

FIELD EVALUATION OF SOME INSECTICIDES AGAINST THE OLIVE PSYLLID, *EUPHYLLURA STRAMINEA* LOGINOVA (HOMOPTERA: PSYLLOIDEA, APHALARIDAE) ON OLIVE TREES IN ISMAILIA GOVERNORATE, EGYPT

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Abstract

A field experiment was carried out during April, 2010 in olive orchard cultivated in Sarapium, Ismailia Governorate to evaluate the efficiency of six insecticides against the olive psyllid, *Euphyllura straminea* Loginova (Homoptera : Psylloidea, Aphalaridae) on olive trees. The obtained results showed that, the tested insecticides were highly effective against the olive psyllid, *E. straminea* and protect the new emergency flowers from insect damages. The highest effective compounds on the nymphal population were Fenitrothion and Phosmet (98.25 - 98.50%) followed by Imidacloprid (98.17%) and Pyriproxyfen (97.82%) whereas Chlorpyrifos and miscible mineral oil were the least effective (94.68 - 94.74%), respectively. Also, Fenitrothion and Phosmet were the highest effective insecticides on the adult population showing 98.11 - 98.32% followed by Pyriproxyfen and Chlorpyrifos (97.31 - 97.58%). Imidacloprid (96.35%) and Mineral oil came in last order (94.35%).

The percentages of reduction in the insect population reached its maximum by the 4th week, it reached more than 97% for the nymph and adult populations. The obtained results revealed that, the post-spraying counts must be continue 4 weeks after application to determine the efficiency of the evaluated insecticides for control the olive psyllid *E. straminea* on olive trees.

INTRODUCTION

The olive psyllid, *Euphyllura straminea* Loginova was recorded in Egypt for the first time on the olive trees in March, 1988 at Rafah, El-Arish (Nada, 1994). This species causes serious damage for the olive trees and reduce the olive production. Both nymphs and adults suck the plant sap from the leaves and flower buds and secreted a large amount of honeydew which encouraged the growth of sooty mould fungi. In addition the infested trees became dirty black appearance which affected on photosynthesis and respiration processes. During the last few years this species became a key pest in the cultivated olive orchards in many governorates in Egypt.

Field observations and ecological studies showed that the females of this species begin to be active from late March until late April. Adult females begin to deposit eggs in the terminal buds of old branches during this period. The females

preferred flower clusters for laying eggs, especially between calyx and corolla. The severe infestation of the olive psyllid, *E. straminea* affected greatly on the olive yield, it causes falling of racemes or declines the number of floral buds/raceme and reduce the flower fertility which caused by drying the pistils.

Reviewing the available of literature showed few control measures for the olive psyllid, *E. straminea* in Egypt. Radwan (1996) stated that Fenitrothion 50% EC at rate 0.3% gave 98.43% reduction for the olive psyllid population on olive trees in Fayoum Governorate.

The present work was conducted to evaluate the efficiency of six insecticides against the olive psyllid, *E. straminea* on olive trees under field conditions to minimize the losses of the olive yield from insect damages.

MATERIALS AND METHODS

The present work was conducted during April, 2010 in olive orchard (Tophahy cultivar) cultivated in Sarapium, Ismailia Governorate. The olive orchard about seven feddans and about 20 years old. Sixty three trees of same size, height and level of infestation were selected for experimental purposes. The experimental design was Randomized Complete Block (RCB). The selected trees were distributed in three blocks, each block (21 trees) was divided into 7 plots (3 trees /plot).

The experimental insecticides were randomly distributed in each block and replicated three times in the three blocks, while the seventh plot in the three blocks was left as control index. The tested compounds with their commercial and common names as well as rate of application are given in Table (1).

Spray application was conducted on 7, April, 2010 by using motor sprayer (1.5 hp) and 150 liters tank with pressure of 100 pound on square inch. The spraying was applied manually to secure complete coverage for all parts of olive trees.

The pre-spraying samples were picked up at random from each replicate before spraying application with rate of 10 twigs (20 cm long) / sample whereas the post-spraying samples were taken after one, two, three and four weeks intervals. The collected samples were kept in special plastic boxes and transferred to laboratory for counting procedures by aid of stereoscopic microscope. The insect population was sorted to dead and alive nymphs and adults and the reduction percentages were calculated according to Henderson and Tilton equation (1955). The statistical analysis was conducted by computer using MSTATC program. To separate between the means, the percentages of mortality were transferred to arc-sine, when "F" value was significant LSD values were determined.

