*Research Paper :*

# Efficacy of Certain Insecticides Against Arecanut Spindle Bug, *Carvalhoia arecae* Miller and China (Heteroptera:Miridae) Under Field Conditions

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**SUMMARY**

**The study on efficacy of some insecticides against arecanut spindle bug was conducted in farmers fields. All the insecticides tested were effective in controlling the arecanut spindle bug. Malathion 5% dust, phorate 10% granules,monocrotophos 0.15% spray, lamda cyhalothrin 0.10% spray showed cent per cent mortality in bug population on seventh day after application. Chlorpyrrphos 0.20% spray and profenophos also showed higher efficacy in controlling the bug population. All other insecticides showed either moderate or least effectiveness but they were significantly superior over control.**

**Key words :** Spindle bug, *Carvalhoia arecae*, Arecanut, Efficacy

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The spindle bug *Carvalhoia arecae* Miller and China (Heteroptera: Miridae) was first reported as pest of arecanut palm from Dakshina Kannada (Karnataka) by Khandige (1955). Miller and China (1957) recorded this as a new genus and spicies from *Areca catechu.* These are brightly coloured red and black bugs, inhabit the innermost two or three leaf axils and are of a chronic problem in areca plantations of Kerala, Karnataka and parts of Tamilnadu (Nair, 1964). Both nymphs and adults hiding in leaf axils suck the sap from the emerging spindle and tender leaflets. Fresh feeding marks appear as watery streaks on the infested leaflets and spindle. These linear lesions turn brown and become necrotic resulting in small shot-holes. As a result of feeding, the spindle often dries and fails to open. Complete decay and death of the spindle during rainy season is also noticed. Persistent incidence of this pest without preventive measures would be detrimental to the general health and longevity of palm. Seedling and young palms under such condition may die.

Now, the spindle bug has assumed the pest status and spread extensively in areca gardens of Shimoga region and causing economic loss to the farmers. Very little information is available on control measures against spindle bug. General recommendations include keeping sachets with granular insecticides into the innermost two or three leaf axils of arecanut palm (Sathiamma *et al.*, 1985; Jacob, 1990). In the present studies some insecticides including chemical and bio pesticides were tried for their efficacy against arecanut spindle bug.

## MATERIALS AND METHODS

A field experiment was conducted to know the efficacy of some insecticides against arecanut spindle bug, *Carvalhoia arecae* in farmers field at Hatti village, which is located 10 km away from Channagiri. A total of three acres garden comprising palms of two years old was used. The experiment was laid out using randomized block design with 13 treatments (Table 1). Each treatment was imposed on ten plants with three replications. The knapsack sprayer was used for spraying and the nozzle was directed towards the spindle and inner most leaf axils. Dusting was done manually and granular insecticide was placed in perforated polythene sachet. Two such sachets were kept at the base of the spindle. Observations were recorded on number of bugs present prior to application and first, third and seventh day after application. Mean number of bugs from eight plants of each replication was worked out. Finally the data were subjected to statistical analysis.

**Table 1 : The treatment details for the management of arecanut spindle bug**

| Sr. No. | Treatment | Concentration (%) | Trade name |
|---|---|---|---|
| 1. | *Verticillium chlamydospori* ($10^9$ spores/ml) | 0.15 | Varsha |
| 2. | Chlorpyriphos 20% EC | 0.20 | Dursban |
| 3 | Azadirachtin (1%) | 0.20 | Econeem |
| 4. | Azadirachtin (0.4%) | 0.40 | Agrigold |
| 5. | Indoxacarb 14.5% SC | 0.10 | Avaunt |
| 6. | Profenophos 50% EC | 0.20 | Curacron |
| 7. | Spinosad 2.5% | 0.20 | Success |
| 8 | Novaluron 10% EC | 0.15 | Rimon |
| 9. | Lamda cyhalothrin 5% EC | 0.10 | Karate |
| 10. | Monocrotophos 36% SL | 0.15 | Hycrophos |
| 11. | Malathion 5% Dust | 20 gm /palm | Cythion |
| 12. | Phorate 10% G (Std. Check) (2.5 gm sachets) | 2 sachets/palm | Thimet |
| 13. | Untreated control | - | - |

## RESULTS AND DISCUSSION

Prior to imposition of treatment the mean number of bugs per palm ranged from 5.20 to 11.30 indicating uniform incidence. The bug population reduced considerably among all the treatments on different days of observation (Table 2). A day after imposition of treatment, malathion 5% dust showed cent per cent mortality followed by lamda cyhalothrin 0.10 per cent spray, monocrotophos 0.15 per cent spray, chlorpyriphos 0.20 per cent spray and phorate granules 2 sachets per palm with a mortality per cent of 96.58, 87.20, 80.06 and 79.76, respectively. *Verticillium chlamydospori* 0.15 per cent spray showed the least mortality in bug population (22.57 per cent) followed by azadirachtin (0.4%) 0.40 per cent spray, Indoxacarb 0.10 per cent spray and spinosad 0.20 per cent spray with a mortality per cent of 30.78, 31.91 and 35.74, respectively. Azadirachtin (1%) 0. 20 per cent spray, profenophos 0.20 per cent spray and novaluron 0.15 per cent spray showed moderate mortality per cent of 56.54, 45.84 and 47.64, respectively. On third day after application, cent per cent mortality was observed in malathion 5% dust, lamda cyhalothrin 0.10 per cent spray, monocrotophos 0.15 per cent spray and phorate granules 2 sachets per palm. The per cent mortality in pest population as slightly increased in chlorpyriphos 0.20 per cent spray, profenophos 0.20 per cent spray and novaluron 0.15 per cent spray when compared to previous observation with mortality per cent of 92.60, 68.53 and 65.87, respectively. The lowest per cent of mortality was noticed in indoxcarb 0.10 per cent spray (36.17 per cent) which was at par with verticillium 0.15 per cent spray (38.95 per cent). At the same time, there was an increase in bug population was noticed in

