

EVALUATION OF THREE DIFFERENT FORMULATIONS OF TRIMEDLURE AS ATTRACTANT LURES FOR THE MEDITERRANEAN FRUIT FLY, *CERATITIS CAPITATA* (WIED.)

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Abstract

Standard trimedlure (TML) loaded on cotton wicks was compared with two other TML dispensers as attractants for the Mediterranean fruit fly, *Ceratitis capitata* (Wied.) in Jackson sticky traps. The three tested formulations differed in their efficacy and persistence under field conditions through the course of the experiment. Host plant plays a very important role in directing and attracting medfly irrespective to the type of TML formulation. Trap direction and its interaction with TML formulations had no effect on the attractancy of medfly.

INTRODUCTION

The Mediterranean fruit fly, *Ceratitis capitata* (wied.) is a serious and world-wide pest attacking a wide range of different crops. A large amount of work had been done to establish control measures against this pest. The effectiveness of trimedlure (TML) as an attractant lure to medfly was first reported by Beroza *et al.*, (1961). Their work was followed shortly by work on the chemistry of TML analogues (Beroza *et al.* 1964) and its volatility and longevity, including the use of liquid extenders in relation to medfly trap collections (McGovern *et al.*, 1966). Due to handling, retreating and contamination problems which occur when using large numbers of cotton wicks loaded with TML, improved dispensers had been required (Rice *et al.*, 1984 Leonhardt *et al.*, 1984).

The objective of this study is to compare between two concentrations of TML in different dispensers and the standard concentration of TML loaded on standard cotton wick. This would help find the most suitable conditions for medfly attraction under local climatic conditions. Location and direction of hung traps were also taken into consideration. Behaviour of flies and migration to successive hosts were also studied.

MATERIALS AND METHODS

An experiment was conducted for 8 weeks during June- July 1991 at Fayoum governorate. The selected area was about 20 feddans cultivated with navel orange which was in an immature form at the time of the experiment to avoid host attractancy of medfly in this area . The selected area was surrounded by other medfly host plants at the fruiting stage thus preceding navel orange in maturity (Apricot and Mango trees from northern and southern direction, respectively).

Standard cotton dental roll wicks (3cm length 1cm diam) loaded with trimedlure in liquid form was compared with two commercial ones formulated as controlled released dispensers of TML, using standard Jackson traps with unobstructed ends (Harris *et al.*, 1971). These formulations were :

- 1 - Rubber dispenser offered by Sandoz Co. (S) containing 0.2g of TML.
- 2 - Disc dispenser offered by Fermone Co. In Arizona (A) containing 2g of TML.
- 3 - Cotton wick dispenser loaded with 5ml of TML (standard TML).

Traps loaded with different dispenser were each hung on a tree at 1.5 - 2.0 m above the ground , representing the four cardinal directions, in addition to the central part of the tree . Three replicats (each contained 5 traps/ treatment /5 directions) were placed in randomized complete block design. The distance between traps in each replicate was 50m . About 1.5 feddan was left between each two replicates . Traps were inspected twice per week, captured flies were counted, average number of captured flies per trap per day per direction (CTDD) or per formulation (CTDF) were calculated and recorded . After each count, new sticky inserts were

installed in each trap. The results were statistically analysed using the analysis of variance.

RESULTS AND DISCUSSION

Data represented in Table 1, and illustrated in Fig. 1, show the efficacy of the three tested formulations of TML on attraction of medfly males. Attraction percentages which occurred with the rubber dispensers were 14.6 and 7.0% at the end of the 1st and 2nd weeks, respectively. Thereafter, the efficacy decreased drastically to reach 0.45 % at the end of the 8th week. Disc dispensers gave the highest attraction percentages during the first 3 weeks compared with the other two formulations (65.1, 53.52 and 50.3 %) at the 1st, 2nd and 3rd weeks, respectively. Attraction percentages of this lure remained stable (about 33%) throughout the next five weeks. Attractive percentages of the standard TML on cotton wick dispensers started with 20.3 and increased gradually to reach 66.1% on the average at the end of the experiment. Attraction percentages of the standard TML on cotton wick were higher throughout the first 3 weeks than the rubber dispensers but were lower than the disc dispensers.

