Field efficacy of insecticides and antifeedants against advanced stage larvae of *Amsacta moorei* Butler

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**ABSTRACT**

The insecticides methyl parathion (0.05%), carbaryl (0.1%) and quinalphos (0.05%) and the antifeedant TPTA (0.05%) were individually effective against full grown larvae of *Amsacta moorei* under field conditions. The insecticides BHC and malathion and the antifeedant TPTH were practically ineffective. Use of antifeedant TPTA in combination with the effective insecticides is suggested for the effective control of *Amsacta moorei*.

**INTRODUCTION**

The red hairy caterpillar, *Amsacta moorei* Butler (Arctiidae: Lepidoptera) is a serious pest of 'kharif' crops in the arid and semi-arid zones of Rajasthan (Verma, 1980) and the control of advanced larval stages with insecticides alone is difficult. Aryltin antifeedants have shown promise against other hairy caterpillars like *Pericallia ricini* (Sunderamurthy and Abdul Kareem, 1968), *Diacrisia obliqua* (Chand, 1975), *Amsacta albistriga* (Abdul Kareem et al., 1974) and also against *Amsacta moorei* in the laboratory studies (Verma, 1977). Information on field efficacy of the antifeedants is not available. Present studies were, therefore, undertaken to investigate the field efficacy of two aryltin antifeedants and some contact insecticides against the full grown larvae of *Amsacta moorei*.

**MATERIAL AND METHODS**

Seven insecticidal formulations viz. BHC (Hexidole 50% W. P.), carbaryl (Sevin 85% W. P.), malathion (Cythion 50% E. C.), quinalphos (Ekalux 25% E. C.), phosalone (Zolone 35% E. C.), fenitrothion (Accothion 50% E. C.) and methyl parathion (Metacid 50% E. C.) and two aryltin antifeedants viz. triphenyltin acetate or TPTA (Brestan 60% W. P.) and triphenyltin hydroxide or TPTH (Du-Ter 20% W. P.) were applied at high volume concentrations (Table 1) in the pearl millet crop. The crop was sown at the Central Research Farm of the Central Arid Zone Research Institute, Jodhpur in a randomized block design with three replications in plots measuring 3m x 3m interspaced at 1.0 m. Row to row spacing was 45 cm and plant to plant spacing was maintained at 10 cm approximately. The treatments were...
Table 1. Field efficacy of contact insecticides and antifeedants against *Amsacta moorei* Butler larvae (V – VI stage) in pearl millet crop (spray volume @ 300 l/ha)

<table>
<thead>
<tr>
<th>S. N.</th>
<th>Pesticide</th>
<th>Per cent conc. of spray</th>
<th>*Mean no. of larvae/9m² Pretreatment 24 hr after the treatment</th>
<th>**Per cent decrease (−) or increase (+) in Mean larval population</th>
<th>***Comparative per cent decrease of larvae</th>
<th>Relative efficacy (BHC = 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>BHC</td>
<td>0.1</td>
<td>1.333 (1.00) 1.282 (1.00)</td>
<td>+ 6.08 (+ 9.16)</td>
<td>12.04</td>
<td>1.00</td>
</tr>
<tr>
<td>2.</td>
<td>Carbaryl</td>
<td>0.1</td>
<td>1.715 (2.00) 1.000 (0.00)</td>
<td>+ 39.35 (− 40.37)</td>
<td>61.57</td>
<td>5.11</td>
</tr>
<tr>
<td>3.</td>
<td>Malathion</td>
<td>0.08</td>
<td>1.883 (2.66) 1.380 (1.00)</td>
<td>− 30.54 (− 26.50)</td>
<td>47.70</td>
<td>3.96</td>
</tr>
<tr>
<td>4.</td>
<td>Quinalphos</td>
<td>0.05</td>
<td>1.686 (3.00) 1.000 (0.00)</td>
<td>− 28.19 (− 30.37)</td>
<td>51.57</td>
<td>4.28</td>
</tr>
<tr>
<td>5.</td>
<td>Phosalone</td>
<td>0.05</td>
<td>1.382 (1.00) 1.000 (0.00)</td>
<td>− 24.35 (− 23.70)</td>
<td>44.90</td>
<td>3.73</td>
</tr>
<tr>
<td>6.</td>
<td>Fenitrothion</td>
<td>0.05</td>
<td>1.626 (1.66) 1.138 (0.33)</td>
<td>− 26.97 (− 28.06)</td>
<td>49.26</td>
<td>4.09</td>
</tr>
<tr>
<td>7.</td>
<td>Methyl parathion</td>
<td>0.05</td>
<td>1.821 (2.33) 1.000 (0.00)</td>
<td>− 41.97 (− 44.73)</td>
<td>65.93</td>
<td>5.47</td>
</tr>
<tr>
<td>8.</td>
<td>TPTA</td>
<td>0.05</td>
<td>1.656 (2.00) 1.000 (0.00)</td>
<td>− 29.50 (− 32.47)</td>
<td>53.67</td>
<td>4.46</td>
</tr>
<tr>
<td>9.</td>
<td>TPTH</td>
<td>0.05</td>
<td>1.471 (1.33) 1.382 (1.00)</td>
<td>− 7.19 (− 4.50)</td>
<td>25.70</td>
<td>2.134</td>
</tr>
<tr>
<td>10.</td>
<td>Control</td>
<td>—</td>
<td>1.382 (1.00) 1.686 (1.66)</td>
<td>+ 22.73 (+ 21.20)</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

