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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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PERFORMANCE OF BENTGRASS CULTIVARS AND SELECTIONS IN NEW JERSEY TURF TRIALS

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Bentgrass species used for specialized, high maintenance, close-cut turf include creeping bentgrass (*Agrostis palustris*, also known as *A. stolonifera*), colonial bentgrass (*A. tenuis* or *A. capillaris*), highland or dryland bentgrass (*A. castellana*), and velvet bentgrass (*A. canina*). Creeping bentgrasses have a dense, prostrate growth habit and are able to persist under low heights of cut, making this grass the most popular for putting green utilization. Through vigorous stolon growth, creeping bentgrasses form a fine-textured, dense, low growing turf, and are well adapted for golf course use in both the cool, temperate and warm, humid environments of the United States. With the recent release of improved creeping bentgrasses, turf managers now have a choice of new varieties that may outperform the older varieties.

Colonial bentgrass, also referred to as browntop, has traditionally been used as a lawn grass in areas of northern Europe and New Zealand that have cool and humid or mild summers. Colonial bentgrasses are fine-textured grasses that have a more upright and less aggressively spreading growth habit than creeping bentgrasses. Compared to creeping bentgrasses, colonial bentgrasses typically have a brighter green color and better color retention during cool weather. They also generally have better dollar spot resistance, but are more susceptible to the brown patch disease. Colonial bentgrasses perform best in New Jersey when mowed between 3/8 to 3/4 of an inch, and thus are better adapted for fairway or tee use.

Velvet bentgrass has been called the "aristocrat" of turfgrasses. It forms the finest-textured and most dense turf of the bentgrasses and can nearly resemble green velvet when managed properly. It spreads mainly through profuse production of erect tillers with short, limited stolons. This grass can tolerate very close mowing, heat, cold, and shade and is one of the most drought resistant of the bentgrasses used for turf (Skogley, 1973). Velvet bentgrass can form excessive thatch, especially at higher fertility rates and higher cutting heights. It is also susceptible to red thread and copper spot diseases. Velvet bentgrass has not been used extensively for high maintenance turf, therefore its management requirements are not well known among the industry.

Other bentgrasses currently under evaluation for turf include dryland bentgrass and Idaho bentgrass (*A. idahoensis* Nash.). Dryland bentgrasses are similar in adaptation and appearance to colonial bentgrasses, but are more blue-green in color and have rhizomes. Idaho bentgrass is native to the western United States and is adapted to wet meadows or bogs in mountainous regions. This grass establishes well in turf plots, but has a dull green color and an upright growth habit that is less attractive than creeping, colonial, or velvet bentgrasses. In New

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Jersey turf trials, this species has exhibited good resistance to dollar spot disease.

The New Jersey Agricultural Experiment Station participates in the National Turfgrass Evaluation Program (NTEP), which evaluates many species of turfgrasses, including bentgrasses, throughout the United States. The Rutgers turfgrass breeding program conducts extensive field evaluations of collections and new material developed in the improvement program, and it also evaluates cultivars or selections developed in other breeding programs.

PROCEDURES

Bentgrass evaluation trials were established in May 1994 (Table 1 and 2), September 1995 (Table 3), September 1996 (Table 4), and September 1997 (Table 5 and 6) at North Brunswick, New Jersey. The two trials seeded in May 1994 included all entries of the 1993 National Bentgrass Test coordinated by NTEP. The trials seeded in September 1995, 1996, and 1997 included named cultivars, but the majority of entries were experimental selections. One test simulated putting green conditions on a modified Nixon loam and was seeded in May 1994 (Table 1). The other five tests simulated fairway conditions on a Nixon loam.

All sites were well-drained and, except for the higher cut fairway/tee trail seeded in September 1997 (Table 6), were openly exposed to both sunlight and air circulation. The September 1997 trial was blocked of south or southwest sun by a barn and a line of pine and oak trees. Plot size was 4 X 6 ft in the trials seeded in May 1994, 4 X 6 ft in the trial seeded in September 1995, 2.5 X 3.5 ft in the trial seeded in September 1996, and 3 X 5 ft in the trials seeded in September 1997. A 6 inch unseeded border surrounded each plot to minimize seed contamination from adjacent plots. Plots were hand-seeded at a rate of approximately 0.5 lb/1000 ft^2. All tests used a randomized complete block design with three replications.

