Reducing hay losses through smart harvesting, storing, and feeding

As margins are tight in the cow calf business, it is critical to take all the steps you can to reduce feed waste and control costs.

One of the places losses can be excessive is hay harvest, storage, and feeding. These losses can be both from pounds of total dry matter available for feeding and quality losses of protein, energy and other nutritional components of the hay.

If you purchase hay for $80 per ton, the actual cost of hay consumed by the cow will range from $88.88 with 10 percent storage and feeding loss, to $114.29 if losses are 30 percent.

Harvesting hay under undesirable conditions can lead to losses in the hay field. Hay that is baled too wet may have losses even if mold and other quality issues are not obvious. If hay is raked numerous times leaf losses grow, reducing quality. In addition, heat damaged protein is an indication of damage to hay that is baled too wet. This damage can be discovered with forage lab analysis, and rations can be balanced based on available protein.

Covering hay with tarps, storing in barns, and using net wrap all can reduce hay storage losses. Barn storage can hold losses to 5 percent, while losses outside may exceed 30 percent. If hay is stored outside, it is important to select a well drained site that reduces water “wicking” into the bales. It is best to orient the rows of bales north to south with three feet between rows to allow the sun to dry the sides of the bales. Ends of bales in the row should be butted against each other solidly.

Reducing soil-to-bale contact is a plus. Storing on a gravel pad, or on pallets or tires, etc. can reduce storage losses. Net wrapping has helped reduce storage and handling losses, but choosing storage sites with poor drainage can lose part of that advantage.

A recent study conducted by Michigan State University found hay feeding losses that ranged from under 4 to nearly 15 percent depending on what type of feeder was used. The difference between a bale ring with a bottom panel and the same ring with a cone was only 2.6 percent in this study, with high quality hay and close monitoring of hay allotment.

Properly feeding hay to your cattle is one of several methods that can help reduce hay costs.

Staff at the ISU McNay Research farm are conducting some demonstrations this winter to look at different feeders and losses with lower quality hays.

It is not uncommon to have hay feeding losses from 15 to 25 percent when large amounts of hay are offered to cows. Many different feeding systems can reduce waste if they are well managed and hay is allotted to cows properly. The Iowa Beef Center Web site has a great publication prepared by researchers across the United States called “Minimizing Losses in Hay Storage and Feeding.” To learn more, go here: http://www.iowabeefcenter.org/content/MinimizingLossesInHayStorageAndFeeding(MSUEPub).pdf.
Questions arise every year about heating in hay and the potential for hay and silo fires. Although the potential for spontaneous combustion in hay exists, it is not common. While the risk of total loss from burning is minimal, there is still a great potential for nutritive loss in hay and silage due to excessive heating.

The first cut hay that producers harvested in the upper Midwest this season was more mature than most would have liked. The large stems of this more mature hay are more difficult to dry and may have led to some hay being baled at a higher moisture content that producers realize.

You are encouraged to be alert to the risk of heating hay in storage, and to pay closer attention to stored hay this summer. It is recommended to bale hay at less than 20% moisture or at slightly higher moisture conditions if you are using an effective mold inhibitor preservative. For haycrop silage, chop and store forage at 55% to 70% moisture and pack well to exclude excess air. Proper harvest and storage management keeps heating to a minimum.

Nearly all hay and silage heats a little in storage. It is a natural process where respiration of nearly dry plant cells and spoilage bacteria, yeast and fungi use plant sugars and oxygen to generate heat. The respiration and heating also require a high humidity. Hay baled at 18% to 30% or more moisture and silage stored at about 50% or less provide the right mixture of air, moisture and sugars for respiration and heating.

How hot is too hot? When should you become really concerned?

If hay or silage feels warm or hot, use a thermometer to know what the temperature range actually is of your hay or silage. The best way to check the temperature of hay or silage is to drive a pointed tube about eight to 10 feet into the hot hay or silage. Lower a thermometer into the tube. A chemistry lab thermometer with a 200 to 300 F scale works well. Leave the thermometer in the tube for 10 to 15 minutes before reading. Hay or silage may have “hot spots,” so it is desirable to check in several locations. If the temperature is:

125 ºF
This temperature is considered to be normal. You could probably not hold your arm in hay at this temperature for more than 30 seconds.

125-150 ºF
This extra heat is generated by respiration of bacteria and spoilage fungi. At these temperatures chemical processes called the Maillard reaction causes hay to turn brown, protein digestibility decreases and the hay is said to be “caramelized.”

150-175 ºF
Check temperature daily. The caramelizing Maillard reaction continues. Consider reducing the volume of the warm hay by spreading the hay out. Caution! It may be dangerous to move hotter hay without fire department assistance.

175-190 ºF
Check temperature every two to four hours. Alert the fire department of the situation and work with them on your management strategy. Chemical reactions which occur at these high temperatures begin to dominate the continued rise in temperature. Avoid the addition of extra oxygen into the hot hay pile. Hay or silage that reaches these temperatures are often nearly black and have a much lower feeding value.

190-210(+) ºF
Have the fire department present when hay is being removed. Spontaneous ignition is possible. Don’t forget about stored hay. Hay, particularly in deep piles, can retain heat and continue heating slowly for weeks or months! You may smell hot hay before you feel it.

Getting to know an IBC beef specialist

Iowa counties served: Butler, Grundy, Black Hawk, Bremer, Chickasaw, Howard, Winnebago, Fayette, Delaware, Buchanan, Dubuque, Clayton and Allamakee.

What made you decide to become a livestock specialist? I enjoy the contact with producers and agri-businesses involved in the livestock industry. My background was in dairy and beef production in North Dakota so this has been an area of interest for a long time.

What activities do you perform for your job that you enjoy the most? I very much look forward to the visits with farmers on their farm. Then we can implement the educational efforts through meetings and mass media directly with the producer in their unique situation. I also enjoy the dialog of teaching, be that at a field day or in the classroom.

What recommendations do you offer producers who are collecting and storing hay this spring? Hay is still very expensive so we need to be sure it is stored on ground where moisture will drain away. Then if we can set the bales on used tires, poles, or gravel we will greatly improve the air movement and drainage around the base of the bale. Keep the rows of bales inline with the slope of the land so the water doesn’t pool on the top side of the bale.