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This publication includes lecture notes of papers presented at the 2019 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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Deborah Spinella, Proceedings Layout Editor
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PERFORMANCE OF PERENNIAL RYEGRASS CULTIVARS AND SELECTIONS IN NEW JERSEY TURF TRIALS, 2019

Jennifer Halterman, Ronald F. Bara, Dirk A. Smith, Ryan M. Daddio, Yuanshuo Qu, Phillip L. Vines, Stacy A. Bonos, and William A. Meyer¹

INTRODUCTION

Perennial ryegrass (*Lolium perenne* L.) is a bunch-type, cool-season perennial grass native to mild climates in Asia, North Africa, and Europe (Beard, 1973; Terrell, 1968). It rapidly germinates, establishes quickly and grows best in moist, well-drained soils with a pH near 6.5 (Beard, 1973; Funk and Clarke, 1989; Thorogood, 2003). Perennial ryegrass performs well as a permanent turfgrass in parks, golf fairways and roughs, athletic fields, racetracks, and home lawns in mild climates (Beard, 1973; Beard and Beard, 2005; Thorogood, 2003). In warmer climates, it is used to overseed warm-season grasses during winter dormancy (Beard and Beard, 2005; Thorogood, 2003; Turgeon, 2008). It can also be used for roadsides for quick soil stabilization (Beard and Beard, 2005). Perennial ryegrass is susceptible to several fungal and oomycete diseases, but the Rutgers University Turfgrass breeding program selects for improvements in turf quality, disease resistance, seed yields, and increased tolerance against environmental stress factors (Bonos and Huff, 2013; Thorogood, 2003).

The Rutgers turfgrass breeding program began in 1961, released its landmark perennial ryegrass cultivar, 'Manhattan', in 1967, and became the largest cool-season turfgrass breeding program releasing more than 400 cultivars by 2010 (Funk et al., 1969; Funk and Meyer, 2001; Honig, 2011). Rutgers turfgrass breeding program started out small, having only limited worldwide resources of perennial ryegrass germplasm, but began diversifying and improving the germplasm in 1996 by collecting from countries throughout Europe and Asia (Thorogood, 2003; Bonos et al., 2004; Honig, 2011). These collections focus on isolating and identifying new sources of disease resistance that can be introduced to elite NJAES perennial ryegrass to test and improve resistance creating better cultivars.

Turfgrass breeding efforts at NJAES are focused on resistance against a number of fungal and oomycete diseases such as gray leaf spot (*Pyricularia oryzae*), stem rust (*Puccinia graminis* subsp. *graminicola*), crown rust (*Puccinia coronata*), and dollar spot (*Clarireedia jacksonii*) (Bonos and Huff, 2013; Bonos et al., 2006; Salgado-Salazar et al., 2018). Additional diseases include anthracnose (*Colletotrichum cereale*), brown patch (*Rhizoctonia solani*), pythium (*Pythium* spp.), and red thread (*Laetisaria fuciformis*) (Bonos et al., 2006; Smiley et al., 2005).

PROCEDURES

Two perennial ryegrass trials were established in 2016 (Tables 1,2), one perennial ryegrass trial was established in 2017 (Table 3), two perennial ryegrass trials were established in 2018 (Tables 4,5), and one perennial ryegrass trial was established in 2019 (Table 6). All trials were hand sown with 0.88 oz of seed into 3 ft × 5 ft plots (3.7 lb seed/1000 ft²) and arranged in a randomized complete block design with three replications. A 6-inch unseeded border was made to limit contamination. The annual rate of nitrogen and mowing height for each trial are represented in (Table 7). Single fertilizer applications did not exceed 1.0 lbs N/1000 ft². The trials were maintained to encourage biotic and abiotic stresses but were irrigated to avoid drought stress. Turf plots were mowed regularly to 1.5" height.

Dimension (dithiopyr) was used on all perennial ryegrass trials for preemergent control of annual grass and broadleaf weeds in April, June, August and October. Topeka (dicamba, dimethylamine salt), Weedar 64 (2,4-D), and Lontrel (clopyralid) were used to control broadleaf weeds. Merit (imidacloprid) was used to control grubs in June. Segway (cyazofamid) was used in August to control pythium disease, and Tenacity (mesotrione) was used to control grassy weeds in August.

¹Field Researcher IV, Laboratory Researcher II, Principal Laboratory Technician, Field Researcher IV, Graduate Assistant, Assistant Research Professor, Research Professor, and Research Professor, respectively, New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey, New Brunswick, NJ. 08901-8520.

Perennial ryegrass trials were evaluated monthly during the growing season for turf quality, *Bipolaris* leaf spot, gray leaf spot, dollar spot, color, and stemminess. All turf plots were rated by multiple evaluators to limit personal biases toward particular traits. Ratings were based on a 1 to 9 scale, with 9 representing the most desirable turf characteristics. Data was summarized and subjected to an analysis of variance (ANOVA), and means were separated using Fisher's protected least significant difference (LSD) mean separation test.

RESULTS AND DISCUSSION

Results for the perennial ryegrass trials established in 2016 through 2018 (Tables 1-5) were ranked by overall turf quality. High turf quality averages indicate good disease resistance, dark-green color, high shoot density and uniformity, fine leaf texture, low growth habit, good mowing quality, and minimal damage from insects. Trials were further ranked using additional parameters (i.e., establishment, color, disease rating, etc.) to distinguish cultivars or selections that were equally ranked based on turf quality ratings. The turfgrass trial established in 2019 (Table 6) were primarily ranked by gray leaf spot disease ratings and secondarily ranked by turf quality ratings.

Turf Quality

Perennial ryegrass is popular for overseeding home lawns, athletic fields, golf courses and other general turf areas. Since the release of the first turf-type cultivars in the 1960s, improvements have been made to overall turf quality (Huff, 1997). In the 2016 perennial ryegrass test (Table 1), PST-2MAY, PPG-PR-301, Xcellerator, PST-SYN-2DML, and PPG-PR-342 had the highest turf quality, while Double Time GLS, Playfast, MSP 4044, Royal Green, and Double Up GLS had the lowest turf quality. In the 2016 perennial ryegrass NTEP test (Table 2), Furlong, AllStar Fore, Slugger 3GL, DLFPS-236/3547, Alloy, NP-2, PPG-PR-421, PPG-PR-423, and SR 4700 had the highest turf quality, while LPB-SD-105, DLFPS-238/3014, Brightstar SLT, BAR LP 6162, and Linn had the lowest turf quality. In the 2017 perennial ryegrass test (Table 3), FCW, PR-6-16, PR-7-16, Silver Sport, PST-2FLCP, PST-2GLM, 2CL6, PPG-PR-437, and PR-8-16 had the highest turf quality, while Prelude IV, Double Time, Bizet 1, and Fabian had the lowest turf quality. In the 2018 perennial ryegrass test (Table 4), GR4 Comp, Principal II, Home-

run LS, GR3, and GR1 had the highest turf quality, while ORPRG16-7, ORPRG16-5, Laredo II, Tetra Grain, and ORPRG16-6 had the lowest turf quality. In the 2018 perennial ryegrass CTBT test (Table 5), DLFPS-236-3547, DLFPS-236-3582, PPG-PR-438, PST-214, PPG-PR-478, PPG-PR-436 had the highest turf quality, while APR2839, SEPR-3, SEPR-1, APR2846, and Brightstar SLT had the lowest turf quality. In the 2019 perennial ryegrass test (Table 6), 2CL3, PST-214, 2CL1, PPG-PR-489, and Paragon 2 GLR had the highest turf quality, while PRG-19MH, Cutter II, Panther GLS, Replay, Gator 3, PHX-NZ, and PRG-19DH had the lowest turf quality.

Gray Leaf Spot

Gray leaf spot (*Pyricularia oryzae*) is a prominent disease in the Northeast. Typical in late summer and early fall with warm temperatures and high humidity, the first symptoms appear as small, water-soaked lesions from gray to light brown with a dark border. Eventually, these lesions will mature and combine blighting the leaf blades forming a 'fish-hook' with gray spores. Conidia favorably produce under warm, humid conditions and are spread by wind and water but can be carried on lawn equipment as well. In the 2019 perennial ryegrass test (Table 6), 2CL3, 2CL4, 2CL1, PPG-PR-515, PST-2FOXY-16, and PPG-PR-524 performed well against gray leaf spot while Prelude IV, Panther GLS, Replay, PRG-19DH, and PHX-NZ were most susceptible to gray leaf spot.

Dollar Spot

Dollar spot is a widespread turfgrass disease that causes silver-dollar shaped spots of dead turf. On perennial ryegrass and other taller turfs, dollar spot infections may expand and coalesce, leading to larger areas of damaged turf. Dollar spot was evaluated in the 2017 perennial ryegrass test (Table 3), the 2018 perennial ryegrass test (Table 4), and the 2018 CTBT perennial ryegrass test (Table 5). In the 2017 perennial ryegrass test (Table 3), Virte, Tetradark, Double Time GLS, Karma, FCW, PST-2FLAT, Wicked, Align II, and GO-143 performed well against dollar spot, while Sox Fan, EUS, PST-2PDA, Commander ST, Harrier, and Bizet 1 were most susceptible to dollar spot. In the 2018 perennial ryegrass test (Table 4), Double Time GLS, Peridot, Paradox GLR, PPG-PR-473, and Karma performed well against dollar spot, while ORPRG16-7, ORPRG16-6, Pinstripe II, and Replicator were most susceptible to dollar spot. In the 2018 CTBT perennial ryegrass test (Table 5),

PPG-PR-436, PPG-PR-438, PST-214, PPG-PR-338, and APR2790 performed well against dollar spot, while NAI-LD52, SEPR-2, DLFPS-236-3024, and APR2839 were most susceptible to dollar spot.

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 test (Table 3), the 2018 perennial ryegrass test (Table 4), and the 2018 CTBT perennial ryegrass test (Table 5). 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. In the 2017 perennial ryegrass test (Table 3), PR-15-16, 2CL6, PPG-PR-372, PPG-PR-437, PPG-PR-435, PR-28-16, Tetradry, Mercitwo, and Bizet 1 performed well for this trait, while PST-2EGS, Gallop, Gator 3, Double Time GLS, Panther GLS, and Prelude Iv performed poorly for this trait. In the 2018 perennial ryegrass test (Table 4), PPG-PR-437, Principal II, PPG-PR-436, PPG-PR-435, PPG-PR-438, Greenland, MN-EPR18 performed well for this trait, while Brightstar SLT, Charger II, LNSPRG1, Barbados, and Cutter II performed poorly for this trait. In the 2018 CTBT perennial ryegrass test (Table 5), DLFPS-236-3541, DLFPS-236-3547, DLFPS-236-3542, and Signet performed well for this trait, while Prospect 4, SEPR-2, and SEPR-3 performed poorly for this trait.

Genetic Color

In the United States, a dark green turf color is typically considered more desirable when compared to a light green turf. A focus of the Rutgers turfgrass breeding program has been to breed for darker green varieties of perennial ryegrass. Genetic color was evaluated in the 2016 NTEP perennial ryegrass test (Table 2). ASP0116EXT, Palace II, Paragon 2 GLR, RAD-PR 112, and MRSL-PR16 had the darkest color, while BAR LP 6233, LPB-SD-101, BAR LP 6165, and Linn had the lightest color.

SUMMARY

Turf type perennial ryegrass is very versatile with its high traffic tolerance, rapid establishment, improved disease resistance, and dark green color. These traits continue to make perennial ryegrass a dominant perennial grass in the turfgrass seed industry. Plant breeding has improved perennial ryegrass cultivars, but more research is needed to increase heat, drought, and salt tolerance, cold hardiness, resistance to crown rust, and its ability to survive under ice sheets for long periods.

ACKNOWLEDGEMENTS

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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 ¹ -----				Leaf Spot ² 15-Sep-17
	2017-2018 Avg.	2017 Avg.	2018 Avg.	2019 Avg.	
1 PST-2MAY	6.7	6.3	6.7	7.3	9.0
2 PPG-PR 301	6.5	6.2	6.5	7.0	9.0
3 Xcellerator	6.4	6.1	6.3	6.9	8.3
4 PST-SYN-2DML	6.3	6.2	6.2	6.4	8.7
5 PPG-PR 342	6.2	5.8	6.3	6.4	8.0
6 PST-2CPR-BS	6.1	6.3	6.3	5.7	9.0
7 Furlong	6.1	6.3	5.7	6.2	7.7
8 PPG-PR 304	6.0	5.7	6.0	6.4	6.3
9 FCW	6.0	6.0	6.3	5.6	8.3
10 PRC6	5.9	6.0	5.5	6.1	7.3
11 PST-2FLAT/2BFD	5.9	5.8	5.9	5.8	8.7
12 Intense	5.9	5.9	5.8	5.9	7.3
13 Homerun LS	5.8	6.2	5.7	5.5	8.3
14 PST-2GTD	5.8	5.6	5.8	5.9	8.3
15 Grand Slam GLD	5.8	6.0	5.7	5.6	9.0
16 PPG-PR 243	5.8	6.5	5.1	5.6	7.3
17 LLP-836	5.7	6.1	5.1	5.8	9.0
18 PRC2	5.7	6.0	5.9	5.1	8.3
19 PRC3	5.7	5.8	5.9	5.2	8.3
20 PPG-PR-303	5.7	6.0	5.4	5.6	8.0
21 Gray Wolf	5.6	5.8	5.3	5.8	8.7
22 PST-2FLTE Bulk	5.6	5.5	5.8	5.7	5.7
23 PST-2FOXY	5.5	5.6	5.2	5.8	8.0
24 PPG-PR 310	5.5	5.5	5.7	5.2	8.7
25 PPG-PR372	5.5	5.8	5.4	5.3	7.3
26 Benchmark	5.5	5.3	5.4	5.8	5.3
27 PPG-PR 309	5.5	5.7	5.5	5.3	8.0
28 8851	5.5	6.0	5.5	4.9	8.3
29 PST-2MKD	5.4	5.3	5.6	5.4	8.3
30 PST-SYN-2E6	5.4	5.3	5.4	5.7	7.3
31 PST-2A12	5.4	5.5	5.5	5.3	8.3
32 Provost	5.4	5.7	5.4	5.1	7.0
33 PPG-PR 229	5.4	6.2	5.2	4.8	8.0
34 PST-SYN-2DRG	5.4	5.6	5.2	5.2	6.3
35 PST-2A2	5.3	5.5	5.0	5.4	8.7

(Continued)

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 ¹ -----				Leaf Spot ² 15-Sep-17
	2017-2018 Avg.	2017 Avg.	2018 Avg.	2019 Avg.	
36 PRC4	5.3	6.0	5.2	4.8	8.0
37 PPG-PR 376	5.3	5.5	5.2	5.3	7.3
38 Metolius	5.3	5.8	4.7	5.3	9.0
39 Spark	5.3	5.7	5.3	4.8	8.3
40 LLP-838	5.3	4.7	5.1	5.9	5.7
41 PRC5	5.2	6.0	4.7	4.9	8.7
42 PPG-PR 368	5.2	5.7	5.3	4.5	8.0
43 LLP-123	5.2	5.6	5.4	4.6	7.3
44 PPG-PR 338	5.1	5.8	5.0	4.6	8.7
45 021	5.1	5.3	5.1	4.9	8.7
46 023	5.1	5.7	5.4	4.3	7.7
47 Homerun	5.1	5.1	4.9	5.4	3.7
48 Premium	5.1	5.5	5.0	4.8	6.7
49 Fastball RGL	5.1	5.3	4.6	5.3	6.7
50 UHS	5.1	5.6	4.7	4.9	8.3
51 SPV	5.0	5.5	4.6	5.1	7.7
52 Stellar 3GL	5.0	5.3	5.0	4.6	8.7
53 Uno	5.0	5.0	4.9	5.0	4.7
54 LLP-174	5.0	4.7	4.7	5.5	3.7
55 UEV	4.9	5.0	5.2	4.6	7.3
56 Ruckus	4.9	5.2	4.6	5.0	6.3
57 PST-2EGAD	4.9	5.2	5.0	4.5	5.7
58 LLP-912	4.9	5.1	4.3	5.4	5.7
59 Expedite	4.9	5.1	4.8	4.8	7.7
60 LLP-172	4.9	5.1	4.8	4.8	5.7
61 Silver Sun	4.9	4.7	5.1	4.8	5.3
62 Apple SGL	4.9	5.2	4.3	5.0	6.3
63 PST-SYN-2MR	4.8	4.8	4.8	4.9	7.7
64 Gray Hawk	4.8	5.3	5.0	4.2	7.7
65 Aspire	4.8	5.1	4.7	4.6	7.7
66 LLP-911	4.8	4.7	4.6	5.0	6.3
67 PPG-PR 426	4.7	5.0	4.6	4.6	7.7
68 Sun	4.7	4.7	4.7	4.8	3.7
69 Molalla	4.7	4.5	4.7	4.8	5.3
70 LLP-943	4.6	4.5	4.9	4.5	7.0

(Continued)

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 ¹ -----				Leaf Spot ² 15-Sep-17
	2017-2018 Avg.	2017 Avg.	2018 Avg.	2019 Avg.	
71 PST-2REB	4.6	5.3	4.4	4.2	7.0
72 Pistol	4.6	4.9	4.7	4.3	7.0
73 PST-2BD1 Bulk	4.6	4.7	4.8	4.3	7.7
74 Salinas II	4.6	4.3	4.8	4.7	5.0
75 LLP-536	4.5	4.6	4.4	4.6	3.3
76 Panther GLS	4.5	4.7	4.6	4.2	3.3
77 PPG-PR 308	4.5	4.5	4.8	4.3	5.7
78 Vision	4.5	5.0	4.4	4.1	6.7
79 LLP-944	4.5	4.9	4.5	4.0	6.3
80 Panther H2O	4.5	4.1	4.6	4.7	4.7
81 Green Emperor	4.5	4.7	4.3	4.3	4.3
82 Rinovo	4.5	4.5	4.3	4.5	3.7
83 RAD-PR73R-Q	4.4	5.4	4.3	3.7	5.7
84 LLP-747	4.4	5.0	3.9	4.2	5.3
85 Silver Dollar	4.4	4.4	4.5	4.2	4.0
86 PST-2BET	4.4	4.9	4.2	4.0	7.7
87 LTNS PRG Blend 1	4.3	4.3	4.6	4.0	4.3
88 MSP 4017	4.3	4.3	4.1	4.4	3.7
89 Penant H2O	4.3	3.9	4.5	4.3	2.3
90 New Sealand	4.3	4.3	4.6	3.9	5.0
91 LLP-157	4.3	4.1	4.0	4.6	5.0
92 LLP-837	4.3	4.3	4.6	3.9	2.3
93 PPG-PR-321	4.2	4.6	4.0	4.0	3.0
94 LTNS PRG Blend 2	4.2	4.4	4.1	4.0	4.7
95 Palmer III	4.2	4.2	4.5	3.8	3.0
96 LLP-888	4.1	4.0	3.9	4.4	3.7
97 Presidio	4.1	4.2	4.0	4.0	3.7
98 Cascadia	4.1	4.2	3.9	4.0	2.7
99 Double Time	4.1	4.1	3.8	4.2	2.7
100 Prominent	4.0	4.0	4.5	3.7	4.3
101 LLP-1017	4.0	4.1	4.3	3.7	4.7
102 Arctic Green	4.0	4.0	3.9	4.0	4.0
103 Divine	3.9	3.7	4.1	4.0	2.7
104 PST-2STOL	3.9	3.7	3.4	4.6	5.3
105 LLP-169	3.9	3.7	3.8	4.2	2.3

(Continued)

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 ¹ -----				Leaf Spot ² 15-Sep-17
	2017-2018 Avg.	2017 Avg.	2018 Avg.	2019 Avg.	
106 LLP-475	3.7	3.6	3.5	3.9	2.7
107 Charger II	3.6	3.6	3.7	3.6	3.3
108 Prelude IV	3.5	3.2	4.0	3.3	2.0
109 LLP-473	3.5	3.1	3.5	3.9	2.0
110 Double Time GLS	3.4	3.2	3.5	3.5	3.3
111 Playfast	3.3	3.3	3.5	3.0	2.7
112 MSP 4044	3.2	3.3	3.0	3.2	3.0
113 Royal Green	2.7	2.9	2.7	2.6	2.3
114 Double Up GLS	1.1	1.1	1.0	1.1	8.0
LSD at 5%=	1.0	0.8	1.1	1.5	2.5
CV	12.7	9.7	14.0	19.1	25.4

¹9 = best turf quality

²9 = 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 National Turfgrass Evaluation Program (NTEP) test.

