



Ridin' Herd

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Determining how much forage a beef cow can consume daily

It's October, and spring-born calves are weaned or about to be weaned. Now it's time for producers to turn their focus to mapping out the feeding program for their cow herd. A frequent question from producers is, "How much will my cows eat on a daily basis?" This is important to know to determine if you have enough forage in inventory.

Producers want to meet their cows' nutrient requirements, but they sure don't want to overfeed forages. Even with high calf prices, producers should continue to strive to cut costs. Closely estimating the amount of feed needed to get through the part of the winter when they are going to feed harvested forages will be important to contain costs. In addition, cattle have a certain requirement for specific nutrients such as protein, energy and minerals/vitamins.

Intake: DM vs. as fed

This can be a challenging concept to explain to my undergraduate students: What is the difference between dry-matter and as-fed, especially when nutrients for beef cows are on a dry-matter basis. Intake on a dry-matter basis means that the forage doesn't include moisture. We know that forages contain moisture and that not all forages contain the same amount of moisture.

If forage intake can be determined on a dry-matter basis, it can easily be converted to an "as-is" or "as-fed" basis. As an example, if it were determined the daily dry-matter intake of a group of 1,200-pound (lb.) cows eating an average-quality hay is 24 lb. and the hay that cows consume is 88% dry matter, these cows would consume about 27 lb. (24 lb. ÷ 0.88) per head per day on an as-fed basis.

If the same group of 1,200-lb. cows

were fed a ration where part of the ration called for corn silage to be fed at 10 lb. per head per day on a dry-matter basis and the corn silage is 35% dry matter and 65% moisture, the pounds of corn silage in the diet would be 28.5 lb. (10 lb. ÷ 0.35) per head per day on an as-fed basis. Remember, of the 28.5 lb. of silage, 18.5 lb. is water and 10 lb. is silage.

What determines daily forage intake?

There are a number of different factors that determine the daily intake of a cow. The primary factors are cow weight, forage quality and stage of production (gestating or lactating). When feeding the same forage, cows that weigh 1,300 lb. will consume more on a daily basis compared to cows that weigh 1,100 lb. In addition, cows that are lactating will consume more feed than cows that are not lactating.

Forage quality affects dry-matter intake of cows. As forage quality increases, indicated by an increase in total digestible nutrient (TDN) content of the forage, the amount of the forage that the cow can consume also increases. As forage quality increases, there is more leaf as compared to stem. When quality is low, there is more stem and, therefore, more cell-wall contents that are not as easily digested. The forage does not pass through the rumen very fast. In addition, as forages increase in maturity, there is an increase in lignin content. Lignin is not digested by rumen microbes.

A good example of how forage quality affects the amount a cow can consume daily is wheat straw. Wheat straw is low in protein (4.0% crude protein) and energy (40% TDN). When cows have full access to wheat straw, they don't quit

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eating wheat straw because they don't like it; they quit eating it because they can't stuff any more into their rumen. Straw has such a low digestibility that it takes extra time in the rumen for it to be digested and passed through the rumen before more can be consumed. Daily intake on a dry-matter basis may be 1.6%-1.8% of body weight.

In comparison, corn silage will typically be about 70% TDN, and lactating beef cows can easily consume 2.5%-2.7% of their body weight on a dry-matter basis of this feed.

There are other factors that impact forage or feed intake of cattle. Cold stress increases dry-matter intake of cows, and heat stress reduces dry-matter intake. For planning purposes, these factors are more difficult to factor in.

For planning purposes, Table 1 contains some "thumb rules" to help estimate daily feed intake of cows on a dry-matter basis consuming forages of differing quality when they are either gestating or lactating. When forage quality is low (52% TDN or less) and cows are not lactating, they will consume 1.8% of their weight on a dry-matter basis. If the forage quality is average (TDN content between 52% and 59%),

non-lactating cows will consume about 2.0%-2.2% of their body weight daily on a dry-matter basis. As an example, if the forage were 56% TDN and lactating cows on the average weigh 1,200 lb., then it could be estimated that they would eat 26.4 lb. (1,200 lb. × 0.022) of hay daily on a dry-matter basis. If the hay were 88% dry matter, on an "as-fed" basis cows would eat about 30 lb. (26.4 lb. ÷ 0.88) daily. If there were 200 head of cows in the herd, it would take about 3.0 ton of this hay per day [(200 head × 30 lb. per head per day) ÷ 2,000 lb.], not accounting for any waste.

To take this thought process one more step, the 1,200-lb. cow the first 90 days postcalving, producing 20 lb. of milk at peak milk production, needs to consume 2.7 lb. of protein daily on a dry-matter basis (nutrient requirements are on a dry-matter basis). If the hay is 8.5% crude protein and the cow consumes 26.4 lb. of hay dry matter, she will eat 2.24 lb. of protein (26.4 lb. × 0.085). This hay after calving will need to be supplemented with some protein to meet the protein requirement. Likewise, she needs 16.0 lb. of TDN daily; then 26.4 lb. of the forage that is 56% TDN yields 14.8 lb. of TDN consumed. This forage will need to be supplemented with some additional energy. A small amount of a good-quality alfalfa could fit the needs.

Final thoughts

Estimating daily feed intake of your cow herd is the first step in determining the amount of forage that is needed for the winter feeding program. Being able to determine how much inventory is on the ranch and the quality of the forages will determine supplementation strategy needed and will help enhance the profit potential of the cow-calf enterprise.

Table 1: Guidelines for daily feed/forage capacity of beef cows

Forage type	Class of cattle ¹	Dry-matter capacity ² , %	Dry-matter capacity ³ , lb./hd./day
Low-quality forages (52% TDN; dry, native range, straw, stalks)	Dry cow	1.8%	20-22 lb.
	Lactating cow	2.0%	22-24 lb.
Average-quality forages (53%-59% TDN; native hay, bromegrass hay, alfalfa)	Dry cow	2.0%	22-24 lb.
	Lactating cow	2.3%	25-28 lb.
High-quality forages (>59% TDN; alfalfa, boot-stage hay)	Dry cow	2.5%	28-30 lb.
	Lactating cow	2.7%	30-33 lb.
Green pasture	Dry cow	2.5%	28-30 lb.
	Lactating cow	2.7%	30-33 lb.
Silages	Dry cow	2.5%	28-30 lb.
	Lactating cow	2.7%	30-33 lb.

¹1,100- to 1,200-lb. cow.

²Capacity as a percent of body weight.

³Total daily intake on a dry-matter basis.

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.

