EFFICACY OF SOME INSECTICIDES AGAINST THE SCALE INSECT *Hemiberlesia lataniae* (SIGNORAT) (HOMOPTERA, DAISPIDIDAE) INFESTED MULBERRY TREES *Morus alba* (FAMILY MORACEAE).

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ABSTRACT

Mulberry trees were heavily infested with the scale insect *Hemiberlesia lataniae*(S) Therefore, Insect growth regulator (Admiral) 0.5%, the organophosphate Pesticide (Malathion 57%Ec.) at 0.15% and the mineral oil (Supermox) at 1.5%., were tested for against the scale insects infesting mulberry trees in Giza. Reduction% in different stage of the insect proportional to per- treatment counts ,were estimated according to Henderson and Tilton (1955). Data were subject to Duncan's multiple range test (Duncan 1951) 0.05, 0.01 between treatments and their efficacy on the different insect stages. Results indicated that all tested materials were obvious differences between the pre – treatment counts and the post treatment counts and also, differences occurred among treatments. Moreover, the population density of scale insect *H. lataniae* was reduced according to the potancy of each compound .

Key Words: Scale insects, *Hemiberlesia lataniae* Chemical control, (IGR.), mineral Oil,, Organophosphate Mulberry

INRODUCTION

Hemiberlesia lataniae (Signoret) is one of the most important scale insects attacking fruit and ornamental trees in Egypt, it infests mulberry, fig, guava, pear, apple, grape, and olive. **El-Minshawy *et al.* (1972). Kikuchi (1976)** in Japan recorded that about 200 insect species attack mulberry. Notes are provided on their injuriousness with special reference to sericulture), the factors that tend to lead to outbreaks and cultural control methods, for each species, suitable insecticides are listed with their dilutions and times for treatment, for the 18 insecticides recommended, waiting periods in relation to the rearing of silkworms *Bombyx mori* L. are also given. **Villiers (1978)** studied the control of some pests of Guava in south Africa. These include the use of malathion against the scale insect *Hemiberlesia lataniae* (Signoret). (Malathion, Dimethoate, Parathion) when added to a mineral oil against *H. lataniae* on fig trees during October, March and May. The results indicated that organophosphorus insecticides when added to oil gave better results against *H. lataniae* than oil alone. **Su and Wang (1988)** in Taiwan tested various insecticides in the laboratory and in the field against *H.lataniae* application of Supercide (methidathion) 40% Azodrin (monocrotophos) 55% and dimethoate 44% were effective in controlling *H. lataniae* causing 93–100% mortality. **Blank and Olson (1990)** in Newzealand. studied the effect of methidathion at 50g/ 100 L. and diazinon at 48g /100 l. against *H. lataniae* on Kiwifruit. The results indicated that methidathion gave 96% control of *H.lataniae* and diazinon gave 79%. **Hill and Allan (1990)** in Newzealand reported intermediate oil (2L. a. i. /100 liters) diazinon 80 Ec at 48 g. a.i. /100 liters) and chlorpyrifos (Dorsban 40 Ec at 20 g. a. i / 100 liters) separately and

in oil – insecticide mixture applied as single dormant season sprays gave good control of *H. lataniae* on *Lombardy poplars* (*populus nigre* varitalica) near kiwifruit orchards. Diaspidid were more easily killed than those exposed on bark. **Kessing (1990)** in Newzealand tested 4 insecticides in controlling *H. lataniae* toxicity was detremined in four pesticides. He reported to be LC_{50}, 0.017 g. a. i liter for chlorpyrifos, 0.017 for permethrin plus 0.007 for diazinon and 0.125 for phosmet. **(Osman 2005)** in Egypt studied the seasonal abundance of the scales insect, *H.lataniae* (S.) on Mulberry trees, revealed that the period from early July till early September proved to be the most appropriate time for controlling this pest.

Nevertheless, the aim of the present investegation is to evaluate the efficiency of three different materials in three different groups; an insect grouth regulator, a mineral oil and an organophosphate pesticide against such scale insect infesting mulberry trees**,** and used as summer sprays.

MATERIALS AND METHODS

1- Insect growth regulator Admiral 10% Ec-**2** Organophosphorus Pesticide Malathion 57% Ec. **3-** Mineral oil (Supermox), Ec. local mineral oil formulated by Alex. Pesticide company (Mox). The rats of application for the tested compounds was 0.5, 0.15 and 1.5% for Admiral, Malathion and Supermox, respectively.

