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Are Bugs in Your Corn?

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Are Bugs UR Corn?

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The heat that comes up from below is often sufficient to permit the development of molds, and that is exactly what is happening in some of our bins. Melting snow might have increased the moisture content of the surface layer of corn, but in the absence of the heat resulting from insect activity, surface temperatures would be so low that molds could not develop until spring.

Crusting did not occur during the summer. You may wonder why. It was largely because the surface layer of corn was warmer than the mass of corn below. Therefore, moisture that came to the surface, instead of condensing on the corn, drifted away in the air.

Insects Are Causing Some of the Mold in Stored Shelled Corn

By H. Gunderson and G. C. Decker

At that time all of the corn in the bin was dry and warm. The bugs were active and moved about freely in the grain, particularly near the surface. Probably the number of insects increased considerably, if not even greatly, during August and September.

During October the outermost portions of the grain became cooler, and instinctively the insects began to move toward the center of the bin to get away from the cold. This migration process has now resulted in a mass of insects concentrated near the center of the bin. Heat and moisture are by-products of the life processes of all animals, and insects are no exception. This mass of insects, therefore, is constantly producing heat and moisture which is imparted to the surrounding corn. As the warm, moisture-laden air rises, it soon reaches the cool surface where the moisture condenses. This results in the formation of a crust—in other words, a compact surface layer of corn of high moisture content.

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Crusting did not occur during the summer. You may wonder why. It was largely because the surface layer of corn was warmer than the mass of corn below. Therefore, moisture that came to the surface, instead of condensing on the corn, drifted away in the air.
Nevertheless they are present in some bins, particularly in large bins, and they may yet become a serious problem.

Our cold Iowa winters bring some blessings for not only weevils, but even the bran bugs have difficulty in surviving Iowa winters in many types of bins. In bins of 1,000 or 2,000-bushel capacity that are fully exposed to the weather, the temperatures usually drop to such low levels during the winter that few if any stored grain insects can survive. Even in these bins, currents that passed over the grain. Temperatures in insect-infested bins often go as high as 95 or 100 degrees F. but seldom higher. This type of heating should not be confused with the heating which occurs in bins of wet grain. In the latter case temperatures may go much higher and heat damage often results.

Test for Bugs

To make sure that insects are involved in this problem dig down 10 to 20 inches below the surface of the moldy area and bring up several handfuls of corn. Place it on a piece of ordinary door screen and shake it over a white paper, cloth or pan. No doubt you will be surprised at the number of small brown insects that you get out of even a small sample of corn.

The so-called “bran bugs” are the most common cause of this type of trouble in stored shelled corn in Iowa. Several different species of insects similar in size, color and general habits are included under this one common name. The flour beetles, the sawtoothed beetle, the foreign grain beetle and a number of other species often found in heating shelled corn are similar in their habits and the same control measures are recommended for all. All of these insects are small, reddish-brown beetles, usually about 1/8 inch in length. The larvae are small, dirty white, comparatively slender grubs or worms. Both the larvae and the adults feed largely upon cracked or broken kernels, and for this reason most of our serious infestations have occurred in bins of corn which had a comparatively high percentage of cracked corn and foreign material.

Yes! There are such insects as weevils. In southern states they are very serious pests of stored corn, and in many ways they are more dangerous pests than the bran bugs because they normally bore into and feed within sound kernels. Fortunately for us the weevils are not very winter-hardy, and consequently they have not given us a great deal of trouble in Iowa. However, relatively large amounts of cracked corn often permit insects to build up such large populations during the summer that the insects themselves are able to maintain a high temperature in the center of the bin throughout the winter, in which case winter mortality is reduced.

Large bins of 5,000 to 10,000-bushel capacity and temporary bins in barns or stables seldom cool down to a point where all of the insects will be killed. For this reason, we have found the percentage of serious insect infestations in large bins and bins in barns has been much higher than in smaller bins fully exposed to the cold winter winds. On some farms corn shelled from the same crib has been put into two bins, one exposed and the other in a protected building. Serious insect infestations have developed in the protected bin, while
the corn in the exposed bin remained comparatively free from insect damage.

**Fumigating**

The man who is having trouble wants to know, "What can I do to kill the insects and prevent further damage to the corn?" Fumigation with one of the heavier-than-air gases is probably the most economical and most effective control measure that has been developed. We are recommending the use of a mixture of 3 parts of molding and taking the temperature of the corn in circles around the area that is crusted and molded. In general, all of the area where the temperature is above 60 degrees F. contains active insects which can be easily killed by the fumigant. This area should be marked with small stakes and the number of bushels in that area calculated. For example if the surface area of molded and crusted corn is 16 square feet and the corn is 10 feet deep, you have a volume of 160 cubic feet. This figure when multiplied by 0.8 gives you 128 as the number of bushels in the warm area, in other words, the amount of corn which should be fumigated.

Never use less than a gallon of fumigant in a bin, and for small quantities of corn you should use at least 1 gallon for every 100 bushels of infested corn. Since larger volumes of corn can be successfully treated with less fumigant, the following schedule is recommended: 1 gallon per 100 bushels for 100 to 500-bushel quantities; 2 1/2 gallon per 100 bushels for 500 to 1,000-bushel quantities and 3 1/2 gallon per 100 bushels for quantities of corn over 1,000 bushels.

The required amount of fumigant may be applied to the surface of the corn with an ordinary garden sprinkling can, or it may be sprayed onto the corn with a pressure sprayer.

