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THE NEW JERSEY TURFGRASS ASSOCIATION

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# 1997 RUTGERS TURFGRASS PROCEEDINGS

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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 (white pages) includes lecture notes of papers presented at the 1997 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 (green pages) includes technical research papers containing original research findings and reviews covering selected subjects in turfgrass science. The primary objective of these papers is to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

Special thanks are given to those who have submitted papers for this proceedings, to the New Jersey Turfgrass Association for financial assistance, and to those individuals who have provided support to the Rutgers Turf Research Program at Cook College - Rutgers, The State University of New Jersey.

Dr. Ann B. Gould, Editor  
Dr. Bruce B. Clarke, Coordinator

# PERFORMANCE OF PERENNIAL RYEGRASS CULTIVARS AND SELECTIONS IN NEW JERSEY TURF TRIALS

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The development of a more attractive, turf type perennial ryegrass (*Lolium perenne* L.) continues at the New Jersey Agricultural Experiment Station and other research facilities across the nation. Many of the newer commercial and experimental perennial ryegrasses are darker in color and have a denser, lower growth habit and a more uniform appearance. The presence of an endophyte (*Neotyphodium lolii*) found in many ryegrasses continues to prove its benefits in the enhancement of stress tolerance and insect resistance.

By collecting new sources of germplasm from old turfs around the world, plant breeders are expanding the genetic base of perennial ryegrasses used in cultivar development. Further improvements are still needed, however, in summer performance, disease resistance, and cold hardiness.

The tables presented in this paper provide current data on trials established at the Plant Science Research Center, Adelphia, NJ and The Horticulture Farm II, North Brunswick, NJ. Two of the tests (Tables 1 and 2) were conducted in cooperation with the National Turfgrass Evaluation Program (NTEP).

## PROCEDURES

Four different perennial ryegrass tests were established between 1994 and 1996. One test was seeded at North Brunswick, NJ in September 1994 (Table 1). The three other trials were seeded at Adelphia, NJ: one in September 1994

(Table 2), the second in August 1995 (Tables 3 and 4), and the third in August 1996 (Table 5).

The three Adelphia tests were hand sown with 0.88 oz of seed into 3 X 5 ft plots (3.7 lb seed/1000 ft<sup>2</sup>). The North Brunswick test was hand sown with 2.1 oz of seed into 3.5 X 5.5 ft plots (6.8 lb seed/1000 ft<sup>2</sup>). A six inch unseeded border surrounded each plot. Each test was arranged in a randomized complete block design with three replications.

The annual rate of nitrogen (N) fertilization and mowing height for each test are presented in Table 6. Based on soil test results, tests were limed as needed to maintain a soil pH of 6.0 to 6.5. Single applications of fertilizer did not exceed 1.0 lb N/1000 ft<sup>2</sup>. The amount and timing of nitrogen applied to turf was often varied to encourage disease and other stresses. Tests were regularly mowed with reel mowers at 1.5 inches except for the 1994 Adelphia test, which was mowed at 2.0 inches. Rotary mowers were occasionally used to remove stems and prostrate leaf blades.

Management procedures included irrigation as needed to avoid severe drought stress, a fall application of 2,4-D and Dicamba for broadleaf weed control, a spring application of Dacthal on the Adelphia tests, and a spring application of Dimension or Betasan on the North Brunswick test for preemergence control of summer annuals. In July 1997, Daconil was applied to the 1994 North Brunswick test to control red thread disease.

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All tests were rated at frequent intervals throughout the growing season for turf quality (i.e., attractive appearance, turf color, uniformity, density, clean mowing, reduced rate of vertical growth, leaf texture, spring green-up, and insect and disease damage). The 1994 trial at North Brunswick (Table 1) was evaluated for spring green-up, color, leaf texture, red thread, and dollar spot; red thread and dollar spot were also assessed for the 1995 Adelpia test (Table 3).

The 1995 Adelpia test was subjected to artificial wear during the 1997 growing season. A novel traffic simulator developed at Rutgers University (Meyer et al., 1997) was used to apply wear to half of each plot. Plots were worn once in each direction every week during the growing season. Turf quality ratings were taken on the worn and unworn portion of each plot (Table 4).

All turf quality and disease ratings were based on a 1 to 9 scale, with 9 representing the best turf performance. Plots were evaluated by a number of turfgrass specialists to reduce the effects of personal preference for particular traits. All data were summarized and subjected to an analysis of variance. Means were separated using the least significant difference (LSD) multiple comparisons test.

## RESULTS AND DISCUSSION

Results for all tests are presented in Tables 1 through 5. Entries in these tables are ranked according to the two year quality average. A high quality average is generally indicative of a darker green color, greater density, finer leaf texture, lower growth habit, better mowing quality, and less damage due to insects or disease.

The color and leaf texture ratings in Table 1 indicated that many of the newer cultivars such as Brightstar II, Catalina, Palmer III, and Premier II possess a darker color and finer leaf texture than older varieties such as Linn and Pennfine. However, the spring green-up rating

indicated that newer perennial ryegrasses were slower to come out of winter dormancy than many of the older cultivars.

Moderate resistance to dollar spot was evident in varieties such as Affirmed, Brightstar II, Calypso, Palmer III, and Panther (Tables 1, 3, and 4). Red thread ratings (Tables 1 and 3) indicated that improvements in resistance to this disease are greatly needed.

