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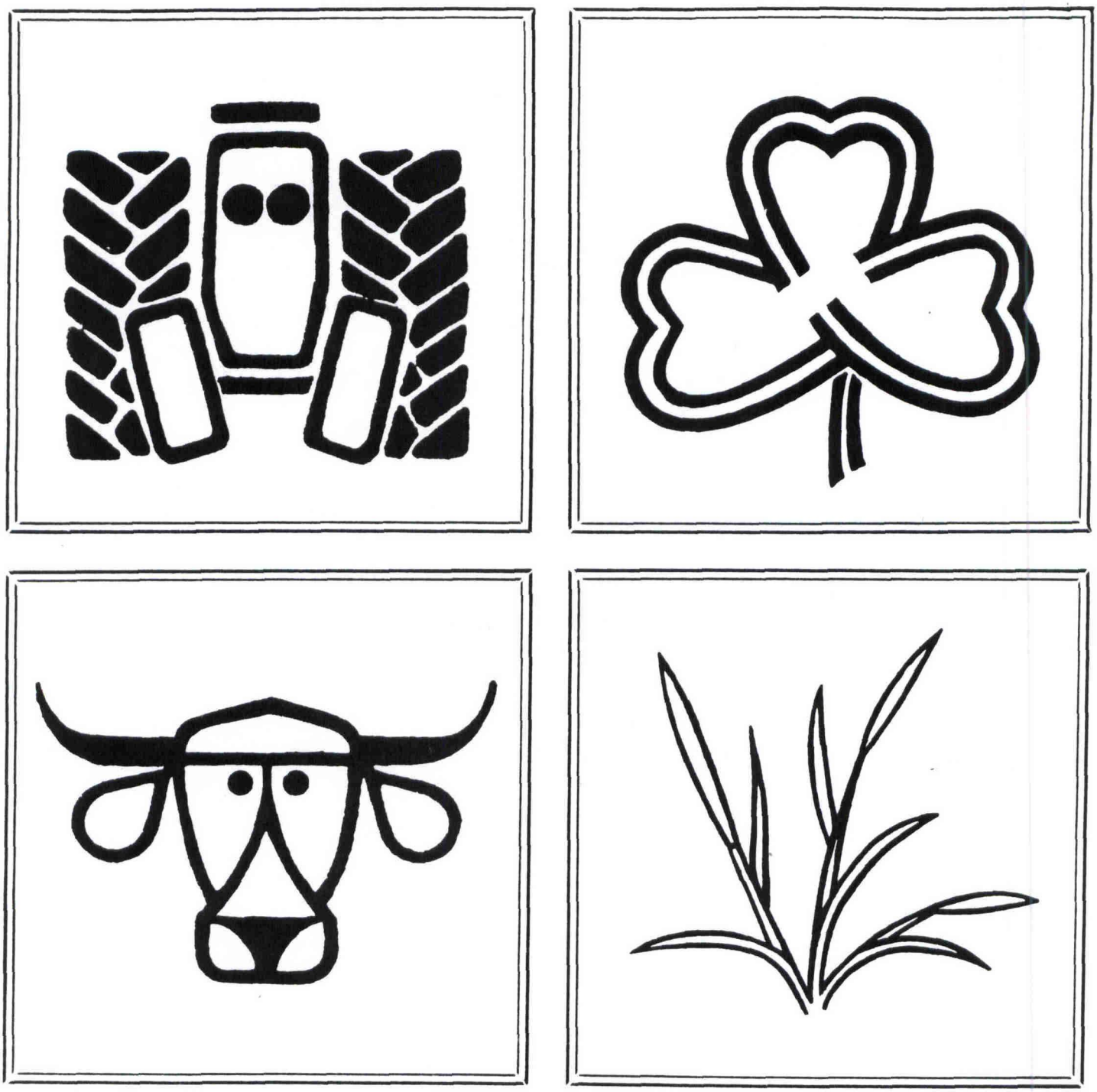

Forage Research in Texas

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Performance of Bermudagrass Hybrids and Cultivars in the Brazos River Bottom, 1981-1983

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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 Pybas-1, Brazos and B-13 with more than 9.5 tons per acre. B-11 and B-13 exceeded 9 tons per acre in 1983. Most of the highest quality sources were damaged by the low temperature in the 1981-82 winter and did not recover sufficiently to be among the highest yielding sources. Brazos and Pybas-8 were among the sources showing the best combinations of quality, winter survival and yield.

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, winter hardiness, 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

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grazing. Thus, Coastal serves as a standard for these characteristics. The major improvement needed over Coastal is forage quality and winter hardiness for North Texas.

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

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; five times in 1982: May 11, June 11, July 29, September 13, and December 8; and five times in 1983: May 8, June 16, July 26, August 23 and October 7. 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; and 100 pounds N per acre each on April 29, 1981 and 1982 and June 27, 1983. Forage samples were saved from each harvest except December 8, 1982, for analysis by the in vitro technique for dry matter digestibility.

RESULTS AND DISCUSSION

The production yields in 1983 (Table 1) of two sources, B-13 and B-11, exceeded 9 tons of forage per acre and five additional sources exceeded 8 tons per acre.

