

# Controlling Stored-food Pests in the Home

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The ability to store food helped our ancestors to survive and live more comfortably. Home storage of food is still a useful, necessary practice, even though we no longer face the same problems of survival. We do, however, share with our ancestors one continuing problem, the presence of insect pests in stored food.

Discovering “signs of life” in home-stored grain, flour, or dry food products is frustrating. The insect pests that most commonly infest food items include saw-tooth grain beetles, flour beetles, Indian meal moths, and carpet beetles (see Figs, 1-4). Collectively they often are referred to as “flour weevils.” This is misleading since true weevils are seldom found, and when they are discovered, true weevils infest many non-flour food items.

The life cycles of the common food pests vary with different conditions, but they all need to eat. Their food source includes all dry food products stored in the home, including pet foods and animal fibers.

Thousands of dollars are spent on home food storage in today's society. A large amount of food is wasted because of insect damage during storage. Most damage can be prevented through proper buying, careful attention to storage conditions, and the timely rotation of stored food.

Also, weatherizing the house to keep out cold and heat also will help exclude stored product insect pests. Be sure to caulk where pipes, dryer vents, etc. enter the house, and to install good weather-stripping around doors and windows.

## Inspecting the home for food pests

Insects that infest food are found almost everywhere. To minimize or prevent infestations, keep the kitchen, pantry and other food storage areas clean and free of spilled flour, cereal products, or pet food.

When an infestation is discovered, the first step is to inspect the home to determine the infestation source. This is most important! Usually insect problems begin in the kitchen or pantry where most food is kept. Examine all potential sources such as prepared cereals, flour, garden seed, dry milk products, prepared mixes, spices, dry pet foods, and livestock feeds. Be sure to inspect behind and under cupboards, cabinets, drawers, and appliances where food particles may have accumulated. Check cupboard corners carefully. Mounted trophy birds, game heads, hides, feathers, pet food, old furniture, and wool carpets are frequently the source of carpet beetles.

In persistent cases where the infestation source remains a mystery, look for external sources, including bird and rodent nests. These same insect pests come from leaf-cutting bee boards, honeybee boxes, and farm seed stored near the home. Once the insect source is located, the food must be discarded, removed, or treated to control the pest.

## Protection of kitchen and pantry areas

**Step 1.** Remove all dishes and foods before cleaning and treating a storage area for insect control.

**Step 2.** Remove paper or cloth shelf coverings for cleaning. Insects hide under such covering.

### Three keys to reducing problems with stored-food pests:

- Proper buying
- Proper storage
- Good housekeeping



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**Step 3.** Use a vacuum cleaner to clean debris from cracks and corners of storage areas. Discard the vacuum bag when finished.

**Step 4.** Scrub storage space and vicinity with very hot water and a strong detergent solution. Rinse well. Allow to dry.

Note: Steps 1-4 are all that are necessary in most cases. If you still want to use an insecticide, follow steps 5-7.

**Step 5.** Spray the cupboards and shelves with one of the household pressurized sprays containing tetramethrin, sumithrin, or pyrethrum. Select one that states on the label that it is for crack and crevice spraying to control carpet beetles, ants, etc., in cupboards and cabinets in homes. Follow label directions and be sure that all crevices and joints are thoroughly wetted with spray. Diatomaceous earth, boric acid dusts, or silica gels may be applied to cracks and crevices instead of sprays. Do not treat food, dishes, or utensils. Do not treat counter tops where food is prepared.

**Step 6.** Ventilate room and allow two hours drying and airing time. If shelf coverings are used, replace with new ones. It is best for people and pets to be out of the room.

**Step 7.** Wash flat surfaces of cupboards again with clean water to remove extra residue and odor.

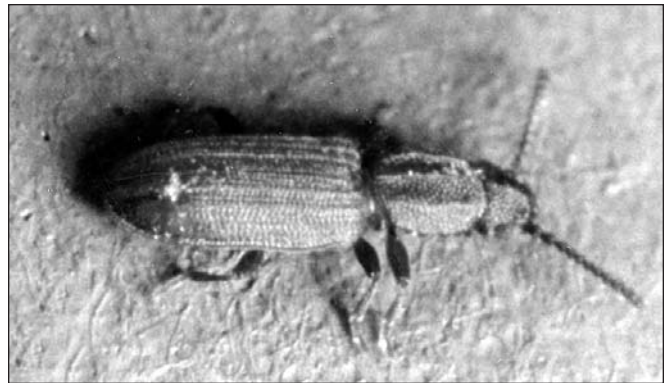
**PESTICIDE RESIDUES:** These recommendations are based on current labels for each pesticide listed. To avoid excessive residues, follow label directions carefully with respect to rate and number of applications.

**Step 8.** Place food in tightly covered containers before returning to storage even though the food does not appear to be infested. Doing so will help assure you that other food will not be infested.

Regularly inspect your cupboards and storage area to determine if treatment is necessary. Retreatment may be necessary to kill larvae or beetles that were missed or that emerged from protected egg or pupal shells after the initial treatment.

### Prevention in small quantity storage

Dry food items in the kitchen or pantry must be stored in clean food-safe metal, glass, or hard plastic containers. Tight-fitting lids are a must. An added benefit of tight-fitting containers is the containment of an infestation rather than its spread to other areas or food.



**Fig. 1. Sawtoothed grain beetle**



**Fig. 2. Red flour beetle, adult**

### Prevention in large quantity storage

Many people store bulk lots of wheat, rice, beans, dry milk, etc. The best protection available for your stored foods is a good pest prevention program. This should be a major consideration since improper storage can result in total loss of food to insects, rodents, spoilage, or moisture.

