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Effect of Winter Gain on Summer Rate of Gain and Finishing Performance of Yearling Steers

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> Steers wintered at 1.7 lb/day maintained approximately 80% of the weight advantage over steers wintered at .7 lb/day during summer grazing, justifying a rate of winter gain greater than .7 lb/day.

Summary

The effect of winter rate of gain on subsequent grazing and finishing performance was evaluated using 80 medium-framed steers. During the winter period, steers were fed to achieve gains of approximately .7 (low gain; 40 head) or 1.7 lb/day (high gain; 40 head). Warm-season Sandhills range was grazed by 20 low-gain and 20 high-gain steers, while the other 40 grazed bromegrass pasture from May to September. Both low- and high-gain cattle grazing brome pasture gained slower than those grazing sandhills range. During summer grazing, low-gain cattle gained faster than high-gain cattle, but compensated for only 19.9% (sandhills) and 18.7% (brome) of the weight deficit following the low-gain winter treatment.

Introduction

In Nebraska, management of medium-framed yearling steers from weaning to slaughter commonly consists of a winter and summer growing period followed by a relatively short finishing. These three phases have been found to be interactive relative to effects of previous nutrition on gain and efficiency in subsequent phases. That is, cattle subjected to nutritional restriction normally exhibit compensatory growth during subsequent periods of higher nutrient intake. Due to this response, accelerated rates (1.75-2.75 lbs/day) of winter gain may not translate into either heavier cattle at the end of summer grazing or fewer days in the feedlot. Consequently, harvested feeds or commercial supplements used to elicit higher winter gains may not be economical when considering the entire system. The potential exists to lower feed input costs during the winter and allow for compensatory gain during summer grazing. However, the optimum rate of winter gain in yearling systems remains an elusive and important question.

In Nebraska, yearlings are commonly grazed in the summer for 90 or more days during the grazing season before being placed in the feedlot. To avoid extra cost of ownership, if may be beneficial to remove cattle from grass earlier if gains are declining. To assist decision making of grazing season length, live weight-gain patterns of yearlings grazing various forages would be a useful tool. These growth patterns, however, may vary with previous nutrition and forage quality, further emphasizing the importance of this information to the yearling producer.

The objectives of this research were to evaluate the effect of winter gain on both summer rate of gain and finishing performance and to describe summer live weight gain patterns of grazing yearling steers.

Procedure

Eighty medium-framed, British-breed steers (497 lb) were used in a 2 x 2 factorial treatment arrangement with rate of winter gain and summer grazing forage type (location) as factors. Forty steers were assigned randomly to a low rate and 40 to a high rate of winter gain (approximately .7 and 1.7 lb/day, respectively). Following the winter period, 20 from each group were assigned to graze warm-season range in

(Continued on next page)

the Nebraska Sandhills or bromegrass pasture in Eastern Nebraska.

During the 163-day winter period, steers first grazed cornstalks, followed by the feeding of bromegrass hay and corn gluten feed to achieve desired winter gains. Steers were implanted with Compudose before summer grazing. On May 6, steers were placed on summer range/pasture and grazed until September 6. Steers in the Nebraska Sandhills grazed primarily warm-season pasture dominated by little bluestem, prairie sandreed, sand bluestem, blue grama and switchgrass. Steers assigned to Eastern Nebraska grazed smooth bromegrass. All animals were allowed access to a trace mineralized salt block throughout the winter and summer periods. Using ruminally fistulated steers, diet samples were taken at both locations throughout the summer grazing season and analyzed for CP and digestibility. Initial and final weights for the winter and summer phases were determined using the average of weights taken on two consecutive days following a five-day limit feeding period.

In order to describe live weight gain patterns during summer grazing, an automatic scale system was used to weigh individual steers each time they watered. If steers were weighed more than once daily, the minimum individual weights were used to calculate a daily mean for each treatment group.

Following removal from pasture, steers were implanted with Revalor and finished (10 head/pen) on a dry-rolled corn and corn gluten feed based diet (7.5% roughage) until an estimated .5 inch fat thickness was reached. Final weights were calculated using hot carcass weights assuming a common dressing percentage (62%). Liver abscess scores and hot carcass weights were taken at slaughter and fat thickness at the 12th rib, quality grades and yield grades were recorded following a 48-hour chill.

Results

Cattle on both the high- and low-gain winter treatments grazing brome pasture gained slower ($P < .05$) than those grazing sandhills range (Table 1). At both locations, steers wintered at a low rate gained faster ($P < .05$) than cattle on the high-winter gain treatment, exhibiting a degree of compensatory growth. The higher summer gains allowed steers to compensate for 19.9% (sandhills) and 18.7% (brome) of the weight deficit resulting from the low-gain winter treatment.

