

# RUTGERS

New Jersey Agricultural  
Experiment Station

## **2018 Turfgrass Proceedings**

***The New Jersey Turfgrass Association***

In Cooperation with  
Rutgers Center for Turfgrass Science  
Rutgers Cooperative Extension



# **2018 RUTGERS TURFGRASS PROCEEDINGS**

of the

## **GREEN EXPO Turf and Landscape Conference**

**December 4-6, 2018**

**Borgata Hotel**

**Atlantic City, New Jersey**

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 2018 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.

Special thanks are given to those who have submitted papers for this proceedings, to the New Jersey Turfgrass Association for financial assistance, and to Anne Diglio, Barbara Fitzgerald, and Nalini Kaul for administrative support.

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

## PERFORMANCE OF PERENNIAL RYEGRASS CULTIVARS AND SELECTIONS IN NEW JERSEY TURF TRIALS, 2018

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Perennial ryegrass (*Lolium perenne* L.) is a bunch-type, cool-season perennial grass native to temperate regions of Asia, North Africa, and Europe (Beard, 1973; Terrell, 1968). The species has been introduced to all parts of the world and, with exception of Antarctica, is grown on every continent (Thorogood, 2003). Perennial ryegrass is a rapidly germinating species that grows in alkaline and acidic soils with a pH range of 5.1 to 8.4, but it thrives in moist, well-drained soils at a pH near 6.5 (Beard, 1973; Funk and Clarke, 1989; Thorogood, 2003). In mild climates, perennial ryegrass is managed as a permanent turfgrass in parks, golf fairways and roughs, athletic fields, racetracks, and home lawns (Beard, 1973; Beard and Beard, 2005; Thorogood, 2003). In lower latitudes, the species is used to overseed warm-season turf during periods of winter dormancy (Beard and Beard, 2005; Thorogood, 2003; Turgeon, 2008). Perennial ryegrass is also grown in less-heavily managed areas such as roadsides (Beard and Beard, 2005).

Perennial ryegrass is susceptible to a number of fungal and Oomycete diseases (Bonos and Huff, 2013; Bonos et al., 2006; Thorogood, 2003). To date, disease-related breeding efforts of perennial ryegrass have primarily been directed toward improving resistance to gray leaf spot (caused by *Pyricularia grisea*), stem rust (*Puccinia graminis* subsp. *graminicola*), crown rust (*Puccinia coronata*), and dollar spot (*Clarireedia jacksonii*, formerly known as *Sclerotinia homoeocarpa*) (Bonos and Huff, 2013; Bonos et al., 2006; Salgado-Salazar et al., 2018). Additional diseases affecting perennial ryegrass include anthracnose (*Colletotrichum cereale*), brown patch (*Rhizoctonia solani*), Pythium blight, and red thread

(*Laetisaria fuciformis*) (Bonos et al., 2006; Smiley et al., 2005).

The Rutgers University turfgrass breeding program at the New Jersey Agriculture Experiment Station (NJAES) is the largest breeding program for cool-season turfgrasses in the world (Honig, 2011). Thorogood (2003) referenced the NJAES-based program as the most effective perennial ryegrass breeding program in the United States. The program was started in 1961 and 'Manhattan,' a landmark perennial ryegrass cultivar, was released a short time later (in 1967) (Funk et al., 1969; Funk and Meyer, 2001). By 2010, the turfgrass breeding program had flourished to release more than 400 turf cultivars (Honig, 2011).

For many years, the NJAES turfgrass breeding program was based on a relatively small sampling of the total perennial ryegrass germplasm worldwide (Thorogood, 2003). However, in 1996, turf breeders from the program began collecting diverse germplasm from various countries across Europe and Asia to diversify and improve the germplasm base of the species at the NJAES; more than 15,000 new germplasm sources have been collected as of 2010 (Bonos et al., 2004; Honig, 2011). Collected perennial ryegrass germplasm potentially harbors desirable traits that, once identified, can be introduced into elite NJAES perennial ryegrass germplasm via population improvement techniques (Bonos et al., 2004).

Objectives for perennial ryegrass breeding programs are dependent upon intended applications and locations of usage (Thorogood, 2003). In general, breeders select for improvements in turf appearance

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and growth habit, increased disease resistance, higher grain yields, and enhanced tolerance to abiotic and environmental stresses (Bonos and Huff, 2013; Thorogood, 2003).

## PROCEDURES

Three perennial ryegrass trials were established in 2016 (Tables 1 to 3), one perennial ryegrass trial was established in 2017 (Table 4), and two perennial ryegrass trials were established in 2018 (Tables 5 and 6). All trials were hand sown with 0.88 oz of seed into 3 × 5 ft plots (3.7 lb seed per 1000 ft<sup>2</sup>) and arranged in a randomized complete block design with three replications. A 6-inch unseeded border was left between plots to limit contamination.

Dimension (dithiopyr) was applied to all perennial ryegrass trials in April and June for pre-emergent control of annual grass and broadleaf weeds. Lontrel (clopyralid), Topeka (dicamba, dimethylamine salt), and Weedar 64 (2,4-D) were applied to all trials in June for control of broadleaf weeds. Grubs were controlled with an application of Merit (imidacloprid) in June, and Segway (cyazofamid) was applied to all trials in late summer to provide preventive control for Pythium disease. Additionally, Tenacity (mesotrione) was applied to trials established in 2018 to control grassy weeds.

The annual rate of nitrogen (N) and mowing height for each trial are presented in Table 7. Single fertilizer applications did not exceed 1.0 lb N per 1000 ft<sup>2</sup>. The amount and timing of nitrogen applied to the turf varied to encourage diseases and other stresses. Trials were mowed regularly to maintain 1.5-inch height of cut. All trials were irrigated when necessary to avoid drought stress.

During the growing season, perennial ryegrass trials were evaluated monthly for visual turf quality (i.e., overall appearance, turf color, uniformity, density, mowing quality, reduced rate of vertical growth, leaf texture, and damage due to insects and diseases). In addition, the trials were rated for gray leaf spot disease, color, establishment, and stemminess. All ratings were based on a 1 to 9 scale, where 9 represented the most desirable turf characteristics. These data were summarized and subjected to an analysis of variance (ANOVA). Means were separated using Fisher's protected least significant difference (LSD) mean separation test.

## RESULTS AND DISCUSSION

Results for the perennial ryegrass trials established between 2016 and 2017 were ranked by overall turf quality average and presented in Tables 1 to 4. A high quality average is generally indicative of good disease resistance, dark green color, high shoot density and uniformity, fine leaf texture, low growth habit, good mowing quality, and minimal damage due to insects. The trial data were further ranked according to additional evaluation parameters (i.e., establishment, color, disease rating, etc.) to distinguish two or more cultivars or selections that were equally ranked based on turf quality ratings. Results for the perennial ryegrass trials established in 2018 (Tables 5 and 6) were primarily ranked by gray leaf spot disease ratings and secondarily ranked by turf quality ratings. In addition to trial data collected in 2018, data from previous years are also included in the tables. These data have been discussed in prior proceedings articles and are included here for viewer convenience.

### 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 late 1960s (Huff, 1997). In the 2016 perennial ryegrass trial (Table 1), PST-2MAY, PPG-PR 301, PST-2CPR-BS, PST-SYN-2DML, Xcellerator, and FCW had the highest turf quality average during 2017 and 2018, while Double Up GLS, Royal Green, MSP 4044, and LLP-473 had the lowest turf quality average.

