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The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, Cook College, Rutgers University in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. Through this forum, these professionals also reach a more general audience, which includes the public. Articles appearing in these proceedings are divided into two sections.

The first section includes lecture notes of papers presented at the 1998 New Jersey Turfgrass Expo. Publication of the New Jersey Turfgrass Expo Notes provides a readily available source of information covering a wide range of topics. The Expo Notes include technical and popular presentations of importance to the turfgrass industry.

The second section includes research papers containing original research findings and reviews covering selected subjects in turfgrass science. The primary objective of this section is to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

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Dr. Ann B. Gould, Editor
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SURVIVAL OF WARM-SEASON GRASSES IN NEW JERSEY

Gwyneth A. Mansue, William A. Meyer, and William K. Dickson[1]

Warm-season turfgrasses are species adapted to favorable growth during warm portions (80 to 95°F) of the growing season (Turgeon, 1996). These grasses are most suitable for regions in the United States that are considered tropical and subtropical, but they are also capable of growing in the Transition zone.

The Transition zone is the area between the subtropical and temperate climates, including the climate of New Jersey. Some warm-season species do not perform as well as other species in northern climates because of a low survival rate. The cold winters that often occur in New Jersey can cause damage to the turf, which leads to decline or even death. When temperatures drop below 32°F (0°C), direct low temperature kill can occur in some species. Direct low temperature kill involves the death of turfgrasses as a result of ice crystal formation internally within the tissues (Beard et al., 1991). To survive the winters in the Transition zone, warm-season grasses go dormant after the first hard frost and usually green up in the late spring.

Buffalograss is a native prairie grass that can be used for low maintenance lawns. It spreads by stolons, but is not as aggressive as bermudagrass or centipedegrass. Buffalograss begins to grow in mid to late May and begins to go dormant with the first freeze (deShazer et al., 1992). It performs best under extreme conditions such as very hot summers and cold winters. It does not perform well in humid climates and when there are mild winters because the grass does not become completely dormant.

Bermudagrass is a warm-season grass that thrives during hot weather and rapidly spreads through vigorous stolon growth and rhizomes. It has a prostrate growth habit that can be very aggressive when grown under warm to hot conditions. Common bermudagrass (*Cynodon dactylon*) and African bermudagrass (*C. transvaslensis*) are the two commonly planted species. African bermudagrass is much finer leafed then common bermudagrass.

The *Zoysia* genus is indigenous to Pacific-Rim countries ranging from 50°N latitude in northern China southward to New Zealand (Watson and Dallwitz, 1992). Zoysiagrass species have been collected from a wide range of environmental conditions and can be used in many growing situations. These grasses, which have both rhizomes and stolons, are adapted to low maintenance turf, not requiring heavy fertilization or frequent irrigation. Compared to most other warm-season grasses, the *Zoysia* genus is fairly cold tolerant.

Centipedegrass was introduced into the United States in 1916 from China. It is a medium-textured, stoloniferous, warm-season, perennial grass with a prostrate growth habit and slow vertical shoot growth rate. Centipedegrass does not grow any farther north than the state of Georgia. One selection from Cherry Hill, NJ has survived in a turf trial at North Brunswick, New Jersey, however, for nearly sixteen years.

PROCEDURES

Cultivars and Selections

In the spring of 1983, a warm-season grass test was planted in North Brunswick, NJ that contained bermuda, zoysia, and centipede grasses (Table 1). The grasses were all collec-

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tions that had the potential to become turf type cultivars. Many of the names of the collections are from the areas in which they were found, such as Cherry Hill 5 and Ozark 1. All selections in this trial were grown in the greenhouse before transplanting as 6 inch plugs to 6 X 6 ft plots. Each selection was replicated twice. At this time, an additional bermudagrass test was established, also in North Brunswick (Table 2). Vegetative sprigs of bermudagrass cultivars and experimental selections were planted to 10 X 10 ft plots in a replicated, random design.

