

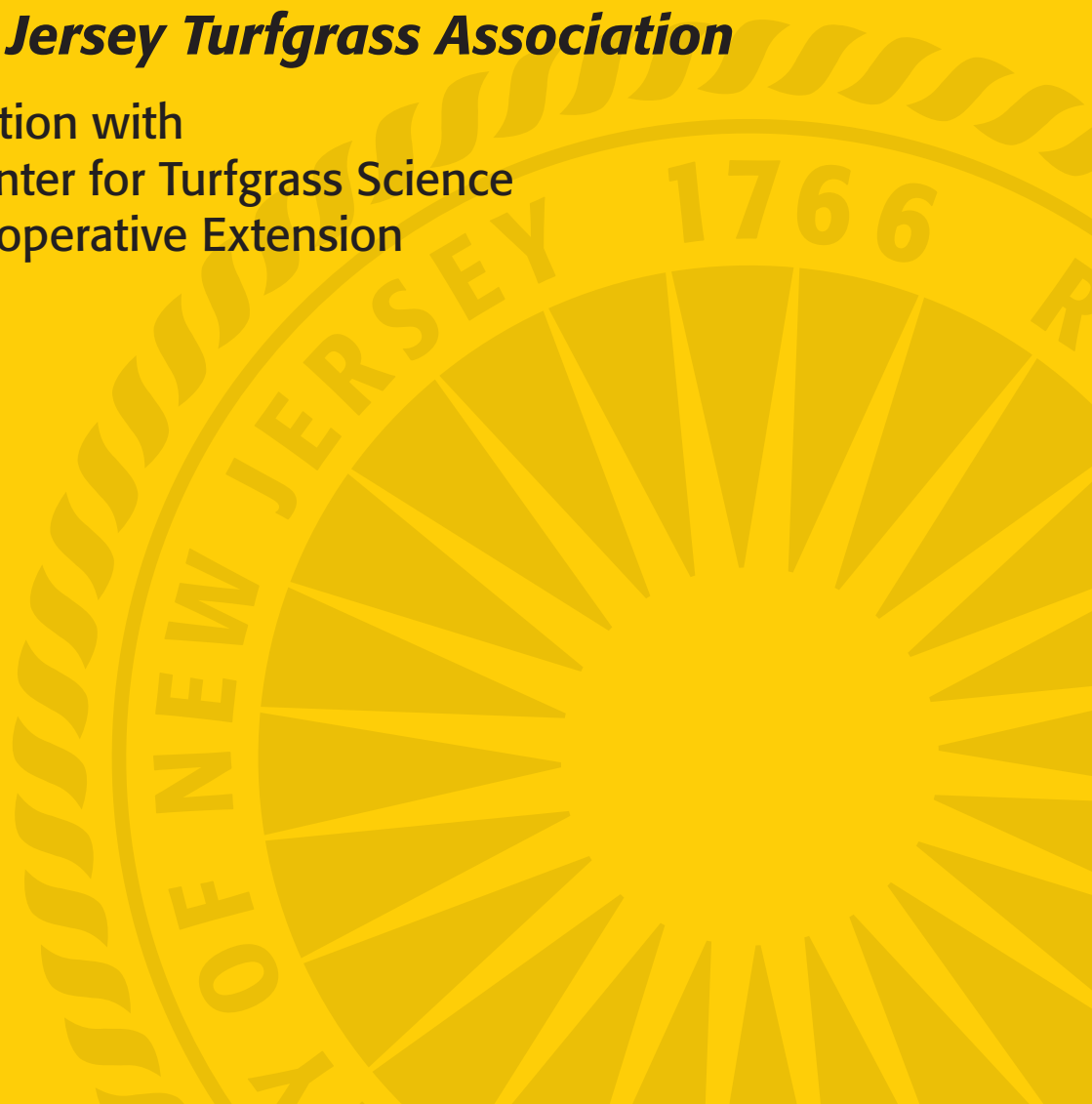
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The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey 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.

This publication includes lecture notes of papers presented at the 2014 GREEN EXPO Turf and Landscape Conference. Publication of these lectures provides a readily available source of information

covering a wide range of topics and includes technical and popular presentations of importance to the turfgrass industry.

This proceedings also includes research papers that contain original research findings and reviews of selected subjects in turfgrass science. These papers are presented primarily to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

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Dr. Ann Brooks Gould, Editor
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PERFORMANCE OF PERENNIAL RYEGRASS CULTIVARS AND SELECTIONS IN NEW JERSEY TURF TRIALS

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Perennial ryegrass (*Lolium perenne* L.) is a cool-season, bunch type grass that performs well in a wide variety of soil conditions but thrives in dark, rich soils with a pH between 5 and 8 in regions with mild climates (Paterson, 2002; USDA, 2002). Perennial ryegrass is an important turfgrass because of its ability to germinate quickly, creating an attractive leafy appearance in a short period. It is often used in the southern United States for overseeding dormant lawns, athletic fields, and golf courses. Perennial ryegrass is economically important because it allows for athletic play year-round in areas where warm season turfgrasses go dormant in the winter months. This species is attractive for this purpose because it provides a playing surface during cold weather and dies out in the summer, making way for warm-season grasses to take over.

Perennial ryegrass can also be used as a permanent grass in temperate climates. This species prefers to be planted in full sun but will tolerate low levels of shading. It is often found in mixtures with slower germinating grasses such as Kentucky bluegrass (*Poa pratensis* L.) and the fine fescues (*Festuca* spp.) to help prevent soil erosion during lawn establishment and to increase the traffic tolerance of the turf stand. In mixtures, perennial ryegrass is extremely competitive, and if a high percentage is used, the turf stand will eventually be dominated by this species (Murphy and Mohr, 2002).

In 1967, the first turf-type perennial ryegrass, 'Manhattan,' became commercially available, followed by the release of 'Pennfine' in 1970. Today, many more cultivars have been developed. These cultivars are readily available to turf managers for use in sports fields as well as home lawns. New cultivars

have been improved upon to have increased general stress tolerance, insect and disease resistance, improved mowing quality, dark green color, more uniform leaf texture, as well as higher shoot density (Murphy and Park, 2004). The development of improved perennial ryegrass cultivars continues at the New Jersey Agricultural Experiment Station as well as at other research facilities.

The center of origin for perennial ryegrass includes Europe, North Africa, and parts of Asia. International collection trips are always underway in an effort to acquire new sources of germplasm. Perennial ryegrass collections have the potential to contain new desirable traits that can then be used to breed the next generation of improved perennial ryegrass cultivars.

Perennial ryegrass is susceptible to an array of diseases such as crown rust (*Puccinia coronata*), stem rust (*Puccinia graminis*), red thread (*Laetisaria fuciformis*), grey leaf spot (*Magnaporthe grisea*), and dollar spot (*Sclerotinia homoeocarpa*). Crown rust is caused by a fungus where sequential infection of two host plants, called alternate hosts, is needed to complete its complex life cycle. The disease first appears on ryegrass as a yellow flecking on infected leaf blades followed by raised pustules that break through the epidermis of the blade to release spores (Smiley et al., 2005). Stem rust is also an important disease of perennial ryegrass and can cause serious problems in seed production fields. Red thread forms pinkish to red hyphae that grow out of infected leaf tips in humid environments. Dollar spot can also be found in perennial ryegrass populations if the weather is hot and humid. Dollar spot hyphae are easily identifiable as a cobweb-like mycelium. Grey leaf spot is an important

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disease of new perennial ryegrass turf stands and of old stands with poor air circulation. This disease can be identified by the twisting and distortion of leaves at the point of infection or by round, tan spots with a dark border on the leaf blade (Smiley et al., 2005). Breeding efforts are currently underway to improve resistance to all of these pathogens.

