Grazing Comparison of Woodward Sand Bluestem and Caddo Switchgrass in Oklahoma

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Many acres in Oklahoma are planted to native grass each year. Information is needed on the productive capacities of grasses available for these plantings. This study was designed to provide information to land owners and operators regarding the relative productive capacities of Woodward sand bluestem and Caddo switchgrass under grazing. These grasses are selections of the native sand bluestem (*Andropogon hallii*) and switchgrass (*Panicum virgatum*) and are available for grass plantings.

Very little literature is available on grazing studies using pure stands of selected strains of native grass. Many workers have studied grazing effects on native grass mixtures (3,4,5,7). Elder (2) reported responses of heifer calves grazing small grain pastures. Launchbaugh (6) studied reseeded pastures of buffalograss, western wheatgrass and intermediate wheatgrass. He found length of grazing season to be somewhat longer, the carrying capacity higher, and gain per head higher in the cool-season grasses.

METHODS

Two eight-acre pastures were prepared and seeded with a grassland type drill to pure stands of native grass in April of 1957 on the Paradise Experiment Station, Paradise, Oklahoma. One pasture was seeded to Caddo switchgrass and the other was seeded to Woodward sand bluestem. The soils of both pastures are Dougherty fine sandy loam, outwash of the nearby Cimarron River.

The first grazing comparison of the two grasses was initiated in the spring of 1961. At that time the switchgrass pasture had an excellent uniform stand (Figure 1), while the bluestem pasture was characterized by a more open stand of grass (Figure 2). For this reason the bluestem was stocked with four bred Hereford heifers and the switchgrass with five. During the 1962 grazing season each pasture carried five bred

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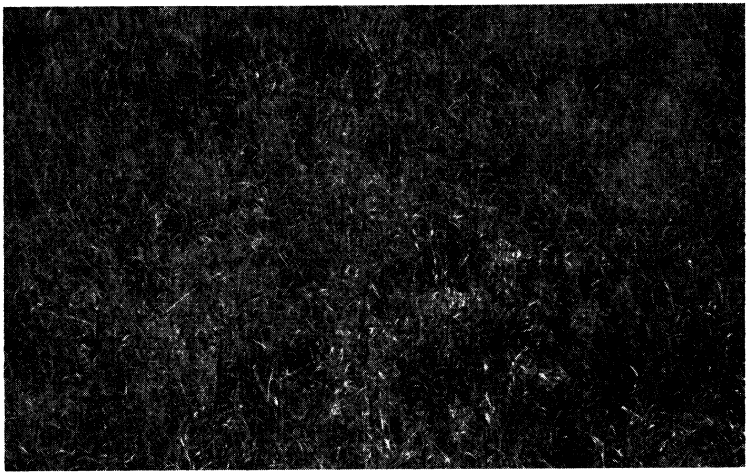

Figure 1. The Caddo switchgrass pasture showing uniform stand.

Figure 2. Woodward sand bluestem pasture showing the more or less bunch grass type growth.

heifers on each pasture (Figure 3). In 1963 each pasture was grazed with seven yearling Hereford steers (Figure 4). The animals used in these evaluations were very uniform in both appearance and response.

At the close of each season, samples were clipped to determine the quantity of forage remaining on each pasture and at the end of the last grazing season, 1963, utilization estimates were made by clipping plots

