

FORAGE QUALITY: DIFFERENCES IN SPECIES

January 2012 Georgia Cattleman

Dr. Dennis Hancock

Forage Extension Specialist

The University of Georgia

Most folks realize that not all forage species are created equal. Some forage crops are higher in nutritional value than others. In this month's article, an overview of these differences is presented. Also provided is a summary of over 16,000 forage samples from several different forage species submitted to the University of Georgia's Feed and Environmental Water Lab between July 2003 and February 2011.

Species Differ in Quality

It is well-known that different forage types exhibit differences in digestibility and nutritive value (Figure 1). In general, grasses have more fiber than legumes. As a result, legumes are generally more digestible than grasses. Similarly, cool season grasses are typically more digestible than warm season grasses.

More than Just Crude Protein

However, it may be surprising to many folks to learn that many of our forage species are typically quite similar in crude protein (CP). Figure 2 provides a graphical summary of the CP data from over 16,000 hay and silage samples that were submitted to the University of Georgia's Feed and Environmental Water Lab (FEWL) between July 2003 and February 2011.

In addition to the observed average and the typical range that should be expected, the figure indicates the amount of CP that is necessary for most dry cows (gray bars) and lactating cows (blue bars). Note that, on average, all of the forage species have enough CP to support the needs of a dry cow and nearly all provide enough CP for a lactating cow. Indeed, most of the classes of beef cattle that are being fed in the Southeast have relatively low requirements for CP. Most of the forages produced in the Southeast can meet these requirements relatively easily.

Unfortunately, there is a false perception that protein is the most limiting nutrient in the animal's diet. The reality is that the energy value of the forage (e.g., TDN) is usually the most limiting factor.

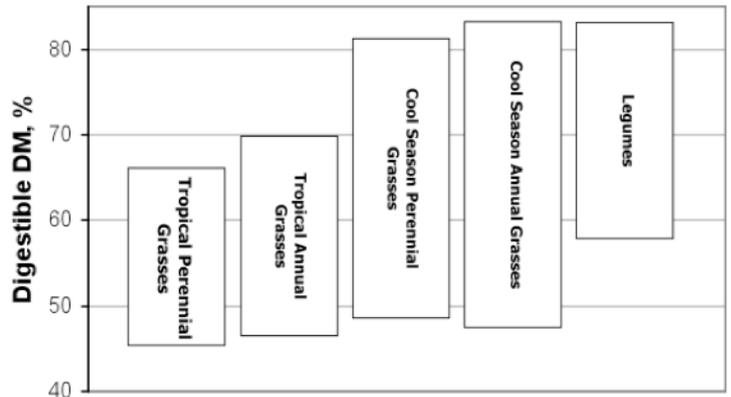


Figure 1. Digestibility ranges of major forage types. Note that the ranges overlap, but some forage types are more likely to be lower in quality than others.

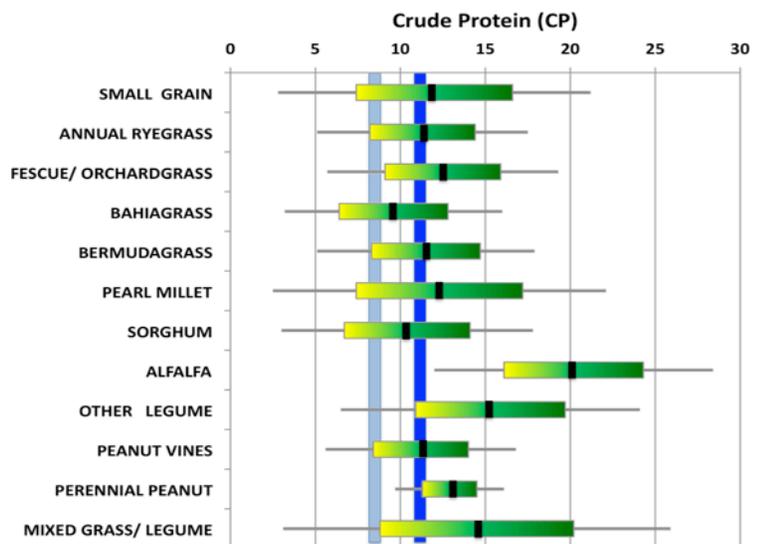


Figure 2. The average (black vertical lines) and typical range (yellow to green horizontal bars) of CP in samples of various forage species submitted recently to the UGA FEWL. Behind the graph lies a gray bar representing the CP needs of a typical dry cow and a blue bar for the CP needs of a typical lactating beef cow.

Differences in Digestible Nutrients

Forage species differ more widely in the typical concentration of total digestible nutrients (TDN) and energy than in CP content. Figure 3 presents, in a manner similar to the CP graph, the observed average and typical range of TDN in various forage species. Note that these forage species, on average, would all provide sufficient TDN for the typical dry cow. However, only a few of the forages would provide enough TDN for a lactating cow, on average.