The annual nitrogen applied and mowing height for each test are presented in Table 7. The putting green test was mowed five to six times per week during periods of active growth with a triplex or walk-behind reel mower equipped to collect clippings. The fairway tests were mowed and clippings were removed three times per week with a triplex reel mower during periods of active growth. Soil pH was maintained in the range of 6.0 to 6.5 with agricultural limestone. All tests were irrigated to avoid drought stress.

All trials received at least two applications of Primer™ wetting agent beginning in the spring of 1998. In 1998, the tests seeded in May 1994 received one application each of Daconil 2787, Chipco 26019, and Banner in the summer to control diseases and one application each of Turcam 76 and Dursban for insect control. The tests seeded in September 1995 and 1996 received one application of Bayleton for disease control in 1998. The two tests seeded in September 1997 received a spring application of MCPP + Betasan for summer annual weed control and one application of Bayleton for disease control.

The May 1994 putting green trial received core cultivation using 3/8 inch tines in May 1998. Topdressing, using a 90:10 sand-peat mixture, was applied on 15 May, 29 June, and 25 July. The two trials seeded in September 1997 received topdressing on 15 May. The other trials did not receive core cultivation or topdressing in 1998. The May 1994 putting green and fairway tests were subject to artificial wear during the 1998 growing season. Wear was applied on each date by passing over one-half of each plot two times with a novel wear simulator (Meyer et al., 1997). Plots in the May 1994 fairway trial were subjected to wear on 25 dates from 18 June through 3 September. Frequency of wear treatments ranged from every 2 days in June and July to every 4 days in August. Plots in the May 1994 greens trial were subject to wear on eight dates scheduled every 4 days during the month

of August. Turf quality ratings were taken on both worn and unworn portions of each plot (Tables 1 and 2).

Plots were evaluated frequently during the growing season for overall turf quality (i.e., turf density, texture, uniformity, color, growth habit, and freedom from disease and insect damage). Turf quality, spring green-up, color, density, disease, and turf cover were rated on a 1 to 9 scale, where 9 represented the most desirable turf characteristic. All data were subjected to analysis of variance. Means were separated using the least significant difference (LSD) means separation test.

RESULTS AND DISCUSSION

Turf Evaluation Trials

Based on the 4-year (1994 to 1998) quality average from the greens test seeded May 1994 (Table 1), many newer creeping bentgrass cultivars performed better than the older cultivars. Performance of the creeping bentgrasses was better than the colonial bentgrasses, particularly at the putting green height of cut (Table 1). Ratings from the fairway/tee trial seeded in May 1994 showed that colonial bentgrasses performed better at a higher height of cut (Table 2). According to turf quality data obtained from colonial bentgrass plots that were subjected to wear, colonial bentgrasses seem to have better wear tolerance than once thought (Table 2).

Ratings from the fairway/tee trial seeded September 1995 also indicated that many newer creeping bentgrass cultivars and selections performed better than the older cultivars (Table 3). Ratings from the fairway/tee trials seeded in September 1995 and 1996 reflect differences among creeping bentgrasses in winter color and resistance to dollar spot (Tables 3 and 4).

In the 1997 fairway/tee tests (Tables 5 and 6), the turf quality of SR 7200 velvet bentgrass at both the 9/32 and 13/32 inch mowing heights exceeded that of the creeping bentgrasses. Primary factors responsible for the high turf quality ratings of velvet bentgrass include its bright, very attractive, dark green color, fine leaf texture, good turf density, and lack of significant damage due to disease. The April 1998 disease evaluations (Tables 5 and 6) reflect the appearance of symptoms typical of cool-weather brown patch (i.e., yellow patch) caused by *Rhizoctonia cerealis*; however, this disease was not formally diagnosed. Among the creeping bentgrasses, there was a range in susceptibility to brown patch (Table 5) and dollar spot disease (Tables 5 and 6). This variability in disease resistance indicates that there is a potential to develop more disease resistant cultivars through selective crosses and breeding efforts.

Percent Green Cover and Wear Quality

Percent green turf was evaluated in July 1998 on the half of the fairway/tee plots to which wear had been applied (Table 2). Most of the colonial bentgrasses exhibited good to excellent recovery from wear. Colonial bentgrass entries ISI-At-90162 and SR 7100 performed best in the trial; percent green turf for these entries (83%) was considerably higher than that of the colonial bentgrass Exeter (43%). In addition, entries ISI-At-90162 and SR 7100 were more tolerant of wear than most of the creeping bentgrasses in the trial.

