FIELD EVALUATION OF SOME ATTRACTANTS FOR ATTRACTING THE ADULTS OF THE MEDITERRANEAN FRUIT FLY, *CERATITIS CAPITATA* (WIED.)

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Abstract

Field evaluation of some attractants (bominal and local attractants) to attract the adult of the Mediterranea fruit fly, *Ceratitis capitata* were carried out through four experiments at Kalubia Governorate during the two successive seasons; 1995 and 1996. Fresh bominal was superior for attracting medfly adult at 5%, 10% and 15% concentrations in the four experiments, followed by local attractant (No. 2) at the same concentrations during three experiments. At 20% concentration, local attractant (No. 2) hold the first place in two experiments and the second place in the two other experiments. Attractant efficacy of fresh bominal decreased sharply when its storage reached 1-5 years, where the mean percentages of reduction in fresh bominal efficacy ranged between 45.29%-88.99%. Attractant efficacy for local attractants decreased also, when its storage reached six months.

INTRODUCTION

The Mediterranean fruit fly, *Ceratitis capitata* (Wied.) is a serious and worldwide pest attacking a wide range of different crops. In Egypt, this pest causes considerable damage and inflicts significant economic losses in citrus and deciduous fruits (Awadallah *et al.*, 1974; Saafan, 1986). Hashem *et al.* (1987) and Saafan *et al.* (1989 & 1993) successfully used partial bait spray for the control of the Mediterranean fruit-fly, *Ceratitis capitata* (Wied.) in Egypt.

The present investigation was designed to evaluate the efficacy of some food attractants for attracting medfly adults on various medfly hosts during different seasons.

MATERIALS AND METHODS

Four experiments were carried out at Kalubia Governorate throughout two successive years; 1995 and 1996 to evaluate the efficacy of some food attractants for attracting the adult fly of the Meditrranean fruit fly, *Ceratitis capitata*.

The first experiment was carried out throughout May to July, 1995 in apricot orchard. The second one was carried out in summer citrus orchard (Valencia orange) during the period from April to June, 1996. The third one was in peach orchard during July and August, 1996 The fourth one was in winter citrus during November and December, 1996.

The food attractants were used as follows:

- Fresh bominal (protein hydrolyzate) imported in the same experimental year.

- Old bominal stored under room temperature conditions since 1991.

-Two local attactants consisted of a mixture of molasses+brower's yeast+ water at a ratio of 20%: 20%: 60% for the first, and 40%: 30%: 30% for the second one, respectively.

Four concentrations of each attractant were tested (5%, 10%, 15% and 20%) and 2% sodium benzoate was added to each attractant concentration as a preservative.

McPhail traps (described by Nicanor, J. *et al.*, 1993) were used, hanged on fruit trees and baited weekly with the used attractants. The captured medfly adults were collected in plastic tubes, inspected in the laboratory. The mean catch per trap per day " CTD" for male, female and their total was calculated. Three replicates for each treatment were placed in a randomized distribution and the distance between two adjacent traps was 20 meters. Traps were remained for eight weeks for each experiment. Differentiation between means was carried out using statistical "T" test.

RESULTS AND DISCUSSION

Data presented in Table 1 show the efficacy of different concentrations of attractants on attracting medlfly adult in apricot grove during May-July, 1995, where medfly population was high. Fresh bominal was the superior attractant, where values of medfly captured per trap per day " CTD" were 5.70,8.70 and 6.83 flies for 5%, 10% and 15% concentrations, respectively, followed by local attractant (No. 2), where the values of " CTD" were 2.65, 3.70 and 4.88 flies for the same concentrations, respectively. Local attractant (No.1) came in the third category, where values of " CTD" were 2.34,3.45 and 4.31 flies for 5%, 10% and 15% concentrations, respectively. Old bominal was the least attractant for capturing

Table 1. Mean number of CTD* for medfly adult captured in McPhail traps baited with different attractants in apricot orchard during May-July, 1995 at Kalubia Governorate.

