



Know What's in Your Forage

Clear picture can minimize costs, maximize production.

by **Barb Baylor Anderson**, field editor

The beef industry benefits from those research and development advancements that lead to new products, technologies and management strategies. However, to capitalize on the collective potential for improved performance, beef producers must consider the value of nutrition, too.

While producers routinely rely on pasture, stockpiled forage, hay and silage for feed, beef cattle specialists suggest those ration decisions are best made with complete nutrient knowledge.

35 Keys to Success Pasture Management

“These are the most variable of feedstuffs in terms of nutrient content, so producers must be aware of their forage quality,” says David Lalman, Oklahoma State University Extension beef cattle specialist. “Forage samples should be obtained on a regular basis and tested by a lab to determine nutrient content. Then producers know

what the quality is, and can prevent over- or underfeeding cattle. You can determine the right feed ration supplements, minimize production costs and provide a balanced diet that allows optimum animal health and performance.”

Lalman says many factors influence nutritive value and forage quality, including plant species, season, soil type and fertility, drought stress, time of day at harvest, rain and more.

Know your protein and energy content

Protein and energy concentration within a hay type can vary by as much as 10%-25%, adds Lalman, as stage of maturity at harvest also has a dramatic influence on forage nutritive value. As the plant matures, protein, mineral and non-fiber carbohydrate composition decline, while the concentration of neutral detergent fiber (NDF) and lignin increase.

“If you seek high forage quality, cut legumes at bud stage and grasses at boot stage. If a high nutrient yield per acre is the goal, legumes should be harvested at early flowering and grasses at heading or flowering.

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Tried-and-true feeding programs

University of Nebraska Extension beef specialists say general feeding program guidelines can be developed based on understanding nutrient requirements, previous feeding experience and research results. These tried-and-true principles may help you develop the best feeding program.

1. Understand that not meeting the energy needs of the cow herd after calving reduces the number of cows cycling early in the breeding season. This is especially true for cows and heifers that are thin (body condition score 4 or less) at calving.
2. When dry or cool weather delays grass growth, extending the length of the breeding season will help prevent having a high percentage of open cows.
3. Feed costs can be reduced by extending grazing in the fall and winter on range, meadows or crop residues rather than feeding harvested feeds.
4. If feed costs are extremely high, the cow's nutrient needs may not match with the nutrient quality of the grass/forage resource. Consider changing when calving occurs and/or when calves are weaned based on forage nutrient content to help reduce feed costs.

For legume-grass mixtures, cutting is usually based on the predominant plant,” says Craig Sheaffer, University of Minnesota forage management professor.

“Even minimal differences in hay nutritive value can have a significant impact on animal performance if the difference isn’t corrected through appropriate supplementation,” says Lalman.

For example, a cow in average body condition consuming hay with 6% protein and 54% total digestible nutrients (TDN) would require 2 pounds (lb.) per day of a 30% protein range cube during late gestation, says Lalman. Such a program should allow the cow to maintain average body condition through calving, but if the TDN concentration were overestimated by only 10%, the cow could lose one full body condition score during the last trimester. Applied to an entire herd, pregnancy rates could drop by 20%-30%. On the other hand, if protein concentration is overestimated by 10%, 2.5 lb. of supplement would be required.

“Protein-deficient diets reduce forage intake, digestion and animal performance,” says Lalman. “If hay nutritive values are underestimated, there could be feed cost savings.”

Virginia Tech Extension echoes that pastures and stockpiled forage may meet or exceed the protein and energy needs of even lactating cows. Cool-season grasses like fescue and orchard grass are very nutritious in the vegetative stages, but nutritional value decreases as they bloom. Warm-season grasses may need supplemental protein. The specialists also note that while hays

are usually adequate in energy and protein, legume hays are high in protein and corn/sorghum silage is moderate to high in energy but low in protein.

“Cool-season forages should be harvested to a 1- to 3-inch stubble height for maximum yield. Leaving more stubble benefits only the stressed or winter-injured stands,” says Sheaffer. “Warm-season grasses should be harvested to an 8- to 10-inch stubble height.”

According to Rick Rasby, University of Nebraska Extension beef specialist, while nutritional composition of harvested forages can be estimated fairly accurately with lab analysis, estimating standing forage quality is more difficult. That’s because cattle grazing pasture tend to consume the plant parts that are most palatable, which, in most cases, are the most nutritious parts of the plants. Producers must pay careful attention to cow condition while grazing.

