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
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PERFORMANCE OF TALL FESCUE CULTIVARS AND SELECTIONS IN NEW JERSEY TURF TRIALS, 2018

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Tall fescue [*Schedonorus arundinaceus* (Schreb.) Dumort.], a cool-season grass that is native to Europe and some parts of Africa (Buckner et al., 1979), was introduced to the United States in the 1600s (Beard, 2013). Tall fescue gained popularity after the release of the first commercial cultivar 'KY-31' in 1940, which enhanced forage production in United States. The utility of tall fescue extended to turfgrass after the release of the first turf type tall fescue cultivar 'Rebel' in 1979 (Funk et al., 1981). Since then, tall fescue has become one of the major cool-season turf species used in the United States because of its winter hardiness, persistence, adaptability to a wider range of soils, and tolerance to shade and drought. Tall fescue has a deep root system that enhances drought tolerance and allows the plant to stay green longer in dry conditions. Tall fescue also has among the best heat tolerance of the cool-season grasses. These qualities have increased the use of tall fescue in home lawns, sports fields, golf course roughs, recreational fields, sod farms, and roadsides.

The Rutgers tall fescue breeding program has focused on turf quality (darker leaf color, lower growth habit, finer leaf texture, and denser turf canopy) and the presence of endophytes that convey resistance to insects that feed above ground. Endophytic fungi live symbiotically inside the stem and leaf tissues (intercellular areas) and produce alkaloids that enhance tolerance to above-ground insect feeding (Funk et al., 1993). The incorporation of endophytic fungi in tall fescue has been a major breeding objective for many years.

One of the major limitations of tall fescue is its susceptibility to brown patch, a disease caused by the fungus *Rhizoctonia solani*, in warm and humid regions. Brown patch, a soilborne disease of both cool-season and warm-season turfgrasses, causes blighted, circular to irregularly-shaped patches to form in the turf which quickly fade to light brown. Gray leaf spot is another disease of increasing significance in cool-season turfgrasses. Caused by *Pyricularia grisea*, this disease is common on annual and perennial ryegrasses. Tall fescue has been damaged by gray leaf spot in the southeastern United States; the disease has spread north the past few years. Breeding for disease resistance is one of the main objectives of the Rutgers breeding program. The demand for disease resistant cultivars, with concurrent higher turf quality and superior performance, is high among consumers.

Another major objective of the Rutgers turfgrass breeding program is to improve drought tolerance in tall fescue. The program utilizes an automated rainout shelter to screen for drought tolerance in tall fescue in the summer months; as a result of its use, drought tolerance in tall fescue has greatly improved.

The Rutgers turfgrass breeding program has continued to develop improved tall fescue cultivars. At present, thousands of germplasm sources have gone through numerous cycles of selection and hybridization to improve turf quality, disease resistance, billbug resistance, and wear and drought tolerance. To achieve these objectives, collected germplasm has also been incorporated in the breeding program to introduce beneficial genes into tall fescue populations.

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PROCEDURES

Field Establishment and Maintenance

Five tall fescue trials were established at the Rutgers Plant Biology Research and Extension Farm at Adelphia, NJ between 2015 and 2018 (Tables 1 to 5). All tests were established in September by hand sowing 1.41 oz of seed per 3 x 5 ft plot (5.9 lb per 1000 ft^2), except for the 2018 NTEP test (Table 5) which was sown at the rate of 2.29 oz of seed per 4 x 6 ft plot (5.9 lb per 1000 ft^2). All tests were arranged in randomized complete block design with three replications, and each plot had a 6-inch unseeded border to limit contamination.