Table 1. The evaluated insecticides with their formulations, common names and rates of application.

Common name	Formulation - % a. i	Pesticide group	Rate of application
1- Pyriproxyfen	Admiral 10% E.C	Juvenile Hormone mimic (JHm)	50 ml / 100 liter of water
2- Imidacloprid	Chinook 35% SC	Neonicotinoid	75 ml/100 liter of water
3- Phosmet	Imidan 50% W.P	Organphosphorous	100 g/100 liter of water
4- Chlorpyrifos	Robust 48% E.C	Organphosphorous	125 ml/100 liter of water
5- Fenitrothion	Sumithion 50% E.C	Organphosphorous	300 ml/100 liter of water
6- Mineral oil	Super Royal 95% E.C	Mineral oil	1.5 liter/100 liter of water

RESULTS AND DISCUSSION

Data in Table (2) showed the pre- and post-spraying counts of *E. straminea* as well as the evaluated insecticides with their reduction percentages on nymph and adult populations after 1st, 2nd, 3rd and 4th week, respectively.

The obtained results revealed that the reduction percentages of the tested insecticides on the nymphal population were varied after one week of application. The highest effective compounds were Fenitrothion (96.9%), Pyriproxyfen (96.2%), Imidacloprid (96.2%) and Phosmet (95.1%) whereas the least effective compounds were Mineral oil (88.7%) and Chlorpyrifos (86.9%) respectively.

On the other hand, the evaluated insecticides showed the same trend on the adult population. The highest effective compounds after one week of application were Fenitrothion (96.9%) followed by Pyriproxyfen (95.6%) and Phosmet (95.3%) while the lowest compounds were Chlorpyrifos (92%), Imidacloprid (90.4%) and Mineral oil (89.2%), respectively.

Statistical analyses showed that, the tested insecticides were highly significant effect on reduction percentages of the nymphal population (F value = 1084.6). The highest effective compounds were Fenitrothion and Phosmet they came in the 1st rank (98.25 - 98.50%) followed by Imidacloprid in the 2nd rank (98.17%). Pyriproxyfen came in the 3rd rank (97.82%) whereas Chlorpyrifos and Mineral oil came in the last rank (94.68 - 94.74%), respectively.

Also, results of statistical analyses showed highly significant effect on the adult population (F value = 8.8). The highest effective insecticides were Fenitrothion and Phosmet they came in the 1st rank (98.11 - 98.32%). Pyriproxyfen and Imidacloprid came in intermediate effectiveness (97.31 - 97.58%) followed by Imidacloprid in the 3rd rank (96.35%) and Mineral oil came in the last one (94.35%).

Data in Table (2) and Figs. (1&2) showed that, reduction percentages in the nymph and adult populations were varied in the 4 week of inspection, it increased gradually and reached more than 97% in the 4th week of application.

The afore-mentioned results showed that, the tested insecticides were highly effective on the insect population and the real effect appeared after 4 weeks of application. So, the present work proved that, the tested compounds were more sufficient as control measure for the olive psyllid, *E. straminea* under field conditions.

Reviewing the available literature showed that, Fenitrothion 50% at rate of 0.25% gave 95.6% reduction for *Icerya seychellarum* (Westwood) on *Cycas revolute* at Zohria Botanic Garden, Giza governorate (El-Borollosy *et al.*, 1990). Radwan (1996) stated that Fenitrothion 50% at rate of 0.3% was strongly efficient against *E. straminea* on olive trees it reduces the insect population to 98.43% in Fayoum governorate. Elwan *et al.* (2005) revealed that, Fenitrothion 50% EC at rate of 0.15% reduced the population of *P. tenuivalvata* in sugarcane fields to 98.1% in Naga-Hammadi, Qena governorate.

On the other hand, Pyriproxyfen 10% EC at rate of 0.05% gave 96.1% reduction for *Parlatoria oleae* on olive trees in Ismailia governorate (El-Amir, 2002) and 94% reduction for *Hemiberlesia lataniae* infesting guava trees in Giza governorate (Hassan , 2003).

Table 2. Field evaluation of some insecticides against the olive psyllid, *E. straminea* infesting olive trees at Sarapium, Ismailia Governorate during April, 2010 with statistical analysis.

