Forage Quality

COLLECTING A FORAGE SAMPLE FOR ANALYSIS

PASTURES

When trying to determine the quality of a large pasture, consider subdividing it into a few fields and collecting a composite sample from each field. Define a zig-zag path and the number of steps you will walk as you collect the samples. Several samples per field should make a composite sample of that field. This will account for the variability throughout the field and provide an average forage quality for it.

Properly homogenize the samples collected throughout the area since approximately 1 pound of forage material will be sent to the laboratory for analysis. Make sure you store the samples properly to avoid loss of forage quality due to spoilage before shipping.

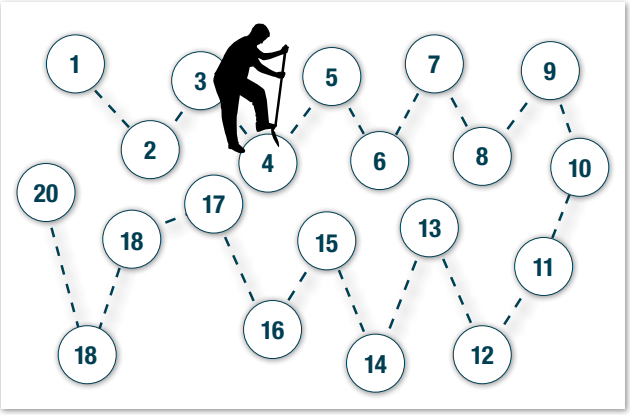

Figure 53. Collect samples in a zig-zag pattern.

Figure 54. Collect random samples from several bales.

HAY AND BALEAGE

Prior to feeding hay and baleage to your livestock, it is useful to have the feed analyzed so that you can balance the animal diet as needed. Use a hay probe with a powerful drill for the extra power needed to get samples from bales.

After collecting each baleage sample, put heavy-duty tape over each hole. You don't want air and wildlife to get inside the bales; this can contaminate and decrease quality of the baleage. While duct tape is convenient, it is not UV resistant and will degrade over time. Collect random samples from several bales to get an adequate representation of the average quality of the material.

Prior to collecting your forage samples, contact the laboratory to better understand the required procedure to send routine analysis samples. For more information, visit "Collecting Forage Samples for Laboratory Analysis" on the Alabama Extension website.

PARAMETERS COMMONLY REPORTED ON A FORAGE ANALYSIS

- **Dry matter (DM) percentage.** Forage samples are oven dried to determine the amount of water and dry matter in a sample. The dry matter percentage influences how stable stored forages, such as hay, baleage, and silage, may be during storage. A goal of 85 percent dry matter is preferred for hay. Baleage may contain between 40 and 60 percent dry matter and silage between 30 and 40 percent dry matter.
- **Crude protein (CP) percentage.** Crude protein is the total nitrogen in a forage sample multiplied by a 6.25 correction factor. Protein is important for growth, milk production, and muscle development. A lactating beef cow needs a diet containing 11 percent CP on a daily basis during the first 60 days after calving. During mid-to-late lactation, CP needs decrease to 9 percent. A dry, pregnant cow has the lowest CP needs (7 percent) until the last 60 days before calving, after which nutrient needs begin to increase again.
- **Neutral detergent fiber (NDF) percentage.** The NDF value is the total cell wall material, which consists of hemicellulose, cellulose, and lignin. As forage NDF increases, forage intake decreases. The percentage of dry matter intake of the animal as a percentage of its body weight per day can be estimated as 120 NDF. For example, if the forage report has a dry matter NDF value of 60 percent, then dry matter intake (as a percentage of body weight) is 120 ¸ 60 = 2.0%. The calculated estimated dry matter intake of this forage is 2.0 percent of the animal's body weight.
- **Acid detergent fiber (ADF) percentage.** Acid detergent fiber is an estimation of the forage component that is indigestible to the animal. This value refers to the cell wall portions of the forage that are made up of cellulose and lignin. The greater the ADF, the less digestible forages become to the animal. Both NDF and ADF increase as the forage becomes more mature because of increasing cell wall content. Most forages have an ADF value of 40 percent or greater. The ADF value is used to determine the total digestible nutrients of the forage.

