

**THE POPULATION DENSITY OF MEDITERRANEAN  
FRUIT FLY, *CERATITIS CAPITATA* (WIED.) AND THE  
PEACH FRUIT FLY, *BACTROCERA ZONATA* (SAUND.)  
BY USING LURE TRAPS ON NAVEL ORANGE AND  
PEACH ORCHARDS AT EL-BEHAIRA GOVERNORATE,  
EGYPT.**

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**ABSTRACT**

The population density for each of the Mediterranean fruit fly *C. capitata* (MFF) and peach fruit fly *B. zonata* (PFF) were estimated by using two types of sex lure attractants. These sex lure are Trimedlure and Methyleugenol for capturing males of *C. capitata* and *B. zonata*, respectively. Another type of attractants is food baits (buminal), which attracts both sexes (males and females) for both species. This study was carried out in two orchards of fruit, navel orange and peach orchards for a period of two seasons where extended from February 2009 to February 2011. Both types of traps received the highest numbers of flies in navel orange orchard than peach orchard. Three peaks of both species of flies were recorded yearly; the highest peak was corresponded with the ripening of fruits in October for both species while the other peaks were happened for 1<sup>st</sup> season in April and June or July in both of navel orange and peach orchards by using Jackson traps baited with designated lure. Buminal baits caught highest number of females than males for both species of flies. As it is in the case of the sexual attractants, the food attractant were recorded highest number of MFF than PFF. Buminal

**bait was used in McPhil traps and placed at 1.5-2 meter up to the soil surface.**

## INTRODUCTION

In recent years, usage of overloading the chemical insecticides caused dramatic environmental pollution for all the food resources. So, sex attractant lures and food baits for fruit flies were the best methods of food safety in fruit trees. Mediterranean fruit fly (MFF) and peach fruit fly (PFF) are the main insect pests in Egypt.

The population density of the Mediterranean fruit fly, *Ceratitidis capitata* (Wied.), were recorded from 1991 to 1995 using Jackson traps baited with trimedlure in two orchards in Thessaloniki northern Greece (Papadopoulos *et al* 2001).

The effectiveness and use of pheromone traps in capturing and monitoring the population of *C. capitata* adult in fruit groves were described and discussed by many researchers Harries, *et al.* (1971), El-Sayed *et al.*(1992) and Mogahed (1999).

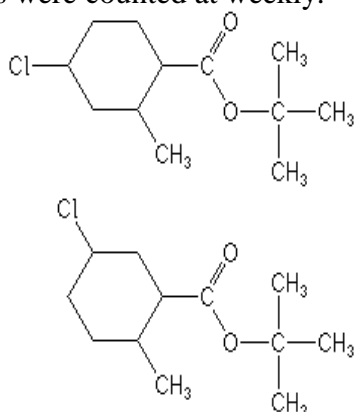
Buminal baits (5, 10 and 15 concentration) was superior in attraction MFF (Saafan, 2000 and Amin, 2003) and PFF adults (Ghanim, 2009). The protein hydrolyzate used as food attractants as a bait in McPhail traps (Steyskal, 1977), and they captured a large number of both sexes of MFF and PFF (Anonymous, 1985 and Saafan 2005). Catches of MFF and PFF by olfactory in attractant traps can be used for monitoring their population and for predicting the infestation level (Ghanim, 2009).

Both insects are very dangerous in most fruit trees in Egypt. The yield loss in guava, citrus and stone fruits represented with reduction in fruit qualitative and quantities. So, the study selected one species fruit trees for each group (navel orange and peach trees) to record the population fluctuations for both fruit flies.

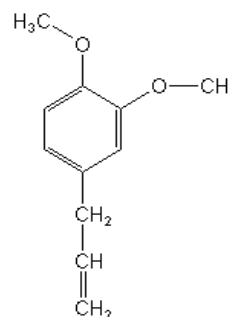
## MATERIAL AND METHODS

The experiments were conducted at El-Behaira Governorate (at Nobarria district) through two successive seasons 2009/10 and 2010/11 in two farms of fruit trees peach and citrus. The population

fluctuation of Mediterranean fruit fly (MFF), *C. capitata* and the peach fruit fly (PFF), *B. zonata* on fruit trees were recorded. Jackson traps were baited with Trimedlure and other traps were baited with methyl eugenol. The capsule was fixed in the sticky sheet of the traps. Each sticky sheet of the trap was replaced weekly by new one. The capsule lure was exchanged regularly every three weeks; the traps were distributed in four directions in the experimental orchard. The traps were fixed at the center of the trees at 1.5 – 2 meter height. The baited traps catch only adult males of *C. capitata* and *B. zonata*. The capture flies were counted at weekly.



**Trimedlure**



**Methyleugenol**

Protein hydrolyzate attractants (buminal) placed in four McPhil traps to attract both sexes adult flies of Mediterranean fruit fly (MFF), *C. capitata* and peach fruit fly (PFF), *B. zonata*. Four traps contain about 100 ml of the attractant mixed with 0.5 % malathion (EC). The traps were distributed in four directions hanged at about 1.5 – 2 meters height in shadow place and investigated weekly. Captured females and males of both insects were counted and estimated.

