

Egg: Laid singly, glued to the surface of the pod (in fields) or on grains (in stores). Fresh eggs are translucent, orange cream in colour, changing to greyish white with age.

Grub: Fleshy, curved, creamy white in colour with black mouth parts.

Pupa: Pupation takes place in a pupal cell prepared beneath the seed coat.

Adult: Brownish grey beetle with characteristic elevated ivory like spots near the middle of the dorsal side. It is small, short, active with long conspicuous serrate antenna. Elytra do not cover the abdomen completely, which is called as pygidium. Pygidium is black with a central longitudinal white streak. Adults are short lived, it is harmless and do not feed on storage produce at all.

7. Tamarind beetle, *Pachymeres gonagra*, Bruchidae, Coleoptera

Symptom of damage: Circular holes on fruits of tamarind both in tree and storage.

Nature of damage: Grub causes the damage.

Adult: Small grey coloured beetle.

8. Khapra beetle, *Trogoderma granarium*, Dermestidae, Coleoptera

Host range: Wheat, maize, jowar, rice, pulses, oil seeds and their cakes.

Life history: 80-125 E 4-10 d G

14 d 24-40 d

A 5-8 d P

Total life cycle : 25 d

Generations/year : 12

Symptom of damage: Stored grains reduced to frass, seed coat chewed up in an irregular manner on all cereals.

Nature of damage: Adults are harmless. Grub damages the grain starting with germ portion, surface scratching and devouring the grain. It reduces the grain into frass. Excessive moulting results in loss of market value due to insanitation caused by the cast skin, frass and hair. Crowding of larvae leads to unhygienic conditions in warehouses. Damage is confined to peripheral layers of bags in bulk storage.

Egg: Eggs are laid on the grains or crevices.

Grub: Grub is straw coloured and hair with dark brown hairy bands on each segment and typical posterior tuft forming a tail of long hairs. It is active, move and feed freely.

Pupa: Pupation takes place on the surface of the grain in bulk and overlapping edges of bags.

Adult: Reddish brown, convex, oval in shape with practically no distinct division of head, thorax and abdomen. Abdomen size is comparatively larger.

9. Angoumois grain moth or Grain moth, *Sitotroga cerealella*, Gelechiidae, Lepidoptera

Host range: Paddy, maize, jowar, barley and wheat (rarely). It is not capable of attacking milled rice or other cereal products.

Life history: 100 E 4-30 d L 4

 24 d

A 7 d P

Total life cycle : 32 d

Generations/ year : 3-4

Symptom of damage: Grains with circular emergence hole with characteristic flap/trap door