

FIELD EVALUATION OF CERTAIN MATERIALS AGAINST THE MEALYBUG *Icerya seychellarum* (WESTWOOD) (HOMOPTERA, MARGARODIDAE) ON MULBERRY TREES *Morus alba* AT GIZA GOVERNORATE.

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ABSTRACT

Three materials namely; the insect growth regulator (Admiral) 0.5%, the organophosphoate pesticide (Malathion 57% Ec.) at 0.15% and the mineral oil (Supermox) at 1.5%, were tested for against the mealy bug, *Icerya seychellarum* (w) infesting mulberry trees in Giza. A total of 30 branches, per treatment, were examined per and post-treatment. The after one, two, three, four, six and eight weeks of Summer application. Reduction % in different stage of the insect, proportional to per- treatment counts, were estimated according to **Henderson and Tilton (1955)**. Data subject to Duncan's multiple range test (Duncan 1951) 0.05, 0.01 between treatments and their efficacy on the different insect stages .

Key Words: Mealy bug, *Icerya seychellarum*, Chemical control, (IGR.), Mineral Oil, Organophosphate ,Mulberry (*Morus alba*).

INRODUCTION

The margarodid mealybug *Icerya seychellarum* (Westwood) is a polyphagous insect first recorded in Egypt by **Ezz and Samhan (1965)** on five host plants at **Suez**. **Assem et al. (1991)** found that the range of host plants of this mealy bug includes 44 plant species and varieties in Cairo, Giza, Qualyobia, Beheria and Suez. Most of such hosts are economic horticultural plants that belong to several plant families. This giant mealybug mainly attacks the foliage, sucks a great amount of plant sap and secretes honeydew. Most mealy bug individuals are found accumulated along the underside leaf veins especially along the mid rib (**Assem 1990**).

The crude diesel emulsion was used against *Icerya seychellarum* in Mauritius by **Jepson (1938)**. In Egypt the most effectieve insecticides against this bug are mineral oil (KZ), (Capl -2) and the organophosphorus pesticide Cidial (Phenthoate) 50% (**Negm et al 2001**). This seychelles fluted mealybug as one of the main pests of mulberry trees *Morus alba* in Nile Delta that reduces sericulture and silk production, in Egypt, according to **Osman (2005)** in a study on the biochemical changes in mulberry leaves infested with this and their influences on some biological aspects of the silkworm *Bombyx mori* L., as well as the effect of some insecticides sprays on silkworm rearing.

Nevertheless, the aim of the present investegation is to evaluate the efficiency of three different materials in three different groups; an insect growth regulator, a mineral oil and an organophosphate pesticide against such mealy bug 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 application rates for the three tested chemicals was 0.5, 0.15 and 1.5%

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 without treatment as an untreated checks (Contol). Experiment was conducted according to Ministry of Agriculture protocol (1993). Spraying was done on July 7th 2008 using dorsal sprayer (about 20 liters) volume. Samples of 10 infested branches (20cm. 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

The effect of the three tested materials on *I. seychellarum* nymphs, adult females (without eggs, or laying eggs) and on the total population in the six post-treatment counts are shown in table (1).

Data in this table clearly indicated the high efficacy of the three materials chosen at the rate used on the different stages and total population of the *I. seychellarum* which infesting mulberry trees.

Data, on post-treatment count could be discussed as follows (Table 1):

1- One week after application:

Analysis of variance clearly indicated significant differences between the tested scalicides in efficacy against *I.seychellarum* different stages. Mean % reductions were 81.4, 76.8 and 76.2% nymphal, female wt. no eggs and laying female, respectvily.

Concerning the total population, significant differences were also obtained The most efficient was Malathion 0.15%, followed by Supermox at 1.5% and the least was Pyriproxyfen 0.5% Mean % reductions in population reached 99.5% ,72.2 and 62.5% , respectively.

2- Two weeks after application:

Data in table revealed that the superior efficiency was Malathion 0.15% was the best followed by Supermox 1.5% then Pyriproxyfen 0.5%. Reduction percentages in population 98.5, 82.2 and 72.5% respectively .

The mean percentages of reduction for nymphs, females and laying females were 87.8, 83.0 and 82.5% respectively.

