

Safe Alternative of Pesticides for Controlling Long Tailed Mealy-bug, *Pseudococcus Longispinus* (Targiani-Tozzetti) on Olive Trees Under Irrigation Conditions at Burg El-Arab

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ABSTRACT

Two field experiments were carried out to investigate alternative pesticides for controlling long tailed mealy-bug, *Pseudococcus longispinus* (Targiani-Tozzetti) on olive trees during flowering and fruiting stages (May and July, 2000 respectively) in irrigated farms at Burg El-Arab (50 Km west of Alexandria). During flowering stage, Super Masrona oil (1.5%) was successful for controlling *P.longispinus* as well as the organophosphorus insecticide Phenthoate (Cidial, 0.15% EL) without significant differences between them. At the fruiting stage (early July), two mineral oils, (KZ and Super Royal; 1.5%), two organophosphorus insecticides [Pirimiphos-methyl (Actilic) and, Carbofos (Malathion) (0.15%)], bio-insecticide [Biofly (0.15%)] alone and in their mixtures were tested for controlling *P.longispinus*. The obtained results showed that the mixture of KZ oil with Actellic and KZ with Biofly were the most effective treatments where they caused highly reduction percentage of 98.6 and 94.8% respectively, without significant differences. Also Super Royal oil caused reduction percentage of 89.9%, indicating it is not different with the two previous treatments. Therefore, the mineral oils or their mixtures with bio-insecticide can be useful to be used on olive trees at irrigated olive farms at against *P.longispinus* during summer months.

INTRODUCTION

In Egypt, olive trees are attacking by several insect pests such as scale insects and mealy-bugs causing a serious damage to the trees and reduce the olive yield (Moursi, 1999).

The long tailed mealy-bug, *Pseudococcus longispinus* Targ. has been reviewed on many host plants as *Mangifera indica*, *Jasminium* sp., *Vitis vinifera*, *Ficus nitida* and Guava trees (Hall, 1922; Quayle, 1941; Ebling, 1945 and Moursi, 1974). In the last few years it became one of the most serious pest of olive farms under irrigation system at Burg El-Arab area (Moursi, 1996).

The present work aimed to evaluate the efficacy of three mineral oils (KZ, Super Masrona and Super royal), three organophosphorus insecticides (Actellic, Cidial and Malathion), and a Bio-insecticide (Biofly). Also the mixtures of these pesticides to control of the population of *Pseudococcus longispinus* Targ. during flowering and fruiting stages of olive farms under irrigation system at Burg El-Arab area.

MATERIALS AND METHODS

Two field experiments were carried out at Burg El-Arab in farms under irrigation system. The olive trees are similar uniformity in shape and size and

the experiment were designed as a complete randomized block. The first experiment was carried out during flowering stage (early May), and the second was conducted during fruiting stage on the end of July. The tested insecticides are shown in Table (1)

Table 1. Type of treatments, rate of applications and the sources of it

Pesticides	Rate	Company	Formula
KZ oil	1.5%	Kafr El-Ziat Pesticides and Chemicals Co.	E.C
Supper Royal oil	1.5%	El-Gameia El-Taawnia for Petrol Co.	E.C
Supper Masrona oil	1.5%	Misr Petroleum Co.	E.C
Actellic (Pirimiphos-methyl)	0.15%	Zeneca Agrochemical Company	E.C
Nasr lathion (Malathion)	0.15%	El-Nasr Chemical Company	E.C
Cidial (Phenthoate)	0.15%	Zeneca Agrochemical Company	E.C
Biofly	1.5%	(100%) <i>Beauveria bassiana</i> with concentration of 3×10^7 conidia/ml without any inert additives. (El-Nasr Fertilizers and Biocides Co.)	
KZ + Actellic	1:1		
KZ + Malathion	1:1		
SR + Actellic	1:1		
SR + Malathion	1:1	Prepared Mixtures	E.C
KZ + Biofly	1:1		
SR + Biofly	1:1		

The treatments as well as control treatment were replicated five times and randomly distributed over 30 trees. Sixty leaves from each treatment were selected. Pre-treatment and four post treatment counts were immediately calculated before and after spraying. Numbers of living individuals (adults and nymphs) were counted. To evaluate the efficiency of the tested materials, percentage of reduction was calculated according to Henderson & Tilton (1955). Statistical analysis of variance and LSD value for comparing the mean effects of each treatment were adopted according to Snedecor (1961).

RESULTS AND DISCUSSION

The first experiment was conducted on first week of May during the flowering stage of olive at Burg El-Arab area in farm under irrigation system to control the long tailed mealy bug, *P. longispinus* Targ. The data presented in Table (2) and Fig (1) show that Super Masrona and Cidial are significantly more effective than their mixture. They caused reduction percent 89.9% and 86.2%, respectively while their mixture had a reduction percentage 78.3%. It is clearly that the mixture of Super Masrona and Cidial is not suitable and caused low reduction at the different intervals after spraying except the last period. Considering the residual efficacy of the treatments, they caused deleterious effect on *Pseudococcus longispinus* for a long period; two months after application.

