Comparative efficacy of selected botanicals and chloropyriphos against gram pod borer

**Helicoverpa Armigera (Hubner)** on chickpea

**Cicer arietinum (L.)**

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**Abstract**

The present investigation was conducted during November, 2016 to April, 2017 at Agricultural research farm, SHUATS, Allahabad. The studies on infestation of gram pod borer, at third, seventh and fourteenth day after spraying revealed that the treatments chloropyriphos 20% EC, NSKE and neem oil were found superior over all the treatments after first and second spray respectively. Minimum percent of pod infestation was observed in chloropyriphos 20% EC with 2.39%, infestation followed by NSKE with 2.94%, Neem oil with 3.36%, neem leaf extract with 3.58%, Garlic extract with 3.90%, Pongamia oil with 4.45% and Papaya leaf extract with 4.61% pod infestation respectively.

**Keywords:** Botanicals, Chickpea, Chloropyriphos, Efficacy, *Helicoverpa armigera*.

1. Introduction

Gram commonly known as a ‘chickpea’ or Chana is a very important pulse crop that grows as a seed of a plant named *Cicer arietinum* in the Leguminosae family. It is one of the first cultivated crops and originated in south eastern Turkey (Ackcin, 1988) [1]. According to the Food and Agriculture Organization (FAO) statistics, cultivated chickpea is in the first rank, with about 10,671,503 ha cultivated, among cool season food legumes in the world and Turkey as well.

It is an important and favourable pulse of many people of India. India is the largest chickpea producer as well as consumer in the world. Chickpea production has increased during the past 30 years from 6.5 million tones’ (1978-1980 average) to 9.6 million tons (2007-09) because of increase in grain yields yield from 630 to 850 kg/ha during this period. Four states viz., Madhya Pradesh, Uttar Pradesh, Maharashtra and Rajasthan together contribute about 87 per cent of production from 65 per cent area. In India, the area under chickpea was 7.58 million hectares with a production of 7.91 million tons and productivity of 780 kg/ha during rabi 2007-08 (Singh et al., 2008) [2].

Chickpea also known as gram is attacked by eleven species of insect pests, i.e. gram pod borer, thrips, jassids, aphids, cutworm, leaf miner etc.. The chickpea has relatively few insect pests but gram pod borer, *Helicoverpa armigera* is the major pest and has great economic importance. Cause considerable loss to chickpea production. (Ahmed and Awan, 2013) [3].

*Helicoverpa armigera* appear in great number during vegetative growth and at pod formation stage of chickpea. But the losses reached at its peak when the pods appeared i.e. a single larva may destroy several pods before reaching to maturity and this pest is reported to damage 5 to 40 per cent pods of chickpea crop. The few studies also found that seed yield losses due to *H. armigera* were 75-90% and in some places the losses were up to 100%. These losses can be reduced by the application of insecticides (Balasubramanian et al., 2001) [4].

**Materials and Method**

The trial was conducted in Rabi season during November 2016 the central research field, SHUATS, Allahabad (U.P.). Trial was laid out in a randomized block design consisting of seven different treatments. Each treatment was replicated thrice and chickpea Pusa-362 was used for study. After observing a sufficient level of insect population, application of treatments for the management of the stem borer was undertaken. The data were subjected to statistical analysis. The yield per plot was also recorded.

**Results and Discussion**

The data on the percent infestation of pod borer on third day after spray revealed that all the
treatments were significantly superior over control. Among all the treatments lowest percent infestation of gram pod borer was recorded in chloropyriphos (2.9%) and it was the most effective treatment, followed by which statistically significant to remaining treatments like NSKE (3.9%), Neem oil (4.1%), Neem leaf extract (4.3%), Garlic extract (4.3%), Pongamia oil (4.6%) and papaya leaf extract (4.7%).

The data on the percent infestation of pod borer on seven days after spray revealed that all the treatments were significantly superior over control. Among all the treatments lowest percent infestation of gram pod borer was recorded in chloropyriphos (2.47%) and it was the most effective treatment, followed by which statistically significant to remaining treatments like NSKE (3.28%), Neem leaf extract (3.37%), Nee oil (3.66%), Garlic extract (3.80%), Papaya leaf extract (3.82%) and Pongamia oil (3.92%).

The data on the percent infestation of pod borer on 14 days after spray revealed that all the treatments were significantly superior over control. Among all the treatments lowest percent infestation of gram pod borer was recorded in chloropyriphos (3.41%) and it was the most effective treatment, followed by which statistically significant to remaining treatments like NSKE (3.45%), Neem oil (4.29%), Garlic extract (4.17%), Neem leaf extract (4.89) and Pongamia oil (5.11%), Papaya leaf extract (5.29%).

The Mean data on the percent infestation of pod borer on 3, 7 & 14 days after spray revealed that all the treatments were significantly superior over control. Among all the treatments lowest percent infestation of gram pod borer was recorded in chloropyriphos (2.94%) and it was the most effective treatment, followed by which statistically significant to remaining treatments like NSKE (3.54%), Nee oil (4.02%), Garlic extract (4.12%), Neem leaf extract (4.91) and Pongamia oil (4.56%), Papaya leaf extract (4.61%).

