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COMPARISON OF YEARLING STEER GAINS IN EARLY SUMMER UNDER SEASON-LONG NATIVE, SEASON-LONG CRESTED WHEATGRASS AND JUNE-DEFERRED NATIVE GRAZING SYSTEMS

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Summary

Season-long native, season-long crested wheatgrass and June-deferred native grazing systems were compared with regard to average daily gains, gains per acre and total gains. Due to drought conditions, the typical 4-month spring-summer season was reduced to a season of approximately 2 months beginning in June. Few differences were detected between the systems for ADG in each month or over the season. Gains per acre were greatest ($P<.05$) on crested wheatgrass pastures (33.75 lb/acre), but no differences were detected between native pastures (10.61-16.61 lb/acre) regardless of whether they had been grazed for 2 months or one (using similar stocking rates). This study indicates that, using weight gain data from 1989 and a 2-month grazing season, the greatest potential gain for the season is realized with a system where cattle graze crested wheatgrass in June and native pastures in July. If this system was applied on 320 acres crested wheatgrass and 640 acres excellent condition native pasture, it would have the potential to produce approximately 23,196 lb of gain on yearling steers compared with season-long (June-July) production of 9,408 lb on 640 acres and 14,112 lb on 960 acres native pasture.

(Key Words: Native Range, Crested Wheatgrass, Spring Deferment, Grazing Systems.)

Introduction

Rangelands in South Dakota are made up of both native and introduced plant communities. Native range vegetation occupies vast acreages in the state and is well suited to the relatively dry, unpredictable climate typical of the Great Plains. Native range vegetation is generally made up of both cool- and warm-season species, providing green forage throughout most of the growing season. Introduced cool-season grasses, especially crested wheatgrass, occupy much less extensive acreages than native vegetation but have long been recognized as a valuable source of rangeland forage, producing high quality forage in early spring and maturing in early summer. These grasses typically produce much greater amounts of forage per acre than native species.

Native rangeland in western South Dakota is generally most susceptible to grazing damage in spring, when green nutritious forage is in relatively short supply and cool-season plants are often overgrazed. An early season or spring deferment of native pastures may reduce or reverse deterioration of the range, and thereby sustain the productivity of the range over the long term. The nutritional requirements of cattle may be met during the deferment period by grazing other native pastures not being deferred or grazing crested wheatgrass (or other introduced cool-season grass) pastures.

The objective of this study is to evaluate the value of spring deferment on western South Dakota rangeland and to compare several options for grazing cattle during the deferment period with respect to cattle performance and vegetation responses. This paper provides a report of the cattle performance data for only one year of the study.

Materials and Methods

This study was conducted at the South Dakota Range and Livestock Research Station, Cottonwood. Two condition classes of native mixed prairie rangeland, excellent and fair (EXC and FAIR), were utilized in this study comparing two grazing systems: June deferment (DF) and season-long (SL) grazing. Crested wheatgrass (CW) pastures

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(interseeded with alfalfa) provided grazing in June for cattle which were moved onto June-deferred native pastures in July. The CW pastures also provided grazing for additional cattle throughout the grazing season. Native pastures were 17 acres in size with three replicates of each combination of pasture condition and grazing system. CW pastures were 25 to 30 acres in size with four replicates.

The study began June 8, 1989 and was projected to continue for 4 months. Inadequate forage supplies due to drought conditions resulted in the study being terminated after approximately 2 months. The pastures were grazed by yearling black baldy steers. Average weights at the beginning of the study were 659 and 728 lb for steers which grazed native pastures (both SL and DF) and for those which remained on the CW pastures the entire grazing season, respectively. Steers were removed from CW and native SL pastures on August 3. Additional steers were added to each of the DF native pastures on August 6 and grazing continued through August 9 in order to provide similar numbers of animal unit days (AUD) of grazing (118 and 111 AUD for SL and DF native pastures, respectively). Stocking rates (assuming each steer is approximately .7 AU) for native pastures were approximately .25 animal units months per acre (AUM/acre), with 3 steers on each pasture grazed season-long and 4 steers on each pasture receiving a June deferment. CW pastures were stocked with 12 steers per pasture in June and reduced to 6 head per pasture beginning July 6. Stocking rates were .43 and .51 AUM/acre for 30- and 25-acre pastures, respectively. The 6 animals removed from each of the CW pastures on July 6 (24 head total) were randomly allotted to the fair and excellent condition June-deferred pastures (FAIR-DF and EXC-DF). Cattle were weighed at the beginning of the study and at 28-day intervals. Weights were taken following overnight removal of water and forage to reduce variability due to rumen fill.

