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## Response of yearling steers to pasture burning, fertilization, and intensive early season stocking (bluestem pastures)

### Abstract

Nine pastures totaling 492 acres were summer grazed by yearling Hereford steers. Five pastures were burned April 24, 1974; four were not burned. Burned and nonburned pastures had 0, 40, or 80 lbs. of nitrogen per acre applied aerially May 2, 1974. Stocking rates were determined with herbage production data from experimental plots under similar treatments. Under equal fertilization and stocking rates, burned pastures produced more average daily gain and gain per acre than nonburned pastures. Fertilizing and heavier stocking tended to reduce average daily gains, but increase gain per acre. Steers on the early-season, intensively grazed pasture, gained the most per day (2.09 lbs.) and produced a high gain per acre (96 lbs.). Range condition was higher on burned pastures. On unburned pastures, range condition decreased as fertilizer rate increased. High feed grain prices have forced beef producers to use forages to lower beef production costs. The native bluestem grasses have long provided a major portion of the forage for the Flint Hills beef producer and methods of increasing native grass production are being studied. Late spring burning (late April) has increased steer gains and improved range condition. Nitrogen fertilization has improved both the quantity and protein content of the forage produced, but also increased cool-season grasses and weedy species in the pastures. We are studying treatments explained above separately and in combination to evaluate effects they have on beef production and range condition. The effects of early-season, intensive stocking on a burned pasture also are being studied.

### Keywords

Cattlemen's Day, 1975; Report of progress (Kansas State University. Agricultural Experiment Station); 230; Beef; Steers; Pasture burning; Fertilization; Stocking rate

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Response of Yearling Steers to Pasture Burning,  
Fertilization, and Intensive Early Season Stocking  
(Bluestem Pastures)

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Summary

Nine pastures totaling 492 acres were summer grazed by yearling Hereford steers. Five pastures were burned April 24, 1974; four were not burned. Burned and nonburned pastures had 0, 40, or 80 lbs. of nitrogen per acre applied aerially May 2, 1974. Stocking rates were determined with herbage production data from experimental plots under similar treatments. Under equal fertilization and stocking rates, burned pastures produced more average daily gain and gain per acre than nonburned pastures. Fertilizing and heavier stocking tended to reduce average daily gains, but increase gain per acre. Steers on the early-season, intensively grazed pasture, gained the most per day (2.09 lbs.) and produced a high gain per acre (96 lbs.). Range condition was higher on burned pastures. On unburned pastures, range condition decreased as fertilizer rate increased.

High feed grain prices have forced beef producers to use forages to lower beef production costs. The native bluestem grasses have long provided a major portion of the forage for the Flint Hills beef producer and methods of increasing native grass production are being studied. Late spring burning (late April) has increased steer gains and improved range condition. Nitrogen fertilization has improved both the quantity and protein content of the forage produced, but also increased cool-season grasses and weedy species in the pastures. We are studying treatments explained above separately and in combination to evaluate effects they have on beef production and range condition. The effects of early-season, intensive stocking on a burned pasture also are being studied.

Experimental Procedure

Nine native bluestem pastures, totaling 492 acres, four miles northwest of Manhattan were used in the study. All treatments were the same as the previous two years. One burned, nonfertilized pasture, and one nonburned, nonfertilized pasture have had the same treatment the last 24 years, to study long term effects. Burned pastures were burned April 24, and ammonium nitrate (34% nitrogen) was applied aerially May 2. The pastures grazed the entire summer season were stocked from May 1 to October 4. The intensively grazed pasture was stocked from May 1 to July 16. All were stocked with Hereford steers averaging 408 lb. One half of the steers were implanted with Ralgro, the other half with Synovex-S before being placed on pasture. All were sprayed for flies as needed, and salt was free choice. They

were gathered the first of each month, penned overnight without feed or water, and weighed the next morning.

### Results and Discussion

Late spring burning increased daily gain and gain per acre (table 10.1). Nitrogen fertilization at 40 or 80 lbs. per acre tended to reduce daily gain, but increased gain per acre. The burned pasture receiving 80 lb. of nitrogen probably was stocked too heavily for maximum long range productivity. The burned, nonfertilized pastures produced highest average daily gain for the full-season stocked pastures. The intensively-stocked pasture produced the highest average daily gain over all. Differences in average daily gain between the steers implanted with Ralgro and those implanted with Synovex-S were not significant.

All burned pastures had better range condition than unburned pastures did. Pastures not burned had high amounts of Kentucky Bluegrass and western ragweed. Carbohydrate reserves were much higher on burned than on nonburned pastures. The highest range condition was in the intensive, early-stocked pasture. Major plant species in the pastures are shown in table 10.2.

Table 10.1. Effects on Steer Gains From Burning and Fertilizing Native Bluestem Pasture, May 1 to October 4 (156 days), 1974.

	Daily gain per steer, lbs.	Gain per acre, lbs.	Acres per steer
Not burned			
No nitrogen, same treatment 24 years	1.30	61	3.3
No nitrogen	1.30	61	3.3
40 lb. nitrogen per acre	.99	70	2.2
80 lb. nitrogen per acre	.99	74	2.1
Burned April 27			
No nitrogen, same treatment 24 years	1.85	92	3.1
No nitrogen	1.69	79	3.3
40 lb. nitrogen per acre	1.48	93	2.2
80 lb. nitrogen per acre	1.19	101	1.8
Intensively stocked			
May 1 to July 16 (76 days)	2.09	96	1.7

Table 10.2. Composition (Percentages) of Major Species on Burned and Fertilized Pastures in Loamy Upland Bluestem Range.

	Nitrogen (lb/A)		
	0	40	80
Kentucky Bluegrass			
Burned			
1972	8.6	0.2	1.2
1973	8.3	1.0	2.2
1974	11.9	2.0	5.7
Nonburned			
1972	9.1	15.3	21.2
1973	15.1	21.6	32.5
1974	23.2	31.9	41.8
Big Bluestem			
Burned			
1972	25.6	34.4	34.2
1973	27.7	32.6	33.2
1974	26.2	30.1	23.1
Nonburned			
1972	14.9	19.1	18.3
1973	17.1	19.5	12.3
1974	13.4	14.1	12.4