Significant differences in wear were evident among many of the varieties and experimental turfgrasses tested (Table 4). Cultivars with improved density and turf quality such as Affirmed, Secretariat, Gator II, and ISI 95 APPRX-P demonstrated some of the best wear resistance. It appears the traffic simulator could provide a uniform stress important to the breeding program for selection purposes.

Although perennial ryegrasses have been considerably improved through breeding efforts, enhanced performance under low fertility conditions, improved heat and cold hardiness, and the ability to survive under ice sheets for extended periods are still needed. In addition, improved, genetically stable resistance to diseases such as gray leaf spot, crown rust, dollar spot, pink patch, red thread, and brown patch is also needed to attain a more attractive, reliable turf.

## ACKNOWLEDGMENTS

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Table 1. Performance of perennial ryegrass cultivars and selections in a turf trial seeded September 1994 at North Brunswick, NJ (Includes National Turfgrass Evaluation Program (NTEP)).

	Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Spring-green-up <sup>2</sup> April 1997	Color <sup>3</sup> May 1997	Leaf Texture <sup>4</sup> Nov. 1997	Red Thread <sup>5</sup> July 1997	Dollar Spot <sup>5</sup> Aug. 1997
		1995-1997 Avg.	1995 Avg.	1996 Avg.	1997 Avg.					
1	Brightstar II	6.6	7.0	6.4	6.3	2.7	8.3	6.0	2.7	6.0
2	Panther	6.4	6.5	6.2	6.6	5.7	5.7	7.7	5.7	6.7
3	Palmer III	6.4	7.0	6.1	6.2	5.7	7.0	7.7	4.7	5.0
4	Calypso II	6.4	6.7	6.1	6.3	5.7	5.7	7.3	5.7	7.3
5	Premier II	6.3	6.5	6.3	6.1	5.0	6.0	6.0	5.0	6.3
6	Catalina	6.2	6.4	6.0	6.2	4.3	6.3	7.0	4.0	8.0
7	Prelude III	6.2	6.5	6.0	6.1	4.3	8.0	5.7	4.0	5.0
8	Montery	6.2	6.7	5.9	5.9	4.7	5.3	7.0	4.7	7.0
9	Secretariat	6.1	6.8	5.7	5.9	5.7	6.0	7.7	5.7	6.0
10	Repel III	6.1	6.4	5.9	6.1	5.0	8.0	5.7	5.0	6.7
11	Line Drive	6.1	6.4	5.7	6.0	4.7	7.0	6.7	5.0	5.7
12	LRF-94-C8	6.0	6.4	5.9	5.8	5.3	8.0	6.7	3.3	5.0
13	Manhattan III	6.0	6.3	5.6	6.2	4.7	6.7	7.3	5.7	7.7
14	Laredo	5.9	6.0	5.9	5.8	6.3	5.7	6.0	5.7	6.3
15	Citation III	5.9	6.2	5.7	5.7	6.0	6.7	5.7	3.3	6.0
16	Chaparral	5.9	6.3	5.4	5.9	4.7	7.3	6.3	2.3	6.7
17	Pennant II	5.8	6.4	5.5	5.7	4.7	7.0	6.7	3.7	5.3
18	Divine	5.8	6.1	6.1	5.3	6.0	6.0	5.3	4.3	5.0
19	Caddieshack	5.8	6.2	5.5	5.6	5.0	6.7	6.7	5.0	7.7
20	Esquire	5.7	5.7	5.6	5.8	5.7	6.0	4.7	5.3	6.7

(Continued)

Table 1 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Spring-green-up <sup>2</sup> April 1997	Color <sup>3</sup> May 1997	Leaf Texture <sup>4</sup> Nov. 1997	Red Thread <sup>5</sup> July 1997	Dollar Spot <sup>5</sup> Aug. 1997
	1995-1997 Avg.	1995 Avg.	1996 Avg.	1997 Avg.					
21 Majesty	5.7	5.9	5.5	5.6	3.7	7.0	6.3	4.7	6.0
22 Prizm	5.6	6.1	5.8	5.0	5.3	5.0	6.3	4.7	5.7
23 Pick Lp 102-92	5.6	6.2	5.4	5.3	4.7	6.7	5.3	4.0	5.7
24 Accent	5.6	6.1	5.6	5.1	4.7	5.3	6.3	6.3	7.3
25 MB 45	5.6	5.8	5.6	5.3	4.3	7.0	5.3	3.7	4.3
26 WX3-93	5.6	6.1	5.0	5.6	4.3	7.3	5.7	4.7	4.3
27 Top Hat	5.5	5.9	5.6	5.1	5.3	5.0	6.0	5.3	6.0
28 Wind Dancer	5.5	5.9	5.2	5.5	4.0	7.7	7.7	3.3	6.0
29 ISI-MHB	5.5	6.1	5.2	5.3	5.0	4.3	6.3	5.0	6.0
30 Windstar	5.5	5.8	5.3	5.4	5.3	4.3	6.7	6.0	8.0
31 Elf	5.5	6.0	5.6	4.9	5.7	5.3	6.3	4.7	4.7
32 APR 124	5.5	5.6	5.4	5.4	4.7	5.3	6.3	5.3	7.0
33 Omega III	5.5	6.0	5.6	4.8	5.0	5.3	6.3	3.7	6.0
34 Top Gun	5.4	5.6	5.5	5.2	5.7	5.0	5.0	6.3	6.3
35 Precision	5.4	5.6	5.6	5.0	5.7	4.7	6.7	6.3	6.3
36 Yorktown III	5.4	5.5	5.2	5.5	6.3	4.3	7.3	6.3	7.3
37 Radiant	5.4	5.7	5.1	5.3	3.7	8.3	4.0	2.7	3.7
38 Omni	5.3	5.8	5.0	5.2	4.3	5.7	5.3	5.3	5.7
39 Sonata	5.3	6.3	4.6	5.1	4.3	5.7	7.7	4.3	8.3
40 Brightstar	5.3	6.0	4.8	5.2	4.7	6.7	6.7	4.0	5.3