The results in Table (3) and Figure (2) show that, there were significant differences between the two mineral oils and so, the two organophosphorus, during fruiting stage (early July). There were no significant differences between the mixtures of KZ oil with the two organophosphorus pesticides and Biofly, single treatment of Super Royal and its mixture with Malathion but they are significantly different with the mixture of Super Royal with Actellic. Also, there were no significant differences between Malathion and Super Royal oil - Actellic mixture and between the single treatment of both Actellic and biofly.

The evaluated treatments could be arranged descendingly according to their reduction percentage values as follows : mixture of KZ with Actellic (98.6%) > KZ - Biofly mixture (94.8%) > Super Royal – Malathion mixture (93.4%) > KZ - Malathion mixture (91.7%) > Super Royal (89.9%) > Malathion (79.2%) > Super Royal - Actellic mixture (78.0%) > KZ (77.7%) > Biofly (73.5%), Actellic (71.2%) > Super Royal - Biofly mixture (64.7%).

The obtained results, for the tested treatments against the long-tailed mealy-bug, *P.longispinus* during the fruiting stage period under irrigation showed that Super Royal oil alone and its mixture with Malathion or the mixture of KZ with Biofly and both the organophosphorus pesticides had the same value of reduction.

It could be recommended that using the mineral oils alone or their mixtures i.e. Super Masrona during flowering-set and KZ with organophosphorus pesticides and Biofly during the flower-set and fruit-set period of olive is a suitable control program to protect the natural enemies which increased during this period. Besides using summer mineral oils are preferable economically and delay any out-set of resistance to organophosphorus. These results are in agreement with those obtained by El-Sebae *et al.*, (1976), Helmy *et al.*, (1984), Moursi *et al.*, (1991), Yigit *et al.*, (1992), Gomma *et al.*, (1995), El-Deeb, (1999) and Hussien, (2000).

Table 2. Reduction percentages of *P.longispinus* during flowering stage (May, 2000) of olive trees under irrigation system at Burg El-Arab area.

Weeks Post spray	Treatments		
	Supper Masrona	Supper Masrona + Cidial	Cidial
1 week	84.2	73.4	92.0
2 weeks	95.8	89.8	96.9
4 weeks	81.0	57.8	50.2
6 weeks	92.1	73.3	94.9
8 weeks	96.2	97.1	96.9
Mean	89.9 ^a	78.3 ^b	86.2 ^a

Table 3. Reduction percentages of *P. longispinus* during fruiting stage (July, 2000) by early summer spray at Burg El-Arab area.

Treatments	KZ oil	Supper Royal (SR)	Actellic	Malathion	KZ + Actellic	KZ + Malathion	SR + Actellic	SR + Malathion	Biofly	KZ + Biofly	SR + Biofly
2	100	88.3	41.7	66.7	100	100	51.4	82.4	41.7	88.9	55.6
4	100	100	100	100	94.4	100	94.4	98	83.3	95.2	100
6	31	75.1	43	50	100	100	66.7	93.3	85.7	95.2	36.5
8	80	96.2	100	100	100	66.7	99.5	100	83.3	100	66.7
Mean	77.7 ^{cd}	89.9 ^{ab}	71.2 ^{cd}	79.2 ^{bc}	98.6 ^a	91.7 ^a	78.0 ^{bc}	93.4 ^a	73.5 ^{cd}	94.8 ^a	64.7 ^e