Broadleaf weeds were controlled with spring or fall applications of 2,4-D, dicamba (Banvel), and MCPP. Dithiopyr (Dimension) was applied in spring to control annual grassy weeds. In July, metalaxyl (Subdue) was applied when required to prevent Pythium blight. Single applications of fertilizer did not exceed 1.0 lb nitrogen (N) per 1000 ft^2. The amount and timing of N applied to the turf varied to encourage disease and other stresses (Table 6). Each trial at establishment had an application of 10-10-10 fertilizer at the rate of 1.0 lb per 1000 ft^2. Field trials were mowed regularly (approximately 1 to 2 times per week) with rotary mowers to maintain a 1.5-inch height of cut. The annual rate of N applied as well as mowing height for each test is presented in Table 6. Based on soil test results, lime was applied as needed to maintain a pH of 6.0 to 6.5. Irrigation was applied to each test as needed to avoid wilting

Visual Assessment

All tests were rated throughout the growing season for visual turf quality (i.e., overall appearance, turf color, uniformity, density, mowing quality, reduced vertical growth rate, leaf texture, and damage due to insects and diseases). Other ratings such as establishment, percent green cover, and damage due to specific diseases were documented when significant differences were evident. All ratings except percent green cover were based on a 1 to 9 scale, where 9 represented the best result. 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) means separation test.

RESULTS AND DISCUSSION

Results of tall fescue tests are found in Tables 1 through 5. Tests presented in Tables 1 to 3 are ranked by overall turf quality average; remaining tests (Tables 4 and 5) are ranked based on gray leaf spot rating. A high quality average is generally indicative of better disease resistance, a darker green color, greater turf density and uniformity, finer leaf texture, lower growth habit, improved mowing quality, and less damage due to insects.

Turf Quality

Higher turf quality increases the utility of tall fescue in athletic fields, school grounds, sod farms, lawns, and parks. Turf quality characteristics include canopy density, uniformity, lower growth habit, finer leaf texture, dark green color, and tolerance to disease or environmental stress.

The selections and cultivars that had the highest quality ratings in the 2015 Tall Fescue Test (Table 1) were WN2 Comp, WN1 Comp, SCR2 Comp, and HFBC1 Comp, while the selections and cultivars that had the lowest quality ratings were Rendition RX, Titan Ulta, Titan Rx, and No Net. In the 2016 Tall Fescue Test, the highest quality rated selections and cultivars were PPG-TF 262 and PPG-TF 255, while the selections and cultivars with the lowest quality ratings were LLT-993, LLT-825, GO-FNKY, Scorpion II, and GO-FKYT (Table 2). In the 2017 Tall Fescue Test, the highest quality selections and cultivars were Bullseye LTZ and AH1, while the cultivars and selections with the lowest quality ratings were GO-FNKY and Crewcut II (Table 3).

Establishment

Improved establishment of tall fescue after seed sowing makes a sward denser and reduces soil erosion. Cultivars with improved establishment are in demand by turfgrass managers, sod growers and consumers. Rapid establishment is an objective for turf breeders to improve germination and tillering rates. The cultivars and selections that exhibited rapid establishment in the 2018 Tall Fescue Test were AH2, PST-5FOE, PPG-TF 232, and Fesnova, while BAR FA 8269 and Persuasion had the lowest establishment rate (Table 4). Percent green cover one month after seeding is also a measurement of establishment. The cultivars and selections with higher percent green cover in the 2017 test were

Bullseye LTZ, AH1, TD2, Genius, JS-DTT, TF 424, and TF 426, while cover for Cannavaro and Crewcut II was low (Table 3).

Disease Resistance

Brown patch. This disease, a major disease of tall fescue, causes significant damage during humid and warm weather conditions. Improved cultivars are available but there are no cultivars that are completely resistant to this disease. In the 2016 Tall Fescue Test, the selections and cultivars that were most resistant to brown patch were PPG-TF 265, PPG-TF 277, RH2, and RHF, while the selections and cultivars that were least resistant were Saltillo, and LLT-825 (Table 2). In the 2017 Tall Fescue Test, the selections and cultivars that were most resistant to brown patch were AH2, PPG-TF 304, Bullseye LTZ, NAI-ST5-R5, and PPG-TF 308, while GO-FNKY and Crewcut II were most susceptible (Table 3).

