

Stored Product Pests

Department of Entomology

RICE, GRANARY, AND MAIZE WEEVILS

Sitophilus oryzae (L.), *S. granaries* (L.), and *S. zeamais* (Motsch.)

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DESCRIPTION

Grain weevils in the genus *Sitophilus* are worldwide in distribution, but the granary weevil is more temperate in distribution. All three species attack grain and grain products, but they are primarily pests of whole grain in storage. Like all weevils, these have a distinct snout. When disturbed, it will draw its legs up to its body and remain motionless.

Rice Weevil: This weevil has small round pits on the surface of the thorax (although midline is usually free of pits), four red to yellow markings on the forewings, and is able to fly. It is approximately 1/8 inch long (3 mm).



Rice weevil.
(Photo Credit: John Obermeyer)

Granary Weevil: This weevil is slightly larger (3/16 inch (4.8 mm)) than the other two weevils. It is black-brown in coloring although it can be red-brown shortly after adult emergence. If you examine the thorax closely you can see longitudinal punctures. Adults cannot fly.

Maize Weevil: This weevil also has small distinct colored spots on the forewings, and punctures on the thorax, including the midline. Adults can fly.



Granary weevil.
(Photo Credit: John Obermeyer)



Maize weevil.
(Photo Credit: John Obermeyer)

BIOLOGY AND BEHAVIOR

Eighty to 200 eggs are deposited on the outside of the kernel, grooves or holes made by other insects and the larvae

bore into the kernel. The larva remains inside the kernel until adult emergence. The number of eggs is dependent on food, season, or temperature. Two or three larvae may develop on kernel of corn, but from other grains only one adult can be produced. There are three larval molts. The last larval instar usually spins a silken cocoon within the feeding cavity. The pupal case can be reddish brown to nearly black, depending on age.

Adults emerge through a small round hole in the kernel. Upon adult emergence, females move to a surface above the food to release the sex pheromone. Males are attracted to this pheromone for mating. Development time from egg to adult varies with temperature from 30 days at 30°C (86°F) and 40 days at 25°C (77°F). Minimum temperature RH for development is 16°C (60.8°F)/30% Rh; optimum is 30°C (86°F)/75% Rh and the maximum is 36°C (85°F). Adults are generally short lived (about 7 days) and are non-feeding.

Like many moths the peak time for flight activity is dusk. Females alight on grain and are simulated to oviposit. Air that has passed through the grain, especially grain that has some mold growth, acts as an attractant. Angoumois grain moth can coexist with sawtoothed grain beetle. However, maize weevil or lesser grain borers totally suppress Angoumois grain moth populations.

The larva is dormant for four to five months during the winter in colder climates. There are generally four to five generations per year, although in heated warehouses there may be as many as 10 to 12 generations.

FOOD

Weevils can be found infesting a variety of grain and food materials. They attack all cereal grains, however are most often found in corn, oats, barley, rye, and wheat. They cannot breed in finely processed grain but will readily breed in manufactured products such as macaroni, noodles and milled cereals that have become caked from excessive moisture.

CONTROL

The only way to control these pests is fumigation. Since it is an internal pest, residual control will only kill exposed adults. To kill the internal stages (larval and pupal), you must fumigate. Heating grain to 60°C can kill larvae, however, this may decrease germination and baking quality of flour.

READ AND FOLLOW ALL LABEL INSTRUCTIONS. THIS INCLUDES DIRECTIONS FOR USE, PRECAUTIONARY STATEMENTS (HAZARDS TO HUMANS, DOMESTIC ANIMALS, AND ENDANGERED SPECIES), ENVIRONMENTAL HAZARDS, RATES OF APPLICATION, NUMBER OF APPLICATIONS, REENTRY INTERVALS, HARVEST RESTRICTIONS, STORAGE AND DISPOSAL, AND ANY SPECIFIC WARNINGS AND/OR PRECAUTIONS FOR SAFE HANDLING OF THE PESTICIDE.

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