FIELD EVALUATION OF SOME ATTRACTANTS FOR ATTRACTING ADULTS OF FRUIT FLIES

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Abstract

Evaluation of different attractants for adults of the Mediterranean fruit fly (MFF), *Ceratitis capitata* (Wied.) and Peach fruit fly (PFF), *Bactrocera zonata* (Saund.) was carried out at three locations (orchards) in Sinuris & Ibshaway, Fayoum Governorate through an experiment during May-June, 2003.

The mean capture per trap per day "CTD" for MFF adults were 0.20, 0.31, 0.54, 0.58 and 0.83 fly for Buminal 2.5 %, Buminal 5 %, Buminal 10 %, Di-ammonium phosphate 2 % and Di-ammonium phosphate 3 %, respectively. For PFF adults, "CTD" were 1.87 flies for Buminal 2.5 %, 2.23 flies for Buminal 5 %, 2.82 flies for Buminal 10 %, 6.78 flies for Di-ammonium phosphate 2 % and 5.34 flies for Di-ammonium phosphate 3 %.

Di-ammonium phosphate concentrations were more attractant for males and females of MFF & PFF adults than Buminal concentrations.

All the attractants attracted PFF adults more than MFF adults, also, all the attractants attracted females more than males for MFF and PFF adults.

INTRODUCTION

Fruits flies of family Tephritidae are well known pests in Egypt. They attack fruits reducing both yield and quality. Mediterranean fruit fly (MFF), *Ceratitis capitata* (Wied.) causes considerably damage and significant economic losses in apricot, peach, guava, mango, fig and citrus (Awadallah *et al.*, 1974, Saafan, 1986, Hashem *et al.*, 1987 and Saafan *et al.*, 1989).

During 90's of the last century, the Egyptian ecosystem has been attacked by one of the most harmful pests, the peach fruit fly (PFF), *Bactrocera zonata* (Saund.). It infested different fruits and vegetables (*e.g.* mango, peach, fig, guava, apple, citrus, tomato, ... etc.) (Narayana and Batra, 1960, Kapoor and Agaewall 1982 and El-Minshawy *et al.*, 1999). Hafez and Ezzat (1967) used traps baited with 3 % solution of diammonium phosphate for monitoring population of *C. capitata* in the New Valley. Steyskal (1977) mentioned that protein hydrolysate used in McPhail traps captured a large number of medfly females.

Saafan (2000) carried out four experiments at Kalubia Governorate to evaluate some attractants for attracting MFF adults. He found that fresh Buminal was superior in attrcting medfly adults at 5 %, 10 % and 15 %. Hanafy *et al.* (2001)

carried out field evaluation of Di-ammonium phosphate compounds for attracting adults of PFF and MFF in guava orchards at Alexandria region. He found that females were more attracted to ammonium compounds than males for MFF & PFF. He mentioned also, that ammonium acetate was more efficiency than Di-ammonium phosphate.

Field evaluation of some concentrations of Di-ammonium phosphate for attracting PFF adults were carried out at Fayoum Governorate (Mohammed, 2003). He mentioned that Di-ammonium phosph. with 3 % concentration was significantly the most attractive for PFF adults.

The present investigation was designed to evaluate the efficacy of some attractants for adults of the Mediterranean fruit fly (MFF), *Ceratitis capitata* (Wied.) and Peach fruit fly (PFF), *Bactrocera zonata* (Saund.) in apricot orchards.

Two objectives for using the attractants, the first one, using the attractants for fruit flies control (partial bait spray and killing bags), the second one, for detecting and monitoring MFF & PFF adults.

The present investigation is the third one of a series of investigations carried out on mango, citrus, and apricot plantations.

MATERIALS AND METHODS

To evaluate efficacy of some different attractants for adult flies of Mediterranean fruit fly, *Ceratitis capitata* (Wied.) (MFF) and Peach fruit fly (PFF), *Bactrocera zonata* (Saund.), an experiment was carried out on apricot plantation during May - June, 2003 at Sinuris & Ibshaway districts, Fayoum Governorate.

The experiments was carried out in three apricot locations (orchards) which represent the different dynamics of MFF and PFF population.

The experiment was carried out during six weekly inspections (5/5//2003 to 16/6/2003).

The used attractants were:

1. Buminal (protein hydrolyzate) as a food attractant in three concentrations, 2.5 %, 5 % and 10 %.
2. Di-ammonium hydrogen orthophosphate as an aggregating attractant in two concentrations, 2 % and 3 %.