(Continued)

Table 1 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Spring-green-up <sup>2</sup> April 1997	Color <sup>3</sup> May 1997	Leaf Texture <sup>4</sup> Nov. 1997	Red Thread <sup>5</sup> July 1997	Dollar Spot <sup>5</sup> Aug. 1997
	1995-1997 Avg.	1995 Avg.	1996 Avg.	1997 Avg.					
41 Edge	5.3	5.3	5.3	5.3	5.7	4.7	4.7	6.3	7.0
42 Mardi Gras	5.3	5.8	5.3	4.7	4.7	5.3	5.3	4.0	5.0
43 Head Start	5.3	5.8	4.9	5.1	3.3	6.3	5.3	5.0	5.3
44 Night Hawk	5.3	5.6	5.4	4.9	4.7	5.7	6.3	4.3	3.3
45 Advantage	5.3	5.7	5.1	5.0	4.3	5.7	6.3	3.7	6.0
46 Palmer II	5.2	5.8	4.9	5.0	5.0	6.3	4.0	5.3	4.3
47 Legacy II	5.2	5.5	4.6	5.5	4.7	6.3	5.7	3.7	7.3
48 Roadrunner	5.2	5.2	4.9	5.6	6.0	6.0	5.0	4.3	7.3
49 Stallion Supreme	5.2	5.5	5.1	5.1	5.0	5.0	5.7	5.3	6.3
50 Imagine	5.2	5.8	4.7	5.1	2.7	8.0	5.0	3.0	4.0
51 Prelude II	5.2	5.4	4.8	5.4	5.3	5.0	5.3	6.0	5.3
52 Achiever	5.2	5.2	5.2	5.1	6.7	4.7	3.7	5.0	7.0
53 SR 4200	5.2	5.3	5.1	5.2	5.3	4.3	6.0	5.7	6.3
54 Riviera II	5.2	5.4	5.2	5.0	5.0	5.3	5.0	4.7	5.0
55 Wizard	5.2	5.2	5.2	5.0	5.3	5.0	6.0	4.3	5.7
56 Stardance	5.1	5.5	5.1	4.8	6.7	5.0	6.0	4.3	6.0
57 Saturn II	5.1	5.5	5.1	4.8	6.0	4.7	5.7	3.0	5.0
58 Cutter	5.1	5.4	4.7	5.2	4.0	5.3	5.7	5.3	6.7
59 MVF-4-1	5.1	5.4	4.7	5.2	6.0	4.3	7.0	5.3	7.0
60 Passport	5.1	5.3	4.8	5.1	4.3	5.7	4.0	3.0	6.3

(Continued)

Table 1 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Spring-green-up <sup>2</sup> April 1997	Color <sup>3</sup> May 1997	Leaf Texture <sup>4</sup> Nov. 1997	Red Thread <sup>5</sup> July 1997	Dollar Spot <sup>5</sup> Aug. 1997
	1995-1997 Avg.	1995 Avg.	1996 Avg.	1997 Avg.					
61 Blackhawk	5.1	5.3	5.0	4.9	5.0	4.3	5.0	4.7	5.3
62 Koos 93-6	5.1	5.4	4.8	5.0	6.0	4.7	6.0	5.7	6.3
63 Excel	5.1	5.4	5.2	4.6	5.0	6.7	5.0	2.3	2.7
64 WX3-91	5.0	5.2	4.8	5.1	7.0	5.0	5.0	4.7	6.0
65 WVPB-93-KFK	5.0	5.3	5.3	4.5	5.3	4.7	4.7	5.0	4.3
66 Assure	5.0	5.4	4.8	4.8	5.0	5.0	5.3	5.3	4.3
67 Nine-O-One	5.0	5.2	4.6	5.1	4.7	5.7	5.0	6.0	5.3
68 Quickstart	5.0	5.2	5.2	4.5	5.3	4.7	4.0	4.7	5.7
69 Blazer III	5.0	5.4	4.6	4.8	4.3	5.7	5.7	4.0	5.3
70 Vivid	4.9	5.4	4.8	4.6	5.3	5.3	4.7	4.7	6.7
71 Stallion Select	4.9	5.0	5.1	4.7	5.0	4.7	4.0	6.0	4.3
72 PST-2CB	4.9	5.8	4.6	4.5	6.0	5.0	4.0	4.0	4.7
73 Repell II	4.9	5.3	4.8	4.6	4.7	5.0	4.7	3.3	3.3
74 Morning Star	4.9	4.8	4.9	4.9	5.7	4.7	4.7	6.7	5.3
75 R2	4.9	4.9	5.0	4.7	6.0	4.0	6.0	5.3	7.0
76 PS-D-9	4.9	4.9	5.0	4.7	5.3	4.3	5.0	6.3	6.0
77 CAS-LP23	4.8	5.4	4.5	4.5	4.0	6.3	6.0	4.0	4.7
78 Advent	4.8	5.3	4.6	4.6	5.7	4.0	5.7	5.7	6.0
79 Koos 93-3	4.8	5.0	4.9	4.6	5.7	4.7	4.3	5.3	6.0
80 SR 4010	4.8	5.2	4.7	4.5	5.0	4.3	4.3	4.7	5.0