An experiment was carried out at Giza Governorate on Mulberry trees. Trees were kept out of any insecticidal exposure during this investigation. Four treatments were applied in three replicates i.e.3 trees per each treatment. Three trees were left as an untreated checks (Contol). Experiment was conducted according to Ministry of Agriculture protocol (1993). Spraying was done on July 2008 by using dorsal sprayer (about 20 liters) volume .Samples of 10 infested branches (20 cm. long) per tree from four cardinal directions and the middle, that grew in the preceeding spring, were collected randomly from each replicate immediately before spraying. The branches and leaves were picked out from all directions. Samples (30 branches per treatment), were taken as an index for per-treatment count. The post- treatment counts were recorded after, one, two, Three, four, six and eight weeks of application. The samples were taken to the laboratory in paper labeled bages for examination. Nymphs, adult females and females laying eggs (ovipositing females) were counted per branch. The mean number of alive insects/branch was recorded and reduction percentages were also calculated according to **Henderson and Tilton (1955).**

Possible phytotoxic effects : were observed such as flaming curl and colour change in leaves of treated plants up to 30 days after spraying. The efficiency of the tested compounds was expressed as weekly % reduction in alive insects for 8 weeks after spraying.

RESULTS AND DISCUSSION

Results shown in table (1) indicate that three tested materials were differences between pre and post – treatment counts and also, differences occurred among treatments. Moreover, the population density of scale insect *H. lataniae* was reduced according to the potancy of each compound.

Data in this table clearly indicated that all tested scalicides gave satisfactory results against *H.lataniae* population during 1, 2, 3, 4, 6 and 8 weeks. Data on post-treatment could be discussed as follows:

1-One week after application:

Results of analysis of variance clearly demonstrated that the % reductions were79.2%, 68.4 of nymphs, females without eggs and females laying eggs, respectively.

Mean% reduction between the three tested material, highly effect of treatments were found for Malathion was 98.6% followed by Supermox was 57.8% and Pyriproxyfen was 57.1% .

2- Two weeks after application:

Nymphs showed significantly highly responses to scalicides followed by adult females then ovipositing females with 89.8, 81.7 and 80.2% respectively.

Results in the same table revealed significant differences between the effect of treatments against alive population of this pest. The first order including Malathion was the superior in reduction the population (96.4%), followed by Supermox was 83.3% then Pyriproxyfen caused the least effect 72.0% reduction.

3- Three weeks after application:

Nymphs showed significant responses to the tested scalicides with 92.5%, reduction, followed by females without eggs then adult female laying eggs which caused 89.4, 88.4%, respectively. The mean reduction percentages was 92.7 % for Supermox followed by 90.3 % for Pyriproxyfen and 87.4% for Malathion.

4- Four weeks after application:

The mean reduction percentages were 92.3, 86.9 and 86.2% for nymphs, adult females and ovipositing females respectively.

The mean reduction percentages were 97.6% for Supermox, 92.2% for Pyriproxyfen and 75.5% for Malathion. These differences were significant.

5- Six weeks after application:

The Mean reduction percentages were 92.9%, 89.1 and 88.8% for nymphs, females without eggs and females laying eggs respectively, with a significant differences.

Also, results showed that no significant differences were detected between Pyriproxyfen and Supermox, with %reduction were 97.1 and 98.4% respectively.

Results showed that the differences between the efficacy of treatments were significant between Malathion and the other two tested scalicides where % reduction were 75.4, 97.1 and 98.4% respectively.

6- Eight weeks after application:

Nymphs showed significant responses to the tested scalicides with 93.8% reduction, followed by adult females with no eggs and females laying eggs which caused 89.7 and 89.5% reduction respectively . These results are in agreement with the findings of **Helmy *et al*., (1991)** in Egypt who reported that the nymphal stages of certain scal insects were more susceptible followed by adult females to tested scalicides while ovipositing females were less responsive .

The effect of the tested treatments on population was significant differences between Malathion and the other two tested scalicides where the % reduction were 75.1, 98.4 and 99.5% respectively. Also, results showed that no significant differences were detected between Pyriproxyfen and Supermox with the percentages of reduction were 98.4 and 99.5% respectively.

According to their effects on the general mean of reduction percentages of *H .lataniae* ,the tested materials could be arranged as follows :

Supermox 1.5% (88.26%), Malathion 0.15% (84.77) and Pyriproxyfen 0.5% (84.54%).

Table 1

Also, after along time (6 - 8 weeks) the addition gave very good results with insignificant differences between the efficacy of Pyriproxyfen and Supermox could be used safely without any affected sericulture and silk production according to **Osman (2005)** in a study on the safe period recommended to use Mulberry leaves for silkworm feeding after treatments with Pyriproxyfen, Malathion and Supermox were 30.0 27.0 and 29.0 days post-treatment in which larval mortalities reached 13.3, 13.3 and 6.6% respectively .and **Kikuchi (1976)** who studied the waiting periods in relation to the rearing of silkworms *Bombyx mori* L.

