Gains of Stocker Cattle on Midland and Hardie Bermudagrass Pastures: A 5-Year Summary

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Story in Brief

Hardie and Midland bermudagrass have been evaluated in a 5-year grazing trial with steers. Average daily gain was 1.80 lb for Hardie and 1.61 lb for Midland. Stocking rates were adjusted to utilize available forage and averaged 2.4 steers per acre for Hardie and 2.3 steers per acre for Midland. Total beef production per acre was 636 lb for Hardie and 492 lb for Midland. These results reveal that Hardie bermudagrass produced higher daily steer gains, had a greater carrying capacity and produced more beef per acre.

Introduction

The selection and release of two new bermudagrass varieties, Hardie and Oklan, were based upon laboratory tests for forage quality. The purpose of this study was to compare these grasses with Midland bermudagrass in regard to animal performance. This report includes results of steer grazing trials conducted in 1981, plus a 5-year summary of results for 1977 through 1981.

Experimental Procedure

The trials were conducted at the Agronomy Research Station, Perkins, Oklahoma. Two blocks of pastures, containing one pasture each of the hybrid bermudagrass varieties Midland, Hardie, Oklan and SS-16 (an unreleased experimental strain), were used in a randomized complete block design. The soils were the Dougherty, Konowa and Teller fine sandy loams (Arenic Haplustafs, Ultic Haplustafs and Udic Argiustolls). Soil tests revealed that the pH was 5.7 to 6.5, and soil phosphorus and potassium were very high. Soil moisture measurements have been taken at several dates each season with a neutron moisture probe for the 1978 through 1981 seasons.

The pastures were sprigged in 1975, and grazing trials began in 1977. Each of the pastures was about 3 acres in area and was subdivided with electric fences into three paddocks to facilitate rotational grazing during the grazing trials. The rotational grazing objective was 1-week grazing of the pastures followed by a 2-week deferment. Thus, throughout most of the bermudagrass growing season, the forage was 2, and never over 3, weeks of age.

In early June of each year, when steers were rotated, each paddock was mowed to remove cool season annuals. The pastures were fertilized with 150 lb of actual nitrogen in three equal applications in early April, late June and early August.

Hereford and Hereford × Angus steers for the 1980 trial were purchased at a livestock auction in March and grazed on small grain with limited forage until the trial began. Average daily gain during this pretrial period was about 0.8 lb. Details

of the steers and their management in the earlier years were reported by Horn and McMurphy (1981). The steers were assigned to treatment groups on the basis of source, breed and weight. These were the tester steers which remained on the pasture all season. Stocking rates were adjusted to utilize available forage using additional steers, put-and-take animals.

Daily gains were calculated from weight gains of steers that remained in the pastures throughout each grazing trial (tester steers). Average initial weight (mean ± SEM) of all tester steers in 1977 was 518 ± 8.4 lb; in 1978, 520 ± 6.3 lb; in 1979, 486 ± 10.9 lb; 1980, 453 ± 9.1 lb; and in 1981, 499 ± 10.1 lb.

Stocking rates on the pastures were adjusted according to the amount of available forage throughout the grazing trials by use of put-and-take steers. For calculation of total steer gain, put-and-take steers were assigned daily gains of tester steers during each period. Steer weights were measured after about a 16-hour overnight shrink without feed or water.

All 1980 and 1981 steers were implanted with Ralgro at the beginning of each trial. In previous years the steers were implanted with diethylstilbestrol. Tramisol (levamisole phosphate) was given for internal parasite control in April. Excellent fly control was achieved during each trial by spraying the steers on each weigh date, except July 1 when a pour-on insecticide for grub control was applied, and by keeping dust bags in the pastures. Steers in all pastures had access to trees or constructed shades. A commercial mineral supplement that contained 12 percent calcium and 12 percent phosphorus was fed free-choice during the trials.

Results and Discussion

Rainfall recorded at the station during the first 9 months of each year is compared with the long-term average in Table 1. This 9-month total has varied from 73 to 106 percent of the long-term average. The driest season was in 1978, and the greatest total precipitation was in 1980 although distribution of rainfall in 1980 was very poor. The 1981 season began very dry. Soil moisture was adequate only in the surface three feet, and the subsoil moisture in the fourth and fifth feet of the soil profile remained dry throughout 1981. In normal seasons it is the moisture from the lower soil profile that supports growth during short dry spells. Production in 1981 was very much dependent upon the timely precipitation which occurred. The bermudagrass did stop growth twice, once in May and again

Table 1. Seasonal precipitation (inches) for Agronomy Research Station, Perkins

Month	1977	1978	1979	1980	1981	Long-term average
January	0.22	0.92	2.11	2.14	0.05	1.53
February	1.16	2.63	0.25	0.86	1.02	1.46
March	2.50	1.46	3.80	2.39	1.66	2.20
April	2.23	1.85	3.42	4.07	1.05	3.16
May	8.46	7.28	6.83	7.57	6.92	5.09
June	1.90	4.59	3.01	8.78	4.52	4.58
July	3.15	0.90	0.42	0.05	4.89	3.45
August	2.88	0.53	1.62	1.56	5.06	3.19
September	1.77	0.49	1.94	2.88	1.93	3.81
Total	24.27	20.65	23.40	30.30	27.10	28.47

in July, and exhibited signs of severe moisture stress. Thus, while the overall grazing production results for 1981 were excellent, we were on the brink of disaster twice.