(Continued)

Table 1 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Spring-green-up <sup>2</sup> April 1997	Color <sup>3</sup> May 1997	Leaf Texture <sup>4</sup> Nov. 1997	Red Thread <sup>5</sup> July 1997	Dollar Spot <sup>5</sup> Aug. 1997
	1995-1997 Avg.	1995 Avg.	1996 Avg.					
81 Navajo	4.7	5.3	4.5	3.0	5.0	5.3	4.3	4.7
82 Academy	4.7	5.2	4.7	5.7	4.7	5.3	4.3	6.0
83 APR 106	4.6	4.7	4.8	5.0	4.7	4.7	4.0	6.7
84 WVPB-PR-C-2	4.6	5.1	4.4	5.0	4.3	4.7	4.3	4.3
85 SR 4400	4.5	5.3	4.2	5.0	4.3	5.3	6.0	5.0
86 Express	4.5	4.6	4.9	6.0	3.7	4.3	5.3	6.3
87 Dancer	4.5	5.0	4.7	5.3	4.3	5.0	5.7	4.0
88 Nobility	4.5	4.9	4.3	5.3	3.7	5.0	6.3	5.0
89 BAR Er 5813	4.5	5.2	4.5	4.3	4.7	5.3	3.0	4.0
90 Pegasus	4.4	4.5	4.7	6.0	4.3	4.7	4.7	4.0
91 APR 131	4.4	4.9	4.5	5.3	4.0	3.7	5.3	4.0
92 WVPB 92-4	4.4	4.5	4.3	6.3	3.3	3.0	6.0	5.7
93 Saturn	4.3	4.4	4.3	5.7	4.3	5.0	5.0	4.7
94 Prelude	4.2	4.3	4.4	6.0	3.0	4.7	4.0	3.7
95 Williamsburg	4.1	4.4	4.3	5.0	3.3	3.3	4.3	5.3
96 Repell	4.0	4.3	4.0	6.7	3.0	5.3	5.3	4.0
97 Blazer II	3.9	4.1	4.0	5.0	3.7	3.3	3.0	2.7
98 DLP 1305	3.8	4.1	3.5	5.7	4.7	3.7	5.0	5.7
99 Manhattan II	3.8	3.9	3.7	5.7	3.0	5.3	4.3	4.0
100 Fiesta II	3.8	4.0	4.0	5.3	3.3	4.3	3.0	3.0

(Continued)

Table 1 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Spring-green-up <sup>2</sup> April 1997	Color <sup>3</sup> May 1997	Leaf Texture <sup>4</sup> Nov. 1997	Red Thread <sup>5</sup> July 1997	Dollar Spot <sup>5</sup> Aug. 1997
	1995-1997 Avg.	1995 Avg.	1996 Avg.	1997 Avg.					
101 APR 066	3.8	4.4	3.5	3.4	5.3	3.7	4.7	3.3	7.7
102 Dasher II	3.7	4.2	3.5	3.5	5.3	3.0	4.7	4.7	3.7
103 Mulligan	3.5	3.6	3.7	3.3	6.7	3.0	4.7	5.7	3.3
104 Figaro	3.0	3.3	2.8	2.9	5.0	3.3	3.3	5.7	3.0
105 DSV NA 9402	3.0	3.2	3.1	2.7	5.3	3.7	2.3	5.3	5.0
106 DSV NA 9401	3.0	3.4	3.0	2.5	4.7	3.3	2.0	4.3	4.3
107 Pennfine	3.0	3.2	2.7	3.0	6.7	2.3	2.7	5.3	5.3
108 Linn	1.6	1.7	1.6	1.4	6.7	1.0	1.0	4.7	5.0
LSD at 5% =									
	0.5	0.7	0.9	0.7	1.5	0.9	1.8	1.8	2.1

<sup>1</sup>9 = best turf quality  
<sup>2</sup>9 = freshest green color  
<sup>3</sup>9 = darkest green color  
<sup>4</sup>9 = finest leaf texture  
<sup>5</sup>9 = least disease

Table 2. Performance of perennial ryegrass cultivars and selections in a turf trial seeded September 1994 at Adelphia, NJ (Includes National Turfgrass Evaluation Program (NTEP)).

	Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			
		1995-1997 Avg.	1995 Avg.	1996 Avg.	1997 Avg.
1	Brightstar II	6.8	7.6	7.0	5.9
2	Premier II	6.1	6.9	6.0	5.5
3	Wind Dancer	6.0	7.0	6.0	5.1
4	MB 45	6.0	6.8	6.0	5.2
5	Palmer III	6.0	7.1	5.7	5.2
6	Pennant II	6.0	7.0	6.0	5.0
7	Brightstar	5.9	6.2	6.2	5.4
8	Line Drive	5.9	6.8	5.7	5.2
9	Majesty	5.8	6.8	5.6	5.0
10	Secretariat	5.8	6.3	5.7	5.4
11	Palmer II	5.7	6.2	5.5	5.5
12	Calypso II	5.7	6.4	5.9	4.9
13	Prelude III	5.7	6.5	5.7	4.9
14	Panther	5.7	5.6	5.6	5.8
15	Elf	5.7	6.5	5.5	5.0
16	Legacy II	5.7	6.5	5.5	5.0
17	Chaparral	5.7	6.4	5.4	5.2
18	Monterey	5.6	5.9	5.4	5.6
19	Excel	5.6	6.6	5.4	4.8
20	Caddieshack	5.6	5.8	5.8	5.1
21	LRF-94-C8	5.6	6.6	5.7	4.4
22	Sonata	5.6	6.0	5.6	5.1
23	Repel III	5.5	6.5	5.5	4.6
24	Divine	5.5	6.3	5.5	4.8
25	WX3-93	5.5	5.7	5.3	5.4
26	Laredo	5.4	5.9	5.6	4.7
27	Catalina	5.4	5.8	5.4	5.0
28	Wizard	5.3	5.9	5.3	4.8
29	Advantage	5.3	5.8	5.2	5.0
30	Pick Lp 102-92	5.3	5.9	5.6	4.4

(Continued)

Table 2 (continued).

	Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			
		1995-1997 Avg.	1995 Avg.	1996 Avg.	1997 Avg.
31	Manhattan III	5.3	5.7	5.6	4.5
32	Radiant	5.2	5.7	5.4	4.6
33	Prelude II	5.2	5.1	5.4	5.2
34	Stallion Select	5.2	5.2	5.4	5.1
35	Prizm	5.2	5.7	5.1	4.8
36	Imagine	5.2	5.8	5.3	4.5
37	Top Hat	5.2	5.6	5.3	4.6
38	Citation III	5.2	5.7	5.2	4.5
39	SR 4200	5.1	5.6	5.1	4.7
40	Repell II	5.1	5.0	5.2	5.1
41	Accent	5.0	5.1	5.2	4.8
42	Esquire	5.0	4.7	5.2	5.2
43	ISI-MHB	5.0	5.1	5.0	5.0
44	Passport	5.0	5.3	5.2	4.5
45	Mardi Gras	5.0	5.5	4.9	4.5
46	Omni	5.0	5.6	4.8	4.4
47	Head Start	5.0	5.2	4.8	4.9
48	Roadrunner	4.9	5.4	5.0	4.3
49	Advent	4.9	4.9	5.0	4.6
50	Cutter	4.8	4.7	5.0	4.8
51	Night Hawk	4.8	5.3	4.9	4.3
52	Saturn II	4.8	5.6	4.7	4.1
53	Blackhawk	4.8	4.9	4.9	4.5
54	Blazer III	4.7	4.8	5.0	4.4
55	Stardance	4.7	5.0	4.6	4.5
56	Yorktown III	4.7	4.5	4.7	4.9
57	Top Gun	4.7	4.4	5.0	4.8
58	Precision	4.7	4.4	4.9	4.7
59	Riviera II	4.7	4.9	4.8	4.3
60	Assure	4.7	4.4	5.2	4.4

(Continued)

Table 2 (continued).

	Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			
		1995-1997 Avg.	1995 Avg.	1996 Avg.	1997 Avg.
61	APR 106	4.7	4.6	5.0	4.4
62	Morning Star	4.7	4.6	4.9	4.4
63	Koos 93-6	4.6	4.6	4.6	4.7
64	Omega III	4.6	5.2	4.4	4.2
65	Vivid	4.6	4.5	4.5	4.7
66	WX3-91	4.6	4.4	4.9	4.4
67	Windstar	4.5	4.6	4.7	4.3
68	Pegasus	4.5	4.8	4.6	4.2
69	Koos 93-3	4.5	4.7	4.6	4.2
70	Navajo	4.5	4.7	4.6	4.2
71	WVPB-93-KFK	4.5	4.6	4.6	4.2
72	Nine-O-One	4.4	4.4	4.6	4.2
73	Edge	4.4	4.2	4.5	4.5
74	Quickstart	4.4	4.6	4.8	3.9
75	PST-2CB	4.4	4.5	4.7	3.9
76	Achiever	4.4	4.9	4.3	3.9
77	APR 124	4.4	4.3	4.6	4.1
78	CAS-LP23	4.3	4.9	4.0	4.0
79	BAR Er 5813	4.3	4.3	4.4	4.1
80	Stallion Supreme	4.3	4.5	4.2	4.1
81	R2	4.3	3.9	4.6	4.3
82	SR 4400	4.3	4.3	4.2	4.3
83	MVF-4-1	4.2	4.4	4.5	3.9
84	SR 4010	4.2	4.1	4.2	4.4
85	Nobility	4.2	3.8	4.6	4.3
86	Blazer II	4.2	4.0	4.4	4.2
87	Dancer	4.1	4.2	3.9	4.2
88	APR 131	4.1	4.0	4.5	3.8
89	Academy	4.1	4.2	4.2	3.9
90	Competitor	4.0	4.0	4.2	4.0

(Continued)

Table 2 (continued).

	Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			
		1995-1997 Avg.	1995 Avg.	1996 Avg.	1997 Avg.
91	Saturn	4.0	4.1	4.3	3.7
92	Williamsburg	4.0	3.9	4.1	4.1
93	Dasher II	4.0	3.7	3.9	4.4
94	PS-D-9	4.0	3.8	4.3	3.8
95	Fiesta II	4.0	4.0	4.0	3.9
96	WVPB-PR-C-2	3.9	3.8	4.0	3.9
97	Repell	3.9	3.8	3.8	4.1
98	Gator E-	3.8	3.7	3.8	4.0
99	Express	3.8	3.6	3.9	3.9
100	Gator E+	3.7	3.7	3.6	3.9
101	Prelude	3.7	3.7	3.9	3.5
102	WVPB 92-4	3.6	3.7	3.9	3.3
103	Manhattan II	3.6	3.5	3.8	3.5
104	APR 066	3.6	3.3	3.7	3.8
105	Pennant	3.5	3.2	4.1	3.3
106	DLP 1305	3.5	3.4	3.5	3.5
107	DSV NA 9402	3.2	2.6	3.4	3.5
108	Figaro	3.1	2.6	3.4	3.4
109	DSV NA 9401	2.9	2.3	3.0	3.3
110	Pennfine	2.6	2.5	2.9	2.5
111	Linn	1.1	1.1	1.1	1.1
	LSD at 5% =	0.7	0.7	0.8	0.9

<sup>1</sup>9=best turf quality

Table 3. Performance of perennial ryegrass cultivars and selections in a turf trial seeded August 1995 at Adelphia, NJ.

	Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Red Thread <sup>2</sup> Feb. 1997	Dollar Spot <sup>2</sup> Aug. 1997
		1996- 1997 Avg.	1996 Avg.	1997 Avg.		
1	Affirmed	6.9	7.0	6.7	3.7	7.6
2	Secretariat	6.4	6.6	6.3	3.7	7.3
3	Palmer III	6.0	6.9	5.2	4.0	7.0
4	C-10	5.9	6.1	5.7	3.0	8.3
5	Calypso II	5.7	6.0	5.4	3.3	7.3
6	Gator II	5.6	5.8	5.3	3.3	8.3
7	Archer	5.5	6.1	5.0	4.0	7.7
8	Legacy II	5.4	5.8	5.0	4.3	8.3
9	ISI 95 APRX-P	5.4	5.6	5.1	3.7	9.0
10	ISI 95 APRX	5.2	5.6	4.8	3.3	8.7
11	ISI R2B.1xDG	5.2	5.5	4.8	3.0	7.7
12	Brightstar	5.1	5.2	5.0	3.3	7.3
13	Elf	5.1	5.3	4.8	3.7	7.3
14	J-1704	5.0	5.0	5.0	3.7	7.3
15	Prizm	5.0	4.7	5.3	3.3	6.3
16	Repell II	5.0	4.9	5.0	3.3	8.3
17	Advantage	4.9	5.3	4.5	4.0	7.7
18	LP22	4.7	5.4	4.0	3.7	7.3
19	Wx4-134	4.6	4.5	4.7	2.7	8.3
20	SR-4200	4.6	4.7	4.6	3.3	8.3
21	Prelude II	4.6	4.4	4.7	3.7	7.3
22	LP23	4.6	5.2	3.9	2.7	7.3
23	Pearl	4.6	4.9	4.2	2.7	6.7
24	Edge	4.5	4.2	4.7	4.0	7.7
25	Assure	4.5	4.4	4.6	3.0	7.7
26	Cutter	4.5	4.3	4.6	2.3	8.7
27	ER-95	4.4	4.3	4.5	3.0	8.0
28	Advent	4.4	4.0	4.7	3.0	7.0
29	Chatham	4.2	3.7	4.6	3.7	8.3
30	Seville	4.2	3.9	4.4	3.0	8.7

(Continued)

Table 3 (continued).

	Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Red Thread <sup>2</sup> Feb. 1997	Dollar Spot <sup>2</sup> Aug. 1997
		1996- 1997 Avg.	1996 Avg.	1997 Avg.		
31	Top Hat	4.1	3.5	4.6	4.0	7.3
32	Blazer II	4.0	4.1	4.0	4.3	6.3
33	MP26	4.0	4.0	3.9	4.0	8.0
34	Fiesta II	3.9	4.0	3.9	3.0	8.0
35	Yorktown III	3.9	3.8	4.0	3.7	8.3
36	Dasher II	3.9	3.5	4.3	3.7	8.3
37	Lowgrow	3.9	3.5	4.2	4.0	6.7
38	JD PR-7	3.7	3.4	4.0	4.0	7.7
39	Edge	3.6	3.5	3.7	3.7	8.3
40	Gettysburg	3.5	3.1	3.9	3.7	8.3
41	Pennfine	2.8	2.2	3.3	3.7	7.7
42	Duet	2.6	2.3	2.8	3.0	8.3
43	Linn	1.4	1.2	1.5	3.3	9.0
	LSD at 5% =	0.5	0.7	0.7	1.5	2.0

<sup>1</sup>9 = best turf quality<sup>2</sup>9 = least disease

Table 4. Performance of perennial ryegrass cultivars and selections in a turf trial seeded August 1995 at Adelphia, NJ.

