



Ridin' Herd

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Forage quality vs. forage yield

Volatility in the cow-calf industry continues to be a challenge for producers. Although cow-calf producers seem to be in the driver's seat as a result of low beef cow inventory, overbuilt bunk space in the feedyard and good demand, their annual cow costs continue to rise.

\$2 per day

The Kansas Farm Management Association grouped cow-calf clients into high-profit, middle-profit and low-profit producers based on annual cow costs. For the time period 2006 to 2010, annual cow costs for high-profit producers averaged \$636.40 per cow; for low-profit producers, annual cow costs averaged \$886.14. For middle-profit producers, annual cow costs averaged \$755.15.

With the rising cost of inputs, it's hard to think that annual cow costs for 2011 were not higher. It wasn't that long ago that cow costs were about \$1 per day, with daily costs being a little cheaper in the summer compared to winter. Now, a more reasonable daily cow cost is closer to \$2.

The higher corn price has pushed pasture costs in many states higher. Keeping cows grazing to meet their nutrient needs is still the most economical approach to lowering feed costs. Feed costs are the major component of annual cow costs. In some management systems or in some areas of the United States, harvested forages are needed to feed the cow herd.

What determines forage quality and yield

It has been said that there are three items that determine forage quality: maturity at

harvest, maturity at harvest and maturity at harvest. It is safe to say, stage of maturity of forages at harvest is the primary factor that influences forage quality.

As plants mature or advance in maturity, forage quality declines. As the plant matures, a larger portion of the plant is stem as compared to leaves. Also, as the plant matures the fiber components of the plant increase, causing a decline in quality and digestibility. In addition to the fiber components that increase as the plant matures, so does the lignin content. Lignin is a component of the plant's cell wall that is not digested by ruminants.

On the flip side of forage quality is forage yield. As the plant matures, more plant material is produced and more plant is available for harvest. Therefore, as plants mature, forage yield goes up. It is a balancing act for producers to optimize forage quality and yield. If producers maximize quality, then forage yield is minimized. If forage yield is maximized, then forage quality suffers.

Harvesting method to optimize harvest and grazing

Table 1 demonstrates the concept of maturity at harvest and the effect on quality and yield. This experiment was conducted in the Sandhills of Nebraska, and the grasses are warm-season grasses. More specifically,

the grasses in these pastures were blue grama, little bluestem, prairie sandreed, sand bluestem, switchgrass, northern reedgrass, sand lovegrass and indiangrass.

As cutting date increases, crude protein (CP) content decreases. CP of the grass harvested on June 1 was 11.9%. Forages harvested on July 1 were 8.0% CP, and forages cut on Aug. 1 were 6.4% CP.

There are huge differences in forage yield based on first harvest date. There is about a ton [2,026 pounds (lb.) per acre] difference in forage yield when comparing the cutting date of June 1 to July 1. This compares to about half the yield (1,046 lb. per acre) difference between July 1 (4,679 lb. per acre) and Aug. 1 (5,725 lb. per acre) cutting dates. There is not much difference in yield between Aug. 1 and Aug. 15. In fact, the data say there is a reduction in yield, but due to variation in the data, statistics indicate those yield numbers are not significantly different.

Early-cut hay would be a good protein and energy source for females after calving, when the nutrient requirements are high. The early-cut hay would also be a forage that could be targeted to first-calf females during their first lactation. If the forage source doesn't meet the requirement, then only minimal supplementation would be needed.

Interesting in this experiment is that forage availability and forage quality was determined at a fixed time in the fall. In these cases, forage availability and crude protein were determined in September on the same locations that the different cutting dates were performed.

It is interesting that in September, forage quality increased as cutting date increased. In other words, the forage in September that was on the area that was harvested on June 1 (9.1% CP) was lower in crude protein compared to the protein content in the area that was harvested on Aug. 1 (16.5% CP). After you think about it, this makes sense, because in September, the forage cut in that area on June 1 is more mature compared to the forage first harvested on Aug. 1, then re-cut in September.

The forage available in September was much greater when the cutting date was June 1 (3,099 lb. per acre) compared to Aug. 1 (611 lb. per acre). Statistics say that September yield when the first cutting date was June 15

Table 1: Effect of cutting date on average DM yield and CP, four years of data

Cutting date	First harvest		End of season (Sept.)		Total yield lb./acre
	Yield, lb./acre	CP, %	Yield, lb./acre	CP, %	
June 1	2,653 ^a	11.9 ^a	3,099 ^a	9.1 ^a	5,752 ^a
June 15	3,453 ^b	9.6 ^b	1,921 ^b	11.1 ^b	5,374 ^a
July 1	4,679 ^c	8.0 ^c	1,669 ^b	12.5 ^c	6,348 ^c
July 15	4,868 ^c	6.9 ^d	1,208 ^c	13.8 ^d	6,076 ^{b,c}
Aug. 1	5,725 ^d	6.4 ^d	611 ^d	16.5 ^e	6,336 ^c
Aug. 15	5,603 ^d	6.4 ^d	167 ^e	18.4 ^f	5,770 ^{a,b}

Means within columns with different superscripts are statistically different.

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(1,921 lb. per acre) is not different than that cut on July 1 (1,669 lb. per acre).

In the final column of the Table, total yield is reported. Total yield is the sum of yield at first harvest plus the forage yield in September. Total yield is not different when the first harvest date was July 1 compared to Aug. 1. However, CP (8.0%) content is greater in forage harvested July 1, and one could assume that energy (%TDN) content is greater in the July harvested forage compared to the CP (6.4%) and energy content in forage harvested Aug. 1.

Forage available for dormant-season grazing is 2.7 times greater when the first cutting was taken as hay on July 1 compared to the forage cut as hay Aug. 1. Will the dormant standing forage meet

the cow's nutrient needs? Maybe; maybe not, as it will depend on her stage of production. If it doesn't, then a little strategic supplementation may be warranted. In addition, hay harvested in July may need little to no supplementation depending on when it is targeted to be fed. This could be a win-win situation, depending on your goals and management strategies.

Two factors that would affect forage quality and yield are precipitation and fertilization. With the recent price of nitrogen fertilizer, it's hard to pencil in the return to fertilization. Do these calculations for your area and response expected for different rates of application.

Final thoughts

It will be important to keep costs low, especially feed cost, without negatively

affecting production. The data presented suggest there are opportunities to manipulate both hay yield and quality by changing time of first harvest. First harvest date also affects forage quantity available for stockpiled grazing opportunities. The optimum time for first harvest will depend on management objectives and forage resource(s) for a particular ranch. These kinds of strategies can affect supplementation need and therefore supplementation costs.



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Editor's Note: "Ridin' Herd" is a monthly column written by Rick Rasby, professor of animal science at the University of Nebraska. The column focuses on beef nutrition and its effects on performance and profitability.