Discovering “bugs” in your breakfast cereal may be disgusting, but it isn’t unusual, because many insects like to eat what we do. Stored foods commonly infested include flour, cereals, cracked grains, baking mixes and processed foods, crackers, macaroni, cured meats, powdered milk, dried fruits, nuts, popcorn and spices. Insects that feed on these products may also infest other grain-based items such as pet foods, birdseed and ornamental corn. Dried flower arrangements may also be attacked. Insect pests most often encountered in stored food products are:

- Indian meal moths
- dermestid beetles
- sawtoothed grain beetles
- cigarette and drugstore beetles
- flour beetles
- granary, rice and maize weevils
- bean weevils
- spider beetles.

Several stages (egg, larva, pupa and adult) of these insects may be Continued on next page.
present at the same time in infested products. Because we keep our houses warm, these insects may continually reproduce and many stored product infestations can be found nearly any time of the year.

The first indication of an infestation is often presence of small brown beetles, moths or worms in cupboards or on counters. Upon closer inspection, insects may also be found in opened packages or containers of food and in the cracks and crevices of cupboards. Unopened packages may also become infested because some of these insects can readily chew into cardboard and foil packaging. Insects can be brought into the home along with infested food products. They can multiply and spread to other stored foods.

Once an infestation is suspected, identify the pest and try to locate the source. Occasionally, the source of an infestation can be very hard to find. It may be in an unopened package from the store. Consider the possibility food may have been spilled next to or behind hard-to-move appliances. Mice will sometimes collect seeds or dry pet food and hoard them in walls, under cupboards or dishwashers where the infestations are nearly impossible to find.

**Indian Meal Moth (Plodia interpunctella)**

The Indian meal moth (IMM) (Figure 1a) is the most common food-infesting moth found in homes, grocery stores and any place where dried pet foods are produced or stored. It feeds on a large variety of stored food products, but home infestations often get started through dried pet food or birdseed. Nuts are a favorite breeding source; infestations have been found in nut caches of squirrels in attics and chimneys. The larva (Figure 1b) prefers coarse grades of flour, whole grains, cereal, dried fruits, seeds and spices. Foods infested with these insects will have silk webbing present, especially near the food surface.

Adult moths are nearly 1/2-inch long and have distinctive wing markings. The base of the forewing is pale grey and the outer two-thirds is reddish-brown with a coppery luster. They have a distinctive way of “resting” on the wall at an angle with their wings folded. The larvae are generally dirty-white in color with shades of yellow, pink, brown or green. Mature larvae, which are about 1/2-inch long, usually move away from the feeding site before pupating within silken cocoons.

When female IMM’s are ready to breed, they emit a sex pheromone which only the male moths can smell. This pheromone has been identified and synthesized and made into a lure that can catch male moths in a sticky trap. This is an ideal, non-toxic method of detecting the earliest signs of an IMM infestation and help pinpoint areas of activity. These lures attract males 25 to 50 feet away and last eight to 12 weeks. In a typical home environment, only one trap is often needed. These pantry pest sticky traps are available at many retail locations.

**Dermestid Beetles (Family: Dermestidae)**

These common insects scavenge and feed on animal matter like dried meats, dead insects, hides and woolens. The species that feed on wool and other natural fibers or blends are sometimes called carpet beetles. Closely related species, such as the warehouse beetle (Figure 2a), varied carpet beetle and larder beetle (Figure 2b), have expanded their diet and also feed on grain and grain-based products. They are especially common in flour and cereals, but also found in candy, cocoa, cookies, corn meal, nuts, pasta, dried spices and many other dry foods.

The adult beetles are small, oval and variously colored. The full grown larvae are similar in size to the adults for each species and tend to be cigar-shaped and banded with dark, long hairs. In some species, the larvae have a tuft of hair at the tail-end of the body.

Typically, only larvae will be seen in infested food because the adults feed on pollen and leave the food once they have emerged from their pupal stage. Sometimes only the larval "skins" will be found. Dead adults are often found in window sills because they fly to the light, trying to get outside.

Because some of these species feed on woolens, infestations in the pantry may spread and damage valuable clothing, woolens and furs. Proper cleaning and storage of natural fabrics will help prevent damage.