## RESULTS AND DISCUSSION

Both of Mediterranean fruit fly, *Ceratitidis capitata*, and peach fruit fly *Bactrocera zonata*, are exist all over the year and no dormancy for these flies. But each of these flies were varied in their periods of activity. The study interested with the competition between

each of its and the fluctuation of males and both sexes using male sex attractants (Trimedlure for *C. capitata* and Methyl eugenol for *B. zonata*) and Buminal sed as baits for both sexes for both species.

Data in Table (1) recorded the weekly capture males of *C. capitata* in both of navel orange and peach orchards for the two seasons. In 1<sup>st</sup> season, four Jackson traps were distributed in each orchard field; investigation period began from February, 2009 to February, 2011 for both hosts to record the weekly numbers of males for each trap. Fewer numbers of males were received on navel orange than peach orchard through a period extended from February 13<sup>th</sup> until May 28<sup>th</sup> and then the total capture males on navel orange raised up than peach orchard until the end of season.

The same trend was noticed in the 2<sup>nd</sup> season. The weekly number of males began with higher number in peach orchard than navel orange until June 18<sup>th</sup>. From this date, more number of males was received in navel orange. So, the adults of Mediterranean fruit flies is a polyphagous insect moved from to another and generally the females attack the ripen fruit of each host.

Regarding both seasons for each host, data indicated that the monthly average of males in navel orange in 2009/10 began with fewer number in March, 2009 than March 2010 and still fewer number in February, March and April 2009 than the same months in 2010. Then the number increased from May to August, 2009 in navel orange than same months in the 2<sup>nd</sup> season. While from September 2010 until the end of investigation season at January, 2011 the monthly number were higher in the 2<sup>nd</sup> season than 1<sup>st</sup> season. Also, peach orchard in both seasons followed the same trends as indicated in navel orange.

Statistical analysis showed that the differences in the weekly fluctuation numbers of *C. capitata* between the two tested years, in the same fruit orchard, weren't significant. While the differences in such weekly numbers of *C. capitata* between the two fruit orchards in the same year in the 1<sup>st</sup> season and 2<sup>nd</sup> season were highly significant ( $P = 0.01$ ). However, the population density was higher in citrus orchard than in peach orchard.

Saafan *et al.* (2000), in Egypt stated that *C. capitata* existed in fig orchards from July to December, Papadopoulos, *et al.* (2001), in Greece used Jackson traps baited with trimedlure to study the population dynamics of *C. capitata*. No adults were captured from

December to the end of June, the first captures were recorded from the end of June to August, depending on the year and orchard, and captures rates peaked in the autumn of each year. Hashem *et al.* (2001), stated that the population of *C. capitata* were increased gradually with fruiting and ripening, where the peak of infestation in mango and apple orchards was in July.

The 2<sup>nd</sup> species of fruit flies was peach fruit fly, *B. zonata*. Data in Table (2) showed that the population fluctuation of males attracted to four Jackson traps baited with Methyl eugenol and distributed in navel orange and peach orchards. In the 1<sup>st</sup> season, Jackson traps received higher number of *B. zonata* males in February, 2009 and then decreased gradually in March, April, May and June. While the opposite was found in monthly counts in peach orchard for the same period in 2009 to record increasing average of monthly captured. In the 2<sup>nd</sup> period extended from July until January, 2010 the average captured number of males was higher in navel orange than peach orchard.

In the 2<sup>nd</sup> season 2010/11, the numbers of *B. zonata* increased gradually through three successive months February, March and April in navel orange and the same trend in peach orchard and began to decreased from May to September and raised up in October then decreased to the end of season on peach orchard to record zero number in January, 2011. As the navel orange orchard the monthly average numbers of males were fluctuated and raised up to the top most in October, 2010 and followed the gradually reduction the end of season in February, 2011.

Generally, (Fig. 1 and 2) showed that the monthly fluctuation of *C. capitata* raised up gradually in navel orange for both seasons than peach orchard. Also, *B. zonata* for both hosts through two successive seasons were fewer than weekly numbers of *C. capitata*

Mohamed (2002), who studied the seasonal fluctuation of *B. zonata* at Sohag Governorate for three successive years 1999, 2000, and 2001 by using McPhil traps baited with diamonium phosphate. Through the first year, 1999, the caught flies concentrated at August, September and October, while in the rest of the year the flies disappeared or in few numbers. The same trend mostly had occurred in the second (2000) and third (2001) years.

These results indicated that the population of *C. capitata* was dominant on *B. zonata* population through the two seasons 2009/10 and 2010/11 in disagreement with Mohamed (2002). Also the present results are disagreement with Hashem *et al.* (2001), they demonstrated that the population fluctuation of medfly, *C. capitata* and peach fruit fly *B. zonata* as mentioned by weekly mean captures of male flies per traps showed that *B. zonata* surpassed the infestation in all the examined orchard.

