Assessment of Bio-efficacy of Insecticides against Mites and Thrips Insect Pest of Chilli

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Authors’ contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

A field experiment was conducted during kharif 2018-19 in Samajik Vigyan Kendra, Dr. B.R. Ambedkar University, Bordi, Sehore (M.P.) – INDIA. To assess the bio-efficacy of insecticides against mites and thrips insect pest of chilli pests. The bio-efficacy of three different insecticides, namely (i) Chlorfenapyr 240 SC - spray four time with different-different doses, (ii) Fipronil 5% SC and (iii) Imidacloprid 17.8 SL. One untreated plot was also used to investigate against Mites and Thrips. Among these insecticides, Chlorfenapyr 240SC doses 288 g.a.i/ha (gram active ingredient per hectare) has reduced maximum mites and thrips population and it is most effective insecticides in chilli. The highest reduction of mites population recorded in treatment T4 (97.17%) followed by T5 chlorofenapyr (95.13%), T6 Imidacloprid (91.67%), T5 Fipronil 5% SC (85.35%), T2 chlorofenapyr (85.27%) and it was least in T1 chlorofenapyr (81.40%). Further, the thrips number was maximum reduced in treatment T4 chlorofenapyr (90.69%) followed by T5 chlorofenapyr (89.80%), T6 Fipronil 5% SC (89.51%), T5 Imidacloprid (74.18%), T2 chlorofenapyr (69.74%) and T1 chlorofenapyr (68.44 %). Hence, present study was clearly indicated that the treatment T4 chlorofenapyr 240SC@288 proved, the most effective insecticides. The cost benefit ratio was noted higher in Fipronil 5% SC@ 10 g.a.i ha⁻¹ (3.20) followed by imidacloprid 17.8 SL @ 50 g.a.i ha⁻¹ (2.99).

Keywords: Chilli; Polyphagotarsonemus latus; Scirtothrips dorsalis hood; hybrid; bio-efficacy.
1. INTRODUCTION

Chilli (Capsicum annum Linnaeus) has a place with the family Solanaceae is one of the imperative business vegetable, yield developed in all over India [1-5]. Being a harvest of tropical and sub-tropical area, it requires a warm damp atmosphere. It is a local of tropical America and West Indies and accepted to have been acquainted with India by the Portuguese amid seventeenth century [5-11]. Nutritionally, It is rich wellspring of Vitamin A, C, and E. It is a fundamental element of Indian curry, which is described by enticing shading and titillating sharpness. India is the world's greatest creator of Chilli and the collect is grown all through the country, has a region of 875 thousand ha with a production of 1591 thousand tones. India contributes about 38% to the complete world generation. In India Andhra is the biggest maker of chilli and contributes about 29% to the complete territory under chilli pursued by MH. (17%), KN. (13%), Orissa (11%), and Madhya Pradesh, chilli possesses a region of 57810 ha with a creation of 98730 MT of chilli (Anonymous, 2015). Insecticides application can substantially reduce yield losses caused by sucking pests. Bioefficacy of insecticides and some selected biorationals need to be studied for formulating effective and economical management strategies of insect pests [12,13].

2. MATERIALS AND METHODS

Investigation on field evaluation of many doses of insecticides against chilli insect pests infesting chilli was carried out in kharif period of 2018-19 at Samajik Vigyan Kendra DR. B.R. Ambedkar University, Bordi Sehere (M.P.). The experiment was laid out in a Randomized Block Design with three replication having the plot size of 198.45 m². For the purpose Chilli Hybrid F1 variety NHC-886 (Priya) was raised at 45 X 45 cm spacing. All the Recommended agronomical practices except plant protection were followed for raising the crop. First spray application of respective insecticides was given on the appearance of the pests and subsequently two sprays were given using manually operated knapsack sprayer having nozzle with slight moister stage. The observation on the population of mites and thrips were recorded by selecting five leaves of tagged plants. The sucking insect pest’s population was recorded before as well as1, 3, 5, 7 and 10 days after each spray. The yield of chilli natural products got from various treatment kg/ plot recorded aimed every picking the yield information acquired were changed over into per ha. Yield and exposed to factual investigation.

