

## DATE PALM FRUITS AS A POTENTIAL HOST OF THE PEACH AND MEDITERRANEAN FRUIT FLIES IN FAYOUM GOVERNORATE

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### Abstract

The peach fruit fly, *Bactrocera zonata* (Saunders) and the Mediterranean fruit fly *Ceratitis capitata* (Wiedmann) are two of the most destructive fruit flies that attack commercial fruits causing significant damages. This study was contributed for monitoring the relative abundance and infestation percentage of *B. zonata* and *C. capitata* during two successive seasons, 2010 and 2011 in Fayoum governorate. The experimental locations included various types of date palm cultivation including, firstly, the mixed fruit orchards that containing mango and citrus beside date palm trees, secondly, the orchards containing field crop and vegetables bedside fruit and date palm trees, thirdly, an aggregated date palm orchards only. During The 1<sup>st</sup> season, the means of CTD (captured flies per trap per day) of *B. zonata* were 7.68 , 4.55, and 1.65 flies, for the forementioned types, respectively, while during the 2<sup>nd</sup> season, the means of CTD were 15.31, 6.55 and 0.47 flies for the same cultivations, respectively. The highest CTD values of *B. zonata* were 11.95 and 26.71 flies / trap/ day observing on 3<sup>rd</sup> week of October and 3<sup>rd</sup> week of September during the two seasons, 2010 and 2011, respectively, recorded on the mixed orchard cultivations. Population of *C. capitata* was low in mixed-cultivation orchards, whereas the means of CTD were 0.16 and 0.48 fly during the 1<sup>st</sup> and 2<sup>nd</sup> seasons, respectively, while, there weren't captured flies of *C. capitata* on the other two types of mentioned date palm cultivations.

The samples of fallen date fruit were free of infestation by either of *B. zonata* or *C. capitata* in the mature stage for the four tested varieties (Siwi, Amhat, Zaghoul and Balady) of date palm. Percentages of infestation of *B. zonata* in the fallen palm fruits for the half-ripe and ripe stages during the 1<sup>st</sup> season in Siwi, Amhat, Zaghoul and Balady varieties were 18.29, 6.31, 6.36, 4.37, 16.29, 5.50 and 20.51, 5.66%, respectively, and during the 2<sup>nd</sup> season, the percentages of infestation were 34.40, 17.00, 9.42, 3.10, 25.00, 11.76 and 28.96, 6.15%. The obtained data suggests that the earlier control of the fly on the former crop, removal of the infested date fruits that are shelter of immature stages of *B. zonata* and *C. capitata*, also, the early harvesting of some date varieties that could be marketing on mature stage results in reducing the population and percentages of infestation of the two flies. Also, avoidance of mixed fruit host cultivation and removing the secondary hosts support such procedures.

**Key words :** *Bactrocera zonata* - *Ceratitis capitata* – date palm- *Phoenix dactylifera*- host – ecology.

## INTRODUCTION

The Egyptian ecosystem is attacked by two of the most harmful tephritid pests, the peach fruit fly, *Bactrocera zonata* (Saunders), and the Mediterranean fruit fly, *Ceratitis capitata* (Wiedmann) that infesting many commercial fruits, mango, guava, apricot, peach, apple and citrus all over the year causing considerable damage which inflicts significantly economic losses (Hashem *et. al.*, 2001). The larvae of the fruit flies feed on the pulp of ripe fruits forming tunnels inside them causing a great damage and make fruits unfavorable for marketing and exportation (White and Elson-Harris, 1992).

Determination of alternative fruit fly hosts in the production area and determination when these plants are fruiting is one of the key steps in managing fruit flies (Messing 1999). Date palm, *Phoenix dactylifera* L., fruits were reported to infested by many tephritids, the Mediterranean fruit fly, *C. capitata* (Liquidó *et. al.*, 1991), the oriental fruit fly, *B. dorsalis* (Hendel), *B. cucurbitae* (Coquillett), *B. tryoni* (Froggatt) *B. melas* (Perkins & May) (Margosian *et. al.*, 2007).