Statistical analysis showed that the differences in the weekly fluctuation numbers of *B. zonata* between the two tested years, in the same fruit orchard, weren't significant. While the differences in such weekly numbers of *B. zonata* between the two fruit orchards in the same year in the 1<sup>st</sup> season and 2<sup>nd</sup> season were highly significant ( $P = 0.01$ ). However, the population density was higher in citrus orchard than in peach orchard.

Other types of baits were used not only sex attractant for males but it also for both sexes for both species, as food attractant (Buminal or protein hydrolyzate). Buminal bait used with MacPhil traps and record the captured flies males and females weekly.

Data in Table (3) showed that the Mediterranean fruit fly attacks both navel orange and peach orchard and the capture number of females were higher than capture males through the examination period from February, 2009 until February, 2010. Same results were recorded for peach fruit flies also in the same period of investigation. While the total numbers of both sexes of *C. capitata* were higher in navel orange and peach orchard than the total numbers recorded for *B. zonata* during the 1<sup>st</sup> season of investigation.

As for the population fluctuation of *C. capitata* began with fewer numbers through February, March and April, 2009 and then relatively increased through long period extended from May, June, July, August and September, 2009 and then raised up in October and November. Generally reduction were happened in total number of *C. capitata* during December, 2009 and January and February 2010. As the presence of *C. capitata* in peach, the capture flies record three peaks through a year, the 1<sup>st</sup> peak recorded in May 8<sup>th</sup> and decreased gradually to the lower number in July and small peak in August, while the last peak was recorded in November, 2009.

As for *B. zonata*, three small peaks were recorded in navel orange and long term of presence was recorded during September, October, November and December, 2009. While the presence of *B. zonata* were recorded in two periods, 1<sup>st</sup> presence was from March to May and completely disappeared in Mid of June, July and August 2009. The 2<sup>nd</sup> presence was in September, October and November, 2009 and no flies were found in December and January, 2010.

**Table (3): Weekly numbers of captured males and female of *C. capitata* and *B. zonata* by using four buminal traps in both navel orange and peach orchards at Nobaria district, during the first season (2009/10):**

Investigation date		MFF*						PFF*					
Day	Month	Navel orange			Peach			Navel orange			Peach		
		♂	♀	Total	♂	♀	Total	♂	♀	Total	♂	♀	Total
13	Feb. 2009	2	7	9	2	5	7	1	3	4	0	0	0
20		5	6	11	2	3	5	3	4	7	0	0	0
27		0	2	2	6	5	11	3	4	7	0	0	0
6	March	1	4	5	1	6	7	6	6	12	2	4	6
13		1	0	1	4	4	8	2	3	5	2	7	9
20		0	3	3	4	13	17	2	4	6	1	7	8
27		4	4	8	7	9	16	0	0	0	3	9	12
3	Apr.	1	3	4	3	14	17	0	0	0	4	12	16
10		2	2	4	6	12	18	0	1	1	5	14	19
17		4	7	11	12	14	26	0	3	3	4	10	14
24		7	13	20	9	17	26	3	4	7	6	17	23
1	May	7	11	18	12	23	35	1	3	4	6	26	32
8		10	20	30	9	33	42	0	1	1	5	25	30
15		9	10	19	11	29	40	0	0	0	9	24	33
22		6	17	23	13	20	33	0	0	0	4	18	22
29	6	27	33	18	21	39	0	0	0	3	10	13	
5	Jun	10	11	21	13	14	27	0	0	0	2	9	11
12		6	21	27	10	11	21	0	0	0	0	2	2
19		7	21	28	8	7	15	0	0	0	0	0	0
26		15	26	41	3	5	8	0	0	0	0	0	0
3	Jul.	8	18	26	0	0	0	3	2	5	0	0	0
10		8	22	30	0	0	0	2	6	8	0	0	0
17		9	19	28	0	2	2	2	3	5	0	0	0
24		11	12	23	0	0	0	1	4	5	0	0	0
31		9	7	16	0	0	0	1	2	3	0	0	0
7	Aug.	7	16	23	2	5	7	0	0	0	0	0	0
14		12	13	25	4	11	15	0	0	0	0	0	0
21		15	20	35	2	5	7	0	0	0	0	0	0
28		10	21	31	0	3	3	5	4	9	0	0	0
4	Sep.	8	14	22	0	1	1	5	7	12	1	3	4
11		4	9	13	0	0	0	6	8	14	0	4	4