Among the creeping bentgrasses evaluated, Penn G-2, Pennlinks, and BAR WS 42102 recovered best from wear (65, 60, and 60% green turf, respectively). The entry Cato was least tolerant of wear (28% green turf). The creeping bentgrass variety Penn G-2 also had the best wear tolerance of the creeping bentgrasses in both the fairway and putting green trials (Tables 1 and 2).

Dollar Spot Disease

As a group, colonial bentgrasses have better tolerance to dollar spot than the creeping bentgrasses. Within the creeping bentgrasses, Loft's L93 has repeatedly exhibited good resistance to dollar spot, whereas Crenshaw has been highly susceptible to the disease. The velvet bentgrass SR 7200 had the best resistance to dollar spot in both fairway/tee trials seeded in 1997 (Tables 5 and 6). The Idaho

bentgrasses in the fairway/tee trial seeded in 1996 (Table 4) showed good resistance to this disease as well.

Winter Color

Many bentgrasses have a tendency to turn off-color during the winter months. Compared to creeping bentgrasses, colonial bentgrasses tend to have better color retention and are the least dormant during cooler months of the year (data not reported). Creeping bentgrasses can turn purple, yellow, or straw-colored during the winter months. The best winter color ratings among the creeping bentgrasses are for those entries that have retained some percentage of green color. The velvet bentgrass SR 7200 exhibited good winter color retention in both the 1995 and 1996 seeded fairway tests (Tables 3 and 4).

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Table 1. Performance of bentgrass cultivars and selections in a putting green trial seeded in May 1994 at North Brunswick, NJ. (Includes 1993 National Bentgrass Greens Test - NTEP.)

	Cultivar or Selection	Species	Turf Quality[1] 1994-1998 Avg.	1994 Avg.	1995 Avg.	1996 Avg.	1997 Avg.	1998 Avg.	Spring Green-up[2] April 1998	Dollar Spot[3] June 1998	Worn Turf Quality[4] Sept. 1998
1	Loft's L-93	creeping	7.2	7.1	7.3	7.2	7.4	7.0	4.7	9.0	3.3
2	Penn A-1	creeping	6.9	7.0	7.0	6.4	7.0	7.0	6.0	8.0	3.0
3	Penn G-2	creeping	6.4	6.5	6.6	4.4	7.3	7.0	6.3	7.0	6.0
4	Penn A-4	creeping	6.3	5.9	6.3	6.2	6.7	6.5	5.7	7.7	3.3
5	Penn G-6	creeping	6.2	6.5	6.2	5.4	6.8	6.0	6.0	7.3	2.0
6	Cato	creeping	6.1	5.7	6.5	5.6	6.7	6.2	4.0	8.3	3.0
7	Providence	creeping	6.1	6.1	6.0	5.6	6.7	5.9	4.0	8.3	2.5
8	Southshore	creeping	5.9	5.8	5.6	5.3	7.0	5.9	4.0	7.0	3.3
9	Imperial	creeping	5.7	6.1	5.2	5.2	6.0	5.9	5.0	6.7	4.2
10	Atlanta	creeping	5.4	5.5	5.7	4.3	5.5	6.2	5.0	7.3	3.3
11	MSUEB	creeping	5.4	5.8	4.9	5.2	5.7	5.3	4.0	8.0	4.2
12	Century	creeping	5.4	5.7	4.8	5.0	6.0	5.4	4.3	4.0	3.7
13	BAR WS 42102	creeping	5.3	4.7	5.2	5.2	6.1	5.4	3.7	7.3	3.7
14	Regent	creeping	5.2	5.7	4.9	5.3	5.5	4.7	3.7	6.7	2.3
15	Putter	creeping	5.1	5.7	4.8	5.0	5.4	5.0	2.3	7.7	2.3
16	ISI-AP-89150	creeping	5.1	5.3	5.2	4.9	5.3	4.9	2.7	7.7	4.2
17	Pennlinks	creeping	5.1	5.3	5.5	4.8	5.2	4.8	4.0	8.3	3.3
18	Backspin	creeping	5.1	6.0	4.3	4.5	5.0	5.6	4.0	5.7	3.7
19	DG-P	creeping	5.1	5.3	4.9	5.3	4.8	5.0	3.0	7.7	3.2
20	Pro/Cup	creeping	4.8	5.6	4.7	4.5	4.9	4.6	2.7	5.3	3.7

(Continued)

Table 1 (continued).