Unfortunately, the reviewed literature that concerning date palm fruits infestation by fruit flies is still in lack, in Egypt, the fruiting season of date palms is coinciding with other significant fruiting hosts like guava and fig and relatively extends to navel orange fruits, thus interpreting the non-attraction of such crop by ecological studies of fruit flies during this period of the year (Saafan *et. al.*, 2006, Afia, 2007 and Amin, 2008). Some biological aspects of *B. zonata* on rearing on date palm fruits under laboratory conditions was reported (Soliman 2008).

The severity of date palm fruiting time and its ripening comes with mango fruit harvesting and the existence of citrus fruits, specially, navel orange fruits to enter its maturity and ripening stages.

The present study attempts to highlight the population abundance and infestation levels of both fruit flies on different types of date palm trees either in random manner among the main hosts of both fruit flies, or in aggregated orchards, also, the study extends to study the population on date palm trees that distributed among field and vegetables orchards.

## MATERIALS AND METHODS

### A- The selected experimental orchards :

The study was conducted from 1<sup>st</sup> week of July until end of October throughout the two successive seasons, 2010 and 2011 in Fayoum governorate in three types of date palm cultivation :

#### 1- The mixed-host cultivation orchards:

The selected orchards were cultivated with mango, guava, fig and citrus species including mainly naval orange, mandarin and limon. The sites were located in Fayoum district (Beni-Salh and El-Mandra), Sennoris district (El-Sellin) and Ibshway district (Senro and Tubhar). The total cultivated areas of the mentioned orchards were about 150 feddans. The date palm trees of the mentioned orchard are cultivated randomly among the above hosts and varied in their commercial varieties including mainly Baldy, Siwi, Zaghloul and Amhat in different quantities.

#### 2- The orchards containing date palm trees, field crop and vegetables:

The mentioned areas were selected in Fayoum district (Al-zawya), the cultivations included maize, tomato, cucumber, squash, peppermint, pepper and eggplant, mango and fig. The total cultivated areas was about 120 feddans.

#### 3- The aggregated areas of date palm trees:

The mentioned orchards were selected in two main districts, Fayoum district (El-Bassyonia) which included about 180 feddans of Siwi dates. The second district, Tamia (Kom Oshim) is about 350 feddans containing Zaghloul and Balady varieties.

### **B-Monitoring of *B. zonata* and *C. capitata* populations:**

For monitoring the two flies, three Jackson sticky traps (Harris *et. al.*, 1971) were used for each experimental site. The traps were baited with methyl eugenol as a male lure of *B. zonata* males and malathion as a toxicant agent in ratio of (8:2), respectively. Also, an equivalent number of the same trap were baited with trimedlure as male lure of *C. capitata* males. The traps were hanged at a height approx., 1.75-2.50 m. and distributed alternatively in the orchards. Traps were inspected weekly with replacing the sheets and replenished with the mentioned attractant by injection the cotton wick by medical syringe. The attracted males of both fruit flies were counted and the mean catch per trap per day "CTD" was calculated. Traps that placed in the mixed-host cultivation were suspended on mango trees under date palm trees, while, fruit and shadow trees were selected to that placed on the field crop and vegetable and the aggregated areas of date palm trees.

### **C- Incubation of date palm fruits:**

Sampling was performed at weekly intervals of fallen date fruits that are dropped on the ground under date palm trees. The collected fruits were classified according to their verities, brought to the laboratory in plastic bags and placed in plastic containers after counting above a layer of sterilized sand (10 cm). After 3-5 days, the fruits were inspected for infestation percentage assessing, the non-infested fruits were removed.

After larvae pupation, the pupae were extracted from sand by screening and the numbers of produced pupae were counted and kept in Petri dishes. The emerged adult fruit flies were counted and identified to Mediterranean or peach fruit fly.

