Effects of Forage Characteristics on Beef Cow Grazing Efficiency

Eric Mousel, University of Minnesota

Morphological and physiological characteristics of forages have a critical impact on grazing livestock use efficiency and ability to obtain nutrients. Most forage quality parameters decline with maturity. It is recommended that ideal grazing strategies retain forage species in a leafy, vegetative state to maximize nutrient concentrations and animal performance. While true for legume species, recent University of Minnesota data suggest performance may not be maximized using this model for perennial pasture grasses. The study evaluated performance of cow/calf pairs in a rotational grazing system at three growth stages compared to a standard season-long grazing system. It was conducted on upland, improved pasture consisting largely of orchardgrass, quackgrass, Timothy, and Kentucky bluegrass. Treatments included: a season-long continuously grazed pasture (80 ac) with 20 cow/calf pairs turned out Jun 1 and pulled Oct 1; four 20-acre pastures with 20 cow/calf pairs turned out May 15 and pulled Sept 15 to maintain a vegetative stage of growth; four 20-acre pastures with 20 cow/calf pairs turned out Jun 15 and pulled Oct 15 to maintain an elongation stage of growth; and, four 20-acre pastures with 20 cow/calf pairs turned out Jul 1 and pulled Nov 1 to maintain grass in the seed-head stage. All treatments were at recommended stocking rates and treatment combinations were replicated three times over three years. Cattle were weighed prior to pasture turn out and as they were removed. Weighing procedures consisted of drylotting pairs for 12 hours (overnight) with no feed access. Cows had access to water and calves had access to cows. They were weighed using a portable scale. Pasture vegetation was sampled for yield and scored by treatment for maturity stage every two weeks and sampled for quality monthly.

Results showed cow body weight (BW) increased for each treatment over the initial weight (Table 1). Treatments of season-long continuous grazing and the seed-head stage were not different. Only grazing at the elongation stage significantly increased cow BW. Calf BW at the end of grazing in the elongation stage was 7% higher than other treatments. There are likely two reasons we saw this response. First, moisture concentration among the treatments varied widely (Table 2). Feed moisture concentrations >70-75% seem troublesome for grazing ruminants. As moisture goes down performance increases as long as corresponding nutrients are available. The 'washy grass' effect observed in northern and eastern U.S. has a big impact on performance – not only does the cow not gain much weight on really 'washy' grass without supplement, milk quantity and/or quality to the calf also decreases.

Table 1. Mean BW for cows and calves before grazing and following 120 days of grazing.

Weight	Initial BW	Season-Long	Vegetative Stage	Elongation Stage	Seed-Head Stage
Cow	1,345a	1,380b	1,390b	1,455c	1,395b
Calf	255	525a	530a	570b	513a

*Different letters are significant ($P<0.1$) within rows.

Table 2. Mean yield, % NDF , NDF yield (lbs), %CP, and CP yield (lbs) for each grazing treatment.

Grazing Treatment	Yield	Moisture	NDF	NDF Yield	% CP	CP Yield
	lbs/ac	%	%	lbs/ac	%	lbs/ac
Season-Long	975a	77	63.7a	621.2a	14a	136.5a
Vegetative	1,155a	87	69.8a	806.1b	19b	219.4b
Elongation	2,265b	61	58.1b	1,315.9c	13a	294.4c
Seed-Head	4,215c	52	46.2c	1,947.3d	9c	379.3d

*Different letters are significant ($P<0.1$) within column.

Second, there is focus on nutrient concentrations rather than nutrient yield in grazing situations. Table 2 shows for both the season-long and vegetative stage treatments, neutral detergent fiber (NDF) and crude protein concentrations were exceptionally high and decreased substantially in the elongation stage and seed-head stage treatments. However, NDF yield and CP yield increased from the season-long treatment to the seed-head stage treatment. This, in combination with performance data, suggests cows (and calves to a lesser degree) are short of energy in the season-long and vegetative stage treatments, even though NDF concentration per unit is much higher than other treatments. Therefore, grazing strategies adhering to keeping vegetation short and actively growing may in fact be limiting intake of energy or limiting total intake at certain times of the grazing season, even at recommended stocking rates.