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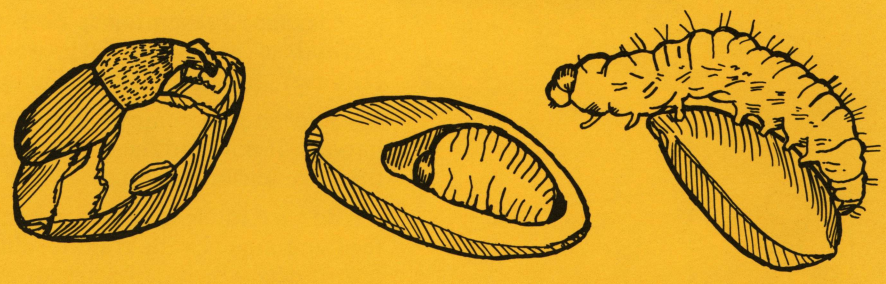
# Insect Control in Farm Stored Wheat



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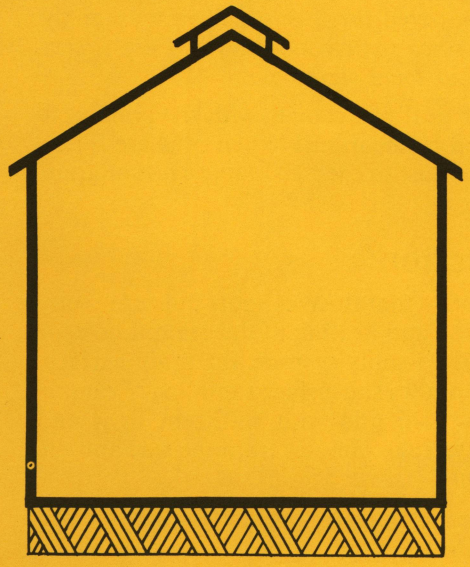
You can prevent most, if not all, of the insect-caused losses of farm-stored grain. The reasons for such losses are one or more of the following:

1. Poor storage building structure or location.
2. Lack of preventive treatments.
3. Lack of periodic inspection.

## Building Structure and Location

Any building that you can keep dry, weather tight and clean can be used for grain storage, provided the construction is adequate to contain the weight of the grain. However, most frame buildings, including walled-off sections of other-purpose buildings, do not meet all of these requirements. For this reason, farm storage of grains is usually in steel bins especially designed for this purpose. Metal buildings, however, are not free of problems because they may leak through faulty construction; they may sweat and drip on the grain; or wind can blow rain and snow through vents.



A major problem with frame and crib storages is that they are frequently a part of the central farmstead. This offers a source of infestation by insects from animal feeds or even by insects infesting cereal products in the home. But by placing steel storage bins away from the farmstead, you can reduce chances of "local" contamination of the grain in storage.

Although all but a few adult stored grain insects can fly, ordinarily they do not. If they fly it is only for short distances. Large populations of insects and high temperatures increase flight activity. Grain storages 500 yards or more from infestation sources are not likely to be infested by flying stored-product insects.

In Idaho, stored grain insects do not infest grain in the field. All infestations in storage result from contamination introduced by man's activities or carelessness. Except for a few minor pests, stored grain insects are not native to this area and can survive only through association with man.

**Amount per 1000 Bushels**

**Sprays:**

Malathion — 1 pint 57% emulsifiable *premium grade* in 2 to 5 gallons of water.

Pyrethrins + piperonyl butoxide — follow label recommendations.

**Dust:**

4% Malathion *premium grade* on wheat flour — 15 pounds.

**Note:** Use of Malathion other than premium grade will cause an off-flavor which will make grain unacceptable in trade channels.

## Prevention

**Grain Moisture:** Grain to be stored should have a moisture content below 12%, preferably below 10%. Moist grain allows much more rapid insect development should an infestation start. For the same reason, you should check storage structures for leaks in roofs and for openings through which rain or snow may enter when blown by storms.

Grain moisture is an especially critical factor in farm storage because the bin may be filled with grain at one moisture level. The effectiveness of grain protectants is reduced in high moisture grain. In commercial storages, some blending between loads from different producers occur, averaging out an occasional high moisture load.