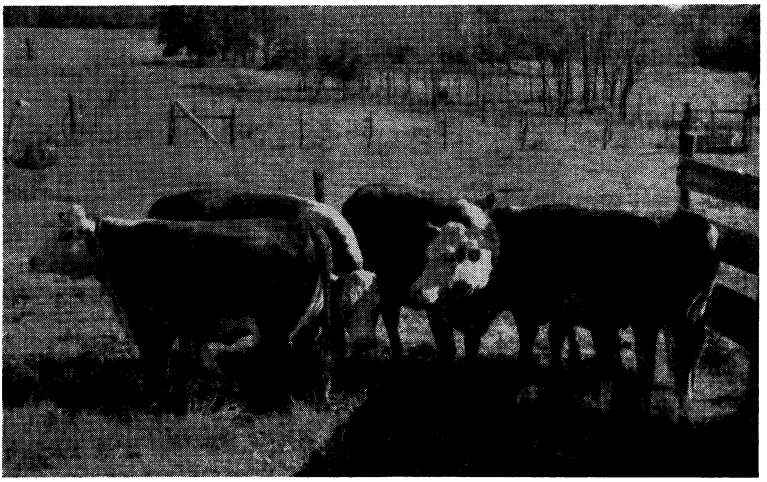

Figure 3. Bred heifers used in the 1961 and 1962 grazing comparison.

Figure 4. Yearling steers used in the 1963 grazing comparison.

protected from grazing and plots unprotected to determine the per cent of forage volume removed in each pasture.

The animals were weighed, following an overnight dry lot, at approximately monthly intervals.

RESULTS

Grass Establishment

Caddo switchgrass was much easier to establish than the Woodward sand bluestem. The switchgrass pasture had a good stand by the fall of 1957 and produced some seed. The bluestem did not produce any seed until 1958 and then only a small amount. Switchgrass was grazed lightly during the summer of 1959 but no records were kept on the animals. Bluestem was grazed during the winter of 1959.

In 1960, 8 cows and calves grazed the 8 acres of switchgrass for 90 days during the summer and bluestem was grazed in the winter. The bluestem stand improved from 1957 through 1960 and was considered ready for grazing test in May, 1961.

Animal Response

The data presented in Table 1 indicate that Woodward sand bluestem was more productive than Caddo switchgrass during 1961 and 1962 when grazed by the bred heifers. The daily gains were essentially the same for June and July but gains were conspicuously lower for switchgrass in August and September in 1961 and 1962. The reason the bluestem pasture showed more animal gain was due to the new growth it produced in late summer. Switchgrass became stemmy by mid-August, had very little green growth, and was producing seedheads, while the bluestem was making considerable new growth.

Several plants of weeping lovegrass (*Eragrostis curvula*), a grass of comparatively low palatability, were growing in both pastures. By late August the cattle had heavily grazed the weeping lovegrass in the switchgrass pasture (Figure 5), but it remained untouched in the bluestem pasture (Figure 6). The weeping lovegrass was relatively green, probably making it more desirable to the cattle on switchgrass, since their pasture was mostly dry.

In 1963 the results of the comparison showed no difference in the two grasses' ability to produce steer gain. Each pasture was grazed with seven yearling steers and gain per day and per head were nearly the same. The stocking rate was somewhat heavier in 1963 than 1961 and 1962 and this extra grazing kept the switchgrass from maturing quite so early, so it produced some new green growth in late August. This new growth kept the animal gains on a level with the steers grazing bluestem.

The effect of this heavier grazing intensity on the pastures was quite evident. At the close of the 1963 season there was considerably less

Table 1. Average Daily and Monthly Gains of Cattle grazed on Woodward and Sand Bluestem (B) and Caddo Switchgrass (S) Pastures.

	May		June		July		August		September		TOTAL	
	B	S	B	S	B	S	B	S	B	S	B	S
1961*												
Avg. Daily Gain (lb.)**	- -	- -	2.3	2.1	1.0	1.1	1.2	0.9	0.7	—0.3	1.26	0.88
Gain Per Head (lb.)	- -	- -	75	69	31	35	43	31	27	—13	176	122
Grazing Days	- -	- -	33	33	30	30	36	36	41	41	140	140
										May 28—Oct. 15		
							Gain Per Acre				88	76

*Bluestem and switchgrass pastures grazed with 4 and 5, 2 year old heifers, respectively.
**Initial average animal weights were 900 lbs. for bluestem and 905 lbs. for switchgrass.

