

## **Evaluating Your Forage Program Georgia Cattleman, August 2001**

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Many of you remember taking tests years ago while you were in school. These exams were never pleasant, but they allowed teachers to evaluate student progress and performance. If students performed poorly, they were generally accused of not studying enough. In reality, if most students performed poorly the professor may be partially at fault and in need of changing his teaching approach. Like professors, forage producers can use some fundamental tests to evaluate their soils and forages and ultimately improve management techniques and productivity.

### **Soil Testing**

All plant growth depends, among other things, on soil pH and nutrients. Soil testing evaluates these factors and is a tool that can greatly impact the vigor and productivity of your pastures. I'm sure that all beef producers in Georgia are aware of soil testing but, according to a Kentucky survey of 10 Southern states, only 21% of forage land is soil tested. In my short tenure as a forage specialist in Georgia, I've already visited several fields where soil acidity and low phosphorous levels were preventing or seriously limiting plant establishment and forage production. A simple (and free) soil test at these locations would have made establishment more rapid, reliable, and economical and overall forage production would be increased.

Soil testing is necessary to determine when lime is needed. Excessive soil acidity is a problem that can affect almost all of Georgia pastures. Generally, bermudagrass and tall fescue can tolerate fairly acidic soils (pH around 5.5). However, high rates of nitrogen fertilizer increase soil acidity over time and lime application is necessary to offset acidification and insure good forage yields. Decreasing soil acidity through liming also indirectly improves forage quality in mixed pastures. Liming improves the competitiveness of legumes which increases both the proportion of clover present in the field and the amount of nitrogen fixed per acre.

Phosphorous or phosphate is critical for seedling survival in newly established pastures and is important for good root growth. Phosphorous is also important in nutrient transfer, cell division and flowering. Poultry litter contains relatively high levels of phosphorous so usually no phosphate is needed on fields fertilized with this byproduct. Much of soil phosphorous is unavailable to plants when soil pH is around 5.3 or lower. Soils that have not been fertilized or limed recently may have low available phosphorous levels that will limit plant performance. Hay fields require higher levels of potassium or potash than nitrogen. In bermudagrass hay fields that yield 6 tons per year, about 250 pounds of nitrogen

is removed with the hay while almost 290 pounds of potash is removed. Potassium is critical for disease resistance and cold hardiness and also is needed for plant protein synthesis and root growth. Many bermudagrass fields that have declining hay yields and an increasing number of weeds or bare areas could be suffering from inadequate potash supplementation. Unlike phosphorous, potash is susceptible to leaching and may need to be applied in split applications on sandy soils.

Pastures used solely for grazing should be tested every two to three years and pastures used exclusively for hay production should be tested annually. Again, soil tests give you the unique opportunity to more accurately and economically match soil nutrient availability with forage nutrient requirements. This is a simple test that most cattlemen are aware of, but seldom use. As a forage producer you should begin to think of soil testing as an absolute necessity for maintaining efficient, productive and profitable pastures.

### **Forage Testing**

Testing your forages should be considered as a final exam. This single test allows you to monitor multiple management decisions and will almost certainly improve your operation's profitability. Using data supplied by Dr. Robert Stewart, UGA Extension Animal Scientist, it is apparent that the costs of supplemental feed required to maintain a beef cow decrease dramatically as hay quality increases. Using average feed costs, the price of supplementing a cow that is fed low quality hay can exceed \$50 dollars per winter. Knowing the quality of your hay allows you to accurately match supplement needs with hay quality so that excessive feed costs can be avoided. For example, if the total digestible nutrient:crude protein ratio of your hay exceeds 7; it is probably necessary to supplement with crude protein. If the ratio is less than 4, energy supplementation would probably be beneficial. Nitrate levels in the hay are also reported on the forage test which can prevent cattle losses resulting from toxicity.

Knowing hay nutrient content also allows forage quality to be matched with animal requirements. If your second cutting of bermudagrass hay was rain damaged, a forage test would determine if damaged hay meets the nutrient requirements of dry cows. Higher quality hay could be stored and fed later to lactating cows to decrease supplemental feed needs. Matching the appropriate quality hay with animal nutrient requirements can save a substantial amount of money over a winter feeding period.

Carefully examining test results not only provides forage quality values which will aid in supplemental feed decisions, but also gives clues about how closely plant nutrient needs are matched with fertilizer application rates. Occasionally it is possible to determine if too much nitrogen is being applied to hay fields. Hay that contains extremely high crude protein and nitrates indicate that too much nitrogen has been applied.

In addition to providing some fertility information, it should also be possible to determine if hay is harvested at the correct maturity or if baling and storage methods are adequate. If hay was harvested at the proper maturity and forage quality is still poor there may be problems in hay raking, tedding or baling that caused leaf loss or protein crosslinking. This would be indicated by high NDF values or high "bound" protein levels depending on the situation.

## **Summary**

Two simple tests that can help you evaluate your forage program are readily available and should be used by all forage producers. Soil testing can alert you to nutrient application problems and increase the health and persistence of your pastures. Forage testing yields clues about your forage system and will pay for itself through decreased supplementation costs or increased animal performance. There is no reliable method of evaluating hay quality other than testing it for nutrient content. Color, leafiness, smell etc. are all qualitative observations that provide hints about hay quality, but are no substitute for actual chemical values.