Perennial ryegrasses naturally contain symbiotic fungi, known as endophytes, that live intercellularly within the leaf, sheath, and stem tissues. The presence of this endophyte (*Neotyphodium* sp.) can convey biotic and abiotic stress tolerance in many perennial ryegrasses (van Zijll de Jong et al., 2008). The utilization of ryegrass cultivars containing endophytes can reduce damage from above ground feeding insects, such as billbugs, sod webworm, and chinch bugs, due to the production of toxic alkaloids by the endophytic fungi (Ahmad et al., 1986; Funk et al., 1994). Endophytes are an important tool for turfgrass breeders as a biological control agent in an environment where pesticide regulations are eminent and sustainable turfgrass management is becoming more popular. The endophyte is transferred via seed to offspring, thus seed must be stored under cool dry conditions post-harvest to retain this beneficial fungus. Turfgrass breeders and researchers are continuing to research the beneficial role of endophytes in turfgrasses.

At Rutgers University we continue to use cycles of selection in single-plot progeny, mowed turf trials and clonal evaluation of spaced plants to breed perennial ryegrasses with improved resistance to pathogens that cause diseases such as gray leaf spot, rust, dollar spot, and red thread. Breeding for tolerance to abiotic stresses such as salinity (at both mature and seedling stages) and drought is underway. The main objective of the perennial ryegrass breeding program is to improve the frequency of traits that will lead to the production of new superior genotypes that are attractive, high yielding, disease tolerant, and tolerant to abiotic stresses.

PROCEDURES

One perennial ryegrass trial was established in 2010 (Tables 1), one trial was established in 2012 (Table 2), three trials were established in 2013 (Tables 3 and 5), and one trial was established in 2014 (Table 6). The tests were seeded at Adelphia, NJ and were hand sown with 0.88 oz of seed into 3 x 5 ft plots

(3.7 lb seed per 1000 ft²). The 2010 trial includes all entries in the National Perennial Ryegrass Test, sponsored by the National Turfgrass Evaluation Program (NTEP), and the 2013 trial (Table 5) includes entries in the Cooperative Turfgrass Breeders Test (CTBT).

All trials were arranged in a randomized complete block design with three replications, and plots had a 6-inch unseeded border to limit contamination. A spring (April) application of Dimension (dithiopyr) was used to control crabgrass in all trials in the month of April. An application of Merit (imidacloprid) was made to all trials in June to control grubs. Banvel (dicamba) and 2,4-D were applied in October to all trials to control broadleaf weeds.

The annual rate of nitrogen (N) and mowing height for each trial is presented in Table 7. Single applications of fertilizer did not exceed 1.0 lb N per 1000 ft². The amount and timing of N applied to the turf varied to encourage diseases and other stresses. Trials were mowed regularly with reel mowers to maintain a 1.5-inch height of cut. All trials were irrigated when necessary to avoid drought stress.

All trials were rated throughout the growing season for visual turf quality (i.e., overall appearance, turf color, uniformity, density, mowing quality, reduced rate of vertical growth, leaf texture, and freedom from insect and disease damage). Other characteristics such as spring green-up, stem rust, dollar spot, and gray leaf spot were rated when significant differences were evident. Most ratings were based on a 1 to 9 scale, with 9 representing the best turf characteristic. Plots were evaluated by a number of turfgrass specialists to reduce the impact of personal bias for particular characteristics. All data were summarized and subjected to an analysis of variance. Means were separated using Fisher's protected least significant difference (LSD) mean separation test.

RESULTS AND DISCUSSION

Results for all trials are presented in Tables 1 to 6. Tests in Tables 1 to 5 are ranked based on their overall turf quality average; the 2014 gray leaf spot test in Table 6 is ranked by disease resistance. A high quality average is generally indicative of better disease resistance, a darker bright green color, higher shoot density, uniformity, finer leaf texture, lower growth habit, improved mowing quality, and less damage due to insects.

Turf Quality

Perennial ryegrass has become a very popular species for home lawns, athletic fields, golf courses, and for overseeding purposes. Substantial improvements have been made to the overall turf quality of perennial ryegrass since the release of the first turf-type cultivars in the 1960s (Huff, 1997). Newer varieties and promising experimental selections such as Pangea GLR, Banfield, Bandalore, Man O'War, Metolius, Seabiscuit, and Thrive possess a darker green color, a more uniform appearance, increased density, lower growth habit, cleaner mowing, and a better tolerance to disease and insects. BAR Lp 7608, Pinnacle, and Linn had lower quality ratings (Tables 1 to 6).

Genetic Color

Contrary to other areas of the world, dark green turfgrasses are typically more appealing to the American populace when compared to lighter green varieties. Breeding for darker green verdure in perennial ryegrass varieties is one focus of the Rutgers turfgrass breeding program. Although genetic color of the cultivar is taken into account when assessing the overall quality rating, individual measures of the depth of genetic green color for each cultivar was also performed (Table 1). A-35, Vintage, Seductive, Prominent, GO-PR60, and Fiesta 4 had the darkest green color, while cultivars Linn, Pinnacle, and BAR Lp 7608 had the lightest green color.

Grey Leaf Spot

Gray leaf spot is an important disease that can cause a leaf blight that kills perennial ryegrass seedlings. Leaf blades are usually distorted and twisted at the point of infection. Gray leaf spot is prevalent during extended periods of high relative humidity and warm temperatures. In the 2013 gray leaf spot trial (Table 3), CT-7 Comp, PPG-PR 205, Sideway, Seabiscuit, and SLT37-12K were top performers, while 3982 P201xSpreader, 3987 Ragnar II, and 3986 Ragnar rated poorly for disease resistance. In the 2014 gray leaf spot trial (Table 6), Pizzazz 2, CU 2 Comp, PL 6 Comp, PPG-PR-241, CU 1 Comp, PPG-PR-243, and CT 1196 AR94 rated well for disease resistance, whereas Paragon GLR, Replat GLX, and Royal Green were most susceptible.

SUMMARY

Turf type perennial ryegrass cultivars are some of the most versatile grasses available on the market today. The high traffic tolerance, rapid establishment, and deep green color of these cultivars are extremely important traits that are in high demand in the turf grass seed industry. Although considerable improvements have been made to perennial ryegrasses, increased genetically stable resistance to diseases such as crown rust is still needed. Additionally, increased heat and drought tolerance, cold hardiness, salinity tolerance, and the ability to survive under ice sheets for extended periods are also necessary.

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Table 1. Performance of perennial ryegrass cultivars and selections in a national turf trial seeded in September 2010 at Adelphia, NJ. (Includes all entries of the National Perennial Ryegrass Test sponsored by NTEP.)

