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Major Insect Pests of Mung Bean During Storage and Their Management

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Pulses are an important component of the Indian agricultural system. Crops such as mung bean, black gram, pigeon pea, lentil, pea, and cowpea are important sources of protein, carbohydrates, minerals, and other essential nutrients in the human diet. A large proportion of the pulses produced by farmers is stored for a certain period. During storage, insect infestation can cause losses in both the quality and quantity of the grains. Among the major insect pests of stored pulses, the pulse beetle is particularly important. The term pulse beetle is commonly used for insects belonging to the genus Callosobruchus. Callosobruchus maculatus is another important species of pulse beetle. Callosobruchus chinensis was first reported from China in 1758, which is associated with the origin of its species name, chinensis. This pest is found in several parts of the world, including India, China, Italy, Japan, Africa, the Hawaiian Islands, Mexico, Nigeria, Belgium, and the United States. Pulse Beetle. Pulse beetles mainly attack the seeds of mung bean, black gram, chickpea, pigeon pea, lentil, and cowpea. Their infestation is often more significant in stored grains than in the field. The female beetle lays eggs on the surface of pulse seeds. After hatching, the larvae enter the seeds and feed on their internal nutritional contents. Consequently, the larval stage is considered the most damaging stage of this pest. As the infestation progresses, characteristic round exit holes appear in the seeds when adult beetles emerge. Heavy infestation can reduce seed quality, nutritional value, and germination capacity. Therefore, proper identification of pulse beetles, selection of healthy seeds, and knowledge of appropriate storage practices are essential for their effective management. Identification of the adult Beetle. The pulse beetle is a small insect that attacks stored pulses. The adult beetle generally has an oval, compact body. Its body colour and markings may vary depending on the species.

Mark of Identification

The colour, body markings, and other morphological characteristics are useful for identifying different species of pulse beetles. The adult beetle is about 3.2 mm in length, oval in shape and chocolate or reddish-brown in colour. The head is small and has a blunt snout. The body is narrow in front and broad at the back. From the side, the abdomen appears clearly swollen. When seen from above, the body looks heart-shaped. The first pair of wings (elytra) does not completely cover the last abdominal segment (pygidium). The end appears truncated (cut short). Waxy-coloured spots are present on the thorax. The female has serrate antennae, while the male has pectinate antennae. The legs have thick femora.

Nature of Damage

Both the grub (larva) and adult stages of this insect are harmful. This insect attacks both standing crops in the field and stored grains. Its mouthparts are of the biting and chewing type. Grubs are generally more destructive than adults. The attack of this insect is not commonly found in chickpea fields. In other pulse crops, infestation starts from February

when green pods begin to develop. The female lays eggs on green pods. The grubs hatch from the eggs and enter the pods. They feed on the seeds inside the pods. the grubs reach storage structures along with the seeds, develop into adults and reproduce there. The female lays yellowish-white, shiny and oval-shaped eggs on the seeds. The newly hatched grubs first make a hole through the egg shell and then penetrate the seed. They enter the seed through a small hole and remain inside until they become adults. These entry holes are not visible. The large holes seen on seeds are actually the exit holes made by adult beetles. The grubs feed inside the seeds and make them completely hollow. Their infestation occurs in standing crops. They are not generally found on dried pulses, except under certain conditions. This insect remains active throughout the year. However, severe infestation generally occurs during August and September. It usually causes about 40–50% damage.

When the population is high, the damage becomes severe. It may cause approximately 40–50% damage. Damage becomes severe when the insect population is high.



Egg Laying in Seed By Pulse Beetles



Infected Seed By Pulse Beetles

Control Measures

Farmers use different methods to control insect pests according to their experience and prevailing conditions.

(A) Cultural Management

- Timely Harvesting - Harvest the crop at the proper time as soon as the pods mature.This prevents insects from moving from the field to the storage area.
- Proper Drying - Before storage, dry the grains properly in sunlight. The moisture content of grains should not be more than 8–10%.
- Godown Cleaning - Before storing new grains, properly clean the old sacks and cracks in the godown.
- Resistant Varieties - For storage of wheat or other grains, select varieties that are tolerant or resistant to storage pests, such as: Pusa Vishal Vishal and Samrat, GM3, GM4, K85

(B) Mechanical Methods

- Sun Drying - Spread the grains in a thin layer under direct sunlight for 4–6 hours at a temperature of 37°C to 45°C. This helps destroy eggs and larvae present in the grains. During storage, sieve the grains in sunlight to remove adult insects.
- To protect stored grains, use airtight and airtight-resistant containers or special plastic bags.

(C) Biological Management

- Mix neem oil, castor oil or mustard oil at the rate of 8–10 ml per kg of grain. This prevents beetle eggs from hatching.

- Dry neem leaves (1 kg per 100 kg of grain), black pepper powder or garlic extract can also provide protection.
- Fungal-based bio-pesticides such as *Beauveria bassiana, Metarhizium anisopliae* and Bacillus can be used for grain protection.

(D) Chemical Control

- Spray Malathion 50 EC or Deltamethrin 2.8 on the walls and floors of empty godowns.
- If grains are to be stored only as seeds (not for consumption), treat them with Deltamethrin 2.8 (0.04 ml per kg of seed) or Fenvalerate 0.4% dust (4 g per kg of seed).
- In large, airtight godowns, when severe infestation occurs, aluminium phosphide (Celphos) tablets may be used (1–2 tablets per tonne of grain).