



The Importance of Forage Quality

Volume 7, Issue 6

Rocky Lemus
Extension Forage Specialist

June 2014

Visit us at: <http://mississippiforages.com>

Hay produced in the south has a large effect on livestock feeding programs during the winter months. In the last decades, we have seen that producers have put more emphasis on forage quantity and completely ignored one of the most important fundamental components of hay production, **forage quality**. Forage quality is measured by the potential of a specific forage crop to produce an animal response (improved calving rates, increase in weaning weights, beef and milk production, etc.). The quality of a forage is measured by its palatability, digestibility, animal intake, nutritive value and anti-quality factors. Over 90% of forage/livestock producers in Mississippi do not recognize the value of using forage quality testing and the information obtained from the analysis as a management tool to balance feeding rations and avoid unnecessary feeding cost. This leave supplementation as one of the most of the biggest costs in a cattle operation. Knowing the quality of the forages you are selling or buying is also economically wise.

There are a number of factors that can affect forage quality such as plant maturity, climate (temperature) and forage species. There are some secondary management practices that can also affect forage quality such as soil fertility, plant stress (insect damage and water stress), and harvest and storage methods. At harvest, maturity is the critical factor because forage quality decline significantly with increase in maturity. As the plant matures, there is an increase in fiber content and lignin and decrease in protein content. These changes decrease forage digestibility, the energy that the livestock can obtained from the forage being fed and the rate of passage.

Table 1. Forage quality of warm-season perennial grasses. Values expressed on a dry matter basis. Samples combined from fertility trials at Mississippi State University (Lemus and White, 2014).

Variable	N	Mean	Maximum	Minimum	Range	Std Dev
----- Bahiagrass -----						
CP, %	333	10.95	17.79	5.45	12.34	1.67
ADF, %	334	38.83	46.71	33.27	13.44	2.02
NDF, %	334	63.75	69.63	57.09	12.54	2.35
WSC, %	328	4.79	8.28	1.11	7.17	1.40
TDN Est., %	334	50.70	57.09	41.63	15.46	2.32
RFQ	334	77.81	97.57	58.33	39.24	6.38
P, %	334	0.21	0.25	0.11	0.14	0.02
K, %	334	1.51	2.00	0.35	1.65	0.21
Ca, %	334	0.56	0.71	0.44	0.27	0.04
Mg, %	333	0.56	17.77	0.28	17.49	1.45
----- Bermudagrass -----						
CP, %	1316	13.49	20.36	6.91	13.45	2.40
ADF, %	1317	33.96	43.60	26.47	17.13	2.73
NDF, %	1317	63.63	75.58	52.24	23.34	3.44
WSC, %	1285	5.20	11.83	0.13	11.70	2.05
TDN Est., %	1317	56.29	64.91	45.21	19.70	3.14
RFQ	1317	86.78	120.30	59.61	60.66	9.21
P, %	1316	0.22	0.34	0.05	0.29	0.03
K, %	1317	1.72	11.67	0.11	11.56	0.45
Ca, %	1317	0.45	37.63	0.19	37.44	1.03
Mg, %	1316	0.68	66.79	0.17	66.62	2.54

TDN = 95.35 - (ADF*1.15); DMI (% BW) = 120/NDF; RFQ = (DMI, % BW) * TDN (% DM)

Forage species can also influence forage quality. Legumes tend to have higher protein content and digestibility than grasses. By the same token, cool-season forages tend to have better forage quality than warm-season grasses when harvest at the recommended stage of maturity (boot stage for grasses and early bloom for legumes).

How to collect a forage sample for Analysis?

