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# Protect Your STORED GRAIN from Insects

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Why worry about insects in stored grain?

For two reasons: (1) They cost you money; insects eat an estimated 2 percent of the nation's farm-stored grain each month. And (2) they contaminate food intended for human use. With tighter government regulations concerning contaminated grain, the problem becomes more acute. Carlots of wheat in interstate shipment will be subject to seizure when the wheat contains 2 percent or more of insect-damaged kernels. The restrictions pertaining to government loans on wheat will also be tightened.

What are the most pressing needs?

The protection of wheat from a variety of insects and corn from the Angoumois moth.

Since WHEAT goes into storage when grain insects are most active, its protection is of prime importance. The threat to CORN from the Angoumois moth is especially serious in the southern third of Illinois. This moth not only attacks stored ear corn, but it also infests corn standing in the fields before harvest.

## Circular 745

UNIVERSITY OF ILLINOIS  
COLLEGE OF AGRICULTURE

Extension Service in Agriculture and Home Economics in co-operation with ILLINOIS STATE NATURAL HISTORY SURVEY

## **What kinds of insects cause damage?**

Two main groups: those causing the weevil type of damage (internal) and those causing the bran bug type (largely external). Damage by the weevil type is to the whole grain. Granary weevil, rice weevil, Angoumois grain moth mentioned above, and the lesser grain borer cause this kind of damage.

Bran bugs feed mostly on broken grain, chaff, dust, and other debris. The most common insects causing this type of damage are the Indian-meal moth and other flour moths, the flour beetles, saw-toothed grain beetle, cadelle beetle, and mealworms. The Indian-meal moth and other flour moths inflict damage only as larvae and are known as surface feeders.

Most grain insects, where conditions are favorable, will complete their life cycle in 30 to 40 days. Adults may live for 6 months to a year, each female laying 200 to 500 eggs. Thus they build up rapidly once they have a start.

Stored-grain insects cause more damage in southern Illinois than in northern because the higher temperatures in the south are more favorable to their survival.

### **Don't neglect sanitation**

Before harvest, clean grain bins, cribs, and machinery thoroughly. Sweep out or vacuum out all old grain, chaff, and dust accumulated in cracks and corners of every bin and crib. Clear out trash, litter, and other debris from the bin and crib area.

Clean up wagons, combines, elevators, and other equipment where insects may have lodged or laid eggs. Feed to livestock the first 2 or 3 bushels of grain passing through the combine.

### **Bin spraying is a must**

After thoroughly cleaning a bin or crib, spray the inside surfaces. Use 2.5% DDT or methoxychlor (2 quarts of a 25% emulsifiable concentrate in 4½ gallons of water, or 2 pounds of the 50% wettable powder in 5 gallons of water). Or use a spray containing 0.5% pyrethrin or allethrin.

Count on 2 gallons of spray for every 1,000 square feet of surface.

### **What about the moisture content of grain?**

For protection against insects, as well as for other reasons, the moisture in stored WHEAT, OATS, BARLEY, and SHELLED CORN should not exceed 13%. For long-term storage a lower moisture content is desirable. Clean, dry grain is not so attractive to insects as dirty grain and grain with high moisture content. It is also less favorable for their development.

EAR CORN usually has 18 to 20% of moisture when it is stored. If it is to stay in storage more than 6 months, it should be shelled as soon as the kernel moisture drops to 13%, usually about the middle of May. Passing shelled corn through a cleaner and storing it in clean, tight bins is a good practice. Cleaners remove both living and dead insects on the outside of whole kernels—also broken grain, dust, and other debris—but they do not remove insects from the inside of the kernels.

Keep all bins in good repair so that neither snow nor rain can blow in and wet the grain. At harvest a forced-air ventilating system can be used to dry grains with too much moisture.

### **What about protective powders?**

Grain to be used for food may be treated with powders containing pyrethrin and piperonyl butoxide or other activators to prevent infestations from developing. These powders may be spread over the surface of a truckload or wagonload of grain or applied to the stream of grain as it is elevated into the bin. Follow dosage directions on the label of the package.

These dusts when properly applied to clean grain, dried to a uniform moisture content, will give protection against most grain insects for 6 to 9 months. The dusts, however, are less effective when the temperature or moisture content of the grain is high.