It seems therefore that the three formulations differ in their efficacy and persistence under field conditions along the experimental period. Reduced efficacy of standard TML throughout the first 3 weeks might be due to the high initial content of the freshly treated wick dispensers which has a repellent effect on medfly males. Attractive concentration of TML reached its optimum after 3 weeks of exposure due to its volatility which was reflected in higher catch of flies. These data are in agreement with the findings of Nakagawa *et al.*, (1975) who reported that high concentration of TML had a repellent effect on medfly and thus reduced the efficacy of catch. They also added that the highest medfly catch was obtained in traps loaded with 2g of TML especially at first 3 weeks of the experiment.

Data presented in Table 2, show that neither trap direction nor interaction between TML formulation and direction had significant effect on catch when the calculated F values were compared with the tabulated ones at 5% level. No significant effect on fly capture was observed among the tested formulations within the 1st week, while at the 2nd week onwards, significant effects were found. Trap catches significantly differed among replicates in 1st, 2nd, 5th, 6th, 7th, and 8th weeks while no significant differences were observed within the 3rd and 4th weeks.

Table 1. Number and percent catch of medfly males in Jackson traps loaded by three different formulations of TML.

Weeks	Formulations							Total
	Replicates	(1)	%	(2)	%	(3)	%	
WK ₁	1	5		23		16		
	2	11	14.6	46	20.3	41	65.1	473
	3	53		27		251		
WK ₂	1	6		37		22		
	2	4	7	101	39.5	42	53.5	446
	3	21		38		175		
WK ₃	1	0		54		32		
	2	1	1.9	93	47.8	23	50.3	360
	3	6		25		126		
WK ₄	1	1		69		15		
	2	0	0.5	37	67.3	10	32.2	202
	3	0		30		40		
WK ₅	1	4		371		202		
	2	1	0.75	35	64.6	14	34.6	670
	3	0		27		16		
WK ₆	1	1		598		270		
	2	0	0.2	99	67.7	32	32.6	1047
	3	1		47		39		
WK ₇	1	4		600		262		
	2	0	0.36	30	66.9	47	32.7	1116
	3	0		91		36		
WK ₈	1	3		197		207		
	2	0	0.45	93	66.8	48	32.8	897
	3	1		49		39		