	Cultivar or Selection	Species	Turf Quality[1] 1994-1998 Avg.	1994 Avg.	1995 Avg.	1996 Avg.	1997 Avg.	1998 Avg.	Spring Green-up[2] April 1998	Dollar Spot[3] June 1998	Worn Turf Quality[4] Sept. 1998
21	Cobra	creeping	4.8	5.6	4.3	4.7	4.9	4.6	2.7	6.3	3.2
22	Crenshaw	creeping	4.7	6.4	3.6	3.7	5.4	4.4	3.0	2.3	4.2
23	SR 1020	creeping	4.7	5.0	4.6	3.9	4.8	5.0	3.3	5.0	4.5
24	Lopez	creeping	4.6	5.7	4.6	3.9	3.7	5.0	3.0	8.0	3.7
25	Trueline	creeping	4.4	5.8	4.3	3.9	4.5	3.5	2.0	6.0	3.3
26	Mariner	creeping	4.0	5.2	3.6	3.0	3.9	4.2	3.3	6.3	3.5
27	Penncross	creeping	3.8	4.5	3.5	3.6	3.7	3.8	3.0	6.7	2.5
28	18th Green	creeping	3.8	5.1	3.6	3.3	3.5	3.4	2.7	5.0	2.5
29	Exeter	colonial	3.2	2.4	2.7	3.1	4.3	3.7	4.0	7.3	2.7
30	BAR AS 493	creeping	2.8	3.4	2.9	2.5	3.1	2.4	5.3	8.0	2.7
31	Tendez	colonial	2.5	4.1	2.5	1.9	2.2	2.0	4.3	7.3	2.2
32	Seaside	creeping	2.2	2.8	1.9	1.8	2.4	2.2	1.7	5.7	2.2
		LSD at 5% =	0.5	0.6	0.5	0.8	1.1	0.9	1.5	1.6	1.4

[1]9 = best turf quality
[2]9 = earliest spring green-up
[3]9 = least dollar spot disease
[4]9 = best turf quality on worn turf

Table 2. Performance of bentgrass cultivars and selections in a fairway/tee turf trial seeded in May 1994 at North Brunswick, NJ. (Includes 1993 National Bentgrass Fairway/TeeTest.)

	Cultivar or Selection	Species	Turf Quality[1] 1994-1998 Avg.	1994 Avg.	1995 Avg.	1996 Avg.	1997 Avg.	1998 Avg.	Spring Green-up[2] April 1998	Green Turf[3] (%) July 1998	Worn Turf Quality[4] June Avg.
1	Penn G-6	creeping	6.7	7.4	6.5	6.2	7.1	6.2	5.0	40.0	3.6
2	Penn G-2	creeping	6.5	7.0	6.5	5.4	6.9	6.8	4.3	65.0	5.8
3	Cato	creeping	6.5	6.8	7.2	6.4	6.7	5.4	2.7	28.3	2.5
4	Loft's L-93	creeping	6.4	6.7	6.9	6.3	6.9	5.2	2.7	48.3	4.0
5	Providence	creeping	6.2	6.2	6.5	6.2	6.4	6.0	4.0	46.7	3.5
6	Atlanta	creeping	5.9	6.7	5.7	5.5	6.0	5.8	2.3	31.7	2.9
7	Penneagle	creeping	5.9	6.3	6.2	5.9	6.0	5.2	3.7	40.0	3.7
8	Putter	creeping	5.8	6.6	5.8	5.4	5.8	5.4	3.3	45.0	3.1
9	Crenshaw	creeping	5.6	7.5	4.9	4.7	5.9	5.1	2.7	40.0	3.3
10	Pennlinks	creeping	5.6	5.6	5.7	5.9	5.8	5.2	3.0	60.0	3.8
11	Southshore	creeping	5.6	6.3	6.0	5.8	5.8	3.9	3.3	40.0	2.8
12	Cobra	creeping	5.4	5.8	5.3	5.3	5.6	4.8	2.7	48.3	2.5
13	Seaside II	creeping	5.3	5.7	5.6	5.3	5.2	4.7	2.3	45.0	3.3
14	ISI-At-90162	colonial	5.2	5.7	5.1	5.4	4.7	5.3	6.3	83.3	5.1
15	Trueline	creeping	5.2	5.9	5.1	4.5	5.1	5.2	2.0	48.3	3.2
16	SR 7100	colonial	5.1	5.1	5.0	5.4	4.9	5.2	6.0	83.3	5.2
17	BAR WS 42102	creeping	5.1	5.3	5.2	5.1	5.2	4.6	3.3	60.0	3.5
18	Lopez	creeping	4.9	5.8	5.0	4.2	5.1	4.3	3.7	48.3	3.5
19	Pro/Cup	creeping	4.6	5.5	4.4	4.1	5.1	4.2	2.7	38.3	2.7
20	Penncross	creeping	4.6	5.0	4.6	4.3	5.0	4.3	2.7	53.3	2.8

(Continued)

Table 2 (continued).

