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# Integrated management of gram pod borer (*Helicoverpa armigera*) of chickpea in rain fed areas of Chhattisgarh

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**Abstract**
Field study was conducted to determine the insecticides and biopesticides were applied as foliar spray to manage the infestation of gram pod borer of chick pea. The insecticides were applied when there was appearance of gram pod borer, average population from 0.1-1.1 per plant. Estimation of losses in yield due to infestation by gram pod borer of chick pea in Kabirdham district. The efficacy of insecticides, Biopesticides and Bird perchar on mean caterpillar population differed considerably. The mean number of gram pod borer before spray varied from 0.1-1.1 per plant but when the treatments were applied there was drastic reduction in overall mean population of gram pod bore. The gram pod borer overall mean population was considerably less in replication RI, overall mean population 0.18 per plant which was treated in Endosulphan. RII, overall mean population 0.17 per plant which was treated in Chlorpyriphos + Cypermethrin (Super D). RIII, overall mean population 0.13 per plant which was treated in Endosulphan. However, the gram pod borer overall mean population was maximum in RI, 0.33 per plant which was NPV treated as compared to 0.38 per plant mean population of gram pod borer in control. RII, 0.28 per plant which was Azadirachtin (Neemplex) and Bird perchar treated as compared to 0.31 per plant mean population of gram pod borer in control. RIII, 0.36 per plant which was Bird preacher treated as compared to 0.41 per plant mean population of gram pod borer in control. The Overall mean population of gram pod borer in RI, RII and RIII, was minimum 0.17 per plant Endosulphan treated as compared to 0.37 per plant overall mean population of gram pod borer in control. The effect of insecticide/ bio insecticides and bird preacher on mean yield in qt. /ha is also varied greatly. The mean yield in qt. /ha was maximum 5qt./ha which was Quinalphos treated while minimum was 4.33qt./ha which was Endosulphan treated as compared to 3.78qt./ha yield in control.

**Keywords:** chickpea, gram pod borer, *Helicoverpa armigera*, insecticides

## Introduction
In Chhattisgarh chickpea is generally grown under rain fed or residual soil moisture conditions in rabi season after harvest of rice during October-March. Among the major pulses grown, chickpea ranks first in area and production. The area of chickpea in kabirdham district is reducing due to some Biotic and abiotic factors. The chickpea has relatively few insect pests but gram pod borer, *Helicoverpa armigera* (Hubner) is the major pest (Lal *et al*. 1985, Naresh and Malik 1986) [4, 7]. Environmental conditions during the late vegetative and reproductive period for chickpea (February to mid-March) are particularly conducive to pod borer development. The pod borers inflicted heavy crop losses from seedling to maturity, but the losses reached at its peak when the pods appeared (Mehto and Singh 1983). Lal (1996) [6] reported that the seed yield losses due to *H. armigera* were 75-90% and in some places the losses were up to 100%. The yield loss in chickpea due to pod borer was reported as 10 to 60 per cent in normal weather conditions, while it was 50 to 100 per cent in favorable weather conditions, particularly in the state where frequent rain and cloudy weather is prevailing during the crop season (Patel 1979) [8].These losses can be reduced by the application of insecticides (Sinha *et al*. 1983, Singh *et al*. 1987, Rakesh *et al*. 1996, Balasubramanian *et al*. 2001) [10]. Chemical insecticides are generally used in pod borer control due to their effectiveness and easy availability. Recently, *H. armigera* is reported to have developed resistance to many commonly used insecticides (Lande 1992) [5]. In past, the best insecticide was reported to be the cypermethrin (Gohokar *et al.* 1985, Singh *et al.* 1987, Khan *et al.* 1993, Jadhav and Suryawanshi 1998) [2, 3] and Endosulfan (Chaudary *et al.* 1980, Rizvi *et al.* 1986) [1]. Phokela *et al*. (1990) [9] observed a tendency of increased resistance to

Cypermethrin in the population of *H. armigera.* Moderate to high levels of resistance to cypermethrin and moderate resistance to Endosulfan were recorded in field populations of *H. armiger.* The growing awareness of the hazards of pesticide use has created a worldwide interest in pest control agents of plant origin that are bioactive and yet ecologically safe. Hence, the present experiment was conducted to assess the performance of insecticide and biopesticides an effective combination of Oviposition inhibitor and larvicidal effect for the management of *H. armigera* on chickpea.