Cultivar or Selection	Turf Quality <sup>1</sup>												---Dollar Spot <sup>2</sup> ---							
	1996-1997 Avg.		Unworn June 3 1997		Unworn June 13 1997		Worn June 13 1997		Unworn Oct. 7 1997		Worn Oct. 7 1997		Unworn Nov. 21 1997		Worn Nov. 21 1997		Unworn Aug. 29 1997		Worn Aug. 29 1997	
1 Affirmed	6.9	6.8	5.5	6.5	5.0	7.3	5.7	5.7	7.0	5.7	7.2	5.7	7.0	5.7	7.2	5.7	7.2	5.2	5.3	
2 Secretariat	6.4	6.7	5.0	6.7	5.3	6.0	5.0	5.0	5.7	5.0	6.0	5.0	5.7	5.0	6.0	5.0	6.0	5.3	5.3	
3 Palmer III	6.0	5.3	4.7	6.0	4.3	4.0	3.3	3.3	5.7	3.3	6.0	3.3	5.7	4.0	6.0	4.0	6.0	5.0	5.0	
4 C-10	5.9	7.0	6.0	6.3	4.7	5.3	4.3	4.3	5.0	4.3	6.0	4.3	5.0	4.0	6.0	4.0	6.0	5.0	5.0	
5 Calypso II	5.7	6.0	4.7	5.7	4.0	5.0	4.0	4.0	6.0	4.0	6.0	4.3	6.0	4.3	6.0	4.3	6.0	5.3	5.3	
6 Gator II	5.6	4.3	4.3	5.7	4.3	6.0	4.7	4.7	6.0	4.7	7.3	6.0	6.0	5.0	7.3	5.0	7.3	6.0	6.0	
7 Archer	5.5	5.7	5.3	5.3	4.0	4.0	3.3	3.3	4.7	3.3	5.7	4.0	4.7	3.7	5.7	4.0	5.7	4.3	4.3	
8 Legacy II	5.4	6.0	4.7	5.0	3.3	4.3	3.0	3.0	4.7	3.0	7.0	4.0	4.7	4.0	7.0	4.0	7.0	4.7	4.7	
9 ISI 95 APRX-P	5.4	5.3	5.0	5.7	4.7	4.7	3.3	3.3	5.0	3.3	6.0	4.0	5.0	4.0	6.0	4.0	6.0	5.7	5.7	
10 ISI 95 APRX	5.2	5.3	4.7	5.0	3.7	4.7	3.7	3.7	4.7	3.7	7.3	4.3	4.7	4.3	7.3	4.3	7.3	5.3	5.3	
11 ISI R2B.1xDG	5.2	6.0	4.7	5.7	4.0	4.0	3.3	3.3	3.7	3.3	5.7	4.0	3.7	2.7	5.7	2.7	5.7	4.7	4.7	
12 Brightstar	5.1	6.0	5.3	5.3	3.7	4.7	3.3	3.3	4.7	3.3	5.0	4.7	4.7	3.3	5.0	3.3	5.0	4.7	4.7	
13 Elf	5.1	5.0	3.7	4.7	3.3	4.7	3.0	3.0	5.0	3.0	5.3	5.0	5.0	3.3	5.3	3.3	5.3	4.0	4.0	
14 J-1704	5.0	5.0	4.7	5.3	3.7	4.7	3.7	3.7	5.3	3.7	4.3	4.3	5.3	4.3	4.3	4.3	4.3	4.0	4.0	
15 Prizm	5.0	6.0	4.7	5.7	4.0	3.7	2.7	2.7	5.7	2.7	4.3	4.3	5.7	4.3	4.3	4.3	4.3	3.0	3.0	
16 Repell II	5.0	5.7	4.0	5.0	3.3	4.7	3.0	3.0	4.7	3.0	6.0	3.7	4.7	3.7	6.0	3.7	6.0	4.3	4.3	
17 Advantage	4.9	5.3	5.0	4.7	3.0	3.7	2.3	2.3	3.7	2.3	5.3	3.0	3.7	3.0	5.3	3.0	5.3	5.0	5.0	
18 LP22	4.7	4.7	5.0	5.0	3.3	3.3	3.0	3.0	3.3	3.0	5.0	3.3	3.3	2.3	5.0	2.3	5.0	3.7	3.7	
19 WX4-134	4.6	5.7	4.3	4.7	3.3	5.3	4.0	4.0	4.3	4.0	6.7	4.3	4.3	3.7	6.7	4.3	6.7	5.3	5.3	
20 SR-4200	4.6	4.3	4.0	4.7	3.3	5.0	4.0	4.0	4.7	4.0	6.7	3.3	4.7	3.3	6.7	3.3	6.7	5.3	5.3	

(Continued)

Table 4 (continued).