	Cultivar or Selection	Species	Turf Quality[1] 1994-1998 Avg.	1994 Avg.	1995 Avg.	1996 Avg.	1997 Avg.	1998 Avg.	Spring Green-up[2] April 1998	Green Turf[3] (%) July 1998	Worn Turf Quality[4] June Avg.
21	BAR AS 493	creeping	4.3	4.3	4.6	4.5	4.2	4.0	4.3	40.0	3.9
22	18th Green	creeping	4.2	5.2	3.6	3.6	4.7	4.1	2.3	50.0	2.7
23	Tiger	colonial	4.2	4.9	4.3	4.1	3.6	4.2	5.0	66.7	4.1
24	Exeter	colonial	4.2	2.9	4.0	4.4	4.8	4.7	2.7	43.3	3.1
25	Tendez	colonial	3.2	4.5	3.6	2.4	2.5	2.8	3.0	56.7	2.7
26	Seaside	creeping	2.7	3.1	2.1	2.3	2.7	3.2	2.0	41.7	2.6
		LSD at 5% =	0.6	0.7	0.6	0.8	1.0	1.3	1.5	19.0	0.9

[1]9 = best turf quality
[2]9 = earliest spring green-up
[3]9 = percent green turf on half of plot subjected to wear stress
[4]9 = best turf quality of worn turf

Table 3. Performance of bentgrass cultivars and selections in a fairway trial seeded in September 1995 at North Brunswick, NJ.

	Cultivar or Selection	Species	Turf Quality[1] 1996-1998-Avg.	Turf Quality[1] 1996 Avg.	Turf Quality[1] 1997 Avg.	Turf Quality[1] 1998 Avg.	Winter Color[2] Feb. 1998	Dollar Spot[3] June 1998
1	Penn G-2	creeping	5.6	6.5	5.5	4.9	4.7	3.3
2	Loft's L-93	creeping	5.5	5.9	4.8	5.9	3.0	5.3
3	Penn G-6	creeping	5.5	6.0	5.1	5.3	2.3	4.3
4	PST Syn OVM	creeping	5.3	6.1	4.5	5.4	4.3	5.3
5	PST Syn ODA	creeping	5.3	6.3	5.1	4.5	4.7	5.0
6	IBM8-14	creeping	5.0	5.9	4.3	4.8	1.0	4.0
7	SRX 1119	creeping	4.9	5.7	4.5	4.6	2.0	4.0
8	Penn A-4	creeping	4.8	6.2	4.0	4.4	3.0	3.3
9	SR 1020	creeping	4.3	5.2	3.7	4.1	3.3	3.3
10	Penneagle	creeping	4.3	4.8	3.8	4.3	2.7	3.7
11	Pennlinks	creeping	4.2	4.4	4.2	4.1	3.0	4.3
12	Seaside II	creeping	4.2	4.8	4.1	3.7	1.7	5.7
13	Providence	creeping	4.0	4.9	3.4	3.7	2.3	2.7
14	Penncross	creeping	3.6	4.4	2.7	3.8	2.3	3.3
		LSD at 5% =	0.4	0.5	0.7	0.7	1.2	1.2
15	SR 7200[4]	velvet	6.7	6.2	7.3	6.7	4.7	6.0

[1]9 = best turf quality
[2]9 = best winter color
[3]9 = least dollar spot disease
[4]9 LSD does not apply for SR7200, analyzed separately

Table 4. Performance of bentgrass cultivars and selections in a fairway trial seeded in September 1996 at North Brunswick, NJ.