A zoysiagrass trial planted in September 1991 in North Brunswick, NJ included the National Turfgrass Evaluation Program (NTEP) for that year in addition to a few experimental selections (Table 3). The entries were randomly replicated throughout the trial. A buffalograss trial was also established that same year (Table 4). This trial contained experimental selections and the NTEP entries for that year. Seeded entries were sown into the plots, and vegetatively propagated plants were planted as plugs.

All tests were rated periodically for turf quality (color, leaf texture, density, uniformity, and damage due to insects and diseases), spring green-up, and color on a 1 to 9 scale where 9 represents the most favorable turf characteristic. Plots were also evaluated for percent turf cover.

Management

Turf trials throughout the years have been managed under low maintenance conditions (Table 5). The tests were irrigated at establishment and then approximately 2.5 times a year for the past 7 to 15 years. No preemergence herbicides were used after establishment; 2,4-D was used twice to control broadleaf weeds.

RESULTS AND DISCUSSION

Many of the grasses planted in these trials did not survive the environmental conditions of New Jersey. From the 1983 bermudagrass trial (Table 2), it is obvious that many entries did not adapt to the Transition zone environment. Midiron is an adapted bermudagrass cultivar that did withstand New Jersey growing conditions. It survived in its own plot and grew into adjacent plots where the planted entry did not survive. Experimental grasses such as 289918 and 290905 did not survive; they probably did not become fully dormant and were killed when cells within the plants froze.

Entries in the warm-season grasses trial planted in 1983 (Table 1) with the high quality ratings are the ones that are more persistent. Note that the percent cover rating recorded in 1998 may have been biased due to the inability to distinguish between plots where enries grew into adjacent plots. Several centipedegrass entries performed fairly well considering that this grass is not normally grown north of the state of Georgia.

Zoysiagrass species grow fairly well in the Transition zone in New Jersey. Except for the last five entries, most of the zoysiagrass entries planted in the 1991 trial are still actively growing, and there are significant differences in average total turf quality (Table 3). Turf cover in most of the zoysiagrass plots was greater than 55% (Table 3); on the other hand, turf cover in the Bermudagrass (Table 2) and buffalograss (Table 4) trials was less than 30% and 31%, respectively.

On the whole, the national buffalograss test planted in 1991 (Table 4) has done poorly compared to the other trials evaluated. Many of the entries did not survive or covered only a small proportion of the plots. The entries that did survive were of poor quality and had lower quality averages than cultivars or selections in the other three tests.

SUMMARY

In comparison, of the cultivars and experimental selections evaluated in this study, zoysiagrass species appear to have the ability to withstand New Jersey environmental conditions. Buffalograsses entries did not adapt well to this climate, and of the bermudagrasses evalu-

ated, only Midiron had the ability to consistently persist. If a warm-season grass is required for a turf situation in New Jersey, zoysiagrass appears to be the best choice.

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Table 1. Performance of cultivars and selections in a warm-season grasses turf trial established in spring of 1983 at North Brunswick, NJ.

	Cultivar or Selection	Turf Quality[1] 1983-1998 Avg.	Turf Quality[1] 1987 Avg.	Turf Quality[1] May 1998	Spring Green-up[2] May 1987	Spring Green-up[2] May 1989	Cover (%) 1998	Color[3] 1987
				ZOYSIAGRASS				
1	FZ 102	6.3	6.2	6.5	5.0	3.5	90.0	5.0
2	Cherry Hill5	6.3	6.5	6.0	7.0	7.0	95.0	6.0
3	FZ 21	6.1	6.2	6.0	5.5	3.0	90.0	5.0
4	Cherry Hill3	5.8	6.5	5.0	6.0	7.0	85.0	6.0
5	Cherry Hill4	5.8	6.5	5.0	6.0	8.0	90.0	6.0
6	FZ 32	5.6	6.2	5.0	5.5	4.5	87.5	5.0
7	FZ 21	5.5	6.0	5.0	5.0	4.0	90.0	6.0
8	Meyer	5.4	6.3	4.5	8.0	8.5	80.0	6.5
9	Ozark 1	5.3	6.0	4.5	7.0	6.5	85.0	6.5
10	FZ 28	5.3	4.5	6.0	5.0	3.0	96.0	5.0
11	FZ 32	5.3	5.5	5.0	4.0	3.0	90.0	5.0
12	Meyer	5.3	6.5	4.0	6.0	6.0	65.0	5.0
13	Cherry Hill2	5.3	5.5	5.0	6.0	6.0	85.0	5.0
14	Audobon3	5.3	5.5	5.0	6.0	7.0	85.0	6.0
15	Ozark 4	5.0	6.0	4.0	6.5	7.5	87.5	6.5

(Continued)

Table 1 (continued).