The rotation grazing was discontinued by September 5. With the slower regrowth rate in September, steers were given free access to all three paddocks in each pasture.

Details of the results for 1977 through 1980 seasons were published by Horn and McMurphy (1979, 1980, 1981). The original study included Oklan and SS-16 bermudagrass; however, these two varieties suffered enough winterkilling damage in the winter of 1978-79 that they were dropped from the test.

Average daily gains (Table 2) were highest in May and lowest in July. The differences between Hardie and Midland have not been statistically significant. The 1981 season average daily gains were 1.89 lb for Hardie and 1.54 lb for Midland. This was close to the 5-year average of 1.80 lb and 1.61 lb ($P<.05$) for Hardie and Midland, respectively.

Table 2. Average daily gains (ADG) of steers, total steer grazing days per acre, and total gain per acre for intervals in 1981 with 5 years of seasonal averages and the 5-year average

Grazing interval	Number of days	ADG, lb		Total steer days/acre[a]		Total gain/acre, lb	
		Midland	Hardie	Midland	Hardie	Midland	Hardie
4-28 to 6-2	35	2.64	3.10	76	103	199	317
6-2 to 7-2	30	1.64	1.97	88	65	144	128
7-2 to 8-4	36	0.69	1.04	122	122	85	127
8-4 to 9-2	29	1.03	1.47	72	72	75	105
9-2 to 10-7	35	1.64	1.83	65	87	106	159
1981 Season	165	1.54	1.89	422	448	609	837
1980 Season	111	1.39	1.57	245	265	351	454
1979 Season	147	1.83	1.99	381	406	658*	861
1978 Season	114	1.82	1.84	242*	259	419	487
1977 Season	153	1.45	1.73	281	313	416*	552
5-year Average	138	1.61*	1.80	315*	337	492*	636

*Indicates a significant difference ($P< 0.05$) between Midland and Hardie.

[a]Steers/acre = $\frac{\text{Steer days/acre}}{\text{No. of days in grazing interval}}$.

The average gains are a product of environment plus good animal and pasture management practices. The animal management includes selection of good steers, implantation with growth hormones, excellent internal and external parasite control, shade and mineral supplement. Pasture practices of nitrogen fertilization, proper stocking rates and rotation to provide young forage between 2 and 3 weeks of age are also factors favorable to good steer gains.

Stocking rates are expressed as steer days per acre. Dividing steer days per acre by the number of days in that interval gives a quotient of steers/acre for that

interval. Thus, Hardie bermudagrass for the entire 1981 season had an average stocking rate of 2.7 steers per acre (448/165).

Producers do not have the option to adjust stocking rates as freely as in our research. The only way most producers can use this program and keep the available forage young will be with rotation grazing and hay removal at peak growth periods. Therefore, the lowest stocking rate at any grazing interval becomes an important value to a producer. A producer must not run out of forage. The lowest stocking rate for a grazing interval was 2.2 steers per acre for Hardie in June and 1.9 steers per acre for Midland in September. Thus, the base stocking rate at which a producer should attempt to operate has been about 2 steers per acre.

Total gain per acre for 1981 was 837 lb of beef for Hardie and 609 for Midland. The total gain per acre as well as the carrying capacity has fluctuated widely over the 5 years. The high production figures for 1979 and 1981 are a result of the late summer drought of the preceding years. The August fertilizer application of 50 lb of nitrogen per acre in 1978 and 1980 never received the precipitation to make it effective for production. The increased production of 1979 and 1981 may well reflect use of residual soil nitrogen from the previous years.

These results reveal excellent average daily gains in some years. The 5-year averages reveal distinct differences between Hardie and Midland bermudagrass, with Hardie being superior in total gain per acre and carrying capacity. Much of the advantage to Hardie was produced during May when Hardie had a higher carrying capacity due to its earlier and faster growth rate at that time.

The results emphasize the importance of a complete program for both steer and pasture management to provide and maintain high quality young forage for maximum animal production. There will be great fluctuations in total forage production from year to year as measured in steer days per acre. However, the minimum stocking rate of about 1.8 to 2.0 steers per acre appears to be consistent with hay removal at peak growth periods. The program is vulnerable to late summer drought in that grazing was terminated in early September in 2 of the 5 years when bermudagrass growth ceased.

Literature Cited

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