EVALUATION OF INSECTICIDES AGAINST LEAF HOPPER
EMPOASCA KERRI PRUTHI IN GREEN GRAM

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ABSTRACT

The efficacy of foliar application of imidacloprid 17.8%SL (0.33 ml/ l), acetamiprid 20%SP (0.4 g/ l),
thiamethoxam 25%WG (0.5 g/ l), quinalphos 25%EC (2.0 ml/ l), neem oil 2% (20 ml/ l) and karanj
oil 2% (20 ml/ l) were evaluated against leafhopper Empoasca kerri Pruthi in green gram. The most
effective insecticides were imidacloprid > thiamethoxam > acetamiprid, with maximum reduction in
incidence after seven days of application of second spray being 82.82 and 75.05% due to imidacloprid
and thiamethoxam, respectively.

Key words: Green gram, Empoasca kerri, imidacloprid, thiamethoxam, acetamiprid, sprays, counts/ 10 plants,
reduction in incidence, yield

India is the largest pulse crop cultivating country,
and green gram occupies the fourth place with 481 kg
ha⁻¹ as productivity. In India, Rajasthan state is having
maximum area and production of green gram followed
by Maharashtra (Anonymous, 2016-17). Among the sap
feeding insects of green gram the more common are the
leafhopper Empoasca kerri Pruthi; and bean aphid Aphis
craccivora Koch which cause damage to the foliage
and pods (Swaminathan et al., 2007). Suganya et al.
(2007) reported that acetamiprid 20SP at 20 g a.i. ha⁻¹
was highly effective against leafhoppers in cotton and
did not show any phytotoxic symptoms even at higher
doses. Raghuraman et al. (2008) found that acetamiprid
20%SP at three doses i.e. 20, 40 and 80 g a.i./ha
was effective against leafhoppers and whiteflies in cotton.
It is important to avoid the incidence of leafhoppers
to obtain higher seed yield (Mahalakshmi et al., 2015).
Insecticide application timing is the most important
basic requirement for effective control of insect pests
in green gram (Khaliq et al., 2017). The present study
evaluated some insecticides against leafhoppers in
green gram.

MATERIALS AND METHODS

The field experiments on the evaluation of field
efficacy of insecticides were conducted at the
Experimental Farm of Agricultural Research Station,
Navgaon, Alwar (Rajasthan) in three consecutive
seasons, i.e. during kharif 2015, 2016 and 2017. The
variety RMG 344 was used and the seeds sown in plots
of size 12 m² at 30 x 10 cm spacing. The crop was sown
at the onset of monsoon in the first fortnight of July
and harvested at maturity during September. A total
of six insecticide treatments were evaluated including
untreated control and each treatment was replicated
thrice. The insecticides i.e. acetamiprid 20%SP (0.4
g/ l), imidacloprid 17.8%SL (0.33 ml/ l), quinalphos
25%EC (2.0 ml/ l), thiamethoxam 25%WG (0.5 g/ l),
neem oil 2% (20 ml/ l) and karanj oil 2% (20 ml/ l)  were
evaluated. The conventional insecticides quinalphos
25%EC was used as the standard check. One spray was
given at 30 days after sowing (DAS) followed by second
at 45 DAS with water volume of 500 l/ ha.

The leafhopper counts were recorded on one day
before 1st spraying and considered as pretreatment
counts for first spraying. The post-treatment counts
were recorded from ten randomly selected plants/ plot
after one, three, seven and fourteen days of each spray.
Fourteenth day counts formed the pretreatment counts
for the second spray. The leafhoppers were counted from
three trifoliate leaves each one from top, middle and
bottom canopies (Fleming and Retnakaran, 1985). The
mean population/ 10 plants was estimated from these
and after transformation were subjected to statistical
analysis, with % reduction analyzed using a formula
given by Henderson and Tilton (1955). The data were
### Table 1. Efficacy of insecticides against *E. kerri* in green gram (2015-17)