Cultivar or Selection	Turf Quality <sup>1</sup>												---Dollar Spot <sup>2</sup> ---							
	1996-1997 Avg.		Unworn June 3 1997		Unworn June 13 1997		Worn June 13 1997		Unworn Oct. 7 1997		Worn Oct. 7 1997		Unworn Nov. 21 1997		Worn Nov. 21 1997		Unworn Aug. 29 1997		Worn Aug. 29 1997	
21	4.6	5.7	4.0	5.0	3.7	4.0	3.0	4.7	4.0	3.0	4.7	3.7	4.7	3.0	5.7	4.3				
22	4.6	5.7	4.7	4.3	3.3	3.7	3.0	3.0	3.7	3.0	3.0	2.3	3.0	3.0	5.3	3.0				
23	4.6	3.7	4.3	4.7	2.7	3.3	3.0	3.0	3.3	3.0	4.0	3.3	4.0	3.0	6.3	4.3				
24	4.5	5.0	4.0	5.0	3.3	4.3	2.7	4.3	4.3	2.7	4.3	3.3	4.3	2.7	6.0	4.3				
25	4.5	4.3	4.3	4.3	3.0	4.7	3.7	3.7	4.7	3.7	5.0	4.3	5.0	3.7	6.7	5.3				
26	4.5	4.3	4.0	4.3	3.3	4.3	2.7	4.3	4.3	2.7	4.7	3.7	4.7	2.7	5.0	4.3				
27	4.4	5.0	3.3	5.0	3.0	5.0	3.7	3.7	5.0	3.7	4.3	3.3	4.3	3.7	5.7	3.3				
28	4.2	4.3	3.7	4.3	3.0	4.7	4.3	4.3	4.7	4.3	4.7	3.7	4.7	4.3	7.0	6.7				
29	4.2	4.0	4.3	4.3	3.0	4.7	3.3	3.3	4.7	3.3	4.0	3.3	4.0	3.3	7.3	5.7				
30	4.1	4.3	3.7	4.7	3.0	4.7	3.7	3.7	4.7	3.7	4.3	3.0	4.3	3.0	8.3	7.0				
31	4.0	4.0	3.7	4.0	2.7	3.3	2.7	2.7	3.3	2.7	3.7	3.3	3.7	2.7	5.0	4.3				
32	4.0	4.0	4.3	4.0	3.0	4.0	2.7	2.7	4.0	2.7	4.0	3.0	4.0	2.7	5.3	3.7				
33	3.9	3.7	2.7	3.7	2.7	4.0	2.7	2.7	4.0	2.7	4.0	3.0	4.0	2.7	5.0	3.3				
34	3.9	4.0	4.0	3.7	2.7	4.0	2.7	2.7	4.0	2.7	4.0	3.7	4.0	2.7	5.0	3.7				
35	3.9	4.0	3.0	4.3	2.7	4.0	3.0	3.0	4.0	3.0	4.7	3.7	4.7	3.0	6.7	6.0				
36	3.9	4.3	3.7	4.3	3.0	3.7	2.3	2.3	3.7	2.3	4.0	3.0	4.0	2.3	5.0	3.0				
37	3.7	4.0	3.7	4.0	2.7	4.0	3.0	3.0	4.0	3.0	3.3	3.0	3.3	3.0	5.7	5.7				
38	3.6	4.0	3.7	3.7	2.7	4.0	2.3	2.3	4.0	2.3	3.0	2.0	3.0	2.0	5.7	4.3				
39	3.5	3.3	3.0	4.0	2.7	3.7	3.3	3.3	3.7	3.3	4.3	3.7	4.3	3.3	6.0	5.7				
40	2.8	3.0	2.7	3.3	2.0	3.7	2.3	2.3	3.7	2.3	3.0	2.0	3.0	2.3	7.3	7.0				

(Continued)

Table 4 (continued).

Cultivar or Selection	Turf Quality <sup>1</sup>												---Dollar Spot <sup>2</sup> ---	
	Unworn June 1997	Worn June 1997	Unworn June 1997	Worn June 1997	Unworn Oct. 7 1997	Worn Oct. 7 1997	Unworn Nov. 21 1997	Worn Nov. 21 1997	Unworn Oct. 7 1997	Worn Oct. 7 1997	Unworn Nov. 21 1997	Worn Nov. 21 1997	Unworn Aug. 29 1997	Worn Aug. 29 1997
1996-1997 Avg.	3	3	13	13	7	7	21	21	7	7	21	21	29	29
41 Duet	2.7	2.3	2.7	1.7	3.0	2.0	3.3	2.7	3.0	2.0	3.3	2.7	5.7	4.3
42 Linn	3.3	1.0	1.0	1.0	1.3	1.0	1.0	1.0	1.3	1.0	1.0	1.0	9.0	9.0
LSD at 5% =	1.4	1.1	1.0	0.9	1.2	1.1	1.2	1.1	1.2	1.1	1.2	1.1	2.2	1.1

<sup>1</sup>9 = best turf quality

<sup>2</sup>9 = least disease

Table 5. Performance of perennial ryegrass cultivars and selections in a turf trial seeded August 1996 at Adelphia, NJ.

	Cultivar or Selection	Turf Quality <sup>1</sup> 1997 Avg.
1	Paragon	6.5
2	Churchill	6.3
3	BAR Lp 695-1	6.3
4	BAR Lp 94-1	6.2
5	Exacta	5.9
6	Palmer III	5.8
7	Gator II	5.5
8	Calypso II	5.4
9	Catalina	5.1
10	ISI PR-37	5.1
11	Secretariat	5.0
12	BAR Lp 695-2	4.8
13	Manhattan III	4.7
14	Citation III	4.6
15	Advantage	4.5
16	Palmer II	4.5
17	Saturn II	4.4
18	Brightstar	4.4
19	ISI PR-38	4.2
20	APM	4.2
21	Equal	4.2
22	Elf	4.2
23	Prizm	4.2
24	Mark V	4.2
25	Windstar	4.1
26	Quickstart	4.0
27	Prelude II	4.0
28	SR 4200	3.9
29	Seville	3.9
30	Advent	3.8

(Continued)

Table 5 (continued).

	Cultivar or Selection	Turf Quality <sup>1</sup> 1997 Avg.
31	Dandy	3.7
32	Manhattan II	3.5
33	Express	3.5
34	Blazer II	3.3
35	Fiesta II	3.2
36	Pennfine	2.4
37	Linn	1.1
	LSD at 5% =	0.6

<sup>1</sup>9 = best turf quality

Table 6. Yearly nitrogen (N) applied and mowing height (Ht) on perennial ryegrass tests established at North Brunswick and Adelphia, NJ

	1995		1996		1997	
	N <sup>1</sup>	Ht <sup>2</sup>	N	Ht	N	Ht
Table 1 (1994 North Brunswick) .....	5.9	1.5	4.3	1.5	3.6	1.5
Table 2 (1994 Adelphia) .....	7.0	1.5	3.4	1.5	3.5	2.0
Tables 3 and 4 (1995 Adelphia) .....			5.0	1.5	3.8	1.5
Table 5 (1996 Adelphia) .....					4.3	1.5

<sup>1</sup>Annual N applied (lbs/1000 ft<sup>2</sup>).

<sup>2</sup>Mowing height in inches.