EFFICACY OF BIOPESTICIDES AND CHLORANTRANILIPROLE AGAINST TOMATO FRUIT BORER *HELICOVERPA ARMIGERA* (HUBNER)

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ABSTRACT

Field trial was conducted at the Central Research Farm, during rabi, 2022-2023. The experiment was laid out in RBD (randomized block design). Eight treatments were evaluated against *Helicoverpa armigera* (Hubner). Insecticides with treatment T1 chlorantraniliprole 18.5%SC (1:10.) was the best. This was chlorantraniliprole 18.5%SC, ½ dose chlorantraniliprole + nisco sixer plus 2ml/ l (*O. sanctum* 13% + *A. nardus* 4%), spinosad 45%SC, nisco sixer plus 2ml/ l (*O. sanctum* 13% + *A. nardus* 4%) recorded the least fruit infestation. The highest yield was noticed in chlorantraniliprole 18.5%SC (240.5 q/ ha), followed by ½ dose chlorantraniliprole + nisco sixer plus 2ml/ l (*O. sanctum* 13% + *A. nardus* 4%).

Key words: Chlorantraniliprole, cost benefit ratio, *Helicoverpa armigera*, incidence, spinosad, tomato, treatments, spinosad, NSKE, azadirachtin, nisco sixer plus, Ocimum, fruit infestation

Tomato (*Lycopersicon esculentum* Mill.) is an important vegetable ranks second among vegetables in area and production and occupies an area of 1.20 million ha. with a production of 19.4 mt with yield of 16.1 mt hectare. Among the various insect pests, tomato fruit borer *Helicoverpa armigera* is highly destructive causing serious damage. It has been found to cause a yield loss of 35 to 37.79% (Biswas et al., 2019). This study evaluates some biopesticides alongwith insecticides against the pest.

MATERIALS AND METHODS

The experiment was conducted under field conditions at the Central Research Farm, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh during rabi 2022-2023. Randomized block design with three replications was followed with plots 2× 1 m size maintaining 30 cm borders as a bunds and treatments was assigned randomly. The observations on infestation of *H. armigera* was recorded visually from five randomly selected tagged plants. The insecticides were sprayed at recommended doses when infestation reached ETL threshold. On seventh and fourteenth days after spraying observations were made on the number of fruits. Descriptive statistics was calculated using MS-EXCEL. ICAR WASP Statistics software was used.

RESULTS AND DISCUSSION

The insecticides viz., T1 chlorantraniliprole 18.5%SC, T2 ½ dose chlorantraniliprole + nisco sixer plus, T3 Spinosad 45%SC, T4 nisco sixer plus 2ml/ l, T5 neem seed kernal extract, T6 azadirachtin 5%, T6 azadirachtin 5%, T7 *Beauvaria bassiana* were evaluated against tomato fruit borer *H. armigera*. The spray was carried out during peak period of fruit borer and the data was recorded one day before treatment (DBT) and then on 7th and 14th day after treatment (DAT). The data on the efficacy of the treatments given in Table 1 revealed significant reduction in incidence after 7 and 14 days after treatment (DAT). Among all the treatments minimum percent infestation of fruit borer was recorded in T1 chlorantraniliprole 18.5SC (8.57%) as compared to T0 untreated control (21.87%) similar to the findings reported by Jamir et al. (2022), Patil et al. (2018). Among all the treatments lowest number of fruit borer was recorded in chlorantraniliprole 18.5%SC. Second most effective treatment was recorded in T2 ½ dose chlorantraniliprole + nisco sixer plus 2ml/ l (9.604%) these results were similar to the findings reported by Lahlhluzuala and Kumar (2022). Third effective treatment was recorded in T3 Spinosad 45%SC (10.66%), which are similar with Harshita et al. (2018). Fourth effective treatment was recorded in T4 nisco sixer plus 2ml/ l (11.35%) these findings agree with those of Tejeswari et al., and Kumar (2021).

Higher yield (240.5 q/ ha) and higher cost: benefit ratio (1:10.4) was obtained from chlorantraniliprole 18.5%SC treated plots and lowest (110 q/ ha) in untreated control plot. These findings agree with
### Table 1. Infestation of *H. armigera* in tomato

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Treatments</th>
<th>Fruit infestation (5 plants) in %</th>
<th>Mean</th>
<th>Yield (q/ ha)</th>
<th>C:B ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>First spray</td>
<td>Second spray</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DBS</td>
<td>7DAS</td>
<td>14DAS</td>
<td>Mean</td>
</tr>
<tr>
<td>T1</td>
<td>Chlorantraniliprole 18.5% SC 1ml/ℓ</td>
<td>21.67</td>
<td>8.44</td>
<td>10.59</td>
<td>9.515</td>
</tr>
<tr>
<td>T2</td>
<td>½Dose chlorantraniliprole + Nisco sixer plus 2 ml/1 0.5 ml/ℓ + 2 ml/ℓ</td>
<td>19.48</td>
<td>9.06</td>
<td>11.37</td>
<td>10.216</td>
</tr>
<tr>
<td>T3</td>
<td>Spinosad 45% SC 0.4 ml/ℓ</td>
<td>18.69</td>
<td>10.25</td>
<td>12.05</td>
<td>11.15</td>
</tr>
<tr>
<td>T4</td>
<td>Nisco sixer plus 2 ml/ℓ</td>
<td>18.91</td>
<td>11.23</td>
<td>13.07</td>
<td>12.15</td>
</tr>
<tr>
<td>T5</td>
<td>Neem seed kernel extract 5% 50 ml/ℓ</td>
<td>18.31</td>
<td>15.00</td>
<td>13.86</td>
<td>14.33</td>
</tr>
<tr>
<td>T6</td>
<td>Azadirachtin 5% 5ml/ℓ</td>
<td>18.02</td>
<td>16.31</td>
<td>15.31</td>
<td>15.81</td>
</tr>
<tr>
<td>T7</td>
<td>Beauvaria bassiana 2 g/ℓ</td>
<td>20.36</td>
<td>17.66</td>
<td>16.17</td>
<td>16.92</td>
</tr>
</tbody>
</table>

**F-test**

NS

**S. Ed. (±)**

1.38 0.35 0.32 0.85 0.39 0.31 0.15 0.42 0.58

**C.D. (p=0.05)**

1.047 0.995 2.842 1.175 0.941 0.463 1.396 1.954


Mengistie G Y, Awlachew Z. T. 2022 Evaluation of the Plant Growth Promotion Effect of Bacillus Species on Different Varieties of Tomato (*Solanum lycopersicum* L.) Seedlings. Hindawi Advances in Agriculture, Article ID 17711477


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