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Insect Pests of Chickpea and their Integrated Management Approaches

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Chickpea (*Cicer arietinum* L.) is widely recognized in India under various names such as gram, Bengal gram, garbanzo, garbanzo bean, Egyptian pea, chana, and chhole. India contributes nearly 64% of the total global chickpea production, making it the leading producer. However, in recent years, its productivity has been significantly affected by various diseases and insect pests. Among these, the pod borer is considered the most destructive pest across the country, causing substantial yield losses. In addition, bruchids are responsible for serious damage during storage. Other important insect pests include termites and cutworms. This article aims to facilitate the identification of these pests and provides essential insights into their damage patterns along with updated, eco-friendly management approaches.

Keywords: Chickpea; *H. armigera*; Insect-pests; IPM,

Introduction

Chickpea (*Cicer arietinum* L.) is a diploid species (2n = 16) that belongs to the family Fabaceae, subfamily, and genus *Cicer* within the tribe Cicereae. It is widely referred to by different names such as gram, Bengal gram, garbanzo, garbanzo bean, Egyptian pea, chana, and chhole. The crop was originally domesticated in Southwest Asia (Turkey) and later spread to various parts of Asia and Europe. Chickpea is valued for its rich nutritional profile, containing about 20–22% high-quality protein along with significant amounts of fibre, minerals, and β-carotene. In India, chickpea ranks first in total pulse production, followed by pigeon pea. Maharashtra is the leading producer, contributing about 3.28 million tonnes from 2.83 million hectares with an average yield of 1156 kg/ha, followed by Madhya Pradesh, Rajasthan, Gujarat, and Uttar Pradesh (DA&FW 2021–22). In Uttar Pradesh, chickpea occupies around 0.62 million hectares with a production of 0.77 million tonnes and a productivity of 1250 kg/ha during 2021–22 (DA&FW). Chickpea also plays a significant role in sustaining soil fertility by enhancing its physical, chemical, and biological properties, and by fixing atmospheric nitrogen through root nodules (Ali and Kumar, 2005). The crop grows best in well-drained soils ranging from sandy loam to clay loam, with a slightly acidic to neutral pH (5.5–7.0).

Insect pests of chickpea

A wide range of insect pests poses a serious threat to crop productivity, damaging plants at different growth stages (Mishra *et al.*, 2023). Chickpea cultivation is affected by insect pests both in the field and during storage, with more than sixty species reported to infest the crop (Parsai, 2005). Among these, sucking pests such as aphids (*Aphis craccivora*), jassids (*Empoasca kerri*), pea aphids (*Acyrthosiphon pisum*), thrips (*Megalurothrips usitatus*), and

whitefly (*Bemisia tabaci*) are responsible for considerable damage to chickpea (Anandhi *et al.*, 2011).

The gram pod borer (*Helicoverpa armigera*) is regarded as the most destructive pest, leading to substantial losses in both yield and pods (Kambrekar, 2012). It alone contributes to nearly 21% reduction in yield and 50–60% loss in pods. To manage these pests, various strategies such as biological control, use of botanicals, chemical insecticides, and integrated pest management (IPM) approaches have been adopted and evaluated based on pest population dynamics (Satpute, 1999; Nene & Reddy, 1997). In India, the gram pod borer remains the most important insect pest causing major yield losses, whereas bruchids (*Callosobruchus chinensis* and *Callosobruchus maculatus*) are the key pests responsible for significant damage during storage.

Table: Insect pest complex of chickpea crop

S.N.	Common name	Scientific name	Nature of damage	Period of prevalence	Period of peak incidence
1.	White grub	*Holotrichia longipennis*	Grub feed on roots, destroying seedling	Sept-Oct	2nd fortnight of Oct
2.	Cutworm	*Agrotis ipsilon*	Larvae cut young seedling	December	1st fortnight of Jan
3.	Black aphid	*Aphis craccivora*	Suck cell sap from tender	Dec-Jan	1st fortnight of Jan
4.	Gram pod borer	*Helicoverpa armigera*	Caterpillar mainly act as defoliators	Dec-Jan	2nd week of March
5.	Semilooper	*Thysanoplusia orichalcea*	Caterpillar mainly act as defoliators	Oct-Nov	2nd fortnight of December
6.	Flea beetle	*Altica himensis*	Adults cause holes on the leaves	Nov-Dec	1st fortnight of February

Integrated Management Approaches

- Deep ploughing immediately after harvesting to destroy the larvae as well as pupae of insects of soil and also soil dwelling insects.
- Use tolerant/resistant varieties for Bundelkhand region viz., JG-16, JG-36, JG-14, JG-11, Subhra, Ujjawal etc.
- Apply well decomposed Farm Yard Manure (FYM) or Neem cake/Mahua cake@ 500 kg/ha for reduce the infestation of termites.
- Inter crop of linseed/mustard/wheat/coriander/rabi sorghum. Mix 5g of Rabi sorghum or Sunflower seeds with Chickpea seeds while sowing to serve as bird attractants.
- Sow marigold as trap/disease indicator crop on border or in between the crop rows.
- Removal of weeds (*Chenopodium album* and *Vicia sativa*) at the flowering stage of the crop.
- Clean/remove the grasses on bud to reduce the habitat for insect pests.
- Erection of 20 bird perches/ha. Bird perches should be removed just after maturity/harvesting of the crop.
- Use of Pheromone traps @ 2-3 for monitoring gram pod borer is strongly recommended.
- Set up light traps 1 trap/acre 15 cm above the crop canopy for monitoring and mass trapping insects.
- Conserve *Campoletis*, lady bird beetles, *Chrysopa*, Stinkbugs, Reduviid bug, Predatory wasps and spiders by intercropping with coriander.

- Spray crude NSKE 5% or Azadirachtin 0.03% (300 ppm) Neem oil based WSP @ 2500 to 5000ml/ha at pre-flowering stage at 15 days interval for reduce the population *Helicoverpa armigera*.
- Spray microbial pesticide *Bacillus thuringiensis* var. *kurstaki* against Pod borer @1 Kg/ha.
- Spray *Ha*NPV 2.0% @ 250 LE (POB 5x1011/ml)/ha + 0.5% Jaggery + 0.1 % fabric whiteners (tinopal, blue etc)/ha on noticing 1st instar larvae or eggs of pod borer (3 sprays at weekly intervals in evening hours).
- Use chemical pesticide Chlorantraniliprole @1.2ml/lit, Spinosad 45 SC @0.4ml/lit when the pest population crossed to ETL level (4-5 larvae/plant).

Conclusions

In both field and storage conditions, insect pests play a vital role in affecting crop productivity. The pod borer, *H. armigera*, remains active throughout the crop season, showing one peak in field conditions. While, storage pests like *Callosobruchus chinensis* and *C. maculatus* are consistently present. Effective management practices have been observed in various instances. In conclusion, Integrated Pest Management on gram crops is a multifaceted strategy addressing the spectrum of challenges. By synergizing cultural, biological, and chemical control methods, offers a comprehensive and sustainable approach to safeguarding gram crops, promoting agricultural resilience and ensuring food security.

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