Total yields for each of the three years are shown in Table 2 along with the winter damage ratings. The average yields are not very meaningful for the reasons that some of the sources were slow starting and had low yields in 1981 but high yields in 1982 (e.g. Brazos, Tifton, 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. Two Burton hybrids had average digestibilities for 9 harvests of above 60 percent, each exceeding Brazos in average digestibility. However, winter damage was more than 70 percent on these hybrids in the 1981-82 winter. Brazos had the highest digestibility among sources sustaining relatively little winter damage in 1981-82.

The results of this experiment typify the problems inherent in improving bermudagrass. The more robust (large stems and wide leaves) stoloniferous types produce a more rapid ground cover but with less density, and generally have higher quality forage than the finer-stemmed types. Also, the robust, more rapid spreading and less winter hardy types generally have higher forage quality than the finer denser types. Brazos bermudagrass, released in 1982, represents a compromise in most of these characteristics. It has higher quality and slightly better low temperature survival than Coastal but produces a ground cover no more rapidly than Coastal. There are a number of hybrids that spread much more rapidly and have much higher quality but lack low temperature survival and ground cover density. Even though they are severely damaged in some winters they may produce as much forage as Coastal because of rapid stand recovery in the absence of competition. However, they are subject to invasion by Common bermudagrass when stands are thinned by winter damage or by close grazing. There are other types that produce a rapid cover and are winter hardy but do not possess the desired forage quality.

Additional hybrids are being developed with the objective of combining the desired characteristics of coed hardiness, rate of spread, quality, ground cover density and yield.

Table 1. Performance of bermudagrass cultivars (1980) at College Station, 1983

	Cultivar	Date of Harvest: May 9	June 16	July 26	Aug 23	Oct 7	Total
		pounds of dry forage per acre					
13	Burton 13	2461	3552 a-b	6123 a	3378 b-c	2866 a-d	18380 a
11	Burton 11	3252	3235 a-c	5992 a-b	2817 b-c	3022 a-c	18318 a
22	Pybas 8	2630	29586 e	3937 c-f	4508 a	2761 a-e	16794 a-b
7	Burton 7	2262	3073 a-d	4702 a-e	3788 a-b	2919 a-d	16744 a-c
24	Tifton 44	3264	3067 a-d	4409 b-f	3596 a-c	2306 b-f	16642 a-c
25	Brazos	2828	2713 b-e	5350 a-d	3238 b-e	2262 c-g	16391 a-d
15	Pybas 1	2364	3152 a-d	5244 a-e	3111 b-e	2433 a-e	16304 a-d
21	Pybas 7	2168	4273 a	3985 c-f	5292 b-c	2147 c-g	15865 a-d
9	Burton 9	1686	2353 b-f	5370 a-d	3322 b-c	3010 a-c	15741 a-d
8	Burton 8	2979	2779 b-e	5187 a-e	3220 b-c	1418 g-h	15583 a-d
16	Pybas 2	2066	3457 a-c	4484 a-e	3138 b-c	2164 c-g	15309 b-e
18	Pybas 4	2284	3090 a-d	4415 a-e	3315 b-c	2164 c-g	15268 b-e
23	Coastal	2598	2815 b-e	3846 d-f	2899 b-c	3010 a-c	15168 b-e
10	Burton 10	2340	2736 b-e	5674 a-c	2862 b-c	1322 h	14934 b-e
20	Pybas 6	2026	2863 b-e	4221 b-e	2465 a-e	2465 a-e	14499 b-e
17	Pybas 3	2236	3147 a-d	4024 c-f	2953 b-c	2015 d-h	14375 b-f
19	Pybas 5	2004	2763 b-e	4138 c-f	3040 b-c	2380 b-f	14325 b-f
1	Burton 1	1418	1718 e-f	3940 c-f	3478 a-c	3400 a	13954 c-g
14	Burton 14	2270	2209 d-f	4283 b-f	3221 b-c	1874 e-h	13857 c-g
4	Burton 4	2145	2344 c-f	3830 d-f	2934 b-c	2500 a-e	13753 d-g
12	Burton 12	1690	1911 d-f	5353 a-d	2914 b-c	1733 f-h	13601 d-g
6	Burton 6	1502	2537 b-f	5266 a-e	2600 b-c	1585 f-h	13490 e-g
5	Burton 5	2596	1354 f	2665 f	3048 b-c	3250 a-b	12715 f-g
2	Burton 2	2074	1748 e-f	3470 e-f	2564 c	2732 a-e	12588 f-g
3	Burton 3	2156	2231 c-f	3774 e-f	2481 c	1548 f-h	12198 g

Values in the same column with a common letter are not significantly different at the 0.05 level.