	Cultivar or Selection	Turf Quality[1] 1983-1998 Avg.	Turf Quality[1] 1987 Avg.	Turf Quality[1] May 1998	Spring Green-up[2] May 1987	Spring Green-up[2] May 1989	Cover (%) 1998	Color[3] 1987
				ZOYSIAGRASS (continued)				
16	Mori 130	5.0	5.0	5.0	5.0	4.0	82.5	3.5
17	Ozark 2	5.0	6.0	4.0	7.0	7.0	80.0	6.0
18	Calgary Cem	5.0	6.0	4.0	8.0	6.0	55.0	6.0
19	GW Cem1	4.9	5.8	4.0	7.0	7.5	77.5	6.0
20	Ozark 7	4.9	5.8	4.0	7.0	8.5	82.5	6.5
21	Ozark 6	4.9	5.8	4.0	6.5	7.0	85.0	6.0
22	Mori 118	4.8	4.2	5.5	4.0	3.0	85.0	6.0
23	GW Cem 3	4.8	5.5	4.0	7.5	8.5	80.0	5.5
24	Emerald	4.8	5.0	4.5	4.5	2.5	75.0	6.5
25	Cherry Hill1	4.8	5.5	4.0	6.0	6.0	70.0	6.0
26	GW Cem 6	4.7	5.3	4.0	7.0	7.5	85.0	5.5
27	Ozark 5	4.7	5.8	3.5	7.0	7.0	80.0	6.0
28	GW Cem 5	4.7	5.8	3.5	7.0	8.0	82.5	6.0
29	Ozark 3	4.7	6.3	3.0	7.0	8.0	70.0	6.0
30	Auburn	4.7	5.8	3.5	6.5	1.5	62.5	7.0
31	GW Cem 8	4.6	6.2	3.0	7.5	7.5	60.0	5.5
32	Odessa Del Cem	4.6	5.7	3.5	7.0	7.0	75.0	7.0
33	GW Cem 4	4.6	5.2	4.0	6.5	7.0	85.0	6.0
34	Bel ZN F1	4.5	6.0	3.0	6.5	8.0	57.5	6.5
35	278 Mori 128	4.4	3.8	5.0	4.5	3.0	77.5	5.5

(Continued)

Table 1 (continued).

	Cultivar or Selection	Turf Quality[1] 1983-1998 Avg.	Turf Quality[1] 1987 Avg.	Turf Quality[1] May 1998	Spring Green-up[2] May 1987	Spring Green-up[2] May 1989	Cover (%) 1998	Color[3] 1987
				ZOYSIAGRASS (continued)				
36	Indyk Fine	4.3	5.0	3.5	6.0	4.5	77.5	5.5
37	218 Busey 1753	4.3	5.0	3.5	3.0	3.0	77.5	4.5
38	GW Cem 7	4.3	5.0	3.5	7.5	7.5	70.0	5.5
39	FZ 93	4.2	4.8	3.5	7.0	7.0	47.5	6.0
40	Midwest	4.2	4.3	4.0	5.5	4.5	80.0	5.5
41	20 Mori 129	4.0	4.5	3.5	6.5	3.5	85.0	6.0
42	Mori 173	3.9	4.8	3.0	7.0	8.5	77.5	5.5
43	FZ 26	3.9	4.3	3.5	5.0	6.5	70.0	4.5
44	FZ 24	3.9	4.8	3.0	4.0	3.0	72.5	5.5
45	FZ 129	3.9	4.8	3.0	6.5	4.5	85.0	5.5
46	BV 21	3.9	4.8	3.0	7.0	8.5	57.5	5.0
47	GW Cem 2	3.8	4.7	3.0	7.0	7.0	82.5	5.5
48	FZ 81	3.8	4.0	3.5	3.5	3.5	77.5	4.5
49	Mori 181	3.8	4.5	3.0	7.5	7.0	72.5	6.5
50	FZ 30	3.8	5.0	2.5	4.5	3.0	77.5	5.0
51	FZ 89	3.8	5.0	2.5	7.5	8.0	60.0	5.5
52	Belair	3.8	6.5	1.0	8.0	7.5	30.0	6.0
53	FG RT	3.8	5.0	2.5	8.5	8.5	47.5	6.0
54	41-21	3.7	5.8	1.5	7.0	7.5	45.0	5.0
55	FZ 82	3.6	4.2	3.0	6.5	7.5	75.0	5.5