Cultivar or Selection	-----Turf Quality ¹ -----				Gray Leaf Spot ²	Crown Rust ³	-----Color ⁴ -----		
	2017-2019 Avg.	2017 Avg.	2018 Avg.	2019 Avg.	10-Oct-16	29-Sep-17	26-Sep-17	8-Nov-18	16-Oct-19
1 Furlong	7.0	7.3	6.6	7.2	7.7	8.3	9.0	7.0	7.7
2 AllStar Fore	6.4	6.6	6.4	6.3	7.3	5.0	7.0	7.0	8.0
3 Slugger 3GL	6.4	6.4	6.0	6.8	8.7	6.3	9.0	5.7	8.3
4 DLFPS-236/3547	6.4	6.5	5.9	6.7	7.7	8.0	9.0	6.7	8.3
5 Alloy	6.3	6.4	6.2	6.4	7.3	4.3	8.0	7.0	8.3
6 NP-2	6.3	7.0	5.9	6.1	8.3	6.7	7.0	6.0	7.7
7 PPG-PR 421	6.3	6.4	5.9	6.6	8.3	4.7	7.0	6.0	7.0
8 PPG-PR 423	6.3	6.5	6.1	6.4	8.7	6.0	9.0	6.7	8.3
9 SR 4700	6.3	6.3	5.9	6.6	7.0	3.7	7.0	6.3	6.3
10 DLFPS-236/3546	6.2	6.5	6.0	6.1	8.0	7.0	9.0	6.7	8.0
11 JR-197	6.2	6.2	5.6	6.8	8.7	6.3	8.0	6.3	7.7
12 Peridot	6.1	6.1	6.0	6.2	7.7	7.0	7.7	5.7	7.3
13 PPG-PR 372	6.1	6.2	5.9	6.2	7.7	4.7	8.0	6.3	8.0
14 PPG-PR 360	6.1	6.4	5.8	6.0	7.7	5.3	8.0	6.3	8.0
15 PPG-PR 371	6.0	6.5	5.8	5.7	7.3	6.0	8.0	5.7	8.3
16 Silver Sport	6.0	6.5	5.7	5.9	8.0	7.7	9.0	6.7	7.7
17 PPG-PR 424	6.0	6.8	5.4	5.9	7.7	7.7	8.0	5.0	7.7
18 DLFPS-236/3542	6.0	6.4	5.7	6.0	8.3	4.3	8.0	6.0	7.7
19 Signet	6.0	6.3	5.9	5.8	8.3	5.0	8.0	5.7	7.0
20 Palace II	6.0	6.1	5.8	6.1	8.3	5.7	8.0	7.0	8.7

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 National Turfgrass Evaluation Program (NTEP) test.

Cultivar or Selection	-----Turf Quality ¹ -----				Gray Leaf Spot ²	Crown Rust ³	-----Color ⁴ -----		
	2017-2019 Avg.	2017 Avg.	2018 Avg.	2019 Avg.	10-Oct-16	29-Sep-17	26-Sep-17	8-Nov-18	16-Oct-19
21 023	6.0	6.6	5.8	5.5	7.7	7.0	9.0	5.0	7.0
22 Intense	6.0	6.2	5.9	5.8	7.0	4.7	7.0	7.0	8.0
23 Fiesta Cinco	6.0	5.9	5.8	6.2	5.7	3.7	8.0	6.3	6.7
24 02BS2	6.0	5.9	5.8	6.1	8.0	6.0	8.0	5.0	7.3
25 02BS1	5.9	6.1	5.9	5.7	8.7	5.3	7.0	7.0	8.0
26 DLFPS-236/3553	5.9	5.8	5.4	6.4	8.7	7.0	9.0	5.7	6.7
27 DLFPS-236/3545	5.9	6.1	5.6	6.0	8.3	7.3	9.0	7.0	8.0
28 Fastball 3GL	5.8	6.2	5.6	5.8	8.0	7.3	9.0	6.7	7.3
29 PPG-PR 420	5.8	6.4	5.4	5.8	7.7	4.7	7.0	5.3	7.3
30 Overdrive 5G	5.8	6.2	5.3	6.1	7.7	5.7	6.0	7.0	8.3
31 Spike GLS	5.8	5.9	5.6	5.9	7.3	7.0	9.0	5.7	7.7
32 Gray Wolf	5.8	6.1	5.6	5.8	8.3	5.3	8.0	6.3	7.7
33 Xcelerator	5.8	6.2	5.2	6.0	7.7	6.7	7.0	6.3	8.3
34 Paragon 2 GLR	5.8	6.2	5.6	5.5	8.3	6.3	9.0	7.0	8.7
35 NP-3	5.8	6.5	4.8	5.9	8.7	6.0	9.0	6.0	7.7
36 DLFPS-236/3552	5.8	5.6	5.7	6.0	6.7	2.7	8.0	7.0	6.3
37 CPN	5.7	6.0	5.7	5.5	7.3	7.7	9.0	6.3	7.3
38 DLFPS-236/3556	5.7	6.4	5.2	5.6	8.0	5.7	7.0	5.0	7.3
39 Apple 3GL	5.7	5.8	5.9	5.5	8.0	4.3	8.0	6.0	7.7
40 PPG-PR 370	5.7	6.0	5.4	5.7	7.7	4.7	9.0	6.3	7.3

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(Continued)

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 National Turfgrass Evaluation Program (NTEP) test.

Cultivar or Selection	-----Turf Quality ¹ -----				Gray Leaf Spot ²	Crown Rust ³	-----Color ⁴ -----		
	2017-2019 Avg.	2017 Avg.	2018 Avg.	2019 Avg.	10-Oct-16	29-Sep-17	26-Sep-17	8-Nov-18	16-Oct-19
41 PST-2A2	5.7	6.0	5.5	5.7	7.7	5.7	8.0	6.7	8.0
42 021	5.7	6.1	5.6	5.4	8.0	6.3	7.0	5.0	6.7
43 DLFPS-236/3548	5.7	6.2	5.5	5.4	6.0	4.3	8.0	5.3	6.7
44 DLFPS-236/3540	5.7	6.1	5.6	5.4	5.7	4.3	8.0	6.3	7.3
45 Shield	5.7	5.7	5.5	5.7	5.7	7.0	8.0	5.3	7.7
46 APR2616	5.6	6.1	5.8	5.0	7.0	4.0	7.0	5.0	7.7
47 DLFPS-236/3544	5.6	5.7	5.5	5.4	8.0	6.7	8.7	6.3	8.3
48 Umpqua	5.6	5.6	5.2	5.9	6.3	7.7	9.0	5.3	5.7
49 PPG-PR 367	5.5	5.6	5.4	5.5	8.3	7.0	9.0	6.3	7.7
50 Slider LS	5.5	6.1	5.3	5.0	7.0	4.7	8.0	6.0	7.0
51 Homerun LS	5.5	6.1	5.1	5.2	6.7	7.7	9.0	5.3	6.7
52 PPG-PR 385	5.5	5.7	5.4	5.3	6.3	6.0	7.0	4.7	7.0
53 PPG-PR 422	5.5	6.0	4.7	5.7	8.3	5.7	9.0	6.3	8.0
54 Seabiscuit	5.5	5.5	5.6	5.2	6.7	5.7	7.0	6.3	7.0
55 PST-2MAY	5.4	5.7	5.6	5.0	6.0	4.3	8.0	6.0	6.0
56 Primary II	5.4	5.6	5.0	5.6	7.3	3.7	5.7	6.0	6.3
57 Grand Slam GLD	5.4	5.3	5.5	5.4	4.7	4.0	9.0	7.0	7.0
58 DLFPS-236/3550	5.4	5.8	5.1	5.2	6.3	3.7	8.0	6.0	6.3
59 Pharaoh	5.4	6.0	4.9	5.2	7.7	5.7	8.0	6.3	8.3
60 PST-2GTD	5.4	5.5	5.4	5.2	7.3	3.7	8.0	6.3	7.0

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(Continued)

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 National Turfgrass Evaluation Program (NTEP) test.

Cultivar or Selection	-----Turf Quality ¹ -----				Gray Leaf Spot ²	Crown Rust ³	-----Color ⁴ -----		
	2017-2019 Avg.	2017 Avg.	2018 Avg.	2019 Avg.	10-Oct-16	29-Sep-17	26-Sep-17	8-Nov-18	16-Oct-19
61 SR 4650	5.3	5.7	5.1	5.2	7.0	6.3	8.0	5.0	7.0
62 PST-2BDT	5.3	5.4	5.4	5.1	6.0	3.7	8.0	5.7	8.3
63 JR-123	5.3	5.9	5.2	4.8	8.0	5.0	7.3	6.3	7.3
64 Man O'War	5.3	5.7	5.0	5.1	6.7	6.7	7.0	6.7	7.7
65 Paradox GLR	5.3	6.2	4.9	4.7	7.3	4.3	7.0	5.0	6.7
66 DLFPS-236/3538	5.2	5.6	4.6	5.5	7.7	3.3	7.0	4.0	5.7
67 Gray Hawk	5.2	5.2	5.6	4.9	5.3	3.7	7.0	5.7	7.3
68 PST-2PDA	5.2	5.4	5.1	5.1	7.7	2.7	7.0	6.0	6.3
69 PST-2FOXY	5.2	5.4	5.3	4.8	6.3	4.7	8.0	7.3	7.7
70 Karma	5.1	5.9	4.4	5.0	9.0	5.0	8.0	4.7	5.0
71 ASP0118GL	5.1	5.1	5.2	4.9	5.0	2.7	8.0	6.7	7.3
72 ASP0117	5.0	4.9	5.1	5.0	4.7	3.7	8.0	6.0	8.0
73 APR3060	4.9	4.7	5.3	4.7	4.0	4.0	7.3	4.0	6.3
74 Derby Xtreme	4.9	5.2	5.0	4.5	6.0	2.3	7.0	6.0	7.3
75 APR2612	4.9	4.9	4.6	5.1	7.3	4.7	7.0	6.3	7.0
76 PST-2EGAD	4.8	4.9	5.0	4.6	7.0	2.7	7.0	5.3	6.3
77 MRSL-PR16	4.7	4.6	5.0	4.5	4.0	3.0	7.0	7.7	8.7
78 BAR LP 6233	4.7	4.5	4.7	4.8	4.0	6.3	7.0	3.7	3.7
79 BAR LP 6164	4.5	4.7	4.4	4.6	4.7	3.7	7.0	3.3	5.3
80 RAD-PR 112	4.5	5.0	4.5	4.1	5.7	2.7	6.0	8.0	8.7

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(Continued)

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 National Turfgrass Evaluation Program (NTEP) test.

