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FORAGE QUALITY

With the winter feeding season for cattle fast approaching, we thought it appropriate to devote this newsletter to forages. In order to utilize much of the information presented here, a forage analysis report will be needed for each lot of hay produced. Forage tests are available through most Extension Agents.

The Whitten PMC has the following studies underway involving forages: Upland switchgrass yield and quality, eastern gamagrass hay and silage, eastern gamagrass intercenter adaptation trial, Carolina clover, upland switchgrass initial evaluation of 92 collections, switchgrass seed dormancy, three studies on CRP or hayland improvement (broomsedge control).

NATIVE VS. INTRODUCED FORAGES

by: Herby Bloodworth, Agronomist

Typically, producers rely upon bermudagrass and bahiagrass, both introduced species, for grazing and hay production. Before these two grasses became dominant in the Southeast, native species like eastern gamagrass and switchgrass were used. Tall and vigorous, these natives require more management than the introduced grasses to survive but can produce respectable yields with little or no fertilizer. A study was designed by the PMC to compare two native species with two introduced species using equal fertilizer rates.

Eastern gamagrass and switchgrass need a long regrowth period before frost which precluded them from harvest in September when the last cutting of 'Tifton 44' bermuda was made. 'Tifton 9' bahiagrass suffered severe cold damage during the 1995-96 winter and was not harvested this year although, by summers end, the stand fully recovered. The following total dry matter yields were observed: ‘Tifton 44’ bermuda yielded 6.1 tons/acre, ‘Alamo’ switchgrass 2.7 tons/acre, and eastern gamagrass 5.6 tons/acre. Forage quality analysis are still being conducted and will be reported later. The study has two more years to completion.

HOW MUCH PROTEIN DOES A COW NEED?

by: Scott Edwards, Lab Director

The following is an excerpt from a research paper titled "Matching the Cow with Forage Resources" by Don Adams et. al., of the University of Nebraska-Lincoln. The original paper was published in a newsletter (Volume 2, No. 3, Summer 1996) by the Center for Grassland Studies.

"The total digestible nutrients (TDN) and crude protein requirements during the last third of pregnancy are about 20 and 14% more than during the middle third of pregnancy, respectively."

"As requirements for pregnancy and lactation increase, the amount of forage needed increases at all densities of crude protein. The greatest amount of forage needed is for a cow producing a high level of milk."

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FORAGE QUALITY
by: Scott Edwards, Lab Director

Forage test results are of little value unless they are understood and used. Crude Protein (CP) and Acid Detergent Fiber (ADF) are the two most common methods used by laboratories to estimate forage quality. From these tests, it is possible to estimate the following quality indicators; Total Digestible Nutrients (TDN), Relative Feed Value (RFV), Digestible Dry Matter (DDM), and Net Energy for Lactation.

Crude Protein is a mixture of true protein and non-protein nitrogen. This estimates the capacity of the feed to meet an animal's protein needs. Crude protein is not a direct measurement of protein but a measurement of the total nitrogen in a plant (CP = % N x 6.25).

Crude protein is related to stage of maturity and leafiness. A high protein forage allows producers to save money by reducing the need for protein supplements in the ration.

Acid Detergent Fiber estimates the digestibility of a feed or forage. Forage fiber is defined as the indigestible or slowly digesting components of forage that occupy space in the gastrointestinal tract of animals. This can truly be measured only by the animal. For this reason, the actual definition of fiber becomes method dependent. Acid detergent fiber is the percentage of highly indigestible plant material (lignified cellulose) in a feed or forage. The lower the percent ADF, the more forage an animal can digest.

Warm season perennial grasses develop lignin rapidly as they mature, thus reducing their digestibility. Highly lignified forages remain in the rumen for long periods of time because of their slow rate of digestion. This will decrease forage intake by the animal, resulting in poor animal performance.

Because forage digestibility is usually the most limiting factor affecting forage intake and animal performance, it is necessary to estimate the potential energy of forages. Total Digestible Nutrients attempts to equate feeds or forages on an energy basis.

Percent ADF has a negative correlation with estimated TDN and Digestible Energy (DE). This means as ADF increases, TDN and DE decrease. Table 1 ranks forage by CP, ADF, and NDF.

Table 1. Quality standards for legume and grass hay. American Forage and Grassland Council.

Quality	CP	ADF	NDF	DDM	DMI	RFV
			%			
Prime	>19	<31	<40	>65	>3.0	>151
1	17-19	31-35	40-46	62-65	3.0-2.6	151-125
2	14-16	36-40	47-53	58-61	2.5-2.3	124-103
3	11-13	41-42	54-60	56-57	2.2-2.0	102-87
4	8-10	43-45	61-65	53-55	1.9-1.8	86-75
5	<8	>45	>65	<53	<1.8	<75

CP = Crude protein = Percent N x 6.25;
ADF = Acid detergent fiber; NDF = Neutral detergent fiber
DDM = Dry matter digestibility = 88.9 - 0.779 ADF (% of DIVI). Similar to %TDN
DMI = Dry matter intake (% of body weight) = 120/NDF (% of DIVI).
RFV = Relative feed value = (DDM x DIVII) / 1.29. Alfalfa hay = 100 on RFV index.

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