

Integrated Pest management of Pod borer, *Helicoverpa armigerain* Gram

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Introduction

Chickpea (*Cicer arietinum* L.), also known as Bengal gram, gram, or chana is an important rabi pulse crop of India and has been considered as “**king of pulses**” consumed as a major nutrient supplement of protein. It is used for human consumption as well as for animal feed, grains; fresh green leaves are used as vegetables, while chickpea straw is an ideal feed for cattle. Globally chickpea is grown in over 45 countries and India occupies 83 percent of the world’s chickpea area (14.56 m. ha.). The current productivity level in India is 850 kg/ha. In Rajasthan chickpea is cultivated in an area of 13.34 lakh hectares with a production of 99 thousand tons and productivity of 690 kg/ha.

Bengal gram is infested by 57 species of insect pests and other arthropods in India; however, the major insect pest of chickpea is the gram pod borer, *Helicoverpa armigera*, which is a polyphagous, multivoltine, and cosmopolitan pest, known to feed on 182 species of plants belonging to 47 families in India. *Helicoverpa armigera* has a wide host range, feed and feeds on more than 250 crop species. The gram pod borer begins infestation at the seedling stage and later feeds on the flowers and developing seeds in pods until crop maturity. The yield loss range in chickpea has been estimated to be from 10 to 60 percent under normal weather conditions 50 to 100 percent under favourable weather conditions with frequent cloudy days during the crop season that often accounts for about 90 to 95 percent of the total damage caused by insect pests.

Life cycle of gram pod borer

Gram pod borer passes its life through four stages viz. Egg, larva, pupa and adult. Complete his life cycle approximately 35-70 days on the gram. There may be as many as 8 generations in a year.

Identifications of gram pod borer

A single female can lay about 500- 750 eggs on tender parts of the plants. The eggs hatch in one week. The newly hatched larva is light green in colour. The young larva begins to feed on tender portions of the leaves and shoots and when pod formation takes place it feeds on pods. Larvae come out, move from pod to pod, and are full-fed in 3 weeks. The grown Larvae come out from the pod and pupate in soil for 2 weeks, which prolongs in winter. A moth is stout with dark yellow olive-grey or brown wings crossed by a dark band near the outer margin and a dark spot near coastal margin of forewings and hindwings pale with a dark apical border.

Nature of damage

The pest is active throughout the year but damage to gram is caused from November to March. The damage is inflicted by larvae, which feed on the leaves and destroy seedlings in the early stages. At the time of pod formation, it is found feeding on developing grain after cutting a hole in the pod and thrusting its heads therein. It has been estimated that a single caterpillar destroys 30-40 pods of gram in its lifetime. It has been observed that grown-up caterpillars feed on the small larvae of their own which is known as cannibalism. In severe infestation, damage may be caused from 20-50 percent. After the harvest of gram crop in March-April, it migrates to tomato and feeds on ripening fruits which h invites the rotting of the fruits.



Damage symptoms



Adult

Integrated strategy for gram pod borer

Cultural Practice

- Deep summer ploughing and destruction of stubbles.

- Application of neem cake @2q/ha/groundnut cake @10q/ha.
- Adoption of tolerant varieties.
- Seed treatment with *Trichoderma* @ 5-10g/kg seed or imidacloprid 3 g/kg or thiamethoxam @ 4g/kg.
- Crop rotation with less favourable crops like jowar, gingelly, blackgram, horsegram, dry paddy (in redgram).
- Collection and distraction of the infested material from the field.
- Early sowings in Pod fly endemic areas.
- Raising intercrops/ Guard crop: In Bengal gram, mustard, coriander as intercrops. In Kharif redgram like green gram, black gram, cowpea @ 1:7 rows and jowar in 2 rows in rabi redgam to encourage and conserve natural enemies viz., *Campoletis chloridae*, *Carcelia illote*, *Apanteles sauros*, *Microbracon brevicornis*

Mechanical Control

- Use of sex pheromone traps (10/ha) for monitoring of *Helicoverpa armigera* population and Installation of T-shaped sticks (60-70/ha).
- Weed management and hand removal of disease and insect-affected plants.
- Collection of nymphs and adults and destroying them by dipping into kerosinized water and foliar spray with carbaryl @3 g/l or monocrotophos 1.5 ml /l or dimethoate 2 ml/l or methyl parathion 2 ml/l or phosphamidon 2 ml/l in case of bugs.

Plant Products

- Use of neem seed kernel extract (5%).
- Use of neem-based commercial formulations i.e. Neem been containing Azadirachtin 0.15% @ 2.5lit/ha.

Bio-agents

- Application of *HaNPV* 250LE/ha. Addition of 1ml teepol, 1g jaggery, and 1 ml liquid soap per liter of water.
- Spray *Bacillus thuringiensis* @ 2g per liter.

Chemical Control

- Avoid indiscriminate use of insecticides, synthetic pyrethroids, and mixtures.
- Foliar application of systemic insecticides like dimethoate 2 ml/l or monocrotophos 1.6ml/l or acephate 1.5g/l against Stem fly, leaf miners.
- In severe incidence, indoxacarb 1 ml/l or spinosad 0.3 ml/l.
- Adopt a community approach.
- Foliar sprays should commence at 50% flowering.
- Foliar spray from flower bud initiation with combination of chlorpyrifos 2.5 ml/l or quinalphos 2 ml/l or novaluron 0.75 ml/l or spinosad 0.75 ml/l or lambda cyhalothrin 1 ml/l in combination with dichlorvos 1 ml /l at weakly intervals in case of Maruca.
- Foliar sprays with Monocrotophos 1.5 ml/l or Dimethoate 2 ml/l in combination with dichlorvos 1 ml /l at weekly intervals from pod formation stage against pod fly and pod wasp.
- Poison bait can be made and kept in the field. For poison bait preparation Carbaryl 50WP @1.25 kg, rice bran @12.5 kg, and jaggery @1.25 kg and water 7.5 liters must be mixed to prepare poison bait for 1-hectare area.