“Grazing animals select a much higher-quality diet than the average ‘clip’ sample,” says Lalman. “We can try to replicate animal selection by hand-plucking samples of what we think the animal would select. That is a closer match than clipping, but not as close as we would like.”

While not economical, a feeding trial may remain the most accurate means of forage evaluation. These specialists say near infrared reflectance (NIR) testing also is effective, unless samples are outside normal testing ranges or mixed with unusual components. Then wet chemistry is preferred. They advise producers use laboratories certified for tests desired, and to make sure tests meet all needs.

Take a close look at hay economics

David Lalman says better-quality hay is often underpriced in the marketplace, and he encourages producers to consider the economics when making feeding decisions.

He compared the cost/breakeven value of feeding low-quality prairie hay and high-quality Bermuda grass hay (see Figs. 1 and 2). The prairie hay is assumed to have 5% protein, 52% total digestible nutrients (TDN) and is priced at \$70 per ton. The cost to maintain an average-size beef cow in late gestation with this hay and enough supplement to allow her to slightly gain weight is about \$1.72 per day.

The Bermuda grass hay is assumed to contain 12% protein and 57% TDN. Free choice consumption with no supplementation allows about the same 0.25 lb.-per-day gain as the low-quality prairie hay. If you assume the Bermuda grass hay is priced the same, the daily cost to keep the beef cow is only 97¢ per day, with the better-quality hay.

How much more valuable is the better-quality hay? To get a fair comparison, increase the price of the Bermuda grass hay until you get to the same \$1.72 per day cost as the prairie hay while holding cow weight change constant. The Bermuda grass hay is really worth about \$123 per ton.

Editor’s Note: A former National Junior Angus Board member, Barb Baylor Anderson is a freelancer from Edwardsville, Ill.

Fig. 1: Cowculator example for high-quality Bermuda grass

Summary		Comments:			
Pistol Pete Stillwater, OK		Brangus cows during mid gest., slightly losing condition Winter range with alfalfa hay and range cubes			
Number of Cattle =	100				
Length of Period, Days =	60				
Ingredient	Total As Fed Pounds Per Day	Cost Per Head Per Day	As Fed Tons For Period	Cost Per Head For Period	Total Cost For Period
Bermuda hay, good	2780	\$1.74	83.40	\$104.25	\$10,425.00
Range Cube, 20%					
PRAIRIE HAY					
Total	2780	\$1.74	83.40	\$104.25	\$10,425.00
This feeding program is projected to result in 0.16 units BCS gain during the feeding period.					
Nutrient Composition of Diet, Dry Matter Basis					
Dry Matter Intake, Lb.	24.5				
DM Intake, % of Body WT	1.95				
Roughage Intake, % of Body WT	1.95				
Crude Protein, % of DM	12.00				
TDN, % of DM	57.00				
NE _m , Mcal/Lb. of DM	0.55				
Calcium, % of DM	0.51				
Phosphorus, % of DM	0.24				

Fig. 2: Cowculator example for low-quality prairie hay

Summary		Comments:			
Pistol Pete Stillwater, OK		Brangus cows during mid gest., slightly losing condition Winter range with alfalfa hay and range cubes			
Number of Cattle =	100				
Length of Period, Days =	60				
Ingredient	Total As Fed Pounds Per Day	Cost Per Head Per Day	As Fed Tons For Period	Cost Per Head For Period	Total Cost For Period
Bermuda hay, good					
Range Cube, 20%	600	\$0.88	18.00	\$58.50	\$5,850.00
PRAIRIE HAY	2140	\$0.75	64.20	\$44.94	\$4,494.00
Total	2740	\$1.72	82.20	\$103.44	\$10,344.00
This feeding program is projected to result in 0.19 units BCS gain during the feeding period.					
Nutrient Composition of Diet, Dry Matter Basis					
Dry Matter Intake, Lb.	24.6				
DM Intake, % of Body WT	1.95				
Roughage Intake, % of Body WT	1.53				
Crude Protein, % of DM	8.80				
TDN, % of DM	57.43				
NE _m , Mcal/Lb. of DM	0.55				
Calcium, % of DM	0.81				
Phosphorus, % of DM	0.31				