

CUPBOARD BEETLES¹

By Art Antonelli
Extension Entomologist, WSU Puyallup

Cupboard beetles or “bran bugs,” as they are often called, are beetles that attack stored-grain products or household foodstuffs. Once established in food, populations of these insects can explode and move throughout the home, infesting other products and other places. Some of these beetles enter the home from outdoors, since they are normally scavengers in the environment, while others are transported to the home in purchased materials.

Every home is vulnerable to cupboard beetle infestation. However, homes where people do not practice good sanitation or food storage methods have the greatest problems. Spilled or exposed food will attract cupboard beetles and increase chances of infestation. Foods not tightly sealed, especially those maintained for long periods of time, are particularly susceptible to eventual infestation. Beetles commonly found in this environment include: drugstore beetle, sawtoothed grain beetle, merchant grain beetle, cigarette beetle, flour beetle, spider beetle, rice weevil, granary weevil, and carpet beetle. The drugstore beetle is the most frequently encountered cupboard beetle in western Washington. The sawtoothed grain beetle is probably the major bran bug in eastern Washington, but weevils and flour beetles are also significant.

Drugstore Beetle

The drugstore beetle, *Stegobium paniceum* (Fig. 1), is brown in color, approximately 3 mm (1/8 inch) long, with the head bent downward, giving the insect a humped appearance. Its name is quite fitting, since the drugstore beetle not only feeds on most foodstuffs and animal products, but also has been known to infest certain drugs and toxic materials. These beetles may even perforate wood to access a food source. Dried pet foods and spices are some of the most commonly reported sources of infestation in the home. The life cycle is like that of all beetles—it has an egg, larval, pupal, and adult stage. One to four generations per year will occur, depending on environmental conditions, such as temperature, and food availability. Food quality is not as important as one might expect, since this pest contains symbiotic organisms that resemble yeasts. These yeasts manufacture many “B” vitamins, allowing the beetles to survive on low-quality foods.



Fig. 1. Drugstore beetle



Fig. 2. Cigarette beetle

Cigarette Beetle

The cigarette beetle, *Lasioderma serricorne* (Fig. 2), strongly resembles the drugstore beetle in appearance and lifestyle. Cigarette beetle attacks everything the

¹ The text was revised and derived from the former publication EB 0973, written in January 1982.

drugstore beetle attacks, but feeds on an even wider range of foods. The beetle's name is derived from its frequent attacks on tobacco products. Normally, cigarette beetles produce from three to six generations per year, depending on temperature and humidity. Both the drugstore beetle and the cigarette beetle can fly.

Grain Beetles

The sawtoothed grain beetle, *Oryzaephilus surinamensis*, and the merchant grain beetle, *Oryzaephilus mercator*, are slender, flattened, reddish-brown beetles that measure about 3 mm (1/8 inch) in length. They exhibit saw-like teeth along the edge of the prothorax (shoulder area). The only difference between these two species lies in the configuration of the shoulder area, which can be observed by using a hand lens. Feeding habits of these two grain beetles are similar to that of the drugstore beetle, but the grain beetle does not have as wide a food range. Grain beetles produce from one to ten generations per year. Although they are suspected of being capable of flight, grain beetles have never been reported as observed while flying.



Fig. 3. Sawtoothed grain beetle



Fig. 4. Rice weevil

Granary Weevil

The granary weevil, *Sitophilus granaries*, is dark brown to black in color, measuring 4 to 5 mm (3/16 inch) long, and displays a characteristic weevil "snout". The granary weevil does not have any wings. Primarily a pest of whole or intact grains, granary weevils do not typically infest processed foodstuffs. Two to ten generations may appear in a given year, but four generations per year is average.

Rice Weevil

The rice weevil, *Sitophilus oryzae* (Fig. 4), is closely related to the granary weevil, and shows similar habits and appearance. Rice weevil differs from its relative by having four light-colored spots on its wing covers, well-developed wings under the wing covers, and a slightly smaller size. Though rice weevils have been found in Washington, it is more commonly known as a pest in the South.



Fig. 5. Flour beetle

Flour Beetles

The flour beetles, *Tribolium spp.* (Fig. 5), are small (approximately 3 mm or 1/8 inch long), elongate beetles that are reddish-brown or black in color, depending on the species. Flour

beetles are most often found in finished or processed cereal products. Some species can fly, but only rarely. In a heated building, they can produce four to five generations per year.

Spider Beetles

Spider beetles, *Ptinus spp.* (Fig. 6 & 7), are small globular-appearing beetles that measure from 2 to 4 mm (1/16 to 1/8 inch) long. Although variable in color, they all possess an obvious spider-like appearance. Spider beetles feed on a wide range of foods from grain products to feathers, rodent droppings, as well as other insects. Spider beetles can withstand colder temperatures than most bran bugs. Free water is very important to their success in establishment and speed of development. One of the more common spider beetles, the whitemarked spider beetle, produces four to ten generations per year. Spider beetles are normally encountered only in situations with very poor sanitation and/or long-standing foodstuffs. Even then, other insects have usually already attacked the food.