Figure 1 shows summer live weight gain patterns of steers grazing Sandhills range from the low- and high-gain winter treatments. Figure 2 shows weight gain patterns of steers grazing bromegrass pasture. Gains of cattle on sandhills range appeared to be linear or constant throughout the grazing season. In contrast, cattle grazing bromegrass appeared to gain rapidly from May to late June and leveled off for the remainder of the season. Steers on the low- and

Table 1. Steer performance for winter, summer and finishing periods.

	Sandhills Range		Bromegrass Pasture	
	Winter Gain			
Item	Low	High	Low	High
Winter				
Days	163	163	163	163
ADG, lb/d	.70[a]	1.67[b]	.68[a]	1.68[b]
Final weight, lb	611[a]	769[b]	608[a]	771[b]
Summer				
Days	123	123	123	123
ADG, lb/d	1.92[a]	1.66[b]	.73[c]	.48[d]
Final weight, lb	846[a]	973[b]	697[c]	830[a]
Finishing				
Days	99	71	124	99
ADG, lb/d	4.17[a]	4.57[ab]	4.48[a]	5.03[b]
DMI, lb/d	28.8[a]	31.3[ab]	28.6[a]	31.7[b]
Feed/gain	6.91[a]	6.84[a]	6.40[b]	6.31[b]
Final weight[e], lb	1262[ab]	1309[ab]	1249[a]	1323[b]
Yield grade	2.84[a]	2.37[b]	2.80[a]	2.95[c]
Fat thickness, in	.51[ab]	.44[a]	.48[ab]	.53[b]
Percentage of choice	90	58	100	79

[a,b,c,d]Means with unlike superscripts within a row differ ($P < .05$).
[e]Based on hot carcass weight adjusted to a common dressing percentage (62%).

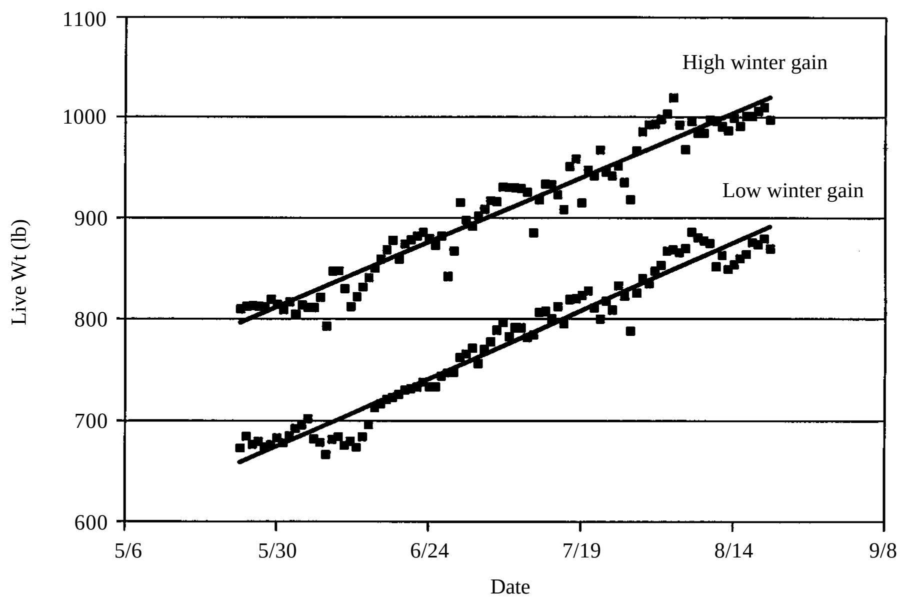

Figure 1. Summer weight gain patterns of steers grazing sandhills range.