**Temperature Drops**

While taking temperatures in the bin you will find that the corn outside the infested area has dropped to somewhere between 55 and 50 degrees F. or even lower. In the area below 50 degrees the insects are dormant and are not causing any damage to the corn.'

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Left: Insects seldom bother corn in Iowa stored in small bins well off the ground if they’re well exposed. Below: It’s large bins, such as this (32 x 48 x 8 feet), where insects thrive.

ethylene dichloride to 1 part carbon tetrachloride because this mixture has proved to be very effective and relatively safe to use. This fumigant is non-explosive and non-inflammable, and because it is not very toxic to human beings an inexperienced man can apply it to the grain without a gas mask and without much danger of suffering any ill effect.

Since the insects are working in a certain definite and rather limited area in the bin, now is the time to control them because at this time you can kill more insects per gallon of fumigant than you can in the spring or in the summer after the bugs have scattered out through the corn.

Before fumigating, outline the area in which the bugs are active. This can be done by attaching a thermometer to a stick or a piece
Fine, Firm Seedbed

Over a long period of years many experimental plantings have been made at the Iowa Station to compare different times of planting, methods and rates of seeding and especially the different kinds and sources of seed.

Alfalfa needs a firm seedbed. The better the seedbed is prepared, the better the alfalfa crop that follows. Alfalfa seedings usually follow a cultivated crop such as corn. No better seedbed can be had than a well-disced and harrowed cornfield that was kept free from weeds the previous year. When alfalfa follows soybeans it is important to firm the seedbed with a cultipacker or corrugated roller, using the cultipacker both before and after seeding, if possible.

One of the best methods of seeding is to cultipack, broadcast the seed and cultipack again. This firms the soil about the seed, and places the seed at the right depth. When one seeds with a drill equipped with a grass seeder attachment, he must be careful to prevent the seed from being covered too deeply.

Alfalfa seed should be covered not more than about 1/2 inch in the heavier soils and not more than an inch in the lighter soils.

When to Seed

Many experimental plantings indicate that there is no better time and method of seeding for average conditions than in the early spring with a small grain nurse or companion crop, in exactly the same way usually used for clover and grass.

Choosing a nurse crop for early spring seedings is important. Barley is satisfactory but no better than a short-strawed, early-maturing variety of oats, such as Iowa 105 or Iogold. Reducing the rate of seeding the small grain helps the alfalfa. If drought threatens the alfalfa, cut the small grain in the milk stage and make it into hay.

In some parts of Iowa, on soils low in organic matter with poor water-holding capacity, best results are obtained when alfalfa is seeded alone. Preparing a seedbed in the early spring and cultivating at intervals until June to kill weeds is an excellent procedure.

When seeding alone in June, using a cultipacker is particularly desirable.

Many excellent stands of alfalfa have been obtained from seeding in August. The success of August seeding depends on late summer rains. When seeded in June or in August no nurse crop is used. The later the seedings are made the greater the danger of winterkill. We recommend sowing alfalfa not much later than Aug. 15 in northern and central Iowa and Aug. 25 in southern Iowa.

Under extremely favorable conditions 10 to 12 pounds of seed per acre may be sufficient, but under average farm conditions the larger yield to be had in the first year from 12 to 15 pounds usually pays well.

Management

Unless alfalfa stands a foot or more high by mid-August the year it is seeded, the crop should not be cut until the following season.

Three Cuttings per Year. We have compared removing one, two, three and four cuttings per year on several different seedings at the Iowa Station through a period of years. We found that when cut four times a year the growth is exceedingly weak and the stand about gone by the end of the second year. The fewer the cuttings, the more vigorous the growth and the longer the stand is maintained. Maximum yields may be had when only two crops are taken per year, cutting when in the full bloom stage. But the feeding value,

**SUMMARY OF HAY YIELDS OF DOMESTIC ALFALFA STRAINS 1927—1940.**

<table>
<thead>
<tr>
<th>Variety or strain</th>
<th>Number of experiments</th>
<th>Average annual yields in tons per acre</th>
<th>Average yield in percent of Grimm</th>
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<tr>
<td>Ladak</td>
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<tr>
<td>Cossack</td>
<td>14</td>
<td>3.28</td>
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<td>Ontario Variegated</td>
<td>16</td>
<td>3.06</td>
<td>103</td>
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<td>Hardigan</td>
<td>16</td>
<td>3.05</td>
<td>100</td>
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<td>16</td>
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<tr>
<td>Arizona Common</td>
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<td>1.11</td>
<td>37</td>
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</tbody>
</table>

*Including Canadian.

Hay at 12-percent moisture.

Are Bugs in YOUR Corn?

(Continued from page 5)

Furthermore, fumigation does not give satisfactory results at temperatures below 60 degrees unless excessive amounts of chemicals are used. It is, therefore, most economical to fumigate only the area where the temperature is above 60 degrees F.

Fumigation of the molded and crusted area will kill the insects present and thereby remove the principal source of heat and moisture. This will make it easier for the cold to penetrate throughout the bin and will result in a rapid lowering of the temperature throughout the mass of grain.

What should be done with the crust? It is always desirable to have the crusted surface broken up before the fumigant is applied. When the crust is very thin the corn will begin to dry out on the surface of the bin as soon as the insects are killed, but where the crust is heavy or where a quantity of corn is very moldy or rotting, the spoiled and wet corn should be removed. It is not desirable, however, to remove this layer until you are ready to fumigate as this would result in exposing a new surface of cold corn which would in turn become crusted.

If you are in doubt as to the proper procedure to follow in taking care of your corn, call your county agent, your county AAA organization or write the Extension Service at Iowa State College.