Concentrations / Food attractants	5 %				10 %				15 %				20 %			
	Males	Females	Total	T**	Males	Females	Total	T	Males	Females	Total	T	Males	Females	Total	T
Fresh bominal	2.10	3.60	5.70	a	4.00	4.70	8.70	a	2.97	3.86	6.83	a	2.55	1.76	4.31	a
Percentages (%)	36.84	63.16	-		45.98	54.02	-		43.48	56.52	-		59.16	40.84	-	
Old bominal	0.85	0.86	1.71	b	1.16	1.27	2.43	b	1.55	1.60	3.15	b	0.62	0.64	1.26	b
Percentages (%)	49.71	50.29	-		47.74	52.26	-		49.21	50.79	-		49.21	50.79	-	
Local attractant (1)	1.08	1.26	2.34	b	1.74	1.80	3.54	b	2.10	2.21	4.31	ab	2.19	2.27	4.46	a
Percentages (%)	46.15	53.85	-		49.15	50.85	-		48.72	51.28	-		49.10	50.90	-	
Local attractant (2)	1.30	1.35	2.65	ab	1.87	1.83	3.70	b	2.41	2.47	4.88	ab	2.46	2.52	4.98	a
Percentages (%)	49.06	50.94	-		50.54	49.46	-		49.39	50.61	-		49.40	50.60	-	

* CTD : Captured per trap per day.

** Means followed by the same letter are not significantly different ($P < 0.05$).

medfly adults, where values of " CTD" were 1.71, 2.43, 3.15 and 1.26 flies for 5%, 10%, 15% and 20% concentrations, respectively.

For 20% concentration, local attractant (No. 2) proved superior in capturing medfly adult (CTD: 4.98 flies) followed by local attractant (No.1) (CTD: 4.46 flies) and fresh bominal (CTD:4.31 flies).

The same Table also indicates that the percentages of medfly females were relatively higher than males at concentrations of 5%, 10% and 15% for fresh bominal attractant (63.16%, 54.02% and 56.52%, respectively), while it was the least percent in 20% concentration for the same attractant (40.84%). For the other attractants, there were no high differences between the captured of males and females.

Statistical analysis showed significant differences between fresh bominal and the other attractants at 5%, 10% and 15% concentrations, and insignificant differences between old bominal, local attractant (1) and local attractant (2) at the same concentrations. At 20% concentration, there were significant differences between old bominal and the other attractants.

Data presented in Table 2 show the efficacy of different concentrations for some attractants for attracting medfly adults in valencia orange grove during April-June, 1996, where medfly population was moderate. Fresh bominal was the superior for attracting medfly adults, where the values of "CTD" were 1.54, 3.13 and 2.93 flies for 5%, 10% and 15% concentrations, respectively. Local attractant (No. 2) came in the second category (CTD: 1.12, 2.09 and 2.21 flies) for 5%, 10% and 15% concentrations, respectively. Local attractant (No. 1) came in the third category, where values of "CTD" were 1.07, 1.67 and 1.97 flies for 5%, 10% and 15% concentrations, respectively. Old bominal hold the fourth place, where values of "CTD" were 0.47, 0.73 and 1.08 flies for 5%, 10% and 15% concentrations, respectively.

For 20% concentration, local attractant (No. 2) was the superior attractant for capturing medfly adult (CTD: 2.32 flies), followed by local attractant (No. 1) (CTD: 2.01 flies), and fresh bominal (CTD: 0.92 fly). Old bominal was the least attractant at 20% concentration (CTD: 0.51 fly).

Table 2 indicates that the percentages of captured medfly females were relatively higher than males in all concentrations of the four attractants.

Table 2. Mean number of CTD* for medfly adult captured in McPhail traps baited with different attractants in valencia orchard during April-June, 1996 at Kalubia Governorate.

Concentration / Food attractants	5%				10%				15%				20%			
	Males	Females	Total	T**	Males	Females	Total	T	Males	Females	Total	T	Males	Females	Total	T
Fresh bominal	0.73	0.81	1.54	a	1.56	1.57	3.13	a	1.46	1.47	2.93	a	0.44	0.48	0.92	bb
Percentages (%)	47.40	52.60	-		49.84	50.16	-		49.83	50.17	-		47.83	52.17	-	
Old bominal	0.22	0.25	0.47	b	0.36	0.37	0.73	c	0.54	0.54	1.08	b	0.25	0.26	0.51	b
Percentages (%)	46.81	53.19	-		49.32	50.48	-		50.00	50.00	-		49.44	50.56	-	
Local attractant (1)	0.46	0.61	1.07	ab	0.78	0.89	1.67	bc	0.93	1.04	1.97	ab	0.98	1.04	2.01	a
Percentages (%)	42.99	57.01	-		46.71	53.29	-		47.21	52.79	-		48.76	51.74	-	
Local attractant (2)	0.51	0.61	1.12	ab	0.97	1.12	2.09	ab	1.03	1.18	2.21	ab	1.14	1.18	2.32	a
Percentages (%)	45.54	54.46	-		46.41	53.59	-		46.61	53.39	-		49.14	58.86	-	

* CTD : Captured per trap per day.

