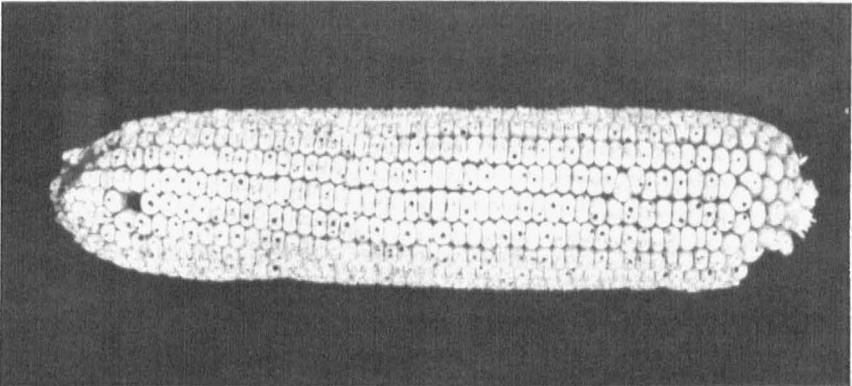


# Combating Pests of Stored Grain and Food

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Ear of corn showing severe damage by Angoumois grain moth.

It is important that everyone do everything possible to save food and feed from loss, be it due to neglect, the elements, or to insect attack. Dry stored foods, such as grain, seeds, mill products, and fruits, are always subject to serious losses by insects in the warehouse and stores, as well as in the home. Right now, it is important that everyone check on such food products and make certain that they are not being damaged by stored food pests. This brief report will have served its purpose if it does nothing more than call to the attention of millers, grain dealers, seed men, farmers, and housewives the importance of protecting grain and other stored foods from insect losses. Here are a few simple recommendations for preventing such losses.

## The More Important Insect Pests of Stored Grain and Foods

There is a large list of different insect pests of stored grain and other dry food products, but, fortunately, most of them have similar destructive habits, and control measures used against one may prove equally effective for a number of others. Also, in most cases, the pests which affect stored grain and food products in the farm bin and in the home are the same as those in stores, mills, and grain elevators.

In Missouri, the most serious pests of wheat, corn, and other grains and grain products include two moths which feed as caterpillars, two snout beetles or weevils, and half a dozen true beetles. Some of these feed only on or in whole grain, others only on cracked or ground grain, and still others largely on heating or molding grain.

**Grain Moths.**—Of the moths, the small Angoumois grain moth, whose caterpillar is responsible for the small, round holes in the grains of both shelled and ear corn, (See Fig. 1) as well as in wheat and other grains, is the most important single grain pest in Missouri. From the central part of the state south it may even attack oats and wheat in the shock or stack and unshucked corn in the field, but it is most serious in stored grain. Our second most important grain moth is the Indian meal moth, whose caterpillar attacks not only grain and cereal products but also soybeans, peanuts, nut meats, dried fruits, and many other foods in stores and homes. In the home, these two moths are frequently mistaken for clothes moths.

**True Grain Weevils.**—The two weevils or snout beetles are the small rice weevil and the slightly larger granary weevil. The first species is much more abundant and destructive. Both the legless grubs and the adults attack and feed in whole grain in storage and, at times, also out in the field.

**Grain Beetles.**—The mealworms, which resemble the true wireworms, are almost always present in or near stored grain, ground feeds, or even in chaff in or under mangers. The adults are about half an inch long, slow-moving, dark beetles found commonly under boxes or barrels near grain. The cadelle is a smaller black beetle with an active white larva. Of the very small beetles, the saw-toothed grain beetle and the confused flour beetle are usually most important. A newer arrival and one which promises to prove serious is the lesser grain borer. Both the slender brown beetle and its grub feed inside the grain. Besides these, there are several other small beetles, some of which are commonly associated with heating grain and mill products, and they help to hasten its spoilage.

Some of these grain insects may develop as many as four or five broods or generations in a year, and they are able to do great damage to grain in a short time if control measures are not applied.

## Controlling Stored Grain Insects

In the control of the various insects which attack stored grain, seeds, foods, and similar materials, sanitation is vital and cannot be overstressed. On the farm, in the mill, elevator, store and seed house, do not fail to thoroughly clean sacks, bins, rooms, and other storage space before refilling them. Old infested grain, used sacks, grain siftings about mills, and the like are sure to carry over the various grain pests which promptly reinfest the new crop or new shipment of seeds and foods. With a little care and effort and at slight expense much of our large annual loss from stored grain insects can be prevented.

