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MAJOR INSECT PESTS OF CHICKPEA AND THEIR MANAGEMENT STRATEGIES

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Abstract: -

Chickpea is a nutritionally rich and economically important pulse crop widely cultivated under rainfed conditions. Despite its significance, chickpea productivity is greatly constrained by insect pests, both in the field and during storage. Among the most destructive are gram pod borer, cutworm, termites and several sucking pests including aphids, thrips, whiteflies, and leafhoppers. These pests feed on leaves, flowers, pods, and seeds causing yield losses ranging from 10–60% under normal conditions and up to 100% during severe outbreaks. Effective management of these pests requires an Integrated Pest Management approach that combines cultural, mechanical, biological, and chemical methods. Cultural practices such as crop rotation, intercropping, timely sowing, sanitation, and deep ploughing, along with biological control agents like HaNPV and natural enemies, play a crucial role in reducing pest incidence. Need-based application of botanicals and selective insecticides further enhances protection while minimizing ecological risks. Adoption of IPM strategies is essential for sustainable chickpea production, ensuring higher yields, reduced pest-induced losses, and long-term agricultural sustainability.

1. Introduction:

Chickpea (*Cicer arietinum* L.) is one of the world's most important food grain legumes. Commonly known as "Chana" or "Bengal gram," it is a major pulse crop and a vital component of dry, rainfed cropping systems due to its ability to fix 80 to 120 kg of atmospheric nitrogen per hectare (Golding & Dong, 2010). Chickpea is an essential source of energy, protein, and both soluble and insoluble dietary fiber. Its seeds contain 60–

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65% carbohydrates, about 6% fat, and 12–31% protein, making it nutritionally superior to many other pulses. In addition, chickpea is rich in vitamins particularly vitamin B complex and minerals such as potassium phosphorus, sulfur , iron, magnesium and zinc. By fixing atmospheric nitrogen, chickpea also plays a key role in enhancing soil fertility, meeting up to 80% of the crop's nitrogen requirement naturally.

There are many reasons responsible for the poor production of this crop. In field condition and storage condition insect pest and diseases are plays a very important role against crop production (Bentley & Clements,1989) About sixty insect species are known to feed on chickpea (Parsai,2005) Among them gram pod borer, aphid, cutworm, semilooper, bruchid, and leaf miners are major pest of chickpea (Gurjar *et al*., 2011).

2. Major insect pest of chickpea and their management:

1. Gram pod borer:

2.1.1 Economic Importance of gram pod borer:

The gram pod borer, *Helicoverpa armigera* (Hübner) (Lepidoptera: Noctuidae), is recognized as one of the most destructive insect pests of chickpea (*Cicer arietinum* L.) across the globe. Adult moth is light pale brownish yellow and their forewings are grey to pale brown with V shaped speck. It lays spherical shaped creamy white eggs on tender parts of the plant. The larvae infests the crop from the seedling stage to maturity, causing severe damage by feeding on tender leaves, flowers, developing pods, and seeds. The extent of damage inflicted by *H. armigera* is highly variable and largely influenced by environmental conditions. Under normal circumstances, yield losses in chickpea due to its infestation range between 10–60%, whereas under favorable conditions for pest development, losses can escalate to 50–100%, often leading to complete crop failure (Sarwar *et al*., 2009).

Fig 1: Larvae of gram pod borer

2.1.2 Management:

The management of *H. armigera* poses a considerable challenge, primarily because the pest has evolved resistance to a wide range of conventional insecticides. Consequently,

frequent chemical applications not only prove ineffective but also impose an unsustainable financial burden on smallholder and resource-poor farmers. Moreover, indiscriminate use of insecticides leads to ecological concerns such as environmental contamination, adverse effects on non-target organisms, and resurgence of secondary pests.

The combination of cultural, mechanical, biological, and chemical practices aimed at minimizing crop losses. Monitoring of the pest population is essential, and economic threshold levels are considered at 2 early instar larvae or 5 to 8 eggs per plant. For effective monitoring and mass trapping, pheromone traps at the rate of 12 per hectare can be installed, while erecting bird perches at 50 per hectare encourages predation of larvae by insectivorous birds. Mechanical methods such as hand picking and destruction of grown-up larvae and blister beetles are also effective at reducing pest load. Biological control measures include application of *Nucleopolyhedrovirus* (HaNPV) at 1.5 × 10^{12} polyhedral occlusion bodies (POB) per hectare, mixed with teepol (1 ml/liter) for better spread and efficacy. In addition to these practices, need-based application of insecticides may be undertaken. Farmers may choose any one of the following options, ensuring judicious use: dichlorvos 76 WSC at 625 ml/ha, neem seed kernel extract (NSKE) 5% at 31.0 kg/ha (applied twice), triazophos 40 EC at 780 ml/ha, neem oil at 12.5 liters/ha, or phosalone 35 EC at 1.25 liters/ha.

