

## Wet Conditions Cause Forage Problems

**What is the quality of my forages? I had a first cutting on June 25.** The nutritive quality of the standing crop declines both as it matures and as it is affected by spoilage microorganisms in the high-humidity conditions. The greatest decline in quality occurs during late May through very early June from excellent to good, as flowers of legumes and seed heads of grasses form. The decline during the next few weeks due to further maturity is slower, declining from good to fair or low. If the forage was cut on June 25, baled, and stored normally, its nutritive quality could be from fair to low. To determine what its feeding value is and to know how to use it in winter feeding rations, you should get a forage analysis on a sample that represents the variability in the hay. Check with your local extension office or extension crop or livestock specialists to see how a sample should be taken and where to send the sample for analysis. Extension livestock field specialists can assist in interpreting the results and planning for the use of the forage in a feeding program.

**What is the nutrient value of hay if it was cut and then rained on for one to two weeks before baling?** Once the crop is cut, the forage becomes more susceptible to leaching of nutrients and protein loss due to leaf shatter. Vitamins, minerals, and sugars are the first to leach from the curing hay. Proteins remain with the hay as long as the leaves remain attached. Legumes such as alfalfa and clover lose leaves more quickly than do grasses during curing and handling. Spoilage microorganisms are more abundant on hay that has been cut, so mold will

probably be a factor in the hay when it is baled, stored, and fed. Cattle are generally more tolerant of mustiness and mold in feed than are horses. After a week or two of rain damage, nutritive value will probably be low for legumes and fair to low for grasses. A forage sample and analysis will be very helpful to know what the quality is and useful in building it into winter feeding rations.

**What about storage of wet hay?** Hay baled at moisture contents of greater than 15 percent or so will heat and lose moisture during storage. This heating comes from the rapid growth of fungi and bacteria in a favorable environment (moisture, available carbohydrate sources, and oxygen). Their respiration generates heat. The heat will either dissipate rapidly from individual bales or from small, shallow stacks of bales. However, if the bales are dense, or stored in deep tight stacks, or both, the heat cannot dissipate rapidly, and is retained in the stack, building to higher temperatures.

Hay with 15 to 20 percent moisture content will generally only heat to 90 to 120° F with no more than a minor decrease in protein digestibility—this is “normal curing.” However, hay stored at higher than 20 percent moisture will support fungal spoilage growth for a longer period, will often be musty or visibly moldy, and can have significant reduction in percent digestible protein, called “heat damaged protein.” If heat builds up in deep stacks of this wetter hay, temperatures can approach 140 to 150° F or higher. If the temperature climbs to no higher

than this, the stack will eventually cool off. If the temperature continues to rise, the local fire department should be notified of “hot hay.” **Don’t begin moving bales until advised by fire department officials!** At these temperatures, chemical reactions can quickly lead to further temperature increases to the ignition point (450 to 525° F), hot enough to smolder and char. Opening the stack to oxygen can result in open flames.

If hay is baled wetter than desired, storage suggestions include the following:

- Store round bales outside individually, or in rows, only one-bale deep until heating has ceased.

- Store large, rectangular bales inside, in a well ventilated area, preferably off the floor, on pallets or tires, with spaces between bales, and no deeper than one-bale depth.
- Store small, rectangular bales inside, in a well ventilated area, no deeper than 4 to 6 feet deep, preferably stacked loosely with spaces between bales.

Bales can be restacked after the initial heating has subsided.

Sample and test all hay to determine its nutritive content, and use the information to develop sound feeding rations. For concerns about mustiness and mold, consult a veterinarian.

Prepared by Steve Barnhart, extension agronomist.

File: Agronomy 3

**... and justice for all**

The Iowa Cooperative Extension Service’s programs and policies are consistent with pertinent federal and state laws and regulations on nondiscrimination. Many materials can be made available in alternative formats for ADA clients.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Stanley R. Johnson, director, Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa.