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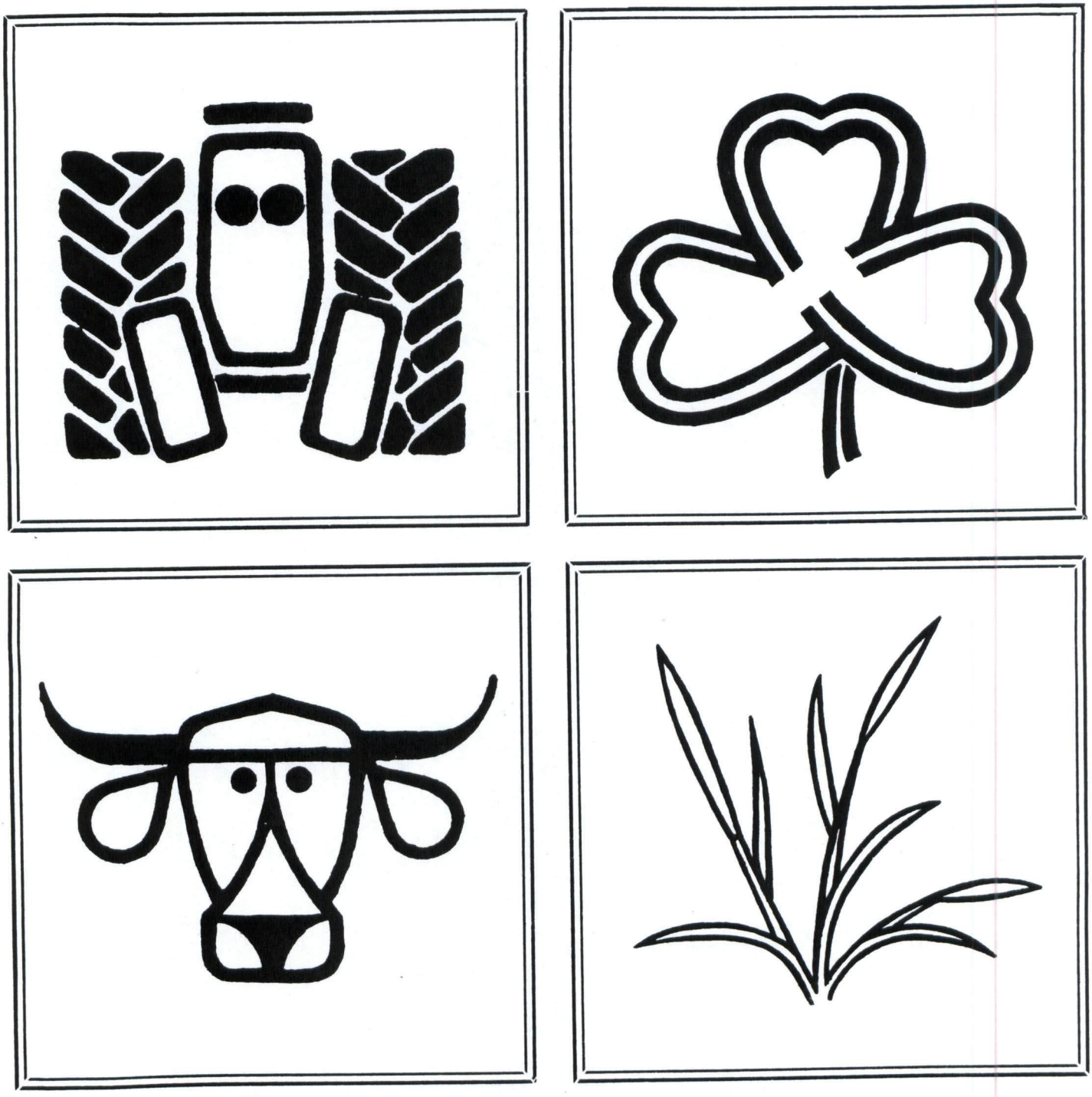

Forage Research in Texas

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Performance of Bermudagrass Hybrids and Cultivars in the Brazos River Bottom

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SUMMARY

Twenty-two new bermudagrasses and three standard cultivars were established in a replicated test in 1980. Due to weed competition and a very dry summer in 1980, some of the sources did not become well established until mid-spring 1981. Yields in 1981 reflect the slower establishment of sources such as Brazos, Tifton 44, B-11, and B-10. Several rapid starting hybrids produced more than 6 tons of forage in 1981. Yields in 1982 reflect to some extent stand damage from 5°F temperature in January. The highest yielding sources in 1982 were Coastal and B-13 with more than 10.5 tons per acre. Most of the highest quality sources were damaged by the low temperature in the 1980-81 winter. Quality was unaccountably low in 1982 with limited differences among sources except for the top four or five sources. Brazos was one of the highest quality sources that had little or no winter damage.

INTRODUCTION

Bermudagrass is the most important tame pasture grass in Texas, and Coastal is by far the most important improved cultivar in terms of total acreage. Coastal has the potential for producing high yields and is responsive to fertilization, but forage quality does not meet the requirements of some classes of cattle, especially in mid-summer.