Gray leaf spot. In fall of 2018, the Rutgers Plant Science Research and Extension Farm at Adelphia witnessed the first gray leaf spot outbreak in the newly seeded tall fescue trials. In the 2018 Tall Fescue Test, PW5, PW1, and Copious showed best gray leaf spot resistance, while RAD-TF103, 06-WALK, and Escalade were most susceptible to gray leaf spot (Table 4). In the 2018 NTEP Tall Fescue Test, JS-DTT, DLFPS-321/3699, AH2, and BAR 9FE MAS were most resistant to gray leaf spot, while Estrena, RAD-TF0.0, and Kentucky-31 were most susceptible (Table 5).

SUMMARY

At Rutgers, turfgrass breeders are continuing to make progress in improving tall fescue to extend its acceptance in the turfgrass industry and among consumers. Resistance to brown patch, rapid establishment, and higher turf quality are among the primary goals of tall fescue breeding programs. Ongoing evaluation of cultivars and germplasm helps to identify superior lines that can be used by breeders to develop new cultivars. Efforts to collect germplasm and incorporate endophytes in tall fescue may lead to increased persistence and tolerance to above ground insect feeding and diseases. Therefore, the efforts to improve tall fescue would extend its utility to the areas where it has not been used before and would be suitable to different regions in United States.

ACKNOWLEDGMENTS

New Jersey Agricultural Experiment Station Publication No. E 12194-05-19. Project No. 12180, supported by the New Jersey Agricultural Experiment Station, State and Hatch Act funds, Rutgers Center for Turfgrass Science, other grants, and gifts. Additional support was received from the United States Golf Association and the New Jersey Turfgrass Association.

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Table 1. Performance of tall fescue cultivars and selections in a turf trial established in September 2015 at Adelphia, NJ.

		Turf Quality[1]			
	Cultivar or Selection	2016-2018 Avg.	2016 Avg.	2017 Avg.	2018 Avg.
1	WN2	6.5	6.8	6.4	6.4
2	WN1	6.5	6.5	6.7	6.2
3	SCR2	6.5	6.9	6.2	6.3
4	HFBC1	6.5	6.5	6.5	6.3
5	RS4	6.4	6.8	6.3	6.1
6	NAI-15-3N2	6.4	6.5	6.6	6.1
7	HFBC2	6.4	6.7	6.3	6.2
8	NT-3	6.4	6.6	6.2	6.3
9	WB2	6.3	6.7	6.3	6.0
10	RS3	6.3	6.9	6.3	5.8
11	PPG-TF-232	6.3	6.7	6.3	5.9
12	NAI-15-3N1	6.3	6.2	6.3	6.4
13	PPG-TF-231	6.2	6.6	6.1	6.0
14	RS2	6.2	6.4	6.2	6.0
15	HFBC3	6.2	6.2	6.4	6.1
16	NAI-15-CTR	6.2	6.3	6.2	6.1
17	SCR3	6.2	6.5	6.1	5.8
18	Avenger II	6.2	6.1	6.2	6.2
19	LRT	6.1	6.6	6.0	5.9
20	PPG-TF-235	6.1	6.6	6.0	5.8
21	Raptor III	6.1	6.4	6.1	5.8
22	BPS	6.1	6.3	6.1	5.9
23	PPG-TF-242	6.1	6.5	6.0	5.8
24	Corbett	6.1	6.2	6.0	6.0
25	Amity	6.1	6.7	5.9	5.6
26	PPG-TF-238	6.1	6.4	6.0	5.8
27	PPG-TF-239	6.1	6.8	5.9	5.4
28	PPG-TF-240	6.0	6.1	5.8	6.2
29	PPG-TF-236	6.0	6.3	6.0	5.8
30	PRT	6.0	6.0	6.4	5.7
31	URT	6.0	6.4	5.9	5.7
32	Supersonic	6.0	6.4	5.8	5.8
33	SCR1	6.0	6.5	5.8	5.7
34	RS5	6.0	6.1	6.1	5.8
35	PPG-TF-229	6.0	6.0	5.9	6.0

(Continued)

Table 1. Tall fescue turf trial, 2015 (continued).