Cultivar or Selection	-----Turf Quality ¹ -----					Genetic Color ² Oct. 2014
	2011- 2014 Avg.	2011 Avg.	2012 Avg.	2013 Avg.	2014 Avg.	
1 Pangea GLR	6.4	7.2	6.2	6.1	6.1	8.0
2 Banfield	6.3	7.2	5.9	6.2	5.8	7.3
3 Bandalore	6.3	6.9	6.0	6.4	5.7	6.3
4 Thrive	6.1	7.6	5.2	5.8	5.9	7.7
5 Grand Slam GLD	6.1	7.4	5.1	5.8	6.0	7.0
6 Karma	6.1	7.4	5.4	5.6	5.9	6.7
7 APR 2445	6.0	6.7	5.8	5.9	5.6	6.7
8 Wicked	6.0	6.7	5.9	5.8	5.6	5.3
9 Evolution	5.9	6.7	5.7	5.6	5.6	7.7
10 GO-PR60	5.9	7.0	5.7	5.5	5.4	8.3
11 Riptide	5.9	7.0	5.2	5.7	5.7	6.7
12 Rio Vista	5.8	6.7	5.6	5.4	5.6	7.3
13 Green Supreme	5.8	6.9	5.2	5.4	5.8	6.0
14 Fiesta 4	5.8	6.4	5.3	5.7	5.7	8.3
15 PPG-PR 136	5.8	6.9	5.3	5.5	5.4	7.3
16 Rinovo	5.7	7.1	4.9	5.7	5.3	7.7
17 Metolius	5.7	6.7	5.1	5.4	5.4	6.3
18 SR 4650	5.7	7.0	4.7	5.4	5.6	7.0
19 Benchmark	5.6	6.4	5.0	5.6	5.4	3.7
20 RAD-PR55R	5.6	6.6	5.3	5.2	5.4	7.3
21 Dominator	5.6	6.1	5.5	5.4	5.4	6.3
22 Aspire	5.6	6.2	5.0	5.5	5.6	6.3
23 Octane	5.5	6.1	4.9	5.5	5.7	6.3
24 CS-PR66	5.5	6.4	4.9	5.2	5.5	7.0
25 JR-178	5.5	6.7	4.8	5.2	5.3	6.7
26 Diligent	5.5	6.6	5.2	5.1	5.1	6.0
27 Fastball RGL	5.5	6.3	5.0	5.2	5.4	6.7
28 APR 2320	5.5	6.3	5.2	5.4	5.1	6.7
29 LTP-RAE	5.5	6.5	5.0	4.8	5.6	7.0
30 Stellar 3GL	5.5	6.4	4.6	5.5	5.3	8.0
31 Palmer V	5.4	5.6	4.8	5.8	5.5	7.7
32 PSRX 4CAGL	5.4	6.2	4.9	5.3	5.4	6.7
33 Pizzazz 2 GLR	5.4	6.3	4.7	5.4	5.2	7.0
34 Mach I	5.4	6.3	5.1	5.0	5.2	7.7
35 Sideways	5.4	6.2	5.1	5.3	5.0	7.7

(Continued)

Table 1. Perennial ryegrass turf trial, 2010, NTEP (continued).

Cultivar or Selection	-----Turf Quality ¹ -----					Genetic Color ² Oct. 2014
	2011- 2014 Avg.	2011 Avg.	2012 Avg.	2013 Avg.	2014 Avg.	
36 CL 307	5.4	6.5	4.9	5.0	5.1	7.3
37 PST-2K9	5.4	5.9	5.4	5.6	4.5	6.3
38 Uno	5.4	5.9	4.7	5.8	5.0	6.0
39 BAR Lp 10969	5.3	5.4	5.3	5.4	5.1	3.3
40 BAR Lp 10970	5.3	6.1	5.5	5.4	4.3	5.7
41 Sunstreaker	5.3	6.3	4.4	5.5	5.1	6.0
42 Premium	5.3	6.1	4.7	5.2	5.2	6.0
43 Rainwater	5.3	5.1	5.4	5.5	5.1	5.0
44 Salinas	5.3	5.3	5.3	5.4	5.0	4.3
45 Stamina	5.2	6.4	4.8	4.9	4.9	5.3
46 SRX-4MSH	5.2	5.7	4.8	5.3	5.1	5.3
47 Monsieur	5.2	6.0	4.3	5.1	5.2	5.3
48 PRX-4GM1	5.1	6.1	4.8	4.9	4.8	7.3
49 Amazing A+	5.1	6.2	4.4	5.1	4.7	7.3
50 Hancock	5.1	6.1	5.1	4.4	4.7	8.0
51 Sox Fan	5.1	5.7	4.6	5.0	4.9	6.7
52 RAD-PR62	5.1	5.7	4.6	4.8	5.0	7.3
53 Parkside	5.0	5.6	4.7	4.8	4.9	6.3
54 PST-2DR9	5.0	5.1	5.1	5.1	4.7	5.7
55 BAR Lp 10972	5.0	5.1	5.6	4.9	4.3	4.7
56 Manhattan 6	5.0	6.0	4.4	4.7	4.8	7.3
57 PST-2NKM	5.0	5.2	5.1	5.2	4.4	5.3
58 Haven	4.9	5.3	4.7	5.0	4.7	4.7
59 DLF LGD-3022	4.9	5.7	5.0	4.8	4.2	5.0
60 GO-G37	4.9	5.4	5.2	4.5	4.5	7.7
61 Bonneville	4.9	5.4	4.5	4.6	5.0	7.0
62 CL 11601	4.9	5.6	4.4	4.8	4.7	6.0
63 A-35	4.9	5.5	5.6	4.4	3.9	8.7
64 PPG-PR 135	4.9	5.8	4.1	4.9	4.6	6.0
65 Sienna	4.8	6.6	3.7	4.3	4.8	5.7
66 Pistol	4.8	4.8	5.3	4.9	4.4	6.0
67 Provost	4.8	5.8	4.3	4.5	4.6	6.7
68 PPG-PR 128	4.8	5.4	4.5	4.7	4.6	6.0
69 PPG-PR 142	4.8	5.8	4.3	4.5	4.6	5.7
70 Pacific Gem	4.8	5.4	4.7	4.7	4.4	7.3

(Continued)

Table 1. Perennial ryegrass turf trial, 2010, NTEP (continued).

