

# **NUTRITION — FORAGE EVALUATION**

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## **Steer Weight Gains on Midland, Hardie, Oklan and SS-16 Bermudagrass Pastures**

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### **Story in Brief**

Daily weight gains of steers, stocking rate and total beef production per acre were evaluated on four varieties (Midland, Hardie, Oklan and SS-16) of bermudagrass pastures during the 1977 and 1978 bermudagrass growing seasons. Total season average daily gains of steers were good and ranged from 1.45 to 1.80 lb (1977) and 1.72 to 2.09 lb (1978). Total gains per acre on Hardie bermudagrass were about 135 lb greater (552 *vs* 417 lb) than those of the other varieties (1977), and about 80 lb greater (487 *vs* 407 lb) than those of Midland and SS-16 bermudagrass (1978). Total gains per acre on Oklan bermudagrass were the lowest for both growing seasons which was a reflection of some stand loss from winter killing.

The steer gains emphasize the importance of pasture management in maintaining an immature, growing forage. Marked changes in carrying capacity (total steer days/acre) observed within varieties for different periods of the bermudagrass growing season indicate that adjustment of stocking rate is a critical management problem in bermudagrass stocker programs.

### **Introduction**

Bermudagrass is often criticized as not supporting acceptable weight gains of stocker cattle throughout the bermudagrass growing season. Over 750 and 625 lb of stocker gain per acre for yearling steers and spring-weaned calves, respectively, on Coastal bermudagrass at the North Louisiana Hill Farm Experiment Station (Homer, Louisiana) have been reported by Oliver (1976). We report, herein, results of steer grazing trials conducted during the bermudagrass growing seasons of 1977 and 1978 on pastures of four bermudagrass varieties.

### **Experimental Procedure**

The trials were conducted at the Agronomy Research Station, Perkins, Oklahoma. Two blocks of pastures, each containing one pasture 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 are the Dougherty, Konowa and Teller fine sandy loams (Arenic Haplustalfs, Ultic Haplustalfs and Udic Argiustolls). Soil tests revealed that the pH was 5.7 to 6.5, and soil phosphorus and potassium were very high.

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

In early June of each year, each paddock was mowed to remove cool season annuals when steers were rotated. The pastures were fertilized with 150 lb of actual nitrogen per acre each year of the grazing trials. Nitrogen was applied as ammonium nitrate in three equal applications in early April, late June and early August.

Steers of two sources were used in the 1977 grazing trial. Forty-five were raised on the research station. They had grazed small grain pasture for two months prior to the trial and were in fleshy condition at the beginning of the trial. Fifteen steers were purchased at a livestock auction on May 2; they were in thin condition and were placed directly on bermudagrass. The steers, Hereford and Hereford x Angus, were assigned to treatment groups on the basis of source, breed and weight.

All steers (Hereford and Hereford x Angus) for the 1978 trial were purchased at a livestock auction in late March. The steers were grazed on small grain pasture with limited forage until the trial began and were in thin condition at the beginning of the trial.

Daily gains were calculated from weight gains of steers that remained in the pastures throughout each grazing trial (tester steers). 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 gains, 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 steers were implanted with 15 mg of diethylstilbestrol at the beginning of each trial. Injectable Tramisol (levamisole phosphate) was given for internal parasite control on July 1, 1977 and twice in 1978 (March and July 1). Excellent fly control was achieved during each trial by spraying the steers on each weigh date and keeping dust bags in the pastures. Steers in all pastures had access to shade from trees or constructed shades. A commercial mineral supplement that contained 12 percent calcium and 12 percent phosphorus was fed free-choice during the trials.

The data were analyzed by analysis of variance. Where F values were significant ( $P < .05$ ), differences among treatment means were tested for significance ( $P < .05$ ) by Duncan's multiple range test.

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

Month	1977	1978	Long Term Average
January	0.22	0.92	1.53
February	1.16	2.63	1.46
March	2.50	1.46	2.20
April	2.23	1.85	3.16
May	8.46	7.28	5.09
June	1.90	4.59	4.58
July	3.15	0.90	3.45
August	2.88	0.53	3.19
September	1.77	0.49	3.81
Total	24.27	20.65	28.47

**Table 2. Average daily gains (ADG) of steers, total steer grazing days per acre and total gain per acre (1977 Grazing Trial)<sup>abcd</sup>**

Grazing interval	Number of days	ADG, lb <sup>e</sup>				Total steer days/acre				Total gain/acre, lb			
		Midland	Hardie	Oklan	SS-16	Midland	Hardie	Oklan	SS-16	Midland	Hardie	Oklan	SS-16
5-5 to 6-2	28	1.22	1.79	2.14	2.04	41 <sup>c</sup>	99 <sup>a</sup>	26 <sup>d</sup>	47 <sup>b</sup>	49 <sup>b</sup>	178 <sup>a</sup>	55 <sup>b</sup>	95 <sup>b</sup>
6-2 to 6-30	28	1.52	1.67	1.28	1.29	52	52	52	52	80	87	67	68
6-30 to 8-2	33	1.36	1.33	1.74	1.64	51	51	56	41	69	68	99	66
8-2 to 8-31	29	1.41	1.40	1.26	1.66	62	46	63	40	87	64	76	65
8-31 to 10-5	35	1.71	2.39	2.10	2.29	76 <sup>a</sup>	65 <sup>b</sup>	49 <sup>c</sup>	65 <sup>b</sup>	131	155	101	143
Total season	153	1.45	1.73	1.72	1.80	281 <sup>ab</sup>	313 <sup>a</sup>	246 <sup>b</sup>	244 <sup>b</sup>	416 <sup>b</sup>	552 <sup>a</sup>	398 <sup>b</sup>	437 <sup>b</sup>

<sup>abcd</sup>Means under column headings ADG, total steer days/acre and total gain/acre having no or common lettered superscripts are not significantly different ( $P > .05$ ).