The data on the percent infestation of pod borer on second spray 3 days after spray revealed that all the treatments were significantly superior over control. Among all the treatments lowest percent infestation of gram pod borer was recorded in chloropyriphos (2.27%) and it was the most effective treatment, followed by which statistically significant to remaining treatments like NSKE (2.80%), Neem oil (3.21%), Neem leaf extract (3.31) and Garlic extract (4.10%) Pongamia oil (4.24%). Papaya leaf extract (4.60%).

The data on the percent infestation of pod borer on 7 days after spray revealed that all treatments were significantly superior over control. Among all the treatments lowest percent infestation of gram pod borer was recorded in chloropyriphos (1.81%) and it was the most effective treatment, followed by which statistically significant to remaining treatments like NSKE (2.45%), Neem leaf extract (2.82) Nee oil (2.98%) and Garlic extract (3.16%) Pongamia oil (4.12%), Papaya leaf extract (4.46%).

The data on the percent infestation of pod borer on 14 days after spray revealed that all the treatments were significantly superior over control. Among all the treatments lowest percent infestation of gram pod borer was recorded in chloropyriphos (1.44%) and it was the most effective treatment, followed by which statistically significant to remaining treatments like NSKE (1.79%), Neem oil (1.91%) Neem leaf extract (2.75) and Garlic extract (3.36%), Pongamia oil (4.63%), Papaya leaf extract (4.75%).

The data on the percent infestation of pod borer on 3,7&14 days after spray revealed that all the treatments were significantly superior over control. Among all the treatments lowest percent infestation of gram pod borer was recorded in chloropyriphos (1.84%) and it was the most effective treatment, followed by which statistically significant to remaining treatments like NSKE (2.35%), Neem oil (2.7%), Neem leaf extract (2.96%) and Garlic extract (3.69%) Pongamia oil (4.33%), Papaya leaf extract (4.60%).

The Overall mean data on the percent infestation of pod borer on 1st & 2nd spray revealed that all the treatments were significantly superior over control. Among all the treatments lowest percent infestation of gram pod borer was recorded in chloropyriphos (2.39%) and it was the most effective treatment, followed by which statistically significant to remaining treatments like NSKE (2.94%), Neem oil (3.36%) Neem leaf extract (3.58%) and Garlic extract (3.90%), Pongamia oil (4.45%) and Papaya leaf extract (4.61%).

### Efficacy of Certain botanicals against Gram Pod Borer (Helicoverpa armigera Hubner) on Chickpea (Cicer arietinum L.)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Treatments</th>
<th>Dosage</th>
<th>First spray % Infestation</th>
<th>Second spray % Infestation</th>
<th>Overall mean % Infestation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 DBS</td>
<td>3 DAS</td>
<td>7 DAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>T1</td>
<td>Neem leaf extract</td>
<td>50 ml/lit</td>
<td>4.54  (14.41)</td>
<td>4.32  (11.99)</td>
<td>3.37  (10.58)</td>
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<tr>
<td>T2</td>
<td>NSKE</td>
<td>50 ml/lit</td>
<td>5.86  (14.00)</td>
<td>3.90  (11.38)</td>
<td>3.28  (10.43)</td>
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<tr>
<td>T3</td>
<td>Chloropyriphos</td>
<td>2.5 ml/lit</td>
<td>5.94  (14.10)</td>
<td>2.94  (9.97)</td>
<td>2.47  (9.04)</td>
</tr>
<tr>
<td>T4</td>
<td>Pongamia oil</td>
<td>30 ml/lit</td>
<td>6.41  (16.66)</td>
<td>4.65  (12.84)</td>
<td>3.92  (11.42)</td>
</tr>
<tr>
<td>T5</td>
<td>Garlic extract</td>
<td>30 ml/lit</td>
<td>6.37  (14.61)</td>
<td>4.38  (12.08)</td>
<td>3.80  (11.23)</td>
</tr>
<tr>
<td>T6</td>
<td>Papaya leaf extract</td>
<td>50 ml/lit</td>
<td>6.30  (14.53)</td>
<td>4.72  (12.55)</td>
<td>3.82  (11.27)</td>
</tr>
<tr>
<td>T7</td>
<td>Neem oil</td>
<td>30 ml/lit</td>
<td>6.75  (15.10)</td>
<td>4.11  (11.69)</td>
<td>3.66  (11.03)</td>
</tr>
<tr>
<td>T8</td>
<td>Untreated</td>
<td>-</td>
<td>6.33  (14.57)</td>
<td>7.38  (15.76)</td>
<td>7.90  (16.31)</td>
</tr>
<tr>
<td>F-test</td>
<td>NS</td>
<td>-</td>
<td>0.94  0.94</td>
<td>0.04  0.04</td>
<td>0.04  0.04</td>
</tr>
<tr>
<td>S. Ed.</td>
<td>S</td>
<td>-</td>
<td>2.84  2.84</td>
<td>0.13  0.13</td>
<td>0.13  0.13</td>
</tr>
</tbody>
</table>

Figures in parenthesis are arc sin transformed values.
Acknowledgement
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