EFFICACY OF NEWER INSECTICIDES AGAINST WHITEFLY 
(Bemisia tabaci Genn.) INFESTING OKRA UNDER FIELD 
CONDITIONS

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Abstract: The experiment was conducted to evaluate the efficacy of eight insecticides against whitefly in 
okra. Two sprays of different insecticides viz., T1 Thiocloprid 10SC @ 0.3 ml/L, T2 Acetamiprid 20SP @ 
0.5 ml/L, T3 Spinosad 45SC @ 0.2 ml/L T4 Imidacloprid 17.8SL @ 0.3 ml/L, T5 Thiamethoxam 25WG @ 
0.1 g/L, T6 Novaluron 10EC @ 1 ml/L, T7 Cartap hydrachloride @ 1.2 g/L and T8 control. Spray was 
made at 15 days interval. This study revealed that amongst the treatments tested, the cumulative effect of 
foliar spray of Thiamethoxam 25 WG and imidacloprid 17.8SL were found best effective treatment and they 
were at par with each other. Followed by the thiocloprid 10SC and acetamiprid 20SP. The rest of the 
treatments were also found statistically superior over control.

Keywords: Efficacy, Insecticides, Okra and whitefly.

Introduction: Okra (Abelmoschus esculentus L. 
Monech), commonly known as “Bhendi”, is 
cultivated throughout India. Okra provides an 
important source of vitamins, calcium, potassium 
and other minerals, which are often lacking in the 
diet of developing and under developed 
countries. Besides various other factors for lower 
productivity, heavy damage is inflicted by major 
insect pests viz., leafhopper, Amrasca biguttula 
biguttula (Ishida), whitefly, Bemisia tabaci 
(Gennadius) and shoot and fruit borer, Earias 
vittella (Fabricius) Among these, whitefly, 
Bemisia tabaci (Gennadius) is a serious pest, 
known to be the vector of vein clearing disease 
[1]. The cultivation of okra in India received a 
setback due to yellow vein mosaic virus 
(YVMV) and enation leaf curl virus (ELCV), 
spread by the vector whitefly. The loss in 
marketable yield has been estimated at 50-94%, 
depending up on the stage of crop growth at 
which the infection occurs. Failure to control 
these pests in the initial stage causes a yield loss 
upto 54.04 per cent [2].

On the other hand it is established that 
use of chemicals form an important part of pest 
management strategies. There are many 
upcoming newer molecules having different 
mode of action and also being comparatively safe 
to non-target organisms and environment which 
are equally effective against the pests. Thus in 
the present investigation an attempt has been 
made to evaluate the efficacy of some newer 
insecticides against whitefly in Okra.

Materials and Methods

The present investigation was conducted at the experimental field of BHU Varanasi in the 
kharif season. The experiment was laid out in 
randomized block design with eight treatments 
replicated three time. Okra variety ‘Kashi 
Pragati’ was raised at a spacing of 60 cm × 45 
cm in plots of size 4 x 3 m. Recommended 
agronomical practices except plant protection 
were followed for raising the crop. Two sprays 
were given at fortnightly interval. The treatments 
included T1 Thiocloprid 10SC @ 0.3 ml/L, T2 
Acetamiprid 20SP @ 0.5 ml/L, T3 Spinosad 
45SC @ 0.2 ml/L T4 Imidacloprid 17.8SL @ 0.3 
ml/L, T5 Thiamethoxam 25WG @ 0.1 g/L, T6 
Novaluron 10EC @ 1 ml/L, T7 Cartap hydrachloride @ 1.2 g/L and T8 Untreated 
check. The observations pertaining to population 
of whitefly was made on three leaves, each 
selected randomly on 10 plants from top, middle 
and bottom canopy. The population was recorded
before as well as 1, 5, 10 and 15 days after each treatment. Observations on whitefly adults were recorded without disturbing the plants to minimize the observational errors. The insect population was counted from three leaves of every randomly selected plant in every plot and population per 10 plants was noted. After that mean of three replications was calculated for each treatment. And the same was done with the untreated plot. Then percentage reduction was calculated by using the following formula.

$$\text{Percent reduction} = \frac{\text{Population in control} - \text{Population in treatment}}{\text{Population in control}} \times 100$$

The data obtained on the pest was subjected to statistical analysis after suitable transformations as per statistical guidelines given [3].

**Results and Discussion**

**First Spray:** The population recorded one day before first application revealed that there is no significant variation among different treatments including untreated check. The population of whiteflies ranged between 57.67 and 62.33 per ten plants. Significant reduction in whitefly population was noticed 1, 5, 10 and 15 days after application of insecticides compared to untreated control (table 1).

