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Interactions of forage quality and physiological state on forage intake of grazing beef cows in autumn

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Key words : beef cattle, forage quality, grazing, intake, lactation

Introduction Intake by grazing cattle is affected by quality and availability of forage and by physiological demands, such as lactation and gestation. However, limited information is available on how these factors interact. We tested the hypothesis that autumn forage intake is altered by the interaction of cow physiological state and forage quality using cows in different stages of lactation and gestation grazing forages varying in digestibility.

Materials and methods Cows calving during late winter (n=40, average calving date=February 7) or late spring (n=40; average calving date=May 31) were subjected to one of two nutritional environments (seeded pasture or native rangeland) for approximately 60 days during autumn (October through November). Cows grazed one of two replicated pastures of each forage type. Pastures were 26 ha for seeded forage and 71 to 90 ha for native rangeland. Differences in calving season were selected to provide non-lactating cows in mid-to late gestation compared to lactating cows in early gestation exposed to varied nutritional regimens with similar climatic conditions. Forage intake was measured twice (October and November) during the grazing trial using chromic sesquioxide from sustained release boluses as a fecal output marker and indigestible NDF as a digestibility marker. Associated forage and diet quality were defined through laboratory measures on clipped forage and esophageal extrusa. Data were analyzed using mixed model methodology in a fixed model with a 2 (pasture type) × 2 (calving system) arrangement of treatments that included pasture within treatment.

Results and discussion At the first intake measure, cows in the late spring calving system grazing native rangeland ate more (P=0.02) forage (expressed as either OM intake in kg/d or as a percentage of body weight) than cows in all other treatment groups (Table 1). Although they consumed more forage, these cows showed a loss in body weight and body condition score. The nutrient demands of lactation did not appear to be completely met by increasing OM intake. Cows in the late winter calving system gained body weight on both pasture types with greater weight gain on the seeded pasture (P<0.01), although OM intake was similar between pasture types at both intake measures. Cows changed seeded pastures in November, and the OM digestibility after this change was less (P<0.01) than native range. During November, no differences in OM intake were observed for either pasture type or calving system. Gains were greater (P<0.01) for calves suckling dams on seeded than native pasture.

Table 1 Effect of physiological state and forage type on body weight (BW), body condition score (BCS) changes and organic matter (OM) intake (I) and digestibility (D) during a 60-d autumn grazing trial.

	Late winter calving		Late spring calving		P values for		
	Native range	Seeded pasture	Native range	Seeded pasture	Pasture type	Calving system	Pasture type x calving system
Cow BW, kg							
Initial	603±13	581±13	545±13	533±13	0.20	<0.01	0.72
Change	43±3 ^a	60±3 ^b	-31±3 ^c	4±3 ^d	<0.01	<0.01	0.01
BCS change	0.3±0.1 ^a	0.1±0.1 ^a	-0.8±0.1 ^{bc}	-0.6±0.1 ^{bd}	0.58	<0.01	0.06
October							
OMI, kg/d	11.4±0.6 ^a	10.6±0.6 ^a	14.2±0.7 ^b	10.8±0.6 ^a	<0.01	0.02	0.05
OMD %	64.5±0.5	66.2±0.4	64.7±0.5	66.9±0.5	<0.01	0.41	0.61
OMI% of BW	1.8±0.1 ^a	1.7±0.1 ^a	2.7±0.1 ^b	2.0±0.1 ^a	<0.01	<0.01	<0.01
November							
OMI, kg/d	13.9±0.8	15.8±0.8	14.0±0.8	13.4±0.9	0.43	0.16	0.14
OMD %	64.9±0.4 ^a	59.7±0.4 ^b	63.0±0.4 ^c	60.0±0.4 ^d	<0.01	0.19	0.06
OMI% of BW	2.3±0.1	2.6±0.1	2.6±0.1	2.6±0.1	0.25	0.38	0.17
Calf BW, kg							
Initial	-	-	168±3	174±3	0.19	-	-
ADG	-	-	0.83±0.02	1.01±0.02	<0.01	-	-

Superscripts indicate interaction effects, ^{a,b}P<0.05, ^{c,d}P<0.10

Conclusions Demands of lactation can increase forage intake for cows grazing native rangeland in autumn. However, lactating cows grazing higher quality seeded pasture that supported maintenance of body weight did not differ in intake from non-lactating cows.