Cultivar or Selection	-----Turf Quality ¹ -----				Gray Leaf Spot ²	Crown Rust ³	-----Color ⁴ -----		
	2017-2019 Avg.	2017 Avg.	2018 Avg.	2019 Avg.	10-Oct-16	29-Sep-17	26-Sep-17	8-Nov-18	16-Oct-19
81 Allstar III	4.5	4.8	4.4	4.2	4.3	2.3	7.0	6.3	8.0
82 MRSL-PR15	4.5	4.3	4.7	4.4	4.7	2.3	7.0	6.3	8.3
83 BAR LP 6158	4.4	4.4	4.5	4.4	5.0	3.0	6.0	3.3	4.7
84 CS-6	4.4	4.5	4.7	4.1	4.7	2.3	8.0	8.0	8.3
85 Pepper II	4.4	5.1	4.5	3.7	4.7	2.3	6.0	7.7	7.0
86 GO-142	4.4	4.5	4.6	4.0	5.3	2.3	7.0	4.7	6.7
87 Evolve	4.4	4.4	4.2	4.5	4.7	2.3	4.7	4.7	7.3
88 Tee-Me-Up	4.3	4.3	4.5	4.2	3.3	2.0	8.0	7.0	8.0
89 ASP0218	4.3	4.7	4.6	3.7	4.7	2.7	8.0	6.3	8.3
90 BAR LP 6117	4.3	4.2	4.4	4.2	3.7	1.3	6.0	3.7	6.3
91 BAR LP 6159	4.3	4.3	4.6	3.9	3.7	2.7	6.0	4.0	5.3
92 Mensa	4.3	4.5	3.5	4.8	2.7	5.0	8.0	5.0	8.3
93 ASP0116EXT	4.3	4.2	4.7	3.9	2.7	2.0	9.0	9.0	9.0
94 Nexus GT	4.2	4.4	4.7	3.5	4.3	2.0	8.0	7.7	7.3
95 LPB-SD-104	4.2	4.3	3.6	4.7	3.3	3.7	8.0	4.7	7.0
96 LPB-SD-102	4.2	4.1	3.8	4.6	2.7	3.0	7.0	6.0	6.7
97 Saguaro	4.2	4.3	3.9	4.2	2.3	3.0	8.0	4.7	7.0
98 LPB-SD-103	4.1	4.3	3.7	4.4	3.7	3.0	8.0	5.0	7.3
99 Green Supreme +	4.1	4.5	4.3	3.6	4.0	3.0	8.0	6.7	7.3
100 Hatrick	4.1	4.0	4.3	3.9	2.7	3.0	9.0	8.3	7.3

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(Continued)

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 National Turfgrass Evaluation Program (NTEP) test.

Cultivar or Selection	-----Turf Quality ¹ -----				Gray Leaf Spot ²	Crown Rust ³	-----Color ⁴ -----		
	2017-2019 Avg.	2017 Avg.	2018 Avg.	2019 Avg.	10-Oct-16	29-Sep-17	26-Sep-17	8-Nov-18	16-Oct-19
101 BAR LP 6165	4.0	3.7	3.5	4.7	2.3	6.3	2.3	1.0	2.3
102 GO-143	3.9	4.1	4.5	3.2	3.7	2.0	7.0	7.0	7.0
103 GO-141	3.9	3.9	4.0	3.8	3.3	1.7	7.0	6.7	7.3
104 JR-747	3.8	3.9	3.3	4.4	2.7	2.0	6.0	4.7	7.0
105 JR-888	3.8	4.0	3.4	4.1	2.0	4.0	6.0	2.7	4.3
106 Savant	3.7	3.6	3.2	4.3	1.3	3.7	6.0	3.3	4.7
107 Fireball	3.4	3.5	3.7	3.2	1.7	2.3	9.0	8.0	8.0
108 LPB-SD-101	3.4	3.5	2.9	3.9	1.7	2.7	7.0	3.3	3.3
109 BAR LP 6131	3.4	2.9	3.7	3.4	1.7	3.3	7.0	4.7	4.3
110 LPB-SD-105	3.3	3.4	2.7	3.8	1.3	3.7	8.0	4.0	6.3
111 DLFPS-238/3014	3.2	3.0	3.5	3.2	2.3	5.0	7.0	4.0	6.7
112 Brightstar SLT	3.1	3.0	3.2	3.2	1.7	2.7	7.0	4.0	5.0
113 BAR LP 6162	3.1	2.7	3.6	3.1	2.3	4.0	9.0	6.7	7.7
114 Linn	1.0	1.0	1.0	1.0	1.0	3.7	1.0	1.0	1.0
LSD at 5%= ⁴	0.7	0.7	0.9	0.9	1.5	1.9	0.2	1.3	1.4

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¹9 = best turf quality
²9 = least disease
³9 = least disease
⁴9 = best genetic color

Table 3. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in September 2017 at Adelphia, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----			-----Stemminess ² -----		Dollar Spot ³
	2018-2019 Avg.	2018 Avg.	2019 Avg.	11-Jun-18	12-Jun-19	8-Aug-19
1 FCW	6.9	7.3	6.4	5.0	5.7	5.7
2 PR-6-16	6.3	6.4	6.1	5.7	5.3	5.3
3 PR-7-16	6.2	6.6	5.7	4.7	6.0	5.0
4 Silver Sport	6.2	6.6	5.7	3.3	4.3	5.0
5 PST-2FLCP Bulk	6.1	6.6	5.6	4.0	6.0	3.7
6 PST-2GLM Blk	6.1	6.7	5.5	6.0	6.0	5.3
7 2CL6	6.1	6.8	5.3	4.7	7.3	3.3
8 PPG-PR 437	6.1	6.3	5.8	6.7	7.0	4.0
9 PR-8-16	6.1	6.4	5.7	5.3	6.0	4.0
10 8851	6.0	6.6	5.5	4.3	5.7	4.3
11 PPG-PR 420	6.0	6.1	5.9	5.7	5.0	4.7
12 PPG-PR 424	6.0	6.6	5.4	5.0	6.0	3.7
13 PPG-PR 436	5.9	6.1	5.8	5.0	6.7	4.7
14 PPG-PR 342	5.9	6.2	5.6	5.0	5.3	5.0
15 PPG-PR-367	5.9	6.3	5.5	3.3	4.3	4.3
16 2CL4	5.9	6.8	5.0	4.3	6.7	2.7
17 Xcelerator	5.9	6.2	5.6	3.7	5.3	5.0
18 PR-10-16	5.9	6.5	5.3	3.0	3.7	5.0
19 PPG-PR 376	5.9	6.1	5.6	3.7	5.7	4.0
20 PPG-PR-372	5.9	6.3	5.4	5.0	7.3	4.3
21 2CL1	5.9	6.8	4.9	3.0	3.3	4.3
22 PPG-PR-422	5.8	5.8	5.8	4.3	5.7	5.0
23 2CL2	5.8	6.5	5.2	3.3	5.0	3.3
24 Apple 3GL	5.8	6.1	5.5	5.0	5.3	5.0
25 PR-15-16	5.8	6.1	5.5	5.3	7.7	3.0
26 Peridot	5.8	6.1	5.4	4.7	4.0	4.7
27 PPG-PR 435	5.8	6.2	5.3	6.3	7.0	4.0
28 PPG-PR-343	5.8	6.3	5.2	5.0	6.3	3.7
29 PR-26-16	5.7	6.2	5.2	5.0	6.3	4.7
30 PR-30-16	5.7	6.1	5.4	6.7	6.0	4.3
31 PST-214	5.7	6.2	5.2	3.7	5.3	5.0
32 PST-2BAD	5.7	5.6	5.7	5.0	5.3	5.3
33 PPG-PR 423	5.7	6.1	5.3	6.0	6.7	4.0
34 PPG-PR 438	5.7	5.8	5.5	4.0	5.7	5.0
35 PPG-PR 434	5.7	6.1	5.2	4.0	4.3	4.7

(Continued)

Table 3. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in September 2017 at Adelphia, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----			-----Stemminess ² -----		Dollar Spot ³
	2018-2019 Avg.	2018 Avg.	2019 Avg.	11-Jun-18	12-Jun-19	8-Aug-19
36 Blackstone	5.6	6.0	5.3	5.0	6.3	4.7
37 PPG-PR-329	5.6	6.1	5.1	3.3	5.3	4.7
38 Gray Wolf	5.6	6.2	5.0	5.0	6.7	3.3
39 Evolution	5.6	5.9	5.3	5.7	3.7	4.3
40 PST-2FLAT	5.6	5.7	5.4	4.7	5.7	5.7
41 Palace II	5.6	5.7	5.5	3.7	5.0	4.3
42 Fastball 3GL	5.6	5.9	5.2	4.0	5.3	4.3
43 2CL3	5.6	6.4	4.7	4.0	5.3	3.7
44 PES	5.5	5.8	5.2	3.0	4.0	4.0
45 CPU-B15	5.5	5.8	5.2	6.7	5.3	4.3
46 PST-2MAY	5.5	5.8	5.3	5.3	5.7	4.3
47 Spike GLS	5.5	5.9	5.1	5.0	5.0	4.7
48 Monsieur	5.5	5.7	5.3	5.0	4.3	4.7
49 PR-9-16	5.5	6.0	5.0	3.0	3.3	3.3
50 PR-28-16	5.5	6.1	4.9	5.0	7.0	3.7
51 Gray Hawk	5.5	6.1	4.8	4.3	4.0	3.7
52 PST-2A2	5.5	6.2	4.7	4.3	4.0	3.3
53 Ruckus	5.5	5.9	5.0	5.7	5.7	3.7
54 Peridot	5.4	5.7	5.1	3.3	4.0	5.3
55 PST-2MKD	5.4	5.6	5.2	5.7	6.0	5.3
56 PPG-PR 432	5.4	5.8	5.0	3.7	5.7	3.3
57 CPN	5.4	6.0	4.7	4.0	4.3	3.7
58 Stellar 3GL	5.4	5.8	5.0	5.0	5.7	4.3
59 2CL5	5.4	6.1	4.6	4.0	5.7	4.0
60 PR-5-15	5.4	5.6	5.1	4.3	6.3	4.7
61 PR-27-16	5.4	5.9	4.8	5.3	6.0	3.7
62 Primary II	5.3	5.5	5.1	4.3	6.0	4.3
63 Karma	5.3	5.5	5.2	6.3	6.0	6.0
64 Bandalore	5.3	5.7	5.0	4.0	5.3	4.0
65 PR-19-16	5.3	5.7	4.9	4.3	6.7	3.7
66 Vision	5.3	5.4	5.2	3.0	5.7	4.0
67 Grandslam GLD	5.3	5.4	5.2	5.0	6.3	3.7
68 Slider LS	5.3	5.9	4.6	5.0	4.7	3.3
69 Virte	5.3	5.3	5.2	3.3	3.3	7.0
70 Derby Xtreme	5.3	5.5	5.0	2.7	5.3	4.0