**Control in Farm Bin.**—Bins, whether they be the new metal type or old wooden bins, should be thoroughly cleaned and, if grain pests are abundant, sprayed with an oil similar to odorless kerosene or with one pound of 50 per cent wettable DDT to 2½ gallons of water before new grain is stored in them. Roofs should be checked for leaks and cracks in the sides and bottom of wooden bins should be mended to make them reasonably gas tight. Then plan to thresh wheat, oats, and other small grains as soon after harvest as weather and grain moisture make it safe. This will help to prevent serious field infestation in such grains.

After the grain is threshed and stored, make a practice of examining it frequently and if insect injury shows up fumigate promptly. In farm bins, where there is no serious fire hazard, carbon bisulphide continues to be the most effective fumigant. Wherever there are fire hazards, however, the farmer should use the new combined ethylene dichloride-carbon tetrachloride mixture which is non-explosive. With a tight bin and an air temperature of 70° F. or warmer, 2 gallons of carbon bisulphide, or 4 gallons of ethylene dichloride-carbon tetrachloride, will treat 1,000 bushels of grain or a bin of approximately 1,000 cubic feet. Sprinkle the chemical on sacks spread over the surface of the grain in the bin, and *keep fire away if carbon bisulphide is used*. Also, avoid inhaling too much of these gases, for while they are safe to use they can prove harmful, even fatal, if carelessly used.

Ear corn in open cribs cannot be satisfactorily fumigated for the control of stored grain pests. Where infestation is serious and the corn is to be held long, crib the corn as early in the fall as possible and as soon as the moisture content of the grain is favorable shell and store it in tight bins, where it can be fumigated as described for small grain. During the winter months little damage is done to ear corn in open ventilated cribs, but grain insects may rapidly build up during the following summer and soon cause much damage. In such cases, either shelling and fumigating or feeding it out rapidly is necessary to cut down on loss.

**Treating Mills and Elevators.**—Sanitation and the use of modern equipment for drying and conditioning grain help greatly with grain pests in mills and elevators. However, fumigation, at times, is necessary. In such cases, as a rule, the deadly hydrocyanic acid gas proves most satisfactory, though methyl bromide, ethylene dichloride-carbon tetrachloride, and other gases may also be used effectively. With this type of fumigation work, however, a fumigation specialist is usually required.

**Treating Seeds and Stored Foods.**—In food stores and in the home, flour, cornmeal, cereals, nuts, dried fruits, and other foods are often attacked by stored grain pests. To prevent injury to such foods, keep them in unbroken sealed packages or in tight containers. If necessary, in the home heat them to 150° F. in a slow oven to destroy eggs and living stages of the pest. If desired, they may be fumigated in a tight box or barrel, using either carbon tetrachloride, which is commonly used in the home for removing grease spots, or carbon bisulphide. Two ounces of the former, or 1 ounce of the latter, is required to treat 6 cubic feet of space in the box. Dry beans intended either for food or seed, and seed peas which show attack by weevils, should be fumigated in the same way. Beans to be eaten may also be heated to 150° F. in a slow oven without injuring their food value, but heating is apt to injure the germination of seed beans.

Hybrid seed corn men and seed dealers generally may have serious trouble with one or more of the stored grain insects. If so, they should fumigate the seed in a tight bin or fumigation box, as described here for beans and other foods, or as previously outlined for treating farm bins. Sanitation about seed stores and other stores handling seed, combined with the prompt fumigation of seed which may become infested will help to prevent damage by stored grain and seed pests.

### SUMMARY

- (1) To combat stored grain pests, practice sanitation in cribs, bins, and elevators.
- (2) Do not store a crop of new grain in a bin with old infested grain.
- (3) Before storing new grain in a bin clean it out thoroughly and spray its walls and floor with an odorless oil solution or an oil emulsion or with a water solution containing one pound of 50 per cent wettable DDT to 2½ gallons of water.
- (4) Examine cribs of corn and bins of grain frequently for stored grain pests.
- (5) Shell corn if infestation occurs and store in bins, and fumigate.
- (6) Fumigate bins of small grain as soon as infestation appears.
- (7) Examine feeds, foods and seeds frequently and fumigate or dispose of them promptly if insect injury appears.