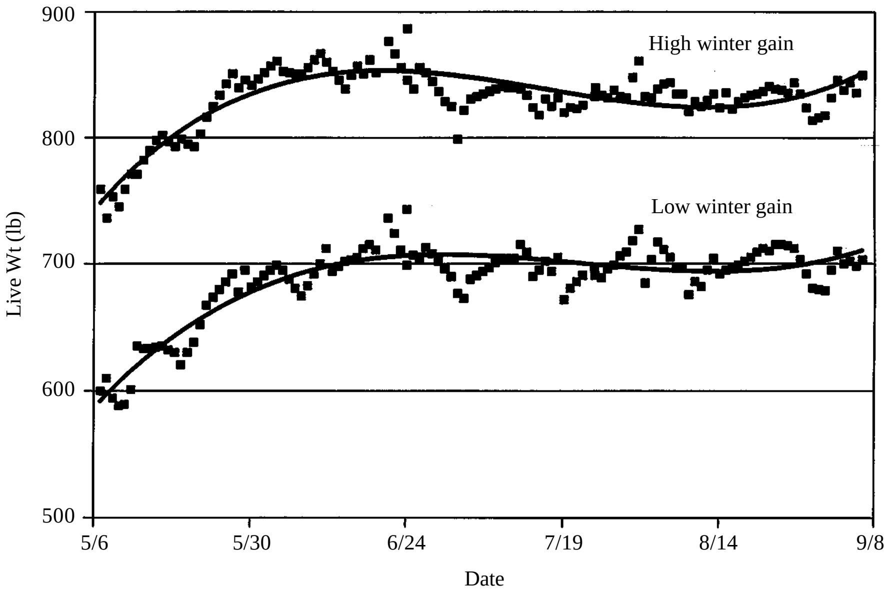

Figure 2. Summer weight gain patterns of steers grazing bromegrass pastures.

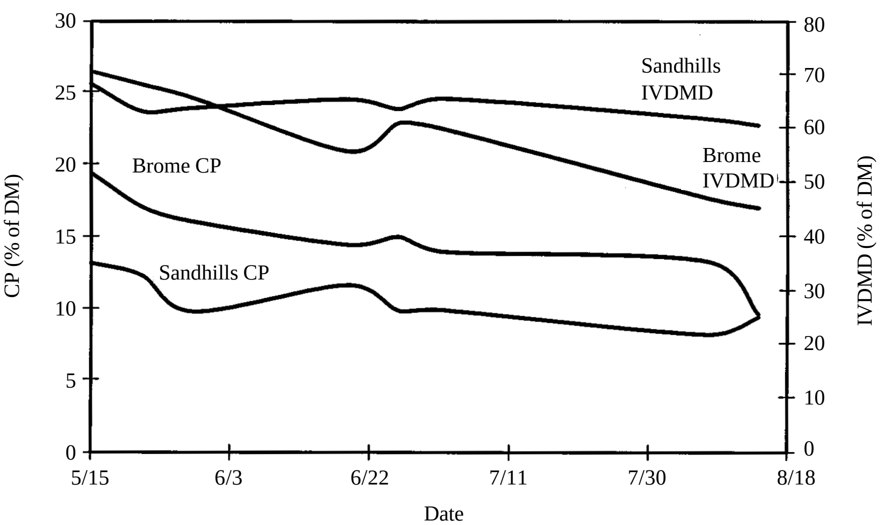

Figure 3. Crude protein and digestibility of summer diets collected from brome pasture and sandhills range.

high-gain winter treatments at each location seemed to exhibit similar growth patterns during summer grazing. The compensatory growth of the low-gain winter cattle most likely occurred gradually, making it difficult to observe a difference in live weight gain patterns between the two groups.

The pasture gains on bromegrass were much lower than in previous years, and is an illustration of the commonly observed "summer slump" of cattle grazing cool-season pasture. Due to several factors, the growth pattern of brome in 1996 was not conducive to optimal cattle performance relative to previous years. May was both unseasonably cool and wet, promoting rapid growth of bromegrass. Because of this, forage quantity exceeded animal demand early in the season, allowing maturation and reduction in quality. Cattle were then forced to graze mature bromegrass in late June and July and considerable trampling occurred. Trampling, in combination with less-than-optimal temperature and moisture in June and July, caused limited forage availability in August.

Figure 3 shows the CP and digestibility changes from May to August at both locations. Protein levels of diets collected from bromegrass pasture imply crude protein did not limit cattle performance to the extent observed. Digestibility of bromegrass decreased from approximately 70% to 45% during the grazing season, while digestibility of sandhills range remained relatively constant. Digestibility values of bromegrass diets reflect rapid forage growth and maturation during the summer and help explain the large performance differences between locations.

During finishing, high-winter-gain cattle summered on brome exhibited higher ($P < .05$) finishing ADG and DMI than low-gain steers at either location. Low- and high-winter-gain cattle grazing bromegrass were more efficient ($P < .05$) than steers grazing sandhills range. The greater efficiency of cattle grazing bromegrass was due to a combination of less weight (low-gain cattle) and less condition upon entering the feedlot. Low-gain cattle from both locations were on feed for more days than high-gain cattle. High-gain steers summered on sandhills range exhibited the lowest ($P < .05$) yield grade, whereas high-gain steers grazed on bromegrass had the highest ($P < .05$) yield grade. Quality grade and liver abscess scores were affected neither by winter treatment nor location.

At both locations, steers on the high-winter-gain treatment maintained approximately 80% of the weight advantage over steers on the low-gain treatment through the summer grazing period. Relative to the low-gain winter treatment, higher winter gain produced heavier steers following summer grazing which finished with fewer days on feed, justifying a rate of winter gain greater than .7 lb/day.

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