<table>
<thead>
<tr>
<th>S. No</th>
<th>Treatments and dose (g/ml)</th>
<th>Pretreatment counts</th>
<th>Mean reduction (%) in counts days after First spray</th>
<th>Second spray</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 DAS</td>
<td>3 DAS</td>
<td>7 DAS</td>
</tr>
<tr>
<td>1</td>
<td>Acetamiprid 20 %SP (0.4g/l)</td>
<td>27.66</td>
<td>38.56</td>
<td>47.67</td>
</tr>
<tr>
<td></td>
<td>Neem oil 2% (20.0 ml/l)</td>
<td>30.00</td>
<td>26.07</td>
<td>34.41</td>
</tr>
<tr>
<td></td>
<td>Thiamethoxam 25 % WG (0.5 g/l)</td>
<td>28.00</td>
<td>44.01</td>
<td>54.91</td>
</tr>
<tr>
<td></td>
<td>Imidacloprid 17.8 % SL (0.33ml/l)</td>
<td>29.00</td>
<td>52.62</td>
<td>62.83</td>
</tr>
<tr>
<td></td>
<td>Quinalphos 2 % EC (2.0 ml/l)</td>
<td>29.66</td>
<td>35.01</td>
<td>42.90</td>
</tr>
<tr>
<td></td>
<td>Karanj oil 2 % (20.0 ml/l)</td>
<td>29.66</td>
<td>19.68</td>
<td>27.51</td>
</tr>
<tr>
<td>7</td>
<td>Untreated control</td>
<td>31.00</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**SEMs±**

**CD (p=0.05) 2015**

1. Acetamiprid 20 %SP (0.4g/l) 38.67 41.73 48.48 58.51 40.27 51.29 52.84 62.92 47.05
2. Neem oil 2% (20.0 ml/l) 41.00 32.01 38.16 42.77 25.36 42.00 42.03 45.03 28.88
3. Thiamethoxam 25 % WG (0.5 g/l) 39.00 45.70 53.88 63.60 45.39 54.84 58.26 68.51 52.80
4. Imidacloprid 17.8 %SL (0.33ml/l) 39.00 54.60 50.81 62.13 50.15 53.01 53.03 59.02 50.79
5. Quinalphos 2 %EC (2.0 ml/l) 40.67 38.81 44.71 51.38 34.32 48.34 48.71 54.65 39.38
6. Karanj oil 2% (20.0 ml/l) 40.67 27.29 32.95 37.75 20.31 37.71 37.56 39.53 23.11
7. Untreated control 42.00 - - - - - - - - -

**SEMs±**

**CD (p=0.05) 2016**

1. Acetamiprid 20 %SP (0.4g/l) 30.67 38.63 44.91 59.12 35.57 48.54 50.35 66.37 42.76
2. Neem oil 2% (20.0 ml/l) 33.00 27.38 32.50 40.59 18.07 37.44 37.22 43.72 20.11
3. Thiamethoxam 25 %WG (0.5 g/l) 31.00 43.59 51.70 66.41 41.87 52.96 57.18 73.41 50.19
4. Imidacloprid 17.8 %SL (0.33ml/l) 32.00 51.26 59.17 76.99 50.03 60.17 64.59 79.62 59.38
5. Quinalphos 2 %EC (2.0 ml/l) 32.67 35.43 40.50 51.16 28.77 45.14 45.44 55.77 33.33
6. Karanj oil 2% (20.0 ml/l) 32.67 21.63 26.02 34.37 11.90 32.12 31.66 36.85 12.87
7. Untreated control 34.00 - - - - - - - - -

**SEMs±**

**CD (p=0.05) 2017**

2.649 1.336 3.334

PTP: Pre treatment population; Transformed (arc sine) values in parenthesis; DAS- Days after spraying
analyzed statistically by ANOVA after converting it to suitable transformed values.

RESULTS AND DISCUSSION

The field experiments led to the conclusion that imidacloprid 17.8%SL (0.33 ml/l) is the most effective at 7 days of II spray and reduced the counts of *E. kerri* by 82.82, 73.55 and 79.62% during 2015, 2016 and 2017, respectively. Similarly, thiamethoxam 25%WG (0.5 g/l) (0.5 g/l) was also found effective. Karanj oil 2% was found to be the least effective (Table 1). These results are in conformity with findings of earlier workers-Chaudhary et al. (2018) found imidacloprid 17.8SL @ 0.005% as the most effective followed by acetamiprid 20SP @0.004% and dimethoate 30EC @0.03%. Sutaria et al. (2010) concluded that imidacloprid 0.01%, thiamethoxam 0.05% and acetamiprid 0.04% were the most effective against leaffoppers in soybean. The effectiveness of imidacloprid (0.005%) and thiamethoxam (0.025%) against leaffopper had been reported by Afzal et al. (2002), Ganapathy and Karuppiah (2004) and Singh et al. (2014). Parmar et al. (2015) obtained significant results with acetamiprid, imidacloprid, thiamethoxam, fipronil, thiocarb and spinosad. Panduranga et al. (2010) observed that avoidable yield loss was maximum with acetamiprid 20SP @ 0.2 g/l at 25 DAS. The imidacloprid 17.8% SL is effective due to its systemic translaminar action. From the present study it can be concluded that imidacloprid 17.8% SL (0.33 ml/l) is the most effective followed by thiamethoxam 25%WG (0.5 g/l) against leaffopper in green gram

REFERENCES


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