(Continued)

Table 3. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in September 2017 at Adelphia, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----			-----Stemminess ² -----		Dollar Spot ³	
	2018-2019 Avg.	2018 Avg.	2019 Avg.	11-Jun-18	12-Jun-19	8-Aug-19	
71	PPG-PR 368	5.3	6.0	4.6	3.3	4.7	3.3
72	Wicked	5.3	5.2	5.3	4.7	4.7	5.7
73	Soprano	5.2	5.6	4.8	4.3	5.0	3.7
74	PST-Syn-2GRD	5.2	5.4	5.0	2.0	3.7	4.7
75	PST-2FOXY-16	5.2	5.5	4.9	4.3	5.0	4.3
76	PPG-PR 433	5.2	5.6	4.8	3.7	4.7	4.3
77	Benchmark	5.2	5.5	4.9	4.3	5.0	4.7
78	Homerun LS	5.2	5.7	4.7	3.3	4.7	4.0
79	Sideways	5.2	5.4	4.9	3.7	5.0	5.0
80	Intense	5.1	5.8	4.5	3.0	4.7	3.7
81	PST-2GTD	5.1	5.5	4.8	4.7	5.3	2.7
82	PR-29-16	5.1	5.9	4.4	4.3	5.7	3.0
83	SR 4650	5.1	5.3	4.8	3.7	4.0	4.3
84	Align II	5.0	5.4	4.7	3.3	3.7	5.7
85	PST-2YAY Bulk	5.0	5.2	4.8	3.7	5.3	4.7
86	PPG-PR 229	5.0	5.7	4.3	5.7	6.7	3.7
87	Aspire	5.0	5.3	4.8	3.0	3.7	3.3
88	Hancock	5.0	5.4	4.6	3.3	4.3	4.3
89	Diligent	5.0	5.1	4.8	3.0	3.7	5.0
90	CS-6	4.9	5.1	4.8	2.7	4.3	4.7
91	LTNS PRG Blend 2	4.9	5.3	4.5	4.3	4.7	4.0
92	Zoom	4.9	4.9	5.0	3.7	4.0	4.0
93	Linedrive II	4.9	5.0	4.9	3.3	5.3	3.7
94	Keystone 2	4.9	5.4	4.4	3.3	5.3	3.7
95	Banfield	4.9	5.2	4.5	3.3	4.3	3.7
96	PST-2EGS Bulk	4.9	5.3	4.4	2.3	2.3	3.7
97	PST-2BD1	4.9	5.4	4.3	6.0	5.7	3.3
98	Thrive	4.9	5.7	4.0	3.7	5.7	2.7
99	Big League	4.9	5.2	4.5	4.3	5.0	4.7
100	NAI-LME-17	4.9	5.5	4.2	4.3	3.7	3.7
101	Sox Fan	4.9	5.6	4.2	2.7	3.7	2.3
102	Ringles	4.9	5.2	4.5	4.0	4.3	3.0
103	Panther H2O	4.8	4.8	4.8	3.3	4.0	3.3
104	Evolution	4.8	5.3	4.3	3.0	3.7	4.3
105	Allstar 3	4.8	5.3	4.2	3.3	4.7	3.7

(Continued)

Table 3. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in September 2017 at Adelphia, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----			-----Stemminess ² -----		Dollar Spot ³
	2018-2019 Avg.	2018 Avg.	2019 Avg.	11-Jun-18	12-Jun-19	8-Aug-19
106 PST-2EGAD	4.7	5.2	4.3	3.3	2.7	3.3
107 GO-143	4.7	4.4	5.0	4.0	5.0	5.7
108 PR-25-16	4.7	4.8	4.6	5.3	5.3	4.0
109 EUS	4.7	5.6	3.8	4.3	4.7	2.3
110 Evolve	4.7	4.9	4.4	3.0	5.0	4.0
111 PST-2PDA	4.6	5.3	3.9	3.0	3.0	2.3
112 GO-341S	4.6	4.6	4.6	3.7	4.7	4.0
113 PST-2BET	4.6	4.9	4.2	3.7	4.0	3.7
114 Tetradry	4.6	4.4	4.7	8.0	7.0	4.3
115 LTNS PRG Blend 1	4.5	4.7	4.3	3.7	3.7	4.3
116 PPG-PR-385	4.5	5.0	4.1	5.0	6.0	3.3
117 Harrier	4.5	5.1	3.9	2.0	3.0	2.0
118 Mighty	4.5	4.6	4.4	3.7	3.7	4.3
119 PST-2DRG	4.5	4.7	4.2	3.7	4.0	3.3
120 Stamina	4.5	5.0	4.0	4.7	4.3	3.0
121 Spark	4.5	5.2	3.8	3.7	4.3	3.0
122 Black Pearl	4.5	4.9	4.1	3.0	3.7	4.7
123 Salinas II	4.5	4.6	4.3	2.7	4.7	4.7
124 Galleon	4.5	4.8	4.1	2.3	3.7	2.7
125 Rinovo	4.5	4.7	4.2	3.7	4.0	3.3
126 Pennant H2O	4.4	4.4	4.3	3.3	3.3	4.3
127 GO-142	4.4	4.4	4.3	3.3	4.0	4.7
128 Dasher 3	4.3	4.7	3.9	2.7	3.3	3.7
129 LGT-4-16	4.3	4.0	4.6	5.3	5.7	4.3
130 Express II	4.3	4.8	3.8	3.0	3.3	3.3
131 GO-140S	4.2	4.3	4.2	3.7	4.7	3.7
132 Pennant H2O	4.2	4.1	4.3	3.3	3.7	4.0
133 GO-241S	4.2	4.2	4.2	2.0	3.7	4.0
134 LTNS PRG Blend 3	4.2	4.5	3.9	2.3	3.3	4.0
135 Red Hawk	4.2	4.5	3.9	2.0	3.7	4.0
136 SR 4660ST	4.2	4.5	3.9	2.7	3.3	3.0
137 Expedite	4.2	4.6	3.8	2.3	4.3	3.7
138 LCP 186	4.2	4.5	3.8	3.7	4.7	3.3
139 Gallop	4.1	4.4	3.8	2.3	2.3	3.0
140 Tetrastar	4.1	3.8	4.3	6.7	6.0	4.7

(Continued)

Table 3. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in September 2017 at Adelphia, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----			-----Stemminess ² -----		Dollar Spot ³	
	2018-2019 Avg.	2018 Avg.	2019 Avg.	11-Jun-18	12-Jun-19	8-Aug-19	
141	Manhattan 5 GLR	4.1	4.0	4.2	1.7	3.3	3.0
142	Hawkeye 2	4.0	4.3	3.8	3.0	3.0	3.7
143	Palmer III	3.9	3.8	4.0	3.3	3.0	4.7
144	Mercitwo	3.9	4.2	3.6	8.3	7.0	3.3
145	Lover	3.9	3.8	4.0	2.7	4.0	5.3
146	Gator 3	3.9	4.2	3.6	3.7	2.3	3.3
147	GO-141	3.9	4.3	3.4	3.7	4.3	3.0
148	Fiesta 4	3.8	3.8	3.9	2.3	3.7	2.7
149	Sun	3.8	3.9	3.8	3.7	3.7	3.3
150	Fiesta 3	3.8	4.0	3.6	3.0	3.3	3.0
151	Commander ST	3.8	4.0	3.6	3.0	4.0	2.3
152	Cutter II	3.8	3.9	3.7	3.3	3.3	4.0
153	Blazer 4	3.7	3.9	3.5	2.0	4.0	3.7
154	Top Hat 2	3.7	3.7	3.7	3.0	2.7	3.7
155	Penguin 2	3.7	3.7	3.7	3.3	3.3	3.0
156	Clementine	3.6	3.9	3.3	8.7	6.7	2.7
157	Tetradark	3.6	3.0	4.2	2.3	3.3	7.0
158	Tetragreen	3.6	3.3	3.8	5.3	4.3	4.3
159	Double Time GLS	3.5	3.1	4.0	3.3	2.3	6.7
160	Calypso 3	3.5	3.8	3.2	3.3	3.0	3.0
161	Edge II	3.5	4.0	2.9	3.3	4.0	2.7
162	Replicator	3.5	3.3	3.7	5.3	4.3	4.3
163	Panther GLS	3.5	3.5	3.5	3.0	2.3	4.3
164	Prelude IV	3.4	3.4	3.4	3.7	2.0	4.7
165	Double Time	3.2	2.9	3.4	3.3	3.0	5.3
166	Bizet 1	3.1	3.4	2.7	8.0	7.0	1.7
167	Fabian	2.4	1.6	3.2	6.3	6.0	3.0
LSD at 5%=							1.6
CV							25.0

¹9 = best turf quality
²9 = least stemminess
³9 = least disease

Table 4. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2018 at Adelphia, NJ.

