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E. C. 1552

Stored Grain Insect Control

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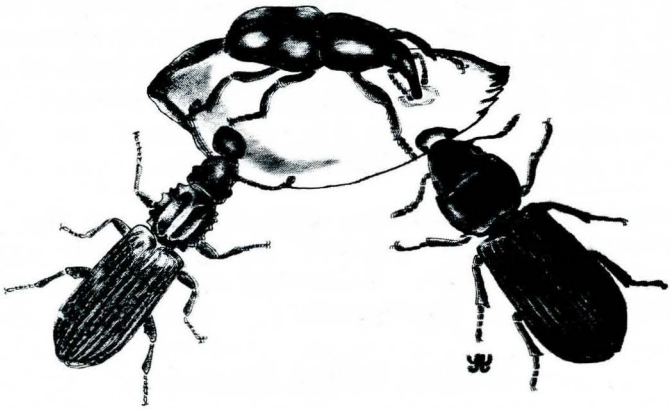

Insects that attack stored grain take a bigger "cut" out of Nebraska farm incomes than most insects attacking crops. All too frequently these tiny robbers are over-looked by the farmer. The present practice of holding grain on the farm for long periods of time has greatly increased the danger of insect invasion.

Most stored grain infestations are from insects living in or around the granary the year around. However, some insects like the Angoumois grain moth and the rice weevil can fly from one bin to another spreading infestations. Some insects like the cadelle, burrow into the woodwork of bins where they remain over long periods, only to come out when fresh grain is placed in the bin. Cracks and crevices, or linings in grain bins harbor many kinds of insects that come

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out to feed as soon as fresh grain is put in the bin. Milled grain can transfer insects from the mill to the farm very easily. It naturally follows that grain and grain product sacks left laying around offer food and shelter for many insects. Any infestation and its source can be easily cleaned up by proper methods.

Grain with less than 12 per cent moisture content is less likely to be invaded by insects than grain with more moisture. Grain with 9 per cent or less moisture gets practically no damage in storage.

Control

Many kinds of insects attack grain in the bin, but fortunately, the control measures for all are fundamentally the same. Following are several methods of control that are recommended:

Dusting Sacked Grain

Sacked grain that is not going to be used as food for livestock or humans can be dusted with 5 per cent DDT as the sacks are being piled. This will protect the sacks throughout a winter season, and have no effect on the germination of the seeds. Grain, being sacked for seed, that is dirty or suspected of having insects already in it can be treated with 3 per cent DDT dust at the rate of $\frac{1}{2}$ oz. per bushel, or finely ground magnesium oxide at the rate of 1 oz. to the bushel. Sacked grain, intended for food, should never be dusted with DDT. If insects attack such products, the piled bags can be covered with a heavy tarpaulin and each pile fumigated separately or the whole building sealed and fumigated. For directions, see the section on Fumigation.

Sanitation

A large portion of farm granary infestations are from insects that remain in or around the bin the year

around. Any grain bin should be thoroughly cleaned and sprayed with DDT 5 per cent oil solution, or 2 per cent water suspension before being refilled. Bits of grain and grain dust around the outside of the bin are shelters for many grain pests that later move into the bin. Any old grain or moldy grain left in cracks in the woodwork of the bin or under the lining of a bin also affords protection, and insects feed and multiply in a presumably empty grain bin. No control has any permanence unless the area around the bin is cleaned up and all sources of reinfestation removed. Sanitation in the farm grain bin pays with grain at low prices. It pays much better with grain at high prices.

Fumigation

Methods.

Ideal fumigation conditions are tight bins and high grain temperatures. Make the bin as airtight as possible for fumigation. Most wooden bins are not tight enough to hold the gas in and get a good job done. Fumigants are used because they have a high penetrating quality. Consequently, any cracks, knotholes, loose board, etc., give the gas a quick exit. Also, fumigants will not do the job if the grain temperature is below 70° F. Ideal fumigation temperatures are between 80° and 90° F.

Grain in the bin should be leveled and covered before fumigation. A tarpaulin makes a good cover, or newspapers weighted down with grain sacks are satisfactory. This way the covers can be lifted, the fumigant poured in, and the covers replaced to hold the fumes down in the grain.

If the grain is more than 5 feet deep, pipes can be stuck in the grain and part of the fumigant poured in -- not neglecting the corners. This way the vapors get deeper in the grain and give more satisfactory results.

Materials.

Carbon disulfide has for many years been the standard heavier-than-air grain fumigant. However, this material is extremely explosive. If used, keep any source of fire away for 24 to 48 hours.

Amounts of Carbon Disulfide:

Tight metal bins	3 gal. per 1000 bu.
Bins with some leakage or shallow bins with large surface area.	4 gal. per 1000 bu.
For small quantities	1 qt. per 100 cu. ft.
50 gallon barrel or drum	7 tbsp. ($3\frac{1}{2}$ oz.)

A mixture of 3 parts ethylene dichloride and 1 part carbon tetrachloride is replacing carbon disulfide in many places, because it is non-inflammable. This mixture can be bought under proprietary brand names. However, neither carbon tetrachloride nor ethylene dichloride is as strong as carbon disulfide. Therefore, the quantity and the cost of fumigant is about doubled.

Amounts of Ethylene Dichloride-Carbon Tetrachloride Mixture:

Tight metal bins	6 gal. per 1000 bu.
Bins with some leakage or shallow bins with large surface area	8 gal. per 1000 bu.
For small quantities	2 qts. per 100 cu. ft.
50 gallon barrel or drum	14 tbsp. (7 oz.)

Fumigation at its best only cleans up the insects present in the bin. It has no lasting qualities if insects are again allowed at the grain. There is no substitute for sanitation in and around stored grain.