(1) Rubber dispenser

(2) Cotton wick dispenser

(3) Disc dispenser

(%) Catch out of total catch

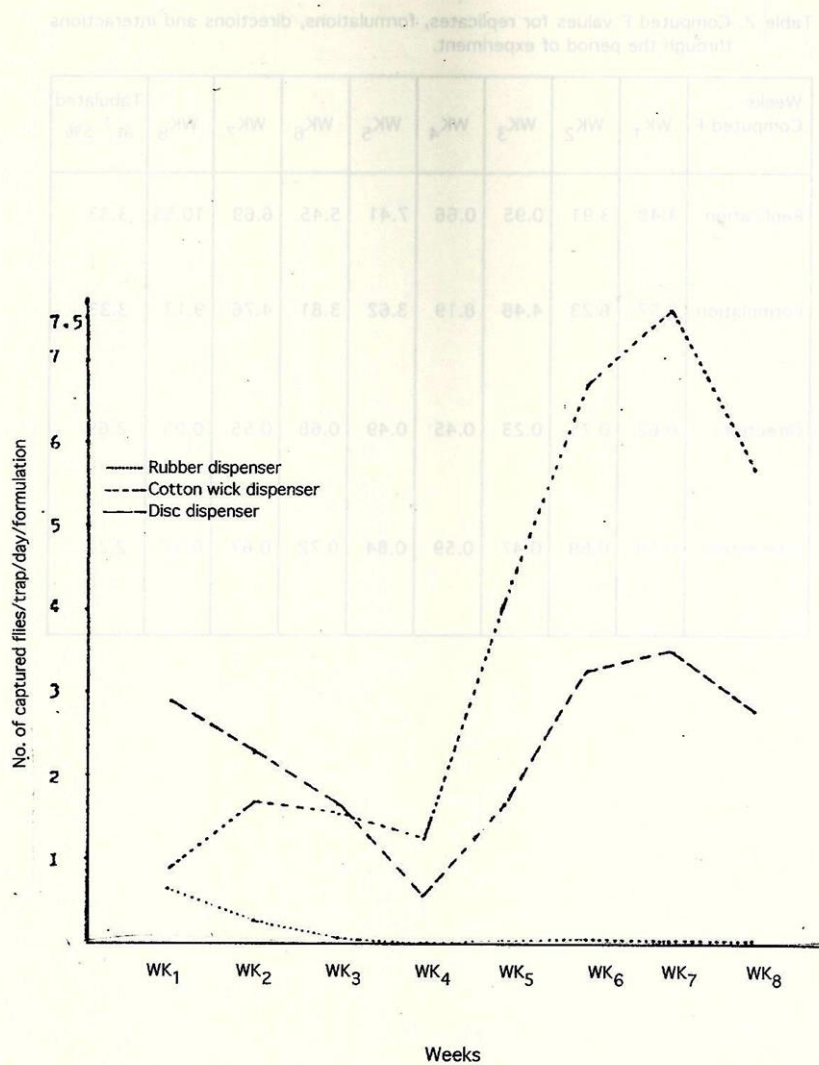


Fig. 1. Number of captured flies /trap/day/formulation (CTDF) along 8 weeks.

Table 2. Computed F values for replicates, formulations, directions and interactions through the period of experiment.

Weeks Computed F	WK ₁	WK ₂	WK ₃	WK ₄	WK ₅	WK ₆	WK ₇	WK ₈	Tabulated at F 5%
Replication	3.48	3.91	0.95	0.66	7.41	5.45	6.69	10.55	3.33
Formulation	2.57	6.23	4.48	8.19	3.62	3.81	4.76	9.13	3.33
Direction	0.62	0.75	0.23	0.45	0.49	0.68	0.55	0.05	2.69
Interaction	0.58	0.69	0.47	0.59	0.84	0.72	0.67	0.57	2.27

Data in Table 3 show that traps of the third replicate captured the highest number of flies at the first 3 weeks of the experiment. This could be due to the closeness of the 3rd replicate to apricot trees which were infested with medfly. No significant effect of catch among replicates within 3rd and 4th weeks was observed. This could be due to the completion of apricot fruit season and the absence of ripe fruits of any other hosts at this period of the year. At the 5th week onwards, number of trapped flies increased and fluctuated among replicates, i. e. the number of flies attracted in the 1st replicate was significantly higher than in the 3rd replicate in all treatments, while catches in the 2nd replicate were higher than those of the 3rd replicate but were lower than their correspondings in the 1st replicate. This fluctuation could be due to the beginning of mango fruit ripening near the 1st replicate, therefore, it could be concluded that host plant plays a very important role in directing and attracting medfly.

Table 3. Number of captured flies into traps along 8 weeks of experiment.

Weeks Total	WK ₁	WK ₂	WK ₃	WK ₄	WK ₅	WK ₆	WK ₇	WK ₈
Replicate 1	44	65	86	85	577	869	886	667
Replicate 2	98	147	117	47	50	91	143	141
Replicate 3	331	234	197	70	43	87	87	89
Formulation (S)	69	31	7	1	5	2	4	4
Formulation TML	96	176	172	139	433	704	747	559
Formulation (A)	308	239	181	65	232	341	365	294
LSD/ Repl.	15.8	8.3	-	-	21.7	37.3	23.9	19.03
LSD/Form.	-	8.3	8.9	8.9	21.7	37.3	23.9	19.03

15 traps per replicate

15 traps per formulation

Data in Fig. 2, illustrate the values of catches /trap/day/direction (CTDD) along the 8 weeks of the experiment irrespective to the type of TML dispenser. Table 4, demonstrates the mean values of CTDD when related to the three tested formulations of TML. The general mean values of CTD were 0.14, 3.53, and 2.38 for rubber, disc and cotton wick dispensers, respectively. The highest mean CTDD value (7.01) was obtained when the traps loaded with standard TML were hung at the centre of the trees. Data in Fig.2, and Table 4, show that the central part of the tree was be the most suitable trap position. This could be possibly due to the tendency of flies to shelter at the shady places.