Cultivar or Selection	Turf Quality ¹ 2019 Avg.	Gray Leaf Spot ² 2018 Avg.	Establishment ³ 2018 Avg.	Stem-miness ⁴ 12-Jun-19	Dollar Spot ⁵ 8-Aug-19	Bipolaris Leaf Spot ⁶ 14-Jun-19
1 GR4	6.8	7.3	5.0	4.3	4.3	7.3
2 Principal II	6.6	7.7	8.0	6.3	5.7	7.3
3 Homerun LS	6.5	7.3	7.7	4.3	5.0	6.3
4 GR3	6.4	7.0	5.0	5.7	5.0	8.0
5 GR1	6.4	6.7	4.3	3.7	4.3	7.3
6 Peridot	6.3	6.7	6.3	4.3	6.0	7.0
7 PDS3	6.3	7.7	5.3	4.7	5.0	7.7
8 021	6.3	8.0	7.0	3.7	4.7	6.0
9 GR5	6.3	6.7	4.0	4.3	4.7	7.7
10 Gray Hawk	6.2	7.0	8.0	4.7	4.3	6.7
11 Bandalore	6.2	6.3	6.7	5.3	5.7	6.3
12 PEM	6.2	7.0	5.7	4.3	3.7	7.7
13 GR6	6.1	7.3	5.0	3.0	4.0	7.0
14 GR8	6.1	6.0	4.3	4.3	3.7	7.0
15 PST-Syn-2MEG	6.1	6.0	4.7	4.7	4.3	7.3
16 PPG-PR 434	6.1	7.3	7.0	4.0	4.3	7.0
17 Paradox GLR	6.1	7.3	7.3	5.3	6.0	7.0
18 Xcelerator	6.0	6.7	7.0	4.0	5.0	6.3
19 PPG-PR 473	6.0	6.0	5.3	4.3	6.0	6.7
20 Karma	5.9	7.3	7.3	5.0	6.0	6.0
21 Fastball 3GL	5.9	7.3	6.3	3.7	5.7	6.7
22 UEV	5.9	7.0	6.7	4.3	3.7	7.7
23 PPG-PR 422	5.9	8.0	6.3	5.3	3.3	7.0
24 PDS1	5.9	7.0	5.3	4.0	4.3	6.7
25 PPG-PR 436	5.9	6.3	5.7	6.3	4.3	7.3
26 PPG-PR 435	5.8	7.7	7.3	6.3	5.0	7.3
27 Slugger 3GL	5.8	6.3	5.0	5.7	4.7	6.7
28 PDS2	5.8	7.0	4.7	3.0	5.7	6.7
29 PPG-PR 438	5.7	6.3	7.0	6.3	4.3	6.3
30 PPG-PR 476	5.7	5.7	4.7	6.0	5.0	7.7
31 Silver Sport	5.7	7.3	5.7	4.0	5.0	6.3
32 Apple 3GL	5.7	6.7	6.7	4.7	4.7	7.3
33 GR2	5.7	6.7	4.7	4.0	2.7	7.0
34 Primary II	5.7	5.7	7.3	5.7	3.7	5.0
35 Stellar 3GL	5.7	7.7	7.0	4.0	4.0	7.0

(Continued)

Table 4. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2018 at Adelphia, NJ.

Cultivar or Selection	Turf Quality ¹ 2019 Avg.	Gray Leaf Spot ² 2018 Avg.	Establishment ³ 2018 Avg.	Stem-miness ⁴ 12-Jun-19	Dollar Spot ⁵ 8-Aug-19	Bipolaris Leaf Spot ⁶ 14-Jun-19
36 Pillar II	5.7	7.3	8.0	3.7	4.0	5.3
37 Palace II	5.7	7.3	7.0	6.0	4.0	7.7
38 PST-2EGY	5.7	6.0	4.0	5.0	3.0	6.7
39 PPG-PR 376	5.6	7.3	7.3	5.0	5.3	6.7
40 Pharoah	5.6	6.3	7.0	3.7	4.3	7.0
41 Grandslam GLD	5.6	5.0	6.3	5.0	4.0	5.7
42 GR7	5.6	6.7	4.3	3.7	4.0	6.3
43 PPG-PR 437	5.6	6.0	7.0	6.7	4.0	7.3
44 PPG-PR 478	5.5	6.0	4.7	5.7	4.3	6.7
45 PPG-PR 479	5.5	6.0	4.7	4.3	4.7	6.7
46 SR 4650	5.4	7.3	6.7	3.3	5.7	6.3
47 PPG-PR 433	5.4	6.0	6.7	4.7	5.3	7.3
48 Banfield	5.4	5.7	6.0	5.7	4.3	7.3
49 PPG-PR 477	5.4	5.0	4.3	5.3	4.7	7.0
50 Greenland	5.4	6.0	5.7	6.3	3.7	7.7
51 Thrive	5.4	5.0	6.3	5.3	3.7	6.7
52 Intense	5.4	6.0	7.3	3.7	4.7	6.0
53 Stamina	5.4	6.0	6.3	5.0	4.0	6.3
54 Premium	5.2	6.7	7.0	3.7	4.3	6.3
55 Fastball RGL	5.2	5.3	6.7	4.3	4.0	6.7
56 PPG-PR 432	5.2	6.0	7.0	4.3	4.0	6.3
57 PPG-PR 474	5.2	6.0	5.3	4.7	3.0	6.7
58 Apple SGL	5.2	5.3	6.7	3.7	4.3	7.0
59 PPG-PR 338	5.1	6.7	6.0	4.0	3.7	7.3
60 PSL	5.1	6.3	4.7	3.3	2.3	6.0
61 Benchmark	5.1	4.7	7.0	4.0	4.7	6.3
62 Paragon 2 GLR	5.1	7.0	5.3	3.0	4.0	4.7
63 Vision	5.0	6.7	6.3	2.7	3.3	5.7
64 Slider LS	5.0	6.0	5.3	4.7	3.0	5.7
65 Alloy	5.0	5.7	6.0	3.7	4.0	7.0
66 Aspire	5.0	6.3	7.3	3.3	3.0	4.7
67 PST-Syn-2LOME	5.0	4.7	4.3	3.0	4.7	6.0
68 Sideways	4.9	6.0	5.7	2.7	4.3	5.7
69 Pennant H2O	4.9	5.0	7.3	3.7	4.3	5.0
70 TEM	4.9	4.7	5.3	3.0	2.0	6.7

(Continued)

Table 4. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2018 at Adelphia, NJ.

Cultivar or Selection	Turf Quality ¹ 2019 Avg.	Gray Leaf Spot ² 2018 Avg.	Establishment ³ 2018 Avg.	Stem-miness ⁴ 12-Jun-19	Dollar Spot ⁵ 8-Aug-19	Bipolaris Leaf Spot ⁶ 14-Jun-19
71 PDS4	4.8	6.0	4.3	3.0	3.0	5.3
72 PPG-PR 475	4.8	5.3	4.3	3.7	4.0	6.0
73 Expedite	4.8	4.7	6.3	3.3	4.7	4.0
74 Big League	4.8	4.0	6.7	3.3	4.3	5.7
75 Spark	4.8	6.0	7.7	2.7	3.3	5.7
76 Diligent	4.7	7.0	6.3	4.0	4.3	4.3
77 Ruckus	4.7	6.3	7.0	4.7	5.3	6.0
78 Sox Fan	4.7	5.0	7.3	3.0	4.0	6.7
79 Linedrive II	4.6	4.7	7.3	3.7	3.3	5.0
80 Pistol	4.6	4.7	7.3	2.7	4.0	4.7
81 EUS	4.5	5.3	6.3	3.7	2.3	6.7
82 PPG-PR 472	4.5	5.0	5.0	3.7	3.7	5.3
83 PPG-PR 471	4.4	4.3	4.7	5.0	3.7	6.3
84 Defender	4.4	4.3	6.7	2.7	5.3	5.3
85 Provost	4.4	5.7	5.0	4.0	3.3	6.7
86 ULS	4.4	5.7	4.0	3.7	2.7	6.0
87 PPG-PR 480	4.4	4.7	3.3	3.3	3.3	7.0
88 PPG-PR 483	4.3	5.0	4.7	3.0	3.0	4.7
89 Wicked	4.3	4.0	5.7	3.3	3.3	6.0
90 Double Time GLS	4.2	5.7	6.3	3.7	6.3	4.0
91 PST-2CARD Bulk	4.2	4.3	4.7	3.0	4.0	4.7
92 Primary	4.2	4.0	6.7	3.3	4.7	5.0
93 Dasher 3	4.1	4.7	6.0	3.7	2.7	5.0
94 Homerun	4.1	3.7	6.7	4.0	3.7	6.3
95 Virte	4.1	4.0	6.3	3.3	5.0	4.3
96 Fiesta 4	4.0	4.7	5.0	2.7	3.0	4.0
97 Presidio II	3.9	3.0	7.3	2.7	3.3	4.7
98 Silver Dollar	3.8	2.7	6.7	2.3	4.3	3.3
99 Ringles	3.8	4.0	5.3	2.7	3.3	4.3
100 Black Pearl	3.6	3.0	6.0	2.7	4.0	4.3
101 Rinovo	3.5	4.7	5.0	3.0	3.0	4.3
102 Revenge-GLX	3.5	4.0	6.0	3.0	3.3	4.3
103 Brightstar SLT	3.3	2.3	7.3	2.0	2.7	2.0
104 SR 4660ST	3.2	4.0	6.3	2.3	2.3	4.0
105 Cascadia	3.2	2.7	6.0	2.7	3.3	4.0

(Continued)

Table 4. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2018 at Adelphia, NJ.