(Continued)

Table 1 (continued).

	Cultivar or Selection	Turf Quality[1] 1983-1998 Avg.	Turf Quality[1] 1987 Avg.	Turf Quality[1] May 1998	Spring Green-up[2] May 1987	Spring Green-up[2] May 1989	Cover (%) 1998	Color[3] 1987
				ZOYSIAGRASS (continued)				
56	Mori 122	3.6	4.7	2.5	5.0	4.5	60.0	4.0
57	FZ 28	3.6	4.2	3.0	4.5	4.0	77.5	5.0
58	FZ 2	3.6	4.2	3.0	4.5	3.5	65.0	5.0
59	FZ 108	3.6	4.7	2.5	4.5	4.5	62.5	6.0
60	Mori 124	3.5	4.0	3.0	4.0	3.0	72.5	5.0
61	FZ 91	3.4	4.3	2.5	5.0	4.5	75.0	5.0
62	FZ 107	3.3	3.5	3.0	3.5	3.5	70.0	5.5
63	Mori 169	3.2	3.8	2.5	6.5	7.5	70.0	5.0
64	FZ 80	3.2	2.8	3.5	3.0	2.5	82.5	4.0
65	Busey 1829	3.2	4.3	2.0	3.5	2.0	65.0	6.0
66	FZ 15	3.0	3.5	2.5	4.0	3.5	72.5	5.0
67	Mori 128	3.0	4.0	2.0	3.0	1.0	45.0	5.0
68	Mori 184	2.8	3.7	2.0	5.0	6.5	65.0	3.5
69	FZ 107	2.3	3.5	1.0	3.0	2.0	30.0	6.0

(Continued)

Table 1 (continued).

	Cultivar or Selection	Turf Quality[1] 1983-1998 Avg.	Turf Quality[1] 1987 Avg.	Turf Quality[1] May 1998	Spring Green-up[2] May 1987	Spring Green-up[2] May 1989	Cover (%) 1998	Color[3] 1987
	BERMUDAGRASS							
1	Arlington Cem5	5.5	5.0	6.0	4.0	3.0	90.0	6.0
2	Cherry Hill 1	5.3	5.5	5.0	4.0	2.0	85.0	5.0
3	Arlington Cem4	4.5	5.0	4.0	5.0	3.0	85.0	3.0
4	Arlington Cem2	3.5	6.0	1.0	7.0	5.0	35.0	5.0
5	Arlington Cem3	3.5	4.0	3.0	4.0	2.0	60.0	6.0
6	Cherry Hill 3	3.3	5.5	1.0	5.0	3.0	20.0	6.0
7	Cherry Hill 2	2.8	4.5	1.0	3.0	3.0	30.0	6.0
8	Cherry Hill 4	2.5	4.0	1.0	3.0	2.0	30.0	6.0
9	Arlington Cem1	2.3	3.5	1.0	2.0	5.0	40.0	6.0
10	Clearview GC	2.0	3.0	1.0	4.0	1.0	30.0	6.0
	CENTIPEDEGRASS							
1	Miller	3.1	3.5	2.7	4.3	2.3	56.7	6.0
2	Cherry NJ 1	3.0	3.3	2.7	6.3	2.0	48.3	6.0
3	AU Contennial	2.9	3.7	2.0	6.0	2.7	46.7	5.3
	LSD at 5% =	2.7	1.1	2.0	2.2	2.2	23.0	1.2

[1]9 = best turf quality
[2]9 = most actively growing
[3]9 = darkest turf

Table 2. Performance of bermudagrass cultivars and selections in a turf trial established in spring of 1983 at North Brunswick, NJ.

