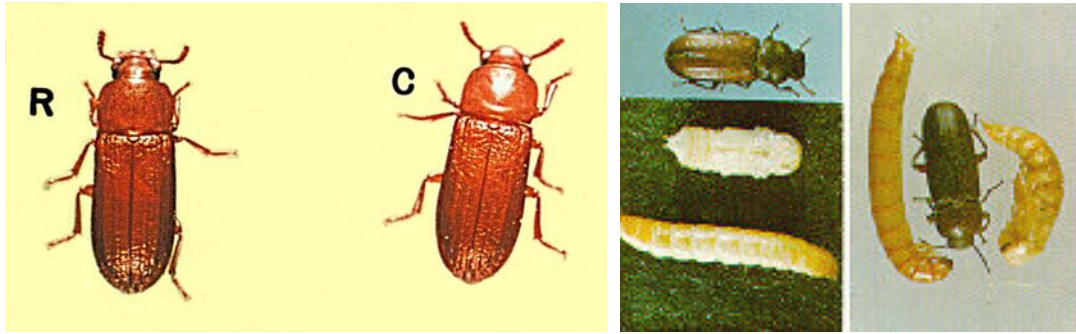


RED & CONFUSED FLOUR BEETLES



Common Name: Red flour beetle / Confused flour beetle
Scientific Name: *Tribolium castaneum* / *Tribolium confusum*

Introduction. The red flour beetle gets its common name from its coloration and its habit of infesting flour. It is one of the most important pests of stored products found in the home and in grocery stores. It is of Indo-Australian origin and now occurs worldwide in the warmer climates. In the United States, it is found primarily in the southern states.

The confused flour beetle apparently got its common name because of the confusion regarding its identity. It is one of the most important pests of stored products found in the home and in grocery stores. Although of African origin, it now occurs worldwide in cooler climates. In the United States, it is more abundant in the northern states.

Recognition. Adults of the both the red and confused flour beetles measure 1/8 inch long, and are reddish-brown in color. However, red flour beetle antennae terminate in an abrupt, 3-segmented club. Whereas confused flour beetle antennae gradually widen from the head outward. Wings functional but commonly flies only short distances. Also, the red flour beetle has functional wings but only flies short distances; while the confused flour beetle is never observed flying.

Full-grown larvae of both species measure 1/8 to 1/4 inch long are yellowish-white, and wiry in appearance.

Similar Beetles. (1) The black (*Tribolium audax*) and false black (*Tribolium destructor*) flour beetles are black and longer (about 1/4 inch) than the red and confused flour beetles. (2) The lesser mealworm (*Alphitobius diaperinus*) is also longer (about 1/4 inch in length). (3) The yellow (*Tenebrio molitor*) and dark (*Tenebrio obscurus*) mealworm beetles are dark brown to black, and much longer (about 1/2 to 3/4 inch).

Biology. The red and confused flour beetle females deposit about 300 to 500 clear-white sticky eggs on or among food materials in cracks, in bags, or through the mesh of sacks containing food. The females live for 2 to 3 years and lay 2 to 3 eggs per day.

The eggs hatch in 5 to 12 days into brownish-white larvae, which go through 5 to 18 instars (usually 7 to 8) and reach maturity in about 30 days under optimal conditions. The life cycle (egg to egg) can be completed in only 7 weeks, or it may require 3 months or longer. In heated storage facilities and processing plants, there are 4 or 5 generations annually.

Habits. These beetles are unable to feed on whole kernels or undamaged grain. They have been recorded attacking grains and grain products, peas, beans, shelled nuts, dried fruits, spices, milk chocolate, drugs, snuff, cayenne pepper, herbarium and insect specimens, and other museum display and collection items. They are mainly attracted to flour of high moisture content. Although they do not injure humans, flour beetles do impart a disagreeable odor and taste to the flour and food products they infest. Red flour beetle adults can fly and are attracted to light. Confused flour beetles often crawl towards light sources.

Cultural Control & Preventative Measures. The first step towards stopping an infestation of red or confused flour beetles is locating and, if possible, removing the food source(s) or excluding the breeding site(s). Beetles, larvae and pupae can be removed using a vacuum cleaner fitted with a hose attachment. Flour, meal, cereal and other vulnerable items should be stored in airtight, thick-walled containers until needed. Infested items of value can be heat-treated in a warm oven (140°F) for 30 minutes to destroy all stages, or deep-frozen (0°F or colder for 72 hours) to destroy eggs, larvae and adults (but not all the pupae, if present). Rodent bait that has been stashed away in structural voids by invasive mice, as well as dry animal carcasses in structural voids, may be infested by beetle larvae and can be difficult to locate and treat.

Infestations in large commercial settings, such as food processing plants, mills and warehouses must be addressed via an aggressive on-site cleaning and sanitation program. All floor areas (including edges and crevices), equipment surfaces, beams, bracework, exhaust fan components and other interior surfaces on which processed cereal and grain dust may accumulate, must be thoroughly cleaned.

Professional Control. A Rottler pest management professional will assist in locating red and confused flour beetle breeding sources and making recommendations for preventing re-infestation. A spot treatment of an infested structural void or a crack and crevice treatment into cabinet seams and shelf junctures using non-residual or residual insecticide aerosol or dust formulations may be applied by the technician to stop additional pest breeding.

Larvae that form pupae in well-concealed cocoons during late summer and autumn may not give rise to new adult moths until the following spring. Therefore, good sanitation and food-storage practices must be maintained perpetually, once an Indian meal moth infestation has been detected and treated.

When dealing with beetle infestations in large commercial settings, such as food processing plants, mills and warehouses, Strategically placed insect pheromone traps and insect light traps are important for monitoring infestations of these and other insect pests. Rottler pest management professionals can install and monitor these devices to help determine the internal breeding source(s) of stored product pests so that they can be discovered and removed. If necessary, fumigation of the facility or space treatment using ULV or thermal fogging equipment with a synergized pyrethrum insecticide may be necessary to eliminate large pest populations.



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