18		8	15	23	0	0	0	6	9	15	3	7	10
25		7	27	34	2	6	8	9	10	19	1	4	5
2	Oct.	8	35	43	3	8	11	9	15	24	2	6	8
9		14	30	44	4	7	11	6	16	22	3	7	10
16		12	36	48	4	10	14	9	14	23	4	9	13
23		17	33	50	6	4	10	10	14	24	8	11	19
30		14	30	44	8	13	21	5	11	16	5	7	12
6		10	33	43	7	24	31	8	13	21	8	7	15
13	Nov.	14	35	49	10	21	31	11	18	29	5	13	18
20		11	29	40	9	19	28	8	14	22	6	17	23
27		9	30	39	10	26	36	4	11	15	8	13	21
4	Dec.	11	18	29	8	15	23	3	15	18	3	8	11
11		6	15	21	4	13	17	6	14	20	3	1	4
18		8	19	27	0	7	7	6	13	19	2	2	4
25		6	22	28	0	0	0	4	10	14	0	0	0
1	Jan. 2010	10	10	20	0	0	0	3	8	11	0	0	0
8		7	12	19	0	0	0	3	5	8	0	0	0
15		4	16	20	0	0	0	3	3	6	0	0	0
22		7	10	17	0	0	0	0	0	0	0	0	0
29		2	9	11	0	0	0	0	0	0	0	0	0
5	Feb.	1	2	3	0	0	0	0	0	0	0	0	0
Mean													

\* MFF = *Ceratitis capitata* \* PFF = *Bactrocera zonata*



**Table (4): Weekly numbers of captured males and female of *C. capitata* and *B. zonata* by using four buminal traps in both navel orange and peach orchards at Nobaria district, during the second season (2010/11):**

Investigation date		MFF*						PFF*					
Day	Month	Navel orange			Peach			Navel orange			Peach		
		♂	♀	Total	♂	♀	Total	♂	♀	Total	♂	♀	Total
12	Feb. 2010	2	4	6	2	6	8	0	0	0	0	0	0
19		5	8	13	4	12	16	0	0	0	0	0	0
26		5	10	15	3	11	14	0	0	0	3	5	8
5	March	2	5	7	5	15	20	0	0	0	6	13	19
12		2	4	6	5	17	22	0	2	2	10	9	19
19		3	6	9	6	22	28	2	5	7	9	16	25
26		1	8	9	6	20	26	4	5	9	7	17	24
2	Apr.	6	9	15	7	25	32	6	11	17	10	19	29
9		7	6	13	6	35	41	8	8	16	14	17	31
16		7	13	20	9	31	40	8	12	20	13	25	38
23		5	14	19	12	26	38	8	11	19	15	28	43
30		8	10	18	9	29	38	7	10	17	8	29	37
7	May	6	13	19	12	25	37	5	6	11	12	22	34
14		13	11	24	10	29	39	4	4	8	15	14	29
21		7	15	22	7	23	30	2	1	3	10	19	29
28		2	6	8	8	23	31	0	0	0	9	16	25
4	Jun	2	7	9	6	20	26	0	0	0	9	12	21
11		4	8	12	4	22	26	0	0	0	0	6	6
18		4	9	13	5	16	21	3	1	4	0	0	0
25		4	12	16	1	4	5	4	3	7	0	0	0
2	Jul.	4	7	11	0	0	0	0	3	3	0	0	0
9		3	10	13	0	0	0	0	2	2	0	0	0
16		4	11	15	0	0	0	0	0	0	0	0	0
23		5	21	26	2	5	7	0	0	0	0	3	3
30		4	13	17	3	12	15	0	0	0	1	2	3
6	Aug.	5	14	19	1	14	15	2	4	6	0	0	0
13		5	18	23	0	0	0	5	8	13	0	0	0
20		7	13	20	0	0	0	8	6	14	0	0	0
27		6	20	26	0	0	0	7	10	17	0	0	0
3	Sep.	9	14	23	0	0	0	9	13	22	0	0	0
10		6	20	26	0	0	0	13	14	27	0	0	0
17		8	23	31	0	0	0	11	15	26	0	0	0
24		11	33	44	2	5	7	17	12	29	2	2	4
1	Oct.	7	29	36	2	6	8	14	19	33	2	4	6
8		7	24	31	3	18	21	11	20	31	6	11	17
15		9	27	36	7	13	20	16	20	36	7	15	22
22		9	39	48	5	18	23	15	19	34	10	18	28
29		13	37	50	8	19	27	19	15	34	10	26	36
5	Nov.	11	40	51	6	20	26	12	17	29	9	34	43
12		16	48	64	7	23	30	10	15	25	11	20	31
19		17	41	58	5	18	23	10	16	26	7	14	21

26		11	44	55	4	15	19	8	11	19	4	11	15
3	Dec.	10	40	50	4	13	17	9	7	16	5	9	14
10		11	41	52	3	11	14	5	6	11	4	7	11
17		12	36	48	4	12	16	4	8	12	1	4	5
24		10	37	47	4	11	15	6	8	14	0	0	0
31		11	25	36	3	9	12	2	7	9	0	0	0
7		9	21	30	2	5	7	4	6	10	0	0	0
14	Jan. 2011	7	18	25	0	0	0	3	5	8	0	0	0
21		11	21	32	0	0	0	0	0	0	0	0	0
28		9	11	20	0	0	0	0	0	0	0	0	0
4	Feb.	5	9	14	0	0	0	0	0	0	0	0	0
Mean													