	Cultivar or Selection	Species	Turf Quality[1] 1997-1998-Avg.	Turf Quality[1] 1997 Avg.	Turf Quality[1] 1998 Avg.	Winter Color[2] Feb. 1998	Dollar Spot[3] June 1998
1	SR 7200	velvet	6.6	6.1	7.1	4.7	5.0
2	SRX 1HTS	creeping	5.3	4.8	5.8	2.3	4.7
3	Penn G-6	creeping	5.3	5.5	5.0	2.3	3.0
4	PST A2E-96	creeping	5.2	5.1	5.3	2.0	4.0
5	PST Syn AIP	creeping	5.2	5.2	5.3	1.0	4.7
6	DCAT-UM-86-01-95	creeping	5.2	5.2	5.2	2.3	2.3
7	PST Syn OVN	creeping	5.1	5.2	5.1	2.0	5.0
8	Loft's L-93	creeping	5.1	4.8	5.3	2.7	5.3
9	Penncross	creeping	5.0	5.1	5.0	3.7	3.3
10	SRX 1M150	creeping	5.0	4.9	5.1	2.3	4.0
11	PST Syn OPE	creeping	5.0	5.1	4.8	2.7	4.0
12	Penn G-1	creeping	4.9	4.2	5.6	2.3	3.0
13	Penn G-2	creeping	4.9	5.0	4.8	2.3	1.7
14	SRX 1P101-34	creeping	4.9	4.9	4.9	3.0	2.0
15	SRX 1119	creeping	4.9	4.5	5.3	2.3	2.7
16	SRX 1MO149	creeping	4.8	5.1	4.5	2.3	3.3
17	LRF-94-A5	creeping	4.8	4.2	5.3	2.0	5.0
18	SRX 1HTP	creeping	4.7	4.5	4.9	2.3	4.3
19	SRX 1P98-29	creeping	4.7	4.6	4.8	1.7	3.7
20	SRX 1STROL	creeping	4.6	4.7	4.4	2.0	3.0
21	SRX 1DG	creeping	4.5	4.9	4.2	1.3	1.3
22	SRX 1CRCO	creeping	4.5	4.9	4.2	2.3	3.7
23	SRX 1 Cincy	creeping	4.5	4.1	4.9	2.3	2.7
24	Putter	creeping	4.3	4.5	4.1	1.7	2.3
25	Pennlinks	creeping	4.3	4.3	4.3	2.7	3.0
26	Cobra	creeping	4.2	4.1	4.3	2.7	2.3
27	Penn A-4	creeping	4.2	4.1	4.3	1.0	3.3
28	Atlanta	creeping	4.1	4.5	3.8	1.3	2.3
29	18th Green	creeping	4.1	4.2	4.0	1.0	1.0
30	Southshore	creeping	4.0	4.0	4.0	2.7	3.0

(Continued)

Table 4 (continued).

	Cultivar or Selection	Species	Turf Quality[1] 1997-1998-Avg.	Turf Quality[1] 1997 Avg.	Turf Quality[1] 1998 Avg.	Winter Color[2] Feb. 1998	Dollar Spot[3] June 1998
31	Providence	creeping	3.9	4.1	3.7	1.7	2.7
32	SR 1020	creeping	3.7	3.4	4.0	1.3	2.3
33	Seaside II	creeping	3.6	3.4	3.8	2.3	5.3
34	J-102	Idaho	3.2	3.2	3.1	1.7	6.3
35	J-101	Idaho	2.7	2.6	2.8	1.7	6.7
		LSD at 5% =	0.6	0.8	0.8	1.1	1.2

[1]9 = best turf quality
[2]9 = best winter color
[3]9 = least dollar spot disease

Table 5. Performance of bentgrass cultivars and selections in a turf trial seeded in September1997 at North Brunswick, NJ and maintained under fairway/tee conditions at 9/32 inch.