		Turf Quality[1]					Spring Green-up[2]								
	Cultivar or Selection	1984-1998 Avg.	Sept. 1984	June 1986	1987 Avg.	July 1998	1984-1998 Avg.	May 1984	May 1985	April 1986	May 1987	May 1989	Color[3] 1987	Cover (%) 1984	Cover (%) 1998
1	Midiron	6.9	7.0	8.5	6.3	6.5	6.1	5.5	8.5	6.5	5.0	5.0	6.0	50.0	100.0
2	Vamont	6.3	8.0	7.5	5.8	4.5	5.9	6.0	7.5	6.0	7.0	3.0	4.0	45.0	45.0
3	Clone 300 Beltsville	6.3	5.5	8.5	6.5	4.5	6.7	6.0	7.5	7.0	6.5	6.5	6.0	30.0	75.0
4	B-27	5.8	6.0	8.5	5.8	3.0	5.5	4.5	7.0	7.5	5.5	3.0	3.0	25.0	50.0
5	BT 1	5.6	6.5	8.0	5.0	3.5	4.3	3.0	5.0	3.0	5.5	5.0	7.5	55.0	55.0
6	290875	5.4	4.0	3.0	5.3	2.5	2.6	0.5	1.0	3.0	5.0	1.5	4.0	25.0	7.5
7	Radko	5.3	7.0	7.0	5.5	1.5	4.5	3.5	6.0	5.0	5.5	2.5	7.5	65.0	15.0
8	Burton 224141	5.3	5.5	8.0	5.0	3.0	4.0	2.0	4.0	7.5	4.0	2.5	3.0	55.0	50.0
9	Kneebone	5.3	3.5	7.5	5.8	4.0	2.8	0.5	2.0	6.5	3.5	1.5	3.0	15.0	35.0
10	290660	5.2	4.0	7.5	5.0	4.5	2.7	1.5	2.5	5.5	3.0	1.0	3.0	25.0	85.0
11	224145	4.9	6.5	7.0	4.5	2.0	3.4	2.0	3.5	6.0	3.0	2.5	3.0	50.0	28.5
12	290874	4.9	5.5	7.0	5.0	2.0	2.8	0.0	3.0	5.5	3.5	2.0	3.0	55.0	27.5
13	Indyk 6A	4.7	6.5	3.5	3.8	6.0	1.4	0.0	2.0	1.0	2.5	1.5	5.5	80.0	55.0
14	B36 *	4.7	7.0	7.0	4.5	0.5	4.8	4.5	5.5	5.0	4.5	4.5	5.5	55.0	5.0
15	Indyk 1A	4.5	5.0	5.0	5.0	2.5	4.2	1.5	3.0	4.5	7.0	5.0	7.0	50.0	25.0
16	Large Patch by G.H.	4.2	4.5	6.0	4.5	1.5	5.5	4.5	6.5	3.5	7.5	5.5	7.0	10.0	10.0
17	Indyk 6A Fla	4.0	6.0	2.5	3.5	4.5	1.3	0.0	1.0	1.0	3.0	1.5	4.5	60.0	40.0
18	291981	4.0	3.5	4.0	5.5	1.5	3.2	1.0	4.0	3.0	3.5	2.0	3.5	40.0	27.5
19	Cooper Utah	3.5	4.0	4.5	3.8	1.5	5.2	3.0	5.0	5.0	7.0	6.0	7.5	17.5	25.0
20	290872	3.0	2.0	0.5	4.5	1.0	0.0	0.0	0.0	0.5	6.5	2.5	4.0	20.0	5.0

(Continued)

Table 2 (continued).

