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# ANTIFEEDANT EFFECT OF VARIOUS AQUEOUS LEAF EXTRACTS AGAINST TOBACCO CATERPILLAR, *SPODOPTERA LITURA* FAB.

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Indiscriminate use of pesticides for the management of insect pests has resulted in a number of biological and environmental hazards This man made intervention into the nature has further resulted in phytotoxicity, mammalian toxicity, pesticide residues, insect resistance, insect outbreaks and increased cost of production. Hence, the search for new solutions to control insect pests is currently gaining momentum (Scott *et al.,* 2003). More than 1000 species of plants have been reported to have chemicals in leaves, stems, flowers, seeds and roots which have insecticidal property, only a few of them have been used for practical insect control on a commercial scale in the past. The chemical poisons of plants are mostly alkaloids. The alkaloid extracts when applied to the insects bring about disturbance in the nervous system and cause death. They are, therefore, basically act as nerve poisons (Shahid, 2003).

Tobacco caterpillar, *Spodoptera litura* Fab. is most important pest in both nursery and transplanted crop. The caterpillar feeds voraciously along the veins of leaves and also cut the stems of small and tender seedlings, particularly during nights. The prolonged drought situation during nursery period may cause more damage. In severe cases, there will be about 80 to 100% loss of nurseries due to this pest. Although chemical control strategies are available for managing the pest, efforts are on for safe management practices. Keeping in view the deleterious effects of chemical pesticides and also the economic importance of this pest, a laboratory trial was conducted to find out the antifeedant effect of different leaf extracts, which may serve for the control of tobacco caterpillar.

The study was conducted with six aqueous dry leaf extracts *viz.*, *Nicotiana tabacum*, *Azadirachta indica*, *Pongamia pinnata*, *Ipomoea batatas*, *Datura stramonium* and *Calotropis procera* at Central Tobacco Research Institute, Rajahmundry during 2005. Fresh leaves of the above botanical species were rinsed in distilled water and shade dried for about two weeks. Dried leaves were ground and aqueous suspension in distilled water was kept under shaker overnight. Final extract was obtained after filtering through Whattman filter paper. These extracts were tested at 2 and 4% concentrations. Tobacco leaf discs of 10 cm diameter were dipped in the extracts and fed to the second instar larvae under both choice and no choice situations. In choice test, treated discs were placed peripherally in plastic troughs with 15 larvae released at the centre and no choice test was done in Petri plates with two larvae each. An untreated leaf disc served as control. All treatments were replicated thrice. Observations were made after 24 h of feeding. The results obtained were analysed statistically.

Under choice condition, less leaf area (1.7%) was consumed in *Azadirachta indica* 4% which was on par with *Calotropis procera* 4% (2.3%), *Azadirachta indica* 2% (8.7%), *Pongamia pinnata* 4% (9.0%), *Calotropis procera* 2% (10.3%) and *Pongamia pinnta* 2% (17.0%). In *Nicotiana tabacum* 2% and *Ipomoea batatas* 2%, the leaf area consumed was more (84.0%) and were on par with control (86.3%). Under no choice condition (forced feeding), though less leaf area (16.7%) was consumed in *Calotropis procera* 2% treatment, it was not significantly differed from *Calotropis procera* 4% (18.0%), *Azadirachta indica* 4% (20.0%) and *Datura stramonium* 4% (24.3%). In the

**Table 1: Effect of different treatments on leaf area consumed under choice and no choice conditions**

| Treatments | Mean per cent leaf area consumed | |
|---|---|---|
| | Choice condition | No choice condition |
| *Nicotiana tabaccum* 2% | 84.0 (67.1) | 84.3 (66.9) |
| *Nicotiana tabaccum* 4% | 58.3 (49.8) | 75.0 (60.1) |
| *Azadirachta indica* 2% | 8.7 (17.0) | 45.7 (42.5) |
| *Azadirachta indica* 4% | 1.7 (4.3) | 20.0 (26.9) |
| *Pongamia pinnata* 2% | 17.0 (24.2) | 71.0 (57.6) |
| *Pongamia pinnata* 4% | 9.0 (17.3) | 47.7 (43.6) |
| *Ipomoea batatas* 2% | 84.0 (66.8) | 76.0 (60.7) |
| *Ipomoea batatas* 4% | 56.0 (48.4) | 66.0 (54.7) |
| *Datura stramonium* 2% | 45.3 (42.3) | 67.7 (55.4) |
| *Datura stramonium* 4% | 33.0 (35.0) | 24.3 (29.0) |
| *Calotropis procera* 2% | 10.3 (18.2) | 16.7 (24.0) |
| *Calotropis procera* 4% | 2.3 (7.0) | 18.0 (25.0) |
| Control | 86.3 (68.6) | 88.3 (70.2) |
| **SEm ±** | **2.99** | **2.69** |
| **CD (P=0.05)** | **8.74** | **7.86** |
| **CV (%)** | **14.4** | **9.8** |

Figures in parentheses are arc sin transformed values

remaining treatments, leaf area consumed was more than 50%. *Nicotiana tabacum* 2% was least effective (84.3%) and on par with control (88.3%). In all, *Calotropis procera* at 4 and 2% were the best treatments under both choice and no choice situations in reducing the leaf area consumed by *Spodoptera litura*.

The present results are in agreement with that of findings made by several workers. Abou-Fakhr Hammad *et al.* (2000) reported that fruit and leaf extracts of chinaberry tree, *Melia azedarach* L. were repellant to the sweet potato whitefly adults and also detrimental to nymphal instars. The bio-efficacy of *Lantana camara* and *Adhathoda vasica* with aqueous and other solvent extracts were found to be promising against tea mosquito bug under field conditions in Jorhat, Assam, India (Deka *et al.*, 2001). Sundararajan and Kumuthakalavalli (2001) reported that aqueous leaf extracts of *Gnidia glauca* Gilg and *Toddalia asiatica* Lam at 1.0% showed more than 50% mortality in sixth instar larvae of H*elicoverpa armigera* (Hbn). Crude aqueous seed extracts of *Annona squamosa* deterred feeding of fourth instar larvae of diamondback moth, *Plutella xylostella* L. in Maluku, Indonesia (Audrey Leatemia and Isman, 2004). Antifeedant, growth regulatory and ovicidal effect of aqueous leaf extract of *Sambucus ebulus* L. was found good against the red floor beetle, *Tribolium confusum* Duv. (Haghighian and Jalali, 2005). The present study opens up new avenues for commercial exploitation of botanicals by identifying the active principles involved in the pest control.

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