	Cultivar or Selection	Species	Turf Quality[1] 1998 Avg.	Germination[2] Sept. 1997	Establishment[3] Oct. 1997	Dormancy[4] Feb. 1998	Disease[5] April 20 1998	Brown Patch (%) June 1998	Dollar Spot[6] June 1998	Dollar Spot[6] Aug. 1998
1	SR 7200	velvet	7.4	7.3	8.0	3.3	6.0	17.3	8.7	8.7
2	Penn G-2	creeping	6.1	6.0	7.7	3.0	3.7	31.7	5.0	3.3
3	Princeville	creeping	6.0	7.3	8.0	2.7	3.3	31.7	4.3	3.0
4	Dcat-um-86-01-95	creeping	5.9	7.0	8.0	1.0	4.0	17.3	4.3	3.0
5	Syn OVSE	creeping	5.9	4.7	7.0	4.7	3.3	50.0	8.0	6.3
6	CB 2-94-97	creeping	5.5	6.0	7.7	2.7	3.0	32.7	5.0	2.7
7	SR 1119	creeping	5.5	6.3	7.7	2.0	2.3	21.7	5.3	3.0
8	Atlanta	creeping	5.5	6.7	7.7	2.0	3.3	23.3	4.3	2.7
9	SRX 1HTP-2	creeping	5.4	6.0	7.3	3.0	3.3	12.3	5.3	4.0
10	LCB-103	creeping	5.4	7.0	8.3	3.0	3.7	41.7	5.3	3.3
11	SRX 1120	creeping	5.4	4.7	7.0	2.0	3.0	30.0	5.7	3.3
12	SRX 1HTB-3	creeping	5.3	4.7	7.0	2.3	2.7	13.3	4.7	3.3
13	Penn A-4	creeping	5.3	7.7	8.7	3.7	3.0	23.3	4.7	2.3
14	SRX 1DIN	creeping	5.3	3.0	6.7	2.3	3.0	48.3	5.3	3.0
15	CB 13-94-97	creeping	5.2	3.3	6.7	2.7	3.0	25.0	5.3	3.0
16	Loft's L-93	creeping	5.2	6.7	7.7	2.7	2.0	31.7	7.0	5.0
17	Syn OVN	creeping	5.2	5.0	6.7	6.3	3.3	53.3	7.7	4.7
18	Syn ODA	creeping	5.1	2.7	5.3	7.0	2.3	41.7	8.0	4.3
19	Syn 96-1	creeping	5.1	7.3	8.3	1.7	3.0	30.0	4.7	1.7
20	SRX 1HTR-3	creeping	5.0	4.3	7.3	3.7	2.7	28.3	6.7	3.7

(Continued)

Table 5 (continued).

	Cultivar or Selection	Species	Turf Quality[1] 1998 Avg.	Germination[2] Sept. 1997	Establishment[3] Oct. 1997	Dormancy[4] Feb. 1998	Disease[5] April 20 1998	Brown Patch (%) June 1998	Dollar Spot[6] June 1998	Dollar Spot[6] Aug. 1998
21	Southshore	creeping	5.0	7.0	7.7	3.0	3.0	25.0	5.3	3.7
22	Syn 96-3	creeping	5.0	7.3	8.0	1.3	2.3	46.7	5.3	2.3
23	Penn G-6	creeping	4.8	7.0	8.3	1.7	2.7	35.0	5.3	3.7
24	Pennlinks	creeping	4.8	7.0	8.0	3.7	2.3	51.7	5.7	4.7
25	Dcat-um-86-02-96	creeping	4.8	7.0	8.0	1.0	3.0	45.0	4.7	3.3
26	Backspin	creeping	4.8	5.0	6.7	1.3	2.7	27.3	4.7	1.7
27	Penneagle	creeping	4.7	6.0	8.0	2.3	2.7	35.0	5.3	3.0
28	CB-94-97	creeping	4.7	4.3	7.3	1.7	2.7	51.7	5.3	3.0
29	CB B-95-97	creeping	4.7	4.0	7.0	2.7	2.7	43.3	5.7	2.7
30	Putter	creeping	4.7	7.3	8.0	3.3	3.0	31.7	5.3	3.0
31	CB 16-94-97	creeping	4.6	2.3	6.0	2.0	2.3	46.7	6.3	4.3
32	CB 3-94-96	creeping	4.6	6.0	7.0	3.7	3.0	61.7	4.0	2.3
33	MS4	creeping	4.5	4.0	6.7	1.0	5.0	35.0	6.3	3.3
34	Seaside II	creeping	4.5	6.0	6.3	2.3	2.7	53.3	7.0	5.0
35	ISI-ap-3	creeping	4.4	6.7	8.0	3.3	2.3	50.0	5.0	2.7
36	Syn OVL	creeping	4.4	2.0	4.7	6.7	3.3	56.7	7.3	5.3
37	Cato	creeping	4.3	7.3	8.0	2.0	2.3	45.0	6.3	4.3
38	ISI-ap-4	creeping	4.3	6.3	7.7	3.0	3.0	50.0	5.0	2.3
39	SR 1020	creeping	4.3	6.3	8.0	1.3	2.7	60.0	5.0	2.7
40	Penncross	creeping	4.2	7.0	8.0	2.3	3.0	53.3	6.3	4.7

(Continued)

Table 5 (continued).