RFQ Differences Tell the Full Story

Increasingly, however, producers and nutritionists are recognizing that even TDN cannot tell the whole story. In addition to understanding how “energy-dense” the forages are (i.e., their TDN concentration), it is also important to understand that some forages are more readily consumed than others (i.e., they have higher dry matter intake values). In the early 2000s, researchers from the Univ. of Wisconsin and the Univ. of Florida developed a more robust measure of forage quality called Relative Forage Quality (RFQ). The RFQ index is based on TDN and estimates of dry matter intake (DMI).

Figure 4 presents the observed and typical range of RFQ observed in our forage species. Here, the gray bars represent the range in RFQ where one could expect to need little or no additional supplemental feed to meet the needs of the typical dry beef cow. Similarly, the blue bars represent the RFQ range that would negate the need for supplemental feed for the typical lactating beef cow. Note that one would need to produce hay or silage from bahiagrass, bermudagrass, fescue and orchardgrass fields that was above average in RFQ to consistently meet the needs of even a dry cow. Furthermore, a producer would need to produce hay that was in the top 10% of quality for these common hay crops to consistently meet the needs of the typical lactating cow. In actuality, the producer would likely find it easier and more cost-effective to produce hay or silage from one of the forage species (e.g., annual ryegrass, small grains, legume or legume mix, etc.) that more easily meets the demand for lactating cows.

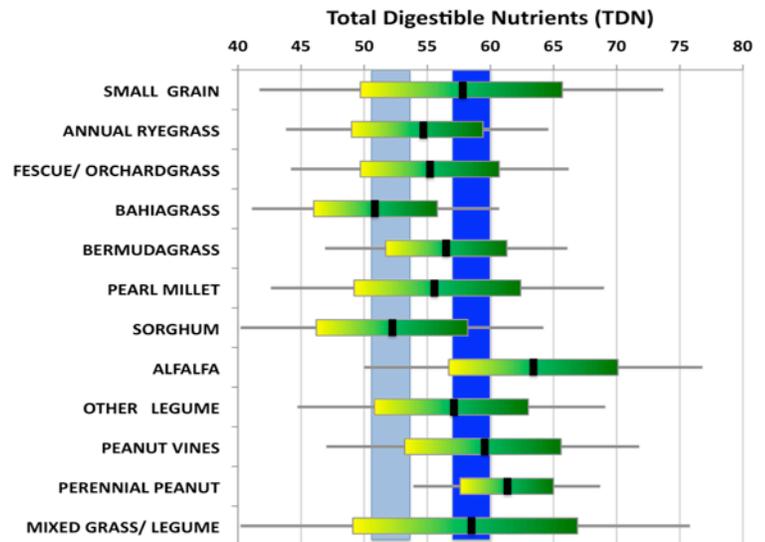


Figure 3. The average (black vertical lines) and typical range (yellow to green horizontal bars) of TDN in samples of various forage species submitted recently to the UGA FEWL. Behind the graph lies a gray bar representing the TDN needs of a typical dry cow and a blue bar for the TDN needs of a typical lactating beef cow.

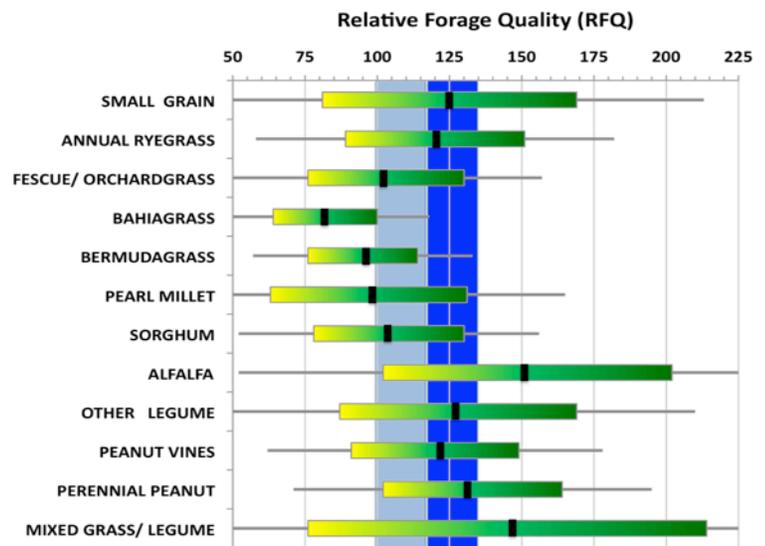


Figure 4. The average (black vertical lines) and typical range (yellow to green horizontal bars) of RFQ in samples of various forage species submitted recently to the UGA FEWL. Behind the graph lies a gray bar representing the RFQ needs of a typical dry cow and a blue bar for the RFQ needs of a typical lactating beef cow.

Use the Right Species and Manage to Minimize Supplemental Feed

Certainly, there are quality differences in the primary forage crops grown on Georgia beef operations. However, more important than the species is the management imposed. All of the forages mentioned here are capable of meeting the needs of a variety of beef cattle classes. However, the point is to manage them so that the forage produced matches the needs of the animal class being fed.

To learn more about the differences in forage species and how to manage them so that they provide the desired quality, check out the information on forage quality on our website at www.georgiaforages.com or contact your local University of Georgia Cooperative Extension office.

got questions?

Have a question or topic that you want Dr. Hancock to address? Email him at: questions@georgiaforages.com.