	Cultivar or Selection	Turf Quality[1] 2016-2018 Avg.	2016 Avg.	2017 Avg.	2018 Avg.
36	NAI-15-PAD2	6.0	6.1	6.1	5.8
37	NT-1	6.0	6.2	5.9	5.9
38	PPG-TF-234	5.9	6.4	5.5	5.8
39	Reflection	5.9	6.4	5.8	5.4
40	WB1	5.9	6.1	5.6	6.0
41	WB3	5.9	6.0	5.7	5.8
42	NAI-15-3B2	5.8	5.9	5.8	5.8
43	RS1	5.8	5.9	5.7	5.9
44	RS6	5.8	5.8	6.1	5.6
45	PPG-TF-176	5.8	6.2	5.8	5.4
46	RAD-TF-105	5.8	6.2	5.5	5.6
47	RAD-TF-104	5.8	6.3	5.7	5.3
48	RAD-TF-98	5.7	6.6	5.6	5.0
49	Xtender	5.7	6.5	5.2	5.4
50	RAD-TF-99	5.6	6.4	5.5	5.0
51	Titanium 2LS	5.6	5.9	5.3	5.7
52	Temple	5.6	5.9	5.6	5.3
53	PPG-TF-230	5.6	5.8	5.5	5.4
54	Faith	5.6	6.1	5.4	5.3
55	Maestro	5.6	5.7	5.4	5.5
56	PPG-TF-172	5.6	6.1	5.2	5.3
57	Firecracker SLS	5.5	5.9	5.3	5.4
58	NT-2	5.5	5.5	5.5	5.6
59	Thor	5.5	6.1	5.6	4.8
60	Black Tail	5.5	5.7	5.5	5.4
61	RAD-TF-103	5.5	6.1	5.6	4.8
62	Screamer LS	5.5	5.7	5.4	5.4
63	PPG-TF-241	5.5	6.0	5.2	5.3
64	JT-388	5.5	6.1	5.4	5.0
65	Ares	5.5	6.3	5.1	4.9
66	Pro Gold	5.4	6.1	5.1	5.1
67	Cochise IV	5.4	5.9	5.2	5.2
68	Firaces	5.4	5.7	5.3	5.2
69	Firecracker LS	5.4	5.9	5.3	4.8
70	Meridian	5.3	5.7	5.2	5.1

(Continued)

Table 1. Tall fescue turf trial, 2015 (continued).

	Cultivar or Selection	Turf Quality[1] 2016-2018 Avg.	2016 Avg.	2017 Avg.	2018 Avg.
71	PST-5DAW-15	5.3	6.0	5.1	4.9
72	PST-5MCD	5.3	5.9	5.0	5.1
73	PST-53D2	5.3	5.7	4.8	5.3
74	Rowdy	5.2	5.7	4.9	5.1
75	PST-5DZP	5.2	5.8	5.2	4.6
76	Shenandoah Elite	5.2	5.7	4.9	5.0
77	ATF 1521	5.2	6.0	5.2	4.4
78	Lifeguard	5.2	5.6	4.9	5.0
79	Spyder LS	5.2	6.0	4.8	4.7
80	RAD-TF-102	5.2	5.9	5.1	4.6
81	Dynamite LS	5.2	6.0	5.0	4.5
82	RAD-TF-96	5.1	6.1	4.9	4.4
83	Hemi	5.1	5.7	4.9	4.6
84	PST-5MINI-14	5.0	5.6	5.0	4.5
85	Shenandoah III	5.0	5.8	4.7	4.6
86	Raptor II	5.0	5.5	5.1	4.4
87	Diablo	5.0	6.1	4.6	4.2
88	Persuasion	5.0	5.4	4.8	4.8
89	BMT-13	5.0	5.7	4.9	4.4
90	PST-5LYM	4.9	5.0	4.8	5.0
91	Terrano	4.9	5.7	4.4	4.7
92	Falcon V	4.9	5.2	4.9	4.7
93	Falcon IV	4.9	5.5	4.8	4.4
94	PST-5T24	4.9	5.8	4.5	4.4
95	Regenerate	4.9	5.4	4.8	4.6
96	Wolfpack II	4.9	5.6	4.4	4.6
97	PST-Syn-5MIZ	4.8	5.5	4.7	4.4
98	Sundial	4.8	5.5	4.2	4.6
99	PST-5BPO	4.7	5.2	4.5	4.5
100	GO-MNKY-RF	4.7	5.6	4.5	4.0
101	PST-5STAR	4.7	5.4	4.5	4.2
102	Gazelle II	4.7	5.6	4.5	4.0
103	FCE3	4.7	5.2	4.8	4.1
104	Moondance	4.7	5.2	4.2	4.6
105	Thunderstruck	4.7	5.6	4.8	3.6

(Continued)

Table 1. Tall fescue turf trial, 2015 (continued).

