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EFFICIENCY OF CERTAIN ATTRACTANTS ON THE CONTROL OF *Ceratitis capitata* (Wied)

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ABSTRACT

Experiment was conducted from November 9th 2000 till February 15th, 2001 in an navel orange grove near El- Mamora village, Alexandria Governorate. The attractiveness of three materials polycor, Buminal and Di-ammonium hydrogenophosphate (NH_4)$_2$ HPO_4. 3% and one blank treatment were studied, with an emphasis on their possible use, as a mean to control the Med-fly *ceratitis capitata* (Wied). The four treatments were studied in three replicates in a randomized block design. The fruit infestation was surveyed every week on three randomly selected trees for each replicate. The effect of temperature and humidity on trap attractancy, and the relationship between trap capture and infestation were also investigated. The attractancies were found to be strongly dependent on attractant type. For males, the highest attractancy was associated with polycor and the lowest with di-ammonium hydrogeno phosphate throughout most of the experiments. However, the infestation was at low level in the treated areas compared with the untreated.

INTRODUCTION

The Mediterranean fruit fly *Ceratitis capitata* (Wied). is a serious pest for different fruit crops especially citrus. Sex attractant, polycor was synthetic attractant for males only used in trapping the Med-fly for detecting infestations or for determining population Beroza (1970), Nakagowa *et al* (1981) and McGovern *et al.* (1986). Food attractant; Buminal is hydrolyzed protein bait, which was applied by Finowerke Buttery *et al.* (1983) and Anonymous (1985). Mass trapping method is a new direction for controls many pests particularly that belonging to the Family Tephritidae Heniotakis (1986) and Zeinab *et al.* (1995).

The current control methods used in Egypt against this pest are the insecticidal treatments which were found to cause contamination to fruits and its by- products as well as severe pollution problems to the environment. The objectives of the present study could be summarized as follows :

- To study the sex attractant and food attractant (Polycor, Buminal and di-ammonium hydrogeno phosphate in local plastic traps) as a mean to control Med-fly, and to determine its optimal lure.
- Producing high quality products that are beneficial to human health.
- Reducing the use of insecticides, if possible, to protect the beneficial insects and the environment from pollution.

MATERIALS AND METHODS

Experiment was conducted in 2000-2001, in an navel orange orchard near El-Mamora region, Alexandria Governorate.

1- Tested orchard :

The tested orchard contained citrus CV. " navel orange". Their age varied and they were all productive. They were located in an area with an inter-tree planting of guava, mango, fig , peach and olive.Traps were Used in 1.5 feddan.

2- Attractant applied :

a-Sex Attractant : Polycor was used to attract the males of the medfly, Trimedlure (tert-butyl 4 (and 5)–chloro- cis and trans – 2, methylcyclohexane – carboxylate .

b- Food Attractant : Buminal is a hydrolyzed protein bait, which was applied by Fino- work in 1986. This lure is assumed to be related in composition to the honeydew Buttry *et al.*, 1983.

c-Chemicals (Oriposition) lure :

The only chemical applied was the di-ammonium hydrogenophosphate $(NH_4)_2 HPO_4$.

3- Traps :

Local plastic traps according Hanafy *et al.* It was charged with 200 ml water solution of polycor, Buminal and di-ammonium phophate.

4- Methodology :

The traps were hung on 9th of Nov. 2000, on trees with the same navel orange fruit load, where possible inside the leaf canopy of the tree, at a height of 1.5 m from the ground. The distance between the traps averaged about 30m.

The time between two changes of the attractant solution was seven days. After each change the position of the traps has to be kept as constant as possible. The four treatments were studied in three replicats, in a randomized block design. Traps readings were carried every week by counting the males and females separately.

The fruit infestation was surveyed, taking a sample of 35 fruits per treatment from four orientation of canopy and center tree. The fruits were examined and infested fruits were counted. Experiment was distributed in a Factorial design and the means were compared by L.S.D at 0.05 according to Steel and Torrie (1981).

RESULTS AND DISCUSSION

Observations during this experiment had shown that the attractancy was strongly influenced by Polycor (sex attractant). The analysis of variance revealed a significant difference among the type of attractant (Polycor, Buminal and Di- ammonium hydrogenophosphate).

Table (1) and Figs (1&2) shows that the mean of total adults catch was significantly higher in polycor (126.63)than the other lures, Buminal(14.42) and di-ammonium hydrogenophosphate (5.43). The lowest attractancy was noticed with di-ammonium hydrogenophosphate . No significant difference was noticed between the solution of Buminal (14.42) and solution 3% di-ammonium phosphate (5.43) L.S.D at 0.05=14.302.

Table 1: Field evaluation of three attractant for Med- fly throughout the period from 9 / 11 / 2000 to 15 / 2 / 2001 in citrus orchard at Alexandria Governorate.

