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EFFECT OF LATE SEASON PROTEIN AND ENERGY SUPPLEMENTATION ON PERFORMANCE OF YEARLING STEERS GRAZING MIXED NATIVE RANGE OR COOL SEASON, CRESTED WHEATGRASS PASTURES

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Summary

Seventy-two yearling, black baldy steers were utilized in a grazing experiment to study the effect of late summer, early fall protein (2.33 lb, 40% all natural, fed each Monday, Wednesday and Friday) or energy (4.4 lb corn fed daily) supplementation on average daily gain. Two pasture types, mixed native range and crested wheatgrass, were also examined. Cattle were purchased in May as part of a larger group and gained an average of 2.16 lb per head daily prior to initiation of the study on September 9, 1988. Average daily gain was significantly greater ($P = .012$) for cattle grazing crested wheatgrass than for steers grazing native range (1.38 vs .62 lb per head daily, respectively). Differences in daily gain due to supplement fed were not statistically significant ($P = .298$). Daily gains for the control, corn and protein group across both pasture types were .77, 1.02 and 1.22 lb per head daily, respectively.

(Key Words: Yearling Steers, Protein Supplementation, Energy Supplementation, Native Range, Crested Wheatgrass.)

Introduction

Performance by yearling cattle grazing native ranges and introduced pastures is related to several factors, including growth potential of the cattle, forage quality and availability, and type and level of supplementation. Cattle performance is typically greatest early in the grazing season and markedly lower during late summer and early fall. This reduction in performance is due to an increase in the energy requirements of the cattle combined with a decline in forage quality and/or availability.

Providing limited amounts of protein supplement during late summer and early fall to cattle grazing

warm season grasses has been shown to improve both forage digestibility and intake and thus performance. It is not clear, however, whether protein supplementation of cattle grazing cool season grasses in fall would result in similar improvements in performance. Providing supplemental energy to pasture cattle has been shown to result in a substitution of supplement for forage. This substitution effect may be desirable when forage quantity is limited.

The objectives of this research were to (1) compare performance of cattle grazing either native range (having both warm and cool season grass components) or crested wheatgrass (a cool season grass) in late summer and fall and (2) determine differences in cattle performance due to either protein or energy supplementation. Data presented in this report represent the second year of an ongoing study.

Materials and Methods

This study was conducted at the Range and Livestock Research Station near Cottonwood, South Dakota. On September 9, 1988, 72 yearling, black baldy steers (734 lb) were randomly allotted to six native and six crested wheatgrass pastures. These steers were purchased in western Nebraska as part of a larger (125 head) group in early May at an average weight of 540 lb. The cattle grazed experimental pastures during summer 1988, with an average gain of 2.16 lb per head daily.

Six steers were utilized in each pasture. Stocking rates were light in order to avoid limiting forage availability during the study. Cattle in two of the native and two of the crested wheatgrass pastures were fed 2.33 lb of a 40% all natural protein supplement per head each Monday, Wednesday and Friday. Cattle in two native and two of the crested wheatgrass pastures were fed 4.4 lb of whole shelled corn daily. Both

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supplements provided equal crude protein to the cattle per week. Cattle in the remaining two native and two crested wheatgrass pastures received no supplemental protein or energy and served as the control group. Cattle in each of the supplemented pastures were fed their supplement allotment as a group in feed bunks. All cattle, including controls, were offered salt and mineral supplements free choice. Cattle were individually weighed at the beginning of the study (September 9), at 28 days and again at 56 days following an overnight withdrawal of feed and water.

On September 29, forage samples were hand clipped from all pastures. Samples were collected of each of the major forage species and subsequently analyzed for crude protein, acid detergent fiber (ADF) and neutral detergent fiber (NDF).

Results and Discussion

Late season performance of yearling steers is shown in Table 1. Cattle grazing crested wheatgrass gained more weight ($P = .012$) than cattle grazing native range (1.38 vs .62 lb per head daily). Crested wheatgrass is a cool season forage and is generally of higher quality than the native grasses (western wheatgrass, blue grama and buffalograss) during late summer and early fall (Table 2).

The interaction between treatment and pasture type was not significant. Differences in daily gain due to treatment were not statistically significant ($P = .298$). Average daily gain of cattle on the control, corn and protein treatments were .77, 1.02 and 1.22 lb per head daily, respectively. For cattle grazing native range, conversion of supplement to added gain was 8:1 and 1.64:1 for the corn and protein treatments, respectively. For cattle grazing crested wheatgrass pastures, corn supplementation did not improve daily gains over the control group. Cattle fed protein supplement gained 1.59 lb per head daily compared with 1.30 and 1.26 lb per head daily for the control and corn fed cattle, respectively. Conversion of protein supplement to added gain was 3.45:1 for cattle grazing crested wheatgrass.

Data published by Oklahoma researchers suggest that protein supplementation improves forage digestibility and stimulates forage intake, thereby improving performance of pasture cattle during late summer and early fall. Performance of cattle in this preliminary study agrees with this suggestion. However, lack of statistical significance prevents conclusions from being drawn. This study will be repeated to increase the number of replications per treatment group and to examine the effect of year on the response to supplementation.

TABLE 1. AVERAGE DAILY GAINS OF YEARLING STEERS, LB/DAY

Pasture type	Treatment ^a			Average ^b
	Control	Corn	Protein	
Native	.24	.79	.85	.62
Crested wheatgrass	1.30	1.26	1.59	1.38
Average	.77	1.02	1.22	

^a Standard error of the mean = .26.

^b Native vs crested wheatgrass, $P = .012$.

TABLE 2. CRUDE PROTEIN, ACID DETERGENT AND NEUTRAL DETERGENT FIBER CONTENT OF GRASSES IN EXPERIMENTAL PASTURES

Grass ^b	Crude protein, %	Acid detergent fiber, %	Neutral detergent fiber, %
Crested wheatgrass	6.96	39.94	71.30
Western wheatgrass	4.19	46.50	75.28
Shortgrass ^c	5.06	45.09	78.67

^a Dry matter basis.

^b Samples from each pasture collected on September 29, 1988.

^c Primarily buffalograss and blue grama.