	Cultivar or Selection	Turf Quality[1] 1984-1998 Avg.	Sept. 1984	June 1986	1987 Avg.	July 1998	Spring Green-up[2] 1984-1998 Avg.	May 1984	May 1985	April 1986	May 1987	May 1989	Color[3] 1987	Cover (%) 1984	Cover (%) 1998
21	289918	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	4.5	3.0	6.5	10.0	0.0
22	290905	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	5.0	1.5	6.5	30.0	0.0
	LSD at 5% =	0.8	1.7	2.8	1.6	1.9	2.1	1.9	1.2	2.7	2.5	1.8	1.0	22.8	26.0

[1]9 = best turf quality
[2]9 = least dormant
[3]9 = darkest green color

Table 3. Performance of zoysiagrass cultivars and selections in a turf trial established in September 1991 at North Brunswick, NJ. (Includes 1991 National Zoysiagrass Test-NTEP.)

		Turf Quality[1]				Cover (%)			Cover[2]	Color[3]	Spring Green-up[4]	Spring Green-up[4]
	Cultivar or Selection	1984-1998 Avg.	June 1993	1994 Avg.	July 1998	Aug. 1992	1994 Avg.	July 1998	May 1994	Aug. 1992	May 1 1994	May 18 1994
1	Sunburst	6.8	6.3	7.2	4.0	96.7	100.0	80.0	7.7	3.7	1.7	3.3
2	El Toro	6.6	7.3	3.0	4.0	96.7	55.0	85.0	2.0	4.7	1.0	1.3
3	Belair	6.4	5.3	6.9	4.7	73.3	97.8	70.0	8.0	5.0	2.0	3.7
4	Dalz 8514	6.4	7.3	6.6	4.3	95.0	98.3	78.3	3.3	4.3	2.3	5.0
5	CD 2013	6.4	6.0	6.9	3.7	80.0	92.2	51.7	6.7	5.0	2.0	3.7
6	Dalz 8516	6.3	7.0	4.0	5.0	76.7	55.0	80.0	1.7	5.0	2.7	4.3
7	TGS-W10	6.3	5.7	6.8	3.7	88.3	95.0	76.7	8.0	4.7	1.0	2.3
8	R1	6.3	4.3	6.8	4.3	76.7	97.2	71.7	7.0	5.0	2.0	2.7
9	JZ-1	6.2	4.7	7.0	2.7	86.7	98.9	68.3	8.0	3.7	1.0	1.7
10	TGS-B10	6.2	5.0	6.8	3.7	86.7	100.0	68.3	7.7	4.3	2.3	2.3
11	Emerald	6.2	6.3	6.3	5.0	60.0	93.3	71.7	5.3	6.3	2.3	4.0
12	CD 259-13	6.1	6.0	6.7	2.3	98.3	97.8	70.0	7.7	4.0	3.0	4.7
13	GT 2004	6.0	5.7	6.3	4.0	73.3	90.0	50.0	3.7	4.7	2.7	4.0
14	K.Common	6.0	4.7	6.8	2.0	95.0	96.7	50.0	7.7	4.3	2.3	4.0
15	Dalz 8512	6.0	6.3	3.2	3.0	58.3	52.5	70.0	1.7	5.5	1.0	1.0
16	R5	6.0	5.0	6.6	2.7	80.0	96.7	56.7	7.7	4.3	1.7	3.3
17	TC 5018	5.9	6.7	6.1	4.0	93.3	98.9	85.0	8.0	4.3	1.7	3.0
18	GT 2047	5.8	5.0	6.4	2.3	88.3	98.9	68.3	8.3	3.7	2.0	4.0
19	Meyer	5.6	5.3	5.0	5.0	66.7	70.6	65.0	3.3	6.3	2.7	4.7
20	Dalz 8507	5.2	6.3	2.4	4.0	66.7	90.0	65.0	1.7	5.0	1.0	1.0

(Continued)

Table 3 (continued).