S.R = Supper Royal oil

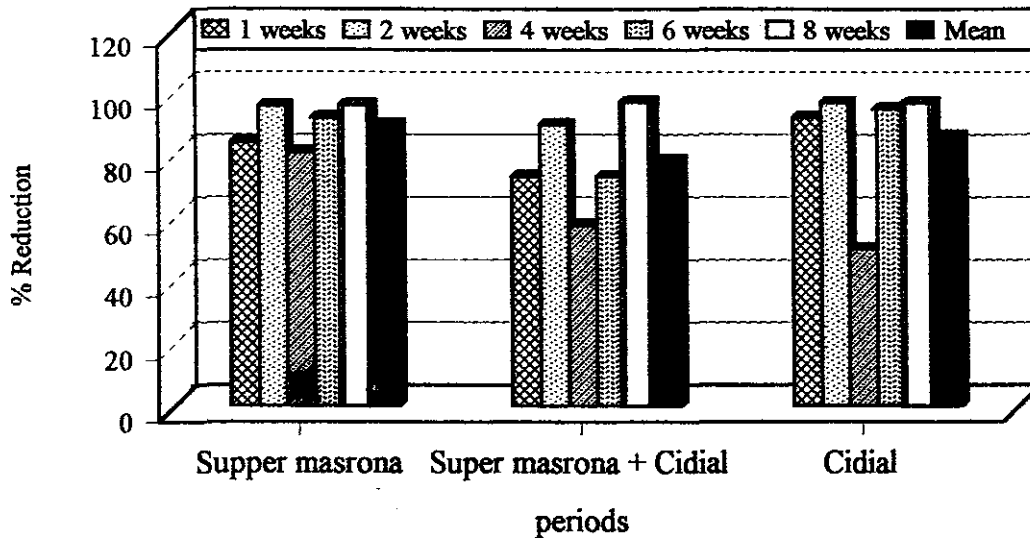


Fig. (1) : Reduction percentages of *P. longispinus* during flowering stage (May, 2000) of olive trees under irrigation system at different periods of spray at Burg El-Arab area.

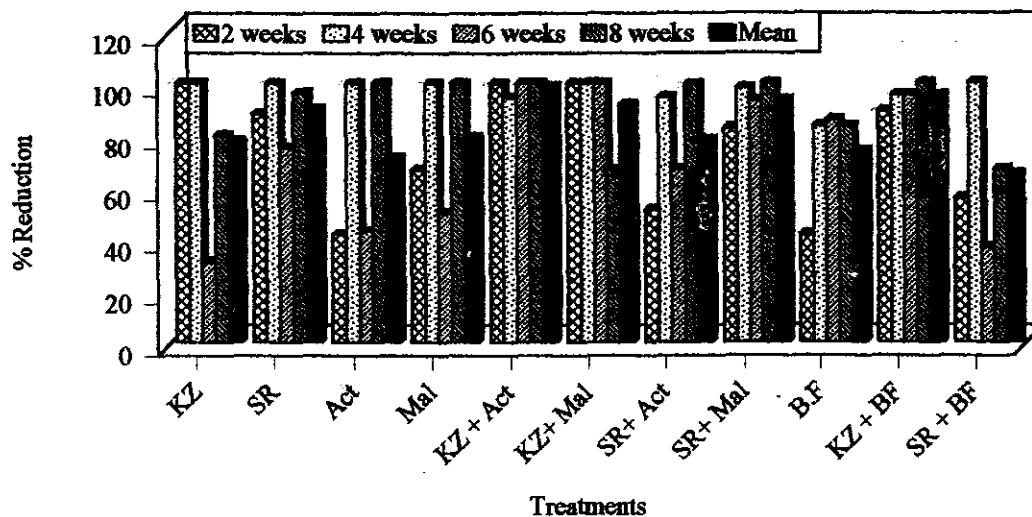


Fig. (2) : Reduction percentages of *P. longispinus* certain periods of early summer spray at Burg El-Arab area (July, 2000).

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ملخص العربي

الاستخدام الآمن للمبيدات لمكافحة البق الدقيقي ذو الذنب الطويل على أشجار الزيتون في المزارع المرورية ببيرج العرب

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مركز البحوث الزراعية

تم إجراء تجربتين حقليتين لاختبار بعض المبيدات لمكافحة البق الدقيقي ذو الذنب الطويل على أشجار الزيتون خلال مرحلتَي الأزهار والأثمار (شهرَي مايو ويوليو عام ٢٠٠٠) في المزارع المرورية ببيرج العرب (٥٠ كم غرب الإسكندرية). في مرحلة الأزهار تم اختبار زيت سوبر مصرونا (١,٥%) والمبيد الحشري فينوثيبيت (١,٥ في الألف) ومخلوطهما، وأحدثت المعاملات الفردية للمبيدات ذات كفاءة عالية بدون فروق معنوية بينما كان تأثير المخلوط أقل كفاءة. أما في مرحلة الأثمار تم اختبار الزيوت المعدنية (كزد، سوبر رويال) بتركيز ١,٥% والمبيدات الفوسفورية الحشرية (بريميوس-ميثيل، كاربوفوس) بتركيز ١,٥ في الألف، وكذا المبيد الحيوي بيوفلاي بتركيز ١,٥ في الألف والمحاليل المزوجة بينهما. وقد أظهرت النتائج أن مخلوط زيت كزد مع بريفيوس-ميثيل ومخلوط كزد مع بيوفلاي كان الأكثر كفاءة حيث أحدث أعلى نسبة خفض في تعداد الحشرة وصل إلى ٩٨,٦%، ٩٤,٨% على التوالي. كذلك فقد أحدث زيت سوبر رويال نسبة خفض في تعداد الحشرة موضع البحث (٨٩,٩%) بدون فروق معنوية. الزيوت المعدنية ومخاليلها تفضل في مكافحة هذه الحشرة في زراعات الزيتون المرورية ببيرج العرب حيث أنها لم تسبب أي تأثيرات جانبية ضارة على الأشجار المعاملة وكذلك لا تؤدي إلى تلوث البيئة وتعمل على خفض التوازن الحيوي في المنطقة.