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Steer Performance Within Summer Grazing Systems

D. J. Jordon
University of Nebraska - Linocln

Galen E. Erickson
University of Nebraska-Lincoln, gerickson4@unl.edu

Terry J. Klopfenstein
University of Nebraska-Lincoln, tklopfenstein1@unl.edu

Don C. Adams
University of Nebraska-Lincoln, dadams1@unl.edu

Todd Milton
University of Nebraska-Lincoln

See next page for additional authors

Authors
D. J. Jordon, Galen E. Erickson, Terry J. Klopfenstein, Don C. Adams, Todd Milton, and Rob Cooper

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D. J. Jordon
Galen Erickson
Terry Klopfenstein
Don Adams
Todd Milton
Rob Cooper[1]

Grazing bromegrass followed by warm-season grass maximized grazing gain in growing finishing systems, resulting in the most desirable slaughter breakeven.

Summary

A growing/finishing trial in 1996-97 evaluated summer grazing systems and subsequent finishing performance. Steers were wintered on cornstalks and assigned to one of three summer grazing systems: 1) Sequential removal of cattle from bromegrass, 2) Bromegrass/warm-season grass, or 3) Sandhills range. Steers on the sequential bromegrass treatment gained fastest in the summer, but had a higher slaughter breakeven. Sequential bromegrass, steers were on grass where cost of gain was fixed, for fewer days; therefore, breakeven was increased. Steers on the bromegrass/warm-season treatment had the lowest slaughter breakevens due to more total weight gain on forage. Slaughter breakevens were similar between the sequential bromegrass and Sandhills range treatments.

Introduction

In the summer, grazing of forages produces excellent gains (1.5-2.0 lb/day) while lowering cost of gain. Maximizing grazed forage gain while cost of gain is low reduces overall breakeven costs of forage systems (1997 Nebraska Beef Cattle Report, pp. 56-59). Therefore, matching grazing systems with forage quality and availability should increase animal gains, resulting in lower slaughter breakevens. Typically, cool-season grasses grow well in May and June and decline in July and August, resulting in reduced performance. Low gains in mid-summer make the economics of continuous grazing of cool-season grasses less favorable. An alternative to continuous grazing at one stocking rate is to stock heavier in the early spring and remove cattle as forage resources decline. Removing cattle allows producers to more easily match stocking rates with yearly variations in forage quality and quantity. Another alternative to continuous grazing of cool-season grasses is to move animals to warm-season grasses in July and August when forage production declines in cool-season pastures. Moving of animals to warm-season pastures should result in sustained performance and lower slaughter breakevens. Yet another option is to transport cattle to range sights where both cool- and warm-season grasses grow together so 'summer slumps' in forage quantity and quality are not as dramatic.

The objective of this research was to compare economics of three summer grazing systems: sequential removal of cattle from bromegrass; bromegrass followed by movement to warm-season grasses; and Sandhills native range.

Procedure

Wintering period

In the fall, 96 medium-framed crossbred steers were purchased and allowed a 28 day acclimation period. Steers were then wintered on common corn residue fields from November 22, 1996 until February 14, 1997. While on cornstalks, steers received 1.5 lb/head/day (as-is) of a protein supplement formulated to contain 44 percent CP and 30 percent undegradable intake protein (DM basis). Following cornstalk grazing, steers were placed into a drylot where they received grass hay and a mineral supplement ad-libitum until May 3, 1997. The wintering scheme was designed to maintain animal health, while keeping inputs to a minimum.

Summer period

On May 3, 1997 steers were weighed, implanted with Compudose®, and randomly assigned to one of three summer grazing treatments: 1) sequential removal of cattle from bromegrass (BROME; Mead, Nebraska), 2) bromegrass/warm-season grass (BW; Mead, Nebraska), and 3) Sandhills range (SAND; Stapleton, Nebraska). Stocking rates in the two bromegrass treatments were based on 112 animal days/acre (5.33 AUM) of bromegrass and warm-season pasture. The sequential bromegrass treatment was designed to match stocking rate in pastures with bromegrass growth. Pastures were stocked heavily early in the grazing season when substantial bromegrass growth typically occurs and lighter in mid-summer when bromegrass growth typically experiences a 'summer slump'. Two 16.5 acre bromegrass pastures were utilized. Each pasture initially contained 24 head. On June 2, 1997, eight head were removed from each pasture, leaving 16 head. It was intended that on July 14, 1997, an additional eight head would be removed from pastures, leaving 8 head in each pasture to graze until September 8, 1997. Bromegrass growth, as expected, was excellent through most of May. However, temperatures turned hot sooner than expected coinciding with reduced rainfall, resulting in little or no regrowth of bromegrass. Although cattle on the BROME treatment quickly consumed available forage, cattle were removed as planned on June 2, 1997. Because pastures had been heavily stocked early in the season, forage became limiting and the second eight head of BROME cattle were removed from pastures on June 23, 1997 instead of July 14, 1997, as planned. As mentioned previously, stocking rate was originally based on 112 animal