1962*												
Avg. Daily Gain**	2.5	1.5	1.0	1.0	1.5	1.5	1.1	0.6	0.4	—0.5	1.29	0.82
Gain Per Head (lb.)	58	35	22	22	47	47	40	20	11	—12	177	112
Grazing Days	23	23	23	23	31	31	35	35	25	25	137	137
										May 14—Oct. 1		
							Gain Per Acre				111	70

*Five 2 year old heifers on each pasture.
**Initial average animal weights were 847 lbs. for bluestem and 848 lbs. for switchgrass.

1963*												
Avg. Daily Gain (lb.)**	1.4	1.4	1.3	1.8	1.0	0.8	1.6	1.4	1.7	1.5	1.37	1.35
Gain Per Head (lb.)	40	41	36	50	29	25	51	45	44	36	200	197
Grazing Days	31	31	27	27	30	30	32	32	26	26	146	146
										May 3—Oct. 1		
							Gain Per Acre				175	172

*Seven yearling steers on each pasture.
**Initial average animal weights were 474 lbs. for bluestem and 472 lbs. for switchgrass.

forage left on the Caddo switchgrass than on the Woodward sand bluestem pasture (Table 2.) In addition, the stand of switchgrass was reduced and the plants were less vigorous than at the outset of the study. The sand bluestem pasture produced nearly 1300 pounds more total forage than the switchgrass pasture. It required 74 percent of the switchgrass produced to graze the seven steers for 146 days but only 55 percent of the bluestem. More forbs were produced in the bluestem pasture, probably due to the more open stand.

There was less grass remaining at the end of the grazing season on the switchgrass pasture than the bluestem pasture each of the three grazing seasons.

Figure 5. Plants of weeping lovegrass (center) in the switchgrass pasture. These were heavily grazed each year beginning in late August.

Figure 6. Large plants are the weeping lovegrass plants in the bluestem pasture. These were ungrazed throughout the study.

Table 2. Forage Production and Percent Utilization of Woodward Sand Bluestem and Caddo Switchgrass at the Close of the 1963 Grazing Season.

	Forage Production (lbs. per acre)						Utilization*
	Ungrazed			Grazed			
	Grass	Forbs	Total	Grass	Forbs	Total	%
Sand Bluestem	3830	692	4522	1705	318	2023	55
Switchgrass	3190	55	3245	825	24	849	74

$$*\%\ \text{Utilization} = \frac{\text{Ungrazed Total} - \text{Grazed Total}}{\text{Ungrazed Total}} \times 100$$

SUMMARY AND CONCLUSIONS

Two eight-acre pastures of selected strains of native grass were planted on a fine sandy loam soil in 1957 on the Paradise Experiment Station, Paradise, Oklahoma. One pasture was planted to Caddo switchgrass (*Panicum virgatum*) and one to Woodward sand bluestem (*Andropogon hallii*). Grazing comparisons of the two species began in the spring of 1961.

The data indicate that when grazed at a rate which is not detrimental to the switchgrass the animal gain is reduced in August and September because the grass matures seed and the leaves dry. When grazed at a rate that keeps switchgrass from maturing quite so early, gains stay up, but the grass is injured due to overgrazing.

The animal gains on sand bluestem were consistently high and the grass was not injured by the grazing rates imposed. Bluestem produced nearly 1300 pounds more forage per acre than switchgrass in 1963, 4522 pounds to 3245 pounds. It required only 55 percent of the forage to support seven steers for 146 days on the bluestem, but 74 percent of the switchgrass (Table 2).

From these data it would appear that on a fine sandy loam soil, Woodward sand bluestem provides consistently higher rates of animal gain and is better able to withstand grazing than Caddo switchgrass. Dwyer, *et al.* (1) have shown that switchgrass is much less resistant to damage by clipping than big bluestem (*Andropogon gerardi*). Sand bluestem is also more productive. However, switchgrass has the advantage of being easier and quicker to establish.

Both grasses appear to be far superior to the standard unselected native grass mixture adapted to the same site.

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