**Cleanup:** Prevention is both the least expensive and the most effective method of protecting farm-stored grain from losses caused by insects. However, for prevention to be effective, you must start before harvest.

You should remove grain remaining in combines immediately after harvest. If not, and the grain becomes infested, it can be a source of pests for the next season's crop.

Be sure to clean all grain handling equipment. Trucks used for hauling feed and augers with grain residues from the previous crop may harbor the few insects which can start an infestation.

Clean storage areas thoroughly before harvest. Remove all old grain, both from inside the structure and on the outside where grain may have spilled. Even if you find no obvious insect infestation in this grain, remove it from the vicinity of the storage and use it for feed or bury it. If the amount of old-crop grain is too much to be discarded, treat the grain before adding new grain.

**Bin Sprays:** Spray bins with a residual insecticide after they have been cleaned. Make sure you thoroughly cover all surfaces, including ceilings. Use one gallon of mixed spray for each 500 square feet of surface. Malathion and Methoxychlor sprays are approved for this use. To make 2½ gallons of spray (for 1,250 square feet), use in water:

1 pint Malathion 57% *premium grade* emulsifiable concentrate

or

1 quart Methoxychlor 25% emulsifiable concentrate

or

1 pound Methoxychlor 50% wettable powder

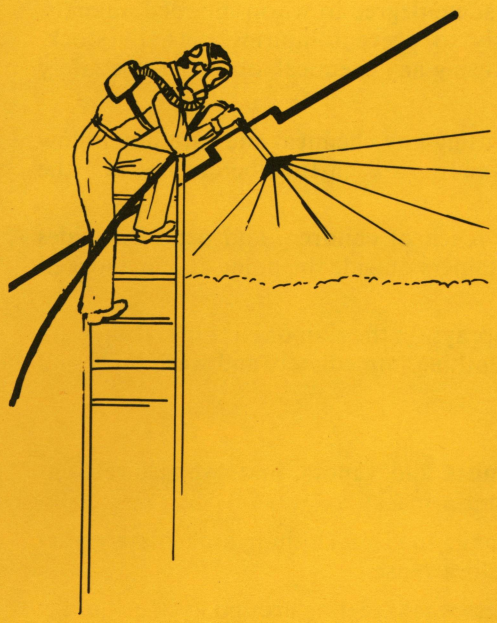
**Grain Protectants:** You can treat grain stored near sources of infestation, or in bins often infested in previous years, with spray or dust protectants as it is being put into the bin. Premium grade Malathion or pyrethrins plus piperonyl butoxide have been approved for this use. You may apply these as *sprays or as dusts. However, since some companies will not accept insecticide-treated grain, check with your local elevator.*

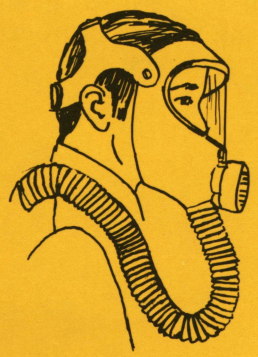
You must thoroughly mix spray or dust protectants with the grain as it enters the storage. **Uniform distribution is important!** When bins are filled, add an extra quart of spray or pound of dust to each 100 square feet of grain surface.

## Inspection

Inspect grain in storage at least once a month. Wet spots indicate faulty construction which may lead to molding and heating of the grain. Look for insects. In warm weather they are often readily seen on the grain surface. Use of a grain probe to take a sample allows subsurface sampling. Examine the grain sample in a large, shallow pan and with sufficient light and sometimes heat to detect insect activity. Take samples from the side and the crown (if possible, the bottom as well).

A simple method of detecting evidence of heating, which is always a sign of trouble, is to insert a bare arm into the grain as deeply as possible.





## Fumigation

**Fumigation is a last resort, necessary only if a severe insect infestation develops. It is only a temporary treatment and should never be used as a preventive measure.** All fumigants are highly toxic to man. Use a gas mask with a canister approved for the fumigant when applying the treatment. Do not take a chance by overextending the useful life of the canister. Never work alone when applying a fumigant. Read the container label to understand the hazards of use and emergency treatments in case of accident. Avoid the spilling of fumigant on clothes or skin — if spilled remove clothing promptly and scrub the affected skin with soap and water.