SEM ± 0.008 0.045 11.834
CD 5% n. s. 0.363 35.05

*Values √(n + 1) transformed, figures in parenthesis actual means.

**Values angular transformed; figures in parenthesis actual means.

***Control nullified by adding − 21.20 to actual per cent values for comparison.
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given at 20 days after sowing when the pest invaded the crop. The control plots were sprayed with water only. Observations on larval population per plot were recorded 24 hr before and after the sprays. Subsequent observations were not required as the pest attack was over.

The data were analyzed statistically after suitable transformations. The comparative mean reduction in larval populations in the plots was worked out by nullifying the control data and the relative efficacy worked out by taking BHC as unit.

RESULTS AND DISCUSSION

Pretreatment larval populations in various treatments was statistically alike and, therefore, post-treatment larval populations fairly indicated the efficacy of various treatments (Table 1). Considering the post-treatment populations, all the chemicals except BHC, TPTH and malathion significantly controlled the larvae and were equally good. Fenitrothion had been at par with TPTH but it also significantly reduced the larval populations over control whereas TPTH, like BHC and malathion was not effective. In control plots the mean larval population increased substantially by 22.73%. In plots treated with BHC, larval populations actually slightly increased.

Considering the mean percent reduction in the larval populations, the most effective chemicals were methyl parathion, carbaryl, TPTA, quinalphos, fenitrothion, malathion, phosalone, TPTH. Kuppuswamy et al. (1965) recommended trichlorfon 0.1% and (ethyl) parathion 0.025% for the control of grown up caterpillars. They also reported BHC 10% dust as less effective. Patel et al. (1963) reported telodrin better than methyl parathion and endrin for all stages of Amsacta moorei but Vijayaraghavan et al. (1964) have reported telodrin as effective only against young and medium sized caterpillars and ineffective against grown up caterpillars. Srivastava and Kaul (1965) further demonstrated telodrin as inferior to parathion, carbaryl and fenitrothion by bioassay against Amsacta moorei. They also reported the efficacy of insecticides as (ethyl) parathion > carbaryl > fenitrothion > BHC and others, judging (ethyl) parathion and carbaryl as the best. The present studies have further established the superiority of these two insecticides, the methyl parathion and carbaryl, under field conditions. Quinalphos, a recent insecticide, is another equally effective chemical. Of the antifeedants, TPTH has been shown to be of no value whereas TPTA has proved as good as the effective insecticides.

The mean comparative percent reduction in larval population by different treatments, worked out by nullifying the population of control plots (Table 1), gives a clearer picture of the effects of various treatments. It is seen that only methyl parathion, carbaryl, TPTA and quinalphos effected more than 50% reduction in the larval population and therefore, these four chemicals can be designated as the most effective chemicals against the advanced larval stages of Amsacta moorei.
When the relative efficacies of various treatments in relation to BHC are examined, it becomes evident that methyl parathion (5.47) and carbaryl (5.11) are comparable and much better than TPTA (4.46) and quinalphos (4.28), although statistically, the four chemicals are at par. Verma (1977) reported that TPTA at 0.05% a.i. could achieve sufficient level of pest control but in periods of epidemic by full grown larvae of *Ansacta moorei*, 0.1% a.i. concentration was desirable. The antifeedant TPTA alone, therefore, would be a second choice to the insecticides methyl parathion and carbaryl for the effective control of *Ansacta moorei*. Insecticides cause mortality of the pest and thus actually bring down the pest level, although damage to crop by larval feeding is not fully checked. Antifeedants, under field conditions, protect the treated crop by actual check of foliar damage by inhibiting the larval feeding but then these compounds render the untreated crop more liable to pest attack by larval distraction.

The results indicate that methyl parathion and carbaryl are effective insecticides and TPTA the effective antifeedant for routine crop protection. However, in periods of epidemic of *Ansacta moorei*, use of the antifeedant TPTA adjunct with the insecticides may be feasible to manage this pest as well as to check the severe foliar damage of the crops by the larvae.

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