Cultivar or Selection	-----Turf Quality ¹ -----					Genetic Color ² Oct. 2014
	2011- 2014 Avg.	2011 Avg.	2012 Avg.	2013 Avg.	2014 Avg.	
71 JR-192	4.8	5.6	4.1	4.4	4.9	6.0
72 Pillar	4.8	5.7	4.1	4.3	5.0	5.7
73 DLF LGT 4182	4.7	4.8	5.0	5.2	4.0	7.0
74 Seductive	4.7	5.3	4.9	4.3	4.2	8.3
75 DLF LGD-3026	4.7	5.9	4.6	4.3	3.9	6.3
76 Vintage	4.6	5.3	5.2	4.1	4.0	8.7
77 Insight	4.6	6.2	3.2	4.4	4.5	5.0
78 Allante	4.5	6.1	3.4	4.1	4.4	5.7
79 Excellence	4.5	4.7	5.0	4.4	3.8	7.7
80 Prominent	4.4	4.9	4.8	4.1	4.0	8.3
81 Playoff 2	4.4	4.6	4.5	4.4	4.2	6.0
82 Pick 4DFHM	4.3	4.7	4.0	4.3	4.3	5.7
83 GO-DHS	4.3	4.4	5.0	4.1	3.8	6.7
84 Apple SGL	4.3	5.2	3.7	4.3	3.9	5.0
85 Brightstar SLT	4.1	4.5	4.0	4.2	3.9	5.0
86 BAR Lp 7608	3.8	4.0	4.1	3.6	3.7	3.0
87 Pinnacle	3.1	2.9	3.1	3.0	3.3	2.0
88 Linn	1.0	1.0	1.1	1.0	1.0	1.0
LSD at 5% =	0.6	0.8	0.8	0.8	0.7	1.5

¹9 = best turf quality

²9 = best genetic color

Table 2. Performance of perennial ryegrass cultivars and selections in a trial seeded in September 2012 at Adelphia, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----		
	2013-2014 Avg.	2013 Avg.	2014 Avg.
1 PST-Syn-2SUP	6.2	6.3	6.0
2 FE5 comp	6.1	6.5	5.7
3 PR 523	6.0	6.2	5.9
4 PR 527	6.0	6.0	6.0
5 PR 509	6.0	6.4	5.6
6 PST-Syn-2A2	6.0	6.6	5.4
7 FE6 comp	6.0	6.4	5.5
8 Pangea GLR	5.9	6.1	5.7
9 Thrive	5.9	6.2	5.6
10 Man O' War	5.9	5.8	5.9
11 Palace	5.8	6.5	5.2
12 PR 541	5.8	5.9	5.8
13 Amazing GS	5.8	6.0	5.6
14 Bandalore	5.8	5.8	5.7
15 PR 490	5.8	5.9	5.6
16 PR 519	5.8	6.2	5.3
17 PPG-PR 171	5.7	6.0	5.5
18 PR 551	5.7	6.0	5.5
19 PR 533	5.7	5.6	5.8
20 Amazing A+	5.7	6.2	5.2
21 PPG-PR 197	5.7	6.0	5.4
22 Wicked	5.7	5.8	5.5
23 Grand Slam GLD	5.6	5.7	5.5
24 PR 477	5.6	5.9	5.4
25 Stellar 3GL	5.6	5.9	5.4
26 1037-12K	5.6	6.0	5.2
27 PR 554	5.6	5.7	5.5
28 Seabiscuit	5.6	5.7	5.4
29 FE7 comp	5.6	6.0	5.2
30 PST-Syn-2FOX	5.6	5.6	5.5
31 WH1037	5.6	6.0	5.2
32 08-1 LpRS-7	5.6	5.5	5.7
33 PR 473 M2	5.6	6.0	5.1
34 08-1 LpRS-6	5.6	5.8	5.3
35 Apple SGL	5.5	5.8	5.2

(Continued)

Table 2. Perennial ryegrass turf trial, 2012 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----		
	2013-2014 Avg.	2013 Avg.	2014 Avg.
36 CT5 comp	5.5	5.5	5.5
37 PR 475	5.5	5.5	5.5
38 PR 497 M2	5.5	5.9	5.1
39 PST-Syn-2LEW	5.5	6.0	5.0
40 Karma	5.5	5.9	5.1
41 Fastball RGL	5.5	5.8	5.1
42 PR 462 M2	5.5	5.4	5.5
43 PR 531	5.5	5.4	5.5
44 SR4650	5.5	5.7	5.2
45 CT6 comp	5.4	5.6	5.3
46 Lp 09-12-1	5.4	5.5	5.3
47 PR 547	5.4	5.7	5.2
48 08-1 LpRS-16	5.4	5.6	5.2
49 Green Supreme	5.4	5.7	5.1
50 PR 472 M2	5.4	5.6	5.2
51 PR 549	5.4	5.5	5.3
52 PPG-PR 196	5.4	5.7	5.0
53 Seville 3	5.4	5.7	5.0
54 08-1 LpRS-5	5.4	5.7	5.0
55 APR 2291	5.3	5.7	4.9
56 Radiance	5.3	5.5	5.1
57 Stamina	5.3	5.6	5.0
58 Palmer V	5.3	5.3	5.2
59 PPG-PR 194	5.3	5.5	5.0
60 PR 537	5.3	5.5	5.0
61 PST-2MRCO bulk	5.3	5.7	4.9
62 CT7 comp	5.3	5.5	5.0
63 PPG-PR 193	5.2	5.3	5.1
64 PR 529	5.2	5.3	5.1
65 PR 544	5.2	5.2	5.3
66 Lp 09-12-16	5.2	5.3	5.2
67 Home Run	5.2	5.5	4.9
68 PS9	5.2	5.3	5.1
69 Sideways	5.2	5.6	4.8
70 PR 499	5.2	5.6	4.8

(Continued)

Table 2. Perennial ryegrass turf trial, 2012 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----		
	2013-2014 Avg.	2013 Avg.	2014 Avg.
71 APR 2225	5.2	5.4	4.9
72 PR 525	5.2	5.2	5.1
73 PST-Syn-2LMD	5.2	5.3	5.0
74 Repell GLS	5.2	5.2	5.1
75 SR 4660 ST	5.2	5.3	5.0
76 PST-Syn-2SHRP	5.1	5.2	5.0
77 20-10 Lp	5.1	5.1	5.1
78 22-09	5.1	5.1	5.0
79 Nexus XR	5.1	5.2	4.9
80 JR-178	5.0	5.4	4.7
81 PR 474	5.0	5.0	5.1
82 57-12	5.0	4.8	5.2
83 Primary	5.0	5.4	4.6
84 4DTWA	5.0	5.4	4.6
85 Apple GL	5.0	4.8	5.2
86 PR 535	5.0	5.2	4.8
87 Silver Dollar	5.0	4.9	5.1
88 CT2 comp	5.0	5.1	4.8
89 CL 11601	4.9	5.0	4.9
90 PPG-PR 195	4.9	5.3	4.5
91 Lp 09-12-2	4.9	5.1	4.7
92 Palmer IV	4.9	4.8	5.0
93 Pennant III	4.9	4.8	5.0
94 Zoom	4.9	5.2	4.6
95 Monsieur	4.9	5.4	4.4
96 08-1 LpRS-17	4.9	4.6	5.1
97 CT3 comp	4.9	5.1	4.7
98 MSP#3956	4.9	4.9	4.8
99 PR 470 M2	4.9	5.1	4.6
100 PST-2CITM	4.9	4.8	4.9
101 CT1 comp	4.8	5.0	4.6
102 PPG-PR 172	4.8	5.1	4.5
103 Presido	4.8	4.8	4.8
104 Buena Vista	4.8	4.8	4.8
105 Lp 09-12-26	4.8	4.7	4.9

(Continued)

