Forage Management

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Hay Quality - The Foundation for Low Cost Winter Feeding

With low cattle prices it is important to keep production costs down. Feed is the major cost in cattle production, and a low cost ration is based on quality forage. This is especially true when grain prices are high.

The first principle in making good-quality hay for winter feeding is to harvest early. Rain damage will reduce hay yields and cause bleaching. However, rain does relatively little damage to hay quality as measured by forage digestibility, crude protein, and intake.

Forage testing tells us a lot about hay quality and how to use it in a least cost manner. Bruce Loyd (Lewis County) has been holding hay and silage shows each winter. In 1994 and 1995, he had a show division for samples that were analyzed by the Southern States forage testing laboratory. Over the two years, 39 samples were entered with the date of harvest noted on each. The Lewis County data clearly demonstrates the advantage of cutting of hay early.

What is hay quality?

Hay can provide a low-cost, homegrown winter feed. It can provide all the energy and protein needed by beef cattle and sheep. Even in rations for high producing dairy cattle, hay can provide over half the feed requirements. When we talk about forage quality, we want to know the hays digestible energy content, crude protein, and the potential dry matter intake of the forage (how much of it an animal will eat).

Digestible energy

High levels of digestible energy in hay mean that a pound of feed will provide more energy for growth, milk production, or body maintenance. Digestible energy is measured as total digestible nutrients (TDN), or as net energy lactation (NEL), or as net energy maintenance (NEM) and net energy gain (NEG). Digestible energy is a measure of the solar energy captured by the plant which can be digested by the animal for use in maintenance and in making products useful to humans. In central West Virginia, as the harvest date for first-cut hay extends past early June, the digestibility of the hay decreases (Fig. 1).

![Fig. 1](image-url)
Crude protein

Crude protein is estimated by measuring hay's nitrogen content and multiplying that by 6.25. Much of the protein in feeds for ruminants (cattle, sheep, and goats) is broken down by rumen bacteria and used by them in digestion of carbohydrates (cellulose, sugars, and starches) in the forage and supplemental grains in the ration. This produces more bacteria which are digested in the true stomach of the animal. As the date of harvesting first cut hay extends past early June the crude protein content decreases (Fig. 2).

Dry matter intake

When looking at animal performance on forage based diets 85% of the difference in performance is due to forage dry matter intake (DMI). One reason that this is so is that as forage digestibility increases forage DMI also increases. As more highly digestible forage is eaten, more energy is available to the animal for growth and milk production. Therefore, hay quality is best described as how much the animal can eat. Again, as the harvest date extends past early June the predicted DMI of the hay decreases (Fig. 3).

Relative Feed Value

Relative Feed Value (RFV) is reported on many forage test reports. It is a combination of the forage's digestibility and DMI. Hay with an RFV of 115 will provide about 15% more digestible energy than a feed with an RFV of 100. Of the hay samples submitted to the Lewis County Hay Show, those harvested before the 5 June had RFV's ranging from 87 to 115 (Fig. 4). Hay samples harvested after 5 June had RFV's ranging from 69 to 100.

The optimum cutting date for any location will depend on your land's elevation. Watch the growth stage of the grasses to determine when to start making first cut hay. When grass is in the late-boot to early-head growth stage, it will provide the best compromise between yield and forage quality (Fig. 5).
The Value of Legumes

Legumes are of major value in hay production. Legumes fix nitrogen from the air and eliminate the need to purchase expensive nitrogen fertilizers. In hay production, a good legume-grass stand having about 25% to 50% legume, will have a hay yield over the growing season comparable to grass fertilized with 150 lb. of actual nitrogen.

With nitrogen fertilizers costing $0.33/lb. N this is a savings of $50/a/yr.

Livestock will eat more legume forage than grass forage. This allows the animal to grow faster or produce more milk. Also, mixed grass-legume hays are higher in crude protein at the same date than most straight grass hays. This allows for their use as a protein supplement with low-protein hays or for feeding with energy supplements such as corn.

Aftermath hay harvests should be made based on the growth stage of the legume. For highest quality, harvest when the legume is in the late-bud growth stage (Fig. 6). To ensure a more vigorous legume stand,
Challenges Making Hay Early

There are several challenges in making early-cut hay. The main one is that the drying conditions in late May are poor compared to late June. For beef cattle not all of our hay needs to be top quality. For them, the key is to make some hay early, to have some high quality forage for growing replacements, for cows after calving, and for use as a protein supplement to be fed with low quality late cut hay.

Be ready to make early-cut hay by tuning up the mower and baler in early May. If good drying weather comes, you will be ready to go for it. Also, hay wrappers allow balage to be made out of early-cut hay without drying it down for hay. If you have a large herd, this can be a cost effective option. For smaller herds, renting the needed machinery is possible in some areas of the state. Before deciding on balage, make sure to count all your costs, including disposal of the used plastic.

How much early-cut, high quality hay you need depends on your livestock management system and your goals. If your cattle are in poor body condition or are not breeding back as soon or as evenly as they should or if your supplemental feed costs are high, you should evaluate your system and see if you need to be making more of your hay at an earlier date.