Cultivar or Selection	Turf Quality ¹ 2019 Avg.	Gray Leaf Spot ² 2018 Avg.	Establishment ³ 2018 Avg.	Stem-miness ⁴ 12-Jun-19	Dollar Spot ⁵ 8-Aug-19	Bipolaris Leaf Spot ⁶ 14-Jun-19
106 Zoom	3.1	4.0	7.7	3.0	2.3	4.7
107 Sun	3.1	3.7	6.3	3.3	1.7	4.3
108 Tailgater	3.1	3.3	6.7	2.7	3.3	6.0
109 Charger II	3.1	3.0	7.3	2.0	1.7	3.0
110 Lover	3.0	3.3	5.0	3.3	2.7	4.7
111 Torison	2.8	2.0	6.7	4.7	2.0	5.7
112 Fiji 2	2.8	2.3	7.0	2.3	2.7	4.0
113 Tetradark	2.7	4.0	5.7	3.3	3.0	4.7
114 MN-EPR18	2.7	2.7	3.3	6.3	2.0	5.0
115 Prominent	2.7	2.7	6.3	2.7	3.3	2.3
116 Continental II	2.7	2.7	7.7	2.7	2.7	5.0
117 Hancock	2.7	2.7	5.3	3.3	2.7	6.0
118 LNSPRG1	2.4	2.0	6.3	2.0	3.0	3.7
119 Blazer 4	2.3	1.0	6.0	3.0	3.0	3.7
120 Brea	2.2	2.3	6.0	3.0	2.3	4.0
121 Barbados	2.2	1.7	6.0	2.0	2.3	3.7
122 Salinas II	2.2	3.0	5.3	3.3	1.7	5.3
123 Express II	2.1	2.7	4.7	2.3	2.0	2.7
124 ORPRG16-2	2.1	2.7	5.0	2.3	1.7	4.3
125 Ringer II	2.0	2.3	5.7	3.0	1.7	3.7
126 Prelude IV	2.0	1.7	7.3	2.3	2.3	4.0
127 Majesty II	2.0	1.7	5.7	4.3	2.7	4.3
128 Palmer III	1.9	1.3	6.7	3.3	3.0	3.7
129 LNSPRG2	1.9	1.3	4.0	2.3	2.0	3.7
130 ORPRG16-3	1.9	1.3	4.3	2.7	2.0	3.7
131 Panther GLS	1.8	1.0	6.7	3.3	2.7	4.3
132 Pinstripe II	1.7	1.7	6.7	2.3	1.0	4.3
133 Evening Shade	1.7	1.7	7.0	2.7	1.7	2.7
134 ORPRG16-4	1.7	1.3	4.0	3.0	1.7	3.3
135 Mighty	1.7	2.0	5.3	2.7	2.0	4.3
136 ORPRG16-1	1.7	1.7	4.3	2.7	1.7	4.0
137 Cutter II	1.6	2.0	6.0	2.0	2.7	2.7
138 PST-2TETS	1.6	3.0	5.7	5.0	2.7	4.3
139 Replicator	1.6	1.3	3.0	5.3	1.0	5.3
140 ORPRG16-7	1.5	1.3	4.3	3.0	1.3	3.7

(Continued)

Table 4. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2018 at Adelphia, NJ.

Cultivar or Selection	Turf Quality ¹ 2019 Avg.	Gray Leaf Spot ² 2018 Avg.	Establishment ³ 2018 Avg.	Stemminess ⁴ 12-Jun-19	Dollar Spot ⁵ 8-Aug-19	Bipolaris Leaf Spot ⁶ 14-Jun-19
141 ORPRG16-5	1.5	2.3	4.3	2.7	1.7	4.7
142 Laredo II	1.3	1.3	5.7	2.7	2.0	3.3
143 Tetra Grain	1.2	1.0	6.0	4.5	2.7	4.3
144 ORPRG16-6	1.1	1.3	4.3	2.5	1.3	4.7
LSD at 5%= CV=	0.9 12.2	1.4 18.0	1.6 17.0	1.5 16.4	1.5 24.0	1.7 29.6

¹9 = best turf quality

²9 = least disease

³9 = best establishment

⁴9 = least stemminess

⁵9 = least disease

⁶9 = least disease

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	Turf Quality ¹ 2018-2019 Avg.	Gray Leaf Spot ² 27-Sep-2018	Establishment ³ 17-Sep-2018	Stem-mininess ⁴ 12-Jun-2019	Dollar Spot ² 9-Aug-2019
1 DLFPS-236-3547	6.6	7.0	7.0	7.0	5.0
2 DLFPS-236-3582	6.5	7.0	6.7	4.7	5.7
3 PPG-PR-438	6.4	7.7	7.7	5.0	6.3
4 PST-214	6.4	7.3	5.7	5.7	6.0
5 PPG-PR-478	6.4	6.3	5.0	5.7	5.0
6 PPG-PR-436	6.4	6.3	6.7	6.3	6.7
7 PPG-PR-344	6.3	8.3	7.7	4.0	4.7
8 PPG-PR-342	6.3	7.0	7.3	5.7	5.0
9 PPG-PR-437	6.2	7.0	7.7	5.7	5.0
10 DLFPS-236-3546	6.2	6.7	7.3	6.3	4.3
11 PPG-PR-229	6.2	5.3	6.0	6.0	5.0
12 DLFPS-236-3581	6.0	6.3	6.0	5.3	5.0
13 PPG-PR-434	6.0	8.0	7.0	3.3	4.3
14 PPG-PR-310	6.0	7.0	7.7	5.0	4.7
15 PPG-PR-435	6.0	7.7	7.7	6.0	4.7
16 DLFPS-236-3542	6.0	6.3	5.3	6.7	4.3
17 Signet	5.9	7.7	7.3	6.7	5.3
18 PPG-PR-338	5.9	7.0	6.3	5.0	6.0
19 DLFPS-236-3543	5.8	6.7	7.7	5.7	5.0
20 PPG-PR-477	5.8	6.0	6.3	5.3	4.3
21 Silver Sport	5.8	6.7	5.3	4.0	5.7
22 DLFPS-236-3575	5.7	6.3	7.0	5.0	5.0
23 DLFPS-236-3577	5.7	6.3	5.7	5.7	5.0
24 PPG-PR-376	5.7	6.3	6.7	4.7	4.0
25 DLFPS-236-3578	5.7	6.0	5.3	4.0	5.0
26 DLFPS-236-3584	5.6	6.3	7.7	6.3	4.7
27 DLFPS-236-3541	5.6	5.3	6.7	7.3	5.0
28 PPG-PR-368	5.6	7.3	7.7	3.7	4.7
29 Shield	5.5	6.7	6.3	3.0	4.7
30 PPG-PR-433	5.5	6.3	7.3	5.3	3.0
31 PPG-PR-432	5.5	5.3	6.7	4.3	4.3
32 APR2609	5.5	6.7	5.7	4.3	3.7
33 PST-2E6	5.4	6.3	5.0	3.0	4.0
34 PST-2GDS	5.4	6.0	5.7	4.3	3.7
35 DLFPS-236-3538	5.4	6.0	6.7	5.0	4.7

(Continued)

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	Turf Quality ¹ 2018-2019 Avg.	Gray Leaf Spot ² 27-Sep-2018	Establishment ³ 17-Sep-2018	Stem-miness ⁴ 12-Jun-2019	Dollar Spot ² 9-Aug-2019
36 Allstar 3	5.3	6.3	6.0	5.7	4.0
37 Evolution	5.3	6.0	6.0	2.7	4.3
38 PST-2BD1	5.3	4.7	8.0	5.7	5.3
39 PST-2MAY	5.2	6.7	6.3	5.0	2.7
40 DLFPS-236-3583	5.2	5.3	6.0	5.0	4.3
41 DLFPS-236-3576	5.2	4.3	6.3	6.0	4.7
42 PST-2FLAT	5.2	5.7	5.3	5.7	4.3
43 NAI-LM2	5.1	5.0	5.0	3.0	5.3
44 PST-2BAD	5.1	4.7	5.7	5.0	5.0
45 DLFPS-236-3579	5.1	4.3	4.0	4.3	5.3
46 PST-2BET	5.0	5.7	5.0	3.0	2.7
47 DLFPS-236-3586	5.0	6.7	6.7	5.0	3.7
48 APR2753	5.0	5.0	5.0	5.0	4.7
49 APR2685	5.0	5.0	5.7	4.7	3.7
50 PPG-PR-471	5.0	4.0	5.3	5.0	4.7
51 PST-2DRG	4.8	5.7	6.0	3.0	3.3
52 DLFPS-236-3540	4.8	5.0	6.0	5.7	4.0
53 SEPR-106	4.8	4.3	5.7	4.3	3.3
54 PPG-PR-472	4.8	5.7	6.0	3.0	2.7
55 Karma	4.8	4.7	3.7	3.0	3.7
56 SEPR-107	4.8	4.3	5.0	4.0	3.0
57 APR2973	4.8	3.3	6.0	5.7	3.0
58 SYN 2HAF	4.7	4.0	4.3	4.7	4.3
59 NAI-17397	4.7	4.0	5.3	3.0	4.7
60 APR2616	4.7	4.3	5.7	5.0	4.0
61 Grandslam GLD	4.6	5.3	7.7	5.3	2.7
62 APR2856	4.6	4.0	4.7	4.0	5.3
63 Carly	4.6	4.3	8.0	3.3	2.3
64 APR2946	4.6	3.7	5.7	4.7	4.0
65 Allsport 5	4.5	4.0	6.3	3.7	3.3
66 Haven	4.4	6.0	8.0	3.0	3.7
67 APR2703	4.4	4.0	4.7	3.3	2.7
68 PST-2BGL	4.4	3.7	5.0	4.0	4.0
69 NAI-17409	4.4	3.3	5.7	2.7	4.3
70 NAI-17106	4.3	4.7	4.7	3.3	3.3

(Continued)

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	Turf Quality ¹ 2018-2019 Avg.	Gray Leaf Spot ² 27-Sep-2018	Establishment ³ 17-Sep-2018	Stem-miness ⁴ 12-Jun-2019	Dollar Spot ² 9-Aug-2019
71 APR2848	4.3	3.3	6.0	6.0	5.3
72 APR2154	4.3	3.3	6.0	4.3	2.7
73 APR2617	4.3	4.3	4.7	3.7	2.3
74 APR2790	4.3	3.0	4.7	3.0	6.0
75 APR2612	4.3	2.0	2.7	4.3	3.3
76 DLFPS-236-3580	4.2	4.3	5.3	4.3	3.0
77 NAI-LM3	4.2	3.3	5.3	3.0	3.7
78 Silver Sun	4.2	3.3	7.3	2.3	3.7
79 APR2944	4.2	3.0	4.7	4.0	3.7
80 New Sealand	4.1	3.7	6.0	2.3	2.3
81 Silverdollar	4.1	3.0	6.7	2.7	4.3
82 Soprano	4.1	5.0	4.7	3.0	2.7
83 PST-2WHB	4.1	3.3	4.7	4.7	2.7
84 DLFPS-236-3585	4.0	4.3	6.7	2.7	2.7
85 APR2719	4.0	3.3	5.0	5.0	3.3
86 Notable	4.0	3.7	6.3	3.0	3.3
87 APR2977	4.0	2.3	5.7	5.7	3.7
88 NAI-LD52	3.9	3.3	5.0	2.7	1.7
89 PST-2MKD	3.9	3.0	5.3	5.3	2.3
90 APR2440	3.8	4.0	4.0	4.0	2.7
91 APR2237	3.8	3.7	4.7	3.3	3.0
92 APR2853	3.8	3.3	4.3	4.7	2.3
93 Prosport 4	3.7	2.7	7.7	2.0	2.7
94 NAI-1422	3.7	4.0	5.0	2.3	3.0
95 APRT2835	3.6	3.7	4.3	2.7	5.7
96 Homerun	3.5	3.0	7.0	3.3	3.0
97 Nexus GT	3.5	2.7	5.7	2.3	3.0
98 APR2637	3.4	3.3	4.7	3.0	2.3
99 PST-2SHRP	3.4	2.7	5.0	4.3	2.0
100 SEPR-2	3.2	2.3	5.3	1.7	1.7
101 Commander ST	3.1	3.0	6.7	3.3	2.0
102 Nexus XR	3.0	2.0	6.3	3.3	2.3
103 APR3060	2.9	1.3	5.3	3.0	3.0
104 APR2462	2.9	1.0	6.0	3.3	3.3
105 DLFPS-236-3024	2.8	1.3	3.3	5.7	1.7

