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Evaluation of Year-round Forage Management Systems for Spring- and Fall-Calving Beef Cows

N. A. Janovick
Iowa State University

James R. Russell
Iowa State University, jrussell@iastate.edu

D. Maxwell
Iowa State University

L. James Secor
Iowa State University

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Abstract
Stored feeds make up almost half the cost of production for cow–calf enterprises in Iowa. Therefore, any reduction in the amount of stored feeds needed to maintain cows through the winter can have an impact on overall costs of maintaining the herd. Two resources that may be used to reduce the use of stored feeds are corn-crop residues and stockpiled perennial forages, which may be grazed during the winter. The objective of this experiment was to design and evaluate grazing systems to utilize such resources.

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Evaluation of Year-round Forage Management Systems for Spring- and Fall-Calving Beef Cows

N. A. Janovick, graduate assistant
J. R. Russell, professor
Department of Animal Science
D. Maxwell, beef herdsman
L. J. Secor, superintendent
McNay Memorial Research and Demonstration Farm

Introduction

Stored feeds make up almost half the cost of production for cow–calf enterprises in Iowa. Therefore, any reduction in the amount of stored feeds needed to maintain cows through the winter can have an impact on overall costs of maintaining the herd. Two resources that may be used to reduce the use of stored feeds are corn-crop residues and stockpiled perennial forages, which may be grazed during the winter. The objective of this experiment was to design and evaluate grazing systems to utilize such resources.

Materials and Methods

A year-round grazing system for spring- and fall-calving cows was developed to compare animal production and performance, hay production and feeding, winter forage composition changes, and summer pasture yield and nutrient composition with that of a conventional, or minimal land system. Systems compared were: (1) rotational grazing of forage from smooth bromegrass-orchardgrass-birdsfoot trefoil (SB-O-T) pastures for both systems in the summer and (2) grazing of corn-crop residues and stockpiled grass-legume pastures for the year-round system with drylot hay feeding during winter for the minimal land system.

The year-round grazing system utilized 1.67 acres of SB-O-T pasture/cow in the summer compared with 3.33 acres of SB-O-T pasture/cow in the control (minimal land) system. In addition to SB-O-T pastures, the year-round grazing system utilized 2.5 acres of tall fescue-red clover (TF-RC) and 2.5 acres of smooth bromegrass-red clover (SB-RC)/cow for grazing in both mid-summer and winter for fall- and spring-calving cows, respectively. First-cutting hay was harvested from the TF-RC and SB-RC pastures, and regrowth was grazed for approximately 45 days in the summer. These pastures were then fertilized with 40 lbs N/acre and stockpiled for winter grazing. Spring-calving cows in the year-round grazing system also grazed corn-crop residue (CCR) pastures at an allowance of 2.5 acres/cow in late fall.

In the minimal land system, hay was harvested from three-fourths of the area in SB-O-T pastures and stored for feeding in a drylot through the winter. Hay was supplemented when the average condition score of spring-calving cows dropped below 5, the condition score of half of the fall-calving cows dropped to 3, or forage allowance was limited by forage mass or weather conditions. Summer grazing was managed with rotational stocking for both systems, and winter grazing of stockpiled forages and corn-crop residues by year-round system cows was managed by strip-stocking.

Results and Discussion

Amounts of hay offered to cows over winter in the year-round grazing system were variable and dependent on weather conditions (Table 1). No hay was fed to either fall- or spring-calving cows in the year-round system in year two, whereas the most hay was fed to these cows during heavy snow and ice cover in year three. Feeding cows over winter in a drylot for the minimal land system required 3,740 lb DM more/cow than the year-round grazing system (P<.05). Though the minimal land system produced more lb DM/cow as hay than the year-round system (P<.05), the difference between summer hay produced and hay fed over winter resulted in a negative hay balance for cows in the minimal land system compared with the year-round system. Fall-calving cows with calves grazing in stockpiled TF-RC pastures over winter required similar amounts of supplemental hay over winter when compared with spring-calving cows grazing corn-crop residues followed by stockpiled SB-RC (P>.05).

Birth weights were not affected by grazing system (P>.05); however, weaning weights and average daily gains of spring calves from either system were greater than fall calves in the year-round system, (P<.05; Table 2). Because more perennial pasture was used in the year-round system compared with the minimal land system, there was 11 lb more growing animal production/acre in the minimal land system (P<.05). However, when production/cow is considered, the year-round system had a 57 lb/cow advantage over the minimal land system (P<.05).

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Table 1. Yearly and overall mean hay production, feeding, and balance in both year-round and minimal land grazing systems.

	Year round		Minimal land
	Fall-calving	Spring-calving	System mean
Hay production, lb DM/cow			
Year 1	3991	5082	4536
Year 2	3698	4763	4228[a]
Year 3	510	1263	887[a]
Average	2732	3703	3216
Hay fed, lb DM/cow			
Year 1	924	1373	1148[a]
Year 2	0	0	0[a]
Year 3	2334	2411	2374[a]
Average	1085	1263	1173[a]
Hay balance, lb DM/cow[x]			
Year 1	3067	3709	3392[a]
Year 2	3698	4763	4228
Year 3	-1824	-1151	-1487
Average	1648	2440	2044

[ab]Differences between means with different superscripts are significant, P<.05.
[x]Hay balance is difference between lb DM/cow produced within a system and lb DM fed/cow within a system.

Table 2. Mean birth weights, weaning weights, and average daily gains for calves and total growing animal production for calves and stockers in the year- round and minimal land grazing systems over three years.

	Grazing system		
Item	Year round		Minimal land
	Fall calves	Spring calves	Spring calves
Birth wt., lb	96.8	90.9	90.9
Weaning wt., lb	410.3[a]	519.9[b]	514.4[b]
ADG, lb/day	2.0[a]	2.4[b]	2.4[b]
Total growing animal production	Year round system mean		Minimal land
Lb/ac[x]	116		127
Lb/cow[y]	482		425

[ab]Differences between means in the same row are significant, P<.05.
[x]Differences between means for growing animal production per acre are significant, P=.01.
[y]Differences between means for growing animal production per cow are significant, P=.04.