<sup>e</sup>Six, 8, 6 and 5 tester steers on the Midland, Hardie, Oklan and SS-16 bermudagrass varieties, respectively. Mean  $\pm$  SEM initial weight of all tester steers was  $518 \pm 8.4$  lb.

**Table 3. Average daily gains (ADG) of steers, total steer grazing days per acre and total gain per acre (1978 Grazing Trial)<sup>abc</sup>**

Grazing interval	Number of days	ADG, lb <sup>d</sup>				Total steer days/acre				Total gain/acre, lb			
		Midland	Hardie	Oklan	SS-16	Midland	Hardie	Oklan	SS-16	Midland	Hardie	Oklan	SS-16
5-9 to 5-31	22	2.65	3.22	2.36	2.73	20 <sup>b</sup>	49 <sup>a</sup>	17 <sup>b</sup>	20 <sup>b</sup>	54 <sup>b</sup>	156 <sup>a</sup>	40 <sup>b</sup>	55 <sup>b</sup>
5-31 to 6-30	30	2.00	1.86	2.31	2.00	86 <sup>b</sup>	95 <sup>a</sup>	48 <sup>c</sup>	86 <sup>b</sup>	173	177	112	173
6-30 to 8-1	32	1.33	1.72	2.03	1.15	80 <sup>a</sup>	59 <sup>b</sup>	54 <sup>c</sup>	80 <sup>a</sup>	105	102	109	92
8-1 to 8-31	30	1.56	.94	1.83	1.33	56 <sup>a</sup>	56 <sup>a</sup>	46 <sup>b</sup>	56 <sup>a</sup>	87	52	85	75
Total season	114	1.82	1.84	2.09	1.72	242 <sup>b</sup>	259 <sup>a</sup>	165 <sup>c</sup>	242 <sup>b</sup>	419	487	347	395

<sup>abc</sup>Means under column headings ADG, total steer days/acre and total gain/acre having no or common lettered superscripts are not significantly different ( $P > .05$ ).

<sup>d</sup>Six tester steers on each of the bermudagrass varieties. Mean  $\pm$  SEM initial weight of all tester steers was  $520 \pm 6.3$  lb.

## Results and Discussion

Rainfall recorded on the station during the first nine months of 1977 and 1978, compared with the long term average, is shown in Table 1. Average daily gains of the steers, total steer grazing days per acre, and total gain per acre (by period and the total grazing season) for the 1977 and 1978 grazing trials are shown in Tables 2 and 3.

The 1977 trial was conducted from May 5 to October 5 for a total of 153 days. Average daily gains of steers grazed on the four bermudagrass varieties ranged from 1.22 to 2.39 lb during the five periods of the trial and from 1.45 to 1.80 lb for the total season. Differences among average daily gains of steers grazed on the four bermudagrass varieties, within periods or for the total season, were not significant ( $P>.05$ ).

Stocking rates (total steer days/acre) during the early summer period (May 5 to June 2) were the highest on the Hardie pastures (99 steer days) and the lowest on the Oklan pastures (26 steer days). For the remainder of the trial, stocking rates were similar among the four bermudagrass varieties except for the last period in which Midland bermudagrass supported the highest stocking rate.

Total gain per acre was much higher, during the first period of the trial, on the Hardie pastures (e.g., about 3.6-fold greater than Midland pastures). Total steer gain for the total grazing season was 552 lb per acre on the Hardie bermudagrass pastures and was greater ( $P<.05$ ) than total gains on the other pastures which were about 417 lb (mean of total gains on the other pastures).

Because of a very dry late summer, the 1978 grazing trial was terminated on August 31 after 114 days (Table 3). Average daily gains of steers during the first period (May 9 to May 31) were extremely good and ranged from 2.36 to 3.22 lb. Average daily gains for the total season range from 1.72 to 2.09 lb. As in the 1977 trial, differences among average daily gains of steers grazed on the four bermudagrass varieties, within periods or for the total season, were not significant ( $P>.05$ ).

Although stocking rates were lower during the 1978 trial than the 1977 trial, the relative differences in the first period of the trial (e.g., much higher for Hardie than the other varieties) were consistent with those of the first grazing trial. Stocking rates were the lowest on the Oklan pastures throughout the trial due to apparent winter killing of the bermudagrass.

Total steer gains (lb/acre) for the total grazing season were the greatest on the Hardie pastures (487 lb), similar on the Midland and SS-16 pastures (419 and 395 lb) and the lowest on the Oklan pastures (347 lb). Differences among total steer gains among the four bermudagrass varieties were not significant ( $P>.05$ ).

The results of these trials show that bermudagrass varieties differ markedly in amount of forage produced during various periods of the bermudagrass growing season and, therefore, in total beef production. Hardie bermudagrass was particularly impressive in these trials in regard to early forage production. Differences in carrying capacity (e.g., 41 to 76 and 20 to 86 total steer days/acre of Midland bermudagrass during the 1977 and 1978 trials) indicate that stocking rate adjustment is a critical management problem in bermudagrass stocker programs. Average daily gains of steers were very good in these trials (1.45 to 1.80 lb and 1.72 to 2.09 lb for the total grazing seasons of 1977 and 1978), and emphasize the importance of pasture management in maintaining an immature, growing forage.

## Literature Cited

Oliver, W.M. 1976. Research Report prepared for meeting of the Louisiana Forage Council.