\* MFF = *Ceratitis capitata* \* PFF = *Bactrocera zonata*

Data in Table (4) recorded the weekly number of *C. capitata* in navel orange and peach orchard for the 2<sup>nd</sup> season 2010/11 with higher number than 1<sup>st</sup> season 2009/2010. The same trend of fluctuation was followed in the 2<sup>nd</sup> year, while in navel orange presence of *C. capitata* was all over the year while three separate were record in peach orchard. The 1<sup>st</sup> peak recorded at April and extended May and June, 2<sup>nd</sup> peak in July and 1<sup>st</sup> week of August. While 3<sup>rd</sup> peak was in October, November and December, 2010.

The peach fruit fly, *B. zonata* had three separate peaks in navel orange with fewer numbers than *C. capitata* and the same trend were recorded with higher number in peach orchard for 1<sup>st</sup> peak only. As for the presence of *B. zonata* in August to December, navel orange received more than peach orchard.

Generally, the total chapter flies of *C. capitata* and *B. zonata* were higher in navel orange than peach orchard of both years.

#### **Response of the tested fruit flies' sexes to buminal:**

##### **1. *C. capitata*:**

The obtained data indicated that, the females of *C. capitata* and *B. zonata* are more attracted than males to the food attractant, buminal (Table 5 and Fig. 3&4). However, the weekly means of males of MFF in citrus were  $7.5 \pm 0.58$  and  $7.05 \pm 0.51$  in the first and second season respectively. In peach orchard, these means were  $4.53 \pm 0.64$  and  $3.88 \pm 0.458$  in the first and second season respectively. While these means of females of this insect were  $16.38 \pm 1.38$  and  $18.7 \pm 1.73$  in citrus orchard and  $8.9 \pm 1.2$  and  $12.65 \pm 1.38$  in peach orchard in the first and second season respectively.

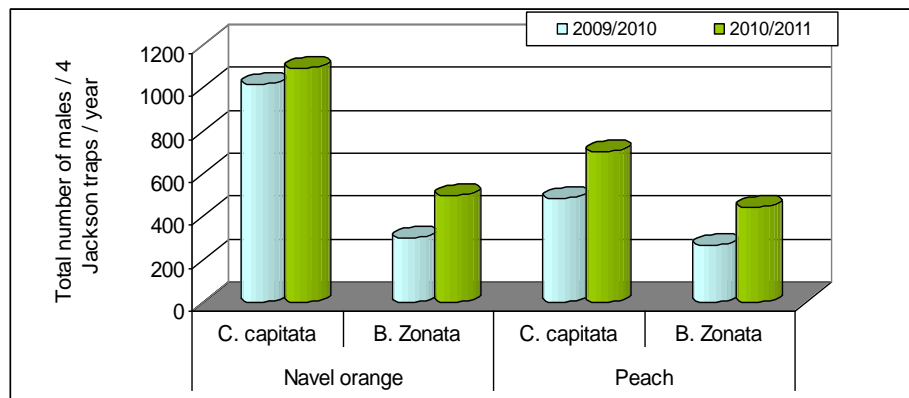
##### **2. *B. zonata*:**

The weekly means of PFF males in citrus orchard were  $3.05 \pm 0.44$  and  $5.4 \pm 0.72$  in the first and second season respectively. In peach this means were  $2.26 \pm 0.36$  and  $4.4 \pm 0.68$  in the two mentioned seasons. While the weekly means of female of PFF in citrus and peach were  $5.48 \pm 0.76$  and  $6 \pm 0.98$  in the first season. In the second seasons these means were  $7.02 \pm 0.87$  and  $8.59 \pm 1.33$  in citrus and peach orchards respectively. These results agreement with Sameh 2009.

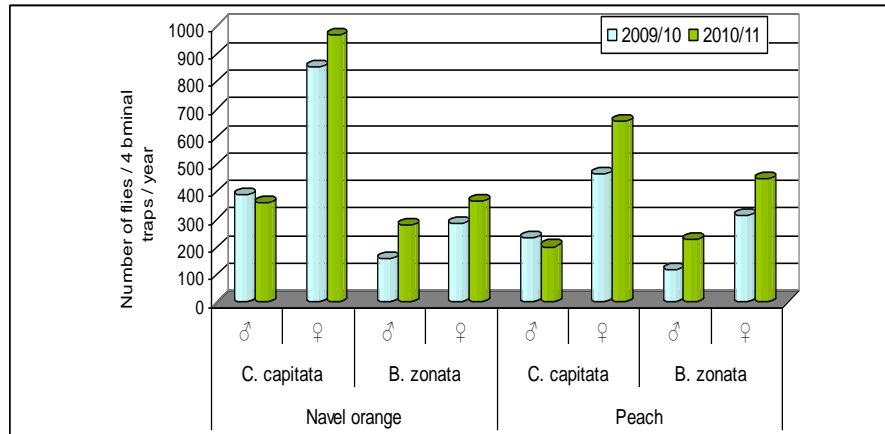
**Table (5): Mean captured *C. capitata* and *B. zonata* females and males/4 trap/week over a year by the food attractants (buminal) on citrus and peach orchards at Nubaria district.**