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days/acre in the BROME treatment; however, because cattle were removed early, pastures were actually stocked at 91 animal days/acre (4.33 AUM). The BW treatment was used to provide both bromegrass and warm-season pastures for 16 head. Again, stocking rate was based on 112 animal grazing days/acre of pasture, resulting in a requirement of 19.3 total acres of pasture. The 19.3 acres was multiplied by a factor of .4 and .6 for bromegrass and warm-season grass, respectively, to determine that 7.7 acres of bromegrass and 11.6 acres of warm-season grass were required. Steers grazed the bromegrass from May 3, 1997 until June 10, 1997 when they were moved to warm-season pastures where they remained until September 15, 1997. On May 3, 1997, 16 steers on the SR treatment were shipped to a location in the Sandhills of Nebraska, near Stapleton. These cattle remained near Stapleton until September 8, 1997 when they were returned for finishing. Sandhills range is primarily warm-season pasture dominated by little bluestem, prairie sandreed, sand bluestem, blue gramma and switch grass. However, early spring growth does favor some cool-season grasses, such as downy brome and needle and thread, providing steers with both cool- and warm-season grasses in the same location. The SR treatment group was stocked at 8.5 acre/head. All steers on pastures were allowed ad-libitum access to trace mineralized salt blocks throughout summer grazing.

Finishing period

Upon removal from pastures, all steers were implanted with Revalor®-S and placed into the feedlot for finishing (eight head/pen). Steers were adapted to the final finishing diet in 21 days using four step-up diets containing 45, 35, 25 and 15 percent roughage fed for three, four, seven and seven days, respectively. The final diet (7.5 percent roughage) was formulated to contain a minimum of 12 percent CP, .7 percent Ca, .35 percent P, .6 percent K, 30 g\ton monensin and 10 mg\kg tylosin (DM basis). Steers were slaughtered when it was visually estimated that .45 inches of fat over the 12th rib had been reached. Final weights were calculated using hot carcass weight and a common dressing percentage (62). Hot carcass weights and liver abscess scores were obtained at slaughter and fat thickness over the 12th rib, quality grades and yield grades were gathered following a 48-hour chill. Costs and slaughter breakevens were calculated to determine the economic impact of each grazing system (Table 2).

Initial and final weights in the winter, summer and finishing periods were the average of two consecutive day weights following three days of limit feeding of a common diet containing both grass and alfalfa hay and wet corn gluten feed at 2 percent of body weight.

Results

Winter period

Cattle were on cornstalks for a total of 78 days and were then moved into a drylot and received grass hay for an additional 85 days. Over the entire 163 day wintering period, steers gained .22 lb/day. Gains were lower than might normally be expected due to poor winter corn residue quality; more specifically, following harvest, fields were practically devoid of downed corn.

Summer period

Steers on the BROME treatment gained faster ($P < .05$; Table 1) on grass compared to steers on either the BW or SR treatments. Increased ADG was expected, as most steers were on pasture for less than 45 days when the bromegrass should have been the highest quality and quantity in the summer period. However, total gain on summer forage was lowest ($P < .05$; Table 1) for steers on the BROME treatment, due to fewer days, on average, on pasture. Recently, a five-year summary of summer grazing systems research was compiled at the University of Nebraska (Nebraska Beef Cattle Report, MP 69 pp. 66-69). In each of the five years, a bromegrass/warm-season grass treatment was included. Because all cattle in the summary and cattle in the present trial were managed

Table 1. Steer performance and carcass data.

Item	BROME	BW	SAND
Winter			
Days	163	163	163
ADG, lb	.22	.23	.20
Final weight, lb	578	577	576
Summer			
Days	55[a]	131	124
ADG, lb	2.34[b]	1.92[c]	2.01[c]
Total gain	118[b]	212[c]	198[c]
Final weight, lb	723[b]	830[c]	826[c]
Finishing			
Days	133[a]	99	106
ADG, lb	3.83[b]	4.33[c]	4.06[bc]
DMI, lb/d	25.9[b]	27.4[c]	28.4[c]
Feed/gain[d]	5.90[e]	6.35[ef]	6.97[f]
Final weight, lb[g]	1227	1237	1236
Carcass Data			
Yield grade	2.8[h]	2.5[i]	2.5[i]
Fat thickness, in	.51	.46	.47
Quality grade[j]	19.2	19.3	19.3

[a]Average values.
[bc]Means within row with unlike superscripts differ ($P < .05$).
[d]Feed/gain was analyzed as gain/feed. Gain/feed is the reciprocal of feed/gain.
[ef]Means within row with unlike superscripts differ ($P < .05$).
[g]Calculated from hot carcass weight adjusted to a common dressing percentage (62).
[hi]Means within row with unlike superscripts differ ($P < .05$).
[j]Average Choice = 20, low Choice = 19, high Select = 18.