### Treatments details

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Treatment details</th>
<th>Dose/hac</th>
<th>Formulations</th>
<th>Water volume (lit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T1-Chlorfenapyr 240SC</td>
<td>144 a.i</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>2</td>
<td>T2-Chlorfenapyr 240SC</td>
<td>192 a.i</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
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<td>500</td>
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<tr>
<td>4</td>
<td>T4-Chlorfenapyr 240SC</td>
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<tr>
<td>5</td>
<td>T5-Fipronil 5% SC</td>
<td>10 a.i</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>6</td>
<td>T6-Imidacloprid 17.8SL</td>
<td>50 a.i</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>7</td>
<td>T7-Ununtreated control</td>
<td>- a.i</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

3. RESULTS AND DISCUSSION

Data in pre-treatment recorded on population of major sucking pests namely mites and thrips on chilli at different days after treatments are presented under different sub headings below.

3.1 Mites (Polyphagotarsonemus latus)

Day before initiation of spraying showed that there was uniform distribution of mites in the plots. The results revealed that all the treatments were significantly found superior over the control. The general decrease in mites population over, pre-treatment population of 1st application to the last calculation of 3rd spray (Table 1) was determined. It was uncovered that the most noteworthy decrease in population was recorded in T1-Chlorfenapyr (46.43%). After second spray the percent decrease in mite’s population from last perception of first spray over, pre-treatment checked determined. Mites uncovered that the most elevated decrease population was recorded, T4-chlorfenapyr (80.73%) trailed by T3-chlorfenapyr (70.32%). The least decrease in parasite’s population was seen in T1-chlorfenapyr (37.49%). After second spray the percent decrease in mite’s population from last perception of second spray over, pre-treatment check was determined. It was uncovered that the most noteworthy decrease in population was recorded in T4-chlorfenapyr which was trailed by T3-chlorfenapyr (63.86%), T5-Fipronil 5% SC 20 (59.65%), T2-chlorfenapyr (52.63%), T1-chlorfenapyr (51.68%), The least was seen in T6- Imidacloprid (46.63%). Third spray it was uncovered that most noteworthy decrease in population was recorded T4-55.39% which was trailed by T3-(55.01%), T6-(51.61%), T5-(44.54%), T2-(43.80%). The least decrease in parasite’s population was seen in T1-(38.51%). Overall we have noticed The outcome uncovered, that the most astounding decrease, in population was
### Table 1. Effect of treatments after three sprays against chilli Mites

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Dose g.a.i ha(^{-1})</th>
<th>1(^{st}) spray</th>
<th>2(^{nd}) spray</th>
<th>3(^{rd}) spray</th>
<th>Average population reduction</th>
<th>Overall population reduction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pretreatment 10 DAS</td>
<td>Population reduction (%)</td>
<td>Population reduction (%)</td>
<td>Population reduction (%)</td>
<td>Population reduction (%)</td>
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<tr>
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<td></td>
<td>Pretreatment 10 DAS</td>
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<tr>
<td>T1 Chlorfenapyr 240SC</td>
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<td>10.59 (3.32)</td>
<td>37.49</td>
<td>3.31 (1.93)</td>
<td>51.68</td>
<td>38.41</td>
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<tr>
<td>T2-Chlorfenapyr 240SC</td>
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<td>10.25 (3.28)</td>
<td>44.49</td>
<td>2.8 (1.79)</td>
<td>52.73</td>
<td>43.7</td>
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<td>T3-Chlorfenapyr 240SC</td>
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<td>9.27 (3.12)</td>
<td>70.22</td>
<td>1.25</td>
<td>63.86</td>
<td>55.01</td>
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<tr>
<td>T4-Chlorfenapyr 240SC</td>
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<td>13.01 (3.39)</td>
<td>80.63</td>
<td>0.95 (1.16)</td>
<td>66.36</td>
<td>55.59</td>
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<td>T5-Fipronil 5%SC</td>
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<td>9.49 (3.16)</td>
<td>57</td>
<td>1.75 (1.47)</td>
<td>59.65</td>
<td>44.54</td>
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<tr>
<td>T6-Imidacloprid 17.8SL</td>
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<td>10.17 (3.27)</td>
<td>52.8</td>
<td>2.9 (1.77)</td>
<td>46.73</td>
<td>51.61</td>
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<tr>
<td>T7-Utreated Control</td>
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<td>9.87 (3.19)</td>
<td>50</td>
<td>10.47 (3.29)</td>
<td>46.73</td>
<td>51.61</td>
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<td></td>
<td>9.48</td>
<td>8.31</td>
<td>5.12</td>
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</tbody>
</table>

