COMPARATIVE STUDY ON THE EFFECTS OF PESTICIDES ON BLACK SCALES, *SAISSETIA OLEAE* (OLIVIER) (HOMOPTERA: COCCIDAE) WHICH OCCUR ON THE NEW HOST *TELOSMA CORDATA* (BURM. F.) MERR. (ASCLEPIADACEAE)

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Abstract: Experiments on the controls of black scales, Saissetia oleae (Olivier), infesting the bunga tongkin, Telosma cordata were discussed. Six types of treatments including control were done. The chemical that used in these studies were Miscible White Oil, Chemicide 75+, CH Endosulfan, Malaxion 570 E, Malathion and distilled water as the control. Pesticides were applied to each sample by using syringes and 0.05 ml pesticides were dropped for each scale. Data were collected for every two days for two weeks (14 days) to observe the effect of the pesticides on the scales. Mortality percentage is calculated for each treatment with five times observations were done under compound microscope which represent five different populations. The percentage is the Total dead organism / Total eggs + total live organism + total dead organism x 100%. Data were analyzed using the SPSS 12.0 with single way ANOVA. As a result these studies reported the T. cordata (Burm. F.) Merr. is the new host for black scales, S. oleae (Olivier). Malathion and White oil were more effective in controlling black scales, S. oleae with average of mortality for three replication were 46.8 and 43.4 respectively, followed by Malaxion (38.4), Endosulfan (32.6), Chemicide (19 2) and distilled water (8.0).

Keywords: Pesticides, Black scales, *Saissetia oleae* (Olivier), new host, *Telosma cordata.*

INTRODUCTION

Most of the Homopteran are pest to crop and plant. Black scales, *Saissetia oleae* (Olivier) (Homoptera: Coccidae: Coccinae: Saissetiini) is the pest for crop, citrus, olive and ornamental plants [2]. The principal damage is caused by piercing and sucking the cell sap. In addition to the feeding behaviour of these insects, the sooty mold fungus can grow on the honeydew given off by this scales. This fungus interferes with the physiological function of the leaves. Ali [1] had reported the occurrence of *S. oleae* in Malaysia meanwhile Hall [4] had reported the occurrence of *S. oleae* on *Calotropis procera*, the same family with *Telosma cordata.*

S. oleae, the black scales is nearly hemispherical in shape, being about 1/5 inch across and from 1/25 to 1/8 inch thick, dark brown and black in color, with a median longitudinal ridge and two transverse elevations on the back forming the letter H (Figure 1) and deposit an average of 2000 eggs. The eggs, which are about 1/80 inch in length, are white at first, later changing to orange. The eggs hatch in about 20 days. The young remain beneath the parent scale for the some hours and then emerge and crawl about, but always start feeding after 3 days [5] (Figure 2).

T. cordata is a small woody plant from Family Asclepiadaceae. It is synonym with *Pergularia odoratissima.* The common name is Tongkin flower or Bunga Tongkin, originated from India and China. The flowers are yellowish with trumpet like neck comes in bunch, fragrant and edible with medical therapeutic value.

Chemical control for black scales may be obtained through coverage spraying with light-medium-or medium-grade-mineral oil emulsions at 1.75 per cent (emulsion) or 2 per cent (emulsion) or with the wettables of Malathion at 0.645 pound, Parathion at 0.375 pound, or DDT at 0.75 pound to 100 gallons of spray. The oil sprays may be fortilled with Retonone or with Malathion, Parathion, or DDT at about one-third the dosage mentioned above. Application should be made as soon as possible after the major hatch of the scales [5,7].

The objectives of these studies were to evaluate the effectiveness of five types of pesticides namely Malathion, White-oil, CH Endosulfan, Chemicide and Malaxion to control the black scales, *S. oleae* (Olivier). Generally Malathion is used to control fruit flies, White oil is used to control thrips on ornamental plant and orchid, CH Endosulfan is used to control aphid on tea, Chemicide 75+ is used to control bugs on cocoa, grasshopper and termites, and Malaxion 570 E is used to control aphid on crusifer vegetables.

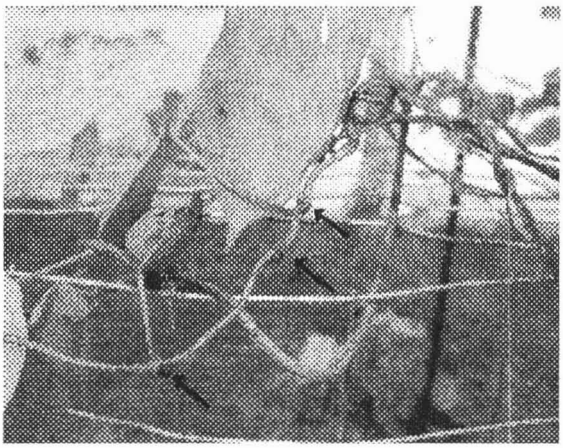

Figure 1: Black scales on *T. cordata* stem.