	Cultivar or Selection	Turf Quality[1] 1984-1998 Avg.	Turf Quality[1] June 1993	Turf Quality[1] 1994 Avg.	Turf Quality[1] July 1998	Cover (%) Aug. 1992	Cover (%) 1994 Avg.	Cover (%) July 1998	Cover[2] May 1994	Color[3] Aug. 1992	Spring Green-up[4] May 1 1994	Spring Green-up[4] May 18 1994
21	TC 2003	5.1	6.3	3.8	4.0	76.7	73.3	52.5	2.3	5.7	1.3	2.3
22	Dalz 8508	5.0	5.3	5.2	3.7	71.7	83.3	55.0	3.0	4.7	1.3	2.0
23	Dalz 9006	4.8	5.3	4.1	3.5	56.7	54.4	55.0	2.3	5.0	1.7	3.7
24	R2	2.4	3.7	1.4	2.0	66.7	20.0	40.0	1.3	4.0	1.7	2.7
25	Dalz 8502	0.0	0.0	1.0	0.0	11.7	0.0	0.0	1.0	5.3	1.0	1.0
26	Dalz 8701	0.0	0.0	1.0	0.0	5.0	0.0	0.0	1.0	5.0	1.0	1.3
27	Dalz 8501	0.0	0.0	2.0	0.0	20.0	30.0	0.0	1.3	5.0	1.7	1.7
28	R3	0.0	0.0	1.0	0.0	2.3	0.0	0.0	1.0	1.0	1.0	1.0
29	R4	0.0	0.0	1.0	0.0	5.0	0.0	0.0	1.0	5.0	1.7	2.3
	LSD at 5% =	0.6	1.3	2.1	1.6	20.4	69.6	19.5	1.4	1.0	1.7	3.1

[1]9 = best turf quality
[2]9 = most total cover
[3]9 = darkest green color
[4]9 = most actively growing

Table 4. Performance of buffalograss cultivars and selections in turf trial established in September 1991 at North Brunswick, NJ. (Includes 1991 National Buffalograss Test-NTEP.)

		Turf Quality[1]										
	Cultivar or Selection	1992-1998 Avg.	Aug. 1992	1993 Avg.	1994 Avg.	July 1998	Color[2] May 1992	Color[2] Aug. 1992	Spring Green-up[3] May 1 1994	Spring Green-up[3] May 18 1994	Cover (%) 1994 Avg.	Cover (%) July 1998
1	NTDG3	5.7	5.0	6.0	6.6	5.3	6.0	5.0	3.7	6.7	96.1	83.3
2	NTDG4	5.7	5.3	6.2	6.7	4.7	5.0	5.3	3.0	5.3	96.7	68.3
3	315	5.4	5.7	7.2	6.1	2.7	6.3	6.0	4.0	6.7	91.7	51.7
4	378	5.1	5.0	5.3	5.9	4.0	6.0	6.0	3.7	6.0	90.0	70.0
5	NTDG5	5.1	4.0	5.7	6.6	4.0	3.7	5.3	3.7	6.3	93.3	70.0
6	NE84-436	5.0	4.7	5.7	6.5	3.3	3.7	5.7	3.3	7.0	96.7	58.3
7	AZ143	5.0	5.3	6.0	6.3	2.3	4.7	5.3	3.7	6.3	96.7	51.7
8	NTDG2	4.5	4.0	5.0	5.8	3.3	3.3	5.3	2.7	5.3	88.3	60.0
9	NTDG1	4.4	3.7	4.3	5.7	4.0	3.3	4.7	3.0	5.7	85.0	71.7
10	609	4.2	4.0	3.8	4.6	4.3	2.7	4.3	1.0	3.0	68.3	61.7
11	Sharp's	4.0	4.0	5.5	5.0	1.7	3.7	5.0	3.0	5.3	88.3	23.3
12	BAM101	4.0	4.0	4.8	5.3	2.0	4.7	4.7	2.0	4.7	83.3	35.0
13	Prairie	3.8	3.3	4.3	4.2	3.3	3.3	4.3	1.0	2.0	68.3	38.3
14	NE84-453	3.7	3.3	3.8	4.9	2.7	2.3	5.0	2.7	5.7	72.8	43.3
15	Bison	3.6	3.7	4.3	4.8	1.7	5.0	5.7	2.0	3.0	90.0	33.3
16	BAM202	3.5	4.0	4.0	4.9	1.0	4.7	5.0	2.0	4.7	73.3	8.3
17	N90-32	3.3	4.7	3.5	1.8	3.3	3.3	3.3	1.0	1.0	11.7	35.0
18	H90-18	3.3	3.7	3.0	2.1	4.3	3.0	5.0	1.0	1.0	13.3	33.3
19	Highlight4	2.9	5.3	3.8	1.6	1.0	3.7	4.0	1.0	1.0	13.3	8.3
20	H90-6	2.9	4.3	3.2	2.1	2.0	3.3	3.3	1.0	1.0	14.4	20.0

