PENNSTATE

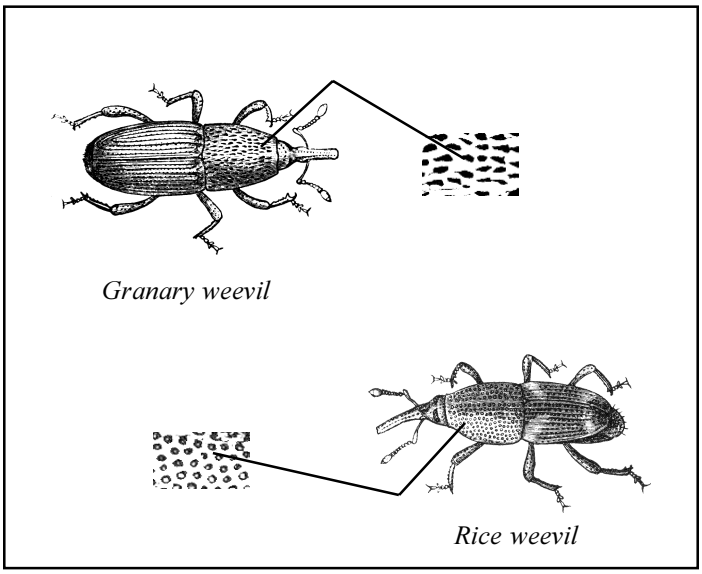
College of Agricultural Sciences • Cooperative Extension

Entomological Notes

Department of Entomology

WEEVILS ON STORED GRAINS

A complex of weevils, the rice (*Sitophilus oryza*), granary (*Sitophilus granarius*), and maize (*Sitophilus zeamais*) weevils, are among the most destructive pests of grains, seeds, and grain products stored in elevators and bins. They probably are not native to North America, but entered in seeds carried by settlers through ports. These weevils are pests of grain throughout the world.



Granary weevil

Rice weevil

DESCRIPTIONS

Rice Weevil: The rice weevil is a small snout beetle which varies in size, but it averages about three thirty-seconds inch in length. It varies from a dull red-brown to black, and is usually marked on the back with four light red to yellow spots. The rice weevil has fully developed wings beneath its wing covers and can fly readily. The thorax is densely pitted with somewhat irregularly shaped punctures, except for a smooth narrow strip extending down the middle of the back. The larval stage of this insect is a soft, white, legless, fleshy grub which feeds on the interior of the grain kernel. When mature, the grub changes to a naked white pupa and later emerges as an adult beetle.

Maize Weevil: The maize weevil is a small snout beetle which varies in size, averaging about three thirty-seconds inch in length. It varies from dull red-brown to nearly black and is usually marked on the back with four light reddish or yellowish spots. The maize weevil has fully developed wings beneath its wing covers and can fly readily. The thorax is densely pitted with somewhat irregularly shaped punctures, except for a smooth narrow strip extending down the middle of the dorsal (top) side. An egg hatches in a few days into a soft , white, legless, fleshly grub which feeds on the interior of the grain kernel. The grub changes to a naked white pupa and later emerges as an adult beetle. The rate of development is slightly slower for the maize weevil than for the rice weevil. A minimum of thirty days is required for passing through the egg, larval and pupal stages.

Granary Weevil: The adult granary weevil is a somewhat cylindrical beetle about two-tenths of an inch (two to three mm) long. The head is prolonged with a distinct snout extending downward from the head for a distance of about one-fourth the length of the body. The weevil is polished red brown to black with ridged wing-covers and a well-marked thorax with oval pits. Unlike the rice and maize weevils, the granery weevil cannot fly. The egg hatches in a few days into a soft, white, legless, fleshy grub which feeds on the interior of the grain kernel. The grub changes to a naked white pupa and later emerges as an adult beetle.

LIFE HISTORIES

Rice Weevil: Adult rice weevils live for four to five months and each female lays 300 to 400 eggs during this period. The female uses her strong mandibles to chew a hole in the grain kernel where she deposits a single egg and seals the hole with a gelatinous fluid. During hot weather, the development period for egg to adult may be as few as twenty-six days. This period is greatly prolonged during cool or cold weather. Rice weevils are capable of flight, and infestations may develop in the field prior to harvest.

Maize Weevil: Maize weevils, for a long time were referred to as a larger strain or race of the rice weevil, but are now recognized as a distinct species. The maize weevil is slightly larger, up to one-eighth inch (four mm) long, and darker than the rice weevil; the degree of variation within each species makes them difficult to tell apart. The thorax of the maize weevil is

densely and uniformly pitted with round punctures. An egg hatches in a few days into a soft, white, legless, fleshy grub which feeds on the interior of the grain kernel. After the larval stages are completed the grub changes to a white pupa and later emerges as an adult beetle.

Granary Weevil: Adult granary weevil live an average of about seven to eight weeks. Each female lays 50 to 200 white eggs during this period. The female uses her strong mandibles to chew a small hole in the grain kernel, where she deposits a single egg in the hole and seals it with a gelatinous fluid. In warm weather, the granary weevil can develop from egg to adult in about five weeks. Cold weather prolongs development. The granary weevil cannot fly and so is most likely to be found where grain is stored, and moves with infested grain.

DAMAGE

These weevils are very destructive grain pests. Of the three, the rice weevil is probably the most insidious, owing largely to the ability of flight. All three weevils develop as larvae within the grain kernels. They frequently cause almost complete destruction of grain in elevators or bins, where conditions are favorable and the grain is undisturbed for some length of time. Infested grain will usually be found heating at the surface, and it may be damp, sometimes to such an extent that sprouting occurs. Wheat, corn, macaroni, oats, barley, sorghum, Kaffir seed, and buckwheat are just some of the grains and products on which these weevils feed.

MANAGEMENT

Prevention is the best strategy to avoid insect problems in stored grains. Proper bin sanitation before introduction of new grain minimizes the need for pesticides. Good sanitation involves the removal of old grain and dust in and around the grain bin. This includes removal of old grain from corners, floors, and walls and grain that may have spilled on the exterior of the bin. Any grain remaining when a bin is emptied can harbor insect infestations which will move into the new grain. After the bin is cleaned, and all needed repairs have been made, the floor and wall surfaces both inside and outside the bin should be treated. Take special care to treat all cracks, crevices, and areas around doorways and other places where insects could hide or enter. Spray the bins about four to six weeks prior to storing grain.

Before grain is placed in a bin, it should be screened to eliminate fine materials and broken kernels. Grain placed in a clean bin should be checked at two week intervals during warm months and at one month intervals during cooler months for the presence of hotspots, moldy areas, and live insects. If any of these conditions exist, the grain should be aerated to lower the moisture level and temperature.

Grain that is to be stored for longer than six months may need a protective application of an approved insecticide. Treatments can be applied as the grain is loaded into the bin through the use of a metering device calibrated to apply the proper amounts. After the grain is binned and leveled, a surface dressing can be applied to prevent insects from entering the grain on the surface. If infestation occurs in spite of these precautions, fumigation of the grain will be necessary. Because of the high toxicity of registered fumigants and technical knowledge needed for their proper use, a qualified pesticide applicator should be contacted to perform the fumigation.

WARNING

Pesticides are poisonous. Read and follow directions and safety precautions on labels. Handle carefully and store in original labeled containers out of the reach of children, pets, and livestock. Dispose of empty containers right away, in a safe manner and place. Do not contaminate forage, streams, or ponds.

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