** Means followed by the same letter are not significantly different ($P < 0.05$).

Statistical analysis showed significant differences between fresh bominal and the other attractants at 5%, 10% and 15% concentrations, and also between local attractants (1) and (2) and the other two attractants at 20% concentration. There were inignificant differences between old bominal, local attractants (1) and (2) at 5%, 10% and 15% concentrations.

Data in Table 3 show the efficacy of different concentrations of attractants on attracting medfly adult in peach trees during July and August, 1996, where medfly population was moderate.

For the concentrations 5%, 10%, 15% and 20%, fresh bominal was the superior attractant, where values of "CTD" were 1.19, 2.79, 2.97 and 2.43 flies, followed by local attractant (No. 2), where values of "CTD" were 0.43, 0.74, 1.01 and 1.07 flies for the same concentrations, respectively. Local attractants (No. 1) came in the third place as values of "CTD" were 0.35, 0.68, 0.68, 0.89 and 1.03 flies for 5%, 10%, 15% and 20% concentrations, respectively. Old bominal arranged in the fourth rate, as values of "CTD" were 0.15, 0.27, 0.34 and 0.25 fly for 5%, 10%, 15% and 20% concentrations. In most concentrations of different attractants, percentages of medfly females were slightly higher than the males.

Statistical analysis showed significant differences between fresh bominal and the other attractants at the all concentrations, and also between old bominal, local attractant (No. 2). There were insignificant differences between local attractant (No. 1) and local attractant (No. 2) at all concentrations.

Data represented in Table 4 show the efficacy of different concentrations of attractants on attracting medfly adult in winter citrus orchard during November and December, 1996, when medfly population was low. Fresh bominal was the superior attractant, as values of "CTD" were 0.43, 1.44, 1.64 and 0.84 flies for 5%, 10%, 15%, and 20% concentrations, respectively. Old bominal came in the second rate at 10% and 15% concentrations (CTD: 0.74 and 0.97 fly), while local attractant (No. 2) took the same place at 5% and 20% concentrations (CTD: 0.27 and 0.80 fly). Local attractant (No. 1) came in the third place for the two concentrations 10% (CTD: 0.43 fly) and 20% (CTD:0.63 fly), while it came in the fourth rate for the two concentrations 5 % (CTD: 0.20 fly) and 15% (CTD: 0.59 fly).

The same Table indicates that percentages of captured males were relatively higher than females in most concentrations of fresh and old bominal attractants, while local attractants (No. 1 & 2) showed the opposite trend.

Table 3. Mean number of CTD* for medfly adult captured in McPhail traps baited with different attractants in peach orchard during July and August, 1996 at Kalubia Governorate.

Concentrations / Food attractants	5 %				10 %				15 %				20 %			
	Males	Females	Total	T**	Males	Females	Total	T	Males	Females	Total	T	Males	Females	Total	T
Fresh bominal	0.62	0.57	1.19	a	1.44	1.35	2.79	a	1.52	1.45	2.97	a	1.20	1.23	2.43	a
Percentages (%)	52.10	47.90	-		51.61	48.39	-		51.18	48.82	-		49.38	50.62	-	
Old bominal	0.07	0.08	0.15	c	0.13	0.14	0.27	c	0.17	0.17	0.34	c	0.12	0.13	0.25	c
Percentages (%)	46.67	53.33	-		48.15	51.85	-		50.00	50.00	-		48.00	52.00	-	
Local attractant (1)	0.16	0.19	0.35	bc	0.33	0.35	0.68	bc	0.42	0.47	0.89	bc	0.50	0.53	1.03	b
Percentages (%)	45.71	54.29	-		48.53	51.47	-		47.19	52.81	-		48.54	51.46	-	
Local attractant (2)	0.19	0.24	0.43	b	0.35	0.39	0.74	b	0.49	0.52	1.01	b	0.52	0.55	1.07	b
Percentages (%)	44.19	55.81	-		47.30	52.70	-		48.51	51.49	-		48.60	51.40	-	

* CTD : Captured per trap per day.