#### **Statistical analysis:**

The statistical analysis was done as one way ANOVA and means separated was conducted by using L.S.D. at the probability of 5% (Costat. 1990).

### **RESULTS AND DISCUSSION**

#### **A- Population monitoring :**

Data of Table 1 shows the seasonal abundance of *B. zonata* and *C. capitata* populations on different types of date palm trees cultivation in Fayoum governorate during the two successive seasons 2010 and 2011, through the period from July to end of October coinciding with the date palm fruit maturation and ripening stages.

##### **1- *B. zonata* population:**

For the 1<sup>st</sup> season (2010), the presented data of table (1) stated the availability of *B. zonata* population in various abundance on the mentioned types of dates cultivation. The mixed fruit cultivations was the most attractive for *B. zonata* comparing with the other types. The highest mean of CTD values was observed in the mixed cultivation orchards that containing date palm, followed by that containing field crop and vegetables, and the aggregated date palm orchards, whereas the recorded means of CTD were, 7.68, 4.55 and 1.65 flies, respectively. The highest CTD value was observed on the mixed orchard (11.95 flies) on the 3<sup>rd</sup> week of October, while the highest CTD on the other mentioned types were 8.05 and 5.07 flies during the 2<sup>nd</sup> week of October for the field crop and vegetable orchards and the aggregated date orchards, , respectively.

For the 2<sup>nd</sup> season (2011), the presented data of table (1) indicted clearly the abundance of *B. zonata* population in various densities on the mentioned types of dates cultivation. The mixed fruit cultivations was the most attractive for *B. zonata* comparing with the other types. The highest mean of CTD values was observed in the mixed-cultivation orchard that containing date palm, followed by that containing field crop and vegetables, and the aggregated date palm orchards, whereas the recorded means of CTD were, 15.31, 4.65 and 0.47 flies, respectively. On the mixed-cultivation orchard, the highest CTD value was observed (26.41 flies) on the 2<sup>nd</sup> week of October, while the CTD on the other mentioned types were 13.79 and 2.57 flies, respectively, on the 3<sup>rd</sup> and 2<sup>nd</sup> weeks of October, respectively.

Statistically, the CTD means of the peach fruit fly are significantly varied for the two successive seasons. The tabulated data indicated existence of *B. zonata* during the studied period on the mixed- cultivation orchards, while the minor numbers

were observed during certain weeks of that monitored on the other two types of date palm cultivations in particular the aggregated date palm orchards. Notably, there was increasing numbers of *B. zonata* population during the 2<sup>nd</sup> season (2011) comparing to the first season(2010).

### **2- *C. capitata* population:**

The data recorded of table (1) revealed that the *C. capitata* was observed in low values of CTD comparatively to *B. zonata*. Throughout the two studied seasons, values of CTD ranged 0.02-0.57 fly and 0.12-1.29 flies with means of 0.16 and 0.48 fly in the mixed-cultivation orchards during the 1<sup>st</sup> and 2<sup>nd</sup> seasons, respectively. The maximum catches of *C. capitata* in the mixed-cultivation during the two successive seasons were observed on the 4<sup>th</sup> week of October (0.57 and 1.29 flies) for the 1<sup>st</sup> season, and 2<sup>nd</sup> seasons. On the other two types of mentioned date palm cultivations, there were no captured flies of *C. capitata*.

With a careful view, both of *B. zonata* and *C. capitata* had the same trend of population fluctuations during the two studied seasons, *B. zonata* dominance over *C. capitata* was indicated in all the studied orchards that containing date palm trees. The population fluctuations of *B. zonata* flies during the 2<sup>nd</sup> season was higher than that of the 1<sup>st</sup> season in which the CTD values ranging 3.31–11.95, and 7.73-26.41 flies for the 1<sup>st</sup> and 2<sup>nd</sup> seasons, respectively.