2. Cutworm:

2.2.1 Economic Importance of cutworm

The cutworm, *Agrotis ipsilon*, is a serious pest of chickpea and other crops. The caterpillars remain hidden in the soil at a depth of 2–4 inches and feed at night, cutting tender plants at the base or severing branches and stems of growing plants. They often drag the cut portions into the soil for feeding, and the presence of buried stems or branches is almost a sure indicator of the caterpillar's hiding place. The pest can be identified through its different stages: eggs are laid on soil clods, at the base of chickpea stems, and on both surfaces of leaves; larvae are dark brown with a reddish head; pupation occurs in earthen cocoons; and adults are brownish moths, 3–5 cm across the wings, with numerous wavy lines and spots.

2.2.2 Management:

Management of *A. ipsilon* includes deep summer ploughing to expose and kill pupae, and the application of well-decomposed organic manure. Crop rotation and early sowing during the last week of October are effective preventive measures. Intercropping chickpea with wheat, linseed, or mustard reduces infestation, while growing marigold on bunds acts as a trap crop. Avoiding tomato

or lady's finger in nearby fields also helps reduce pest incidence. Mechanical methods such as hand picking and destruction of larvae in the early stages can significantly lower the pest population. Adult moths can be managed using light traps, while chemical control may be applied when infestations are severe. Recommended insecticides include quinalphos 25 EC at 1000 ml/ha, Spark 36 EC at 1000 ml/ha, or profenophos 50 EC at 1500 ml/ha, diluted in 500–600 liters of water per hectare and sprayed uniformly.

3. Termites:

2.3.1 Economic Importance of termites:

The termite, *Odontotermes obesus*, is a destructive pest of chickpea that primarily attacks the roots and stems. Termites bore into plant tissues, disrupting water and nutrient transport system, which causes plants to wither and dry up. Infestation often persists in standing crops, particularly under drought conditions, when moisture stress makes plants more susceptible. Termites are social insects that live in large colonies within termitaria and are organized into distinct castes, including workers, kings, and queens. Eggs are laid on plants and in the soil. The worker termites, which are responsible for the damage, are small with soft white bodies and brown heads.

2.3.2 Management

Management practices for termite control include frequent intercultural operations and pre-sowing irrigation to reduce termite activity. Field sanitation is essential, involving timely removal and disposal of crop residues, stubbles, and undecomposed plant parts. The use of undecomposed farmyard manure or compost should be avoided, as it favors termite multiplication. Two to three rounds of deep ploughing help expose and destroy termite colonies, while termite mounds or bunds in and around the field should be dismantled to kill the queen and supplementary reproductive forms. For effective preventive control, seed treatment with chlorpyriphos at 4 ml/kg of seed is recommended.

4. Sucking pests:

2.4.1 Economic importance of chickpea sucking pests

Sucking pests such as aphids (*Aphis craccivora*), thrips (*Thrips tabaci*), whiteflies (*Bemisia tabaci*), and leafhoppers (*Empoasca kerri*) are among the most important insect pests of chickpea. These insects feed by sucking sap from tender leaves, stems, flowers, and pods, causing curling, yellowing, and stunted growth. Heavy infestations lead to premature flower drop, shriveled seeds, and significant yield reductions. Apart from direct feeding damage, they act as vectors of viral diseases such as stunt and mosaic, which further aggravate crop losses. Yield losses due to sucking pests in chickpea are estimated to

range between 10–35%, but under favorable conditions for pest multiplication, losses may exceed 50%, making them economically important constraints in chickpea production.

2.4.2 Management of sucking pests

Effective management of sucking pests requires an integrated approach combining cultural, biological, and chemical strategies. Timely sowing, crop rotation, maintaining proper spacing, and destruction of weed hosts help reduce pest incidence. Intercropping chickpea with cereals or oilseeds can minimize pest colonization. Installing yellow sticky traps is effective for monitoring and reducing whitefly populations, while encouraging natural enemies such as ladybird beetles (*Coccinella septempunctata*), lacewings (*Chrysoperla carnea*), and parasitoids aids in biological suppression. Seed treatment with systemic insecticides like imidacloprid (5 g/kg seed) offers early protection against aphids and leafhoppers. Need-based foliar sprays may be applied using neem seed kernel extract (5%), neem oil (2–3%), or safer chemicals such as thiamethoxam 25 WG (100 g/ha), acetamiprid 20 SP (100 g/ha), or dimethoate 30 EC (1 L/ha). Regular monitoring and adopting these integrated pest management practices not only reduce crop losses but also minimize the risk of pesticide resistance and safeguard beneficial fauna.

3. Conclusion:

Chickpea productivity is greatly reduced by major insect pests such as gram pod borer, cutworm, termites, and sucking pests, which together cause severe yield losses and sometimes complete crop failure. These pests damage vital plant parts, transmit diseases, and weaken crop growth, making them a serious economic concern. Sustainable management requires an integrated approach, combining cultural practices like deep ploughing, timely sowing, sanitation, and intercropping with biological measures such as natural enemies and HaNPV, along with need-based use of botanicals and selective insecticides. Adoption of Integrated Pest Management (IPM) not only minimizes crop losses but also conserves beneficial organisms and ensures sustainable chickpea production.

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