

EFFICACY OF SELECTED CHEMICALS AND BOTANICALS AGAINST COCONUT SCALE *ASPIDIOTUS DESTRUCTOR* AND MEALYBUG *PSEUDOCOCCUS COCOTIS*

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ABSTRACT

Studies were conducted at Agricultural Research Station, Aliyarnagar to find the efficacy of selected chemicals and botanicals against the coconut scale *Aspidiotus destructor* and mealybug *Pseudococcus cocotis* in young coconut palms. The results revealed that dimethoate @ 0.03% registered 95.00 percent mortality of scales followed by fish oil rosin soap @ 2.5% and monocrotophos @ 0.04 after 3 rounds of spraying. Phosphamidon @ 0.05% and Neem seed kernel extract @ 5%, Pungam oil @ 3%, were found to be less effective in controlling scales on coconut leaves. Similarly dimethoate @ 0.03% and monocrotophos @ 0.04% were found to be highly effective in checking the mealybug population followed by methyl demeton and fish oil rosin soap.

INTRODUCTION

The coconut scale *Aspidiotus destructor* Sign and mealybug *Pseudococcus cocotis* Mask (Nair, 1989) are the serious sucking pests sporadically infesting coconut in most tropical countries especially in Pollachi tract of Tamil Nadu, India. The scale multiplies quickly and feeds on the sap of the leaves. The infected leaves turn yellow, wither and die. Mealybug infests the hearts leaves of coconut which gets deformed and started. On emergence, the mid-ribs of the leaflets of the affected leaves appear waxy and twisted, as a result of which the leaves fail to open up properly. Occasionally, the nymphs enter the unopened spathe, infest the female flowers and prevent nut set. Hence the present study was undertaken at Agricultural Research Station, Aliyarnagar to study the efficacy of selected chemicals and botanicals against coconut scale insect and mealybug in young coconut palms. The scale insect was effectively controlled by spraying with dimethoate @ 0.03% or monocrotophos @ 0.04% (Jalaludin *et al.*, 1991). Monocrotophos and fenthion were found effective against mealybug (Nair, 1989). Very limited works have been done on botanicals against coconut scales and Mealybugs.

MATERIALS AND METHODS

A study on the efficacy of selected chemicals viz., Dimethoate @ 0.03%, Monocrotophos @ 0.04%, Phosphamidon @ 0.05%, Methyl demeton @ 0.025% and botanicals viz., Fish oil rosin soap (FORS) @ 2.5%; Neem oil @ 3%; Pungam oil @ 3% and Neem Seed kernel extract @ 5% with untreated control against coconut scale insect was carried out at Agricultural Research Station, Aliyarnagar on 15 young palms of one year old per treatment with 3 replications in Randomized block design (RBD). Fish oil rosin soap @ 2.5% spray solution was prepared by dissolving 1 kg of FORS in 40 liters of water and filtered through muslin cloth. The insecticides were sprayed directly on the entire leaves particularly the lower surface of the leaves of the young palms. The sprayings were undertaken at weekly intervals for three successive weeks. The efficacy of insecticides and botanicals against scale insect was evaluated based on the per cent mortality of scale insects at 5 days after each spraying for three consecutive sprayings.

The selected chemicals and botanicals (as noted earlier) were sprayed fully covering on the

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emerging fronds (infested with mealybugs) of 15 young palms (of 3 year old) per treatment with 3 replications in Randomized block design (RBD). The efficacy of chemicals and botanicals was evaluated against mealybug by recording the adult and nymphal populations on emerging fronds before 1st, 3rd and 7th day after one round of spraying. The population was recorded by taking 5 observations each per replications. Percent reduction over untreated control was worked out and analysed statistically.

RESULTS

It is evident from the Table 1. that five days after first to third spraying, there was an increasing trend in percentage mortality of scale insects in all the treatments. But dimethoate at 0.03 per cent registered significantly high mortality of 90.00 per cent after second spraying followed by monocrotophos and fish oil rosin soap with 54.72 per cent and 52.68 per cent respectively. Methyl demeton and phosphamidon recorded 42.50 per cent and 38.46 per cent respectively. Among botanicals, Neem oil registered 43.75 per cent mortality of scale insects followed by Neem seed kernel extract and Pungam oil with 30.65 per cent and 23.60 per cent respectively. After 3rd spraying, the dimethoate registered 95.00 per cent mortality of scale insects, followed by fish oil rosin soap and monocrotophos with 75.60 per cent and 70.75 per cent respectively. Phosphamidon was found to be the least effective in checking the scale insects population. Neem oil and Neem seed kernel extract and Pungam oil were not so effectively controlled the scale insects even after three rounds of spraying where they are individually applied on the coconut leaves. After 3 rounds of spraying at 7 days after spraying, the order of toxicity against scale insects was; Dimethoate > Fish oil rosin soap > Monocrotophos > Methyl demeton > Neem oil > Phosphamidon > Neem seed kernel extract > Pungam oil.

The per cent reduction in the numbers of mealybug over control are shown in Table. 2. After Seven days of spraying, there was a significant reduction in the numbers of mealybug over control in young palms sprayed with

dimethoate, monocrotophos and methyl demeton where it registered 93.42 per cent, 90.18 per cent and 81.40 per cent reduction over untreated control respectively. Fish oil rosin soap recorded the percent reduction over untreated control of 74.57 per cent. Phosphamidon was found to be the least effective in containing the mealybug population when compared to other systemic insecticides. Among botanicals, neem oil registered 68.75 per cent reduction of mealybug over control followed by neemseed kernal extract and pungam oil with 57.24 per cent and 42.67 per cent respectively. Pungam oil and neem seed kernal extract were found to be ineffective in reducing the population of mealybugs. Seven days after one round of spraying, the order of toxicity against mealybugs was: Dimethoate > Monocrotophos > Methyl demeton > Fish oil rosin soap > Neem oil > Phosphamidon > Neemseed kernel extract > Pungam oil.

DISCUSSION

In the present study, efforts were made to compare the effective chemicals and botanicals against coconut scale insects and mealybugs. The results of the present investigation indicating the superiority of dimethoate, fish oil rosin soap as repeated spraying for effective control against coconut scale insects are in conformity with report made by earlier workers (Mariau and Julia, 1977; Abad and Eloja, 1978; Visalakshi *et al.*, 1982; Nair, 1989; Jalaluddin *et al.*, 1991). Results showed that five days after three rounds of spraying of dimethoate @ 0.03%, Fish oil rosin soap @ 2.5% and Monocrotophos @ 0.04% satisfactorily controlled the scale insects. Neem seed kernel extract @ 5%, Pungam oil @ 3%, Phosphamidon @ 0.05% proved to be the least effective. Fish oil rosin soap can very well be utilized under field conditions since it imparts appreciable control over scale insects. The mode of action of this oil is asphyxiation since death occur after the spraying of fish oil rosin soap. Earlier works reported that FORS is effective against the scale (Balasubramaniam, *et al.*, 1979; Singh and Rao, 1979).

The results showed that the coconut mealybug was satisfactorily controlled by insecticidal

sprays. Seven days after spraying, dimethoate @ 0.03%, Monocrotophos @ 0.04% and methyl demeton @ 0.025% gave significant control of *Pseudococcus cocotis*. Earlier workers have reported that dimethoate, (Alianiazee and Stafford 1972; Bivins and Deal, 1973) monocrotophos (Rai and Sinha, 1980) as effective against the Pseudococcids on the perennial crops which was similar to the present study. These chemicals are probably specific in their action against mealybug, because their residues are toxic to mealybugs.

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