



Darkling Beetles and Mealworms

Theresa A. Dellinger and Eric R. Day, Department of Entomology, Virginia Tech

Description Darkling beetles belong in the beetle family Tenebrionidae, which consists of more than 20,000 species of beetles. Adult darkling beetles widely range in shape and size, with most measuring from 2 – 19 mm (0.13” – 0.75”). Adults are usually a reddish-brown to brownish-black in color and can be shiny or dull. The elytra (the wing covers) can be smooth, grooved, or otherwise sculptured. Most do not have colorful patterns on their wing covers. Adults are most active at night and tend to avoid bright lights.

Darkling beetle larvae are often referred to as mealworms or false wireworms. They are long, hard-bodied grubs with a cylindrical shape and are shiny yellow-brown to darker brown in color. They are active crawlers.



Adult yellow mealworm, *Tenebrio molitor*.
Clemson University-USDA Cooperative
Extension Slide Series, Bugwood.org.



Yellow mealworm larva, top. Dark mealworm larva,
bottom. Clemson University-USDA Cooperative
Extension Slide Series, Bugwood.org.

Life Cycle Darkling beetles have a complete life cycle with egg, larval, pupal, and adult stages. Most species of darkling beetles have a slow rate of development and may live for a year as an adult. Species living on grains or other stored products may develop faster.

Habitat/Distribution Darkling beetles are found throughout the world except for places with very cold climates. They are scavengers and omnivores, feeding on decomposing plant material, dead insects, fungi, and stored products. Only a handful of darkling beetles are considered pests; the vast majority of them live in the wild and pose no harm.



Confused flour beetle (*Tribolium confusum*).
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Extension Slide Series, Bugwood.org.

Damage Darkling beetles can be pests of stored products in the home, processing plants, or other places where dried foods are kept. Species such as the confused flour beetle (*Tribolium confusum*) and the red flour beetle (*T. castaneum*) feed on dried corn, rice, beans, cereals, and similar grain-based foods, including crackers, pasta, flour, and dry pet food. They are too small to damage intact grains but feed on cracked, broken, or milled grains. They will also feed on birdseed, garden seeds, and arrangements of ornamental corn or wheat. Darkling beetles are often found in dried foods that have been improperly stored and have become damp and moldy. Some species can produce compounds that taint food with a bad smell and taste. Darkling beetles prefer to hide from the light, so populations may build unnoticed over time until they reach large numbers.

Control Darkling beetles that are stored product pests are best controlled through inspection and proper storage of food items. Regularly inspect stored products for signs of infestation such as the presence of cast skins and insect parts, or any signs of feeding activity such as powdery material or hollowed out grains. Remove and discard any products that show signs of infestation. Foods can be heat-treated or placed in a freezer for several days to kill any living insects. Clean and vacuum shelves and the insides of cabinets. Replace shelf paper if used. Place food materials in sturdy sealed containers to prevent beetles from getting into the food, or to limit the spread of an infestation in the event that food brought into the house is already infested.

Some darkling beetles simply enter homes while exploring their environment. Keeping a home in good repair can greatly limit the entry of insects into the home. Check and seal any gaps found around windows and doors, in foundation walls, or places where pipes enter a building. Make sure window screens fit tightly and are in good condition. The occasional darkling beetle inside the home can be controlled with the use of a fly swatter, a vacuum, or an aerosol insecticide. Follow all pesticide labels carefully.

Important Species Dark mealworm (*Tenebrio obscurus*) and yellow mealworm (*T. molitor*) are two common species of mealworms. Adults of both species are very similar in appearance, approximately 14 mm long (0.55") and dark brownish-black. Adult dark mealworms have a dull luster while adult yellow mealworms are somewhat shinier. Larvae of both species are storage pests in grain that is damp and not allowed to dry. The common names refer to the lighter color of the yellow mealworm larvae compared to the dark mealworm larvae. These larvae are commonly raised to feed reptiles, amphibians, and birds kept as pets or in zoos.

Interesting Fact Darkling beetles have served as model organisms for studying population ecology and genetics.