Research in recent years has shown that forage quality in bermudagrass can be improved through breeding. Improved quality is reflected, in turn, in increased animal performance. The important characteristics of an improved bermudagrass cultivar are higher dry matter digestibility, winterhardiness, ground cover density and stand maintenance under grazing, and yield. Coastal bermudagrass is a highly productive cultivar with adequate winterhardiness for most of the state and adequate ground cover to resist common bermudagrass invasion even under intensive grazing. Thus, Coastal serves as a standard for these characteristics. The major improvement needed over Coastal is forage quality and winterhardiness for north Texas.

A study was initiated in 1980 to evaluate 22 new genotypes of bermudagrass for some of the characteristics described above.

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KEYWORDS: Bermudagrass hybrids/forage yield/forage quality/IVDMD/ winter damage.

EXPERIMENTAL PROCEDURE

Twenty-two genotypes of bermudagrass not previously evaluated in Texas were made available for study in the spring of 1980. Fourteen of these are hybrids from the USDA bermudagrass breeding program at Tifton, Georgia (Dr. G. W. Burton) and eight originated from a field where an observation nursery had been grown previously on the J. Pybas ranch near Gainesville, Texas, as types surviving two preceding severe winters.

Four rooted sprigs were planted four feet apart in the center of 6 x 20 foot plots, 4 replications, on June 4, 1980. The plot area was treated with a preemergence herbicide following sprigging, but prostrate milkweed developed and competition retarded spread and ground cover development, especially in the slow spreading genotypes.

The test was harvested five times in 1981: May 13, June 30, July 30, September 11, and November 19; and five times in 1982: May 11, June 11, July 29, September 13, and December 8. Nitrogen was applied at the rate of 60 pounds per acre in late March and following the June 30 and September 11 harvests in 1981; 100 pounds N per acre in early May and 66 pounds per acre each in June and August 1982. Forage samples were saved from each harvest except December 8, 1983, for analysis by the in vitro technique for dry matter digestibility.

RESULTS AND DISCUSSION

Yields in 1982 (Table 1) were very high for sources that were not damaged by the low temperatures in January (Table 2). The production of two sources, B-13 and Coastal, exceeded 10.5 tons of forage per acre. Seven additional sources, including Brazos, produced 9 or more tons of forage. Those sources that were most severely damaged by low temperatures in January were generally the lowest producing in 1982.

Total yields for each of the two years are shown in Table 2 along with the winter damage ratings. The average yields are not very meaningful because some of the sources were slow starting and had low yields in 1981 but high yields in 1982 (e.g., Brazos and B-11); while some of the sources started rapidly, producing high yields in 1981, but were winter damaged and produced low yields in 1982 (e.g., B-3, B-4, and B-9). While rapid production of a ground cover is an important characteristic, it is less important than low temperature tolerance and the ability to persist under close grazing. Many of the open-sod types such as Callie (not included in this test) will produce a very rapid ground cover but do not persist under close grazing. Also many of the open-sod types have good forage quality but are not winter hardy enough to persist in central and north Texas.

Forage quality evaluations (in vitro dry matter digestibility) are given in Table 3. Four Burton hybrids had average digestibilities above 60 percent in 1981, each exceeding Brazos in average digestibility. However, winter damage ranged from 70 to 85 percent on these hybrids in the 1982-83 winter. B-14 had about the same average digestibility

as Brazos, and produced an average of one ton more forage than Brazos. However, the higher production was because of a more rapid start. Its yield in 1982 was 1.6 tons less than Brazos.

Forage quality was low in 1982, averaging 6 digestibility units below 1981. Forage harvested on June 11 was 30 days old and averaged 56 percent digestibility. The other three harvests averaged 47 to 51 percent digestibility. Growth harvested on July 29 and September 13 was approximately 7 weeks old which may have been a factor in the low digestibility on those dates. Average digestibility on May 11 was only 51 percent and while some of the material on that date could have been 6 weeks old spring forage of that age should have been higher in digestibility than the recorded levels. We cannot account for the generally low digestibilities encountered in 1982.

P.8 is a little higher in IVDMD than any other P source. Its yield was more than a ton below the best P sources. The P sources have the advantage of excellent winter hardiness and generally good yield. However, forage quality is not superior to Brazos. Brazos produced almost as much forage as coastal after the first year and had an average digestibility 3 units higher than Coastal though there was no difference in 1982.

Table 1. Forage yield of bermudagrass hybrids, Brazos River bottom near College Station, 1982.