		Turf Quality[1]			
	Cultivar or Selection	2016-2018 Avg.	2016 Avg.	2017 Avg.	2018 Avg.
106	Dallas	4.7	5.6	4.4	4.0
107	NAI-15-TXR	4.7	4.9	4.5	4.5
108	PST-5BRK	4.6	5.3	4.5	4.1
109	Inferno	4.6	5.5	4.1	4.3
110	Titanium	4.6	5.3	4.3	4.2
111	Rain Saver	4.6	5.2	4.8	3.9
112	GO-AO	4.6	5.5	4.1	4.1
113	NAI-15-RXR	4.5	5.2	4.5	3.9
114	JT-107	4.5	5.3	4.3	3.9
115	GO-MNKY	4.5	5.1	4.4	4.0
116	Saltillo	4.5	5.4	4.2	3.7
117	ATF 1255	4.5	5.3	4.3	3.9
118	Tribute II	4.4	5.5	4.0	3.8
119	Titanium LS	4.4	5.0	4.0	4.2
120	Covenant II	4.4	5.4	4.0	3.7
121	Avenger	4.4	5.1	4.1	3.9
122	Summer	4.4	5.2	3.8	4.0
123	Hudson	4.3	5.1	4.0	3.9
124	Stingray	4.2	5.4	3.8	3.5
125	Merida	4.2	4.7	3.9	4.1
126	Sequester	4.2	5.4	3.9	3.3
127	GO-MINI	4.2	5.0	3.9	3.7
128	Picabu	4.2	4.7	3.9	4.0
129	PPG-TF-237	4.2	5.0	3.9	3.7
130	ATV	4.1	5.2	3.8	3.2
131	GO-MNKY-H	4.1	4.8	3.8	3.7
132	Jaguar 4G	4.1	5.1	3.7	3.4
133	Scorpion II	4.0	4.8	3.9	3.5
134	Sungazer	4.0	5.1	3.6	3.2
135	Rain Dance	4.0	4.7	3.6	3.6
136	NoNet	3.9	4.9	3.1	3.6
137	Titan Rx	3.8	4.3	3.4	3.6
138	Titan Ultra	3.6	4.5	3.2	3.2
139	Rendition RX	3.5	4.4	3.0	3.0

(Continued)

Table 1. Tall fescue turf trial, 2015 (continued).

Cultivar or Selection	Turf Quality[1] 2016-2018 Avg.	2016 Avg.	2017 Avg.	2018 Avg.
LSD at 5% =	0.5	0.6	0.7	0.6

[1]9 = best turf quality

Table 2. Performance of tall fescue cultivars and selections in a turf trial established in September 2016 at Adelphia, NJ.