McPhail traps (described by Nicanor *et al.*, 1993) were used on apricot trees and baited weekly with the used attractants.

Five replicates for each concentration were placed in a randomized distribution with a distance of 25 meters between every two traps. The experiment was carried out for six weeks. Trap positions were changed weekly in a rotation. Captured flies were collected weekly in plastic jar, inspected in laboratory of Plant Protection Research Institute (PPRI). The

captured flies for MFF and PFF (separating males and females) were recorded and mean captured per trap per day "CTD" for males and females was calculated.

Results were analysed using two way ANOVA. Mean separation was conducted using L.S.D. ($P < 0.05$) (MSTATE program).

RESULTS AND DISCUSSION

A- Mediterranean fruit fly "MFF" captured :

- **The 1*st* location:**

Represent relatively low population of MFF. Table 1 showed that the mean of "CTD" was 0.08, 0.02, 0.07, 0.05 and 0.04 fly for Buminal 2.5 %, Buminal 5 %, Buminal 10 %, di-Ammon.phosph. 2 % and di-Ammon. phosph. 3 %, respectively. The statistical analysis of the data showed insignificant differences in between the five attractan.

- **The 2*nd* location:**

Represent relatively mid population of MFF. Table 1 indicated that the mean of "CTD" was 0.07 fly for Buminal 2.5 %, 0.39 fly for Buminal 5 %, 0.72 fly for Buminal 10 %, 0.79 fly for di-Ammon.phosph. 2 % and 0.85 fly for di-Ammon.phosph. 3 %.

The statistical analysis of the data showed significant differences between Buminal 2.5 % and the other three attractants, Buminal 10 %, di-Ammon.phosph. 2 % and di-Ammon.phosph. 3 %, while there were insignificant differences in between Buminal 2.5 %, Buminal 5 %. Also, there were insignificant differences in between the four attractants, Buminal 5 %, Buminal 10 %, di-Ammon.phosph. 2 % and di-Ammon.phosph. 3 %

- **The 3*rd* location :**

Represent relatively high population for MFF. Data presented in Table 1 showed that the mean of "CTD" was 0.46, 0.52, 0.84, 0.90 and 1.58 flies for Buminal 2.5 %, Buminal 5 %, Buminal 10 %, di-Ammon.phosph. 2 % and di-Ammon.phosph. 3 %, respectively.

Table 1. Means of capture per trap per day "CTD" of MFF in McPhail traps baited with different attractants, in apricot orchards at the three locations during 5/5/2003 to 16/6/2003.

Attractants	Mean "CTD" of MFF during inspection periods									Grand mean		
	1*st* location			2*nd* location			3*rd* location					
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Buminal 2.5 %	0.02	0.06	0.08 a	0.01	0.06	0.07 b	0.16	0.30	0.46 b	0.06 b	0.14 c	0.20 c
Buminal 5 %	0.00	0.02	0.02 a	0.11	0.28	0.39 ab	0.22	0.30	0.52 b	0.11 ab	0.20 bc	0.31 bc
Buminal 10 %	0.01	0.06	0.07 a	0.18	0.54	0.72 a	0.24	0.60	0.84 ab	0.14 ab	0.40ab	0.54abc
di-Ammonium phosphate 2 %	0.00	0.05	0.05 a	0.23	0.56	0.79 a	0.29	0.61	0.90 ab	0.17 ab	0.41 ab	0.58 ab
di-Ammonium phosphate 3 %	0.02	0.02	0.04 a	0.21	0.64	0.85 a	0.51	1.07	1.58 a	0.25 a	0.58 a	0.83 a
Mean	0.01 c	0.04 b	0.05 c	0.15 b	0.41 a	0.56 b	0.28 a	0.58 a	0.86 a	0.15	0.34	0.49

	Locations		Attractants	
Sex	F-value	LSD at 5%	F-value	LSD at 5%
Male	11.83**	0.11	1.74 ns	0.15
Female	16.74**	0.19	4.08**	0.25
Total	15.81**	0.29	3.29*	0.38

The statistical analysis of the data showed insignificant differences in between the four attractants, Buminal 2.5 %, Buminal 5 %, Buminal 10 % and di-Ammon.phosph. 2 %, also there were insignificant differences in between the three attractants, Buminal 10 %, di-Ammon.phosph. 2 % and di-Ammon.phosph. 3 %. There were significant differences between di-Ammon.phosph. 3 % and the two attractants, Buminal 2.5 % and Buminal 5 %.