**Sawtoothed Grain Beetle (Oryzaephilus surinamensis)**

The Sawtoothed grain beetle (Figure 3) is another very common pantry pest. It does not feed on intact whole grains, but feeds on many processed food products such as breakfast food, bran, dried fruits, nuts, sugar, chocolate and macaroni. It is especially fond of oatmeal and birdseed. These flat beetles can even get into sealed boxes and packages of food.

Adults are nearly 1/4-inch long, slender, brownish-red and active. Their name comes from the six saw-like teeth on either side of the thorax behind the head. After finding a potential food, the female lays white, shiny eggs that hatch into yellowish-white larvae. There can be as many as seven generations each year, but sawtoothed grain beetles often stop breeding in the winter, unless buildings are heated and moisture is sufficient. Adults are very long lived and remain active in the winter.

**Cigarette and Drugstore Beetles**

These small, stout beetles (Figure 4) are common in homes where they attack pet food, cereals, spices, drugs, tobacco and other packaged foods. Because they closely resemble each other, they are often confused. The heads of both beetles are tucked under the prothorax and are not visible from above. Both are brown and about the same size.

The two beetles can be distinguished by their wing covers. The wing covers of the drugstore beetle have rows of longitudinal grooves, while those of the cigarette beetle are smooth. Another distinguishing feature is the antenna. The drugstore beetle has a three-segmented club, while the cigarette beetle has an antenna that

*Continued on next page*
Flour Beetles  
(Tribolium spp)

There are a number of species of tiny beetles that infest flour, but the two most common flour beetles are the confused (Figure 5) and red flour beetles. These beetles are scavengers in that they cannot attack whole grains, but rely on other insects to damage the kernels first. In homes, they can be found feeding on flour, cracked grains, cake mixes, beans, peas, dried fruits, nuts, chocolate, spices and tobacco.

These red and confused flour beetles are very similar: both are reddish-brown and about the same size, 3/16-inch long. They can be distinguished by their antenna. The antenna of the red flour beetle ends abruptly in a three-segmented club while the antenna of the confused flour beetle gradually enlarges toward the tip, ending in a four-segmented club. In addition, the sides of the red flour beetle’s thorax are curved while the confused flour beetle’s thorax has straighter sides.

The biology of these two beetles are very similar. The primary difference is the red flour beetle flies and the confused flour beetle does not. If you see a red flour beetle crawling on the counter, the breeding source is probably nearby, but not necessarily. A confused flour beetle crawling on the counter is almost certain from a nearby food source.

Granary and Rice Weevils (Sitophilus spp)

These insects damage whole grains or seeds. They generally do not feed on flour or cereals unless it has become caked.

Adult weevils are very similar (Figure 6a and 6b). Both are dark reddish-brown and range in size from 1/8 to 3/16-inch long. They have a long snout projecting from the head and wing covers with distinct ridges.

Females lay eggs on seeds, kernels or other suitable foods. The larvae chew into the seed and feed on the inside of whole kernels/seed. Pupation normally occurs within hollowed-out kernels or seeds. There can be as many as three to five generations each year. Weevil-damaged grains are typically hollow and have small round emergence holes.

Because they feed on whole grains, these insects are more likely to be a problem in grain bins and warehouses, but it is possible to have infestations in homes. Most common sources are popcorn, birdseed, decorative Indian corn and nuts.

Bean Weevil  
(Acanthoscelides obtectus)

The most common pest of stored legumes, such as beans, cowpeas and peas in Nebraska is the common bean weevil (Figure 7). The bean weevil is not a true weevil, like the granary and rice weevils, discussed earlier. They are members of the closely related seed beetle family. Their body shape is more round than the rice and granary weevils and they do not have the slender protruding snout of these true weevils.

Bean weevils are common in the field. Sometimes, gardeners harvest beans from the garden that look perfectly good, but can be infested. The homeowner may notice bean weevils for the first time on windows and doors as they emerge from stored seeds. They are attracted to light and are attempting to escape. Usually, there is little concern for their presence until a sack of dried beans or peas, especially homegrown, is emptied and found full of holes. Occasionally, one may take a package of dried beans or peas out of the cupboard to find it infested with small, stout beetles with a short, broad snout.