Table 2. Perennial ryegrass turf trial, 2012 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----		
	2013-2014 Avg.	2013 Avg.	2014 Avg.
106 Lp 09-12-14	4.8	4.7	4.8
107 Exacta II GLSR	4.8	5.2	4.3
108 Line Drive GLS	4.8	4.8	4.7
109 PST-2BDE bulk	4.8	4.8	4.7
110 PST-Syn-2PDA	4.8	5.0	4.6
111 Lp 09-12-13	4.8	4.5	5.0
112 Panter GLS	4.7	4.8	4.7
113 Keystone 2	4.7	4.7	4.8
114 Nexus XD	4.7	4.9	4.5
115 PR 468 M2	4.7	5.0	4.4
116 Hawkeye 2	4.7	4.8	4.6
117 PPG-PR 168	4.7	4.7	4.7
118 PST-2MDT	4.7	4.7	4.7
119 Express II	4.7	5.0	4.3
120 Manhattan 6	4.7	5.0	4.3
121 Mighty	4.7	4.7	4.6
122 FETC comp	4.7	5.1	4.3
123 MOO 17A	4.6	4.9	4.4
124 PST-Syn-2DAP	4.6	4.7	4.6
125 20-09	4.6	4.5	4.7
126 Fiesta 4	4.6	4.8	4.4
127 Sienna	4.6	5.2	3.9
128 4SLGS-2	4.6	4.9	4.2
129 Monterey 4	4.6	4.5	4.6
130 Soprano	4.6	4.7	4.4
131 Haven	4.5	4.9	4.1
132 Insight	4.5	4.9	4.1
133 PST-Syn-2ERO	4.5	4.9	4.1
134 SR 4600	4.5	4.5	4.5
135 Revenge GLX	4.5	4.7	4.2
136 Lp 09-12-22	4.5	4.3	4.6
137 Lp 09-12-6	4.5	4.3	4.6
138 PST-2PUK bulk	4.5	4.7	4.2
139 21-10 Lp	4.4	4.4	4.4
140 21-11	4.4	4.4	4.4

(Continued)

Table 2. Perennial ryegrass turf trial, 2012 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----		
	2013-2014 Avg.	2013 Avg.	2014 Avg.
141 PST-Syn-2PAN	4.4	5.0	3.9
142 PR 467 M2	4.4	4.6	4.3
143 Palmer III	4.4	4.4	4.4
144 Secretariat II GLSR	4.4	4.7	4.1
145 20-11	4.4	4.3	4.4
146 Charismatic II GLSR	4.4	4.8	4.0
147 Allstar 3	4.4	4.3	4.4
148 Pennant II	4.4	4.2	4.5
149 PSG DFHM	4.4	4.5	4.2
150 Misc-12K	4.3	4.5	4.1
151 DSL5B2	4.3	4.4	4.2
152 Harrier	4.3	4.5	4.1
153 Double Time GLS	4.3	4.1	4.4
154 Lp 09-12-3	4.3	4.2	4.3
155 Nightsky	4.2	4.7	3.8
156 Lp 09-12-7	4.2	4.2	4.1
157 SR 4420	4.2	4.2	4.1
158 CSI	4.2	4.6	3.7
159 Lp 09-12-23	4.2	4.1	4.2
160 M46Z-12K	4.2	3.7	4.6
161 Confetti III	4.1	4.4	3.8
162 Manhattan 5 GLR	4.1	4.4	3.9
163 07-13	4.1	4.5	3.7
164 08-16 Lp	4.1	4.5	3.8
165 Penn APR 2116	4.1	4.0	4.1
166 Lp 09-12-18	4.1	3.9	4.2
167 Penn APR 2105	4.0	4.0	3.9
168 07-12	3.9	3.8	4.1
169 Artic Green	3.8	4.0	3.5
170 Accent II	3.8	3.9	3.7
171 DS894J	3.7	3.9	3.5
172 DSF13D	3.7	3.6	3.8
173 DSL5B1	3.7	3.3	4.1
174 JS 501	3.7	3.7	3.6
175 Academy III	3.6	3.6	3.7

(Continued)

Table 2. Perennial ryegrass turf trial, 2012 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----		
	2013-2014 Avg.	2013 Avg.	2014 Avg.
176 Replay	3.6	3.7	3.5
177 Black CAT II	3.6	3.6	3.5
178 DSB2	3.3	3.0	3.6
179 Divine	3.3	3.4	3.2
180 Penn APR 2190	3.3	3.3	3.3
181 08-12 Lp	3.3	3.4	3.1
182 DSF13E	3.3	3.0	3.5
183 Lp 09-12-21	3.0	2.9	3.0
184 Goal Keeper II	2.9	2.8	2.9
185 PST-Syn-2RBA	2.8	2.9	2.7
186 LaQuinta	2.7	2.6	2.9
187 MSP#3934	2.6	2.8	2.3
188 Top Gun II	2.6	2.5	2.7
189 Double Time	2.5	2.4	2.6
190 Caddieshack II	2.3	2.3	2.3
191 Olano	2.2	2.2	2.1
LSD at 5%=	0.6	0.7	0.7

¹9 = best turf quality

Table 3. Performance of perennial ryegrass cultivars and selections in a gray leaf spot trial seeded in July 2013 at Adelphia, NJ.

Cultivar or Selection	Turf Quality ¹	Gray Leaf Spot ²
	2014 Avg.	2013 Avg.
1 FE-6 Comp	6.6	8.3
2 Man O'War	6.5	8.0
3 Seabiscuit	6.3	8.7
4 PPG-PR 196	6.2	7.3
5 CT-7 Comp	6.2	9.0
6 SR 4650	6.1	8.0
7 Metolius	6.1	8.0
8 PPG-PR 202	6.1	7.0
9 SLT37-12K	6.1	8.7
10 FE-5 Comp	6.0	7.3
11 PPG-PR 171	6.0	7.7
12 WH 1037	6.0	8.3
13 Sideway	5.9	8.7
14 CT-6 Comp	5.9	8.3
15 PPG-PR 210	5.9	8.0
16 JR-178	5.9	8.0
17 PPG-PR 167	5.9	8.3
18 Rio Vista	5.9	8.3
19 PPG-PR 211	5.8	8.0
20 Karma	5.8	7.7
21 PPG-PR 205	5.8	9.0
22 PPG-PR 142	5.7	8.0
23 PPG-PR 193	5.7	7.0
24 PPG-PR 197	5.7	8.0
25 PSG H6-20	5.7	7.0
26 Wicked	5.7	6.7
27 Bonneville	5.6	7.7
28 PPG-PR 207	5.6	7.3
29 Amazing A+	5.5	7.7
30 JPF8-5	5.5	7.3
31 PPG-PR 140	5.5	7.3
32 PPG-PR 172	5.5	8.0
33 Dasher 3	5.5	7.7
34 PPG-PR 212	5.4	8.3
35 CT-3 Comp	5.4	8.0

(Continued)

Table 3. Perennial ryegrass gray leaf spot trial, 2013 (continued).