**Table 1. Efficacy of treatments against whitefly after first spray**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Dose</th>
<th>Percentage reduction of population over control</th>
<th>Mean efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1DAT</td>
<td>5DAT</td>
</tr>
<tr>
<td>T1 Thiacloprid 10SC</td>
<td>0.3 ml/L</td>
<td>57.67</td>
<td>51.32</td>
</tr>
<tr>
<td>T2 Acetamiprid 20SP</td>
<td>0.5 ml/L</td>
<td>58.33</td>
<td>47.18</td>
</tr>
<tr>
<td>T3 Spinosad 45SC</td>
<td>0.2 ml/L</td>
<td>61.76</td>
<td>9.83</td>
</tr>
<tr>
<td>T4 Imidacloprid 17.8SL</td>
<td>0.3 ml/L</td>
<td>58.00</td>
<td>66.81</td>
</tr>
<tr>
<td>T5 Thiamethoxam 25WG</td>
<td>0.1 g/L</td>
<td>62.33</td>
<td>66.32</td>
</tr>
<tr>
<td>T6 Novaluron 10EC</td>
<td>1 ml/L</td>
<td>59.33</td>
<td>8.43</td>
</tr>
<tr>
<td>T7 Cartap hydrochloride 50 SP</td>
<td>1.2 g/L</td>
<td>57.67</td>
<td>39.99</td>
</tr>
<tr>
<td>T8 Untreated check</td>
<td>59.67</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

The overall efficacy after first spraying against whitefly revealed that thiamethoxam (77.66%) and imidacloprid (77.44%) being at par were the best and the most effective treatments and significantly superior over all other treatments by recording highest per cent reduction of whitefly population over control. These were followed by thiacloprid with 66.43 per cent reduction of whitefly population over control. The next best treatments were acetamiprid (63.62%) and cartap hydrochloride (58.26%) and were significantly superior over control. Followed novaluron with 97.00 per cent and spinosad was the least effective treatment with 7.03 per cent reduction of population. However all the treatments were significantly superior over the untreated control in reducing the whitefly population on okra.

**Second Spray:** The same trend of effectiveness of insecticides was observed during second spray. The mean efficacy of the four observations at one, five, ten and fifteen days after spraying showed that thiamethoxam (74.36%) and imidacloprid (72.04%) were best and most effective treatments and significantly superior over all the other treatments by recording highest per cent reduction of population of whitefly over untreated control. The next best treatment was thiacloprid with 61.48 per cent population reduction and was significantly superior to the remaining treatments. The treatments that followed closely were acetamiprid and cartap hydrochloride, significantly superior over control by recording, 59.50 and 54.76 per cent reduction, respectively, followed by novaluron (8.94%) and spinosad (6.03%) was the least effective amongst all the treatments. However they are significantly superior over control in reducing the whitefly population on okra (table 2).

**Table 2. Efficacy of treatments against whitefly after second spray**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Dose</th>
<th>Percentage reduction of population over control</th>
<th>Mean efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1DAT</td>
<td>5DAT</td>
</tr>
<tr>
<td>T1 Thiacloprid 10SC</td>
<td>0.3 ml/L</td>
<td>52.67</td>
<td>49.28</td>
</tr>
<tr>
<td>T2 Acetamiprid 20SP</td>
<td>0.5 ml/L</td>
<td>53.33</td>
<td>45.49</td>
</tr>
<tr>
<td>T3 Spinosad 45SC</td>
<td>0.2 ml/L</td>
<td>53.33</td>
<td>7.67</td>
</tr>
<tr>
<td>T4 Imidacloprid 17.8SL</td>
<td>0.3 ml/L</td>
<td>54.33</td>
<td>61.27</td>
</tr>
<tr>
<td>T5 Thiamethoxam 0.1 g/L</td>
<td>51.00</td>
<td>62.74</td>
<td>(52.38)</td>
</tr>
</tbody>
</table>
### Table

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Concentration</th>
<th>Average Yield (g)</th>
<th>Lower Limits</th>
<th>Upper Limits</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>25WG</td>
<td>1 ml/L</td>
<td>52.33 ± 16.26</td>
<td>7.22 ± 15.58</td>
<td>9.29 ± 17.74</td>
<td>11.44 ± 19.76</td>
</tr>
<tr>
<td>T6 Novaluron 10EC</td>
<td>52.33</td>
<td>11.44 ± 19.76</td>
<td>9.29 ± 17.74</td>
<td>7.22 ± 15.58</td>
<td>5.00 ± 7.84</td>
</tr>
<tr>
<td>T7 Cartap hydrochloride 50 SP</td>
<td>51.00</td>
<td>11.44 ± 19.76</td>
<td>9.29 ± 17.74</td>
<td>7.22 ± 15.58</td>
<td>5.00 ± 7.84</td>
</tr>
<tr>
<td>T8 Untreated check NS</td>
<td>0.00</td>
<td>0.00 ± 0.00</td>
<td>0.00 ± 0.00</td>
<td>0.00 ± 0.00</td>
<td>0.00 ± 0.00</td>
</tr>
</tbody>
</table>

Values in parentheses are angular transformed values. Sig.: Significant NS: Non Significant DAT: Days after Treatment

### Discussion

The present findings are in confirmation with the findings [4] who reported that Thiamethoxam 5 SG @ 0.2 g/l was effective on whiteflies compared to untreated control. Similar results were reported [5] who reported the effectiveness of Thiamethoxam 25 WG. The effectiveness of imidacloprid is in line with the findings [6] also reported that imidacloprid @ 0.0053% was found effective against whitefly B. tabaci in okra. Moreover, imidacloprid 200 SL @ 100 g a.i./ha had increased yield of okra upto 42% by controlling whitefly [7]. Also reported that spray of imidacloprid @ 0.004 % starting from 20 day after emergence on okra recorded least cumulative average population of whiteflies i. e., 1.13 per leaf [8].

### References