(Continued)

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	Turf Quality ¹ 2018-2019 Avg.	Gray Leaf Spot ² 27-Sep-2018	Establishment ³ 17-Sep-2018	Stemminess ⁴ 12-Jun-2019	Dollar Spot ⁵ 9-Aug-2019
106 Nexus XD	2.7	1.3	7.0	2.3	3.0
107 SEPR-N6	2.6	1.7	7.0	2.3	2.0
108 APR2463	2.6	2.3	3.7	3.7	2.0
109 APR2846	2.6	1.0	5.3	5.3	2.3
110 APR2839	2.4	2.3	5.0	3.0	1.7
111 SEPR-3	2.3	1.7	4.7	1.7	2.0
112 SEPR-1	2.2	1.7	7.3	3.3	2.3
113 APR2846	2.2	1.3	6.7	5.0	2.3
114 Brightstar SLT	1.8	1.0	6.7	2.3	2.7
LSD at 5%=	0.7	1.3	1.5	1.3	1.8

¹9 = best turf quality

²9 = least disease

³9 = best establishment

⁴9 = least stemminess

⁵9 = least disease

Table 6. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2019 at Adelphia, NJ.

Cultivar or Selection	Gray Leaf Spot ¹ 2019 Avg.	Turf Quality ² 21-Oct-2019
1 2CL3	9.0	9.0
2 2CL4	9.0	7.7
3 2CL1	8.8	8.7
4 PPG-PR 515	8.8	7.7
5 PST-2FOXY-16	8.8	7.7
6 PPG-PR 524	8.8	7.3
7 PST-214	8.7	9.0
8 PPG-PR 489	8.7	8.7
9 CJP2	8.7	8.3
10 PRC3	8.7	8.3
11 SGS4	8.7	7.7
12 SGU1	8.7	7.7
13 PPG-PR 525	8.7	7.3
14 Paragon 2 GLR	8.5	8.7
15 MLS	8.5	8.3
16 Infusion	8.5	8.0
17 PST-2E6	8.5	8.0
18 SGP4	8.5	8.0
19 SGS3	8.5	7.7
20 UEV	8.5	7.7
21 Evolution	8.5	7.3
22 PPG-PR 526	8.5	7.0
23 PST-Syn-2TTT	8.5	6.7
24 SGU3	8.5	6.7
25 CJU	8.3	8.0
26 PST-2MAY	8.3	8.0
27 SGP3	8.3	8.0
28 SGS5	8.3	8.0
29 PPG-PR 519	8.3	7.7
30 PPG-PR 527	8.3	7.7
31 SGS1	8.3	7.7
32 SGU2	8.3	7.7
33 Gray Wolf	8.3	7.3
34 PST-Syn-2AVS	8.3	7.0
35 PST-Syn-2MEGE	8.3	6.7

(Continued)

Table 6. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2019 at Adelphia, NJ.

Cultivar or Selection	Gray Leaf Spot ¹ 2019 Avg.	Turf Quality ² 21-Oct-2019
36 PPG-PR 536	8.2	8.3
37 Principal II	8.2	8.3
38 PPG-PR 530	8.2	8.0
39 Sideways	8.2	8.0
40 Slugger 3GL	8.2	8.0
41 PPG-PR 499	8.2	7.7
42 PPG-PR 528	8.2	7.7
43 SGP1	8.2	7.7
44 SGP2	8.2	7.7
45 Silver Sport	8.2	7.3
46 CJS	8.2	7.0
47 MFPR	8.2	6.7
48 PST-2MEG	8.2	6.0
49 PPG-PR 535	8.0	8.3
50 Process	8.0	8.3
51 Pangea GLR	8.0	8.0
52 PPG-PR 531	8.0	8.0
53 Thrive	8.0	8.0
54 CJP1	8.0	7.7
55 Allstar 3	8.0	7.3
56 Dilligent	8.0	7.3
57 PPG-PR 529	8.0	7.3
58 PST-2GTD	8.0	7.3
59 Bandlore	8.0	7.0
60 Fastball RGL	8.0	7.0
61 Banfield	7.8	8.3
62 Xcelerator	7.8	8.0
63 SGS2	7.8	7.3
64 PPG-PR 514	7.8	7.0
65 PST-2BGL	7.8	7.0
66 Rinovo	7.8	7.0
67 Spike GLS	7.8	7.0
68 Furlong	7.8	6.7
69 Paradox GLR	7.7	8.3
70 Pillar II	7.7	8.3

(Continued)

Table 6. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2019 at Adelphia, NJ.

Cultivar or Selection	Gray Leaf Spot ¹ 2019 Avg.	Turf Quality ² 21-Oct-2019
71	GLS plus	7.7
72	Intense	7.7
73	PST-2BDT	7.7
74	Stellar 3GL	7.7
75	Rio Vista	7.7
76	Aspire	7.5
77	PST-2DRG	7.5
78	Blackstone	7.5
79	Premium	7.5
80	Provost	7.5
81	Greenland	7.5
82	Slider LS	7.3
83	Homerun LS	7.3
84	Apple 3GL	7.3
85	Dasher 3	7.3
86	Grandslam GLD	7.3
87	Karma	7.2
88	Stamina	7.2
89	Fastball 3GL	7.2
90	PST-2BAD	7.2
91	Apple SGL	7.2
92	Harrier	7.2
93	Spark	7.0
94	Allsport 5	7.0
95	Sox Fan	7.0
96	SR 4650	7.0
97	PPG-PR 513	7.0
98	Ringles	6.8
99	LNTS1	6.8
100	PST-2BD1	6.8
101	PST-2WHB	6.8
102	Lateral spread PR	6.7
103	GO-143	6.7
104	Align II	6.7
105	Double Time GLS	6.7

(Continued)

Table 6. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2019 at Adelphia, NJ.

Cultivar or Selection	Gray Leaf Spot ¹ 2019 Avg.	Turf Quality ² 21-Oct-2019	
106	Expedite	6.7	6.0
107	SR 4660ST	6.7	6.0
108	Belize 2	6.5	6.7
109	Fiesta 4	6.5	6.7
110	PST-2CARD Bulk	6.5	5.7
111	Presidio II	6.5	5.3
112	Wicked	6.3	6.3
113	Virte	6.3	6.0
114	Zoom	6.3	5.7
115	Belize	6.2	5.3
116	Evolve	6.0	6.0
117	Peridot	6.0	6.0
118	Silver Sun	6.0	6.0
119	Big League	6.0	5.7
120	Hancock	5.8	5.0
121	Benchmark	5.7	5.3
122	Prosport 4	5.7	5.0
123	Proline ST	5.5	6.7
124	Linedrive II	5.5	5.7
125	Sun	5.5	5.7
126	SSE	5.3	6.0
127	Black Pearl	5.3	5.0
128	Top Gun II	5.3	5.0
129	GO-141	5.2	6.3
130	Hawkeye 2	5.0	5.3
131	Palmer III	5.0	5.3
132	Caddieshack II	5.0	5.0
133	Sunrise	4.7	5.0
134	Spyglass	4.7	4.3
135	Express II	4.7	3.0
136	Lover	4.5	4.7
137	LNTS3	4.3	4.0
138	Prominent	4.3	3.0
139	Edge II	4.0	3.3
140	LNTS2	4.0	3.0

(Continued)

Table 6. Performance of perennial ryegrass cultivars and selections in a turf trial seeded in August 2019 at Adelphia, NJ.

Cultivar or Selection	Gray Leaf Spot ¹ 2019 Avg.	Turf Quality ² 21-Oct-2019
141 Mighty	3.8	3.7
142 Panther H2O	3.8	3.7
143 Greenville 4	3.7	3.3
144 Blazer 4	3.2	3.0
145 Torsion	3.0	3.7
146 Barbados	3.0	3.3
147 PRG-19MH	3.0	2.7
148 Accent II	2.8	3.0
149 Gator 3	2.8	2.3
150 JS501	2.7	3.0
151 Cutter II	2.7	2.7
152 Prelude IV	2.5	3.0
153 Panther GLS	2.2	2.7
154 Replay	2.2	2.7
155 PRG-19DH	2.2	1.7
156 PHX-NZ	1.8	2.0
LSD @ 5%= CV	1.1 10.0	1.4 13.1

¹9 = least disease

²9 = best turf quality

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

	-----2016-----		-----2017-----		-----2018-----		-----2019-----	
	N ¹	Ht ²	N	Ht	N	Ht	N	Ht
Table 1 (2016)	1	1.5	3.5	1.5	3.5	1.5	1.25	1.5
Table 2 (2016 NTEP)	0.5	2.5	2.75	2.5	1	2.5	2.5	1.5
Table 3 (2017)	–	–	1	1.5	3.5	1.5	1.25	1.5
Table 4 (2018)	–	–	–	–	3.15	1.5	4.25	1.5
Table 5 (2018 CTBT)	–	–	–	–	3.05	1.5	3.5	1.5
Table 6 (2019)	–	–	–	–	–	–	1.4	1.5

¹Annual N applied (lb/1000 ft²)

²Mowing height (inches)