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Response of yearling cattle to burning and fertilizing bluestem pasture and intensively stocking early

Abstract

Long term (28 years) annual, late spring burning of bluestem pasture produced the most daily gain of all pasture treatments but not significantly more than stocking intensively early. Nitrogen applied to a late-spring-burned pasture did not significantly increase daily cattle gains over those from a similarly burned pasture not fertilized. But the nitrogen increased gain per acre by increasing carrying capacity of the pasture. Performance of animals on pasture stocked at twice the normal rate the first half of the season (intensive stocking early) did not differ from performance under normal stocking (burned with no nitrogen added) for the entire season. But for the period April 28 to July 15 intensive stocking early was superior in rate of gain and gain per acre. Pastures burned annually produced better range plant composition than unburned pastures. The best range plant composition was on the pasture intensively stocked early.

Keywords

Cattlemen's Day, 1978; Report of progress (Kansas State University. Agricultural Experiment Station); 320; Beef; Yearling cattle; Fertilizer; Daily gain

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K**Response of Yearling Cattle to Burning and Fertilizing
bluestem Pasture and Intensively Stocking Early****S**E. F. Smith, Clenton Owensby, Bob Schalles,
Len Harbers, and Richard Pruitt**U**

Summary

Long term (28 years) annual, late spring burning of bluestem pasture produced the most daily gain of all pasture treatments but not significantly more than stocking intensively early. Nitrogen applied to a late-spring-burned pasture did not significantly increase daily cattle gains over those from a similarly burned pasture not fertilized. But the nitrogen increased gain per acre by increasing carrying capacity of the pasture. Performance of animals on pasture stocked at twice the normal rate the first half of the season (intensive stocking early) did not differ from performance under normal stocking (burned with no nitrogen added) for the entire season. But for the period April 28 to July 15 intensive stocking early was superior in rate of gain and gain per acre.

Pastures burned annually produced better range plant composition than unburned pastures. The best range plant composition was on the pasture intensively stocked early.

Introduction

Late spring burning has increased desirable warm season grasses in bluestem pastures and increased steer gains. Nitrogen fertilization has increased forage production but also changed stand composition toward cool-season, lower producing species and weedy forbs.

Experimental Procedure

We used six native bluestem pastures, totaling 328 acres, five miles northwest of Manhattan in this study. All were managed the same as the previous five years. One burned, nonfertilized pasture, and one nonburned, nonfertilized pasture have had the same management the last 28 years, to study long term effects. Burned pastures were burned April 26 this year, and ammonium nitrate (34% nitrogen) was applied aerially April 28.

The pasture receiving nitrogen was stocked at a heavier rate in an attempt to equalize forage utilization. Pastures grazed the entire summer season were stocked from April 28 to Sept. 30. The pasture intensively grazed early was stocked from April 28 to July 15 at twice the normal rate. All were stocked with Hereford, Angus, some crossbred steers, and a few Hereford heifers averaging 538 lbs. randomly distributed among the pastures. Equal numbers of animals on each pasture were implanted with either Raigro or Stilbestrol and some were reimplanted at mid-summer. All were gathered the first of each month, penned overnight without feed or water, and weighed the next morning.

Plant census was taken by a modified step-point system in early summer on range sites of loamy upland and breaks in each pasture. Perennial grass, weeds, and brush remaining after grazing were estimated by clipping 15 randomly placed 1/10,000 acre plots on loamy upland and breaks in each pasture.

Results and Discussion

Long term annual burning (28 years) increased daily gain over other treatments except intensive stocking, which produced gains not significantly different. Nitrogen applied to a burned pasture did not significantly affect daily gain but increased gain per acre from 74 to 107 lbs. because of the increased stocking rate (2.2 acres per steer). Performance of animals on the intensively stocked pasture did not differ significantly from performance from normal stocking the entire season. But performance was better on the intensively stocked pasture the first half of the season. Usually performance declines during late season, but in 1977 daily gains in late seasons were good. Good rains prompted adequate, green growing grass into September.

During spring burning, approximately 80 percent of the pasture stocked intensively early burned compared with 40 percent or less of the other pastures where grass was too sparse to carry the fire.

Pastures burned annually had better range plant composition than unburned pastures did; best range plant composition was on the pasture intensively stocked early (Table 11.2).

Most pastures were similar in herbage remaining after grazing but the fertilized pasture had significantly less herbage remaining than other pastures (Table 11.3).

Table 11.1. Effects on steer gains from burning and fertilizing native bluestem pasture and from stocking intensively early.

	Daily gain per steer, lbs.	Gain per acres, lbs.	Acres per steer	Steer grazing days per acre
Not burned				
28 years	1.27 ^a	59	3.3	46
6 years	1.22 ^a	57	3.3	46
Burned April 26				
28 years	1.77 ^d	81	3.3	46
10 years	1.60 ^{bc}	74	3.3	46
40 lb. N/acre	1.53 ^b	107	2.2	70
Intensively stocked				
April 28 to July 15 (78 days)	1.71 ^{cd}	75	1.7	45
Stocked normally				
April 28 to July 15 (78 days)	1.49 ^b	35	3.3	23

a,b,c,d Figures with like superscripts do not differ significantly ($P < .05$)

Table 11.2. Botanical composition (%) and basal cover (%) of indicated plant species on loamy upland bluestem range under indicated management. Data collected in June, 1977.

Species	Management					
	Not burned		Burned April 26			
	28 yrs.	6 yrs.	28 yrs.	10 yrs.	40 lb. Intensive N/acre stocking	
Big bluestem						
Bot. comp.	17.9	17.4	25.4	25.7	24.7	30.6
Basal cover	0.99	1.44	1.68	1.56	1.48	1.67
Little bluestem						
Bot. comp.	7.9	18.9	15.3	14.4	5.4	10.8
Basal cover	0.44	1.56	1.01	0.87	0.32	0.59
Indiangrass						
Bot. comp.	9.8	7.8	12.4	11.0	7.9	19.1
Basal cover	0.55	0.64	0.82	0.67	0.48	1.05
Sideoats grama						
Bot. comp.	7.8	3.8	8.9	11.8	8.4	6.8
Basal cover	0.43	0.31	0.59	0.72	0.50	0.37
Kentucky bluegrass						
Bot. comp.	27.9	17.9	3.0	5.7	2.5	3.8
Basal cover	1.55	1.48	0.20	0.35	0.15	0.21
Sedges						
Bot. comp.	7.7	11.8	7.6	7.4	13.8	5.0
Basal cover	0.43	0.97	0.50	0.45	0.82	0.28
Perennial forbs						
Bot. comp.	11.0	11.0	15.1	13.9	14.4	10.3
Basal cover	0.62	0.93	1.01	0.83	0.86	0.54

Table 11.3. Grass and forbs dry matter (lb./acre) remaining after grazing under indicated management. Data collected in October, 1977.

Management	Loamy upland		Breaks	
	Grass	Forbs	Grass	Forbs
Not burned				
28 years	2414	396	1626	821
6 years	2106	398	2069	170
Burned				
28 years	1912	392	1890	379
10 years	2057	145	1952	101
40 lb. N/acre	1319	507	1078	789
intensive stocking	1736	157	1859	264