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## Insect pests of home-stored foods

Whitney S. Cranshaw and Frank B. Peairs<sup>1</sup>

### Quick Facts

Indianmeal moth, flour beetles, sawtoothed grain beetles, and carpet beetles (dermestids) are common pests of food items in Colorado homes.

When insects that infest food items are first detected, try to identify all sources of infestation in the home.

If you know the identity of the insect you can focus your search for insect sources and practices for control.

To control infestations, it's important to use sanitary measures that remove food for the developing insects (such as discarding infested foods, vacuuming spilled food, and tightly sealing food containers).

Cold treatments, placing infested items in below-freezing temperatures, can kill insects in food items.

When using insecticides in and around food storage areas, take care to never apply the chemicals in a manner that allows direct contact with the food.

Several insects commonly infest home-stored foods in Colorado, such as grains, flour, nuts, spices, packaged herbs, and dried fruit. If infestations are prolonged, foods may be seriously damaged and may need to be discarded. Furthermore, many people will discard food products that are even lightly infested by insects. These insects typically pose little health hazard, although some species, notably carpet beetles, can produce irritation or allergic reactions.

### When Using any Insecticide within a Home

- Always read *and follow* all use directions on the pesticide label.
- Never apply insecticides in a manner that allows contact with food, food utensils, or food preparation areas.

Indianmeal moth, flour beetles, and sawtoothed grain beetles are particularly common in Colorado homes and are found throughout most of the world. Sometimes insects that infest food, such as carpet beetles, enter homes through natural migrations. More often, insects enter homes on food already infested during storage or transportation.

### Description

**Flour beetles.** Flour most commonly is infested by either of two closely related beetles, the confused flour beetle and red flour beetle (*Tribolium*, see Figure 1). Small pieces of cracked grains also may be sources of flour beetle infestation.

(actual size)

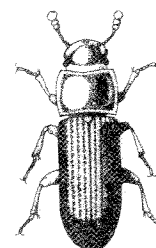


Figure 1: *Tribolium* sp.

<sup>1</sup>Whitney S. Cranshaw, Colorado State University Cooperative Extension entomologist and associate professor, and Frank B. Peairs, Cooperative Extension entomologist and associate professor; entomology (5/90)

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The adult flour beetles are reddish-brown and less than one-eighth inch in length. They are sometimes called "bran bugs" since they are so common in milling operations. Both species of flour beetles have wings but rarely fly.

Immature stages are pale-colored and worm-like. On close inspection, a pair of pointed forks can be seen on the hind body segment. Development of the immature stage typically takes one to two months and adults lay eggs over a period of five to eight months. Both adult and immature stages feed on flour.

**Sawtoothed grain beetle.** The sawtoothed flour beetle (*Oryzaephilus surinamensis*) is the most common beetle found infesting household food in Colorado. It can develop in flour, but most infestations occur in processed grain products such as breakfast cereals, oatmeal, corn meal and pasta. Dried fruit and chocolate also may be infested.

The adult beetle is about one-tenth inch in length, similar in size to the flour beetles. It is elongate in body shape, flattened, and distinctively marked with a series of saw-like projections along the sides of the thorax. However, because of their small size, some magnification may be needed to detect these characters. Sawtoothed grain beetles have wings, but have never been observed to fly.

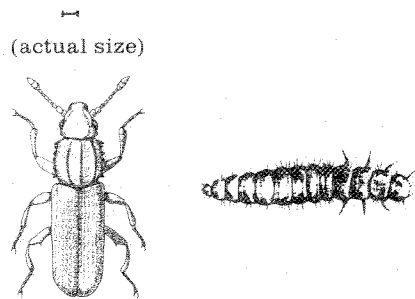


Figure 2: Sawtoothed Grain Beetle, adult (left) and immature stage (right).