The adult bean weevil is a short chunky beetle, about 1/8 inch in length. It is olive-brown with darker brown and gray patches on the wing covers. The elytra are shorter than the abdomen leaving a few segments exposed. Legs are reddish.

With beans stored indoors at warm temperatures, bean weevils breed continuously as long as there is food left in the beans. Populations can become very high.

Spider Beetles  
(Family: Ptinidae)

Spider beetles (Figure 8) get their name because many actually resemble small spiders in appearance with their small head, prothorax and large globular-shaped abdomen. With a quick glance, their six long legs and two long antennae look like the eight legs of a spider.

Adults vary in size from 1/8 to 1/4-inch long, are reddish-brown to black. Females lay eggs within the food mass, such as grain, seeds, cereals, dried fruits, meats, wool and hair. Mature larvae are approximately 1/4-inch long, cream to tan in color and curved. Larvae usually curl their bodies when disturbed. Most spider beetles have two or three generations each year.

Spider beetles are mainly scavengers, but will infest grain-based products that are old, moist and possibly moldy. There is often an association with spider beetles and infestations of rodents, birds, bats or bee/wasp nests in walls or attics. These beetles will feeding and breed in accumulations of

Continued on next page
animal excrement. Older homes and warehouses tend to have more spider beetles due to the likelihood of these food sources. As infestations become severe, beetles will crawl and emerge from walls between floors, attics, basements and crawl spaces. When associated with an animal infestation, removal of animal wastes is an essential component of managing spider beetles.

**Grain Mites (Acarus siro)**

The grain mites (Figure 9) are pests of food and feed products, like cereals, dried vegetable materials, cheese, corn and dried fruits. These mites proliferate under high moisture conditions and are often found in conjunction with fungal growth. Severe infestations result in brownish tinge over the commodity, called “mite dust” because of the light brown coloring of the mite legs. This “mite dust” gives off a “minty” odor if the mites are crushed.

The life cycle from egg to adult takes only about two weeks at normal room temperatures. Overcrowding in heavily infested products will force mites to move off in search of other food sources.

**Pantry Pest Prevention**

The following tips may be useful:
- Purchase food in package sizes that can be used up in a short time. Do not store food products more than two to four months, if possible. Use older packages before newer ones and opened packages before unopened ones.
- When purchasing packaged foods, be certain containers are not damaged and seals are intact.
- Store dried foods in insect-proof containers such as screw-top glass, heavy plastic or metal containers. This will prevent entry or escape of insects. Cardboard, paper or plastic wrapping will not prevent insect infestations.
- Keep food storage areas clean and do not allow crumbs or food particles to accumulate, as exposed food will attract insects. Cleanliness is especially important in areas where pet foods and birdseed are stored.

**Control of All Stored Food Pests**

Inspection and identification of all potential food sources is essential to controlling the infestation. Control requires locating and discarding all infested items. Do not overlook intact boxes or containers because many insects can chew their way into cardboard and foil.

Infested items can be thrown away or salvaged by freezing three to four days. Food can be heated in a 140°F oven for an hour with the same result. Empty and thoroughly vacuum cupboards or shelves holding infested items, paying particular attention to cracks and corners. Vacuuming picks up hiding insects and spilled or infested material. Empty the vacuum cleaner or discard the vacuum cleaner bag after use to prevent reinestation.

Do not use insecticides for controlling these or other insects in pantry areas. Washing shelves with detergent, bleach, ammonia or disinfectants will not have any effect on these pests since these insects lay their eggs on suitable food. Removing infested items and thoroughly cleaning with a vacuum is usually sufficient. As a precaution against reinestation, store susceptible foods in tightly sealed glass, metal or heavy plastic containers or in the refrigerator or freezer.

If insects continue to appear, go through stored items again, also check other rooms in the home for possible sources. Tree seeds blown into ventilators or around windows may harbor these pests. Dermestids (carpet beetles) can develop in many products such as feathers, silk, wool, fur, stuffed animal skins, dead insects, lint and many other materials. If insect problems persist, seek assistance from a pest control professional.

*This educational resource guide was adapted from* Insect Pests of Stored Food in Kitchen and Pantry, G93-1130, authored by S. Kamble, D. Keith and J. Kalisch, University of Nebraska.