In the 2016 perennial ryegrass A-LIST trial (Table 2), Furlong, Slugger 3GL, Homerun LS, Apple 3GL, and PPG-PR 367 had the highest quality average during 2017 and 2018, while Linn, Tetradark, Grand Slam GLD, and Karma had the lowest turf quality average. In the 2016 perennial ryegrass NTEP trial (Table 3), Furlong, DLFPS-236-3541, NP-2, Alloy, and PPG-PR 423 had the highest turf quality average during 2017 and 2018, while Linn, LPB-SD-105, and Brightstar SLT had the lowest turf quality average.

In the 2017 perennial ryegrass trial (Table 4), FCW, 2CL6, 2CL4, 2CL1, and PST-2GLM Blk had the highest turf quality average during 2018, while Fabian, Double Time, Tetradark, and Double Time GLS had the lowest turf quality average.

For the 2018 perennial ryegrass CTBT trial (Table 5), PPG-PR-434, DLFPS-236-3547, PST-214, DLFPS-236-3582, and PPG-PR-344 had the highest turf quality average during 2018, while Brightstar SLT, DLFPS-236-3024, and APR3060 had the lowest turf quality average. In the 2018 perennial ryegrass trial (Table 6), GR2, GR8, PDS3, PPG-PR-434, GR6, and GR3 had the highest turf quality average during 2018, while Blazer 4, Tetra Grain, Panther GLS, Replicator, ORPRG16-4, ORPRG16-7, ORPRG16-6, ORPRG16-3, Laredo II, Palmer III, ORPRG16-1, Majesty II, Barbados, Pinstripe II, Evening Shade, Mighty, Cutter II, ORPRG16-5, Ringer II, Brea, Express II, ORPRG16-2, Hancock, Continental II, 2TETS, and Tetradark had the lowest turf quality average.

### **Gray Leaf Spot**

Gray leaf spot is an important disease that can cause a leaf blight that kills perennial ryegrass seedlings. Leaves are usually distorted and twisted at the point of infection, forming a characteristic 'J-shaped' leaf blade. Gray leaf spot is prevalent during extended periods of high relative humidity and warm temperatures. In the 2018 perennial ryegrass CTBT trial (Table 5), PPG-PR 344, PPG-PR 434, Signet, PPG-PR 435, and PPG-PR438 had the least gray leaf spot, while Brightstar SLT, APR2846, APR2462, DLFPS-236-3024, APR3060, and Nexus XD had the most disease. In the 2018 perennial ryegrass trial (Table 6), 021, PPG-PR 422, PDS3 Comp, Principal II, PPG-PR 435, and Stellar 3GL had the least disease, while Blazer 4, Tetra Grain, and Panther GLS had the most gray leaf spot.

### **Color**

In the United States, a dark green turf color is typically considered more desirable when compared to a light green turf color. A focus of the Rutgers turfgrass breeding program has been to breed for darker green varieties of perennial ryegrass. In addition to the consideration of genetic color when rating for turf quality, the color for each cultivar was also assessed (Table 3). ASP0116EXT, BSP-17, RAD-PR 112, CS-6, and BWH had the darkest green color, and Linn and BAR LP 6165 had the lightest green color.

### **Establishment**

Most cultivars and selections were well-established within two months of seeding, as evidenced by the results from September establishment ratings presented in Tables 5 and 6. Factors such as genet-

ics, environmental conditions, and seed quality and storage can affect seedling establishment and vigor. Perennial ryegrass is regarded as a rapidly germinating species, a trait that helps to suppress weeds and prevent soil erosion. In the 2018 perennial ryegrass CTBT trial (Table 5), Haven, PST-2BD1, Carly, PPG-PR 344, PPG-PR 435, PPG-PR 438, PPG-PR 368, PPG-PR 437, PPG-PR 310, DLFPS-236-3543, DLFPS-236-3584, Grandslam GLD, and Prosport 4 had the quickest establishment, while APR2612 and DLFPS-236-3024 had the slowest establishment. In the 2018 perennial ryegrass trial (Table 6), Principal II, Pillar II, Gray Hawk, Homerun LS, Spark, Zoom and Continental II had the quickest establishment, while Replicator, MN-EPR18, and PPG-PR 480 had the slowest establishment.

### **Stemminess**

Stemminess is an assessment for the amount of residual reproductive stems that remain in a turf plot after mowing. Stemminess was evaluated in the 2017 perennial ryegrass trial (Table 4). Ratings were taken on a 1 to 9 scale, where 9 represented a plot with little residual reproductive stems and 1 represented a plot with a lot of residual reproductive stems. The lack of stemminess is an attractive trait as it allows for a more consistent and visibly appealing turfgrass stand. Clementine, Mercitwo, Tetradry, and Bizet 1 performed well for this trait, and Manhattan 5, Blazer 4, GO-241S, Red Hawk, Harrier, and PST-Syn-2G performed poorly for this trait.

## **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 dark green color of these cultivars are extremely important traits that are in high demand in the turfgrass 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.

## **ACKNOWLEDGMENTS**

New Jersey Agricultural Experiment Station Publication No. E 12194-04-19. This work was conducted

as a part of NJAES Project No. 12180, supported by New Agricultural Experiment Station, State and Hatch Act funds, the Rutgers Center for Turfgrass Science, and other grants and gifts from the United States Golf Association. Additional support was received by the New Jersey Turfgrass Association, the New Jersey Turfgrass Foundation, and the National Turfgrass Evaluation Program.

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Table 1. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2016 at Adelphia, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Leaf Spot <sup>2</sup> 15 Sept. 2017
	2017-2018 Avg.	2017 Avg.	2018 Avg.	
1 PST-2MAY	6.5	6.3	6.7	9.0
2 PPG-PR 301	6.3	6.2	6.5	9.0
3 PST-2CPR-BS	6.3	6.3	6.3	9.0
4 PST-SYN-2DML	6.2	6.2	6.2	8.7
5 Xcellerator	6.2	6.1	6.3	8.3
6 FCW	6.2	6.0	6.3	8.3
7 PPG-PR 342	6.1	5.8	6.3	8.0
8 Furlong	6.0	6.3	5.7	7.7
9 Homerun LS	6.0	6.2	5.7	8.3
10 PRC2	6.0	6.0	5.9	8.3
11 PST-2FLAT/2BFD	5.9	5.8	5.9	8.7
12 PRC3	5.9	5.8	5.9	8.3
13 Intense	5.9	5.9	5.8	7.3
14 PPG-PR 304	5.9	5.7	6.0	6.3
15 Grand Slam GLD	5.8	6.0	5.7	9.0
16 PPG-PR 243	5.8	6.5	5.1	7.3
17 PRC6	5.8	6.0	5.5	7.3
18 8851	5.8	6.0	5.5	8.3
19 PST-2GTD	5.7	5.6	5.8	8.3
20 PPG-PR-303	5.7	6.0	5.4	8.0
21 PPG-PR 229	5.7	6.2	5.2	8.0
22 PPG-PR 310	5.6	5.5	5.7	8.7
23 PRC4	5.6	6.0	5.2	8.0
24 PST-2FLTE Bulk	5.6	5.5	5.8	5.7
25 LLP-836	5.6	6.1	5.1	9.0
26 PPG-PR 309	5.6	5.7	5.5	8.0
27 Gray Wolf	5.6	5.8	5.3	8.7
28 PPG-PR372	5.6	5.8	5.4	7.3
29 023	5.6	5.7	5.4	7.7
30 Provost	5.6	5.7	5.4	7.0
31 PPG-PR 368	5.5	5.7	5.3	8.0
32 PST-2A12	5.5	5.5	5.5	8.3
33 Spark	5.5	5.7	5.3	8.3
34 LLP-123	5.5	5.6	5.4	7.3
35 PST-2MKD	5.5	5.3	5.6	8.3

(Continued)



Table 1. Perennial ryegrass turf trial, 2016 (continued).

	Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Leaf Spot <sup>2</sup> 15 Sept. 2017
		2017-2018 Avg.	2017 Avg.	2018 Avg.	
36	PST-SYN-2DRG	5.4	5.6	5.2	6.3
37	PPG-PR 338	5.4	5.8	5.0	8.7
38	PST-2FOXY	5.4	5.6	5.2	8.0
39	PRC5	5.4	6.0	4.7	8.7
40	Benchmark	5.4	5.3	5.4	5.3
41	PPG-PR 376	5.3	5.5	5.2	7.3
42	PST-SYN-2E6	5.3	5.3	5.4	7.3
43	PST-2A2	5.3	5.5	5.0	8.7
44	Metolius	5.3	5.8	4.7	9.0
45	Premium	5.3	5.5	5.0	6.7
46	021	5.2	5.3	5.1	8.7
47	Stellar 3GL	5.2	5.3	5.0	8.7
48	Gray Hawk	5.2	5.3	5.0	7.7
49	UHS	5.1	5.6	4.7	8.3
50	PST-2EGAD	5.1	5.2	5.0	5.7
51	UEV	5.1	5.0	5.2	7.3
52	SPV	5.0	5.5	4.6	7.7
53	Homerun	5.0	5.1	4.9	3.7
54	LLP-172	5.0	5.1	4.8	5.7
55	Premium	5.0	5.4	4.5	6.3
56	Uno	5.0	5.0	4.9	4.7
57	Expedite	5.0	5.1	4.8	7.7
58	Fastball RGL	4.9	5.3	4.6	6.7
59	LLP-838	4.9	4.7	5.1	5.7
60	Silver Sun	4.9	4.7	5.1	5.3
61	Aspire	4.9	5.1	4.7	7.7
62	Ruckus	4.9	5.2	4.6	6.3
63	PST-2REB	4.8	5.3	4.4	7.0
64	PST-SYN-2MR	4.8	4.8	4.8	7.7
65	RAD-PR73R-Q	4.8	5.4	4.3	5.7
66	PPG-PR 426	4.8	5.0	4.6	7.7
67	Pistol	4.8	4.9	4.7	7.0
68	Apple SGL	4.8	5.2	4.3	6.3
69	PST-2BD1 Bulk	4.8	4.7	4.8	7.7
70	LLP-944	4.7	4.9	4.5	6.3

(Continued)



Table 1. Perennial ryegrass turf trial, 2016 (continued).

	Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Leaf Spot <sup>2</sup> 15 Sept. 2017
		2017-2018 Avg.	2017 Avg.	2018 Avg.	
71	LLP-943	4.7	4.5	4.9	7.0
72	Vision	4.7	5.0	4.4	6.7
73	LLP-174	4.7	4.7	4.7	3.7
74	Sun	4.7	4.7	4.7	3.7
75	LLP-911	4.7	4.7	4.6	6.3
76	LLP-912	4.7	5.1	4.3	5.7
77	Panther GLS	4.7	4.7	4.6	3.3
78	PPG-PR 308	4.6	4.5	4.8	5.7
79	Molalla	4.6	4.5	4.7	5.3
80	Salinas II	4.6	4.3	4.8	5.0
81	PST-2BET	4.5	4.9	4.2	7.7
82	Green Emperor	4.5	4.7	4.3	4.3
83	LLP-536	4.5	4.6	4.4	3.3
84	LTNS PRG Blend 1	4.5	4.3	4.6	4.3
85	New Sealand	4.5	4.3	4.6	5.0
86	Silver Dollar	4.5	4.4	4.5	4.0
87	LLP-747	4.4	5.0	3.9	5.3
88	Rinovo	4.4	4.5	4.3	3.7
89	LLP-837	4.4	4.3	4.6	2.3
90	Palmer III	4.3	4.2	4.5	3.0
91	Panther H2O	4.3	4.1	4.6	4.7
92	PPG-PR-321	4.3	4.6	4.0	3.0
93	LTNS PRG Blend 2	4.3	4.4	4.1	4.7
94	Prominent	4.2	4.0	4.5	4.3
95	Penant H2O	4.2	3.9	4.5	2.3
96	MSP 4017	4.2	4.3	4.1	3.7
97	LLP-1017	4.2	4.1	4.3	4.7
98	Presidio	4.1	4.2	4.0	3.7
99	Cascadia	4.1	4.2	3.9	2.7
100	LLP-157	4.1	4.1	4.0	5.0
101	LLP-888	4.0	4.0	3.9	3.7
102	Double Time	4.0	4.1	3.8	2.7
103	Arctic Green	3.9	4.0	3.9	4.0
104	Divine	3.9	3.7	4.1	2.7
105	LLP-169	3.7	3.7	3.8	2.3

(Continued)

Table 1. Perennial ryegrass turf trial, 2016 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Leaf Spot <sup>2</sup> 15 Sept. 2017
	2017-2018 Avg.	2017 Avg.	2018 Avg.	
106 Charger II	3.7	3.6	3.7	3.3
107 Prelude IV	3.6	3.2	4.0	2.0
108 PST-2STOL	3.5	3.7	3.4	5.3
109 LLP-475	3.5	3.6	3.5	2.7
110 Playfast	3.4	3.3	3.5	2.7
111 Double Time GLS	3.4	3.2	3.5	3.3
112 LLP-473	3.3	3.1	3.5	2.0
113 MSP 4044	3.2	3.3	3.0	3.0
114 Royal Green	2.8	2.9	2.7	2.3
115 Double Up GLS	1.1	1.1	1.0	8.0
LSD at 5% =	0.8	0.8	1.1	2.5

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

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

Table 2. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2016 at Adelphia, NJ. Includes all entries from the 2016 Alliance for Low Input Sustainable Turf Test (A-LIST).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Establishment <sup>2</sup>
	2017-2018 Avg.	2017 Avg.	2018 Avg.	7 Oct. 2016
1 Furlong	5.7	5.2	6.3	6.0
2 Slugger 3GL	5.7	5.0	6.4	5.8
3 Homerun LS	5.3	4.6	6.0	6.8
4 Apple 3GL	5.3	4.3	6.3	6.5
5 PPG-PR 367	5.3	4.9	5.6	5.8
6 DLFPS-3538	5.2	4.4	6.0	5.5
7 Seabiscuit	5.2	3.9	6.4	6.3
8 DLFPS-3541	5.1	4.8	5.4	5.8
9 Fastball 3GL	5.0	4.4	5.5	6.0
10 Man O' War	5.0	4.5	5.5	6.5
11 DLFPS-3543	4.9	5.0	4.9	5.8
12 SR 4650	4.8	4.1	5.6	6.5
13 PPG-PR 385	4.8	4.4	5.2	6.8
14 DLFPS-3540	4.8	4.8	4.7	5.8
15 DLFPS-3548	4.7	4.4	5.0	5.8
16 Stellar 3GL	4.5	4.0	5.0	6.8
17 LTP-DF	4.5	4.1	4.9	6.5
18 DLFPS-3556	4.5	4.6	4.4	6.8
19 Pharoah	4.3	4.0	4.7	6.8
20 DLFPS-3542	4.1	4.0	4.2	5.3
21 Karma	3.9	3.7	4.2	6.5
22 Grand Slam GLD	3.8	3.6	4.0	7.6
23 Tetradark	2.5	2.9	2.2	5.5
24 Linn	1.8	2.1	1.4	9.0
LSD at 5% =	0.9	0.7	1.6	0.9