If you are a commercial hay producer, forage samples should be taken at least 4-6 weeks after harvest and after the microbial respiration (commonly known as bale sweating) has equilibrated. If you are sampling hay to determine feeding protocols in your farm, hay should be sampled at least 4 weeks before the scheduled feeding program. If multiple hay cuttings were obtained during the growing season, it is recommended to take a representative sample for each field and

cutting (usually known as a hay lot). Take a least 20 cored samples for each hay lot. Mix the 20 cores in a clean bucket and place sample in a quart to half gallon zip lock bag. Label the bag with your information: name, location, date of harvest, address, and type of forage. It is also recommended to place the same information inside the bag. Then, submit the sample for laboratory for forage analysis. Forage samples from Mississippi are submitted to the Forage Quality Laboratory at the LSU AgCenter in Fraklinton, LA. The cost per a routine analysis is \$15.00 and \$20.00 for the routine analysis plus minerals. For more information visit, http://www.lsuagcenter.com/en/our_offices/research_stations/Southeast/Features/forage_lab/



Summary

As we face high commodity prices, it is important to keep **forage quality** in perspective as we think ahead for the upcoming winter feeding season. Keep in mind those factors that can impact forage quality and try to manage those to reduce forage quality losses. Determining the forage requirements of your herd and the quality of your forage will be a good tool to evaluate for your hay production system and make adjustments to avoid unnecessary supplementation and reduce cost. Although a lot of producers use feel, texture, color, or smell to assess hay quality, these techniques will not assess the nutritive value of the forage crop. The only true assessment is getting a hay sample tested. Keep in mind that the success of a livestock operation ultimately comes down to economic returns and producing or buying forages with high nutritive values can help mitigate feeding costs.

Table 2. Forage quality of warm-season annual grasses. Values expressed on a dry matter basis. Samples combined from fertility and forage variety trials at Mississippi State University (Lemus and White, 2014).

Variable	N	Mean	Maximum	Minimum	Range	Std Dev
----- Crabgrass/Teffgrass -----						
CP, %	134	14.93	19.64	9.51	10.13	2.06
ADF, %	134	35.24	39.59	30.95	8.64	1.89
NDF, %	134	59.46	65.98	51.38	14.60	2.88
WSC, %	133	4.39	10.57	0.14	10.43	2.04
TDN Est., %	134	54.83	59.76	49.83	9.93	2.18
RFQ	134	90.29	113.50	74.56	38.92	7.44
P, %	134	0.22	0.28	0.13	0.15	0.03
K, %	134	1.60	2.38	0.44	1.94	0.29
Ca, %	134	0.64	0.89	0.45	0.44	0.09
Mg, %	134	0.60	17.65	0.31	17.34	1.49
----- Sorghum, sudangrass, millets -----						
CP, %	266	13.76	22.56	7.82	14.74	3.52
ADF, %	266	35.74	43.42	28.28	15.14	3.08
NDF, %	266	62.02	71.18	50.94	20.24	4.06
FAT, %	260	6.05	13.87	0.22	13.65	2.82
TDN Est., %	266	54.25	62.83	45.42	17.41	3.54
RFQ	266	86.07	118.40	62.25	56.16	11.34
P, %	266	0.25	0.31	0.19	0.12	0.02
K	266	1.77	3.00	0.87	2.13	0.33
Ca, %	266	0.48	0.75	0.10	0.65	0.09
Mg, %	266	0.66	14.42	0.15	14.27	1.58

TDN = 95.35 - (ADF*1.15); DMI (% BW) = 120/NDF; RFQ = (DMI, % BW) * TDN (% DM)

If you are a Mississippi Hay Producer and would like to enter the 2014 Mississippi Hay Contest please visit <http://msucares.com/crops/forages/hay/index.html> for more information or contact your local County Extension Office.

For upcoming forage related events visit:
<http://forages.pss.msstate.edu/events.html>

- July 8 — Simpson Co. Forage Field Day, Mendenhall
- July 10, 2014— Warm-season Forage Tour, Starkville, MS
- July 15, 2014— Alcorn Co. Forage Field Day, Corinth, MS
- October 3, 2014— Mississippi Hay Contest Entries Due
- November 24, 2014— Mississippi Forage & Grassland Conference, Verona, MS.

Cooperative Extension Service • Mississippi State University

Mississippi State University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation or group affiliation, age, disability, or veteran status.