farm and home

AGRICULTURAL ENGINEERING NO. 12

Storing and Drying Wet Corn

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If you're faced with the problem of dealing with high-moisture corn there are a number of alternatives you may wish to consider. Among these are: (1) allowing corn to stand in the field until dry enough for safe storage; (2) storing in silos at high moisture (either whole plants, ears, or shelled corn); (3) storing ears in narrow cribs or in standard-width cribs having additional ventilators to allow more air movement through the corn; (4) artificial drying with unheated or heated air. Storing wet corn as silage is discussed in Agronomy Fact Sheet No. 9.

The best method will depend on your management practices. Remember, corn that is to be fed to livestock needs only to be dry enough to prevent spoilage while in storage.

Allowing corn to stand in the field for an unduly long period will increase your field losses and is usually an undesirable alternative.

Moisture Content

The moisture content of the harvested corn will determine what you do with it. The maximum safe kernel moisture content for storing dry corn under various conditions is given below:

➤Crib storage of ear corn
Wide cribs -- 18 - 20 %
Narrow cribs -- 30 - 32 %

➤Shelled corn storage
Short periods during winter months -- 15 - 16 %
Longer storage periods -- not over 13 %
Immediate sale as U.S. No. 2 corn -- 15.5 % moisture is the highest allowed in this grade. Drying below this point reduces the quantity available for sale. Corn with a higher moisture content will be discounted and may be unsaleable under some circumstances.

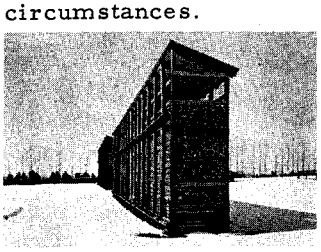

Fig. 1. Ear corn at 35% moisture stored in this $5\frac{1}{2}$-ft. wide crib at the So. Exp. Sta., Waseca, contained 15% moisture and no spoilage when removed the following spring.

Storing Ear Corn in Narrow Cribs

For successful storage in narrow cribs you should: (1) keep crib width to $4\frac{1}{2}$ to 5 feet; (2) provide concrete floor or raise the floor to prevent rodent damage; (3) locate crib away from buildings and other obstructions to make best use of natural air movement; (4) place crib with the long axis at right angles to the prevailing winds; and (5) remove husks, loose kernels, and other debris from the corn.

Build Crib Ventilators

Crib ventilators can be installed in corn cribs, temporary or permanent, to reduce the distance air must move through the corn mass. See figure 2. Vertical flue-type ventilators are not effective. Wind pressure forces air through the corn. The air path through the ventilator should be horizontal with the ends of the ventilator exposed to outside air.

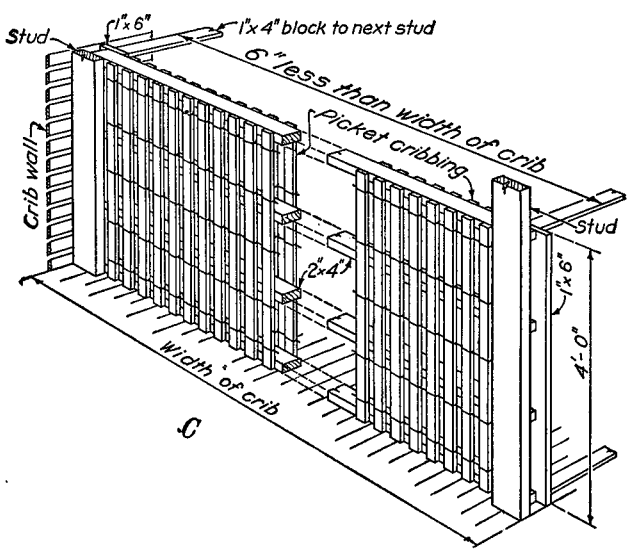

Fig. 2. Well-built crib ventilator.

Install ventilators on center line of crib from end to end or crosswise every 5 or 6 ft. Sections can be placed one above another to any height desired.