Results and Discussion

Average daily gains (ADG) were significantly lower ($P<.05$) in June for EXC-SL pastures than for FAIR-SL pastures (Table 1). Excellent condition pastures used in this study had not been grazed since 1985, leaving a considerable amount of standing dead material interspersed with current year's growth. Consumption of the older, rank forage was generally unavoidable and likely reduced the overall quality of the diet compared with grazing only current year's growth. Average daily gain in July for cattle grazing FAIR-SL pastures was significantly lower ($P<.05$) than for cattle grazing EXC-SL, FAIR-DF and EXC-DF pastures. By this time, cattle on FAIR-SL pastures may have been forced to graze primarily lower quality forages, having consumed most of 1989 cool-season forage in June. The forage available on EXC-SL, FAIR-DF and EXC-DF pastures, however, was likely of higher quality in July due to species composition differences and/or greater availability of cool-season grasses due to a June deferment. The cattle on EXC-DF pastures, which were first grazed in July, showed significantly greater ($P<.05$)

TABLE 1. AVERAGE DAILY GAINS[1] (LB) FOR CATTLE GRAZING NATIVE AND INTRODUCED PASTURES UNDER TWO GRAZING SYSTEMS

Pasture	June	July	June-August
CW			
Heavy steers[2]	2.43^{a}	$.88^{ac}$	1.65^{ac}
Light steers[2]	1.84^{ac}		
FAIR-SL	2.24^{a}	$.39^{a}$	1.32^{a}
EXC-SL	1.41^{bc}	1.59^{bc}	1.50^{ac}
FAIR-DF[2]		1.39^{bc}	1.59^{ac}
EXC-DF[2]		1.86^{b}	1.87^{bc}

[1] Average daily gains within each column followed by the same letter are not significantly different ($P<.05$).

[2] Heavy steers remained on CW for the entire grazing season. Light steers were moved to native deferred pastures July 6. June-August ADG for cattle on native deferred systems is the average of the ADGs for June on CW and July/August on native.

ADG during that month than did cattle on CW, which had been grazed the month prior. Forage did not appear to be limiting on CW pastures (approximately 730 lb/acre on July 30), but it is likely the highest quality and most available forage had already been consumed. Significant differences ($P<.05$) in ADG for cattle over the entire grazing period (June 8 to August 3 for CW, FAIR-SL and EXC-SL and June 8 to August 9 for FAIR-DF and EXC-DF) were found only between FAIR-SL and EXC-DF, with the latter producing an advantage of approximately .5 lb gain/head/day.

Gains per acre (Table 2) were significantly greater for CW than all other pastures and grazing treatments. This may be explained, in part, by the very productive nature of crested wheatgrass compared to native grasses in spring. This allowed us to stock the CW pastures at double the stocking rate of the native pastures (.5 AUM/acre on CW compared with .25 AUM/acre on native) and, thereby double the gains per acre. The difference in gains is also attributable to inadequate moisture (Figure 1) which resulted in reduced total forage production in all pastures and a severe reduction in warm season production on native pastures. Under 1989 climatic conditions, gains per acre (and in this case gains/pasture) were the same on the native pastures whether the forage was consumed in 2 months (June 8 to August 3) or one (July 6 to August 9).

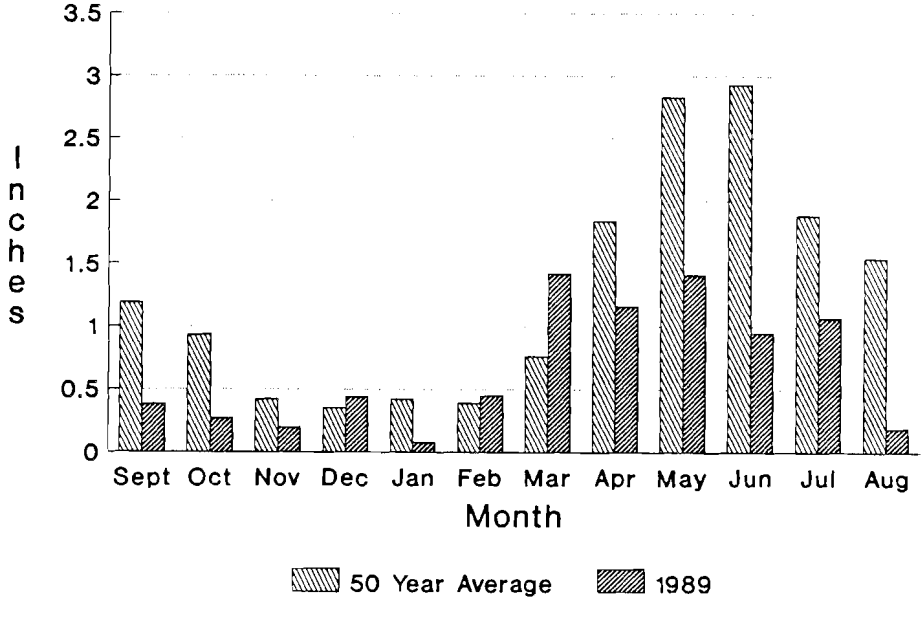
TABLE 2. WEIGHT GAINS PER ACRE[1] (LB) FOR CATTLE GRAZING NATIVE AND INTRODUCED PASTURES