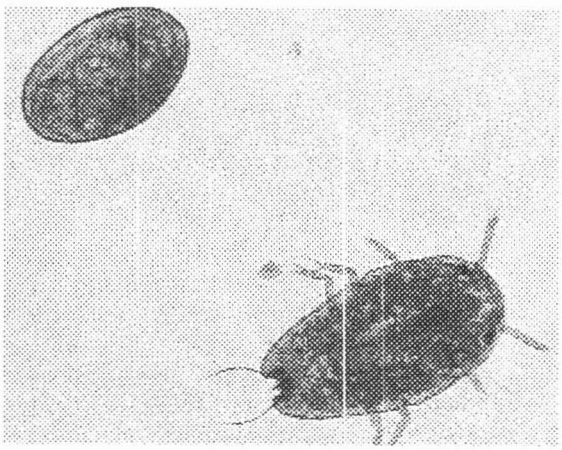

Figure 2: *S. oleae* egg and adult (X 100)

MATERIALS AND METHODS

Pest Identification: The pest is identified with the aid of Williams & Watson [8].

Treatments: Six types of treatments including distilled water as the control were done. The chemical that used in these studies were Miscible White Oil (registered by Cyanmid Agricultural Product Sdn. Bhd, Registration No: LRMP: R1/0727), Chemicide 75+, CH Endosulfan (registered by Choon Huat Sdn.Bhd., (20461-H)), Malaxion 570 E (registered by Choon Huat Sdn. Bhd. (2041-H) Registration No: LRMP.R1/4918), Malathion and distilled water as the control.

Formulation: Formulation for each pesticide as following:

1. 1 ml White oil is added with 77.59 ml water.
2. 1 ml Chemicide 75+ is added with 600 ml water.
3. 1 ml CH Endosulfan is added with 300 ml water.
4. 1 ml Malaxion is added with 450 ml water.
5. 1 ml Malathion is added with 450 ml water.
6. Distilled water.

Sampling: Different coloured threads were used to set the border for six treatments which were White oil (pink thread), Chemicide 75+ (lavender thread), CH Endosulfan (red thread), Malaxion (blue thread), Malathion (brown thread) and distilled water (yellow thread).

Pesticide application: Pesticides were applied to each sample by using syringes and 0.05 ml pesticides were dropped for each scale. Data were collected for every two days for two weeks (14 days) to observe the effect of the pesticides on the scales.

Mortality measurement: Mortality percentage is calculated for each treatment with five times observations were done under compound microscope which represent five different populations. The percentage is the Total dead organism / Total eggs + total live organism + total dead organism x 100%.

Analysis: Data were analyzed by using the SPSS 12.0 with single way ANOVA.

RESULTS AND DISCUSSION

Additional information to Hall [4], these studies reported the *T. cordata* (Burm. F.) Merr. is the new host for black scales, *S. oleae*.

For insect pest control, replication one (R1), between groups there were no significant different ($p > 0.05$). Anyhow, the highest mortality percentage is by using Malathion (60.3 ± 24.3) followed by White oil (44.4 ± 20.8), Endosulfan (23.0 ± 19.3), Malaxion (17.3 ± 13.1), control (7.6 ± 4.1) and Chemicide (6.8 ± 2.6). For replication two (R2), between groups there were significant different ($p < 0.05$). The highest mortality percentage is by using Malaxion (77.0 ± 27.8) followed by Malathion (36.7 ± 13.5), White oil (29.7 ± 15.0), Endosulfan (16.5 ± 11.2), Chemicide (9.4 ± 4.2) and control (3.6 ± 1.8). In addition, Malaxion and Malathion were significantly different ($p < 0.05$) compared to control. For replication three (R3), between groups there were no significant different ($p > 0.05$). The highest mortality percentage is by using Endosulfan (58.3 ± 12.6) followed by White oil (56.1 ± 18.0), Malathion (43.3 ± 12.6), Chemicide (41.3 ± 14.3), Malaxion (21.0 ± 9.0) and control (12.8 ± 4.4).

As a summary, Malathion and White oil were more effective in controlling black scales, *S. oleae* with average of mortality for three replication were 46.8 and 43.4 respectively, followed by Malaxion (38.4), Endosulfan (32.6), Chemicide (19.2) and distilled water (8.0) (Table 1). This may suggest that the Malathion penetrates the scale effectively as the thing happen for Malaxion, an organophosphorous insecticide. Meanwhile in the White oil, it only controls scales by preventing the respiration or forming an oil coat on the insect or larva. The oil plugs the breathing tubes, therefore suffocating the insect.

Table 1: Average of black scales mortality for six types of treatments.

Replicates / Treatments	Replicate 1	Replicate 2	Replicate 3	Average
Distilled water	7.6	3.6	12.8	8.0
White oil	44.4	29.7	56.1	43.4
Chemicide	6.8	9.4	41.3	19.2
Endosulfan	23.0	16.5	58.3	32.6
Malaxion	17.3	77.0	21.0	38.4
Malathion	60.3	36.7	43.3	46.8

These finding agreed with Salama & Amin [6] which had reported that Malathion, Dimethoate, Methyl parathion and Dicrotophos are effective in controlling scale insects that infesting citrus tree in Egypt. Furthermore, Bakircioğlu Erkilic & Uygun [3] had reported that the Insect Growth Regulators and Summer oil were harmless or slightly harmful, whereas Methidathion and Summer oil + Methidathion were respectively moderately harmful and harmful.

CONCLUSION

These studies reported the *T. cordata* is the new host for black scales, *S. oleae*. Malathion and White oil were more effective in controlling black scales, *S. oleae* with average of mortality for three replication were 46.8 and 43.4 respectively, followed by Malaxion (38.4), Endosulfan (32.6), Chemicide (19.2) and distilled water (8.0).

FUTURE ENHANCEMENT

From this piece of finding, for future expansion the experiment should include combination of two treatments, Malathion + White oil.

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