Ridin' Herd

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Just how much forage does a beef cow consume each day?

It's March, and for cow-calf producers in the Northern Great Plains, the majority of the cows are calving or are about to start calving. Spring grass isn't that far away, but it seems like it really is a long time before spring turnout. Cow-calf producers during this time period are typically feeding harvested forages. A frequent question from producers is "How much will my cows eat on a daily basis?"

Producers want to meet the cow's nutrient requirement, but they sure don't want to overfeed expensive forages. With the dry conditions this summer and harvested forages at a premium, closely estimating the amount of feed needed to get through this part of the winter will be important to contain cost. In addition, cattle have a certain requirement for specific nutrients such as protein, energy, and minerals and vitamins.

Table 1: Daily feed/forage capacity guidelines for beef cows

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

[1]1,100- to 1,200-lb. cow.

[2]Capacity as a % of body weight.

[3]Total daily intake, dry-matter basis.

Dry matter vs. as is

The difference between intake on a dry-matter (DM) basis and an as-is basis can be a challenging concept to explain to my undergraduate students, especially when nutrients for beef cows are on a DM basis. Intake on a DM basis means that the forage doesn't include moisture. However, we know that the forages do contain moisture, and not all forages contain the same amount of moisture. So, if forage intake can be determined on a DM basis, it can easily be converted to an "as-is," or "as-fed," basis.

With the dry conditions this summer and harvested forages at a premium, closely estimating the amount of feed needed to get through this part of the winter will be important to contain cost.

As an example, if it were determined the daily DM intake of a group of 1,200-pound (lb.) cows eating an average-quality hay was 24 lb., and that the hay consumed was 88% dry matter, we could calculate that 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 DM 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 ÷ 0.35) per head per day on an as-fed basis. Remember that of the 28.5 lb. of silage, 18.5 lb. is water and 10 lb. is silage.

What determines 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 lighter-weight 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 DM intake of cows. As forage quality increases, indicated as an increase in total digestible nutrients (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 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 the 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 and energy, 4.0% crude protein and 40% TDN. When cows have full access to wheat straw, they don't quit 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 DM basis may be 1.6%-1.8% of a cow's body weight.

When straw is ammoniated, the ammoniation process begins to break down the cell wall contents and, when fed to cows, intake will increase 16%-19% compared to nonammoniated wheat straw. So, in this case, a cow can eat more of the ammoniated feed to go toward meeting her nutrient needs. 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 DM basis of this feed.

There are other factors that affect forage or feed intake of cattle. There are data that would suggest that fleshy cows consume 3%-10% less feed or forage compared to moderate to thin cows. Also, cold stress increases DM intake of cows, and heat stress reduces DM intake. For planning purposes, these factors are more difficult to factor in.

Table 1 contains some "thumb rules" to help estimate daily feed intake of cows on a DM 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 DM basis. If the forage quality is average (TDN content between 52% and 59%), non-lactating cows will consume about 2.0% of their body weight daily on a DM basis of this forage.

As an example, if the forage were 55% TDN and lactating cows on the average weigh 1,200 lb., then it could be estimated that they would eat 28 lb. (1,200 × 0.023) of hay daily on a DM basis. If the hay were 88% dry matter, on an "as-fed" basis, cows would eat about 32 lb. (28 ÷ 0.88) daily. If there were 200 head of cows in the herd, it would take about 3.2 tons of this hay per day [(200 head × 32 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 in the first 90 days post-calving, producing 20 lb. of milk at peak milk production needs to consume 2.7 lb. of protein daily on a DM basis (nutrient requirements are on a DM basis). If the hay is 8.0% crude protein and the cow consumes 28 lb. of hay dry matter, she will eat 2.24 lb. of protein (28 × 0.08). This hay will need to be supplemented with some protein after calving to meet the protein requirement.

Likewise, she needs 16.0 lb. of TDN daily. Consider 28 lb. of forage that is 55% TDN yields 15.4 lb. of TDN consumed. This forage will need to be spiked with some additional energy. A small amount of a good-quality alfalfa could fit the need.

Final thoughts

Estimating daily feed intake of your cow herd is the first step in determining the amount of forage that needs to be on hand for the winter feeding program. When forage availability is tight, like it is during drought, being able to determine how much inventory is needed will help enhance the profit potential of the cow-calf enterprise.

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.*