Cultivar or Selection	Turf Quality ¹	Gray Leaf Spot ²
	2014 Avg.	2013 Avg.
36 FETC Comp	5.4	5.7
37 Stellar 3GL	5.4	8.3
38 CT-2 Comp	5.4	7.0
39 PPG-PR 206	5.3	8.0
40 Octane	5.3	7.3
41 PPG-PR 133	5.3	7.3
42 PSG H6-31	5.2	7.0
43 PPG-PR 194	5.2	7.7
44 RKS	5.2	7.7
45 JPF8-7	5.2	8.0
46 JPF8-9	5.2	7.3
47 CL 11701	5.1	7.3
48 Green Supreme	5.1	6.3
49 PPG-PR 195	5.1	7.0
50 CT-1 Comp	5.1	8.0
51 Exacta II	5.1	5.7
52 Grandslam 3GLD	5.1	8.0
53 PSG H6-49	5.1	6.3
54 Rinovo	5.1	6.7
55 20-10-LP	5.0	6.3
56 PPG-PR 170	5.0	6.3
57 FE-1 Comp	5.0	6.7
58 JPF8-4	5.0	7.3
59 PPG-PR 216	5.0	7.0
60 SR 4600	5.0	6.7
61 Panther GLS	5.0	6.0
62 PSG 4GM1	4.9	6.0
63 SLT03-15K	4.9	7.3
64 Apple GL	4.8	7.3
65 Manhattan 6	4.8	6.3
66 Triathalon	4.8	6.0
67 JPF8-10	4.8	7.3
68 Zoom	4.8	5.3
69 4DTWA	4.7	7.0
70 Homerun	4.7	6.3

(Continued)

Table 3. Perennial ryegrass gray leaf spot trial, 2013 (continued).

Cultivar or Selection	Turf Quality ¹	Gray Leaf Spot ²
	2014 Avg.	2013 Avg.
71 PSG H6-5	4.7	5.0
72 Radiance	4.7	7.3
73 SLTD3-15K	4.7	5.7
74 Fiesta 4	4.7	6.3
75 LaQuinta	4.7	5.7
76 Manhattan 5 GLR	4.7	6.3
77 PSG H6-18	4.7	5.0
78 21-10-LP	4.7	5.3
79 Harrier	4.6	6.0
80 PPG PR-201	4.6	6.0
81 Haven	4.6	6.7
82 PSG 4MSH	4.6	6.7
83 M46Z-12K	4.5	6.3
84 Syn 2BDT-13	4.5	5.7
85 Palmer V	4.5	6.3
86 Primary	4.5	6.3
87 Palace	4.5	6.0
88 Amazing GS	4.4	6.0
89 Secretariat II	4.3	6.0
90 Misc-12K	4.3	5.3
91 3976 MSP	4.2	5.7
92 Hawkeye 2	4.2	5.0
93 Buena Vista GLSR	4.1	4.0
94 PPG-PR 168	4.0	5.0
95 Charismatic II	4.0	5.3
96 Revenge GLX	4.0	4.3
97 PSG 4DFHM	3.9	4.3
98 SLTPC-15K	3.9	4.0
99 CSI	3.8	4.0
100 Double-Up	3.8	6.3
101 3975 MSPxSpreader/Ragnar	3.7	3.7
102 Grey Fox	3.6	4.3
103 3973 MSPxAssure	3.6	3.3
104 Mighty	3.6	4.0
105 Silver Dollar	3.6	4.3

(Continued)

Table 3. Perennial ryegrass gray leaf spot trial, 2013 (continued).

Cultivar or Selection	Turf Quality ¹	Gray Leaf Spot ²
	2014 Avg.	2013 Avg.
106 11-852	3.5	3.7
107 Double-Time GLS	3.5	5.3
108 Panther H2O APR 2201	3.4	3.7
109 3997 Arctic Green	3.4	4.7
110 Cutter II	3.3	3.3
111 08-26LP	3.3	4.0
112 Express	3.3	3.0
113 Nexus XD	3.3	3.3
114 JR-192	3.2	2.3
115 PR 53	3.2	3.3
116 Sunrise	3.2	3.3
117 QTSR-06	3.2	3.7
118 05LPR	3.1	2.7
119 08-14LP	3.1	3.7
120 Nexus XR	3.1	4.0
121 Presido	3.1	3.7
122 11-772	3.0	3.0
123 Accent II	3.0	4.0
124 08-16 PRG	3.0	3.0
125 JS 501	3.0	3.3
126 07-13PR	2.9	4.0
127 11-780	2.9	2.7
128 11-776	2.8	3.0
129 Monterey 4	2.8	2.7
130 PPG-PR 124	2.8	3.0
131 Frontier	2.8	3.3
132 3974 SpreaderxArtic Green	2.7	2.3
133 DS8945-1	2.7	3.0
134 06VLP Poly	2.7	3.3
135 11-774	2.7	2.3
136 11-786	2.7	2.0
137 Goalkeeper II	2.7	2.7
138 11-764	2.7	2.3
139 11-828	2.6	2.0
140 DS8945-12	2.6	3.0

(Continued)

Table 3. Perennial ryegrass gray leaf spot trial, 2013 (continued).

Cultivar or Selection	Turf Quality ¹ 2014 Avg.	Gray Leaf Spot ² 2013 Avg.
141 DS8945-7	2.6	2.3
142 Replay	2.6	3.3
143 SLDF9-8	2.6	3.0
144 Nightsky	2.5	3.0
145 11-766	2.5	1.3
146 11-770	2.5	1.7
147 11-822	2.4	2.0
148 Caddieshack II	2.4	2.3
149 11-836	2.4	1.3
150 11-760	2.3	1.7
151 DSF13D	2.3	2.7
152 Top Gun II	2.3	2.0
153 11-870	2.2	2.0
154 DSF13E	1.9	2.3
155 Olano KK	1.9	1.7
156 DSL5B1	1.8	1.7
157 11-768	1.8	1.0
158 DS8945-6	1.8	1.7
159 3984 Forage	1.7	1.7
160 3982 P201xSpreader	1.6	1.0
161 3987 Ragnar II	1.5	1.0
162 3986 Ragnar	1.2	1.0
LSD at 5% =	0.7	1.2

¹9 = best turf quality

²9 = least disease

Table 4. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in September 2013 at Adelphia, NJ.

Cultivar or Selection	Turf Quality ¹ 2014 Avg.
1 PPG-PR 229	6.9
2 PPG-PR 242	6.7
3 PPG-PR 243	6.6
4 Evolution	6.6
5 PPG-PR 241	6.5
6 PPG-PR 245	6.5
7 PPG-PR 244	6.5
8 SR4650	6.4
9 Pangea	6.3
10 PPG-PR 196	6.3
11 PPG-PR 197	6.3
12 PPG-PR 231	6.2
13 PPG-PR 232	6.2
14 PPG-PR 240	6.2
15 Fastball RGL	6.2
16 CT7	6.2
17 PPG-PR 193	6.2
18 Xcellerator	6.1
19 Rinovo	6.1
20 PPG-PR 234	6.1
21 PPG-PR 230	6.1
22 PR-2-13-Bulk	6.1
23 RKS	6.0
24 4JPRWA2	6.0
25 Karma	5.9
26 Pizzazz 2	5.9
27 Metolius	5.9
28 Stellar 3GL	5.9
29 Wicked	5.8
30 RAD-PR73	5.8
31 PR15K-3-17	5.8
32 CHT	5.8
33 PPG-PR 239	5.8
34 4JPRWA1	5.8
35 PPG-PR 233	5.7

(Continued)

Table 4. Perennial ryegrass turf trial, 2013 (continued).