Table 2. Forage yield and winter survival of bermudagrass cultivars (1980), College Station, 1981-83

	Cultivar	Year				1981-82 Winter Damage
		1981	1982	1983	Average	
		tons of dry forage per acre				1=least
13	Burton 13	8.3	9.6	9.2	9.4 a	4.3
15	Pybas 1	8.2	9.7	8.2	8.7 a-b	1.3
21	Pybas 7	8.7	9.2	7.9	8.6 a-b	1.8
16	Pybas 2	8.0	9.0	7.2	8.2 a-c	1.3
23	Coastal	6.5	10.6	7.6	8.2 a-c	4.0
6	Burton 6	8.6	9.0	6.7	8.1 b-c	6.0
7	Burton 7	7.8	8.0	8.4	8.1 b-d	5.3
18	Pybas 4	7.2	9.0	7.6	7.9 b-e	1.3
17	Pybas 3	8.0	8.8	7.2	7.9 c-e	1.3
22	Pybas 8	6.5	8.7	8.4	7.8 c-f	2.8
12	Burton 12	7.8	8.6	6.8	7.7 c-f	5.3
14	Burton 14	8.0	8.0	6.9	7.6 c-f	4.0
19	Pybas 5	7.7	7.6	7.2	7.5 d-g	1.3
1	Burton 1	8.2	7.4	7.0	7.5 d-g	8.5
9	Burton 9	7.7	6.7	7.9	7.4 d-g	7.8
25	Brazos	4.3	9.6	8.2	7.4 d-h	4.3
20	Pybas 6	6.9	8.0	7.2	7.4 d-h	2.3
11	Burton 11	4.0	9.0	9.2	7.4 d-h	5.0
10	Burton 10	5.3	8.9	7.5	7.2 e-h	2.5
8	Burton 8	6.2	7.4	7.8	7.1 f-h	7.5
4	Burton 4	7.2	6.6	6.9	6.9 f-h	5.8
3	Burton 3	7.0	6.5	6.1	6.5 g-h	7.0
24	Tifton 44	1.9	8.5	8.3	6.1 h	2.0
2	Burton 2	5.7	6.9	6.3	6.3 g-h	7.8

Average values with a common letter are not significantly different at the 0.05 level.

Table 3. Dry matter digestibility of bermudagrasses at College Station 1981-82

	Hybrid or	Date of Harvest									
		1981					1982				
	Cultivar	5/13	6/30	7/30	9/11	11/19	5/11	6/11	7/29	9/13	Average
		% IVDDM									
3	B-3	63.2	65.1	58.7	66.9	55.6	59.0	63.8	60.1	58.8	61.2 a
2	B-2	65.2	64.6	59.1	65.9	55.4	54.6	62.5	61.8	58.4	60.8 a
9	B-9	62.0	60.8	53.5	65.8	52.9	57.4	69.4	60.5	54.8	59.7 a-b
1	B-1	64.1	64.5	53.7	62.4	54.3	55.8	67.4	57.8	55.5	59.4 a-b
4	B-4	64.4	62.7	57.0	62.0	52.2	50.8	62.0	58.5	56.5	58.4 a-c
6	B-6	62.5	59.6	52.8	63.7	50.0	56.2	62.7	56.4	53.4	57.5 b-c
8	B-8	63.5	62.5	50.9	58.8	53.2	52.6	65.1	54.2	55.1	57.3 b-d
25	Brazos	65.0	67.7	50.4	62.0	52.0	50.2	61.6	53.3	49.1	56.8 b-c
10	B-10	64.1	59.6	51.3	60.2	51.2	49.2	62.6	55.2	50.1	55.9 c-e
22	P-8	62.3	59.8	52.7	60.0	45.9	50.7	64.5	56.0	52.7	55.8 c-e
13	B-13	57.4	58.4	50.9	63.8	49.2	52.0	59.1	53.7	54.7	55.5 c-e
12	B-12	58.6	58.1	52.0	60.2	50.3	51.4	61.1	56.4	51.2	55.4 c-e
7	B-7	60.4	59.7	52.9	61.3	47.6	49.3	58.7	55.2	53.7	55.4 c-e
14	B-14	61.5	58.2	51.2	64.3	48.8	52.2	60.7	51.7	50.4	55.2 c-e
24	Tifton 44	65.7	60.2	50.3	58.8	51.4	51.0	60.0	52.3	50.1	55.1 c-e
16	P-2	62.2	56.9	53.0	61.0	47.8	49.9	58.7	51.2	54.2	55.0 c-e
20	P-6	62.0	58.5	54.5	61.9	42.4	48.7	60.9	53.9	51.9	55.0 c-e
19	P-5	61.0	57.5	50.2	61.7	46.8	49.3	59.7	55.2	52.0	54.8 c-e
18	P-4	60.1	56.5	53.2	62.0	47.3	49.2	62.2	54.2	48.2	54.8 c-e
15	P-1	59.8	56.0	53.8	61.1	48.6	47.0	61.4	52.9	51.9	54.7 d-e
11	B-11	62.4	56.0	50.2	56.0	51.1	49.8	64.1	51.8	49.2	54.6 d-e
17	P-3	58.6	56.2	53.3	58.0	49.5	51.4	58.4	52.5	51.9	54.4 d-e
23	Coastal	60.2	54.6	48.2	57.1	49.3	51.7	58.1	53.4	48.0	53.5 e
21	P-7	60.5	54.6	51.1	58.7	46.6	47.3	56.8	53.1	52.4	53.5 e

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