**Table 2 : Efficacy of insecticides against arecanut spindle bug, *Carvalhoia arecae* under field conditions**

| Sr. No. | Treatment | Concentration (%) | Pre count (mean no. of bugs/palm) | Per cent mortality of arecanut spindle bug | | |
|---|---|---|---|---|---|---|
| | | | | 1 DAA | 3 DAA | 7 DAA |
| 1. | *Verticillium chlamydospori* ($10^9$ spores/ml) | 0.15 | 6.30 | 22.57 (28.09)$^{fg}$ | 38.95 (38.58)$^{d}$ | 32.50 (33.66)$^{bc}$ |
| 2. | Chlorpyriphos 20% EC | 0.20 | 5.20 | 80.06 (64.02)$^{c}$ | 92.60 (76.51)$^{ab}$ | 95.97 (79.16)$^{a}$ |
| 3. | Azadirachtin (1%) | 0.20 | 10.70 | 56.54 (48.85)$^{d}$ | 62.69 (52.78)$^{cd}$ | 69.72 (56.60)$^{b}$ |
| 4. | Azadirachtin (0.4%) | 0.40 | 5.50 | 30.78 (33.21)$^{efg}$ | 43.37 (40.91)$^{cd}$ | 53.25 (46.87)$^{bc}$ |
| 5. | Indoxacarb 14.5 % SC | 0.10 | 7.50 | 31.91 (34.21)$^{efg}$ | 36.17 (36.05)$^{d}$ | 34.46 (35.73)$^{c}$ |
| 6. | Profenophos 50% EC | 0.20 | 9.20 | 45.84 (42.46)$^{de}$ | 68.53 (55.86)$^{bc}$ | 91.90 (77.45)$^{a}$ |
| 7. | Spinosad 2.5% SC | 0.20 | 8.80 | 35.74 (36.58)$^{def}$ | 49.09 (43.64)$^{cd}$ | 42.68 (40.24)$^{c}$ |
| 8. | Novaluron 10% EC | 0.15 | 6.90 | 47.64 (43.63)$^{de}$ | 65.87 (54.26)$^{cd}$ | 68.44 (55.80)$^{b}$ |
| 9. | Lamda cyhalothrin 5% EC | 0.10 | 11.30 | 96.58 (80.31)$^{ab}$ | 100.00 (85.94)$^{a}$ | 100.00 (85.94)$^{a}$ |
| 10. | Monocrotophos 36% SL | 0.15 | 5.90 | 87.20(69.86)$^{bc}$ | 100.00 (85.94)$^{a}$ | 100.00 (85.94)$^{a}$ |
| 11. | Malathion 5% dust | 20 gm/palm | 8.10 | 100.00 (85.94)$^{a}$ | 100.00 (85.94)$^{a}$ | 100.00 (85.94)$^{a}$ |
| 12. | Phorate 10% G (2.5 gm sachets) | 2 sachets/palm | 7.30 | 79.76 (66.43)$^{c}$ | 100.00 (85.94)$^{a}$ | 100.00 (85.94)$^{a}$ |
| 13. | Untreated control | - | 6.20 | 12.99 (20.91)$^{g}$ | 1.51 (6.80)$^{e}$ | 3.05 (9.98)$^{d}$ |
| | S. E. ± | | - | 4.69 | 6.75 | 5.52 |
| | C.D. (P=0.05) | | - | 13.70 | 19.70 | 16.11 |
| | CV % | | - | 19.69 | 20.19 | 15.75 |

DAA- Days after application. Figures in parentheses are arc sin transformed values.
Means showing similar alphabet in the columns did not differ significantly.

case of untreated control. The same trend of cent per cent mortality in bug population as noticed on seventh day after application in case of malathion 5% dust, monocrotophos 0.15 per cent spray, lamda cyhalothrin 0.10 per cent spray and phorate granules (2 sachets per palm). There was a slight decrease in mortality in case of *Verticillium chlamydospori* 0.15 per cent spray (32.50 per cent), spinosad 0.20 per cent spray (42.68 per cent) and indoxcarb 0.10 per cent spray (34.46 per cent) when compared to previous observation. Profenophos 0.10 per cent spray and chlorpyriphos 0.20 per cent spray once again showed increased per cent mortality when compared to previous observation with 91.90 per cent and 95.97 per cent, respectively.

The present findings with respect to phorate are in agreement with Jacob (1990) who reported that, keeping the sachets with granular insecticides, irrespective of the insecticides and the number of sachets used into the tender most leaf axils of areca palms, resulted in very low or zero bug population for a number of months compared to control palms. Similarly, Sathiamma *et al.* (1985) reported that, granular formulation of lindane and phorate, applied to the innermost two or three leaf axils at 10 g per palm at quarterly intervals in March, June, September and December gave significant control of spindle bug population in the field. Dhileepan *et.al.* (1990) reported that *Aspergillus candidus* is a virulent entomopathogen, producing 50 per cent mortality within two days of inoculation and 100 per cent mortality in four days after inoculation. Similarly, Abraham *et.al.*(1976) recommended keeping of sachets containing phorate 10% G, Carbaryl 4% G, thiodematon 8% G, granular insecticides for the control of spindle bug in arecanut palm. The absence of relevant literature on other insecticidal treatments pervades the critical comparison.

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