Previous studies indicated the impact role of host availability such as mango, guava, fig, dates and citrus, such host range enabling the *B. zonata* flies to rebuild new generations during this period of the year. Drew and Hooper (1983) stated that females with mature ovaries tend to remain or very near fruiting host plants so long as the fruit is acceptable for egg-laying. If the plants are non-host or hosts with low quality fruit, the mature females either arrive in low numbers and/or emigrate rather rapidly, and in some species may fly considerable distance before finding host plants with acceptable fruits. Moreover, availability of host diversity coinciding with weather factor improvement support such abundance (Saafan *et. al.*, 2006, Afia, 2007 and Amin, 2008).

Table (1) : Catch /trap /day (CTD) of *B. zonata* and *C. capitata* in three types of date palm cultivation at Fayoum governorate during the two seasons; 2010 and 2011.

Date of inspection	Month	Week	The season											
			The 1 <sup>st</sup> season (2010)						The 2 <sup>nd</sup> season (2011)					
			Mixed-cultivated orchards		Field crop and vegetables orchards		Aggregated date orchards		Mixed-cultivated orchards		Field crop and vegetables orchards		Aggregated date orchards	
<i>B. zonata</i>	<i>C. capitata</i>	<i>B. zonata</i>	<i>C. capitata</i>	<i>B. zonata</i>	<i>C. capitata</i>	<i>B. zonata</i>	<i>C. capitata</i>	<i>B. zonata</i>	<i>C. capitata</i>	<i>B. zonata</i>	<i>C. capitata</i>			
July		1 <sup>st</sup>	5.36	0.22	2.43	0.00	0.13	0.00	7.73	0.57	1.29	0.00	0.00	
		2 <sup>nd</sup>	6.48	0.19	4.05	0.00	0.04	0.00	8.09	0.43	1.04	0.00	0.00	
		3 <sup>rd</sup>	7.52	0.17	4.71	0.00	0.13	0.00	10.65	0.40	1.48	0.00	0.00	
		4 <sup>th</sup>	8.74	0.10	1.48	0.00	0.09	0.00	9.22	0.19	1.10	0.00	0.00	
August		1 <sup>st</sup>	7.10	0.02	6.29	0.00	0.09	0.00	10.59	0.43	1.81	0.00	0.00	
		2 <sup>nd</sup>	4.40	0.00	4.71	0.00	0.00	0.00	9.33	0.43	1.43	0.00	0.00	
		3 <sup>rd</sup>	6.19	0.00	2.10	0.00	0.04	0.00	10.48	0.48	3.36	0.00	0.00	
		4 <sup>th</sup>	8.14	0.00	3.14	0.00	0.07	0.00	12.71	0.21	6.52	0.00	0.00	
		5 <sup>th</sup>	7.60	0.00	3.19	0.00	1.73	0.00	12.67	0.19	5.24	0.00	0.00	
Sept		1 <sup>st</sup>	3.31	0.00	2.57	0.00	1.98	0.00	12.52	0.48	6.00	0.00	0.00	
		2 <sup>nd</sup>	4.98	0.07	5.86	0.00	1.41	0.00	12.14	0.12	10.82	0.00	0.00	
		3 <sup>rd</sup>	8.81	0.14	5.81	0.00	5.21	0.00	26.71	0.26	6.57	0.02	0.14	
		4 <sup>th</sup>	7.33	0.17	5.29	0.00	3.93	0.00	19.02	0.48	13.54	0.00	0.62	
Oct		1 <sup>st</sup>	11.07	0.24	4.67	0.00	2.63	0.00	21.52	0.71	13.18	0.02	0.26	
		2 <sup>nd</sup>	10.12	0.36	8.05	0.00	5.07	0.00	26.41	0.76	13.14	0.00	2.57	
		3 <sup>rd</sup>	11.95	0.48	6.76	0.00	2.43	0.00	25.87	0.79	13.79	0.00	1.81	
		4 <sup>th</sup>	11.43	0.57	6.19	0.00	3.14	0.00	24.66	1.29	11.11	0.00	2.14	
Mean			7.68 A	0.16	4.55 B	0.00	1.65 C	0.00	15.31 a	0.48	6.55b	0.00	0.47c	