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

<sup>2</sup>9 = fastest establishment

Table 3. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2016 at Adelphia, NJ. Includes all entries from the 2016 National Turfgrass Evaluation Program Test (NTEP).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Gray Leaf Spot <sup>2</sup> 10 Oct. 2016	Crown Rust <sup>2</sup> 20 Sept. 2017	-----Color <sup>3</sup> -----	
	2017- 2018 Avg.	2017 Avg.	2018 Avg.			26 Sept. 2017	8 Nov. 2018
1 Furlong	7.0	7.3	6.6	7.7	8.3	9.0	7.0
2 DLFPS-236-3541	6.5	6.6	6.4	7.3	5.0	7.0	7.0
3 NP-2	6.4	7.0	5.9	8.3	6.7	7.0	6.0
4 Alloy	6.3	6.4	6.2	7.3	4.3	8.0	7.0
5 PPG-PR 423	6.3	6.5	6.1	8.7	6.0	9.0	6.7
6 DLFPS-236-3546	6.2	6.5	6.0	8.0	7.0	9.0	6.7
7 DLFPS-236-3547	6.2	6.5	5.9	7.7	8.0	9.0	6.7
8 023	6.2	6.6	5.8	7.7	7.0	9.0	5.0
9 Slugger 3GL	6.2	6.4	6.0	8.7	6.3	9.0	5.7
10 PPG-PR 421	6.2	6.4	5.9	8.3	4.7	7.0	6.0
11 Paradox GLR	6.2	6.5	5.8	7.3	6.0	8.0	5.7
12 Signet	6.1	6.3	5.9	8.3	5.0	8.0	5.7
13 Silver Sport	6.1	6.5	5.7	8.0	7.7	9.0	6.7
14 PPG-PR 424	6.1	6.8	5.4	7.7	7.7	8.0	5.0
15 DLFPS-236-3543	6.1	6.3	5.9	7.0	3.7	7.0	6.3
16 PPG-PR 360	6.1	6.4	5.8	7.7	5.3	8.0	6.3
17 Intense	6.1	6.2	5.9	7.0	4.7	7.0	7.0
18 Peridot	6.1	6.1	6.0	7.7	7.0	7.7	5.7
19 PPG-PR 372	6.1	6.2	5.9	7.7	4.7	8.0	6.3
20 DLFPS-236-3542	6.0	6.4	5.7	8.3	4.3	8.0	6.0
21 02BS1	6.0	6.1	5.9	8.7	5.3	7.0	7.0
22 PR-6-15	6.0	6.1	5.8	8.3	5.7	8.0	7.0
23 APR2616	6.0	6.1	5.8	7.0	4.0	7.0	5.0
24 FP2	5.9	6.2	5.6	8.3	6.3	9.0	7.0
25 JR-197	5.9	6.2	5.6	8.7	6.3	8.0	6.3

(Continued)

Table 3. Perennial ryegrass turf trial, 2016 (NTEP) (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Gray Leaf Spot <sup>2</sup> 10 Oct. 2016	Crown Rust <sup>2</sup> 20 Sept. 2017	-----Color <sup>3</sup> -----	
	2017- 2018 Avg.	2017 Avg.	2018 Avg.			26 Sept. 2017	8 Nov. 2018
26 Fastball 3GL	5.9	6.2	5.6	8.0	7.3	9.0	6.7
27 02BS2	5.9	5.9	5.8	8.0	6.0	8.0	5.0
28 PPG-PR 420	5.9	6.4	5.4	7.7	4.7	7.0	5.3
29 CPN	5.9	6.0	5.7	7.3	7.7	9.0	6.3
30 DLFPS-236-3548	5.9	6.2	5.5	6.0	4.3	8.0	5.3
31 DLFPS-236-3554	5.9	5.9	5.8	5.7	3.7	8.0	6.3
32 021	5.9	6.1	5.6	8.0	6.3	7.0	5.0
33 Apple 3GL	5.8	5.8	5.9	8.0	4.3	8.0	6.0
34 DLFPS-236-3540	5.8	6.1	5.6	5.7	4.3	8.0	6.3
35 DLFPS-236-3545	5.8	6.1	5.6	8.3	7.3	9.0	7.0
36 Gray Wolf	5.8	6.1	5.6	8.3	5.3	8.0	6.3
37 DLFPS-236-3556	5.8	6.4	5.2	8.0	5.7	7.0	5.0
38 Spike GLS	5.8	5.9	5.6	7.3	7.0	9.0	5.7
39 PST-2A2	5.8	6.0	5.5	7.7	5.7	8.0	6.7
40 Overdrive 5G	5.7	6.2	5.3	7.7	5.7	6.0	7.0
41 PPG-PR 370	5.7	6.0	5.4	7.7	4.7	9.0	6.3
42 Slider LS	5.7	6.1	5.3	7.0	4.7	8.0	6.0
43 Xcelerator	5.7	6.2	5.2	7.7	6.7	7.0	6.3
44 NP-3	5.7	6.5	4.8	8.7	6.0	9.0	6.0
45 PST-2MAY	5.7	5.7	5.6	6.0	4.3	8.0	6.0
46 DLFPS-236-3544	5.6	5.7	5.5	8.0	6.7	8.7	6.3
47 Homerun LS	5.6	6.1	5.1	6.7	7.7	9.0	5.3
48 DLFPS-236-3552	5.6	5.6	5.7	6.7	2.7	8.0	7.0
49 Shield	5.6	5.7	5.5	5.7	7.0	8.0	5.3
50 DLFPS-236-3553	5.6	5.8	5.4	8.7	7.0	9.0	5.7

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(Continued)

Table 3. Perennial ryegrass turf trial, 2016 (NTEP) (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Gray Leaf Spot <sup>2</sup> 10 Oct. 2016	Crown Rust <sup>2</sup> 20 Sept. 2017	-----Color <sup>3</sup> -----	
	2017- 2018 Avg.	2017 Avg.	2018 Avg.			26 Sept. 2017	8 Nov. 2018
51 Seabiscuit	5.6	5.5	5.6	6.7	5.7	7.0	6.3
52 PPG-PR 385	5.6	5.7	5.4	6.3	6.0	7.0	4.7
53 PPG-PR 367	5.5	5.6	5.4	8.3	7.0	9.0	6.3
54 JR-123	5.5	5.9	5.2	8.0	5.0	7.3	6.3
55 PPG-PR 331	5.5	6.2	4.9	7.3	4.3	7.0	5.0
56 DLFPS-236-3550	5.5	5.8	5.1	6.3	3.7	8.0	6.0
57 Pharaoh	5.5	6.0	4.9	7.7	5.7	8.0	6.3
58 PST-2GTD	5.5	5.5	5.4	7.3	3.7	8.0	6.3
59 PST-2BDT	5.4	5.4	5.4	6.0	3.7	8.0	5.7
60 Grand Slam GLD	5.4	5.3	5.5	4.7	4.0	9.0	7.0
61 Gray Hawk	5.4	5.2	5.6	5.3	3.7	7.0	5.7
62 SR 4650	5.4	5.7	5.1	7.0	6.3	8.0	5.0
63 Umpqua	5.4	5.6	5.2	6.3	7.7	9.0	5.3
64 PST-2FOXY	5.4	5.4	5.3	6.3	4.7	8.0	7.3
65 Man O'War	5.4	5.7	5.0	6.7	6.7	7.0	6.7
66 PPG-PR 422	5.3	6.0	4.7	8.3	5.7	9.0	6.3
67 PR-5-16	5.3	5.6	5.0	7.3	3.7	5.7	6.0
68 PST-2PDA	5.3	5.4	5.1	7.7	2.7	7.0	6.0
69 Karma	5.2	5.9	4.4	9.0	5.0	8.0	4.7
70 ASP0118GL	5.2	5.1	5.2	5.0	2.7	8.0	6.7
71 DLFPS-236-3538	5.1	5.6	4.6	7.7	3.3	7.0	4.0
72 Derby Xtreme	5.1	5.2	5.0	6.0	2.3	7.0	6.0
73 ASP0117	5.0	4.9	5.1	4.7	3.7	8.0	6.0
74 APR3060	5.0	4.7	5.3	4.0	4.0	7.3	4.0
75 PST-2EGAD	5.0	4.9	5.0	7.0	2.7	7.0	5.3