Figures in parentheses are square root transformed values DAS- Days After Spraying

### Table 2. Effect of treatments after three sprays against chilli Thrips

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Dose g.a.i ha(^{-1})</th>
<th>1(^{st}) spray</th>
<th>2(^{nd}) spray</th>
<th>3(^{rd}) spray</th>
<th>Average population reduction</th>
<th>Overall population reduction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pretreatment 10 DAS</td>
<td>Population reduction (%)</td>
<td>Population reduction (%)</td>
<td>Population reduction (%)</td>
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<td>Pretreatment 10 DAS</td>
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<tr>
<td>T1 Chlorfenapyr 240SC</td>
<td>144</td>
<td>6.22 (2.58)</td>
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<td>2.28 (1.66)</td>
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<td>T2-Chlorfenapyr 240SC</td>
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<td>5.99 (2.54)</td>
<td>38.25</td>
<td>2.05 (1.58)</td>
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<td>T3-Chlorfenapyr 240SC</td>
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<td>1.08 (1.23)</td>
<td>52.1</td>
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<td>T4-Chlorfenapyr 240SC</td>
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<td>6.10 (2.56)</td>
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<td>6.20 (2.58)</td>
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<td>56.92</td>
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<td>T7-Utreated Control</td>
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<td>0.09</td>
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<td>12.01</td>
<td>9.21</td>
<td>6.26</td>
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</tbody>
</table>

Figures in parentheses are square root transformed values DAS- Days After Spraying
seen in treatment T4-97.17% trailed by T3-
95.13%, T6-Imidacloprid-91.67%, T5-Fipronil 5%
SC-85.35%, T2-chlorfenapyr -85.27% and least
level of decrease in mites, population was noticed
in T1-81.40%.

3.2 Thrips (Scirtothrips dorsalis Hood)

The population of thrips ranged at a day
before spray indicating uniform distribution
and it differ non significantly among the
different treatments. The outcome further
demonstrated that general decrease in thrips,
population after three uses of treatments over,
pre treatment population of 1st application to the
last calculation of 3rd spray was determined
(Table 2). The thrips population was recorded in
the range of 5.9 to 6.2 in pre treatment observation. Population decrease in percent was
determined after last perception of 1st spray over
pre-treatment check. It was uncovered that the
most astounding decrease in population was recorded in T3-chlorofenapyr-55.00% trailed by
T4-chlorfenapyr-54.88%, T6-Imidacloprid-
41.60%, T1-chlorfenapyr 39.15%, T2-
chlorfenapyr -36.10%. The least decrease in
thrips population was seen in T5-36.10%. second
spray It was seen that the most astounding
decrease in thrips population was seen in treatment T5 (65.12%) trailed by T4-chlorfenapyr
57.30%, T6-Imidacloprid 56.92%, T3-chlorfenapyr
52.10%, T2-chlorfenapyr 45.90% and T1-
chlorfenapyr 40.50%. after third spray The
population decrease was recorded in most,
elevated T3-53.58% trailed by T5-52.81%, T4-
50.23, T1-46.96% and T2-10.10. The least
decrease was noted in T6-5.98%.The outcome
uncovered that the most elevated decrease in
population was seen in treatment T4-
chlorfenapyr (90.69%), trailed by T3-
chlorfenapyr (89.80%), T5- Fipronil 5% SC (89.94%) T6- Imidacloprid (74.18%) T2-
chlorfenapyr (69.90%) and T1-chlorfenapyr (68.68%)

4. CONCLUSIONS

The largest reduction in mites population was
recorded in tr. T4- chlorofenapyr 240SC@ 288
(91.91%) followed by T3- chlorofenapyr 240SC
(88.21%), T5- Fipronil 5% SC (87.48%) and
other treatments. The highest note down
reduction in thrips number was recorded in the
treatment T4- chlorofenapyr 240SC@ 288 g.a.i.
(90.17%) followed by T3- chlorofenapyr 240SC
(95.13%), T5- Fipronil 5% SC (91.67%) and rest of
the treatments.

COMPETING INTERESTS

Authors have declared that no competing
interests exist.

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