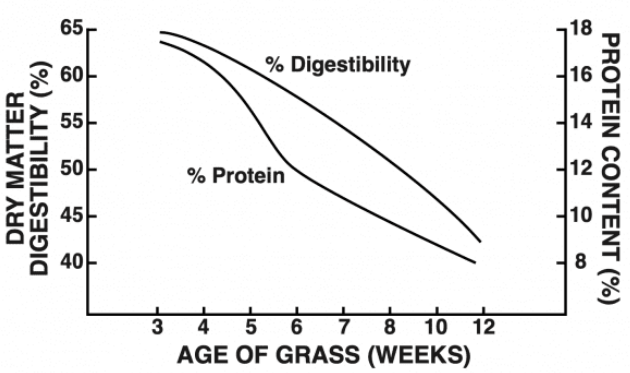

Figure 55. Total digestible nutrient represents the forage energy value.

- **Total digestible nutrients (TDN) percentage.** Energy value of forage is expressed as total digestible nutrients. Typically, the greater the value, the more energy dense the forage is considered. Low-quality hay is generally 45 to 52 percent TDN. Mid-quality hay is generally 52 to 58 percent TDN, and high-quality hay is greater than 58 percent TDN. A dry cow requires a minimum of 48 percent TDN in its diet, and a lactating cow needs a diet that is at least 60 percent TDN per day.
- **Relative forage quality (RFQ).** This is a single number that can be used to compare the overall quality of one or more forage samples. The RFQ value combines an estimate of predicted intake and digestibility. This makes it a good measure of forage quality and can help provide insight for potential animal performance.
- In general, RFQ values range from 50 to 300, with the upper end representing the highest-quality forage. The greater the nutrient demands, the higher the forage nutritive value needs to be to support good animal performance. For more information, see "Interpreting a Forage Analysis for Beef Cattle" on the Alabama Extension website at www.aces.edu or scan the QR code to access the publication.

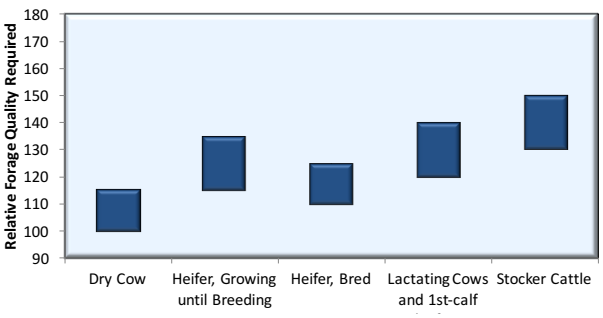

Figure 56. Relative forage quality requirements based on animal class and stage of production.

- **Nitrate-nitrogen parts per million (ppm).** Plants under stress can accumulate excessive amounts of nitrates, which at high levels can be toxic to livestock. Forage crops, such as certain summer annuals and bermudagrass, may accumulate nitrates under conditions of high fertility, drought stress, etc. A nitrate-nitrogen range of 0 to 1,500 is generally safe to feed. In the upper range, use caution when feeding pregnant or young animals, and prevent overconsumption, which is sometimes observed in feeding large, round bales.
- When values range from 1,500 to 5,000 ppm, limit forage to half of the total daily dry matter intake. Feed a balanced ration with adequate energy, and do not feed with liquid feed or other common sources of nonprotein nitrogen supplement, such as molasses-based tubs. If nitrate-nitrogen values exceed 5,000 ppm, the forage is considered toxic to livestock and should not be used in a free-choice feeding situation.
- **pH.** This is a measure of the degree of acidity in ensiled forage crops. Good corn or sorghum silage generally has a pH of 3.5 to 4.5, and baleage from 3.5 to 5.5.

INTERPRETING A FORAGE ANALYSIS REPORT

A forage analysis report provides two columns of numbers. The first column represents results on a dry matter basis and the second on an as-fed or as-received basis. When interpreting a forage analysis report for developing a supplemental feeding strategy, all interpretation is based on the dry matter basis column. Comparing forages on a 100 percent dry matter basis allows for a more equal comparison among forage types. For more information, go to "Interpreting a Forgage Analysis for Beef Catle"on the alabama Extension website at www.aces.edu.