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كفاءة بعض المبيدات الحشريه ضد الحشرة القشرية (حشرة العنب القشرية) التى تصيب أشجار التوت

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تتعرض أشجار التوت – مثلها كمعظم الزراعات الاقتصادية ومحاصيل الحقل – للهجوم بالعديد من الآفات الحشرية والتى قد يصل عددها إلى حوالى ٢٠٠ نوعا وتعتبر الحشرات القشرية والبق الدقيقى من أهم هذه الآفات حيث تسبب الإصابة بها أضراراً خطيرة لأشجار التوت فى مصر ينتج

عنها إنخفاض كبير فى محصول الاوراق والتى تعتبر الغذاء الطبيعى الوحيد لديدان القز، مما قد يؤدى إلى حدوث خسائر فادحة فى تربية ديدان الحرير. تم استخدام ثلاثة من المواد الموصى بها لمكافحة الحشرات القشرية والبق الدقيقى بالتركيزات الموصى بها وهى استخدام احد منظمات النمو الحشرية (IGR) مركب الادميرال بتركيز ٠.٥% -الزيت المعدنى سوبر موكس بتركيز ١.٥% - ثم المبيد الفوسفورى الملاثيون بتركيز ١.٥ فى الالف.

اوضحت النتائج شدة فاعلية المعاملات المختلفة فى خفض اعداد حشرة العنب القشرية وأطوارها المختلفة بعد ١ ، ٢ ، ٣ ،٤، ٦ ، ٨ أسابيع من المعاملة، ويمكن تلخيص النتائج كما يلى:

١- - نتائج الفحص بعد ٧ ايام من المعاملة:

كان للمعاملات المختلفة فاعلية معنوية على طور الحورية بالمقارنة بالحشرات الكاملة والحشرات الواضعة للبيض، كما ان لها فاعلية على مجموع تعداد الحشرة حيث رتبت المعاملات تنازليا حسب تأثيرها على التعداد كما يلى:

(١) الملاثيون بمعدل ٠.١٥% (٢) الزيت المعدنى سوبر موكس بمعدل ١.٥% (٣) منظم النمو ادميرال بمعدل ٠.٥%

٢-- نتائج الفحص بعد ١٥ يوما من المعاملة:

كان لطور الحورية اعلى استجابة للمعاملات المختلفة يليه معنويا طور الاناث البالغة ثم الاناث الواضعة للبيض، كما أوضحت النتائج شدة فاعلية الملاثيون ٠.١٥% على تعداد هذه الآفة يليه معنويا الزيت المعدنى سوبر موكسى ١.٥% وكان فى المرتبة الثالثة منظم النمو ادميرال ٠.٥%.

٣- - نتائج الفحص بعد٢١ يوما من المعاملة:

أوضحت النتائج وجود فروق معنوية وشدة استجابة طور الحورية للمعاملات المختلفة يليه معنويا طور الحشرات الكاملة والحشرات الواضعة للبيض. وكان للزيت المعدنى سوبر موكس ١.٥% كفاءة عالية فى مكافحة هذه الآفة يليه منظم النمو ادميرال ٠.٥% ثم الملاثيون ٠.١٥%.

٤-- نتائج الفحص بعد ٣٠ يوما من المعاملة:

أظهرت الحوريات اعلى استجابة للمعاملات المختلفة يليها كل من الحشرات الكاملة والحشرات الواضعة للبيض . اما بالنسبة التأثير المعاملات على معدل الخفض فى التعداد فان الزيت المعدنى سوبر موكس ١.٥% أعطى أعلى نسبة انخفاض فى التعداد يليه منظم النمو ادميرال ٠.٥%، ثم الملاثيون ٠.١٥%.

٥- نتائج الفحص بعد ٤٥ يوما من المعاملة:

كانت للمعاملات المختلفة فاعلية معنوية عالية على طور الحورية يليها الحشرات الكاملة ثم الحشرات الواضعة للبيض. اما بالنسبة لتأثير المعاملات على معدل خفض التعداد كان الزيت المعدنى سوبر موكس ١.٥% اعطى اعلى نسب انخفاض فى التعداد يليه منظم النمو ادميرال ٠.٥% ثم الملاثيون ٠.١٥%.

٦- نتائج الفحص بعد ٦٠ يوما من المعاملة:

اظهر حوريات هذه الآفة حساسية عالية ومعنوية للمعاملات المختلفة بالمقارنة بكل من الحشرات الكاملة ثم الحشرات الواضعة للبيض. وكذلك وجدت فروق معنوية بين تأثير المعاملات على التعداد وبالتالى أمكن ترتيب المعاملات تنازليا تبعا لتأثيرها فى خفض التعداد كما يلى:

(١) الزيت المعدنى سوبر موكس١.٥%.(٢) منظم النمو ادميرال ٠.٥% (٣) الملاثيون ٠.١٥%

وعلى وجه العموم، تم التحصل على نتائج ممتازة مع تقدم الوقت وخلال فترة التجربة (٨ أسابيع) بعد الرش الصيفى، حيث تم ترتيب المعاملات تنازليا حسب تأثيرها على المتوسط العام للتعداد كما يلى :

(١) الزيت المعدنى سوبر موكس ١.٥ % (٢) الملاثيون ٠.١٥% (٣) منظم النمو ٠.٥%.