### Proper buying

Purchase clean insect-free grains. Preferably, buy grains prepared especially for home storage. Some companies have grain available in sealed metal containers, but these are expensive. Bulk buying of specially cleaned grain is acceptable if it is placed in permanent clean food safety storage containers immediately after purchase. Moisture content should be 10 to 12 percent or less.

### Proper storage

Food in open containers is almost certain to become infested. Storage in plastic, burlap, or cloth sacks is poor protection against insects, mice, or moisture and is not recommended.

Store grain in airtight containers. Several types of metal or hard plastic 5-gallon containers are available, but only those made for food storage should be used. Plastic containers designed for trash disposal should not

be used because the plastic may contain harmful chemicals. A 5-gallon can will store approximately 35 pounds of grain.

Use plastic bags designed for food storage as additional moisture protection inside the metal or hard plastic cans. When used separately, plastic bags offer little protection against insect infestation. Regardless of type or size of storage can, tight fitting lids are a necessity.

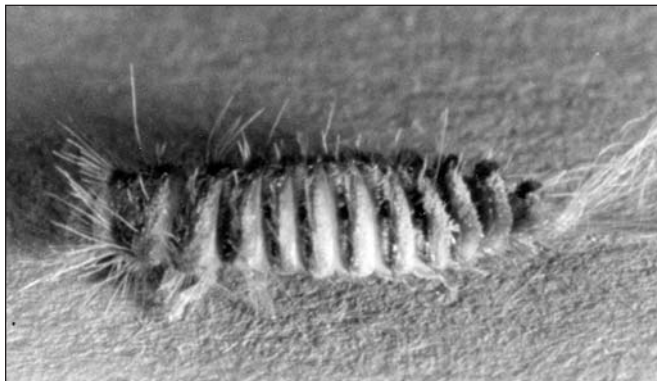
Store grain in a clean, cool, dry place, at least 18 inches off the floor and away from damp areas. Rotate the supply frequently so that the older grain is consumed first. Use a permanent marker to write "use by" dates on the containers.

### Good housekeeping: A necessity

Keep food storage areas free of spilled food, grain, or flour. Wheat grinding equipment must be kept clean when not in use. Wipe excess flour from grinder and vacuum immediately after use. Old dry food products and pet foods should be discarded if there is no longer a use for them. Periodic inspection and cleaning of areas behind shelves and appliances will help prevent food particle accumulation. Animal products, such as hides and feathers, require occasional dusting and treatment with appropriate insecticides to maintain good condition.



**Fig. 3. Indian meal moth, larva and damage**



**Fig. 4. Carpet beetle larva**

In summary: Good housekeeping is the cornerstone for preventing insect infestations of home-stored food.

### Insect control tactics

As previously indicated, heavily infested products should be destroyed. Often it is not necessary to destroy lightly infested grain or flour products, depending on your tolerance level. If you want to save slightly infested products, treat small quantities at a time by either heating or freezing according to the following guidelines:

#### Heating

Heat oven to 140° F. Put grain or flour in shallow pan and place in oven for 30 minutes. This process will destroy the grain's germinating ability.

#### Freezing

Place small packages in a freezer at 0° F or below for at least 4 days. Leave larger packages for at least 7 days. This process may cause excessive moisture in the product if it is defrosted in a humid room.

### Repellents

Homeowners have used bay leaves, spearmint and peppermint gum, and other scented items to repel grain insects, with the claim of many years of insect free storage. The authors have not experienced good results from these repellents in controlled test situations. Therefore, we do not recommend reliance upon them.

Proper buying, storing, and housekeeping still are the best methods to prevent stored food insect problems.

Insecticides should never be used to treat food items directly and should be used very cautiously in areas where food items are stored.

Several household aerosol sprays can be used to reduce infestations of insects, including stored-food pests. Certain insecticides can be used for crack and crevice treatment in food storage areas, but it is critical to read the pesticide label and determine the proper uses before and after buying. Follow directions completely and carefully.

### Dry ice for home grain fumigation

It may not be possible to purchase insect-free grain and cereal products or to be certain of noncontamination. In such cases, grain must be treated after purchase but before long-term storage.

Dry ice is not the most effective fumigant for controlling stored-grain pests but, if used carefully, it is one of the safer compounds available for home use.

To fumigate home-stored wheat or similar products, spread about 3 ounces of crushed dry ice on 3 or 4 inches of grain in the bottom of a 5-gallon container, then add the remaining grain to the can until it is the desired

depth. To fumigate larger quantities, use 8 ounces for 100 pounds of grain or 1 pound for each 30 gallons of stored grain.

Since the gas from vaporizing dry ice is heavier than air, it readily replaces the existing air in the container. Keep the container lid loose until the dry ice has vaporized and replaced the air. Then firmly secure the lid on the container.

If pressure causes the can to bulge after the lid has been put in place, cautiously remove the lid for a few minutes to release the pressure and then replace it. If you have plastic bags in the can, do not seal the bags until the dry ice has vaporized. Carbon dioxide will stay in metal or glass containers for some time if the container lid is tight.

When practical, use the dry ice procedure in a dry atmosphere to reduce the condensation of moisture in

the bottom of the can. If done properly, one treatment should be enough. Yearly treatments are not needed unless an infestation is found.

Dry ice will control adult and larval insects but may not kill the eggs or pupae. A tight-fitting lid placed firmly on the container as soon as the dry ice has vaporized may keep enough carbon dioxide inside to kill the eggs and pupae.

**WARNING:** Dry ice should be handled with care. Skin can be severely frozen if it is handled improperly. Dry ice should not be accessible to children or adults who are unaware of its freezing or vaporizing properties. Do not use in a closed room where carbon dioxide may replace air and cause asphyxiation.

*To simplify information, trade names have been used. No endorsement of named products is intended and no criticism is implied of similar products not mentioned.*

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