Fig. 6. Whitemarked spider beetle



Fig. 7. Brown spider beetle

Carpet Beetles

Carpet beetles are small, elongate or oval beetles ranging from 2 to 8 mm (for most species found in stored products) and vary in color and color pattern (Fig. 8). Homeowners can often easily recognize and diagnose the larvae (Fig. 9), which are often elongate and quite hairy or with distinctive tufts of hair, especially at the end of the body. The number of generations is variable. Under poor conditions, larvae of some species have been known to live for a few years. Adults are capable of flying, and they are the most likely of all the cupboard beetles to fly in from the outdoors. Carpet beetles are common pests of foodstuffs, but they go beyond “cupboard beetle status” since they are also considered a pest of animal products like furs, woolsens, feathers, and animal collections. See Extension publication EB 1257 for more details.



Fig. 8. Carpet beetles



Fig. 9. Carpet beetle larva

Other stored-products beetles include the flatheaded grain beetle, the larder beetle, pea weevil and ham beetle. Other than the pea weevil (refer to EB 0903 for additional information), most of these beetles are rarely encountered in the home.

PREVENTION & MANAGEMENT OF CUPBOARD BEETLES

Sanitation

The primary method for avoiding problems with these pests is good sanitation. Some points to remember:

- Spilling and/or leaving food exposed will attract and harbor these pests. Avoid such practices and you will likely never, or rarely, have this type of pest problem.
- Buy “storage” food such as flour grains only in quantities that you will use in a reasonable length of time. Materials stored for long periods (for example, six months or more) often become havens for serious infestations. Pests can start here without being observed and explode into potentially unmanageable numbers.
- Most cupboard pests can chew their way into cardboard boxes or plastic sacks. Place stored materials into tight-fitting containers, preferably of glass or other tough material. If an infestation should occur under these conditions, it probably will be limited to a single jar. The best storage is cool and dry. If at all possible, you may even want to consider refrigerated storage of little used but important dry goods.
- Dried pet foods are the most frequent stored products attacked by these pests, especially the drugstore beetle. When dried pet foods are accessible to mice, an unusual problem may occur. These rodents steal the pet food and over time can store large quantities of it in unobservable places, such as in wall voids and sub-floor spaces. If cupboard beetle pests locate the stolen food, you will have a most difficult time finding and removing the problem source. Therefore, it is wise to pay close attention to the way you store dry pet foods.
- If cupboard beetle infestation becomes apparent, locate the source immediately and dispose of it. If you act early enough, this may be the only material infested. Unopened cardboard boxes should be thoroughly examined. If there is even the slightest suspicion, be ruthless and throw it out! If the material appears uninfested and you prefer to keep it, if at all possible, at least use a containment/inspection technique. Place the material in a jar or sealed plastic bag and inspect it frequently. A jar is best since the insects cannot escape. Sealed plastic bags are often more convenient, but you will have to inspect them more frequently because many of these pests can chew their way out and move to new food sources.
- Use a vacuum cleaner to clean debris from cracks and corners of storage areas. Also, clean all nearby areas especially spills and crumbs behind and alongside stoves and refrigerators. Check the dishwasher area and toaster for crumbs. Scrub storage space and vicinity with very hot water and a strong detergent solution. Allow the areas to dry.



Fig. 10. Insulation in a wall space filled with dry dog food pellets and sunflower seeds. Mice gathered and stored the food, which caused a serious cupboard beetle infestation in the house. Note the beetle holes in the insulation paper in the upper right corner.



Fig. 11. Containment using a plastic bag. The manicotti shells inside looked uninfested, but were suspected of containing hard-to-see eggs. Two months after containment with frequent checks (every 4-5 days), drugstore beetles began to appear. Note the black specks (beetles) on the lower right shell.

Chemical Management

Chemicals are not usually recommended unless the problem is severe and widespread. If this becomes the case, it would probably be advisable to seek the help of a reputable pest control operator (exterminator). If chemicals are nevertheless considered, they should never be used as the primary tool. They can only supplement proper sanitation, which is considerably more important. Most of the household sprays available are ineffective against many of these beetles. Location of the pests in food prohibits the use of spray in those areas. If used, sprays should be used only in cracks, crevices, or hard-to-reach areas where wandering beetles often hide (away from food sources). Most importantly, use chemicals only as directed by label instructions.

Mechanical Management

Some infested or suspect materials may be worth saving. If so, consider temperature extremes as a management method. Heat may be used to control stored-products pests. All insects infesting stored food products will be killed if held at 120-130° F for two to three hours. Heated at 180° F, the kill is much more rapid. Heat must reach all parts of the infested material. For best results, the material to be treated should be spread thinly and stirred to allow rapid penetration of the heat. If an oven is used, keep the oven door propped open slightly to avoid scorching materials. Care should be taken to avoid heat-treating stored products degraded by excessive heat. Nutrients (vitamin-rich materials), for example, should not be heat-treated, but rather stored in the freezer.

Low temperatures may also be effective. Insect activity usually ceases at temperatures of 40-50° F, and most insects found in stored food products die, or at least become inactivated, when held at 40° F for two or three days. The most resistant forms will be killed if held for two to three weeks in a deep freeze.