AGRI MAGAZINE
(International E-Magazine for Agricultural Articles)
Volume: 02, Issue: 05 (May, 2025)
Available online at http://www.agrimagazine.in

Pests and Diseases in Chickpea and Integrated Pest Management (IPM)

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Chickpea (*Cicer arietinum* L.), also known as Bengal gram, is one of India's most important pulse crops. Rich in protein, it plays a vital role in both human nutrition and sustainable agriculture. India is the world's leading chickpea producer, with cultivation spread across states like Madhya Pradesh, Maharashtra, Rajasthan, and Andhra Pradesh. However, chickpea crops face serious threats from various insect pests and diseases, which can significantly reduce yield and affect grain quality. Relying only on chemical pesticides is not sustainable, as it leads to resistance, environmental damage, and higher input costs. Instead, Integrated Pest Management (IPM) offers a balanced and eco-friendly approach to pest and disease control, combining multiple strategies to protect the crop while preserving biodiversity.

Major Pests of Chickpea

1. Gram Pod Borer (*Helicoverpa armigera*)

- **Damage**: This is the most destructive pest in chickpea. The larvae bore into pods and feed on developing seeds, sometimes causing up to 90% yield loss.
- **Identification**: The caterpillars are greenish to brown in color with a dark head and stripes along the body.
- **Timing**: Peak infestation occurs during flowering to pod formation stages (60–90 days after sowing).

2. Cutworm (*Agrotis ipsilon*)

- **Damage**: Cutworms attack seedlings at the base during nighttime, often cutting them off at the ground level.
- **Affected stage**: Mostly seen during the early seedling stage.

3. Aphids (*Aphis craccivora*)

- **Damage**: These tiny sucking pests cluster on tender shoots and leaves. They extract sap, cause curling of leaves, and excrete honeydew which leads to sooty mold.
- **Significance**: Aphids also act as vectors for viral diseases in chickpea.

4. Termites (*Odontotermes* spp.)

- **Damage**: Feed on roots and stem bases, especially in dry or rainfed areas. This leads to wilting and eventual plant death.
- **Conditions**: Infestation is more common in fields with poor organic matter and low moisture.

Major Diseases of Chickpea

1. Fusarium Wilt (*Fusarium oxysporum* f. sp. *ciceris*)

- **Symptoms**: Plants suddenly wilt and dry up; yellowing of leaves is followed by stem discoloration at the base.

- **Spread**: This is a soil-borne disease, often surviving in the soil and crop residues for years.
- **Impact**: Can cause complete crop failure if not managed in time.

2. Ascochyta Blight (*Ascochyta rabiei*)

- **Symptoms**: Dark brown to black spots with concentric rings appear on leaves, stems, and pods. Under humid conditions, the disease spreads rapidly.
- **Transmission**: Seed- and air-borne; favored by rainy or moist weather.

3. Dry Root Rot (*Rhizoctonia bataticola*)

- **Symptoms**: Plants appear healthy during early stages but suddenly dry from the base upwards. Roots become brittle and discolored.
- **Favorable Conditions**: High temperature and moisture stress.

4. Collar Rot (*Sclerotium rolfsii*)

- **Symptoms**: White fungal growth around the collar region of seedlings, followed by wilting and plant death.
- **Survival**: Through sclerotia in soil, which can remain viable for years.

Integrated Pest Management (IPM) in Chickpea

IPM is a holistic approach that combines cultural, biological, mechanical, and chemical methods to control pests in a sustainable way. Its main goal is to reduce reliance on pesticides while maintaining crop health and productivity.

1. Cultural Practices

- Use **certified, disease-free seeds** and resistant varieties like JG 11, Pusa 372, or JG 14.
- Practice **crop rotation** with cereals such as sorghum or pearl millet to reduce soil-borne diseases.
- **Early sowing** (preferably in October) helps crops escape peak pod borer attack.
- Maintain **field sanitation** by removing infected plant residues and weeds.

2. Biological Control

- Release **Trichogramma chilonis** (50,000 parasitoids/ha) during flowering to control pod borer eggs.
- Apply **Neem Seed Kernel Extract (NSKE) 5%** or neem oil 1% to deter early larval stages and sucking pests.
- Use **Nuclear Polyhedrosis Virus (NPV)** @ 250 LE/ha for controlling *Helicoverpa* larvae.

3. Mechanical and Physical Measures

- Install **pheromone traps** (5/acre) to monitor and mass-trap *Helicoverpa* moths.
- Set up **bird perches** to attract insect-eating birds like drongos and mynahs.
- Regular **handpicking of larvae** in small plots can significantly reduce pest buildup.

4. Chemical Control

- Apply **Emamectin benzoate 5 SG @ 220 g/ha** or **Spinosad 45 SC @ 75 ml/ha** when *Helicoverpa* crosses the ETL (Economic Threshold Level).
- For aphids, use **Thiamethoxam 25 WG @ 100 g/ha**.
- To manage wilt, treat seeds with **Carbendazim 1 g + Trichoderma viride 4 g per kg seed**.
- For blight, spray **Chlorothalonil or Mancozeb @ 2–2.5 g/L** during disease onset.

Economic Threshold Levels (ETLs)

Pest/Disease	Threshold Level (ETL)
Pod Borer	1–2 larvae per meter row
Aphids	10–15 aphids per terminal shoot
Wilt/Blight	>10% plant infection
Cutworm	10% seedling damage

Conclusion

Chickpea cultivation is highly vulnerable to pests and diseases, but Integrated Pest Management offers a reliable and environmentally safe way to deal with them. By adopting IPM practices like resistant varieties, biological agents, neem-based products, and limited use of safe chemicals, farmers can reduce crop losses, protect beneficial organisms, and improve productivity. IPM not only makes farming more sustainable but also ensures better profitability and food safety in pulse production.

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