The means of *B. zonata* followed by the same letter case are significant. LSD<sub>05</sub> = 1.43 for the 1<sup>st</sup> season, LSD<sub>05</sub> = 3.47 for the 2<sup>nd</sup> season

### **B- Infestation percentages of *B. zonata*:**

Concerning the infestation percentages, the collected fallen fruits that sampled from the orchard containing filed crop and vegetables and the aggregated date orchards were not infested by *B. zonata* indicating by non-emerged flies, while the samples of date palm fruits which collected from the mixed-host cultivations orchards were only infested by *B. zonata*.

#### **1-The 1<sup>st</sup> season (2010):**

The tabulated data of Table (2) indicated that the matured fruits are free of infestation by *B. zonata*, while, the half-ripen and the completely ripen fruits were infested with various percentages. For the half-ripen fruits, percentages of infestation could be ordered discendingly as follows: 20.51, 18.29, 16.29, 6.36 % with mean emerged adult / infested fruit of 2.46, 2.20, 3.32 and 1.36 flies for the Balady, Siwi, Zaghoul and Amhat varieties, respectively. For the ripen fruits, the infestation percentages could be discendingly as follows , 6.31, 5.66, 5.50 and 4.37 % for Siwi, Balady, Zaghoul and Amhat varieties, respectively, with mean adult emerged/infested fruit 1.43, 1.28. 1.80 and 1.43 flies for the same varieties, respectively.

Generally, the mean percentages of infestation according to its discendingly order as follows : 11.19, 9.37, 5.56, and 4.54% for Balady, Siwi, Zaghoul and Amhat varieties, respectively, with mean emerged adult / infested fruit of 2.35, 2.05, 3.03 and 1.33 flies for the same varieties, respectively.

#### **2- The 2<sup>nd</sup> season (2011):**

During the 2<sup>nd</sup> season, the infestation was observed also in the half-ripen and ripen fruits. For the half-ripen fruits, the percentages of infestation could be ordered discendingly as follows: 34.40, 28.96, 25.00, 9.42 % for Siwi, Balady, Zaghoul and Amhat varieties, respectively, with mean emerged adult / infested fruit of 3.68, 3.88, 3.42 and 2.64 flies fruit, respectively. For the ripen fruits, the percentages of infestation could be discendingly as follows , 17.00, 11.76, 6.15 and 3.10 % for varieties Siwi, Zaghoul, Balady and Amhat, respectively, with mean emerged/infested fruit of 2.58, 1.21. 1.92 and 1.25 flies for the same varieties, respectively.

Generally, the mean percentages of infestation according to its discendingly order were, 20.65, 19.71, 10.64, and 4.87% for Siwi, Balady, Zaghoul and Amhat varieties, respectively, with mean emerged adult / infested fruit 3.51, 3.76, 2.73 and 2.46 flies, respectively.

Table (2) : Percentages of infestation and mean emerged adult fruit flies / infested fruit for the date palm fruit varieties at Fayoum governorate during the two successive seasons; 2010 and 2011.

