EFFECTS OF GRAZING SYSTEM AND STOCKING RATE ON COW-CALF PERFORMANCE IN THE FLINT HILLS

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Summary

A 6-year study was designed to measure the influences of stocking rate and grazing system on performance of cow-calf pairs grazing tallgrass prairie. This paper summarizes the initial 3 years. Late-season rest-rotation was compared to continuous grazing over low, moderate, and high stocking rates. No differences (P>.10) were observed in body weight of cows or calves as a result of grazing system or stocking rate. However, calf weaning weight tended (P=.20) to be greater with continuous grazing than with late season rest-rotation. Cow body condition score was unaffected (P>.10) by stocking rate or grazing system. Conception rates were also similar between stocking rates and grazing systems. This preliminary information suggests that application of a late-season rest-rotation grazing system will support cow-calf performance comparable to that with a continuous system at a similar stocking rate.

(Key Words: Stocking Rate, Grazing Systems, Cow-Calf Performance.)

Introduction

Ideally, systems of grazing management should be designed to accommodate seasonal changes in plant physiology. During mid and late summer, warm-season grasses replace carbohydrate reserves spent on growth and seed production. By allowing areas of pasture to rest during this period, plant vigor may be improved. Thus, a system of late-season rest-rotation may be well suited for use in the tallgrass prairie region. However, when natural grazing activity is manipulated, cattle weight gains and reproductive performance often decrease.

By definition, specialized grazing systems involve application of special management practices (e.g., rotation, rest, etc.) for all or part of the grazing season. Such management practices may affect forage availability, which, in turn, may limit forage intake and animal performance. The likelihood that a change in forage availability will influence performance depends heavily on stocking rate. Thus, comparison of grazing systems at a single, static stocking rate may be misleading. Our objective for this research trial was to compare performance of cow-calf pairs under either a continuous grazing or a late-season rest-rotation system at high, moderate, and low stocking rates.

Experimental Procedures

Thirteen native tallgrass pastures, located at the Kansas State University Range Research Unit, were used to compare continuous (C) vs late-season rest-rotation (LSRR) grazing at low, moderate, and high stocking rates (approximately 9.6, 6.9, and 4.5 acres/cow-calf pair, respectively). Stocking rates were based on a 16 year study evaluating optimal stocking rates for young, growing steers. Cows with calves at side (145 pairs/year) were stratified by number of parities, body condition, and weight and assigned randomly to pastures each spring. Four pastures were assigned to be grazed at each stocking rate. A single pasture was left

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ungrazed to monitor vegetation response. Three pastures, one at each stocking rate, were grazed continuously during the 1992 - 1994 growing seasons. Nine pastures were designated for the late-season rest-rotation (LSRR) treatment, three pastures per stocking rate. Cattle assigned to an LSRR treatment were allowed access to all three pastures within a given stocking rate from May 1 to July 15 each year and then restricted to two of the pastures from July 15 to October 1. Pastures allowed rest within each LSRR system were rotated, so that each paddock was rested once during the 3-year period. During the breeding season (May 15 to July 15), cattle were combined within stocking rate and rotated through treatment pastures on an equal time per unit area basis. Two complete rotation cycles were completed each year. This was done to reduce the number of bulls needed. Cows and calves were weighed at the beginning, middle, and end of the grazing season, and cow body condition scores were determined. Pregnancy was ascertained by rectal palpation each October. Data were analyzed for effects of grazing system and stocking rate using a least-squares multiple regression approach.

Results and Discussion

Although cow-calf pairs assigned to the LSRR system were restricted to two-thirds of the available forage base for the latter half of the grazing season, cow body weights or condition scores did not differ between grazing systems at any data collection time (Table 1). Alteration of nutrient intake as a result of the LSRR treatment was apparently insufficient to cause a significant decrease in cow weight gain. However, calf body weight at the end of the grazing season tended (P=.20) to be greater under continuous grazing. Because most of the difference in calf gain occurred between July 15 and October 1, the effect on calf performance may have been the result of reduced forage availability and/or quality on LSRR pastures during the second half of the grazing season. These factors may have combined to reduce milk yield of dams or decrease calf forage intake and diet quality. Conception rates were not different between grazing systems (Table 1). However, bull exposure was confined to the first half of the grazing season when forage quality was highest. Furthermore, cattle were combined by stocking rate, across grazing systems, during the 60-day breeding season in order to reduce the number of bulls needed. Thus, the principle effects of grazing system on performance would be expected during the latter half of the grazing season. No differences were detected in weight of cows or calves or body condition score of cows as a result of stocking rate (Table 2). Conception rate was also not statistically different between stocking rates. These preliminary results suggest that a late-season rest-rotation grazing system will support cow-calf performance comparable to that with continuous grazing when managed at a similar stocking rate. However, the ultimate decision to use a particular grazing system or stocking rate must consider impacts on both livestock and rangeland. Concurrent measurements of range plant response are being collected and will become available to aid in the development of grazing management guidelines.

Table 1. Influence of Grazing System on Performance of Cow-Calf Pairs

	Grazing System			
Item	Continuous	Late-Season Rest-Rotation	SEM	P-Value
Cow BW, lb				
May 1	873	875	12.8	.90
July 15	1023	1034	8.4	.51
Oct 1	1065	1060	15.7	.89
Calf BW, lb				
May 1	139	139	0.9	.27
July 15	340	335	4.4	.61
Oct 1	522	503	7.7	.20
Cow body condition score[a]				
May 1	4.41	4.39	0.04	.83
July 15	5.06	5.07	0.08	.93
Oct 1	5.30	5.19	0.10	.53
Conception rate	99%	94%	—	.54

[a]Body condition score scale 1 to 9 (1 = very thin, 9 = very fat).

Table 2. Influence of Stocking Rate on Performance of Cow-Calf Pairs

	Stocking Rate				
Item	Low	Moderate	High	SEM	P-Value
Cow BW, lb					
May 1	877	872	873	10.6	.91
July 15	1033	1035	1018		.94
Oct 1	1077	1055	1056	13.2	.89
Calf BW, lb					
May 1	135	139	142	2.2	.28
July 15	339	338	333	6.4	.89
Oct 1	520	509	507	7.7	.85
Cow body condition score[a]					
May 1	4.40	4.40	4.40	0.07	.98
July 15	5.01	5.19	5.00	0.09	.91
Oct 1	5.29	5.24	5.22	0.11	.87
Conception rate	96%	97%	94%	—	.54

[a]Body condition score scale 1 to 9 (1 = very thin, 9 = very fat).