Attractant	Sexes	Means of captured flies per week														Mean attractants	Mean sexes
		16/11	23/11	30/11	7/12	14/12	21/12	28/12	4/1	11/1	18/1	25/1	1/2	8/2	15/2		
Di-Ammonium Phosphate	♀♀	23.7	44.7	5.0	9.7	5.3	3.3	1.0	2.0	0	1.7	2.0	0.7	0.7	2.0	5.43 a	♀♀ 11.55 a
	♂♂	34.7	4.0	2.0	3.0	2.3	1.0	0.7	1.0	0.3	1.0	0	0	0	0.3		
Buminal	♀♀	72.7	200.3	43.0	1.7	4.7	7.7	1.0	4.3	2.3	1.7	5.7	3.7	0.3	3.7	14.42 a	
	♂♂	1.7	6.7	6.0	0	0.3	0.3	0.6	0.6	1.0	0.3	1.3	1.0	0.3	0		♂♂ 86.10 b
Poiycure	♀♀	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126.63 b	
	♂♂	1152	1011	290.0	208.3	239.0	192.0	184.7	96.7	176.0	203.7	104	15.7	2.3	4.0		
Total mean		214.1 d	155.5 c	57.7 b	37.1 ab	41.9 a b	34.0 a b	31.3 a b	17.4 a b	29.9 a b	34.7 a b	18.8 a b	3.5 a	0.6 a	1.7 a		
	L.S.D at 0.05	for attractant = 14.302					for sexes = 11.753						for time = 30.896				

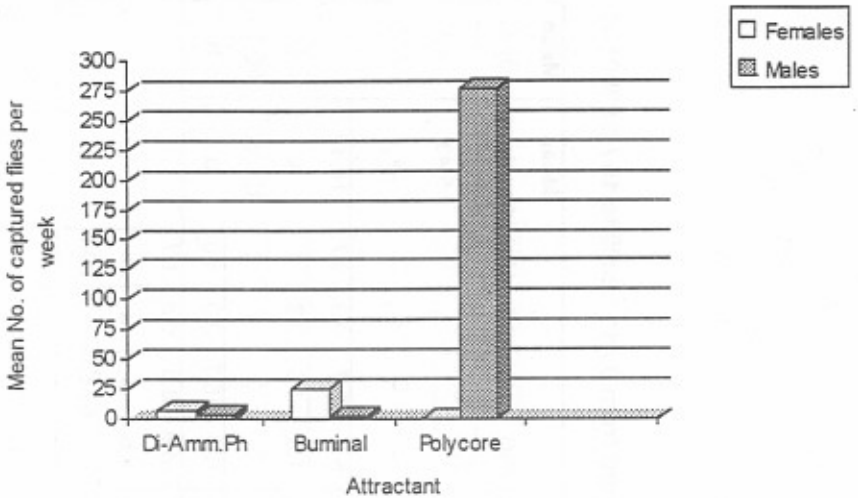

Fig. (1): Attractivity of three attractant for Med-fly C. capitata.

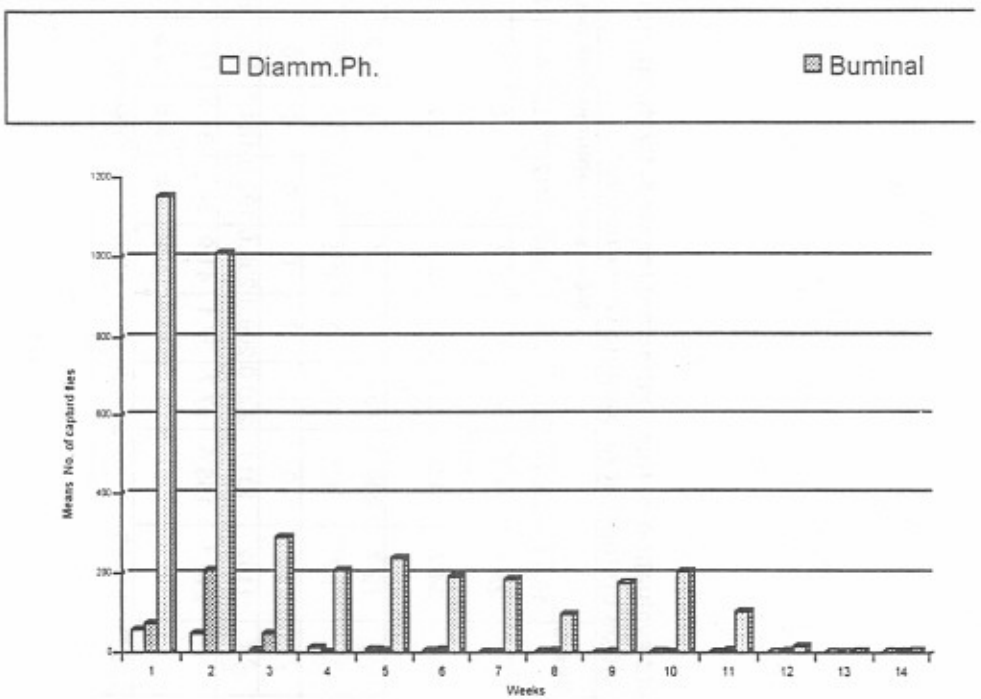

Fig. (2): Field evaluation of three attractant for Med- fly throughout the period from 9 / 11 / 2000 to 15 / 2 / 2001 in citrus orchard at Alexandria Governorate.