Date palm variety	The fruit stage	The 1 <sup>st</sup> season (2010)					The 2 <sup>nd</sup> season (2011)				
		Total no. of collected fruits	No. of infested fruits	Infestation %	Mean no. of emerged flies / infested fruit		Total no. of collected fruits	No. of infested fruits	Infestation %	Mean no. of emerged flies / infested fruit	
					<i>B. zonata</i>	<i>C. capitata</i>				<i>B. zonata</i>	<i>C. capitata</i>
Siwi	Mature	240	0	0.00	0.00	0.00	317	0	0.00	0.00	0.00
	Half-ripe	328	60	18.29	2.20	0.00	529	182	34.40	3.68	0.00
	Ripe	222	14	6.31	1.43	0.00	200	34	17.00	2.58	0.00
	Total	790	74	9.37	2.05	0.00	1046	216	20.65	3.51	0.00
Amhat	Mature	82	0	0.00	0.00	0.00	230	0	0.00	0.00	0.00
	Half-ripe	220	14	6.36	1.36	0.00	297	28	9.42	2.64	0.00
	Ripe	160	7	4.37	1.28	0.00	129	4	3.10	1.25	0.00
	Total	462	21	4.54	1.33	0.00	656	32	4.87	2.46	0.00
Zaghloul	Mature	260	0	0.00	0.00	0.00	180	0	0.00	0.00	0.00
	Half-ripe	135	22	16.29	3.32	0.00	124	31	25.00	3.42	0.00
	Ripe	90	5	5.50	1.80	0.00	119	14	11.76	1.21	0.00
	Total	485	27	5.56	3.03	0.00	423	45	10.64	2.73	0.00
Balady	Mature	558	0	0.00	0.00	0.00	417	0	0.00	0.00	0.00
	Half-ripe	858	176	20.51	2.46	0.00	1331	394	28.96	3.88	0.00
	Ripe	318	18	5.66	1.28	0.00	387	27	6.15	1.92	0.00
	Total	1734	194	11.19	2.35	0.00	2135	421	19.71	3.76	0.00

Concerning the percentages of infestation during the studied two seasons, the matured fruits either in red or yellow color were not infested, while, the half-ripen and ripen fruits were infested in various values. The percentage of the 2<sup>nd</sup> season was higher comparing with that of previous season as result of population increasing during season 2011. The obtained results are in agreement with those reported by Margosian *et. al.*, 2007 who reported the infestation of dates by the oriental fruit fly, *B. dorsalis*, *B. cucurbitae*, *B. tryoni* (Froggatt) *B. melas*. The dates fruit were not entirely infested by *C. capitata*, while, *B. zonata* appears to be the only fruit fly attacker. The non-infestation of date fruits by *C. capitata* females may be due to its low population comparing to that of *B. zonata*.

### **3- Date of infestation:**

Throughout the period of date fruit sampling, the first infestation was occurred during the 3<sup>rd</sup> and the 2<sup>nd</sup> weeks of August during the two successive seasons 2010 and 2011, on fruit varieties of Siwi and Zaghloul, respectively (Table 3). Notably, the fruit infestation was in continuous increasing manual either on the half ripen fruits or ripen fruits. The extending of infestation period was related with date fruit availability and maturing of fruit. The earlier harvesting of Zaghloul fruits, especially during the matured stage (red stage) maybe decrease its infestation by *B. zonata*. As a result of its whole variation on fruiting maturation, the fruit infestation of Balady varieties was occurred for long time relatively to other sampled varieties, such infestation was recorded to start on the 4<sup>th</sup> week of August and extended to the 3<sup>rd</sup> week of October.

The obtained results that concerning population fluctuations indicated that the highest significance abundance of *B. zonata* population on the orchards that containing date palm fruits beside other fruit hosts of *B. zonata*. Many factors maybe play an impact role for such abundance, the availability of successive host in suitable stages for infestation, coinciding of suitable weather factors during the period of the year with the peach fruit fly activity. Density of plant coverage that characterized the mixed-cultivation orchards may be support existence of fly for long periods, such plant coverage density is available in relative manner in the field that containing field crop and vegetables, while it not accessible on the aggregated areas that cultivated with date palm only, thus reducing the flies activities to be under direct effect of climatic factors, especially, temperature during this time of the year.

Females of *B. zonata* that reared on date fruit during its larval stage, in particular Zaghloul variety deposited a quantity of 1749.21 during all its longevity with a mean fecundity of 646.16 and a hatchability % of 85.16% (Soliman 2008). Such high ability indicated the field significant role of dates fruit as potential host of *B. zonata*.