(Continued)

Table 3. Perennial ryegrass turf trial, 2016 (NTEP) (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Gray Leaf Spot <sup>2</sup> 10 Oct. 2016	Crown Rust <sup>2</sup> 20 Sept. 2017	-----Color <sup>3</sup> -----	
	2017-2018 Avg.	2017 Avg.	2018 Avg.			26 Sept. 2017	8 Nov. 2018
76 MRSL-PR16	4.8	4.6	5.0	4.0	3.0	7.0	7.7
77 APR2612	4.8	4.9	4.6	7.3	4.7	7.0	6.3
78 Pepper II	4.8	5.1	4.5	4.7	2.3	6.0	7.7
79 RAD-PR 112	4.7	5.0	4.5	5.7	2.7	6.0	8.0
80 Allstar III	4.6	4.8	4.4	4.3	2.3	7.0	6.3
81 ASP0218	4.6	4.7	4.6	4.7	2.7	8.0	6.3
82 CS-6	4.6	4.5	4.7	4.7	2.3	8.0	8.0
83 BAR LP 6233	4.6	4.5	4.7	4.0	6.3	7.0	3.7
84 GO-142	4.6	4.5	4.6	5.3	2.3	7.0	4.7
85 SNX	4.5	4.4	4.7	4.3	2.0	8.0	7.7
86 BAR LP 6164	4.5	4.7	4.4	4.7	3.7	7.0	3.3
87 MRSL-PR15	4.5	4.3	4.7	4.7	2.3	7.0	6.3
88 ASP0116EXT	4.5	4.2	4.7	2.7	2.0	9.0	9.0
89 BAR LP 6158	4.5	4.4	4.5	5.0	3.0	6.0	3.3
90 BAR LP 6159	4.5	4.3	4.6	3.7	2.7	6.0	4.0
91 AMP-R1	4.4	4.5	4.3	4.0	3.0	8.0	6.7
92 BSP-25	4.4	4.3	4.5	3.3	2.0	8.0	7.0
93 Evolve	4.3	4.4	4.2	4.7	2.3	4.7	4.7
94 GO-143	4.3	4.1	4.5	3.7	2.0	7.0	7.0
95 BAR LP 6117	4.3	4.2	4.4	3.7	1.3	6.0	3.7
96 BSP-17	4.2	4.0	4.3	2.7	3.0	9.0	8.3
97 Saguaro	4.1	4.3	3.9	2.3	3.0	8.0	4.7
98 LPB-SD-103	4.0	4.3	3.7	3.7	3.0	8.0	5.0
99 Mensa	4.0	4.5	3.5	2.7	5.0	8.0	5.0
100 LPB-SD-102	4.0	4.1	3.8	2.7	3.0	7.0	6.0

(Continued)



Table 3. Perennial ryegrass turf trial, 2016 (NTEP) (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Gray Leaf Spot <sup>2</sup> 10 Oct. 2016	Crown Rust <sup>2</sup> 20 Sept. 2017	-----Color <sup>3</sup> -----	
	2017- 2018 Avg.	2017 Avg.	2018 Avg.			26 Sept. 2017	8 Nov. 2018
101 LPB-SD-104	3.9	4.3	3.6	3.3	3.7	8.0	4.7
102 GO-141	3.9	3.9	4.0	3.3	1.7	7.0	6.7
103 JR-888	3.7	4.0	3.4	2.0	4.0	6.0	2.7
104 BAR LP 6165	3.6	3.7	3.5	2.3	6.3	2.3	1.0
105 JR-747	3.6	3.9	3.3	2.7	2.0	6.0	4.7
106 BWH	3.6	3.5	3.7	1.7	2.3	9.0	8.0
107 Savant	3.4	3.6	3.2	1.3	3.7	6.0	3.3
108 BAR LP 6131	3.3	2.9	3.7	1.7	3.3	7.0	4.7
109 DLFPS-238-3014	3.3	3.0	3.5	2.3	5.0	7.0	4.0
110 LPB-SD-101	3.2	3.5	2.9	1.7	2.7	7.0	3.3
111 BAR LP 6162	3.2	2.7	3.6	2.3	4.0	9.0	6.7
112 Brightstar SLT	3.1	3.0	3.2	1.7	2.7	7.0	4.0
113 LPB-SD-105	3.0	3.4	2.7	1.3	3.7	8.0	4.0
114 Linn	1.0	1.0	1.0	1.0	3.7	1.0	1.0
LSD at 5% =	0.7	0.7	0.9	1.5	1.9	0.2	1.3

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

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

<sup>3</sup>9 = best genetic color

Table 4. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in September 2017 at Adelphia, NJ.

Cultivar or Selection	Turf Quality <sup>1</sup> 2018 Avg.	Stemminess <sup>2</sup> 11 June 2018
1 FCW	7.3	5.0
2 2CL6	6.8	4.7
3 2CL4	6.8	4.3
4 2CL1	6.8	3.0
5 PST-2GLM Blk	6.7	6.0
6 PR-7-16	6.6	4.7
7 PST-2FLCP Bulk	6.6	4.0
8 Silver Sport	6.6	3.3
9 PPG-PR 424	6.6	5.0
10 8851	6.6	4.3
11 2CL2	6.5	3.3
12 PR-10-16	6.5	3.0
13 PR-8-16	6.4	5.3
14 PR-6-16	6.4	5.7
15 2CL3	6.4	4.0
16 PPG-PR-343	6.3	5.0
17 PPG-PR 437	6.3	6.7
18 PPG-PR-367	6.3	3.3
19 PPG-PR-372	6.3	5.0
20 PPG-PR 435	6.2	6.3
21 PPG-PR 342	6.2	5.0
22 PR-26-16	6.2	5.0
23 PST-2A2	6.2	4.3
24 Gray Wolf	6.2	5.0
25 Xcelerator	6.2	3.7
26 PST-214	6.2	3.7
27 Peridot	6.1	4.7
28 Gray Hawk	6.1	4.3
29 PPG-PR 434	6.1	4.0
30 PPG-PR-329	6.1	3.3
31 PR-30-16	6.1	6.7
32 PR-15-16	6.1	5.3
33 Apple 3GL	6.1	5.0
34 PPG-PR 436	6.1	5.0
35 PR-28-16	6.1	5.0

(Continued)

Table 4. Perennial ryegrass turf trial, 2017 (continued).