Eggs are laid in crevices in the food supply. The larvae are yellowish-white with a dark head, and worm-like shape. Larvae feed on the same foods as the adult stages. Under optimal conditions they can complete a generation in less than two months. Adult beetles may live for a year or more.

**Carpet beetles.** (See Service in Action sheet 5.549, *Carpet beetles: characteristics and control*). Several species of carpet beetles (Dermestidae) occur indoors and outdoors in Colorado. They have extremely diverse feeding habits but prefer high-protein materials of animal origin, such as wool and skins. Household lint, dead insects or other debris are common materials on which large numbers of carpet beetles may breed.

Infestations of carpet beetles in pantries are less common than for flour or sawtoothed grain beetles. Carpet beetles are relatively slow to develop and require about one year for a genera-

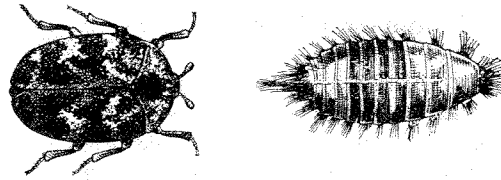


Figure 3: Carpet beetle, adult (left) and larva (right).

tion on cereal products. However, since the insects are highly mobile, infestations may reoccur annually.

Carpet beetles are much more common as pests of woolens, furs and other materials of animal origin. They are far more common, and more damaging, to fabrics than clothes moths in Colorado.

**Spider beetles.** Spider beetles (Ptinidae) are a relatively rare pest of stored food in Colorado. They are larger than the other common stored products beetles and appear similar in shape to a spider. However the three pairs of legs that spider beetles have, distinguishes them from the eight-legged true spiders.

Spider beetles can potentially infest a wide variety of animal or vegetable products. They are most commonly associated with grains, although feathers, wool, dried meat and other products can be eaten.

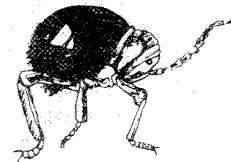


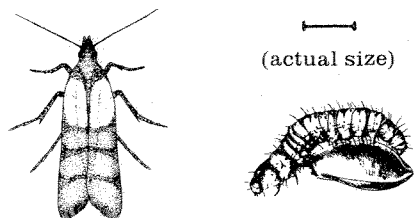
Figure 4: Adult spider beetle.

Eggs of the spider beetles are white and may be conspicuously laid about the food products. The larvae are C-shaped and resemble small white grubs. Pupation of spider beetles often occurs in small cavities, which they chew out of wood or other soft materials.

**Indianmeal moth.** (See Service in Action sheet 5.572, *Moths in the home: characteristics and control*). The Indianmeal moth (*Plodia interpunctella*) is an extremely common insect found infesting food products in Colorado homes. Almost any coarse grains (oatmeal, grits, etc.), nuts, seeds, dried pet foods, candy bars, spices, cocoa, dried fruits or vegetables (e.g., chili's) are suitable materials for Indianmeal moth development. However, flour is rarely infested.

The adult stage of the Indianmeal moth is about one-half inch in length, generally gray with bronze wing tips. The moth is the most common small moth found flying in Colorado homes. Feeding damage is done by the larvae ("worms"), which are usually light in color (pale yellow to pink) with a dark head. When feeding, the larvae produce webbing that is mixed with food particles and droppings.

Indianmeal moth occurs throughout the United States and most household infestations originate from the inadvertent purchase of infested products. During warm months, localized movements of the moths also may occur outdoors, resulting in household infestations in this manner. Because of the broad distribution of the insect, it is rarely possible to definitely establish the original source of a meal moth infestation unless detected at purchase.



**Figure 5: Indian Meal Moth, adult (left) and larva on wheat kernel (right).**

Eggs are laid by the adult moths near suitable food, such as along cracks or folds of packages. The newly hatched larvae are small and capable of penetrating loosely closed packaging. When they reach a suitable food, they begin to feed. Development can be rapid under favorable conditions and the larvae ultimately reach a length of about one-half inch. Pupation occurs and the adult moths emerge. Adult female moths are capable of laying 200 to 400 eggs during their lifetime of several weeks. Complete development of the Indianmeal moth varies due to temperature and food but typically requires at least one month to complete.