Cultivar or Selection	Turf Quality ¹ 2014 Avg.
36 Sideways	5.7
37 Dasher 3	5.7
38 4JPRWA	5.7
39 4DTWA	5.7
40 Triathlon	5.7
41 PPG-PR 194	5.7
42 PPG-PR 195	5.6
43 RAD-PR77	5.6
44 2SUPA Bulk	5.6
45 Grand Slam GLD	5.6
46 4MSH	5.6
47 PPG-PR 238	5.5
48 Manhattan 6	5.5
49 2BNS	5.5
50 Apple SGL	5.5
51 4CAGL	5.5
52 Home Run	5.4
53 PPG-PR 228	5.4
54 4JPRWA4	5.4
55 4JPRWA5	5.4
56 4JPRWA3	5.4
57 Syn-2BET	5.3
58 PR201	5.3
59 SR4600	5.3
60 Phenom	5.3
61 2BED Bulk	5.2
62 Calypso 3	5.2
63 RBL-1-13-1	5.2
64 PR15K-3-19	5.2
65 Harrier	5.2
66 Zoom	5.2
67 Sox Fan	5.2
68 Saltinas	5.2
69 PR15K-1-8	5.2
70 Fiesta 4	5.1
71 Mighty	5.1
72 Edge II	5.1
73 GO-SDG	5.1
74 08-18Lp AB	5.1
75 RBL-1-13-3	5.0

(Continued)

Table 4. Perennial ryegrass turf trial, 2013 (continued).

Cultivar or Selection		Turf Quality ¹ 2014 Avg.
76	Estelle	5.0
77	Gray Fox	5.0
78	Defender	5.0
79	Manhattan 5 GLR	5.0
80	Express 2	4.9
81	SRPR1-3-2	4.9
82	RBL-1-13-2	4.9
83	11-12PR-10	4.9
84	Green Emperor	4.9
85	DSL5B-13	4.8
86	Protégé	4.8
87	PPG-PR 168	4.8
88	Hawkeye 2	4.8
89	PPG-PR 237	4.7
90	2TT Bulk	4.7
91	Blazer 4	4.7
92	RBL-1-13-Bulk	4.7
93	Syn-2MARC3	4.7
94	PR-1-13-Bulk	4.7
95	PR15K-5-24	4.7
96	2NKMS	4.7
97	RBL-1-13-4	4.7
98	Tailgater	4.6
99	2MEW Bulk	4.6
100	RBL-1-13-12	4.6
101	PR-7-13-Bulk	4.6
102	SRPR2-3-6	4.6
103	SRPR1Bulk	4.6
104	PR15K-2-10	4.6
105	Haven	4.6
106	11-12PR-13	4.6
107	SRPR2Bulk	4.6
108	PR15K-6-29	4.6
109	SRPR2-2-6	4.5
110	MSP 3999	4.5
111	Silver Dollar	4.5
112	08-20Lp AB	4.5
113	RBL-1-13-10	4.5
114	Cutter 2	4.4
115	11-12PR-5	4.4

(Continued)

Table 4. Perennial ryegrass turf trial, 2013 (continued).

Cultivar or Selection		Turf Quality ¹ 2014 Avg.
116	11-12PR-7	4.4
117	PR15K-5-29	4.4
118	SRPR1-2-3	4.4
119	SRPR1-4-2	4.4
120	RBL-1-13-11	4.4
121	Nexus XR	4.4
122	4DFHM	4.3
123	11-12PR-4	4.3
124	PRWH2-12	4.3
125	Charismatic II	4.3
126	PSPR-09-3	4.3
127	PR15K-2-6	4.3
128	Cascadia	4.2
129	Double Up GLS	4.2
130	SRPR2-1-7	4.1
131	08FTMSESL	4.1
132	RBL-1-13-6	4.1
133	Night sky	4.0
134	SRPR2-1-2	4.0
135	Nexus XD	4.0
136	RBL-1-13-8	4.0
137	RBL-1-13-7	3.9
138	PR15K-7-21	3.9
139	Double Time	3.9
140	PNCK-13	3.8
141	PRWH4-12	3.7
142	DKDHPR-1-13-Bulk	3.7
143	MSP 4001	3.6
144	PRWH 11-3	3.6
145	MSP 4000	3.6
146	4STD3-13	3.5
147	PPG-PR 200	3.4
148	Charismatic	3.4
149	TAG-DP14	3.2
150	Quebec	3.1
151	Brighstar SLT	3.1
152	Royal Green	3.0
153	Spreader III	2.8
154	Churchill	2.6
155	AGRLLP-150	1.7

(Continued)

Table 4. Perennial ryegrass turf trial, 2013 (continued).

Cultivar or Selection	Turf Quality ¹ 2014 Avg.
LSD at 5% =	0.6

¹9 = best turf quality

Table 5. Performance of perennial ryegrass cultivars and selections in a Cooperative Turfgrass Breeders Test (CTBT) seeded in September 2013 at Adelphia, NJ.

Cultivar or Selection	Turf Quality ¹ 2014 Avg.
1 APR 2524	6.2
2 PPG-PR 229	6.2
3 APR 2445	6.1
4 DLF-PR-565	6.1
5 APR 2385	6.1
6 APR 2540	6.0
7 APR 2554	6.0
8 DLF-PR-569	6.0
9 DLF-PR-523	5.9
10 DLF-PR-583	5.9
11 PSG-20-10	5.8
12 PPG-PR 197	5.8
13 PSG-HLTY	5.8
14 PST-2SHRP	5.8
15 Banfield	5.7
16 PR-09-6	5.7
17 PST-2FIND-13	5.7
18 4JPR	5.6
19 PST-3MP3	5.6
20 PSG-21-10	5.6
21 Esquire	5.5
22 Silver Dollar	5.5
23 APR 2688	5.5
24 PPG-PR 222	5.5
25 PST-2BDT	5.5
26 Pacific Gem	5.5
27 Soprano	5.5
28 DLF-PR-537	5.5
29 DLF-PR-578	5.5
30 PPG-PR 171	5.5
31 Bandalore	5.4
32 Apple GL	5.4
33 Gator 3	5.4
34 PPG-PR 227	5.4
35 PPG-PR 167	5.4

(Continued)

Table 5. Perennial ryegrass turf trial, 2013, CTBT (continued).

Cultivar or Selection		Turf Quality ¹ 2014 Avg.
36	DSL5B1	5.3
37	Fiesta 4	5.3
38	PST-2MPX1	5.3
39	Thrive	5.3
40	PST-2RDY	5.3
41	PST-2TPR	5.2
42	APR 2394	5.2
43	APR 2662	5.1
44	DLF-PR-580	5.1
45	Diligent	5.1
46	DLF-PR-575	5.0
47	PST-3IP	5.0
48	Karma	4.9
49	PST-2PDA	4.9
50	PPG-PR 234	4.9
51	DLF-PR-553	4.8
52	Harrier	4.8
53	PPG-PR 196	4.8
54	PSG-HLT	4.8
55	Stamina	4.8
56	Penguin	4.7
57	PPG-PR 232	4.7
58	APR 2680	4.7
59	DLF-PR-562	4.7
60	DLF-PR-564	4.6
61	Monsieur	4.6
62	PST-2TFC	4.6
63	APR 2104	4.6
64	APR 2477	4.6
65	Gray Fox	4.5
66	GSI-3-12	4.5
67	APR 2154	4.5
68	PS 10	4.5
69	PS 9	4.5
70	Homerun	4.5
71	PSG1037-12K	4.5
72	PST-224	4.4
73	Pop	4.4
74	PSG-HLY	4.4
75	APR 2687	4.4

(Continued)

Table 5. Perennial ryegrass turf trial, 2013, CTBT (continued).