Hybrid or cultivar	pounds of dry forage per acre					
	May 11	June 11	July 29	Sept 13	Dec 8	Total
13 B-13	3103	4825	4038	5686	3681	21,333a[1]
23 Coastal	3354	4017	5185	5299	3438	21,293a
15 P-1	2657	4800	4117	5126	2745	19,445ab
25 Brazos	3088	4197	3841	4689	3337	19,152b
21 P-7	2764	4198	3776	4776	2964	18,478bc
18 P-4	2480	4782	3028	5067	2706	18,063bc
16 P-2	2851	4137	3087	5268	2677	18,020bc
11 B-11	2657	3173	4881	4631	2626	17,969bcd
6 B-6	1882	3727	3409	5197	3714	17,929bcd
10 B-10	2752	4242	3128	5519	2240	17,881bcd
17 P-3	2708	4152	3069	4743	2847	17,519bcde
22 P-8	3437	3067	3462	4424	3038	17,428bcde
12 B-12	1929	3505	3365	5106	3350	17,255cde
24 Tifton 44	2892	2678	3968	4885	2569	16,992cde
14 B-14	1985	3549	2872	4348	3296	16,050def
20 P-6	2506	3606	2659	4188	2958	15,917def
7 B-7	2061	3170	2832	4058	3781	15,902def
19 P-5	2466	3962	2583	4157	2036	15,204efg
8 B-8	2554	2699	3098	3777	2655	14,783efgh
1 B-1	2894	967	3014	4125	3769	14,769efgh
2 B-2	2251	1389	2169	3700	4194	13,703fgh
9 B-9	1805	1514	3016	3958	3202	13,495fgh
4 B-4	1829	2235	2398	3443	3424	13,329gh
3 B-3	1433	2331	2266	3818	3106	12,954h

[1] Total yield values followed by a common letter are not significantly different at the 0.05 level.

Table 2. Average forage yield and spring recovery of bermudagrass hybrids, Brazos River bottom near College Station, 1981-82.

Hybrid or cultivar	Tons of dry forage per acre 1981	1982	Avg.	winter damage 1=0 to 10=dead
13 B-13	8.3	10.7	9.5 a[1]	4.3
15 P-1	8.2	9.7	9.0 ab	1.3
21 P-7	8.7	9.2	9.0 ab	1.8
6 B-6	8.6	9.0	8.8 ab	6.0
23 Coastal	6.5	10.6	8.6 abc	4.0
16 P-2	8.0	9.0	8.5 abc	1.3
17 P-3	8.0	8.8	8.4 abc	1.3
12 B-12	7.9	8.6	8.3 abcd	5.3
18 P-4	7.2	9.0	8.1 abcde	1.3
14 B-14	8.0	8.0	8.0 abcdef	4.0
7 B-7	7.7	8.0	7.9 bcdef	5.3
1 B-1	8.2	7.4	7.8 bcdef	8.5
19 P-5	7.7	7.6	7.7 cdef	1.3
22 P-8	6.5	8.7	7.6 cdef	2.8
20 P-6	6.9	8.0	7.5 def	2.3
10 B-10	5.4	8.9	7.3 efgh	2.5
9 B-9	7.7	6.7	7.2 defg	7.8
4 B-4	7.2	6.7	7.0 fghi	5.8
25 Brazos	4.3	9.6	7.0 fghi	4.3
3 B-3	7.0	6.5	6.8 ghi	7.0
8 B-8	6.2	7.4	6.8 ghi	7.5
11 B-11	4.0	9.0	6.5 hi	5.0
2 B-2	5.7	6.9	6.3 hi	7.8
24 Tifton 44	1.9	8.5	5.2 i	2.0

[1] Average values followed by a common letter are not significantly different at the 0.05 level.

Table 3. Average forage digestibility (IVDMD) of bermudagrass cultivars and hybrids, 1981-82.

No.	Cultivar or hybrid	% IVDMD 1981	1982	Average
3	B-3	61.9 a[1]	56.8 0	59.4 a
2	B-2	62.0 a	55.2 ab	58.6 ab
9	B-9	60.1 abc	55.4 ab	57.8 ab
1	B-1	60.3 ab	53.9 abc	57.1 bc
4	B-4	59.2 bcde	52.4 bcd	55.8 cd
6	B-6	58.0 def	52.7 bc	55.4 cde
8	B-8	58.5 bcde	51.8 cde	55.2 def
25	Brazos	59.6 bcd	49.2 def	54.4 defg
10	B-10	58.0 def	50.1 def	54.1 efgh
12	B-12	56.9 fghi	51.0 cdef	54.0 efgh
14	B-14	57.6 defg	50.0 def	53.8 efgh
7	B-7	56.5 fghi	50.5 def	53.5 fghi
22	P-8	56.5 fghi	50.8 def	53.7 efghi
24	Tifton 44	57.1 efgh	49.8 def	53.5 fghi
13	B-13	56.7 fghi	49.9def	53.3 fghi
19	P-5	56.0 ghij	50.1 def	53.1 ghij
20	P-6	55.9 ghij	49.2 def	52.6 ghij
16	P-2	55.9 ghij	49.2 def	52.6 ghij
15	P-1	55.9 ghij	49.0 ef	52.5 ghij
17	P-3	54.7 ij	49.9 def	52.3 hij
18	P-4	55.2 hij	49.2 def	52.2 hij
11	B-11	54.8 ij	48.8 ef	51.8 ij
23	Coastal	54.1 j	48.5 ef	51.3 j
21	P-7	54.1 j	48.2 f	51.2 j

[1] Values within a column followed by a common letter are not significantly different at the 0.05 level.