Hay Testing is Inexpensive Compared to the Cost of Open Cows

HUNER NICKELL – LIVESTOCK PRODUCTION AGENT

Every summer ranchers cut and bale hay for the winter and don't think much about it. But the nutritive value of hay is highly variable and not always represented by the visual appraisal of the hay.

The nutritive value of hay is primarily a function of protein concentration and digestibility. The protein in hay is primarily digested by the bacteria in the rumen which are then digested by the animal in the small intestine; thus, providing the animal the protein that it requires. As grasses grow the protein concentration decreases; however, this change in protein concentration is not consistent among species of grasses or for the same species across years.

Digestibility is a function of the fiber concentration in the grass. There are several types of fiber, but neutral detergent fiber (NDF) and acid detergent fiber (ADF) are two types of fiber related to digestibility. NDF is the total amount of fiber in the plant and ADF is the amount of poorly digested fiber in the plant. As the total amount of fiber (NDF) increases the digestibility of the grass decreases, and as the amount of ADF increases the digestibility of the grass decreases. From the NDF and ADF concentrations in the hay, we can calculate an estimated digestibility (TDN). As grass grow, the NDF and ADF concentration increases and similar to the protein concentration, this change is not consistent among species or across years.

Visual appraisal of hay can be deceiving. Figure 1 is a picture of bromegrass hay that has a high number of leaves and relatively few stems. Although, stems are present indicating that the plant had reached reproductive stage prior to cutting and baling. The reproductive stage, when seed heads are visible, is one of the later stages of plant growth indicating a lesser quality hay will be produced. However, bromegrass hay is usually a relatively high-quality grass hay.

Figure 2 is the nutritive analysis of the hay in Figure 1. Even with a high number of leaves the protein concentration is quite low at 6.39 %. Feed tables list the protein concentration of bromegrass hay at >8%, which will meet the protein requirements of mid-gestation dry cows; 6% protein will not. Late gestation and lactating cows will need a protein supplement to meet requirements as their protein requirements are 9 to 10%.

The NDF concentration of the hay in Figure 1 was 63% and the ADF was 41%. This calculated to an estimated TDN of 51%, which is just enough to meet energy requirements of mid-gestation dry cows. And with the marginal protein concentration in the hay, the cows will need a protein supplement to be able to digest the hay up to the potential calculated TDN of 51%.

Visual appraisal of hay is not always adequate to assess the nutritional value of the hay. Even home-grown hay can have nutritive value very different than what is expected or what forage analyses from previous years indicates. A basic forage test that will provide protein, NDF, ADF, and TDN concentrations costs $20 to $40 per sample. One sample from each cutting and each field is adequate, but the sample needs to comprise of hay from multiple bales. The best way to sample hay for forage analysis is to use a hay probe on a cordless drill and collect a core from 10% of the bales. The $100 to $200 spent on forage analysis is worth the cost of 1 open cow from feeding hay that results in thin cows at calving.

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Thank you to the Beef Cattle Institute at Kansas State University for the content in this article. If you have any additional questions, or are interested in testing your hay, give Hunter Nickell, Livestock Production Agent, a call at any of the Southwind Extension District offices or by email at nickell99@ksu.edu. We have a probe in each office and are happy to make field visits to assist our producers!

← Figure 1

Nutritive value of bromegrass hay.

Nutrient	Value, Dry Matter Basis
Crude protein	6.39%
Neutral detergent fiber (NDF)	63%
Acid detergent fiber (ADF)	41%
Total digestible nutrients (TDN)	51%

←Figure 2