Cultivar or Selection	Turf Quality <sup>1</sup> 2018 Avg.	Stemminess <sup>2</sup> 11 June 2018
36 2CL5	6.1	4.0
37 PPG-PR 376	6.1	3.7
38 PPG-PR 423	6.1	6.0
39 PPG-PR 420	6.1	5.7
40 CPN	6.0	4.0
41 Blackstone	6.0	5.0
42 PR-9-16	6.0	3.0
43 PPG-PR 368	6.0	3.3
44 Ruckus	5.9	5.7
45 PR-27-16	5.9	5.3
46 Slider LS	5.9	5.0
47 Spike GLS	5.9	5.0
48 Evolution	5.9	5.7
49 PR-29-16	5.9	4.3
50 Fastball 3GL	5.9	4.0
51 PPG-PR-422	5.8	4.3
52 PES	5.8	3.0
53 CPU-B15	5.8	6.7
54 PPG-PR 438	5.8	4.0
55 PPG-PR 432	5.8	3.7
56 PST-2MAY	5.8	5.3
57 Stellar 3GL	5.8	5.0
58 Intense	5.8	3.0
59 Thrive	5.7	3.7
60 Homerun LS	5.7	3.3
61 PPG-PR 229	5.7	5.7
62 PST-2FLAT	5.7	4.7
63 PR-19-16	5.7	4.3
64 Peridot	5.7	3.3
65 Monsieur	5.7	5.0
66 Bandalore	5.7	4.0
67 PR-6-15	5.7	3.7
68 PST-2BAD	5.6	5.0
69 Soprano	5.6	4.3
70 PST-2MKD	5.6	5.7
71 EUS	5.6	4.3
72 PPG-PR 433	5.6	3.7
73 PR-5-15	5.6	4.3
74 Sox Fan	5.6	2.7
75 Benchmark	5.5	4.3

(Continued)

Table 4. Perennial ryegrass turf trial, 2017 (continued).

Cultivar or Selection	Turf Quality <sup>1</sup> 2018 Avg.	Stemminess <sup>2</sup> 11 June 2018
76 PST-2FOXY-16	5.5	4.3
77 NAI-LME-17	5.5	4.3
78 PR-5-16	5.5	4.3
79 Derby Xtreme	5.5	2.7
80 PST-2GTD	5.5	4.7
81 Karma	5.5	6.3
82 PST-2BD1	5.4	6.0
83 Grandslam GLD	5.4	5.0
84 Keystone 2	5.4	3.3
85 Sideways	5.4	3.7
86 PST-Syn-2GRD	5.4	2.0
87 Align II	5.4	3.3
88 Hancock	5.4	3.3
89 Vision	5.4	3.0
90 LTNS PRG Blend 2	5.3	4.3
91 SR 4650	5.3	3.7
92 PST-2EGS Bulk	5.3	2.3
93 Virte	5.3	3.3
94 PST-2PDA	5.3	3.0
95 Evolution	5.3	3.0
96 Allstar 3	5.3	3.3
97 Aspire	5.3	3.0
98 Banfield	5.2	3.3
99 Wicked	5.2	4.7
100 Big League	5.2	4.3
101 PST-2YAY Bulk	5.2	3.7
102 Ringles	5.2	4.0
103 Spark	5.2	3.7
104 PST-2EGAD	5.2	3.3
105 Harrier	5.1	2.0
106 Diligent	5.1	3.0
107 CS-6	5.1	2.7
108 PPG-PR-385	5.0	5.0
109 Stamina	5.0	4.7
110 Linedrive II	5.0	3.3
111 PST-2BET	4.9	3.7
112 Zoom	4.9	3.7
113 Evolve	4.9	3.0
114 Black Pearl	4.9	3.0
115 Panther H2O	4.8	3.3

(Continued)

Table 4. Perennial ryegrass turf trial, 2017 (continued).

Cultivar or Selection	Turf Quality <sup>1</sup> 2018 Avg.	Stemminess <sup>2</sup> 11 June 2018
116 PR-25-16	4.8	5.3
117 Galleon	4.8	2.3
118 Express II	4.8	3.0
119 LTNS PRG Blend 1	4.7	3.7
120 PST-2DRG	4.7	3.7
121 Rinovo	4.7	3.7
122 Dasher 3	4.7	2.7
123 Mighty	4.6	3.7
124 Salinas II	4.6	2.7
125 GO-341S	4.6	3.7
126 Expedite	4.6	2.3
127 LTNS PRG Blend 3	4.5	2.3
128 LCP 186	4.5	3.7
129 SR 4660ST	4.5	2.7
130 Red Hawk	4.5	2.0
131 Tetradry	4.4	8.0
132 GO-143	4.4	4.0
133 Gallop	4.4	2.3
134 GO-142	4.4	3.3
135 Pennant H2O	4.4	3.3
136 GO-141	4.3	3.7
137 GO-140S	4.3	3.7
138 Hawkeye 2	4.3	3.0
139 Mercitwo	4.2	8.3
140 GO-241S	4.2	2.0
141 Gator 3	4.2	3.7
142 Pennant H2O	4.1	3.3
143 Edge II	4.0	3.3
144 Fiesta 3	4.0	3.0
145 Commander ST	4.0	3.0
146 LGT-4-16	4.0	5.3
147 Manhattan 5 GLR	4.0	1.7
148 Clementine	3.9	8.7
149 Blazer 4	3.9	2.0
150 Cutter II	3.9	3.3
151 Sun	3.9	3.7
152 Tetrastar	3.8	6.7
153 Palmer III	3.8	3.3
154 Calypso 3	3.8	3.3
155 Fiesta 4	3.8	2.3

(Continued)

Table 4. Perennial ryegrass turf trial, 2017 (continued).

Cultivar or Selection	Turf Quality <sup>1</sup> 2018 Avg.	Stemminess <sup>2</sup> 11 June 2018
156 Lover	3.8	2.7
157 Top Hat 2	3.7	3.0
158 Penguin 2	3.7	3.3
159 Panther GLS	3.5	3.0
160 Bizet 1	3.4	8.0
161 Prelude IV	3.4	3.7
162 Tetragreen	3.3	5.3
163 Replicator	3.3	5.3
164 Double Time GLS	3.1	3.3
165 Tetradark	3.0	2.3
166 Double Time	2.9	3.3
167 Fabian	1.6	6.3
LSD at 5% =	0.7	1.6

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

<sup>2</sup>9 = fewest stems

Table 5. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2018 at Adelphia, NJ. Includes all entries from the 2018 Cooperative Turfgrass Breeders Test (CTBT).

Cultivar or Selection	Gray Leaf Spot <sup>1</sup> 27 Sept. 2018	Turf Quality <sup>2</sup> 2018 Avg.	Establishment <sup>3</sup> 17 Sept. 2018
1 PPG-PR-344	8.3	7.7	7.7
2 PPG-PR-434	8.0	8.3	7.0
3 Signet	7.7	7.5	7.3
4 PPG-PR-435	7.7	7.3	7.7
5 PPG-PR-438	7.7	6.7	7.7
6 PST-214	7.3	7.8	5.7
7 PPG-PR-368	7.3	7.5	7.7
8 DLFPS-236-3547	7.0	8.0	7.0
9 DLFPS-236-3582	7.0	7.8	6.7
10 PPG-PR-342	7.0	7.3	7.3
11 PPG-PR-437	7.0	6.7	7.7
12 PPG-PR-310	7.0	6.5	7.7
13 PPG-PR-338	7.0	6.5	6.3
14 DLFPS-236-3546	6.7	7.5	7.3
15 APR2609	6.7	7.0	5.7
16 DLFPS-236-3543	6.7	6.8	7.7
17 PST-2MAY	6.7	6.8	6.3
18 Silver Sport	6.7	6.7	5.3
19 Shield	6.7	6.2	6.3
20 DLFPS-236-3586	6.7	5.3	6.7
21 PST-2E6	6.3	7.2	5.0
22 PPG-PR-433	6.3	7.0	7.3
23 PPG-PR-376	6.3	6.8	6.7
24 PPG-PR-436	6.3	6.8	6.7
25 DLFPS-236-3581	6.3	6.8	6.0
26 DLFPS-236-3542	6.3	6.7	5.3
27 DLFPS-236-3584	6.3	6.5	7.7
28 DLFPS-236-3577	6.3	6.5	5.7
29 DLFPS-236-3575	6.3	6.3	7.0
30 PPG-PR-478	6.3	6.3	5.0
31 Allstar 3	6.3	6.0	6.0
32 Evolution	6.0	6.8	6.0
33 DLFPS-236-3578	6.0	6.5	5.3
34 PPG-PR-477	6.0	6.3	6.3
35 PST-2GDS	6.0	6.3	5.7

(Continued)



Table 5. Perennial ryegrass turf trial, 2018 (CTBT) (continued).