Table (3) : Period of date fruits infestation on four varieties of date palm at Fayoum governorate during the two successive seasons; 2010 and 2011.

Date palm variety	The fruit stage	Date of infestation																									
		The 1 <sup>st</sup> season (2010)												The 2 <sup>nd</sup> season (2011)													
		August			September			October			August			September			October										
		1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	
Siwi	Mature			-		-																					
	Half-ripe			+		+			+																		
	Ripe					+			+																		
Amhat	Mature			-		-																					
	Half-ripe					+			+																		
	Ripe								+																		
Zaghloul	Mature			+		-																					
	Half-ripe					+			+																		
	Ripe					+			+																		
Balady	Mature			-		-																					
	Half-ripe			+		+			+																		
	Ripe					+			+																		

(-) Non-infestation

(+) Infestation

In the conclusion, date fruits appear to be a potential host of the peach fruit fly, *B. zonata*. The random date cultivation, in particular, that distributing among mango and citrus trees presents a serious danger for citrus crop. The Balady fruit varieties that differing in their maturation times forms an available host during this period of the year, thus confirming the severity of such trees. Avoidance of such hazards maybe achieved under application of integrated pest management procedures. Such applications could be including the earlier control of the fly on the former crop, namely mango fruits, removal of the infested date fruits that protecting the immature stages of *B. zonata*. Also, the early harvesting of some date varieties that could be marketing on mature stage (Zaghloul), or it can be ripen under special treatments (Amhat) during the mature stage (red or yellow color) may be reduce the infestation percentage. Avoidance of mixed fruit host cultivation and removing the secondary hosts support such procedures.

## REFERENCES

1. Afia, Y. E. 2007. Comparative studies on the biology and ecology of the two fruit flies, in Egypt *Bactrocera zonata* (Saunders) and *Ceratitis capitata* (Wiedemann). Ph. D. Thesis, Faculty of Agriculture, Cairo Univ., 301pp.
2. Amin, A. A. 2008. Ecological and biological studies on the peach and Mediterranean fruit flies in Fayoum governorate. Ph. D. Thesis, Fac. Agric., Fayoum University. 225 pp.
3. CoStat Software. 1990. Microcomputer program analysis Version 4.2, CoHort Software, Berkeley, CA.
4. Drew, R. A. I. and Hooper, G. H. S. 1983. Population studies of fruit flies in south-east Queensland. *Oecologia*, 56: 153-159.
5. Harris, E. J., Nakaqwa, S. and Urago, T. 1971. Sticky trap for detection and survey of three Tephritids. *J. Econ. Entomol.*, 64 (11): 62- 65.
6. Hashem, A. G., Mohammed, M. S. and El-Wakkad, M. F. 2001. Diversity and abundance of the Mediterranean and peach fruit flies (Diptera : Tephritidae ) in different horticultural orchards. *Egyptian J. Appl. Sci.*, 16(2): 303-314.
7. Margosian, M.L., Bertone, C.A., Borchert, D.M., Takeuchi, Y. 2007. Identification of Areas Susceptible to the Establishment of Fifty-three *Bactrocera* spp. (Diptera: Tephritidae: Dacinae) in the United States. USDA-APHIS-PPQ-CPHST-PERAL .available at [http: www.aphis.usda.gov](http://www.aphis.usda.gov).

