



Integrated Pest Management of Chickpea Pod Borer; *Helicoverpa armigera* (Hubner)

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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. Boiled, roasted, steamed, sprouted, flour made into many delicious foods. Chickpea is a *Rabi* season pulse crops.

They contribute 60 per cent world pulse production 28 million ha globally. They are concentrated on temperate and subtropical climate. Chickpea, lentil in developing countries, Peas in developed countries. 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* Hubner (Lepidoptera: Noctuidae) is detrimental role in destruction of Agricultural crops all over world. It is the most prominent insect species that causes major economic damage to crops.

In India, it is commonly known as cotton boll worm, gram pod borer, ear worm, tomato fruit borer etc. it has wide host range due to polyphagous nature and world- wide recorded feed on >250 crop species like maize, chickpea, tomato, cotton, soybean, tobacco, pigeon pea, sorghum, rice, groundnut, okra, cowpea, beans etc. are observed as major host plants that suffer with heavy infestation.

Morphological characteristics

The characteristics of *Helicoverpa* spp. likely contribute to its biological success include its high reproductive potential, dispersal capacity, polyphagous, rapid development. The gram pod borer begins infestation at the seedling stage and later feeds on the flowers and developing seeds in pods until crop maturity. Gram pod borer passes its life through four stages viz. Egg, larva, pupa and adult. Life cycle completed approximately 35-70days on the gram and generally 8 generations are occurring in a year.



A single female can lay about 550- 700 eggs on tender of the plants. The eggs hatch in seven to ten day. Fully grown larva is 30-40 mm long; larvae are yellow to brownish and light red in colour. Larvas emerge from eggs after 3-7 days. 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 18-20 days, 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. A single caterpillar destroys 50 pods of gram in its lifetime. In severe infestation, damage may be caused from 30-50 percent.

Management

A) Cultural/Agronomical practices: Cultural control is the deliberate manipulation of the cropping or soil system environment to make it less favorable for pests or making it more favorable for their natural enemies. Many procedures such as tillage, host plant resistance, planting, irrigation, fertilizer applications, destruction of crop residues, use of trap crops, crop rotation, etc. can be employed to achieve cultural control.

- Deep summer ploughing in 2-3 times a year
- Early sowing and short duration varieties acts as escape from this pest different stage of life cycle, In India continent crop shown in October seen less infected than crop sown in November.
- Cultivation of resistant varieties.
- Inter cropping with sunflower, mustard, coriander, linseed, fennel, sorghum, and African marigold for management of *Helicoverpa armigera*.
 - Chickpea + Coriander/ Fennel/ Linseed/ Fenugreek ratio(1:1)
 - Chickpea + Coriander ratio (4:1)
 - Tomato + Marigold ratio (14:1)
- Grow tall Napier grass, Mustard, Sorghum and American marigold as trap crop around chick pea.

B) Mechanical Method: Hand picking of eggs and larvae and can be effective method if infestation is not severe during early stage when they feed gregariously. Install pheromone traps @ 50/hectare, Install bird perches @ 10-15/ha and setting of light traps (1 light/5 acer) to reduction of adult pod borer population and management.

C) Biological Method: It is also the most complicated as there is a diverse range of species and types of predators, parasitoids and pathogens. The value of biological control agents in integrated pest management is becoming more apparent as researches are conducted. Natural enemies clearly play an important role in integrated management of *Helicoverpa* spp., particularly in low value crops where they may remove the need for any chemical intervention. The egg parasitoids, *Trichogramma* spp. and *Telenomus* spp. destroy large numbers of eggs of *H. armigera* and *H. punctigera*. The ichneumonid, *Campoletis chlorideae* (Uchida) is probably the most important larval parasitoid of *H. armigera* on chickpea. The entomopathogenic fungus *Nomuraea rileyi* (Farlow) Samson resulted in 90–100 per cent larval mortality. Apply HaNPV @ 250 LE/ha at 10-15 days interval. Spray any one of the microbial insecticides starting from one month after planting at 15 days interval, *Beauveria bassiana*, *Metarhizium anisopliae* @ 5-10 ml/lit or *Bacillus thuringiensis* Var. *Kurstaki* 3-5 ml/lit water. Neem and garlic extracts are use as larvicidal, ovicidal, toxic repellent, antifeedant and anti-ovipositional effect of insect pests and Azadirachtin 0.03%, NSKE (Neem Seed Kernel Extract) 5% twice to avoid egg laying.

D) Chemical Method: Foliar sprays any one of the insecticides starting from should commence at 50 per cent flowering at 15 days interval, Lambda cyhalothrin @ 2 ml/lit. or Emamectin benzoate 5% SG @ 1 gm./lit. or Spinosad 45% SC @ 0.20-0.30 ml/lit., endosulfan @2 ml/L and indoxacarb @ 1 ml/L of water. 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.