Cultivar or Selection	Gray Leaf Spot <sup>1</sup> 27 Sept. 2018	Turf Quality <sup>2</sup> 2018 Avg.	Establishment <sup>3</sup> 17 Sept. 2018
36 DLFPS-236-3538	6.0	5.8	6.7
37 Haven	6.0	5.3	8.0
38 PST-2BET	5.7	6.7	5.0
39 PPG-PR-472	5.7	6.5	6.0
40 PST-2FLAT	5.7	6.3	5.3
41 PST-2DRG	5.7	6.0	6.0
42 PPG-PR-229	5.3	7.2	6.0
43 PPG-PR-432	5.3	6.3	6.7
44 DLFPS-236-3541	5.3	5.8	6.7
45 Grandslam GLD	5.3	5.5	7.7
46 DLFPS-236-3583	5.3	5.3	6.0
47 APR2753	5.0	6.2	5.0
48 NAI-LM2	5.0	5.8	5.0
49 DLFPS-236-3540	5.0	4.7	6.0
50 APR2685	5.0	4.3	5.7
51 Soprano	5.0	4.3	4.7
52 PST-2BD1	4.7	5.5	8.0
53 Karma	4.7	5.3	3.7
54 PST-2BAD	4.7	4.7	5.7
55 NAI-17106	4.7	4.7	4.7
56 SEPR-107	4.3	5.3	5.0
57 APR2617	4.3	5.3	4.7
58 Carly	4.3	5.2	8.0
59 APR2616	4.3	5.2	5.7
60 SEPR-106	4.3	5.2	5.7
61 DLFPS-236-3576	4.3	5.0	6.3
62 DLFPS-236-3585	4.3	4.8	6.7
63 DLFPS-236-3579	4.3	4.3	4.0
64 DLFPS-236-3580	4.3	4.2	5.3
65 Allsport 5	4.0	5.7	6.3
66 NAI-17397	4.0	5.0	5.3
67 PPG-PR-471	4.0	4.8	5.3
68 SYN 2HAF	4.0	4.7	4.3
69 APR2703	4.0	4.5	4.7
70 APR2856	4.0	4.0	4.7
71 NAI-1422	4.0	3.7	5.0
72 APR2440	4.0	3.7	4.0
73 New Sealand	3.7	4.5	6.0
74 APR2946	3.7	4.5	5.7
75 PST-2BGL	3.7	4.5	5.0

(Continued)

Table 5. Perennial ryegrass turf trial, 2018 (CTBT) (continued).

Cultivar or Selection	Gray Leaf Spot <sup>1</sup> 27 Sept. 2018	Turf Quality <sup>2</sup> 2018 Avg.	Establishment <sup>3</sup> 17 Sept. 2018
76 Notable	3.7	4.2	6.3
77 APR2237	3.7	3.7	4.7
78 APRT2835	3.7	3.3	4.3
79 APR2973	3.3	4.5	6.0
80 NAI-LM3	3.3	4.3	5.3
81 APR2853	3.3	4.3	4.3
82 Silver Sun	3.3	4.2	7.3
83 APR2719	3.3	4.2	5.0
84 APR2154	3.3	4.0	6.0
85 NAI-17409	3.3	4.0	5.7
86 APR2637	3.3	4.0	4.7
87 PST-2WHB	3.3	4.0	4.7
88 NAI-LD52	3.3	3.2	5.0
89 APR2848	3.3	3.0	6.0
90 Silverdollar	3.0	4.7	6.7
91 APR2944	3.0	3.3	4.7
92 Homerun	3.0	3.2	7.0
93 PST-2MKD	3.0	3.2	5.3
94 APR2790	3.0	3.2	4.7
95 Commander ST	3.0	2.8	6.7
96 Prosport 4	2.7	3.7	7.7
97 SNX	2.7	3.0	5.7
98 PST-2SHRP	2.7	2.8	5.0
99 APR2977	2.3	3.5	5.7
100 SEPR-2	2.3	2.5	5.3
101 APR2839	2.3	1.7	5.0
102 APR2463	2.3	1.7	3.7
103 APR2612	2.0	3.8	2.7
104 Nexus XR	2.0	2.0	6.3
105 SEPR-N6	1.7	2.2	7.0
106 SEPR-3	1.7	1.8	4.7
107 SEPR-1	1.7	1.3	7.3
108 Nexus XD	1.3	1.3	7.0
109 APR2846	1.3	1.3	6.7
110 APR3060	1.3	1.2	5.3
111 DLFPS-236-3024	1.3	1.2	3.3
112 APR2462	1.0	1.3	6.0
113 Brightstar SLT	1.0	1.0	6.7

(Continued)

Table 5. Perennial ryegrass turf trial, 2018 (CTBT) (continued).

Cultivar or Selection	Gray Leaf Spot <sup>1</sup> 27 Sept. 2018	Turf Quality <sup>2</sup> 2018 Avg.	Establishment <sup>3</sup> 17 Sept. 2018
LSD at 5%=	1.3	1.0	1.5

<sup>1</sup>9 = least disease

<sup>2</sup>9 = best turf quality

<sup>3</sup>9 = fastest establishment

Table 6. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2018 at Adelphia, NJ.

Cultivar or Selection	Gray Leaf Spot <sup>1</sup> 27 Sept. 2018	Turf Quality <sup>2</sup> 2018 Avg.	Establishment <sup>3</sup> 17 Sept. 2018
1 021	8.0	7.3	7.0
2 PPG-PR 422	8.0	7.0	6.3
3 PDS3	7.7	7.7	5.3
4 Principal II	7.7	7.3	8.0
5 PPG-PR 435	7.7	6.0	7.3
6 Stellar 3GL	7.7	5.7	7.0
7 PPG-PR 434	7.3	7.7	7.0
8 GR6	7.3	7.7	5.0
9 Homerun LS	7.3	7.3	7.7
10 PR-6-15	7.3	7.3	7.0
11 GR4	7.3	7.3	5.0
12 Pillar II	7.3	6.7	8.0
13 Fastball 3GL	7.3	6.7	6.3
14 PPG-PR 376	7.3	6.3	7.3
15 PPG-PRG-331	7.3	6.3	7.3
16 Karma	7.3	5.7	7.3
17 Silver Sport	7.3	5.7	5.7
18 SR 4650	7.3	5.3	6.7
19 GR3	7.0	7.7	5.0
20 PEM	7.0	7.3	5.7
21 Gray Hawk	7.0	7.0	8.0
22 PDS1	7.0	7.0	5.3
23 UEV	7.0	6.7	6.7
24 Paragon 2 GLR	7.0	6.7	5.3
25 PDS2	7.0	6.7	4.7
26 Diligent	7.0	6.0	6.3
27 GR2	6.7	8.0	4.7
28 GR1	6.7	7.3	4.3
29 Xcelerator	6.7	6.7	7.0
30 Peridot	6.7	6.7	6.3
31 GR5	6.7	6.7	4.0
32 Vision	6.7	6.3	6.3
33 GR7	6.7	6.3	4.3
34 Premium	6.7	5.3	7.0
35 Apple 3GL	6.7	5.0	6.7

(Continued)

Table 6. Perennial ryegrass turf trial, 2018 (continued).