Insecticide	Pre-spraying counts		Post- spraying counts and % of reduction								Average percent of reduction	
			One week		2 weeks		3 weeks		4 weeks			
	7/4/2010		14/4/2010		22/4/2010		30/4/2010		5/5/2010		of reduction (%)	
	Nymph	Adult	Nymph	Adult	Nymph	Adult	Nymph	Adult	Nymph	Adult	Nymph	Adult
1- Pyriproxyfen	297	89	14.33	5.0	13.0	5.0	8.0	3.0	6.67	2.0	10.50	3.75
	% of reduction		96.2%	95.6%	97.6%	97.2%	98.6%	98.5%	98.9%	98.9%	97.82% c	97.58% ab
2- Imidacloprid	372	114	18.0	14.0	13.0	7.0	8.0	3.0	3.67	2.0	10.67	6.50
	% of reduction		96.2%	90.4%	98.1%	96.9%	98.9%	98.9%	99.5%	99.2%	98.17% b	96.35% b
3- Phosmet	419	116	26.0	7.0	8.0	4.0	7.33	2.0	1.33	1.0	10.67	3.50
	% of reduction		95.1%	95.3%	98.9%	98.3%	99.1%	99.3%	99.8%	99.6%	98.25% a	98.11% a
4- Chlorpyrifos	243	127	40.67	13.00	25.0	4.33	8.33	3.0	3.33	0.0	19.33	5.08
	% of reduction		86.9%	92.0%	94.3%	98.3%	98.2%	99.0%	99.3%	100%	94.68% d	97.31% ab
5- Fenitrothion	315	110	12.33	4.33	9.0	3.0	5.0	3.33	3.33	2.33	7.42	3.25
	% of reduction		96.9%	96.9%	98.4%	98.6%	99.2%	98.7%	99.5%	99.1%	98.50% a	98.32% a
6-Mineral oil	277	104	40.00	14.33	23.00	11.33	16.0	8.0	12.0	7.0	22.75	10.17
	% of reduction		88.7%	89.2%	95.4%	94.6%	96.9%	96.7%	97.9%	97.0%	94.74% d	94.35% c
Control	323	119	412	152	582	238	610.67	273.67	681.00	267.00	571.42	232.67
F value between treatments:											1084.6**	8.8**
LSD at 0.05 level :											0.16	1.4

Note:

Percent of reduction were transferred to arc sine values before conducting analysis of variance.

Means in the same column not followed by the same letter is significantly different ($P < 0.05$) using LSD test in MSTATC computer Program.

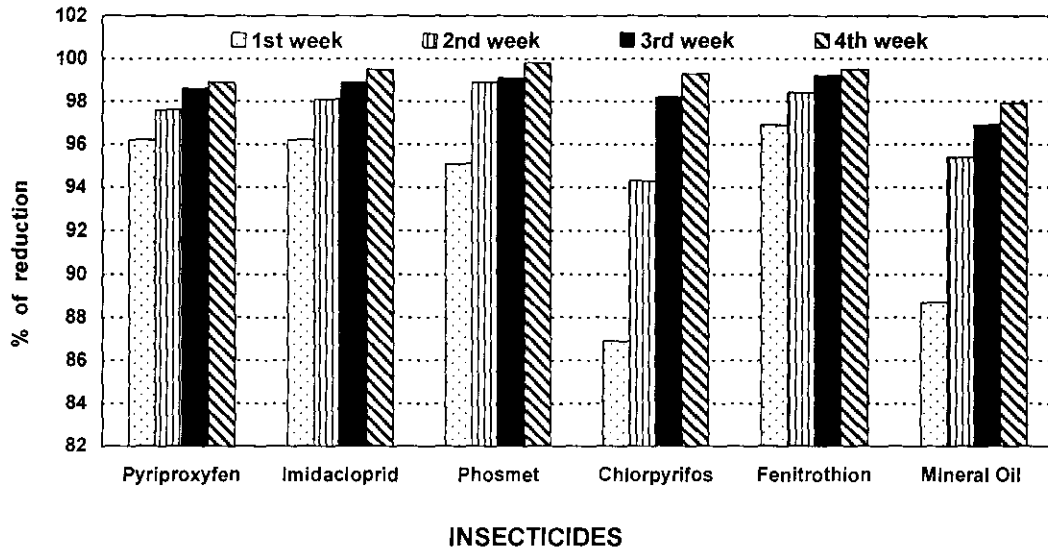


Fig. 1. Reduction percentages in the nymphal population of the olive psyllid, *E. straminea* after spraying with six insecticides at Sarapium, Ismailia Governorate during April, 2010.