Adult fly		2009/2010		2010/2011	
		Female	Male	Female	Male
MFF	Citrus	16.38±1.38	7.5±0.58	18.7±1.73	7.05±0.51
	Peach	8.9±1.2	4.53±0.64	12.65±1.38	3.88±0.458
PFF	Citrus	5.48±0.76	3.05±0.44	7.02±0.87	5.4±0.72
	Peach	6±0.98	2.26±0.36	8.59±1.33	4.4±0.68

Finally, these results indicated that the food attractant (buminal) was attracted MFF and PFF females with a significantly high numbers in comparison to males. Saafan (2005), Afia (2007) and Moustafa and Ghanim (2009) mentioned that females of MFF and PFF were more attracted to food attractants than males. Also, in the present study, the females were obviously more attracted to the tested food attractant (buminal) than males.



**Fig. (3): Total number of males of *C. capitata* and *B. zonata* / 4 Jackson traps / years for the two seasons 2009/10 and 2010/11.**



**Fig. (4): Total number of males and females of *C. capitata* and *B. zonata* / 4 Jackson traps / years for the two seasons 2009/10 and 2010/11.**

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### الملخص العربي

الكثافة العددية لذبابة فاكهة البحر المتوسط وذبابة ثمار الخوخ باستخدام المصائد الجاذبة في بساتين الخوخ والبرتقال ابو سرّة في محافظة البحيرة - جمهورية مصر العربية.

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تم دراسة الكثافة العددية لكل من ذبابة ثمار فاكهة البحر المتوسط *C. capitata* وذبابة ثمار الخوخ *B. zonata* وذلك باستخدام نوعين من الجاذبات وهما الجاذبات الجنسية المتمثلة في مادتي *Methyleugenol* و *Trimedlure* وتستخدم كلا منهما في جذب الذكور فقط. النوع الاخر من الجاذبات هي الجاذبات الغذائية المتمثلة في مادة البومينال والتي تجذب نوعي الذباب وتجذب الذكور والاناث معا. تمت هذه الدراسة في محصولين من محاصيل الفاكهة هما محصول البرتقال ابو سرّة ومحصول الخوخ وذلك لمدة موسمين حيث بدأت الدراسة في فبراير 2009 حتي فبراير 2011. وقد سجلت كلا النوعين من المصائد اعداد اكبر من الذباب في محصول البرتقال ابو سرّة عن الخوخ. سجلت ايضا المصائد بنوعيتها حوالي ثلاث قمم كانت اعلاها دائما التي تتوافق مع فترة نمو الثمار وهي اشهر اكتوبر ونوفمبر بالنسبة لأشجار البرتقال أبو سرّة اما بالنسبة لأشجار الخوخ فكانت اعلي القمم في اشهر ابريل ومايو. سجلت المصائد التي استخدمت فيها مادة البومينال جذب اعدادا اكبر معنويا من الاناث عن الذكور لنوعي الذباب. وكما هو الحال في الجاذبات الجنسية فإنه في الجاذبات الغذائية ايضا اتضح ان الكثافة العددية لذباب فاكهة البحر المتوسط اكبر من الكثافة العددية لذبابة ثمار الخوخ.

**Table (1): Weekly and monthly numbers of captured males of *C. capitata* by using four Jackson traps baited with Trimedlure during two successive seasons 2009/10 and 2010/2011 in navel orange and peach orchards at Nobarria district:**