** Means followed by the same letter are not significantly different ($P < 0.05$).

Statistical analysis showed insignificant differences between all attractants at 5% and 20% concentrations, while it was significant between fresh bominal and the other attractants at concentrations of 10% and 15%.

It is obvious from Table 4 that, the efficacy of the two local attractants decreased in the last experimer t compared with the previous experiments. The decrease in efficacy may be due to the storage of the two local attractants for six months at room temperature.

From the forementioned findings, it could be concluded that the fresh bominal was the superior for attracting medfly adults at 5%, 10% and 15% concentrations in the four experiments, followed by local attractant (No. 2) in three experiments. At 20% concentrations, local attractant (No. 2) came in the first rate in two experiments and in the second rate in the other two experiments. Efficacy of attraction for bominal decreased sharply when it was stored for long time (4-5 years), also the efficacy of attraction of local attractants decreased when stored for a short time (six months).

Table 4. Mean number of CTD* for medfly adult captured in McPhail traps baited with different attractants in winter citrus orchard during November and December, 1996 at Kalubia Governorate.

Concentration / Food attractants	5%				10%				15%				20%			
	Males	Females	Total	T**	Males	Females	Total	T	Males	Females	Total	T	Males	Females	Total	T
Fresh bominal	0.22	0.21	0.43	a	0.73	0.71	1.44	a	0.81	0.83	1.64	a	0.43	0.41	0.84	a
Percentages (%)	51.16	48.84	-		50.69	49.31	-		49.39	50.61	-		51.19	48.81	-	
Old bominal	0.18	0.16	0.22	a	0.38	0.36	0.74	b	0.47	0.50	0.97	b	0.23	0.25	0.48	a
Percentages (%)	52.94	47.06	-		51.35	48.65	-		48.45	51.55	-		47.92	52.08	-	
Local attractant (1)	0.09	0.11	0.20	a	0.21	0.22	0.43	c	0.28	0.31	0.59	c	0.30	0.33	0.63	a
Percentages (%)	45.00	55.00	-		48.84	51.16	-		47.46	52.54	-		47.62	52.38	-	
Local attractant (2)	0.12	0.15	0.27	a	0.19	0.23	0.42	c	0.36	0.40	0.76	bc	0.38	0.42	0.80	a
Percentages (%)	44.44	55.56	-		45.24	54.24	-		47.37	52.63	-		47.50	52.50	-	

* CTD: Captured per trap per day.

** Means followed by the same letter are not significantly different ($P < 0.05$).

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التقييم الحقلي لبعض الجاذبات الغذائية في جذب الحشرات الكاملة لذبابة فاكهة البحر المتوسط "سيراتيتس كابيتاتا"

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تم التقييم الحقلي لأربعة جاذبات غذائية (بومينال حديث ، بومينال قديم، الجاذب المحلي (رقمي ١ ، ٢) وذلك لجذب الحشرات الكاملة لذبابة فاكهة البحر المتوسط وذلك خلال أربعة تجارب أجريت في محافظة القليوبية خلال عامي ١٩٩٥ ، ١٩٩٦.

أثبتت التجارب أن البومينال الحديث كان أكثر الجاذبات في جذب ذبابة الفاكهة خلال التجارب الأربعة وذلك بالتركيزات ٥٪ ، ١٠٪، ١٥٪، تلاه الجاذب المحلي (رقم ٢) بتركيز ٢٠٪ بنفس التركيزات السابقة في تجربتين. جاء الجاذب المحلي (رقم ٢) بتركيز ٢٠٪ في المقدمة خلال تجربتين وفي المركز الثاني خلال التجربتين الأخيرتين، وجاء البومينال القديم (الراكد منذ عام ١٩٩١) في المرتبة الأخيرة في ثلاث تجارب.

وقد وجد أن كفاءة البومينال في جذب الحشرات الكاملة لذبابة الفاكهة قد إنخفضت بشدة نظرا لتخزينه لمدة ٤ - ٥ سنوات، كما انخفضت كفاءة الجاذبان المحليان نسبيا وذلك لمجرد التخزين لمدة ستة شهور.