Summarizing the data in Table 1 it seemed that the grand mean of "CTD" for the three locations was 0.20, 0.31, 0.54, 0.58 and 0.83 fly for Buminal 2.5 %, Buminal 5 %, Buminal 10 %, di-Ammon.phosph. 2 % and di-Ammon.phosph. 3 %, respectively.

The statistical analysis of the data, in Table 1 showed significant differences between Buminal 2.5 % and the two attractants, di-Ammon.phosph. 2 % and di-Ammon.phosph. 3 %. There were insignificant differences in between the three attractants, Buminal 2.5 %, Buminal 5 % and Buminal 10 %, also there were insignificant differences in between Buminal 10 %, di-Ammon.phosph. 2 % and di-Ammon.phosph. 3 %

B- Peach fruit fly "PFF" captured :

- **The 1*st* location:** Represent relatively high population for PFF. Table (2) showed that the mean "CTD" was 3.78 flies for Buminal 2.5 %, 4.04 flies for Buminal 5 %, 5.30 flies for Buminal 10 %, 10.0 flies for di-Ammon.phosph. 2 % and 7.04 flies for di-Ammon.phosph. 3 %.

The statistical analysis showed significant differences between di-Ammon.phosph. 2% and the three attractants, Buminal 2.5 %, Buminal 5% and Buminal 10 %. There were insignificant differences in between Buminal 2.5 %, Buminal 5%, Buminal 10 % and di-Ammon.phosph. 3 %, also between di-Ammon.phosph. 2 % and di-Ammon.phosph. 3 %.

- **The 2*nd* location:** Represent relatively low population for PFF. Data in Table 2 indicated that the mean "CTD" was 0.20, 0.55, 0.35, 1.90 and 2.82 flies for Buminal 2.5 %, Buminal 5 %, Buminal 10 %, di-Ammon.phosph. 2 % and di-Ammon.phosph. 3 %, respectively.

The statistical analysis showed significant differences between di-Ammon.phosph. 3 % and the other four attractants, and also, there were significant differences between di-Ammon.phosph. 2 % and the other four attractants, while there were insignificant differences among the three attractants, Buminal 2.5, Buminal 5 % and Buminal 10 %.

- **The 3*rd* location:** Represent relatively mid population for PFF. Table 2 showed that the mean "CTD" was 1.63, 2.09, 2.81, 8.43 and 6.15 flies for Buminal 2.5 %, Buminal 5 %, Buminal 10 %, di-Ammon.phosph. 2 % and di-Ammon.phosph. 3 %, respectively.

The statistical analysis showed significant differences between di-Ammon.phosph. 2 % and the three attractants, Buminal 2.5 %, Buminal 5 % and Buminal 10 %, while there were insignificant differences among Buminal 2.5 %, Buminal 5 % and Buminal 10 %, also there were insignificant differences in between Buminal 10 % and di-Ammon.phosph. 3 %, and also between di-Ammon.phosph. 2 % and di-Ammon.phosph. 3 %.

Table 2. Means of capture per trap per day "CTD" of PFF in McPhail traps baited with different attractants, in apricot orchards at the three locations during 5/5/2003 to 16/6/2003.

Attractants	Mean of "CTD" of MFF during inspection periods									Grand mean		
	1*st* location			2*nd* location			3*rd* location					
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Buminal 2.5 %	1.43	2.55	3.78 b	0.08	0.12	0.20 c	0.62	1.01	1.63 c	0.71 c	1.16 c	1.87 c
Buminal 5 %	1.60	2.44	4.04 b	0.22	0.33	0.55 c	0.76	1.33	2.09 c	0.86 c	1.37 c	2.23 c
Buminal 10 %	1.87	3.43	5.30 b	0.14	0.21	0.35 c	1.19	1.62	2.81 bc	1.07 bc	1.75 bc	2.82 bc
di-Ammonium phosphate 2 %	4.30	5.70	10.0 a	0.81	1.09	1.90b	3.63	4.80	8.43 a	2.92 a	3.86 a	6.78 a
di-Ammonium phosphate 3 %	2.78	4.26	7.04 ab	1.22	1.60	2.82 a	2.59	3.56	6.15 ab	2.20 ab	3.14 ab	5.34 ab
Mean	2.50 a	3.64 a	6.04 a	0.49 b	0.67 b	1.16 b	1.76 a	2.46 a	4.22 a	1.55	2.26	3.81

Sex	Locations		Attractants	
	F-value	LSD at 5%	F-value	LSD at 5%
Male	9.20**	0.90	5.43**	1.17
Female	12.61**	1.19	4.75**	1.54
Total	11.38**	2.06	5.18**	2.66

Summarizing the data in Table 2 it seemed that the grand mean of "CTD" for the three locations was 1.87, 2.23, 2.82, 6.78 and 5.34 flies for Buminal 2.5 %, Buminal 5 %, Buminal 10 %, di-Ammon.phosph. 2 % and di-Ammon.phosph. 3 %, respectively.

