



Ridin' Herd

► by Rick Rasby, Extension beef specialist, University of Nebraska

Using crop residues as winter feeds: Part 1

The greatest cost to beef cow-calf and backgrounding operations is the feeding of stored feeds in winter months. To effectively lower feed costs, some producers extend the grazing season by using crop residues. Many areas have an abundance of crop residues available for late fall and winter grazing. Residue grazing is an important management practice for many cattle operations, primarily as either a winter feed resource for maintaining the breeding herd or putting weight on cull cows.

Nutritional content

The corncob and stalk are lowest in protein, energy and palatability. The leaf and husk are intermediate in nutrient quality, but high in palatability. The grain is highest in nutrient quality (see Table 1). Research indicates about two times more residue is left in an irrigated field [more than 5,000 pounds (lb.) per acre] compared to a dryland field (2,500 lb. per acre).

Many of the nutrient quality aspects described for corn can also be applied to grain sorghum stubble; however, there are at least two differences (see Table 1). The grain sorghum leaf is generally higher in protein than a corn leaf; however, sorghum grain is not utilized as well as corn grain by the cow. The sorghum berry's hard outer coat makes it difficult for the animal to digest. Cattle can founder while grazing grain sorghum fields with excessive amounts of grain left after harvest, indicating there is some utilization.

The total digestible nutrients (TDN) content of the soybean leaf, pod and stalk are low (35%-41%). The low energy content for soybean stubble residue is due to the high lignin content, especially in the stem. Lignin is the indigestible cell wall component of the plant.

The nutrient content of crop residue does decrease due to weathering. The greatest nutrient loss is energy content in the husk and leaves. Nutrient losses are greater in wet, humid conditions due to increased decomposition and weathering.

Determining stocking rates

Residue (leaf and husk) yield is related to grain yield, but hybrids

obviously vary in this relationship. With high-producing corn (irrigated or with ample rainfall) there will be about 16 lb. dry leaf and husk per bushel (bu.) of corn yield. The specific relationship is: lb. leaf and husk per acre on a dry-matter (DM) basis = [(bu. per acre corn yield × 38.2) + 429] × 0.39.

Some residue disappears by trampling and other factors. I usually estimate 50% utilization of the leaf and husk by the grazing animal. Therefore, 150-bu. corn produces 2,400 lb. leaf and husk per acre, with 1,200 lb. (50%) available for the animal to consume. This is equivalent to about 1.76 animal unit months (AUMs; 1,200 lb. of husk and leaf per acre at 50% use ÷ 680 lb. of feed per AUM).

One AUM is the amount of forage required to sustain a 1,000-lb. cow or equivalent for one month. It has been determined that a 1,000-lb. cow will

consume 680 lb. of DM monthly. A 1,200-lb. cow is 1.2 AU and would consume 816 lb. (680 lb. × 1.2) of forage DM per month.

If the corn yield was 150 bu. per acre, and that yield produced 2,400 lb. of husk and leaf per acre, and 50% of the husk and leaf were consumed, then this residue field would provide 1.5 AUMs (1,200 lb. of husk and leaf per acre ÷ 816 lb. of forage per month for a 1,200-lb. cow = 1.47 AUMs) per acre for a 1,200-lb. cow. This equates to 44 days of grazing (30 days per month × 1.5 AUMs = 44 days of grazing).

If one acre would feed a 1,200-lb. cow for 44 days, then it would feed a 600-lb. calf for 88 days. Higher grain yields provide more AUMs and lower yields less. One acre of irrigated cornstalks or grain sorghum stubble will provide approximately 1.5-2 AUMs of grazing.

Grazing strategies

Strip-grazing (fencing off portions of a residue field) or moving cattle from field to field provides a more uniform nutrient intake. Daily gains of cattle are greater when fields are strip-grazed vs. when cattle are allowed to graze the whole field. However, if residue fields are strip-grazed and there are extended periods of deep snow, some of the best feed may be undergrazed because of snow cover.

Whole-field grazing is the most common grazing strategy. Early whole-field grazing has the potential to allow cattle to consume the best feed (grain and husk) prior to snowfall or muddy conditions. Whole-field grazing should allow cows to put on weight during the early phase, with weight being maintained or lost after grain has been consumed if cows are not supplemented.

Grain left in the field

Estimating the amount of corn left in a field helps producers determine a grazing strategy. An 8-inch (in.) ear of corn contains about 0.50 lb. of corn grain; therefore, 112 8-in. ears would equal 1 bu. (1 bu. = 56 lb.).

By counting the number of ears, the amount of corn can be estimated. If

Table 1: Average percentage composition of harvested crop residues, dry-matter (DM) basis

	%DM	% crude protein		% IVDMD ^a	
		Range	Avg.	Range	Avg.
Corn:					
Grain	73	9.5-11.2	10.2	88-95	91
Leaf	76	6.2-7.5	7.0	41-65	58
Husk	55	3.0-4.0	3.5	63-72	68
Cob	58	2.1-3.8	2.8	59-65	60
Stalk	31	3.0-5.1	3.7	45-60	51
Milo:					
Grain	74	10.3-11.0	10.5	85-95	90
Leaf	66	6.0-13.0	10.0	40-65	56
Stalk	25	3.3-3.9	3.6	53-58	57
Soybean residue:					
Leaf	87	11.0-13.1	12.0	36-40	38
Stem	88	3.6-4.5	4.0	33-36	35
Pod	88	4.5-9.0	6.1	34-51	41

^aIVDMD = In vitro dry-matter digestibility. IVDMD is approximately equal to TDN.

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corn is planted in 30-in. rows, count the number of ears in three different 100-foot (ft.) furrow strips and divide by 2 to give an approximate number of bushels per acre. Small ears and broken ears should be counted as half ears, while very large ears should be counted as an ear and a half. Any amount beyond 8-10 bu. per acre will require a well-planned grazing strategy to ensure that too much grain is not consumed.

Because of the hard outer coat, the grain in

a milo stubble field is essentially unavailable to cattle; yet, when there are large amounts of grain available, cattle can founder. One milo head has about 0.12 lb. of grain; 400 milo heads would equal 1 bu. of milo. As fields approach 10 bu. of downed milo per acre, producers need to implement well-planned grazing strategies to avoid founder.

Final thoughts

This month we looked at the nutrient profile of crop residues, along with how to estimate the amount of grain left in the field, stocking rates and potential grazing strategies. In Part 2, we will focus on

supplement strategies for residue grazing. If you would like an advance copy of Part 2, e-mail your request to Shauna Rose Hermel, editor, at shermel@angusjournal.com.



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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.