**Materials and Methods**

This experiment was conducted in Rainfed areas of kabirdham district under the SK College of Agriculture and Research Station, Kawardha, Indira Gandhi Krishi Vishwavidyalaya Raipur (Chhattisgarh). Insecticides and Biopesticide including control total eight treatment was used. The detail of treatments as follows: Methyl parathion (Metacid-50), Azadirachtin (Neemplex), Quinalphos (Ecalux), Bird purcher (T. Shaped), Endosulphan, N.P.V. (H.), Chlorpyiphos + Cyper methrin (Super D). Sowing was done 8 December 2008 depending upon the availability of sufficient moisture in the fields. It was laid out in randomized block design with three dispersed replication. The chickpea variety was sown in rows with the spacing 30cm. and plot size 5 x 3 meters with line sowing method, germination of seed 16 December 2008, weekly observation to be recorded of the pest population during different growth stage of the crop and time of survey December 2008 to March 2009. The land was fertilized with N-20: P-40: K-20 in the form of urea, single super phosphate and muriate of potash respectively. All fertilizers were applied as basal at the final land preparation. Spraying was done by Knapsack hand sprayer as per treatments. Treatments were applied as foliar spray to manage the infestation of Gram pod borer of chick pea. The insecticides and bio pesticide were applied when there was appearance of gram pod borer, average population from 0.1-1.1/ plant. The numbers of gram pod borer were recorded in 10 randomly selected plants and the average population per plant was estimated. The mean population was recorded at different intervals (weekly) before and after spray for the Estimation of losses in yield due to infestation by gram pod borer of chick pea. Each treatment is replicated three times. At maturity (end of the crop) observation were recorded data were analyzed statistically.

**Results and Discussion**

The efficacy of insecticides/ biopesticide and bird perchar on mean caterpillar population differed considerably. The mean population of gram pod borer before spray varied from 0.1-1.1/ plant but when the treatments were applied there was drastic reduction in overall mean population of gram pod borer. The gram pod borer overall mean population was considerably less in first replication (RI), overall mean population 0.18 per plant which was treated in Endosulphan. In second replication (RII), overall mean population 0.17 per plant which was treated in Chlorpyriphos + Cypermethrin (Super D) and third (RIII), overall mean population 0.13 per plant which was treated in Endosulphan (Table: 1).

However, the gram pod borer overall mean population was maximum in RI, 0.33/plant which was NPV treated as compared to 0.38/plant mean population of gram pod borer in control. In RII, 0.28/plant which was Azadirachtin (Neemplex) and Bird perchar treated as compared to 0.31/plant mean population of gram pod borer in control and in RIII, 0.36/plant which was Bird preacher treated as compared to 0.41/plant mean population of gram pod borer in control (Table:1). The Overall mean population of gram pod borer in RI, RII and RIII, was minimum 0.17/plant Endosulphan treated as compared to 0.37/plant overall mean population of gram pod borer in control (Table: 3). The effect of insecticide/bio pesticide and bird preacher on mean yield in qt. /ha is also varied greatly. The mean yield in qt. /ha was maximum 5qt./ha which was Quinalphos treated while minimum was 4.33qt./ha which was Endosulphan treated as compared to 3.78qt./ha yield in control (Table:2).

**Table 1:** Effect of insecticides and Bio-insecticides in management of pod borer (*Helicoverpa armigera*) in Chickpea

| S. No. | insecticides/ | a.i./ dose | Method of application | Mean pest population | | | |
|---|---|---|---|---|---|---|---|
| | | | | RI | RII | RIII | Over all Mean |
| 1 | Methyl parathion(Metacid-50) | 50 E.C. | Foliar spray | 0.19 | 0.22 | 0.29 | 0.23 |
| 2 | Azadirachtin(Neemplex) | | --do-- | 0.21 | 0.28 | 0.32 | 0.27 |
| 3 | Quinalphos (Ecalux) | 25 EC. | --do-- | 0.2 | 0.23 | 0.27 | 0.23 |
| 4 | Bird purcher (T. Shaped) | | | 0.24 | 0.28 | 0.36 | 0.29 |
| 5 | Endosulphan | 35 EC | --do-- | 0.18 | 0.19 | 0.13 | 0.17 |
| 6 | N.P.V. (H.) | 100 LE | --do-- | 0.33 | 0.22 | 0.32 | 0.29 |
| 7 | Chlorpyiphos + Cyper methrin (Super D) | 50EC+5 EC | --do-- | 0.28 | 0.17 | 0.18 | 0.21 |
| 8 | Control | | | 0.38 | 0.31 | 0.41 | 0.37 |

