



Pantry Pests

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What you should know

- Pantry pests are usually brought into the home in prepackaged food products.
- Beetles and moths are the most common pantry pests.
- Insects can feed on processed food or broken kernels and can chew through paper, cardboard and foil.
- Homeowners can successfully manage pantry pests without chemical control by using careful sanitation.

Pantry pests are insects that infest whole or processed food in the home. Infestations can start out with just a few insects, but a population can quickly surge if given a proper food source and a place to reproduce. Immature and adult insects are typically brought into a home in grain-based products. Pantry pests can thrive in unopened boxes or pouches and adults can survive without any food for months. Pantry pests can remain active all year since homes are heated during the winter. All insect stages can be present at the same time and sometimes the immatures and adults can cause damage to stored food.

Finding insects in food can be disturbing, especially when they are in your kitchen. Commonly infested foods include flour, cereal, pasta, baking mixes, whole or cracked grain, dried fruit, nuts, popcorn and spices. Other items around the home may also become infested, and include pet food, birdseed and dried flowers. Often the insect infestation is obvious and can be located quickly; however, sometimes the source of insects can be difficult to find. Consider looking for insects around small and large appliances, large food storage containers or even in the attic or unopened food.

In general, sanitation will eliminate pantry pests and prevent further infestations. In most situations, controlling pantry pests simply requires disposing of infested food and regularly vacuuming food storage areas. Sometimes infested food products can be saved by storing in a freezer or heated in an oven. Washing infested areas with detergent or bleach is not an effective prevention method for pantry pests. Chemical control for pantry pests is rarely justified for homeowners since sanitation provides sufficient management. Never apply insecticides in a manner that allows direct contact with food, food preparation surfaces or utensils.



Fig. 1. Common dermestid beetle larvae²

Guidelines to reduce pantry pests:

- Inspect grain-based food for insect activity immediately after purchase and periodically check for insects.
- Only buy what food you can use within two months.
- Keep food properly stored in air-tight plastic or metal containers. Insects can chew through paper, plastic or foil storage bags.
- Remember FIFO (first in, first out) when stocking the food pantry. Using older foods first will help minimize continuous infestations of new foods.
- Immediately clean up food spills, especially cooking with grain-based products. Do not allow crumbs or food particles to build up where food is stored or prepared.
- Regularly vacuum and wipe out pantry shelves or areas where food is stored. Empty the vacuum to prevent reinfestations. Washing spills with soap will only create a food paste in shelving cracks that is favorable to insects.
- Remove accumulating paper from damp areas and discard any heavily infested food products. Look for other possible food sources around the home.
- Use caulking to seal cupboard or pantry shelving cracks or anywhere food is stored to reduce food particles.

Dermestid beetle

Dermestid beetles are a common household pest, and are not restricted to just the pantry. Typically, dermestid beetles are scavengers and feed on dried animal matter and natural fibers. Preferred food sources include dried meat and dead insects. If the preferred food sources are scarce, dermestid beetles will feed on candy, spices and many other dried foods. Sometimes dermestid beetles infest stored clothing and fabrics. Proper storage and moth crystals can preserve valuables.

Dermestid beetles can continuously reproduce if living indoors. Larvae (Fig. 2) are light brown and covered with long hairs. Usually dermestid beetle larvae are secretive and like to hide in dark places, but will leave behind many caste larval skins. Fully developed larvae seek out wooden materials to pupate and are often discovered during this time. After pupation, the adults will mate and lay eggs near a suitable food source. Adults (Fig. 1) are small, dark-colored, elongated and covered with hairs.



Fig. 2. Dermestid beetle larva and adult¹

Sawtoothed grain beetle

Sawtoothed grain beetle larvae and adults usually infest processed foods, such as cereals, pasta, cornmeal, flour, oats, spices, herbs, bread and dried pet food. Sawtoothed grain beetles will also attack dried fruits and meat, sugar and chocolate.

Sawtoothed grain beetles can continuously reproduce up to seven generations per year if living indoors. Fully developed larvae are 1/4" long, yellowish-white in color and have a dark head. Adults are 1/4" long, slender and brown-red in color (Fig. 4). Adult beetles have wings but do not fly and can live for more than one year. Adults are named for the six saw-like teeth on the sides of the thorax and are very active insects that easily penetrate packaged food. Eggs are laid in cracks and crevices of food pantry areas.



Fig. 4. Sawtoothed grain beetle adults¹

Indian meal moth

The Indian meal moth is the most common pantry pest in the world and larvae will infest a variety of grains, cereals, dried fruit, nuts, seeds, chocolate, candy, spices and powdered milk. Large numbers of Indian meal moth larvae can be found in dried pet food and birdseed. Infested food products will be webbed together. Occasionally, infestations may spread to stored clothing and fabrics; proper cleaning and storage will help prevent Indian meal moth damage to valuables.