similarly, comparisons of data from the two trials will be made. Steers grazing bromegrass followed by warm-season grass gained 1.81 lb/day following .68 lb/day of winter gain. Steers in 1997 gained 1.92 lb/day following .22 lb/day of winter gain. Continuous grazing of bromegrass from the five-year summary produced gains of 1.59 lb/d. The BROME steers gained 2.34 lb/day which is .7 lb/day greater than would be expected from continuous bromegrass grazing. However, the dry conditions in 1997 would not have provided the 1.59 lb/day gain at the stocking rate of 112 animal days/acre. The fact that steers on the BW treatment maintained 1.92 lb/day gain during the hot and dry summer indicates the warm-season grass was able to carry steers as planned despite little rainfall. Additionally, gains in the present trial for the bromegrass/warm-season grass treatment were numerically greater (1.92 vs. 1.8 lb/day) than those reported in the five-year summary. One possible reason for the increased gain is the hot and dry conditions may have resulted in higher quality (more digestible) forage compared to what might normally be expected with more 'average' summer conditions. Compared to the BROME treatment, the bromegrass/warm-season grass system appeared to have an advantage in carrying capacity, given the unfavorable environmental conditions. Grazing either SR or BW improved off-grass weights by about 100 lb ($P <$ .05) compared to steers on the BROME treatment. The added weight would be expected from days on pasture.

Overall, the BW treatment was the most economical, resulting in the lowest slaughter breakeven ($P < .05$; Table 2). Lower breakeven price for BW steers compared to SR resulted from no summer trucking costs, fewer days on feed and a numerically better feed conversion in the feedlot. Breakevens for the five-year summary at $.50/head/day for grazing were $68.74/cwt and $66.73/cwt for continuous grazing of bromegrass and bromegrass/warm-season grass, respectively. In 1997, the BW cattle had a breakeven of $67.01/cwt which is consistent with the five-year average. Breakevens for the BROME and SR treatments (Table 2) were not better than the five-year average for continuous bromegrass. Despite trucking costs associated with the SR treatment, it was as economical as the BROME, probably due to increased forage gain. As previously mentioned, all systems were charged $.50/head/day for summer grazing costs. However, based on the fact that stocking rates in BROME pastures were lighter than planned, this would actually increase grazing costs to about $.62/head/day and would increase the breakeven to $69.89/cwt. Increased grazing costs discussed here are important because many producers rent pastures by the acre for an entire summer. If pastures are unable to support the planned number of animals, grazing costs are either increased because more pasture is needed or animal performance will be reduced on those pastures, resulting in less total pounds of weight produced.

Table 2. Total system economics of steers grazing different forage systems.

Item	BROME	BW	SAND
Steer cost, $[a]	433.60	432.00	435.20
Interest[b]	42.49	45.58	45.92
Health[c]	25.00	25.00	25.00
Winter costs, $			
Feed[d]	43.36	43.36	43.36
Supplement[e]	9.36	9.36	9.36
Yardage[f]	16.30	16.30	16.30
Summer costs, $			
Grazing[g]	34.00	65.50	69.71
Finishing costs, $			
Yardage[h]	40.20	29.70	31.80
Feed[ij]	192.59	149.25	165.50
Total costs, $[k]	849.40	828.54	854.92
Final weight, lb[l]	1227	1237	1236
Breakeven, $/100 lb[m]	69.25[n]	67.01[o]	69.20[n]

[a]Initial weight × $80/100 lb.
[b]Interest rate = 9%.
[c]Health costs = implants, fly tags, antibiotics, etc.
[d]Stalk grazing cost at $.12/d, spring feed at $.40/d.
[e]Supplement cost at $.12/d (1.5 lb/d, as-fed).
[f]Winter yardage cost at $.10/d.
[g]Summer grazing cost at $.50/d; includes trucking cost to Sandhills range (steer wt × $.0134).
[h]Feedlot yardage cost at $.30/d.
[i]Average diet cost = $.0543/d (DM basis) and 9 percent interest for 1/2 of feed.
[j]Calculated using 15 yr average corn price at $2.41/bu.
[k]Total cost includes 2 percent death loss for each system.
[l]Calculated from hot carcass weight adjusted to a common dressing percentage (62).
[m]Slaughter breakeven price.
[no]Means within row with unlike superscripts differ ($P < .10$).

Finishing period

Differences were noted ($P < .05$) among treatments in terms of ADG, dry matter intake, feed efficiency and yield grade. In all cases except feed efficiency, the BROME cattle were different from both BW and SR treatments (Table 1). Because the BROME steers were lighter, on average, going into the feedlot, it follows they would gain less, eat less feed, have an improved feed efficiency and carry more fat at slaughter due to more total days on feed. No differences were noted in feedlot results or carcass characteristics between steers on the BW or SR treatments.

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[1]D. J. Jordon, research technician; Galen Erickson, research technician; Terry Klopfenstein, professor, Animal Science, Lincoln; Don Adams, professor, West Central Research and Extension Center, North Platte; Todd Milton, assistant professor; Rob Cooper, research technician, Animal Science, Lincoln.