8. Messing R. 1999. Managing Fruit Flies on Farms in Hawaii, Cooperative Extension Service, College of Tropical Agriculture and Human Resources (CTAHR) Publications. IR-4, Sep., 8P.
9. Liquido, N.J., Shinoda, L.A. Cunningham, R.T. 1991. Host plants of the Mediterranean fruit fly (Diptera, Tephritidae) : an annotated review. Mis. Pubbl. Entomol. Soc. Am., 77, Vol. 52.
10. Saafan, M.H., Foda, S.M. & Mohammed, A.A. 2006. Ecological studies on fruit flies on different hosts at Fayoum governorate, Egypt. Egypt. J. Agric. Res. 84(2): 323-336
11. Soliman, N. A. 2008. Influence of fruit host type on some biological activities of *Bactrocera zonata* (Saunders) adults. Bull. Ent. Soc.Egypt, 85(181-192).
12. White, I. M. and Elson-Harris, M.M. 1992. Fruit flies of economic significance, their identification and bionomics. CAB International., Walling ford, UK.

## الدور الكامن لثمار نخيل البلح كعائل لذبابتي ثمار الخوخ وفاكهة البحر المتوسط في محافظة الفيوم

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تعتبر كل من ذبابة ثمار الخوخ وذبابة فاكهة البحر المتوسط من الحشرات التي تهاجم محاصيل الفاكهة مسببة أضرار جسيمة، وقد أجريت هذه الدراسة بهدف التعرف على كثافة التعداد ونسب الإصابة بذبابتي ثمار الخوخ وفاكهة البحر المتوسط على ثمار نخيل البلح خلال موسمي 2010 و 2011 بمحافظة الفيوم. وقد تم اختيار ثلاثة أنماط من البساتين التي تحتوي على نخيل البلح وشملت بساتين الفاكهة المختلطة العوائل بما فيها نخيل البلح وبساتين الفاكهة التي تحتوي على محاصيل حقلية وخضر وفاكهة ونخيل وكذلك بساتين مجمعة من نخيل البلح فقط. خلال الموسم الأول (2010) كان متوسط قيم معدل الجذب اليومي للمصيدة 7.68 و 4.55 و 1.65 ذبابة بينما كانت تلك القيم خلال الموسم الثاني (2011) 15.31 و 6.55 و 0.47 ذبابة وذلك في الثلاثة أنماط من بساتين النخيل بالترتيب السابق. وقد سجلت أعلى قيمة جذب يومي للمصيدة 11.95 ذبابة في الاسبوع الثالث من اكتوبر في الموسم الأول ، و في الموسم الثاني كانت أعلى قيمة 26.71 ذبابة الاسبوع الثالث من شهر سبتمبر وكلتاها كانت في بساتين الفاكهة المتعددة العوائل. وقد سجل تواجد محدود لذبابة الفاكهة في بساتين الفاكهة المختلطة العوائل بما فيها نخيل البلح حيث كان متوسط قيم الجذب اليومي للمصيدة 0.16 و 0.48 ذبابة في الموسم الأول والثاني على التوالي ، وقد لوحظ خلو ثمار البلح والتي في طور اكتمال النمو في مرحلتي اللون الأصفر أو الأحمر من الإصابة بيرقات الذبابتين ، ، كذلك لم تسجل أي إصابة بذبابة الفاكهة في ثمار البلح في كل مراحل النمو المتعاقبة للثمرة وقد كانت النسبة المئوية للإصابة بذبابة الخوخ في ثمار البلح المتساقط النصف ناضجة والناضجة في الموسم الأول في كل من البلح السيوي والامهات والزغول والبلدي 18.29 و 6.31% ، 6.6 و 4.37% ، 16.29 و 5.50% ، 20.51 و 5.66% وفي الموسم الثاني كانت النسبة المئوية للإصابة 34.40 و 17.00% ، 9.42 و 310% ، 25.00 و 11.76% ، 28.96 و 6.15% على الترتيب.

وتوصي النتائج بالمكافحة المبكرة لذبابة ثمار الخوخ على المحصول السابق وضرورة

التخلص من ثمار البلح المتساقطة ، و الجمع المبكر لبعض الاصناف والتي يمكن تسويقها خلال مرحلة اكتمال النمو وبنفادي الزراعات المختلطة لانواع الفاكهة و ضرورة ازالة العوائل الثانوية.