Indian meal moth larvae are the damaging stage and have a light creamy-colored body with a dark brown head (Fig. 3). Larvae can feed for over a month and grow up to 2/3" in length before developing a loose cocoon in small crevices or cracks. Adults are a dull color, have bronze-colored wings, and are about 3/8" long with a wing spread of 5/8" (Fig. 2). Adults live for about one week and fly in a "zig zag" pattern at night and seek out potential food sources to lay eggs.



Fig. 3. Indian meal moth larva and adult²

Confused and red flour beetles

The confused flour beetle and red flour beetle are similar in appearance (Fig. 5) and are considered common pests of flour mills. Flour beetles are scavengers and will only feed on whole grains damaged by other insects. In addition to cracked grain, flour beetles feed on flour, dried fruits, nuts, spices, chocolate and tobacco.

The confused and red flour beetles can continuously reproduce if living indoors. Adult flour beetles are 3/16" long, reddish-brown in color and have a distinct joint between the thorax and abdomen. The confused flour beetle is not capable of flight but the red flour beetle can fly. The antennae of the red flour beetle is abruptly clubbed and the antennae of the confused flour beetle gradually enlarges toward the tip. Adult flour beetles can live up to two years.



Fig. 5. Red and confused flour beetle adults¹

Other beetle pantry pests

In addition to the most common pantry pests, there can be many other beetles infesting stored food products in the home. Examples of other pests include: spider beetle (Fig. 6), flat grain beetle (Fig. 7), cigarette beetle (Fig. 8), and drugstore beetle (Fig. 9). In addition to whole and processed grain products, these beetles can be found infesting tobacco, cigars, book bindings, chocolate, candy, wool, hair, leather, dried flowers, and spices.

Many of the adult beetles look similar in appearance without a hand lens. The management recommendations for these rarely seen beetles is the same as described for common pantry pests. Sanitation, including disposing of infested food and regular vacuuming, should eliminate pantry beetles.

The life cycle of pantry beetles is highly dependant on the temperature, humidity and the quality of the food source. Eggs are usually laid in the food source. There may be four or more generations per year in poor sanitary conditions. Adults range in size from 1/16 - 3/16" long and have wings that form an outer shell. Fully developed beetle larvae can reach up to 1/2" long and are often described as white or yellow grubs.



Fig. 6. Spider beetle adult³



Fig. 7. Flat grain beetle¹



Fig. 8. Cigarette beetle larva and adult¹



Fig. 9. Drugstore beetle larvae and adults³

Pantry pest control

Regardless of which pantry pest has invaded the home, the only reliable control technique is to locate and remove all infested food sources. Use air-tight containers to help minimize infestations (Fig. 10). The adults and larvae can survive on food dust particles and will re-invade new food until the food source is removed or consumed.

To minimize pantry pest infestations, rotate all dried food and use older food first. Avoid keeping excess stocks of susceptible food items. Severe infestations generally occur in containers of food that have been stored for extended periods of time. When infestations do occur, examine all stored food, even unopened containers, for insect activity. Signs include the presence of adult beetles, larvae, and shed larval skins, or off-odors, flavors, or colors. Infested food sources can be treated with heat or cold or simply discarded. Neither the heat treatment nor the cold treatment will remove insect bodies, skins, fecal material or off odors, flavors, or colors.

Heat treatment consists of placing the food item in an oven for 30 to 60 minutes at 130-140°F (or as long as it takes to heat the food item all the way through). This temperature should kill all insect stages. Heating whole or processed grain may alter the characteristics of some foods and may not be economical in terms of energy cost versus replacement cost of the food item. Do not attempt to heat treat finely ground foods such as flour due to the danger of fire or explosion in the oven.

Cold treatment is accomplished by placing the food item in a freezer at 0°F or lower for 4 to 7 days after the entire bulk of the food reaches 0 degrees. This should also kill all insect stages. As with the heat treatment, there are some foods that do not freeze well and will be adversely altered by this treatment.



Fig. 10. Use air-tight containers for food storage

¹ Images courtesy of Clemson University, USDA Cooperative Extension Slide Series (www.forestryimages.org).

² Images courtesy of Whitney Cranshaw, Colorado State University (www.ipmimages.org).

³ Images courtesy of the University of Wisconsin-Madison (<http://www.entomology.wisc.edu/insectid/index.html>).

Precautionary Statement: All pesticides have benefits and risks, however following the label will maximize the benefits and reduce risks. Pay attention to the directions for use and follow precautionary statements. Pesticide labels are considered legal documents containing instructions and limitations. Inconsistent use of the product or disregarding the label is a violation of both federal and state laws. The pesticide applicator is legally responsible for proper use.

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