	Cultivar or Selection	Species	Turf Quality[1] 1998 Avg.	Germination[2] Sept. 1997	Establishment[3] Oct. 1997	Dormancy[4] Feb. 1998	Disease[5] April 20 1998	Brown Patch (%) June 1998	Dollar Spot[6] June 1998	Dollar Spot[6] Aug. 1998
41	18th Green	creeping	4.2	4.3	6.7	1.0	3.3	11.7	3.7	1.3
42	Providence	creeping	4.1	7.3	8.7	3.0	3.0	40.0	5.3	3.3
43	Mariner	creeping	3.9	7.0	8.0	2.3	2.3	60.0	4.3	1.7
		LSD at 5% =	0.7	1.3	1.0	1.1	1.0	25.1	1.1	1.2

[1]9 = best turf quality
[2]9 = earliest germination
[3]9 = best establishment
[4]9 = least dormant
[5]9 = least disease, suspected cool season brown patch
[6]9 = least dollar spot disease

Table 6. Performance of bentgrass cultivars and selections in a turf trial seeded in September 1997 at North Brunswick, NJ and maintained under fairway conditions at 13/32 inch.

	Cultivar or Selection	Species	Turf Quality[1] 1998 Avg.	Germination[2] Sept. 1997	Establishment[3] Oct. 1997	Dormancy[4] Feb. 1998	Disease[5] April 21 1998	Dollar Spot[6] Aug. 1998
1	SR-7200	velvet	6.7	7.3	8.3	4.0	7.0	7.3
2	Penn G-2	creeping	6.0	6.7	7.3	4.3	4.7	5.0
3	Penn G-6	creeping	5.3	6.3	8.3	2.7	5.0	4.3
4	LRF-94-A5	creeping	5.2	6.0	7.3	4.0	4.3	5.0
5	SR-1119	creeping	4.8	4.0	7.3	2.3	3.7	4.0
6	Loft's L-93	creeping	4.8	5.3	7.7	3.7	3.7	5.7
7	SRX-1DIN	creeping	4.8	3.3	7.0	2.3	4.3	4.3
8	SRX-1HTB-3	creeping	4.6	4.7	7.7	2.7	5.0	4.3
9	Pennlinks	creeping	4.5	6.3	8.0	4.3	4.7	3.0
10	Backspin	creeping	4.4	3.3	7.3	2.0	3.7	2.3
11	Crenshaw	creeping	4.4	7.3	8.3	2.0	3.3	2.3
12	SRX-1HTP-2	creeping	4.4	5.0	6.7	4.0	5.0	4.0
13	Southshore	creeping	4.3	6.0	8.0	4.3	4.7	2.7
14	Penncross	creeping	4.3	5.7	8.0	3.7	4.0	2.7
15	Cobra	creeping	4.2	7.0	8.0	4.0	4.0	4.0
16	SRX-1120	creeping	4.2	3.0	7.0	3.3	4.3	3.7
17	Penneagle	creeping	4.2	5.3	7.7	4.7	4.3	3.3
18	SR-1020	creeping	3.8	4.3	7.3	3.3	3.7	3.7
19	Providence	creeping	3.8	7.0	9.0	4.3	4.3	3.7
20	Seaside II	creeping	3.7	5.3	7.7	4.0	4.0	4.7
		LSD at 5% =	0.8	1.4	0.8	1.1	1.1	1.9

[1]9 = best turf quality
[2]9 = earliest germination
[3]9 = best establishment
[4]9 = least dormant
[5]9 = least disease, suspected cool season brown patch
[6]9 = least dollar spot disease

Table 7. Yearly nitrogen (N) applied and mowing height (Ht) on bentgrass tests established at North Brunswick, NJ.

	1994		1995		1996		1997		1998	
	N[1]	Ht[2]	N	Ht	N	Ht	N	Ht	N	Ht
Table 1 (1994 Greens)	4.1	5/32	5.0	5/32	2.8	5/32	2.5	5/32	1.7	5/32
Table 2 (1994 Fairway)	4.1	17/32	3.0	17/32	3.3	13/32	1.5	13/32	0.9	13/32
Table 3 (1995 Fairway)					2.7	13/32	3.0	13.32	1.4	13/32
Table 4 (1996 Fairway)					2.7	13/32	3.0	13.32	1.9	13/32
Table 5 (1997 Fairway)									3.4	9/32
Table 6 (1997 Fairway)									2.9	13/32

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