(Continued)

Table 4 (continued).

	Selection	Turf Quality[1] 1992-1998 Avg.	Turf Quality[1] Aug. 1992	Turf Quality[1] 1993 Avg.	Turf Quality[1] 1994 Avg.	Turf Quality[1] July 1998	Color[2] May 1992	Color[2] Aug. 1992	Spring Green-up[3] May 1 1994	Spring Green-up[3] May 18 1994	Cover (%) 1994 Avg.	Cover (%) July 1998
21	Buffalawn	2.7	4.3	3.7	1.3	1.7	3.7	3.7	1.0	1.0	6.7	18.3
22	Rutgers	2.7	4.3	3.2	2.1	1.3	3.7	3.7	1.0	1.0	6.7	21.7
23	N90-33	2.6	4.0	3.7	2.1	0.7	3.3	3.0	1.0	1.0	16.7	5.0
24	Highlight25	2.5	3.0	2.8	1.7	2.3	3.0	3.3	1.0	1.0	15.6	26.7
25	H90-40	2.3	3.7	2.5	1.0	2.0	2.7	4.0	1.0	1.0	0.0	18.3
26	H90-12	2.3	4.0	2.5	1.3	1.3	2.7	4.0	1.0	1.0	3.3	13.3
27	H90-5	2.3	4.0	3.2	1.2	0.7	3.3	4.0	1.0	1.0	3.3	8.3
28	N90-35	2.2	4.0	3.3	1.0	0.3	4.0	4.7	1.0	1.0	0.0	3.3
29	Highlight15	2.1	3.0	2.7	1.6	1.3	3.3	4.0	1.0	1.0	11.7	15.0
30	H90-14	2.0	4.0	2.7	1.0	0.3	2.3	3.7	1.0	1.0	0.0	3.3
31	H90-29	1.9	3.7	3.0	1.0	0.0	3.0	3.7	1.0	1.0	0.0	0.0
32	Texoka	1.8	2.0	2.5	2.6	0.3	2.3	2.7	1.7	2.7	31.7	3.3
33	N90-41	1.7	3.3	2.5	1.0	0.0	2.7	3.3	1.0	1.0	0.0	0.0
34	H90-16	1.4	2.3	2.2	1.0	0.0	2.0	2.3	1.0	1.0	0.0	0.0
	LSD at 5% =	1.3	1.8	1.6	1.6	2.1	1.9	1.5	0.7	1.3	29.4	25.4

[1]9 = best turf quality
[2]9 = darkest green color
[3]9 = most actively growing

Table 5. Yearly nitrogen (N) applied and mowing height (Ht) on warm-season grasses tests established at North Brunswick, NJ.

	Table 1		Table 2		Table 3		Table 4	
Year	N[1]	Ht[2]	N	Ht	N	Ht	N	Ht
1989	1.0	1.5	1.0	1.5				
1990	0	1.5	0	1.5				
1991	1.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
1992	1.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
1993	0	2.0	0	2.0	0	2.0	0	2.0
1994	0.6	2.0	0.6	2.0	0.6	2.0	0.6	2.0
1995	0	2.0	0	2.0	0	2.0	0	2.0
1996	1.4	2.0	1.4	2.0	1.4	2.0	1.4	2.0
1997	0.5	2.0	0.5	2.0	0.5	2.0	0.5	2.0
1998	0	2.0	0	2.0	0	2.0	0	2.0

[1]Annual N applied (lbs/1000 ft^2).
[2]Mowing height in inches.