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Storing High Moisture Grain

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For the past several years there has been increased interest in the harvesting and storing of high-moisture feed grains, particularly corn, barley and grain sorghum. With improved silos and grain harvesting equipment, the use of high-moisture grains has replaced the conventional methods of harvesting, storing and feeding grains on many cattle feeding farms. There are several reasons why this system is becoming more popular. Harvesting can be done earlier and faster, harvesting losses are reduced, and a minimum number of operations and amount of equipment are required. Storage costs are comparatively low and in most cases storage is rodent free. It is adaptable to mechanical feeding and storage losses are low when good structures and good management are used.

RECOMMENDATIONS

Corn

For the operator who intends to feed his entire corn crop and has storage facilities for high-moisture grain, there is no need to go to the extra expense of drying the corn.

Moisture Content. The moisture content of the corn kernel determines harvest time for ensiling high-moisture corn. Ideal kernel moisture for ear corn or shelled corn silage is about 28%, with a satisfactory range of 25 to 30%. When kernel moisture is 28%, the cob will contain 45 to 50% moisture. Therefore, the moisture content of ear corn silage would be about 32%. A 28 to 35% range is satisfactory.

Processing. High-moisture shelled corn can be stored as whole kernels or coarsely ground. Grinding facilitates packing and may help preservation. Ear corn must be ground before storing to insure packing and safe keeping.

Structures. When upright conventional silos are used, be sure the silo is strong and tight. The pressure imposed on the walls by high-moisture grain is greater than that of regular forage silage. Therefore, the silo walls must be in good shape and reinforced to withstand the additional pressure exerted. Most new silos put up in the last few years have been constructed to handle high-moisture grains. Tightly sealed doors are important to prevent spoilage around the doors.

Trench and bunker silos have been used successfully by many operators. It is important when high-moisture grain is stored in trench or bunker silos that the exposed surface of the grain is sealed by a plastic cover or layer of dirt. Grinding or rolling the grain to allow better packing will reduce spoilage losses in bunker or trench silos.

Gas-tight storage structures cost more but have lower storage losses.

A summary of the presentation given at Cattle Feeders Day, October 1, 1971.

Barley

There are several advantages to harvesting barley at a high-moisture content. Earlier harvest means reduction in loss from hail, collection of weeds such as wild oats before they shatter, easier harvesting and less shattering.

Moisture Content. Research studies on storing high-moisture barley indicates that the grain will store satisfactorily at a range of from 25 to 40%, which is about the same as for high-moisture shelled corn. It should be remembered, however, that the type of storage structure used is more critical at the 25% level. Montana work shows that barley harvested between 35 and 40% moisture was easier to combine than mature grain. Because of the maturing factor or a short ripening period, it may not always be possible to harvest the crop at the desired moisture range. This is not serious as water could be added to bring the moisture content to the desired level. Refer to the table on water addition to increase the moisture of the grain.

Processing. The work at Montana indicated rolling the grain as the silo is filled has been more satisfactory than storing the whole grain. Better compaction, thus reducing the air space, can be obtained with rolled grain. It was found with whole grain that, if the seal was broken, spoilage would move in deeper than with the more compacted, rolled grain. A roller with smooth rolls performed better than serrated rolls. If whole high-moisture barley is stored, it still should be rolled before feeding. Otherwise, feed efficiency is reduced.

Structures. The same as mentioned for corn.

Grain Sorghum

Sorghum grain lends itself to high-moisture storage as well as the other grains described in this paper. In addition, grain sorghum sometimes shoots late heads which may be immature when other heads of the plant are ready for harvest. This results in wet grain mixed with dry grain, which will cause spoilage when trying to store the mixture as dry grain. Under these circumstances storage as high-moisture sorghum is perhaps the best system.

Moisture Content. As with corn and barley, a moisture content within a range of 25 to 30% is satisfactory. It would be more desirable to strive for the 28 to 30% level. Combining seems to be no problem when sorghum grain is at this moisture content.

Processing. Sorghum grain should be rolled or ground before feeding. Otherwise, because of the hard seed coat, much of the grain will pass through the animal undigested. Sorghum grain packs easily without rolling or grinding because of the small size of the seed. Therefore, it is not necessary to roll the grain before putting it in the silo. In fact, rolling or grinding sorghum grain before blowing it into the silo may cause the blower pipe to plug. Also, grinding the sorghum grain slows down the harvesting operations, and time is more critical at silo filling time than when taking the grain out for feeding.

There has been some interest in cutting and storing just the heads of grain sorghum. The moisture content of sorghum heads will average between 35 to 40% moisture. If stored in this manner, the heads will have to be ground or rolled before feeding to insure high digestibility. Until equipment is developed that

will crush the seeds when harvesting and storing, this system of storing grain sorghum is not recommended under most conditions.

Structures. The same as mentioned under corn.

Water Addition to Increase the Moisture of Grain

When harvesting grain to be stored at a high-moisture content, the moisture level of the grain may drop too low because of a time element during harvesting, or it may have been too low when harvesting was started. In this situation water may be added to raise the moisture content of grain to the desired level. The following table shows the amount of water to be added to raise the moisture content of the grain to the desired level.

Percent moisture in grain	Percent moisture desired					
	30	29	28	27	26	25
	Gallons of Water to be Added Per Ton					
29	3.5	--	--	--	--	--
28	7.0	3.5	--	--	--	--
27	10.5	7.0	3.5	--	--	--
26	14.0	10.5	7.0	3.5	--	--
25	17.5	14.0	10.5	7.0	3.5	--
24	21.0	17.5	14.0	10.0	7.0	3.5
23	24.5	21.0	17.5	13.5	10.0	7.0
22	28.0	24.5	21.0	17.0	13.0	10.0
21	31.5	28.0	24.0	20.5	17.0	13.0
20	35.0	31.5	27.5	24.0	20.0	17.0
19	38.5	35.0	31.0	27.5	23.5	20.0
18	42.0	38.5	34.5	31.0	27.0	23.5
17	46.0	42.0	38.0	34.0	30.5	26.5
16	50.0	46.0	42.0	37.5	34.0	30.0