



## BETTER INFESTING FLOUR AND MEAL

**INJURY:** Beetles of several species infest packages of whole grain and grain products. The infestation may begin at the time of manufacture or processing, in the warehouses or food distributors, in transit, on the grocers' shelves, or in the home. Most food processors and handlers make every effort to avoid insect infestations, but occasionally the efforts fail.

Infestations are usually discovered when an infested package is opened for use or when small brown beetles are found in the kitchen near containers of stored grain products. A wide variety of foods may be infested including flour, cereal, dried fruits dehydrated vegetables, shelled nuts, chocolate, spices, candies, pet foods, and birdseed. Eggs, larvae, pupae and adults of the beetles may occur in the infested foods.

**DESCRIPTION:** Two dozen or more different species of insects may occasionally infest grain and grain products used in the home, but four species are much more frequent than the others. Three of these are minute insects, and the fourth is of more moderate size.

The confused flour beetle is perhaps the most common. It is about 1/7 inch in length, and is an elongated, dark brown, hard-shelled beetle. Nearly as common is the saw-toothed grain beetle, which is slightly shorter and more slender. Both species lay eggs so small as to be nearly visible to the naked eye. Their growth and development is similar. The newly hatched larva, a tiny cream-colored insect with dark head, feeds voraciously upon grain and meal, and under the best of conditions will complete its development in six to seven weeks. The pupal stage will require another 10 days to two weeks, so that it is not uncommon to have five or more generations each year. Adult female beetles may lay hundreds of eggs during a two- to- three-year lifespan.

A third species, the red flour beetle, is a red-brown color and slightly larger than the confused flour beetle. Its development is similar to those described above.

The yellow mealworm is a larger insect, the adult being more than 1/2 inch in length. It develops more slowly than the three small species, seldom completing a generation in four months and frequently requiring more than one year. Because these large black beetles are so easily seen, and because of their extended period of development, infestations are usually discovered and treated before they become serious in the home.

Though these four are the most common of the beetles infesting meal and flour in the home, many others are not uncommon, and vigilance is necessary to detect infestations as early as possible.

**MANAGEMENT:** The following suggestions may be useful in bringing an infestation quickly under control. Prompt action can be important in preventing losses of quantities of foods stored on kitchen and pantry shelves:

- Carefully examine all susceptible foods that may have been exposed to infested material. Insects may even be found in paper-wrapped products, which have not yet been opened in the home. All infested packages should be destroyed. There is no satisfactory way of separating insects from the flour or meal.
- The contents from opened packages, which appear to be uninfested, should be transferred to glass jars with tight-fitting tops. This precaution is necessary because of the possibility that eggs of beetles, concealed in the product when the examination was made, may hatch later and lead to a new infestation if not contained. The glass aids in the periodic examination of the food.
- Remove all food containers and utensils from the infested area. Remove old shelf paper and clean thoroughly, first with a vacuum cleaner and then with soap and water. Special attention should be paid to cracks and corners where bits of flour, meal or spices may have accumulated.
- Continue to observe the area for several months after above procedure. If beetles reappear, the clean up may have been inadequate, or a newly infested package may have been brought into the kitchen.
- In extreme cases, remove utensils, dishes and food and treat cupboard cracks and corners with a household formulation of an insecticide that contains one of the following active ingredients: cyfluthrin, deltamethrin, lambda-cyhalothrin, or pyrethrins. When material is dry, put down fresh shelf paper. Never place food or dishes back in the closet until material is entirely dry.

Long-term storage of meal and flour products often leads to infestation and, therefore, such products should be purchased in quantities suitable for early use unless adequate containers are employed.

Insecticides should be used only according to instructions on the label, and such materials should never be stored with foods.

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