First season (2009/10)						Second season (2010/11)					
Investigation date		Navel orange		Peach		Investigation date		Navel orange		Peach	
Day	Month	Males /4 traps	M F*	Males/4 traps	MF*	Day	Month	Males /4 traps	M F*	Males/ 4 traps	M F*
13	Feb. 2009	4	0.08	3	0.166	12	Feb. 2010	3	0.1675	6	0.241
20		3		5		19		5		10	
27		0		6		26		11		11	
6	March	4	0.1225	4	0.294	5	March	8	0.1615	14	0.741
13		0		8		12		1		17	
20		4		11		19		2		23	
27		6		10		26		7		29	
3	Apr.	2	0.2125	15	0.75	2	Apr.	11	0.6418	34	1.2
10		4		21		9		19		39	
17		7		22		16		26		32	
24		11		26		23		23		35	
1	May	13	0.78	32	0.97	30	May	21	0.56	29	1
8		22		31		7		15		31	
15		23		29		14		18		30	
22		28		25		21		18		26	
29	25	20	28	12	25						
5	Jun	18	0.9437	17	0.455	4	Jun	11	0.365	21	0.41
12		29		11		11		7		13	
19		25		14		18		9		8	
26		35		9		25		14		4	
3	July	19	0.802	3	0.071	2	July	8	0.442	0	0.078
10		22		4		9		8		0	
17		34		3		16		13		0	
24		22		0		23		20		5	
31	15	0	30	13	6						
7	Aug.	26	0.88	4	0.169	6	Aug.	16	0.67	9	0.1428
14		17		10		13		19		4	
21		23		3		20		18		3	
28		33		2		27		22		0	
4	Sep.	31	0.9	0	0.035	3	Sep.	25	0.925	0	0.062
11		20		0		10		21		0	
18		22		0		17		27		2	
25		28		4		24		31		5	
2	Oct.	38	1.476	6	0.392	1	Oct.	31	1.382	6	0.5
9		39		7		8		37		13	
16		46		12		15		39		11	
23		40		15		22		44		19	
30	44	15	29	43	21						
6	Nov.	36	1.1125	19	0.562	5	Nov.	49	1.74	20	0.58
13		41		18		12		51		16	
20		29		12		19		50		12	
27		19		14		26		45		17	
4	Dec.	23	0.71	9	0.142	3	Dec.	38	1.149	18	0.578
11		20		5		10		39		20	
18		19		2		17		37		16	
25		18		0		24		29		16	
1	Jan. 2010	11	0.2	0	0	31	Jan. 2011	18	0.51	11	0.116
8		8		0		7		20		8	
15		7		0		14		11		5	
22		0		0		21		14		0	
29	2	0	28	9	0						
5	Feb.	0		0		4	Feb.	7	0.25	0	0

• MF = Monthly fluctuation = mean numbers of male flies/ trap/month.



**Table (2): Weekly and monthly numbers of captured males of *B. zonata* by using four Jackson traps baited with Methyleugenol during two successive seasons 2009/10 and 2010/2011 in navel orange and peach orchards at Nobarria district:**

First season (2009/10)						Second season (2010/11)					
Investigation date		Navel orange		Peach		Investigation date		Navel orange		Peach	
Day	Month	Males /4 traps	M F*	Males/4 traps	MF*	Day	Month	Males /4 traps	M F*	Males/4 traps	M F*
13	Feb. 2009	7	0.238	2	0.083	12	Feb. 2010	4	0.089	0	0.053
20		6		1		19		6		0	
27		7		4		26		0		6	
6	March	8	0.16	6	0.232	5	March	0	0.303	13	0.607
13		5		5		12		9		14	
20		2		7		19		12		19	
27		3		8		26		13		22	
3	Apr.	0	0.125	11	0.464	2	Apr.	15	0.464	16	0.871
10		0		13		9		14		25	
17		5		16		16		11		27	
24		9		12		23		16		25	
1	May	3	0.021	20	0.535	30	May	9	0.098	29	0.776
8		0		19		7		7		28	
15		0		15		14		4		24	
22		0		11		21		0		21	
29		0		10		28		0		14	
5	Jun	0	0.044	3	0.026	4	Jun	5	0.214	7	0.080
12		0		0		11		7		2	
19		0		0		18		6		0	
26		5		0		25		6		0	
3	July	4	0.178	0	0.092	2	July	1	0.042	0	0.028
10		7		0		9		3		0	
17		10		4		16		2		0	
24		4		4		23		0		1	
31		0		5		30		0		3	
7	Aug.	0	0.152	1	0.008	6	Aug.	3	0.267	4	0.035
14		0		0		13		9		0	
21		9		0		20		11		0	
28		8		0		27		7		0	
4	Sep.	10	0.366	2	0.142	3	Sep.	12	0.562	0	0.062
11		11		3		10		16		0	
18		7		5		17		17		3	
25		13		6		24		18		4	
2	Oct.	17	0.471	4	0.2	1	Oct.	17	0.907	7	0.578
9		13		6		8		23		11	
16		10		7		15		29		18	
23		14		8		22		33		22	
30		12		3		29		25		23	
6	Nov.	11	0.383	6	0.25	5	Nov.	19	0.562	17	0.383
13		15		6		12		20		12	
20		9		9		19		14		9	
27		8		7		26		10		5	
4	Dec.	10	0.303	7	0.16	3	Dec.	10	0.35	7	0.085
11		11		4		10		14		3	
18		7		5		17		9		2	
25		6		2		24		9		0	
1	Jan. 2010	6	0.121	0	0	31	Jan. 2011	7	0.151	0	0
8		5		0		7		5		0	
15		2		0		14		5		0	
22		4		0		21		7		0	
29		0		0		28		0		0	
5	Feb.	0		0		4	Feb.	0	0	0	0

\* MF = Monthly fluctuation = mean numbers of male flies/ trap/month.