Cultivar or Selection	Gray Leaf Spot <sup>1</sup> 27 Sept. 2018	Turf Quality <sup>2</sup> 2018 Avg.	Establishment <sup>3</sup> 17 Sept. 2018
36 PPG-PR 338	6.7	4.7	6.0
37 Slugger 3GL	6.3	6.7	5.0
38 Pharoah	6.3	6.3	7.0
39 Bandalore	6.3	6.3	6.7
40 Aspire	6.3	6.0	7.3
41 PSL	6.3	6.0	4.7
42 PPG-PR 438	6.3	5.3	7.0
43 PPG-PR 436	6.3	5.3	5.7
44 Ruckus	6.3	5.0	7.0
45 GR8	6.0	8.0	4.3
46 Syn-2MEG	6.0	7.0	4.7
47 2EGY	6.0	6.7	4.0
48 PPG-PR 473	6.0	6.3	5.3
49 PPG-PR 479	6.0	6.3	4.7
50 Spark	6.0	5.7	7.7
51 PPG-PR 437	6.0	5.7	7.0
52 Sideways	6.0	5.7	5.7
53 PPG-PR 474	6.0	5.7	5.3
54 Slider LS	6.0	5.7	5.3
55 PPG-PR 478	6.0	5.7	4.7
56 Intense	6.0	5.3	7.3
57 PPG-PR 432	6.0	5.3	7.0
58 PPG-PR 433	6.0	5.3	6.7
59 Stamina	6.0	5.0	6.3
60 Greenland	6.0	5.0	5.7
61 PDS4	6.0	5.0	4.3
62 Banfield	5.7	6.0	6.0
63 PPG-PR 476	5.7	5.7	4.7
64 ULS	5.7	5.7	4.0
65 PR-5-16	5.7	5.3	7.3
66 Alloy	5.7	5.0	6.0
67 Double Time GLS	5.7	4.3	6.3
68 Provost	5.7	4.0	5.0
69 Apple SGL	5.3	5.3	6.7
70 Fastball RGL	5.3	5.3	6.7
71 PPG-PR 475	5.3	5.0	4.3
72 EUS	5.3	4.0	6.3
73 PPG-PR 477	5.0	6.0	4.3
74 Pennant H2O	5.0	5.7	7.3
75 Thrive	5.0	5.3	6.3

(Continued)

Table 6. Perennial ryegrass turf trial, 2018 (continued).

Cultivar or Selection	Gray Leaf Spot <sup>1</sup> 27 Sept. 2018	Turf Quality <sup>2</sup> 2018 Avg.	Establishment <sup>3</sup> 17 Sept. 2018
76 Grandslam GLD	5.0	5.3	6.3
77 PPG-PR 472	5.0	5.3	5.0
78 Sox Fan	5.0	5.0	7.3
79 PPG-PR 483	5.0	5.0	4.7
80 Expedite	4.7	6.3	6.3
81 PPG-PR 480	4.7	5.3	3.3
82 TEM	4.7	4.7	5.3
83 Syn-2LOME	4.7	4.7	4.3
84 Pistol	4.7	4.3	7.3
85 Benchmark	4.7	4.3	7.0
86 Linedrive II	4.7	4.0	7.3
87 Dasher 3	4.7	4.0	6.0
88 Fiesta 4	4.7	3.3	5.0
89 Rinovo	4.7	3.0	5.0
90 2CARD Bulk	4.3	5.7	4.7
91 PPG-PR 471	4.3	4.0	4.7
92 Defender	4.3	3.3	6.7
93 Big League	4.0	4.3	6.7
94 Primary	4.0	4.0	6.7
95 Wicked	4.0	3.7	5.7
96 Ringles	4.0	3.7	5.3
97 Virte	4.0	3.3	6.3
98 SR 4660ST	4.0	2.3	6.3
99 Revenge-GLX	4.0	2.3	6.0
100 Zoom	4.0	2.0	7.7
101 Tetradark	4.0	1.0	5.7
102 Homerun	3.7	3.0	6.7
103 Sun	3.7	2.7	6.3
104 Lover	3.3	2.0	5.0
105 Tailgater	3.3	1.3	6.7
106 Presidio II	3.0	3.7	7.3
107 Charger II	3.0	2.7	7.3
108 Black Pearl	3.0	2.7	6.0
109 Salinas II	3.0	1.7	5.3
110 2TETS	3.0	1.0	5.7
111 Silver Dollar	2.7	4.0	6.7
112 Cascadia	2.7	2.7	6.0
113 MN-EPR18	2.7	2.0	3.3
114 Prominent	2.7	1.3	6.3
115 Continental II	2.7	1.0	7.7

(Continued)

Table 6. Perennial ryegrass turf trial, 2018 (continued).

Cultivar or Selection	Gray Leaf Spot <sup>1</sup> 27 Sept. 2018	Turf Quality <sup>2</sup> 2018 Avg.	Establishment <sup>3</sup> 17 Sept. 2018
116 Hancock	2.7	1.0	5.3
117 ORPRG16-2	2.7	1.0	5.0
118 Express II	2.7	1.0	4.7
119 Brightstar SLT	2.3	2.3	7.3
120 Fiji 2	2.3	1.3	7.0
121 Brea	2.3	1.0	6.0
122 Ringer II	2.3	1.0	5.7
123 ORPRG16-5	2.3	1.0	4.3
124 Torison	2.0	2.7	6.7
125 LNSPRG1	2.0	1.3	6.3
126 Cutter II	2.0	1.0	6.0
127 Mighty	2.0	1.0	5.3
128 Prelude IV	1.7	1.3	7.3
129 Evening Shade	1.7	1.0	7.0
130 Pinstripe II	1.7	1.0	6.7
131 Barbados	1.7	1.0	6.0
132 Majesty II	1.7	1.0	5.7
133 ORPRG16-1	1.7	1.0	4.3
134 LNSPRG2	1.3	1.7	4.0
135 Palmer III	1.3	1.0	6.7
136 Laredo II	1.3	1.0	5.7
137 ORPRG16-3	1.3	1.0	4.3
138 ORPRG16-6	1.3	1.0	4.3
139 ORPRG16-7	1.3	1.0	4.3
140 ORPRG16-4	1.3	1.0	4.0
141 Replicator	1.3	1.0	3.0
142 Panther GLS	1.0	1.0	6.7
143 Tetra Grain	1.0	1.0	6.0
144 Blazer 4	1.0	1.0	6.0
LSD at 5%=	1.4	1.2	1.6

<sup>1</sup>9 = least disease

<sup>2</sup>9 = best turf quality

<sup>3</sup>9 = fastest establishment



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

	2016		2017		2018	
	Ht <sup>2</sup>	N <sup>1</sup>	Ht	N	Ht	NHt
Table 1 (2016).....	1.00	1.5	3.50	1.5	3.50	1.5
Table 2 (2016 A-LIST).....	0.50	2.5	2.75	2.5	1.00	2.5
Table 3 (2016 NTEP).....	1.00	1.5	4.25	1.5	3.75	1.5
Table 4 (2017).....			1.00	1.5	3.50	1.5
Table 5 (2018 CTBT).....					2.50	1.5
Table 6 (2018).....					2.50	1.5

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

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