The pyrethrin protective powders have little or

no effect on grain already infested with insects. Even with this treatment, the Indian-meal moth may still develop on the surface of the grain. To prevent this, apply a pyrethrin spray, as recommended for bin spraying, to the surface of the grain. An additional spray may be needed every 4 weeks during the warm months.

On grain that will be used for seed, a 3-percent DDT or 3-percent methoxychlor dust (1 ounce per bushel) may be used. Seeds that were treated with dusts containing as much as 20-percent DDT grew satisfactorily when tested in a standard seed germinator. Excess seed thus treated, however, can be sold only for seed and must not be used as feed for livestock.

### **What about fumigants?**

Fumigation can be used either to prevent an infestation before it starts or to control one that has started. If you haven't used a protectant, it is good insurance to fumigate new grain within 2 to 4 weeks after it is binned. To get good results follow these directions:

**Select a calm, warm day** to do the job. Do not fumigate when the temperature of the grain is below 60° F. Best results are obtained when it is 70° or higher.

**Seal all cracks and holes** in the bin to make it as gas-tight as possible.

**Level surface of grain** and break up crusts to insure more uniform penetration of fumigant. The grain should be 8 inches or more below the level of the bin to keep the fumigant from "rolling" over the sides.

**Apply fumigant as uniformly as possible** over the surface. Apply it liberally—a little too much is better than not enough. One good method of applying fumigants is to use a knapsack-, tank-, or pump-type sprayer. To get a coarse spray, remove spray nozzle and flatten spray rod at outer end with pliers. Some operators merely remove the disc from the spray nozzle. A gardener's

sprinkling can may be used on a small scale, but it is best to use equipment that will not require the operator to get in the bin. If the operator must get in the bin, he should wear a gas mask.

**Place a tarpaulin or other cover** over the grain after applying the fumigant to get a little more complete and lasting effect. Close the bin immediately and leave it closed for at least 24 hours, preferably 4 to 5 days.

Here is a partial list of relatively safe fumigants, together with recommended dosages. Buy fumigants ready-mixed.

	For 1,000 bu. of grain	
	In wooden bins gallons	In steel bins gallons
Ethylene dichloride—carbon tetrachloride (75%-25%, or 3 to 1).....	6 to 8	4
Carbon disulfide—carbon tetrachloride (20%-80%, or 1 to 4).....	5	3
Carbon tetrachloride—ethylene dichloride —ethylene dibromide (60%-35%-5%)..	5	3

### Which should I use?

That depends on conditions. One fumigation 2 to 4 weeks after harvest will protect clean, dry grain stored in well-constructed bins some distance from sources of infestation (preferably in a separate building).

For the same grain stored in bins located near sources of infestation—such as feed rooms, hay mows, livestock shelters, poultry houses, etc.—a protectant is probably more effective.

Two treatments with a fumigant cost about the same as one treatment with a protectant. Grain already moderately infested with insects should be fumigated, not treated with a protectant.

### Inspect grain frequently

Grain stored and treated in either of the above ways will usually stay free from insects for 9 to 12 months. But it is a good idea to inspect all grain at regular monthly intervals, particularly during the warm months, and fumigate when necessary.

One practical but not foolproof method of checking grain for "hot spots" during the winter is to leave several metal rods or pipes sticking down through the grain. It is possible to detect "hot spots" by feeling the rods as they are removed.

### Ear corn treatment has doubtful value

Ear corn can be treated with a protective powder or fumigated, but a satisfactory job requires a good deal of work. With cold weather coming soon after harvest, it is seldom worth while to treat ear corn at that time. If insects become abundant the following spring, treatment may be needed then.

#### **CAUTION: Handle all fumigants carefully.**

**Apply from outside the bin whenever possible. Do not inhale the vapors. Avoid spilling on skin or clothing. Check the application equipment for leaks. Keep all persons and animals way from treated bins for 24 to 36 hours.**

**Air out bins and leave overnight before entering. Grain can be fed to livestock 4 to 5 days after fumigation, if it is aired and stirred to hasten evaporation of the fumigant.**

**Grain may become subject to the tolerance provisions of the Food and Drug Act in July 1955. Read and obey all instructions on labels. Treat well in advance of marketing to be sure of meeting tolerances.**

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