Table(1): The reduction percentages in the different stages of *Icerya seychellarum* (W) total population on Mulberry trees after summer spraying at Giza Governorate.

| % Reduction of <i>Icerya seychellarum</i> (W.) After spraying | Weeks After spraying | Treatments | | | | | | | | | | | | | | | |
|---|----------------------|--------------|------|---------|------|----------|------|--------|------|-----------|------|--------|--------|---------------------|--------|--------|---|
| | | Pyriproxyfen | | | | Supermox | | | | Malathion | | | | Stages general mean | | | |
| | | N. | AF | A+E | M. | N. | AF | A+E | M. | N. | AF | A+E | M. | N. | AF | A+E | M |
| One week | 69.8 | 59.8 | 58.2 | 62.5 A | 74.5 | 71.2 | 71.1 | 72.2 B | 99.8 | 99.5 | 99.3 | 99.5 C | 81.4 B | 76.8 A | 76.2 A | 78.1A | |
| Two week | 79.8 | 69.6 | 68.2 | 72.5 A | 84.5 | 81.2 | 81.1 | 82.2 B | 98.9 | 98.4 | 98.3 | 98.5 C | 87.8B | 83.0 A | 82.5 A | 84.4B | |
| Three weeks | 84.6 | 80.5 | 80.5 | 81.8 A | 88.6 | 87.1 | 86.7 | 87.4 B | 98.7 | 97.8 | 97.4 | 97.9 C | 90.6B | 88.4 A | 88.2 A | 89.1D | |
| Four weeks | 94.2 | 92.3 | 92.2 | 92.9 B | 96.2 | 94.6 | 94.4 | 95 C | 84.2 | 81.4 | 80.8 | 82.1 A | 91.5 B | 89.4 A | 89.1 A | 90 E | |
| Six weeks | 98.8 | 97.7 | 97.6 | 98 B | 99 | 98.3 | 98.3 | 98.5 B | 64.1 | 58.9 | 58.2 | 58.2 | 87.3 B | 85 A | 84.7 A | 85.6 C | |
| Eight Weeks | 99.1 | 98.2 | 97.8 | 98.4 B | 99.2 | 98.5 | 98.2 | 98.6 B | 63.8 | 59.7 | 58.1 | 60.5 A | 87.4 C | 85.5 B | 84.7 A | 85.8 C | |
| General mean | | | | 84.40 B | | | | 89.06C | | | | 83.21A | | | | | |

N: Nymphs AF: Adult female A+E: Adult female with eggs M:Mean

Values followed by the same letter are insignificantly different
(Duncan ,s significant differences test, General Linear Model, spss)

Uses Harmonic Mean Sample Size=9.000

Alpha=.05.

3- Three weeks after application :

The bio-residual efficacy of the three tested compounds against *I.seychellarum* population showed significant differences. The mean reduction percentages was 97.9% for Malathion followed by 87.4% for Supermox and 81.8% for Pyriproxyfen.

Also, the differences between stages were significant. The mean reduction percentages were 90.6, 88.4 and 88.2% for nymphs, females with no eggs and laying females, respectively.

4- Four weeks after application:

The mean reduction percentages were 95.0% for Supermox followed by 92.9% for Pyriproxyfen then 82.1% for Malathion. These differences were significant.

The mean reduction percentages were 91.5, 89.4 and 89.1% for nymphs, adult females with no eggs and with eggs, respectively.

5- Six weeks after application:

The mean reduction percentages were 98.5% in case of Supermox followed by 98.0% for Pyriproxyfen and 60.4% for Malathion, with a significant differences.

Nymphs, adult females without eggs and females laying eggs were reduced by 87.3, 85.0 and 84.7% respectively.

6- Eight weeks after application:

The effect of the tested treatments on population was significantly different. Treatments could be arranged in descending order as follows: Supermox 1.5% with the highest reduction percentages (98.6)% followed Pyriproxyfen 0.5% which caused 98.4% reduction, then Malathion 0.15% which caused 60.5 reduction in *I.seychellarum* alive population .

Considering insect stages, nymphs were the most affected with 87.4% reduction, followed by adult females without eggs with 85.5% reduction, then females with eggs with 84.7% reduction. These results are in agreement with the findings of **Helmy et al., (1991)** in Egypt who reported that the nymphal stages of certain scab insects were more susceptible followed by adult females to tested scabicides while ovipositing females were less responsive.

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

- 1- Supermox 1.5% with general mean reduction of 89.06%,
- 2- Pyriproxyfen 0.5% with general mean reduction of 84.40%
- 3- Malathion 0.15% with general mean reduction 83.21%.

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التقييم الحقلى لبعض المواد ضد بق السيشلارم الدقيقى على اشجار التوت فى محافظة الجيزة

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تعتبر أوراق التوت هى الغذاء الطبيعى الوحيد لديدان الحرير، وبالتالي يتوقف نجاح تربية ديدان الحرير على جودة أوراق التوت بالإضافة إلى خلوها من الإصابة بالآفات وعدم تلوثها بالمبيدات الكيماوية. يمكن اجراء مكافحة الكيماوية لآفات التوت كرش صيفى باستخدام ثلاثة من المواد الموصى بها فى مكافحة الحشرات القشرية والبق الدقيقى بالتركيزات الموصى بها وهى استخدام احد منظمات النمو الحشرية (IGR) مركب الأدميرال بتركيز ٠,٥% -الزيت المعدنى سوبر موكس بتركيز ١,٥% - ثم المبيد الفوسفورى الملاثيون بتركيز ١,٥ فى الألف .