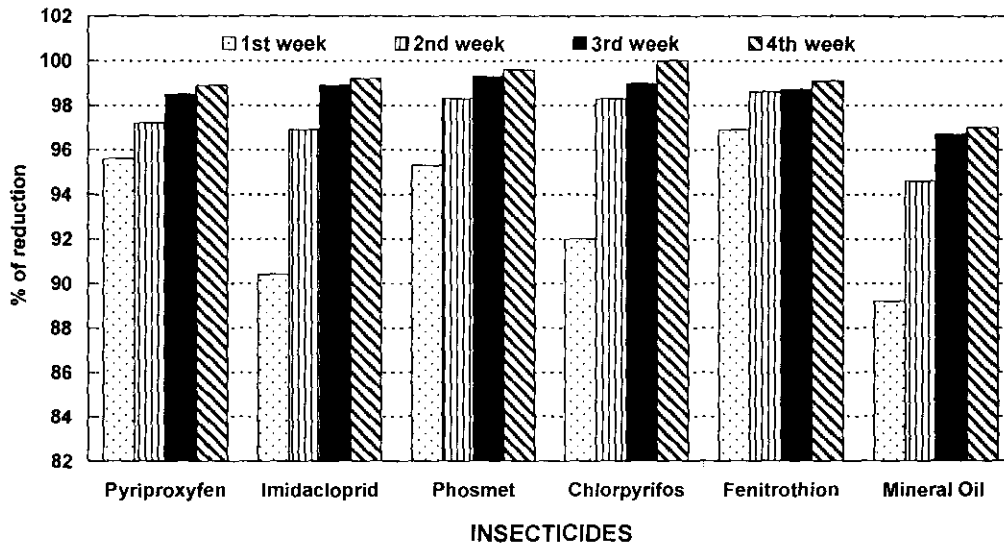


Fig. 2. Reduction percentages in the adult population of the olive psyllid, *E. straminea* after spraying with six insecticides at Sarapium, Ismailia Governorate during April, 2010.

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التقييم الحقلى لبعض المبيدات الحشرية فى مكافحة حشرة بسليد الزيتون
Euphyllura straminea على أشجار الزيتون بمحافظة الاسماعيلية
(Homoptera: Psylloidea: Aphalaridae)

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أجريت تجربة حقلية فى إحدى مزارع الزيتون بناحية سرايوم - محافظة الاسماعيلية فى السابع من أبريل ٢٠١٠ قبل التزهير مباشرة لتقييم كفاءة أربعة مجموعات مختلفة من المبيدات تضم ستة مبيدات حشرية لمكافحة حشرة بسليد الزيتون *Euphyllura straminea* على أشجار الزيتون بغرض حماية المحصول من الضرر الناتج عن الإصابة بهذه الآفة.

أوضحت النتائج كفاءة المبيدات المختبرة فى مكافحة حشرة بسليد الزيتون وحماية الأزهار من الإصابة ، وكانت أكثر المبيدات فعالية فى خفض تعداد حوريات الحشرة مبيد فينتروثيون (٩٨,٥%) ومبيد فوسمت (٩٨,٢٥%) فى المرتبة الاولى ثم جاء مبيد اميداكلوبرايد (٩٨,١٧%) فى المرتبة الثانية ومبيد بايري بروكسفن (٩٧,٨٢%) فى المرتبة الثالثة وجاء مبيد كلوربيرفوس والزيت المعدنى الخفيف (سوبر رويال) فى المرتبة الاخيرة (٩٤,٦٨ - ٩٤,٧٤%) .

كما اتضح من النتائج كفاءة المبيدات المختبرة فى خفض تعداد الحشرة الكاملة حيث جاء مبيد فينتروثيون و فوسمت فى المرتبة الاولى (٩٨,١١ - ٩٨,٣٢%) ثم مبيدى بايري بروكسفن و كلوربيرفوس فى المرتبة الثانية (٩٧,٣١ - ٩٧,٥٨%) ثم مبيد اميداكلوبرايد (٩٦,٣٥%) فى المرتبة الثالثة وجاء الزيت المعدنى الخفيف (سوبر رويال) فى المرتبة الاخيرة (٩٤,٣٥%).

واتضح من النتائج ان نسب الخفض فى تعداد طورى الحورية والحشرة الكاملة وصل اقصاه فى الاسبوع الرابع بعد الرش (اكثر من ٩٧%) وعلى ذلك يجب فحص عينات مابعد الرش بعد مدة لا تقل عن ٤ اسابيع من الرش للحصول على نتائج مؤكدة لفاعلية المبيدات المختبرة فى مكافحة الحشرة .