The statistical analysis of the data, in Table 2 showed significant differences between di-Ammon.phosph. 2 % and the three attractants, Buminal 2.5 %, Buminal 5 % and Buminal 10 %, while there were insignificant differences among Buminal 2.5 %, Buminal 5 % and Buminal 10 %, also in between Buminal 10 % and di-Ammon.phosph. 3 %, also in between di-Ammon.phosph. 2 % and di-Ammon.phosph. 3 %. Table 3. illustrated that all the attractants captured females more than males for MFF and PFF.

Table 3. Means capture per trap per day "CTD" of MFF & PFF in McPhail traps baited with different attractants, in apricot orchards, Fayoum Governorate during 5/5/2003 - 16/6/2003.

Attractants	Grand means of CTD of MFF & PFF					
	MFF			PFF		
	Male	Female	Total	Male	Female	Total
Buminal 2.5 %	0.06 b	0.14 c	0.20 c	0.71 c	1.16 c	1.87 c
Buminal 5 %	0.11 ab	0.20 bc	0.31 bc	0.86 c	1.37 c	2.23 c
Buminal 10 %	0.14 ab	0.40 ab	0.54 abc	1.07 bc	1.75 bc	2.82 bc
di-Ammonium phosphate 2 %	0.17 ab	0.41 ab	0.58 ab	2.92 a	3.86 a	6.78 a
di-Ammonium phosphate 3 %	0.25 a	0.58 a	0.83 a	2.20 ab	3.14 ab	5.34 ab
Mean	0.15	0.34	0.49	1.55	2.26	3.81
F-value	1.74 ns	4.08**	3.29*	5.43**	4.75**	5.18**
LSD at 5 %	0.15	0.25	0.38	1.17	1.54	2.66

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التقييم الحقلى لبعض الجاذبات فى جذب الحشرات الكاملة لذبابة فاكهة البحر المتوسط وذبابة ثمار الخـــوخ فى حدائق المشمش

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نظرا لما تلعبه الجاذبات المختلفة لذباب الفاكهة من دور هام فى المكافحة، وأيضا فى الاستدلال على وجود الذباب، فقد تم التقييم الحقلى لجاذبات مختلفة لجذب ذبابة فاكهة البحر المتوسط وذبابة ثمار الخوخ وذلك فى سلسلة أبحاث أجريت فى حدائق المانجو والموالح والمشمش.

وهذا البحث هو الثالث .. والذى أجرى فى حدائق المشمش بمركزى سنورس وأبشواى بمحافظة الفيوم، خلال شهرى مايو – يونيه ٢٠٠٣.. وكانت نتائج تقييم المواد المختبرة كالتالى :

- كان متوسط الذباب المنجذب للمصيدة الواحدة فى اليوم الواحد "**CTD**" بالنسبة لذبابة فاكهة البحر المتوسط هو ٠,٢٠ ذبابة، ٠,٣١ ذبابة، ٠,٥٤ ذبابة، ٠,٥٨ ذبابة، ٠,٨٣ ذبابة وذلك للجاذبات : بومينال ٢,٥ %، بومينال ٥ %، بومينال ١٠ %، داى أمونيوم فوسفيت ٢ %، داى أمونيوم فوسفيت ٣ %، على التوالى. بالنسبة لذبابة ثمار الخوخ كان متوسط "**CTD**" هو ١,٨٧ ذبابة للبومينال ٢,٥ %، ٢,٢٣ ذبابة للبومينال ٥ %، ٢,٨٢ ذبابة للبومينال ١٠ %، ٦,٧٨ ذبابة لداى أمونيوم فوسفيت ٢ %، ٥,٣٤ ذبابة لداى أمونيوم فوسفيت ٣ %.
- لوحظ أن تركيزات الداى أمونيوم فوسفيت كانت أكثر جذبا لذكور وإناث كلتا الحشرتين عن تركيزات البومينال.
- جميع الجاذبات المختبرة جذبت ذبابة الخوخ أكثر من ذبابة فاكهة البحر المتوسط، كذلك جميع التركيزات جذبت الإناث أكثر من الذكور لكلتا الحشرتين.