**Table 2:** Effect of insecticides and Bio-insecticides of yield data pod borer (*Helicoverpa armigera*) in Chickpea

| S. No. | insecticides/ treatment | Yield in gm./15 sq. meter | | | Mean yield in Kg. |
|---|---|---|---|---|---|
| | | RI | RII | RIII | |
| 1. | Methyl parathion(Metacid-50) | 0.800 | 0.650 | 0.650 | 2.10 |
| 2. | Azadirachtin(Neemplex) | 0.700 | 0.700 | 0.825 | 2.23 |
| 3. | Quinalphos (Ecalux) | 0.850 | 0.625 | 0.800 | 2.27 |
| 4. | Bird purcher (T. Shaped) | 0.700 | 0.600 | 0.850 | 2.15 |
| 5. | Endosulphan | 0.750 | 0.600 | 0.600 | 1.95 |
| 6. | N.P.V. (H.) | 0.800 | 0.600 | 0.550 | 1.95 |
| 7. | Chlorpyiphos + Cyper methrin (Super D) | 0.800 | 0.775 | 0.575 | 2.15 |
| 8. | Control | 0.600 | 0.600 | 0.500 | 1.70 |
| Total | | 6 Kg. | 5.15 Kg. | 5.35 Kg. | 16.50 Kg. |

**Table 3:** Effect of insecticides and Biopesticides in management of pod borer (*Helicoverpa armigera*) in Chick pea

| S. No | Insecticides/ Biopesticide | a.i./dose | Method of application | Mean pest population | Mean yield in Kg. |
|---|---|---|---|---|---|
| 1. | Methyl parathion (Metacid-50) | 50 E.C. | Foliar spray | 0.23 | 2.10 |
| 2. | Azadirachtin (Neemplex) | | --do-- | 0.27 | 2.23 |
| 3. | Quinalphos (Ecalux) | 25 EC. | --do-- | 0.23 | 2.27 |
| 4. | Bird prechur (T. Shaped) | | | 0.29 | 2.15 |
| 5. | Endosulphan | 35 EC | --do-- | 0.17 | 1.95 |
| 6. | N.P.V. (H.) | 100 LE | --do-- | 0.29 | 1.95 |
| 7. | Chlorpyiphos + Cyper methrin (Super D) | 50EC+5 EC | --do-- | 0.21 | 2.15 |
| 8. | Control | - | - | 0.37 | 1.70 |
| | SEm | - | - | 0.05 | 0.07 |
| | CD | - | - | 0.14 | 0.19 |

## Conclusion

From the present study, it can be concluded that pod borer (*Helicoverpa armigera*) there are major insect-pests infesting long duration chick pea in Kawardha region of Chhattisgarh, India. The numbers of gram pod borer mean population was recorded at different intervals (weekly) before and after spray for the Estimation of losses in yield due to infestation by gram pod borer of chick pea for successful crop pried of pest management strategies against insect-pests of chick pea for increasing production efficiency and profit.

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## References

1. Chaudhary JP, Yadav LS, Rustogi KB. Chemical control of gram pod borer, *Heliothis armigera* Hubner and semiloopers, *Plusia* spp. on gram, *Cicer arietinum* L. Haryana Agri Univ J Res. 1980; 10:324-328.
2. Gohokar RT, Thakre SM, Borle MM. Chemical control of gram pod borer (*Heliothis armigera* Hubner) by different synthetic pyrethroids and insecticides. Pesticides. 1985; 19:39-40.
3. Jadhav RS, Suryawanshi DS. Chemical control of *Helicoverpa armigera* (Hubner) on chickpea. J Maharashtra Agric Univ. 1998; 23:83-84.
4. Lal SS, Yadava CP, Dias CAR. Assessment of crop losses in chickpea caused by *Heliothis armigera*. FAO Plant Prot Bull. 1985; 33:27-35.
5. Lande SS. Susceptibility of *Helicoverpa armigera* (Hb.) to conventional insecticides. Unpublished M.Sc Thesis submitted to P.K.V., Akola, 1992.
6. Mehto DN, Singh KM. Succession of insect pests in chickpea, *Cicer arietinum* Linn. Indian J Entomol. 1983; 45:377-383.
7. Naresh JS, Malik VS. Observations on the insect pests of chickpea (*Cicer arietinum* L.) in Haryana. Bull Entomol. 1986; 27:75-77.
8. Patel RK. Unusual outbreak of gram pod borer on gram in Madhya Pradesh. Sci Cult. 1979; 45(1):335-336.
9. Phokela A, Dhingra S, Sinha SN, Mehrotra KN. Pyrethroid resistance in *Heliothis armigera* Hubner: Development of resistance in field. Pestic Res J. 1990; 2:28-30.
10. Sinha MM, Yazdani SS, Kumar A, Lal K. Relative efficacy of different spray formulations against gram pod borer. Pesticides. 1983; 17:33-34.