatial distribution of olive fruit fly *Bactrocera (Dacus) oleae* (Gemlin) on olive varieties in North Sinai. *Annals-of-Agricultural-Science,-Moshtohor.* 40: 541-547, Egypt.
- Awadallah, A. (1973): Seasonal abundance of the olive fruit fly *D. oleae* (Gmel.) *Agric. Res. Rev.* 51 :69-78, Cairo.
- Caleca,-V; Rizzo,-R; Battaglia,-I and Piccionello,-M-P (2007): Tests on the effectiveness of mass trapping by Eco-trap (Vyiril) in the control of *Bactrocera oleae* (Gmelin) in organic farming. *Bulletin-OILB/SROP.* 30: 139-145 .
- Cristofaro,-A-de; Cristofaro,-M; Tenaglia,-F; Fenio,-A and Tronci,-C (2007): Field assessment of different combinations of ammonia-based attractants and a synthetic female sex pheromone for the monitoring and control of the olive fruit fly, *Bactrocera oleae* (Gmel.) (Diptera: Tephritidae) in Apulia, southern Italy. *Bulletin-OILB/SROP.* 30: 31.

- Helal, H. A. M. (1979): Studies on the Reproduction in the olive fruit fly, *Dacus oleae* (Gmelin) (Diptera: Tephritidae). Ph.D. Thesis, Fac. Agric., Al-Azhar Univ., Cairo, Egypt.
- Iannotta-N; Belfiore-T; Perri-E; Perri-L and Ripa-V (2007): Integrated protection system against *Bactrocera oleae* (Gmelin) in organic production. Bulletin-OILB/SROP. 30: 291-296.
- Gaily,-A; Vamvakias,-M and Ragoussis,-N (2007) : Studies towards an enhanced food attractant for fruit flies, especially for the olive fruit fly *Bactrocera oleae* (Gmelin). Bulletin-OILB/SROP. 30: 271 .
- Lazovic, B.; Adakalic, M.; Perovic, T.; Hrcic, S.; Pucci, C.; Terrosi, A. and Spanedda, A. F. (2007): Increased olive oil yield and quality in Montenegrin cv Zutica by *Bactrocera oleae* (Gmel.) (Diptera:Tephritidae) control and improved harvest techniques. Bulletin-OILB/SROP. 30: 301-305.
- Topuz,-H and Durmusoglu,-E (2008): The effect of early harvest on infestation rate of *Bactrocera oleae* (Gmelin) (Diptera: Tephritidae) as well as yield, acidity and fatty acid composition of olive oil. Journal-of-Plant-Diseases-and-Protection. 115: 186-191.

قابلية بعض أصناف الزيتون المختلفة للإصابة والكثافة العددية لذبابة ثمار الزيتون (*Bactrocera oleae*)

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تم دراسة قابلية ستة أصناف من الزيتون هي "بيكوال"، "عجيزي"، "تفاحي"، "منزئيلو"، "ميشن"، "كلاماتا"، في مزرعة زيتون بمناطق إصلاح جديدة (العذلية - بلبيس - محافظة الشرقية) للإصابة بذبابة ثمار الزيتون كذلك تم دراسة تذبذب التعداد للحشرة اليافعة أسبوعيا بواسطة المصائد الجاذبة (مصائد ماكفيل) التي تحتوي على 3% ثنائي فوسفات الأمونيا خلال عامين كاملين 2006، 2007. واتضح من النتائج أن الصنف شديد القابلية للإصابة بالذبابة هو صنف "بيكوال" (21,62 & 30,00 ذبابة/مصيدة) وتتدرج القابلية للإصابة تنازليا "عجيزي"، (25,88 & 23,38 ذبابة/مصيدة) "تفاحي"، (21,72 & 19,16 ذبابة/مصيدة) "منزئيلو"، (17,38 & 15,80 ذبابة/مصيدة) "ميشن"، (13,22 & 13,75 ذبابة/مصيدة) "كلاماتا"، (3,77 & 3,97 ذبابة/مصيدة) خلال موسمي 2006 & 2007. كما تم فحص أعداد اليرقات أسبوعيا خلال موسم تواجد الثمار علي الأشجار واتضح أيضا أن الصنف "بيكوال" سجل أعلى إصابة باليرقات حيث بلغ (27,27 & 51,60 يرقة/125 ثمرة) ثم تدرجت الإصابة في ثمار كل من "عجيزي"، (34,53 & 47,10 يرقة/125 ثمرة) "تفاحي"، (33,00 & 36,50 يرقة/125 ثمرة) "منزئيلو"، (14,00 & 25,65 يرقة/125 ثمرة) "ميشن"، (10,53 & 22,40 يرقة/125 ثمرة) وكان أقلها إصابة، (بمتوسط 6,40 & 16,95 يرقة/125 ثمرة) على صنف "كلاماتا" الذي أظهر نوعاً من المقاومة للإصابة بتلك الآفة. تم دراسة العلاقة بين متوسطات أعداد الحشرات الكاملة في كل مصيدة أسبوعيا مع العوامل المناخية المدى الحراري اليومي، المتوسط اليومي لدرجة الحرارة، الرطوبة النسبية وسرعة الرياح المأخوذة أسبوعيا قبل اخذ العينة فيما عدا سرعة الرياح التي سجلت مقابل كل متوسط لإعداد الحشرات اليافعة أو اليرقات في ذات الأسبوع. وتبين بالنسبة للحشرة اليافعة أن متوسط درجة الحرارة اليومي كان ذا تأثير معنوي سالب علي تذبذبات التعداد للحشرة أسبوعيا. سواء كان بالنسبة للارتباط البسيط أو عن طريق التحليل الاحصائي للاحتدار الجزئي خلال موسمي الدراسة، 2006 & 2007. كما أظهرت سرعة الرياح خلال التحليل الاحصائي للبيانات الأسبوعية للحشرة اليافعة / للمصيدة واليرقات / للثمار تأثيرا موجبا غير معنوي علي الحشرة اليافعة خلال موسمي الدراسة 2006 & 2007 في حين كان التأثير سلبيا في اليرقات للحشرة وإن كان غير معنوي في عام 2006 وكان معنوياً في 2007 وربما يعزى ذلك إلي استجابة طيران الحشرات اليافعة (الذباب) مع الرياح وعدم إمكانيتها لوضع البيض علي الثمار مما اظهر علاقة سالبة في علاقة عدد اليرقات وسرعة الرياح في الموسمين.