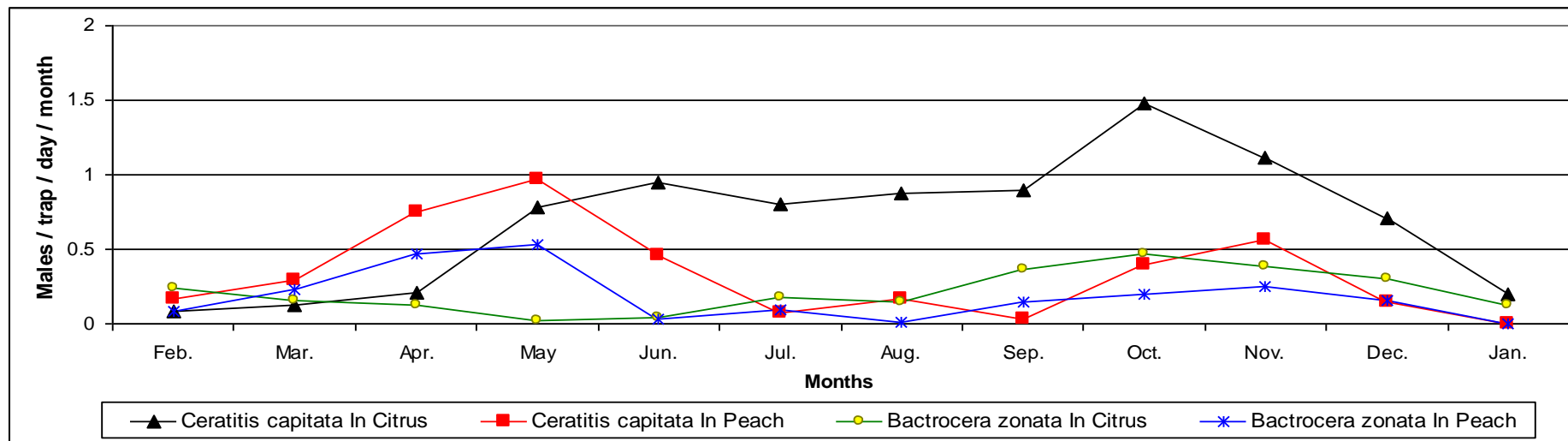


Fig. (1): Monthly fluctuations of captured males of *C. capitata* and *B. Zonata* in both navel orange and peach orchards at Nobaria district, El-Beheira Governorate, during the first season 2009/10.

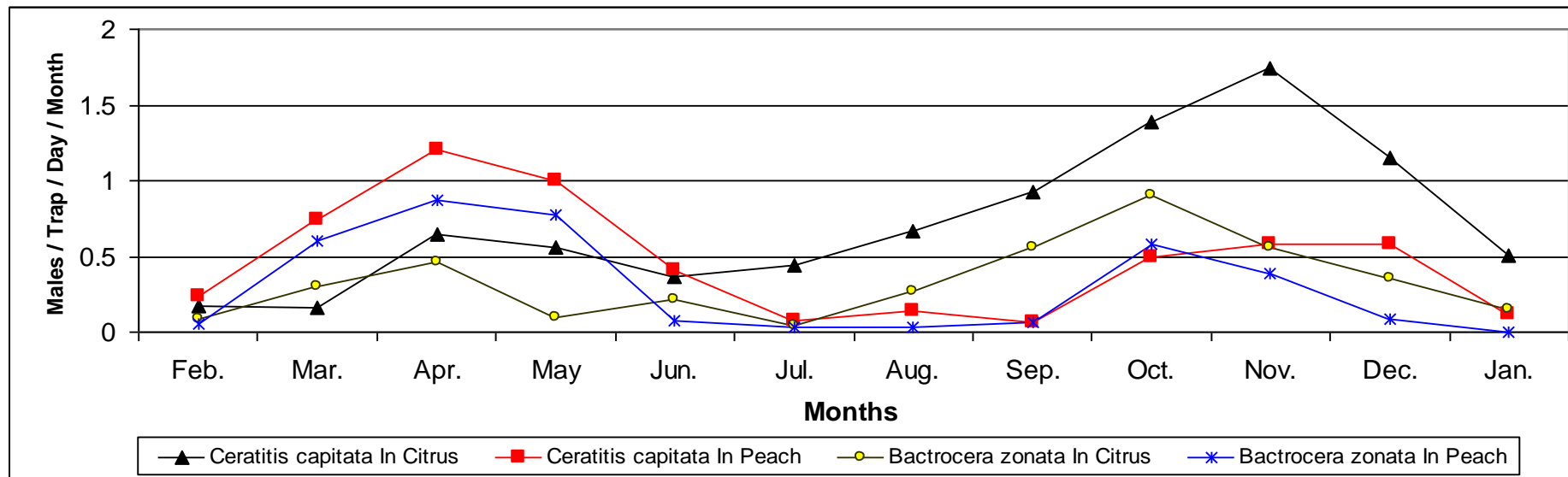


Fig. (2): Monthly fluctuations of captured males of *C. capitata* and *B. Zonata* in both navel orange and peach orchards at Nobaria district, El-Beheira Governorate, during the second season 2010/11.

