

LOW COST COW/CALF PROGRAM

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Forage Consumption

Which critters will eat the most forage - 7 to 9 yr old cows weighing 1150 lb or 10 mo old heifers weighing 370 lb? Even I can answer that. The cows! But what if consumption is calculated and expressed as lb consumption per lb body weight or per lb of metabolic weight ($lb^{0.75}$)? Another "what if" pertains to forage quality. It has appeared to all of us that cows seem to get along better with low-quality forage than do calves. The answers to these questions are contained in a recent report¹ from the USDA Research Center in Clay Center, NE. Eight cows and six heifers were fitted with ruminal and duodenal (upper small intestine) cannulas. The study was conducted in two phases. In phase 1, four cows and three heifers were fed chopped alfalfa hay (18.7% crude protein) and the other four cows and three heifers received chopped brome hay (5.1% crude protein). In phase 2, the diets were switched so that all cows and heifers received both alfalfa and brome hays by the conclusion of the study. Cattle were adjusted to the diets for 20 days prior to sampling.

It's The Denominator

Results are shown in the following table. The cows' daily organic matter intake was three times the consumption by heifers. Both cows and heifers consumed more organic matter when alfalfa was fed than when brome was fed. When intake was expressed on the basis of lb consumed per lb body weight, consumption was the same for both big and little cattle. When metabolic weight was the basis, the cows' consumption was higher than the heifers and both consumed more alfalfa than brome.

Big Tummys

Measurements of ruminal organic matter fill revealed the obvious. The cows have larger rumens than calves. When based on lb of fill per lb of body weight, fill was the same for all cattle. There was more ruminal organic matter fill when the cattle were fed brome as compared with alfalfa. Using metabolic weight as the basis, the cows had more organic matter fill than the

Feed intake and ruminal fill in cows and heifers consuming low- and high-quality forage				
Item	Alfalfa Hay		Brome Hay	
	Cow	Heifer	Cow	Heifer
BW, lb	1175	377	1124	368
Organic Matter Intake				
lb/d	23.23	7.85	20.01	5.86
lb/lb BW	0.020	0.021	0.018	0.016
lb/lb BW ⁷⁵	0.116	0.092	0.103	0.070
Ruminal Organic Matter Fill				
lb	16.05	4.87	17.50	5.91
lb/lb BW	0.014	0.013	0.016	0.016
lb/lb BW ⁷⁵	0.080	0.057	0.090	0.070
Ruminal Fluid Fill				
lb	104.5	42.3	112.4	51.6
lb/lb BW	0.089	0.112	0.100	0.140
lb/lb BW ⁷⁵	0.521	0.495	0.579	0.614

heifers. Quite naturally, the cows had more rumen fluid fill than the heifers. When based on lb of fluid per lb of body weight, however, the heifers' rumens contained more fluid than did the cows. Per unit of metabolic weight, ruminal fluid fill was similar between cows and heifers.

Where Digestion

The following table shows the extent to which the hays were digested in the rumen. As a percentage of intake, the cows digested a good deal more of the hays in the rumen than did the heifers. When taken as a percentage of total digestive

Site of nutrient digestion in cows and heifers				
Item	Alfalfa Hay		Brome Hay	
	Cow	Heifer	Cow	Heifer
True Ruminal Organic Matter Digestion				
% of Intake	48.9	42.8	42.0	35.7
% of Total -				
Tract Digestion	79.5	72.7	79.7	70.8
Total Tract Organic Matter Digestion				
% of Intake	61.6	58.6	52.3	51.2

tract digestion, it is obvious the cows had greater rumen digestion than the heifers.

Implications

1. Mature cows are able to consume 27 and 50% more alfalfa and brome hay, respectively, per unit of metabolic weight than heifers.
 2. Greater utilization of forage by cows is in part due to increased digestive function.
 3. Ruminal liquid dilution rate and rate of ruminal fiber degradation are faster in cows than heifers.
 4. Cows derive more total energy from ruminal fermentation of forage than do heifers.
- Also, cows have a lower maintenance energy requirement (based on metabolic weight) than heifers. The heifers' needs require special consideration. Be mindful that the highest energy required from the ranch is that of increasing BCS of the cows. Other than that, the cow utilizes the junk better than any immature animal.

Rumors

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¹ Varel, V.H. and K.K. Kreikemeier. 1999. Low- and high-quality forage utilization by heifers and mature beef cows. J. Anim. Sci. 77:2774.