Cultivar or Selection		Turf Quality ¹ 2014 Avg.
76	PPG-PR 172	4.4
77	PST-2ED1	4.3
78	APR 2344	4.3
79	Linn	4.3
80	PST-2A2	4.3
81	APR 2659	4.3
82	APR 2397	4.2
83	APR 2679	4.2
84	Aspire	4.2
85	PST-2SURV	4.2
86	Manhattan 6 GLR	4.1
87	PST-2LTD	4.1
88	PST-2ETS	4.0
89	APR 2790	4.0
90	Zoom	4.0
91	Allstar 3	3.9
92	PST-2A12	3.9
93	PPG-PR 231	3.8
94	APR 2399	3.8
95	PST-2REB	3.8
96	DLF-PR-563	3.6
97	Line Drive GLS	3.6
98	PST-2CITM	3.6
99	DLF-PR-561	3.6
100	Brightstar SLT	3.4
101	APR 2320	3.3
102	PST-2BD1	3.2
103	DLF-PR-521	3.0
104	PPG-PR 168	2.5
105	APR 2237	2.4
106	PPG-PR 228	2.4
107	DLF-PR-579	1.0
LSD at 5% =		0.5

¹9 = best turf quality

Table 6. Performance of perennial ryegrass cultivars and selections in a gray leaf spot trial seeded in July 2014 at Adelphia, NJ.

Cultivar or Selection	Gray Leaf Spot ¹ 2014 Avg.	Turf Quality ² 2014 Avg.
1 Pizzazz 2	7.7	6.7
2 CU 2 Comp	7.3	6.3
3 PL 6 Comp	7.3	6.0
4 PPG-PR-241	7.3	6.0
5 CU 1 Comp	7.0	6.3
6 PPG-PR-243	7.0	6.0
7 CT 1196 AR94	7.0	5.7
8 CP 2 Comp	6.7	6.7
9 PL1	6.7	6.7
10 CUT Comp	6.7	6.0
11 Granslam GLD	6.7	6.0
12 CL 307	6.7	5.7
13 Exacta II	6.7	5.3
14 PPG-PR-231	6.7	5.0
15 Pangea	6.3	6.7
16 PL 5 Comp	6.3	6.0
17 PST-2A12	6.3	6.0
18 CP 1 Comp	6.3	5.7
19 CT 1196AR95	6.3	5.7
20 PL 2 Comp	6.3	5.7
21 PL 4 Comp	6.3	5.7
22 Stellar 3GL	6.3	5.7
23 SPM Comp	6.3	5.3
24 PPG-PR-233	6.3	5.0
25 PPG-PR-244	6.0	6.3
26 Fastball RGL	6.0	6.0
27 FEC3	6.0	5.7
28 PL 3 Comp	6.0	5.7
29 PPG-PR-194	6.0	5.3
30 APR 2291	6.0	5.0
31 PPG-PR-193	6.0	5.0
32 PPG-PR-232	6.0	5.0
33 Radiance	6.0	5.0
34 PPG-PR-229	6.0	4.7
35 PPG-PR-165	5.7	6.0

(Continued)

Table 6. Perennial ryegrass gray leaf spot trial, 2014 (continued).

Cultivar or Selection	Gray Leaf Spot ¹ 2014 Avg.	Turf Quality ² 2014 Avg.
36 PPG-PR-240	5.7	6.0
37 SPP Comp	5.7	5.7
38 PPG-PR-197	5.7	5.3
39 PST-2BDT	5.7	5.3
40 Green Supreme	5.7	5.0
41 Benchmark	5.7	5.0
42 Ingles Sun	5.7	4.7
43 PPG-PR-228	5.7	4.7
44 PPG-PR-230	5.7	4.3
45 PPG-PR-196	5.3	5.3
46 Sox Fan	5.3	5.3
47 SPV Comp	5.3	5.3
48 Green Emperor	5.3	5.0
49 Protégé	5.3	5.0
50 RICS	5.3	5.0
51 Salinas	5.3	5.0
52 Double Time	5.3	4.0
53 La Quinta	5.0	5.3
54 Manhattan 6	5.0	5.3
55 PPG-PR-195	5.0	5.3
56 PPG-PR-234	5.0	5.3
57 PST-2REB	5.0	5.3
58 GO-SDG	5.0	5.0
59 Spreader/Arctic-X block	5.0	5.0
60 Triathlon	5.0	4.3
61 Double Up	5.0	4.0
62 Apple SGL	4.7	5.7
63 CT 1196WILD	4.7	5.3
64 Slugger II	4.7	5.3
65 PPG-PR-237	4.7	5.0
66 PPG-PR-238	4.7	5.0
67 Amazing A+	4.7	4.7
68 Artic Green	4.7	4.7
69 Gray Fox	4.7	4.7
70 Pasco	4.7	4.3

(Continued)

Table 6. Perennial ryegrass gray leaf spot trial, 2014 (continued).

Cultivar or Selection	Gray Leaf Spot ¹ 2014 Avg.	Turf Quality ² 2014 Avg.
71 Green EmperorxRoyal Green	4.3	5.0
72 GO-DGR	4.3	4.7
73 PST 2040	4.3	4.7
74 Frontier	4.3	4.3
75 Goalkeeper II	4.0	4.7
76 Monterey 4	4.0	4.7
77 Charismatic II	4.0	4.3
78 Green/Royal/Artic	4.0	4.3
79 Rinvo	4.0	4.3
80 Singular	4.0	4.3
81 CS1	4.0	4.0
82 GO-SDB	4.0	4.0
83 PPG-PR-200	3.7	5.0
84 Revenge GLX	3.7	4.7
85 Belize	3.7	4.3
86 Confetti III	3.7	4.3
87 GO-DHS	3.7	4.3
88 JS 501	3.7	4.3
89 Accent II	3.7	4.0
90 Haven	3.7	4.0
91 Panther	3.7	4.0
92 Secretariat II	3.7	4.0
93 Sunrise	3.7	4.0
94 Top Gun II	3.7	4.0
95 GO-OM3	3.7	3.7
96 Ragnar II	3.7	3.3
97 Caddieshack II	3.3	4.3
98 Kokomo 2	3.3	4.0
99 Ragnar	3.3	3.7
100 Paragon GLR	3.0	4.0
101 Replat GLX	2.7	3.3
102 Royal Green	2.3	2.0
LSD at 5% =	1.5	1.2

¹9 = least disease

²9 = best turf quality

Table 7. Yearly nitrogen (N) applied and mowing height (Ht) on perennial ryegrass established at Adelphia, NJ.

	2011		2012		2013		2014	
	N ¹	Ht ²	N	Ht	N	Ht	N	Ht
Table 1 (2010 NTEP).....	3.25	1.5	3.00	1.5	3.0	1.5	1.75	1.5
Table 2 (2012).....					2.5	1.5	1.90	1.5
Table 3 (2013 Gray leaf spot test)							1.75	1.5
Table 4 (2013).....							1.75	1.5
Table 5 (2013 CTBT)							1.75	1.5
Table 6 (2014 Gray leaf spot test)							0	0.5

¹Annual N applied (lb/1000 ft²)

²Mowing height in inches