Pasture	Gains/acre (lb)
CW[2]	33.75[a]
FAIR-SL[3]	13.81[b]
EXC-SL[3]	15.75[b]
FAIR-DF[4]	10.61[b]
EXC-DF[4]	16.61[b]

[1] Weight gains followed by the same letter are not significantly different ($P<.05$).
[2] Gains based on grazing from June 8 to August 3 for heavy steers (initial weight 728 lb) and from June 8 to July 6 for light steers (initial weight 659 lb).
[3] Gains based on grazing from June 8 to August 3.
[4] Gains based on grazing from July 6 to August 9.

Stock density (number of animals per acre) was 33% greater on June-deferred pastures versus season-long grazed native pastures. Thus, although ADG's were not markedly different between grazing systems, total gains were greater if cattle grazed crested wheatgrass pastures in June and native pastures in the July-August period rather than grazing native pastures throughout the grazing season. The majority of the

FIGURE 1. VEGETATION YEAR PRECIPITATION



additional pounds of beef produced under a deferment system, then, are a result of increased stock numbers rather than increased individual gains.

Based on the stocking rate used (.25 AUM/acre) and the ADG observed, the data from this study were, for the purpose of discussion, translated to more realistic pasture sizes and a 2-month (June-July) grazing season (Table 3). Total weight gains were calculated for both season-long and June-deferred grazing systems involving fair and excellent condition native pastures. June deferment of a 640-acre native pasture allows an increase in the number of steers which could be grazed but also requires the use of a 320-acre pasture of crested wheatgrass for June grazing. Total gains under this type of system would be 11,969 to 13,788 lb greater compared with season-long grazing on 640 acres native pastures for the same 56-day grazing period. At a value of $.70/lb, the additional weight gains represent $8,378 to $9,652 additional gross income. If the additional 320 acres of land were native pasture instead of CW, total gains for the 56-day grazing period would be 7,840 to 9,084 lb less than the CW-native deferment system. At a value of $.70/lb, this represents an advantage of $5,488 to $6,359 for the June deferment system (320 acres CW and 640 acres native) compared to season-long (960 acres native). Costs associated with leasing, buying or establishing crested wheatgrass pastures would determine the cost-effectiveness of this program for ranchers not already having them. We are currently in the process of subjecting these data to a comprehensive economic analysis.

Under normal climatic conditions the grazing season at the Cottonwood Station is about 4 months long, however, a drought during the spring and summer of 1989 reduced the grazing season to 2 months. The relative benefits of the deferred system are greatly enhanced with a short grazing season. For example, if the deferred pastures were grazed 3 months and the season-long pastures were grazed for 4, stock density should be increased on deferred pastures by approximately 33% (112 steers increased to 150 steers on deferred pastures in our example). This would effectively reduce the early season (first 2 months) weight gain advantage for the DF pastures in our example to 3,990 to 4,596 lb and would require only 107 acres of CW. The deferred treatment would have an early season 2,589 to 3,000-lb advantage over season-long grazing of 747 acres (640 acres plus 107 acres) of native pasture. Gains for the last 2 months of the 4-month grazing season should also be greater on the deferred pastures due to the greater number of animals.

The advantages of implementing early season deferment extend beyond increased weight gains during the grazing season. Improved range condition on native pastures in southwestern and south central South Dakota may occur, over time, as a result of delaying grazing until late spring or early summer. A deferment period in April or May could be more appropriate than June in most years, although this is likely to vary with climatic conditions. The timing of the move of cattle from crested wheatgrass to native pastures is also likely to vary with climatic conditions. Studies are planned at the Range and Livestock Research Station at Cottonwood to further evaluate the effect of deferment period on cattle diets and performance and to develop methods for determining when to move livestock in an early season deferment system.

TABLE 3. WEIGHT GAIN POTENTIAL (LB) FOR STEERS DURING A JUNE-JULY GRAZING SEASON UNDER SEASON-LONG GRAZING AND JUNE DEFERMENT

Pasture	Native (640 acres) 56 days 112 steers	CW (320 acres) 28 days Native (640 acres) 28 days 224 steers	Native (960 acres) 56 days 168 steers
FAIR	8258	20227	12387
EXC	9408	23196	14112