

Brush Management On The Cross Timbers Experimental Range. III. Carrying Capacity And Steer Performance.

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Story in Brief

Preliminary results from a long term brush management study are presented. In 1985 and 1986, stocker cattle grazing on untreated Cross Timbers rangeland gained less weight than steers on treated pastures. Performance was similar for steers grazing areas treated with triclopyr or tebuthiuron. Annual spring burning following herbicide application increased steer gains compared to herbicides without burning. In addition to improved performance, brush management increased grazing capacity compared to control areas; there was no difference among the four brush treatments. The combined effects of higher steer gains and greater carrying capacity following brush management has resulted in large increases in per acre livestock production .

Introduction

In the past, brush management studies have simply measured tree kill and herbaceous plant responses following application of treatments. However, the feasibility of any brush management project depends upon the ability to derive some marginal benefit from the investment. These marginal benefits are most commonly measured in terms of net cash returns to an operation. In the Cross Timbers area, sales of domesticated livestock, primarily beef cattle, are the principal source of income derived from the land. Therefore, knowledge of livestock production responses following brush management is a necessary part of the decision-making process. Unfortunately, most available information has been extrapolated from forage response trials rather than livestock grazing trials.

A study was initiated in 1983 to evaluate the influence of four brush management programs on woody plant and herbaceous plant populations in addition to livestock production. This report summarizes the first two years of cattle performance.

Materials and Methods

The experimental design, treatment protocol and physical layout of the research area has been described by Engle et al. (1987). Five brush management treatments -- an untreated control and, two herbicides (triclopyr and tebuthiuron) with and without annual spring burning -- are being compared at the Cross Timbers Experimental Range (CTER) southwest of Stillwater, OK. Herbicides were applied in 1983 and the first spring burns occurred in 1985.

The experimental pastures were grazed by cows and calves in 1984. In 1985 and 1986, cow/calf grazing was replaced by a seasonal stocker

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operation. Conditioned stocker cattle were delivered to the CTER in late March and early April. The cattle were weighed and sorted to one of the 20 treatment pastures. The grazing season started in mid April and extended into late September in both years (table 1). A mineral supplement containing aureomycin was available free-choice throughout the summer. No other feed supplements were offered in amounts great enough to affect animal performance. All cattle weights were recorded after an overnight shrink.

Stocking density varied from 8 to 21 head per 80 acre pasture depending on brush treatment and estimated forage production. The number of cattle on some pastures was adjusted in midseason to achieve the desired level of utilization. The tabular data for grazing capacity were adjusted to include the total days of grazing on a pasture. Animal performance data includes only the gains for cattle that were on a pasture for the complete season.

Fresh fecal samples were collected monthly from each treatment pasture. Fecal nitrogen levels for 1985 are presented in the text.

Table 1. Steer performance following brush management.

	Year	Check	Tebu	Tebu fire	Tric	Tric fire
Init. wt., lb/hd	1985	451	422	431	418	444
	1986	532	519	526	517	515
Total gain, lb/hd	1985	257	275	293	279	304
	1986	224	282	310	284	299
Daily gain, lb/hd	1985	1.67	1.76	2.07	1.78	2.24
	1986	1.63	1.80	2.02	1.83	1.94

Results and Discussion

A higher level of nitrogen in the feces of cattle grazing the treated pastures in 1985 is indicative of a higher plane of nutrition (figure 1). Viewing the general pattern of fecal nitrogen values, cattle on the control pastures were consuming a lower quality diet than cattle on treated pastures while animals on the herbicide/burn pastures were grazing the highest quality forage.

Steer performance data from both years reflect the differences noted in the 1985 fecal nitrogen data (table 1). Performance of the control steers was representative of gains on this type of rangeland. Averaged across the two years, steers grazing on herbicide treated pastures gained 16.3% more weight than the control cattle. Spring burning combined with herbicides, improved gains an additional 7.5% or 23.8% compared to the controls. There was little difference between herbicides.

Carrying capacity and gain/acre data are presented in table 2. Utilization estimates at the end of 1985 and 1986 ranged from 35 to 50%. Based on these estimates we feel that our stocking levels were achieving a desired level of use. Although carrying capacity (AUMs/acre) was slightly greater in 1986, the two years were combined for this

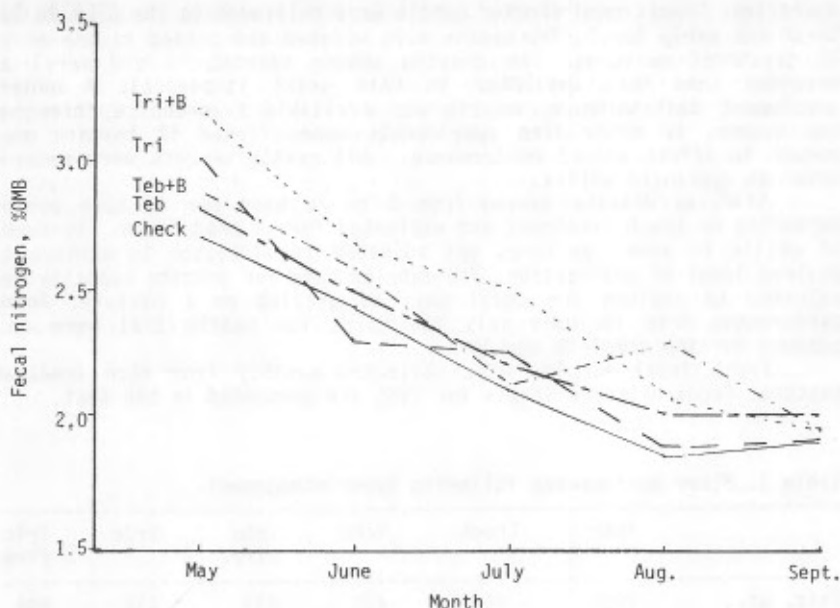


Figure 1. Fecal nitrogen values (%OMB) of steers grazing on the Cross Timbers Experimental Range in 1985.

Table 2. Influence of brush management on grazing capacity and beef production per acre.

	Year	Check	Tebu	Tebu fire	Tric	Tric fire
Season, days	1985	153	154	142	156	137
	1986	140	157	153	156	155
Carrying capacity, AUMs/acre	1985	.49	.70	.68	.75	.71
	1986	.45	.77	.72	.83	.76
Total production, lb/acre	1985	36.4	58.1	63.1	61.4	70.4
	1986	30.3	57.1	57.9	54.3	59.5

discussion. Engle et al. (1987) reported that burning had little influence on herbaceous plant yields. Likewise, carrying capacity (AUMs/acre) was similar on herbicide/burn and herbicide only pastures. During the two summer grazing seasons, carrying capacity was 57% higher on the treated pastures compared to the control areas.

The combined increases in gains and carrying capacity on the treated pastures improved beef production/acre 75 to 95 percent.

These results are initial observations from a study that will continue for several years. The following observations should be noted. First, the increase in individual steer performance following herbicide

application was not expected. Results of fecal and forage analyses should provide some explanation for the response. Secondly, marginal gains following burning were similar to gains noted after prescribed burning on prairie sites (20-30 lb/hd/season). This response in addition to beneficial effects on herbicide-resistant brush species and resprouting woody species, demonstrates the value of burning as a follow-up treatment. Finally, increased individual animal performance in addition to increased carrying capacity pushed production per acre to levels that were higher than expected.

Literature Cited

Engle et al. 1987. Brush management in the Cross Timbers. II. Herbaceous plant responses. OAES MP-119:103.