These results indicate that polycor performed significantly better than Buminal solution and di-ammonium phosphate. In conclusion, polycor is suggested as the optimum lure to be used in detection, survey, early warning, define hot spots, time spray application, demonstrate, need, predator release and control for the management of Mediterranean Fruit Fly *Ceratitis capitata* (Wied.) population.

Findings in the aforementioned table indicate that, on the basis of the weekly count of the traps, catches during the whole period of experiment, indicate that the polycor was most of time the highest attractive, specially in three first weeks, shows that the mean of total adults catch was significantly higher in the first week (214.1)than the other weeks. Next to the second week (155.5)than the other weeks, then the third week (57.7)than the other weeks, However, there was no significant difference between the fourth week till eighth week, In addition, the inspection was not significantly different. The lowest inspection was noticed with thirteen week, fourteen week and twelfth week (0.6, 1.7 and 3.5) respectively. This may be due to the effect of different climatic conditions which may affect the attractancy of different attractants type.

It could be concluded that the percentages of infestation were reduced after treatment by mass trapping. Also, both of population of Medfly and percentage of infestation were reduced by using of mass trapping. This results was in agreement with the results obtained by Cunningham and Suda (1986) who found a reduction in both of the male population and fruit infestation rate of Oriental fruit fly *Dacus dorsalis* (Handel) after using mass trapping method with sex attractant. Also it was in agreement with the results obtained by Saafan (2000) who found that bait spray and killing bags reduction of *Ceratitis capitata* (Wied.) and larval infestation in apricot orchards. Also, it was in agreement with the results obtained by Zeinab *et al.* (1995) who used mass trapping method for control *Bactrocera oleae* (Gmel.). They found that the di-ammonium hydrogenophosphate 1% used in traps was more active than others concentrations for attracted were and reduction the population of olive fruit flies, Also, it was in agreement with the results obtained by Awad and Hanafy (2002) who used mass trapping with bait spray method for control *Ceratitis capitata* (Wied.).

It is obvious from Table (2) that the percentage average of infestation in an navel orange fruits in orchard treated with mass trapping throughout the experimental period was 0.0% (polycor), 14.0% (Buminal) and 12.0% (Di-ammonium phosphate) respectively. While it was 65.0% in untreated (control).

Table(2): Percentage of Med-fly infestation in an navel orange grove

Treatment	Percentage of fruit infestation			Mean
	23/11/2000	30/11/2000	7/12/2000	
Polycor	0.0	0.0	0.0	0.0%
Buminal	25.0	13.0	4.0	14.0%
Di-amm.	18.0	12.0	6.0	12.0%
Untreated	75.0	67.0	53.0	65.0%
Mean	29.0	23.0	16.0	

However, the characteristic of trapping method is the reduction of population after the installation of traps in the tested area and its maintenance at low levels throughout the experimental period (Haniotakis, 1986).The same was observed with the infestation of the tested area where it was maintained at low levels. Thus we recommended the mass trapping method for its advantages such as minimizing the environmental pollution .

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كفاءة بعض المواد الجاذبة في مكافحة ذبابة فاكهة البحر الأبيض المتوسط

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تم تقييم بعض المواد الجاذبة الجنسية والغذائية لمكافحة ذبابة فاكهة البحر المتوسط *Ceratitis capitata* علي أشجار الموالح صنف برتقال أبو سره في منطقة المعمورة في الإسكندرية في الفترة من ٢٠٠٠/١١/٩ إلى ٢٠٠١/٢/١٥ .

وقد وجد من هذه الدراسة ان هناك فروق معنوية عالية في تعداد الذباب خلال هذه الفترة من الدراسة ، فكان متوسط عدد الذباب في الأسبوع الأول ٢١٤ر١ ذبابة /مصيدة في الاسبوع ثم انخفض في الاسبوع الثاني ليصل إلى ١٥٥ر٥ ذبابة / مصيدة/اسبوع ثم انخفض بعد ذلك في الاسبوع الثالث عشر والرابع عشر إلى ٠ر٦ ، ٧ر ١ ذبابة/مصيدة /اسبوع علي التوالي .

كما أوضحت النتائج ان هناك فروق معنوية عالية جدا في كفاءة وفاعلية المواد الجاذبة حيث كان الجاذب الجنسي البوليكور اكثر فاعلية بدرجة كبيرة من الجاذب الغذائي البومينال والجاذب ثنائي فوسفات الامونيوم حيث كان متوسط عدد الذباب في المصيدة البوليكور ١٢٦ر٦٣ ذبابة وفي المصيدة البوميتال ١٤ر٤٢ ذبابة وفي مصيدة ثنائي فوسفات الامونيوم ٤ر٥٣ ذبابة .

كما انخفضت النسبة المئوية للاصابة في الثمار بعد استخدام هذه المصايد كطريقة من طرق مكافحة ذبابة البحر المتوسط لتصبح صفراً % في البوليكور ، ١٤% في البوميتال وأخيرا ١٢% في ثنائي فوسفات الأمونيوم . بينما كانت نسبة اصابة الثمار في الاشجار غير المعاملة (كنترول) ٦٥% .