

Callosobruchus maculatus – A Pest of Stored Legumes

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Introduction

Callosobruchus maculatus is a species of beetles known commonly as the ‘cowpea weevil’ or ‘cowpea seed beetle’. It is a member of the leaf beetle family, Chrysomelidae, and not a true weevil. This is common pest of stored legumes.



Distribution:

It is a cosmopolitan pest. It's origin is in Africa and later spread to tropical and sub-tropical parts of the world.

Host preference

Mainly Cowpea (*Vigna unguiculata*) and other beans and peas such as mung bean (*Vigna radiata*) and adzuki bean (*Vigna angularis*).

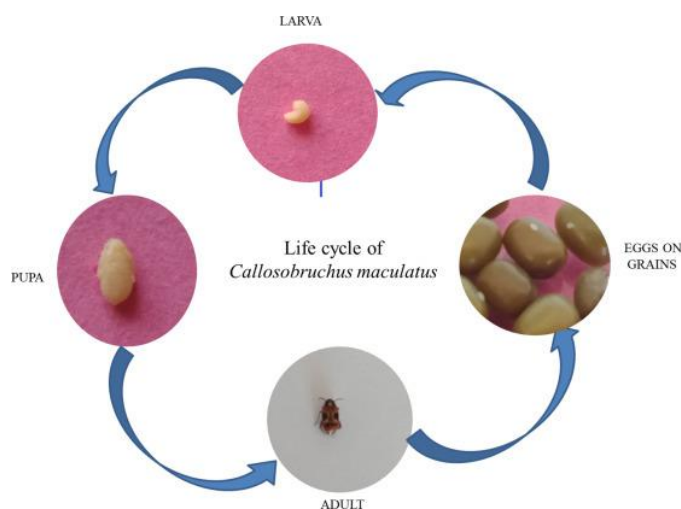
Identification features:

- ✓ Cowpea weevil lacks “snout”, more elongated in shape reddish-brown coloured, with black and gray elytra marked with two central black spots.
- ✓ Adult beetles are 3-4 mm long exhibiting sexual dimorphism.
- ✓ Females are darker overall, while males are brown.
- ✓ The size of the adult beetle depends upon the size of the infested portion of the pulse.
- ✓ Egg production and legume infestation by pulse beetle is highest from July-August in the stores.

Life Cycle

It is a holometabolic insect with four developmental life stages viz., egg, larva, pupa, and adult.

- **Egg:** Female lays more than 100 eggs during its lifetime and deposits one egg per seed. Eggs are transparent, oval, or spindle-shaped and glued to the seed surface
- **Larva:** larva bores inside the seed. It has four larval instars before turning into the pupa. Eggshell gets filled with the larval frass, when the larva gets inside
- **Pupa:** The pupa is whitish in colour. When the larva starts to pupate, the seed shell starts turning thinner.
- **Adult:** The adult chews the seed coat and emerges out of the seed. The adult is metallic in color with some pale spots/stripes. The male and female can be distinguished by the plate's color at the abdomen's end. In the female, the plate is large and colored black on the sides with a white longitudinal line, while in the male, it is smaller and lacks strips. The adults become sexually mature after 24-48 hours of emergence. The adult lives for two-three weeks.



Damage symptoms:

- ✓ The adult and grubs feed on the grain by making a small hole.
- ✓ Infested stored seed can be recognized by the white eggs on the seed surface and the round exit holes with the 'flap' of seed coat.



Fig. Damage symptoms in Cowpea seeds

Fig. Damage symptoms in Mung bean seeds

Management:**Cultural Control:**

- ✓ Periodical exposure of the grain to sun helps to check infestations.
- ✓ Dry the pods to optimum kernel moisture level of about 7%.
- ✓ Store the pods in polythene-lined gunny bags and fill the top surface of the bag with a layer of 3 cm ht. sand.
- ✓ Mouth of bags should not be stitched or closed to avoid germination loss.
- ✓ Care should be taken to avoid breakage.
- ✓ Broken seeds should not be stored for long periods

Mechanical Control:

- ✓ Dip the old gunny bags in boiled water for 15 minutes.

Biological Control:

- ✓ Coat the seeds with small quantities of vegetable oil or mix neem leaves in the stored grains.
- ✓ Hymenopteran ectoparasitoids i.e. *Uscanalariophaga* (Steffan), *Dinarmus basalis* (Rondani), and *Eupelmus vuilleti* (Crawford) are promising biocontrol agents for *Callosobruchus maculatus*.

Chemical Control:

- ✓ Dip the gunny bags in 10% malathion solution.

Other methods of managing Pulse beetle:

- ✓ **Hermetic storage technologies:** Purdue Improved Cowpea Storage bags have been proven successful in controlling this pest.
- ✓ **Longer freezing** of whole storage area for a period of 6-24 hours at -18°C is required in order to kill adults and larvae of this storage pest.

Conclusion:

Callosobruchus maculatus is an important pest of pulses in storage causing significant damage to pulses. The life cycle, damage symptoms and biology of the pest needs to be studied for the development of better integrated pest management strategies for the effective management of this stored pest. Apart from the common pest management approaches, there are other methods like hermetic storage technologies and freezing methods, which are useful in the management of the pulse beetle.