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Drying with Unheated Air

It is possible to accomplish some drying by blowing unheated air through ear corn early in the fall when the weather is favorable. Most cribs can be prepared for drying after they are filled. Prepare the crib in such a way that the drying air forced through the corn will have to travel about the same distance in any direction to escape. This usually can be accomplished by partially covering the sides and ends with reinforced paper or canvas. In a double crib both doors can be sealed and the air blown into the driveway.

Little drying can be accomplished when the outside temperature is below 50°F., or the humidity over 60 percent. An air flow of 5-10 c.f.m. per bushel is recommended. Additional drying is usually required in the spring if the corn is to be kept over summer.

Drying shelled corn with unheated air is not recommended.

Drying with Heated Air

Drying can be accomplished in two ways: (1) with supplemental heat, where the temperature rise is usually 15-35°F. and the drying capacity is rather low; or (2) with high capacity driers where the temperature rise is greater and drying is accomplished in a shorter period of time.

Whenever heat is used fire is always a possibility. Use all precautions possible to keep this hazard at a minimum.

Ear corn can be dried with heated air in cribs prepared in the same way as for drying with unheated air. Corn drying temperatures should not exceed 140° for corn industrial use or 155° for feeding.

Drying Shelled Corn

A fan with heater, a batch dryer, or a continuous flow dryer can be used for drying shelled corn.

Supplemental heat drying can be used to advantage in round steel bins having a false floor. Complete storage and drying units are usually purchased. The temperature of the drying air is usually raised about 20°F. above that of the outside air. These units can be controlled with a thermostat, humidistat, or both. By controlling the relative humidity of the drying air, overdrying the corn is avoided.

Put a 4-foot layer of corn in the bin; when this is dry, add another, and so on. Four days or more may be needed to dry each layer. A total depth of 14-16 feet can be dried this way.

In bin drying where higher drying temperatures are used, the depth of grain to be dried at one time should be limited to about 5 feet. The corn near the bottom of the bin dries faster than that near the top. When the average moisture is reduced to a safe storage level, about 13 percent, the moisture content of the driest grain will be considerably below this and that of the wettest considerably above. The grain must then be mixed so that the moisture content will be uniform.

Moving the grain from the drying bin to the storage bin usually mixes the grain enough.

Batch driers will dry a specific amount of grain, depending upon their capacity, in a relatively short time--2-6 hours. In continuous flow driers the grain moves through at a constant rate. The wet grain usually enters at the top and the dried grain is removed from the bottom with an auger.

Both types are designed so that the distance the drying air travels through the grain is quite small, and all grain passing through is dried to about the same moisture content. These units can be purchased in a variety of sizes, and require the greatest initial investment.

How to Figure Amount of Corn after Drying

The amount of corn remaining after drying can be calculated from the following formula:

$$\text{Weight before drying} \times \frac{100 - \text{initial \% moisture}}{100 - \text{final \% moisture}} = \text{weight after drying}$$

Example: How many pounds of corn remain after drying 1 ton of corn from 30% moisture to 15 %?

$$2,000 \times \frac{100 - 30}{100 - 15} =$$

$$2,000 \times \frac{70}{85} = 1,600 \text{ pounds}$$

The percent moisture in the whole ear can be estimated by adding 5 percent to the kernel moisture determination.

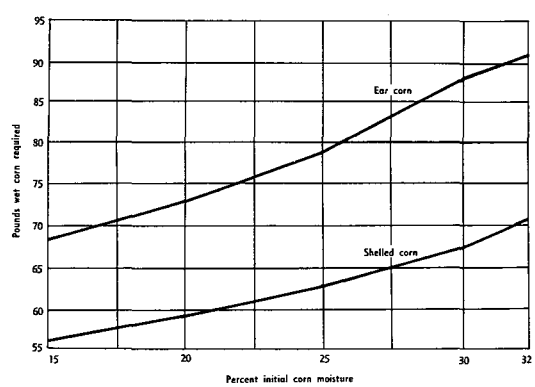

Fig. 3. Pounds wet corn needed to produce 1 bu. (56 lbs.) shelled corn at 15.5% moisture.

For additional information on storage structures and drying corn see your county Agricultural Agent.

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