أوضحت النتائج شدة فاعلية جميع المعاملات المختبرة على تعداد الآفة وأطوارها المختلفة بعد ١، ٢، ٣، ٤، ٦ و ٨ أسابيع من الرش الصيفى
١- نتائج الفحص بعد ٧ أيام من المعاملة:

أظهرت حوريات هذه الآفة حساسية عالية ومعنوية للمعاملات المختلفة بالمقارنة بكل من الحشرات الكاملة والحشرات الواضعة للبيض. وكذلك وجدت فروق معنوية بين تأثير المعاملات على التعداد وبالتالي امكن ترتيب المعاملات تنازليا تبعاً لتأثيرها فى خفض التعداد كمايلى:
(١) الملاثيون بمعدل ٠,١٥ (٢) الزيت المعدنى السوبر موكس بمعدل ١,٥% (٣) منظم النمو الأدميرال بمعدل ٠,٥%

٢- نتائج الفحص بعد ١٥ يوما من المعاملة:

اظهرت الحوريات اعلى استجابة للمعاملات المختلفة يليها كل من الحشرة الكاملة والحشرات الواضعة للبيض كما تم ترتيب المعاملات تنازليا تبعا لتأثيرها على التعداد كما يلي (١) الملاثيون بمعدل ٠,١٥ % (٢) الزيت المعدنى السوبر موكس بمعدل ١,٥ % (٣) منظم النمو ادميرال بمعدل ٠,٥ %

٣- نتائج الفحص بعد ٢١ يوما من المعاملة:

ايضا كانت للمعاملات الثلاثة المختلفة فاعلية معنوية عالية على طور الحوريات يليها الحشرات الكاملة ثم الحشرات الواضعة للبيض . اما بالنسبة لتأثير المعاملات على معدل الخفض فى التعداد فإن الملاثيون بمعدل ٠,١٥ % اعطى اعلى نسبة انخفاض فى التعداد ، ثم الزيت المعدنى السوبر موكس ١,٥ % . ثم منظم النمو ادميرال بمعدل ٠,٥ % .

٤- نتائج الفحص بعد ٣٠ يوما من المعاملة:

اظهرت الحوريات اعلى استجابة للمعاملات المختلفة يليها كل من الحشرات الكاملة ثم الحشرات الواضعة للبيض. اما بالنسبة لتأثير المعاملات على معدل الخفض فى التعداد وذلك بعد مرور ٣٠ يوما من المعاملة فإن الزيت المعدنى بمعدل ١,٥ % اعطى اعلى نسب انخفاض فى التعداد، يليه منظم النمو ادميرال بمعدل ٠,٥ % ثم الملاثيون بمعدل ٠,١٥ % .

٥ - نتائج الفحص بعد ٤٥ يوما من المعاملة:

كانت للمعاملات المختلفة فاعلية معنوية عالية على طور الحورية يليها الحشرة الكاملة ثم الحشرات الواضعة للبيض. أما بالنسبة لتأثير المعاملات على معدل خفض التعداد فانه كل من السوبر موكس ٠,١٥ % ومنظم النمو ادميرال بمعدل ٠,٥ % اعطى اعلى نسب انخفاض فى التعداد ثم الملاثيون بمعدل ٠,١٥ % .

٦ - نتائج الفحص بعد ٦٠ يوما من المعاملة:

كانت للمعاملات المختلفة فاعلية معنوية عالية على طور الحورية يليها الحشرات الكاملة ثم الحشرات الواضعة للبيض. وكذلك وجدت فروق معنوية بين تأثير المعاملات على التعداد وبالتالي امكن ترتيب المعاملات تنازليا تبعا لتأثيرها فى خفض التعداد كما يلي:

(١) الزيت المعدنى سوبر موكس بمعدل ١,٥ % (٢) منظم النمو ادميرال بمعدل ٠,٥ % (٣) الملاثيون ٠,١٥ % وبصفة عامة يمكن ترتيب تأثير هذه المعاملات على المتوسط العام لانخفاض كثافة حشرة بق السيشلارم الدقيقى خلال فترة التجربة (٨ أسابيع) فقط اعطى الزيت المعدنى ١,٥ % نتائج مرضية فى خفض التعداد، ويأتى منظم النمو ٠,٥ % فى المرتبة الثانية ثم الملاثيون ٠,١٥ % .

كذلك ظهرت فروق معنوية بين جميع فترات الفحص (١، ٢، ٣، ٤، ٦، ٨ أسابيع بعد المعاملة) وتزداد نسبة الإبادة بمرور الوقت.