**Insects infesting whole grains.** Several species of beetles can infest whole (unmilled) grains and beans. Among the more common of these "direct pests" is the lesser grain borer, which develops by tunneling kernels of wheat and other small grains. Other types of beetles infest seeds of corn, rice, beans or other items. Although relatively infrequent in homes, these insects can cause serious losses to bulk storages of grains. They also produce grain particles that allow other insects, such as sawtoothed grain beetle, to become established in a food storage area.



**Figure 6: Lesser Grain Borer**

## Control

When insects are first detected in food products, try to identify all sources of infestation in the home. Check all susceptible food items in cupboards and pay particular attention to items that have not been used for a long period of time. Also check areas of spilled foods.

If you know the identity of the insect it will help you focus your search. If flour beetles are present, look only through finely-milled materials. Sawtoothed grain beetles may infest a wider range of food, including oatmeal and coarsely milled food. Indianmeal moths or cockroaches infest pet food or bird seed and other ornamental items that involve the use of grains or dried fruits and vegetables. Carpet beetles most typically are established in woolens, furs and household lint.

The physical presence of the insects is the most obvious means of detecting areas of infestation. Also look for old cast skins left by flour and carpet beetles. The presence of webbing is an easy means to detect items infested by Indianmeal moth.

Items infested by insects that live within the food (carpet beetles, flour beetles, or Indianmeal moth) should immediately be discarded or temperature treated to kill the insect. To control with cold treatment put infested items in deep freeze three to four days. To improve the effectiveness of this treatment alternate freezing treatments with a period of rewarming to room temperature. For high temperature treatments, heat the oven between 133° and 140° F for 20 minutes. Injury to the food is possible with excessively high temperature treatments.

Heat- or cold-treated objects are capable of being reinfested. Keep in the refrigerator or store in tight-fitting containers until household infestations are eliminated. Adult Indianmeal moths and flour beetles deprived of food might live three to five weeks. Carpet beetle and cockroach infestations typically take much longer to eradicate. Since insects also can develop on spilled food, **thoroughly** clean areas where food is stored by vacuuming or sweeping all spilled food. Often bleach or other sanitizing agents are used during this clean up phase. These agents can kill a few exposed insects and eggs, but have no residual effect, unless spilled foods are completely eliminated.

As a routine precaution, materials suspected of having insects can be treated by freezing after purchase. Purchase smaller amounts of food and use food products directly after purchase to prevent infestations from being established from insects brought in on the food.

Use of insecticides within the pantry area is not generally recommended and normally will give little additional control in the absence of sanitation. Some household formulations of the insecticides chlorpyrifos (Dursban), and pyrethrins are labelled for use as crack and crevice treatments near food storage areas. Formulations of the insecticides diazinon (Spectracide) and malathion that allow indoor use also may help control insects in some areas of the home. However, **insecticides should never be applied in a manner that allows direct contact with food or food utensils.** Remove all food and utensils during insecticide treatment to avoid accidental contamination.

Because of the diverse feeding habits and mobility of pests, such as cockroaches and carpet beetles, controls must take place over a larger area of the home. (See references.)

**Always read and follow label directions when using pesticides!** This is particularly important when direct treatments are made around food-stuffs or food handling areas. Only products labelled specifically for use around food storage areas may be used for controlling stored products insect pests.

**Properly Store Insecticides within a Home**

- Purchase only the amount of insecticide you intend to use.
- Store insecticides and other pesticides out of reach from children or pets.
- Store pesticides away from heat or high moisture.
- Never store pesticides with food or food utensils.
- Properly dispose of pesticides as indicated on the label or according to local regulations on hazardous waste disposal.

**References**

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