Fumigation is most effective when the grain temperature is between 70° and 90°F. Increase the dosage at lower temperatures. At 50° twice the dosage will be necessary. Above 90° the fumigant will volatilize too rapidly and will be lost from the top of the bin.

The dosage of fumigant also depends on the construction of the bin. The lower dosages listed on container labels are for tight steel or concrete structures; higher dosages may be necessary in wooden or some concrete structures. Fumigants act and penetrate as gases. If the bin is not reasonably gas tight, leakage will so rapidly dissipate the gas that effective fumigation is impossible.

Apply fumigants to the grain at the top of the bin because the gases are heavier than air. The grain should be leveled and 6 inches below the bin edge. Spray or evenly distribute the liquid fumigant over the grain surface. Apply fumigants from outside the bin if possible.

Allow fumigants at least 3 days to act before opening the bin to ventilate. When ventilating the bin, remember that dangerous concentrations of fumigant may remain. Complete ventilation may take several days. Never enter a fumigated bin, even with a gas mask. The fumigant replaces the air in the bin leaving little or no oxygen to breathe.

| Common Mixtures of Fumigants | Trade Names |
|---|---|
| 1. Carbon bisulfide<br>Carbon tetrachloride | Super fumigas<br>Vertafume<br>Vertafume S<br>Fumigant 82FR |
| 2. Ethylene dibromide<br>Ethylene dichloride<br>Carbon tetrachloride | Weevil Kill<br>Dowfume EB-5<br>Grain Conditioner and Weevil Killer |
| 3. Carbon tetrachloride<br>Carbon bisulfide<br>Ethylene dichloride<br>Ethylene dibromide | Serafume |
| 4. Ethylene dichloride<br>Carbon tetrachloride | Fumigant No. 1<br>Dowfume 75 |
| 5. Methyl bromide | Methyl Bromide<br>Meth-O-Gas<br>Brom-O-Gas |
| 6. Carbon tetrachloride<br>Carbon bisulfide<br>Ethylene dibromide | Dowfume C<br>Fumigant No. 2 |
| 7. Aluminum phosphide | Phostoxin |
| 8. Ethylene dibromide<br>Methyl bromide | Grain Fumigant (73) |

All of these fumigants and mixtures may be used for bin fumigation. Nos. 1, 4 and 7 are effective in tall storages; No. 2 is often preferred for flat storages; Nos. 3, 6 and 8 are most generally useful in farm storages; Nos. 5 and 7 are also used for container, boxcar and truck fumigation at the time of shipping. Dosages and special conditions of use are indicated on container labels.

**Remember:**
**Read the label directions thoroughly before preparing and applying pesticides.**

**Pesticide Residues:** These recommendations are based on the best information currently available for each chemical listed. If followed carefully, residues should not exceed the tolerance established for any particular chemical. To avoid excessive residues, follow recommendations carefully with respect to dosage levels, number of applications and minimum interval between application and shipping or use.

## General Warnings

All pesticides are poisonous to some degree to warm-blooded animals. They should be handled cautiously to prevent injuring pets, livestock, wildlife, children or the user. When using any chemical, observe these safety procedures:

1. Always read the label before using any chemical and carefully follow the directions. Note warnings and cautions each time before opening the container.

2. Keep insecticides out of the reach of children. and pets. Pesticides should be kept in their original containers outside the home and in a locked storage.

3. Do not spill concentrates or sprays on the skin or clothing. If they are spilled, remove the contaminated clothing immediately and wash body and clothes thoroughly.

4. Never smoke while spraying.

5. Avoid inhaling insecticide mists and vapors, and, when directions specify, wear protective clothing and a mask.

6. Wash hands and face and change to clean clothing immediately after spraying. Always wash clothing before reuse.

7. Cover feed and water containers when treating around livestock or pet areas. Do not contaminate fish ponds.

8. Always dispose of empty containers in an approved landfill or by burying so that they pose no hazard to humans, animals or plants. When burning containers, avoid inhaling the smoke or fumes.

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