Table 4. Mean number of captured flies/trap/day (CTD) to three TML formulations when correlated with trap direction.

Formulation Direction	(S)	TML	(A)	General mean
North	0.34	2.41	2.67	1.92
South	0.02	3.6	1.85	1.83
East	0.12	2.9	2.12	1.75
West	0.12	1.7	3.44	1.76
Middle	0.11	7.01	1.85	2.9
General mean	0.14	3.53	2.38	

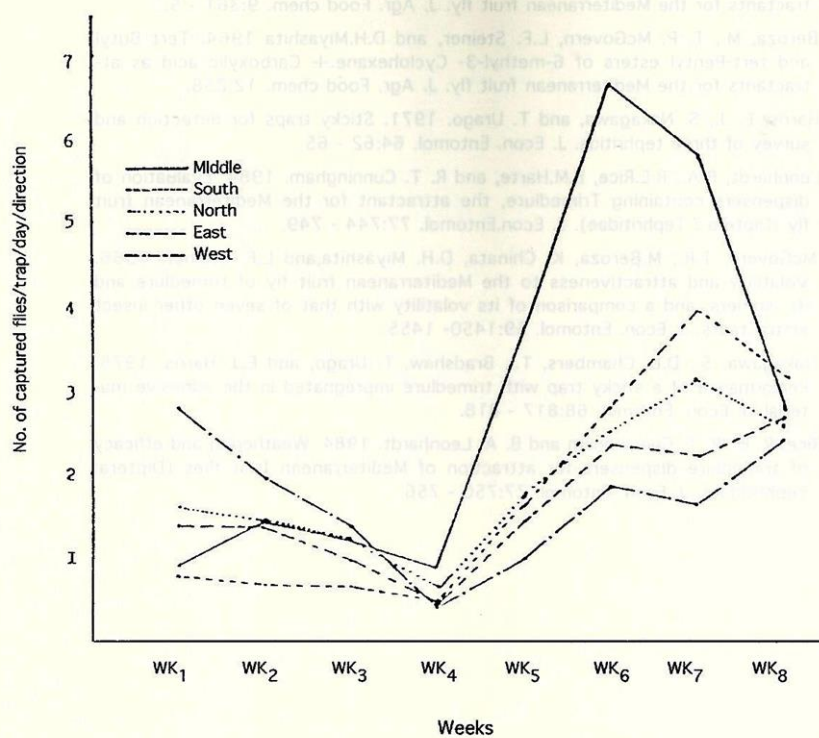


Fig. 2. value of captured flies/trap/day/direction (CTDD) during 8 weeks.

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تقييم ثلاثة مستحضرات مختلفة من الترايملور كجاذب لذبابة الفاكهة

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١ - معهد بحوث وقاية النباتات - مركز البحوث الزراعية - الدقي

تم مقارنة الترايملور السائل المحمل علي قطعة من القطن مع نوعين آخرين من مستحضرات المادة نفسها كجاذب لذبابة الفاكهة باستخدام مصائد جاكسون الورقية. أوضحت النتائج اختلاف كفاءة ومدة بقاء كل نوع من الأنواع الثلاثة تحت الظروف الحقلية. كما تبين أن العائل النباتي يلعب دوراً هاماً في توجيه وجذب ذبابة الفاكهة ثم يلي ذلك تأثير نوع الجاذب. لم يظهر اتجاه تعليق المصيدة والمستحضرات المختبره أي فروق معنوية علي جذب الذباب.