

Stored Product Pests

Department of Entomology

RUSTY, FLAT, AND FLOUR MILL BEETLES *Cryptolestes* spp.

Linda J. Mason, Extension Entomologist

DESCRIPTION

These insects are often grouped together as “flat grain beetles” or “brand bugs.” Technically they are the rusty grain beetle, *C. ferrugineus* (Stephens), the flat grain beetle, *C. pusillus* (Schonherr), and the flour mill beetle, *C. turcicus* (Grouv.). All three species are reddish brown and about 2 mm (1/12 in.) long. The flat grain beetle is slightly longer. The beetles are flat, quite shiny, and have long, slender antennae. The antennae of both male and female rusty grain beetles are long, about half the length of the body. Antennae of male flat grain beetles and flour mill beetles are more than two-thirds the length of the body. The prothorax of the rusty grain beetle is narrowed at the back, whereas those of the flat and flour mill beetles are more nearly square. All adults are strong fliers.

Larvae (3 mm, 1/8 in.) are white and somewhat flattened, with the posterior part of the body slightly broader than the anterior half. The head and a distinctive forked process at the tip of the abdomen are slightly darkened.

BIOLOGY AND BEHAVIOR

Eggs are deposited singly in crevices or furrows in kernels of grain, in the space between kernels, or in debris. They are white, average 0.5-0.8 mm long, and are about 3.5 times as long as wide. Larvae burrow into kernels of grain but may leave their burrows in search of more favorable food. There are 4 larval instars, the last of which forms a silken cocoon. Larvae infesting whole grain often form cocoons in chambers within the kernels. Before chewing their way out, newly formed adults remain within the cocoon for a few days. Development from egg to adult varies between species, with rusty and flat grain beetles taking 22-24 days at 32-35°C (90-95°F) and 75% RH and the flour mill beetle requiring about 30-35 days. The rusty grain beetle is more cold tolerant. Adults, as well as larvae, are cannibalistic and will consume eggs, pupae, and prepupae of their own kind. At 25°C (77°F) and 75% RH, females begin laying eggs within 4 days of adult emergence and oviposition is continu-



Rusty grain beetle. (Photo Credit: John Obermeyer)



Rusty grain beetle adult and larva. (Photo Credit: John Obermeyer)

ous for more than 34 weeks. Oviposition rates vary during the egg laying cycle, but there is no marked peak, and only a slight decline towards the end. Average fecundity is 242 eggs per female.

FOOD

These beetles can be found feeding on grain and cereal products as well as a variety of other materials. The rusty grain beetles have been recorded from wheat, flour, oilseeds, cassava root, dried fruits, and chilies; the flat grain

beetle from wheat, corn, rice, barley, cottonseed, copra, coffee berries, bulbs, and nutmeg; and the flour mill beetle from copra, cocoa, chilies, and nutmeg. Larvae feed preferentially on the germ of the whole cracked kernels, but they also feed on the endosperm and sometimes hollow out the entire kernel. Growth of mold in the endosperm renders kernels more suitable as larval food. In general, molds in the diet also favor development of the flour mill beetle. *Cryptolestes* species are apparently unable to feed on sound grain, but they can feed on kernels with very slight imperfections or injuries.

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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