	Cultivar or Selection	Turf Quality[1] 2017-2018 Avg.	Turf Quality[1] 2017 Avg.	Turf Quality[1] 2018 Avg.	Brown Patch[2] July 2017	Brown Patch[2] Aug. 2018
1	PPG-TF 262	6.7	6.6	6.8	7.7	6.7
2	PPG-TF 255	6.7	6.7	6.7	7.3	7.3
3	Honeymoon	6.6	6.5	6.7	7.3	6.3
4	RHF	6.6	6.8	6.4	7.7	7.7
5	RH4	6.6	6.5	6.7	7.0	7.3
6	PPG-TF 268	6.6	6.7	6.4	6.3	7.0
7	PPG-TF 265	6.6	6.5	6.6	7.7	8.0
8	PPG-TF 257	6.5	6.5	6.5	6.3	6.3
9	RH2	6.5	6.4	6.6	6.3	7.7
10	PPG-TF 267	6.5	6.6	6.3	6.7	7.0
11	PPG-TF 276	6.4	6.6	6.2	6.7	6.3
12	PPG-TF 266	6.4	6.5	6.2	6.0	7.3
13	PPG-TF 264	6.3	6.4	6.2	6.3	7.3
14	PPG-TF 232	6.3	6.5	6.1	6.3	5.7
15	STL	6.3	6.3	6.2	7.3	7.0
16	PPG-TF 274	6.2	6.1	6.4	5.3	6.7
17	RH3	6.2	6.5	5.9	8.3	5.7
18	PPG-TF 233	6.2	6.4	6.0	7.3	7.0
19	PPG-TF 275	6.2	6.4	6.0	6.0	6.7
20	TSE	6.2	6.2	6.2	7.7	6.3
21	PPG-TF 254	6.2	6.0	6.4	6.7	7.3
22	Firehawk SLT	6.2	6.4	6.0	8.0	7.0
23	PPG-TF 277	6.2	6.2	6.1	5.3	8.0
24	RH1	6.2	6.2	6.1	6.7	5.3
25	PPG-TF 263	6.1	6.3	6.0	6.3	6.7
26	PPG-TF 256	6.1	6.2	6.0	6.3	6.0
27	Estrena	6.1	6.1	6.0	7.7	7.0
28	PPG-TF 269	6.1	6.3	5.8	5.7	5.7
29	PPG-TF 260	6.1	6.1	6.0	7.3	7.3
30	RHL1	6.1	5.9	6.2	7.7	6.0
31	PPG-TF 271	6.0	6.2	5.9	5.7	5.7
32	PPG-TF 273	6.0	6.0	6.0	6.7	6.7
33	PPG-TF 252	5.9	6.0	5.8	6.0	6.3
34	3B3	5.9	6.1	5.7	6.3	6.3
35	PPG-TF 245	5.9	6.0	5.8	6.7	5.0

(Continued)

Table 2. Tall fescue turf trial, 2016 (continued).

	Cultivar or Selection	Turf Quality[1] 2017-2018 Avg.	Turf Quality[1] 2017 Avg.	Turf Quality[1] 2018 Avg.	Brown Patch[2] July 2017	Brown Patch[2] Aug. 2018
36	WDS	5.9	6.0	5.8	6.0	6.7
37	PPG-TF 203	5.9	6.5	5.2	6.0	5.7
38	PPG-TF 278	5.8	6.0	5.6	6.0	7.0
39	Amity	5.8	6.3	5.3	6.7	4.7
40	Regenerate	5.8	6.4	5.1	5.7	4.7
41	PPG-TF 270	5.7	5.8	5.6	6.0	4.7
42	RS4	5.7	5.8	5.7	5.7	5.7
43	PPG-TF 231	5.7	6.4	5.0	8.0	4.3
44	ROE	5.6	5.8	5.4	5.7	7.0
45	Screamer LS	5.6	5.7	5.5	6.7	5.7
46	PPG-TF 230	5.6	5.7	5.5	5.3	5.3
47	Raptor III	5.6	6.1	5.1	7.0	5.0
48	PST-5DART	5.6	5.8	5.4	6.7	6.3
49	Reflection	5.6	6.1	5.0	6.3	3.0
50	PST-SYN-5DWL	5.5	5.9	5.2	6.3	5.7
51	PPG-TF 261	5.5	5.4	5.5	6.7	6.0
52	Avenger II	5.4	5.8	5.0	6.7	4.0
53	PPG-TF 272	5.4	5.6	5.2	5.3	5.3
54	Titanium 2LS	5.4	5.8	5.0	6.7	4.0
55	PST-5DZP	5.4	6.1	4.7	5.0	4.3
56	PPG-TF 279	5.4	5.8	5.0	6.0	5.3
57	Temple	5.3	5.4	5.2	6.0	5.0
58	PST-5MINK	5.3	5.6	5.0	4.3	5.7
59	Black Tail	5.3	5.5	5.0	5.7	4.7
60	Lifeguard	5.3	5.6	4.9	6.3	5.3
61	LLT-251	5.2	5.9	4.5	4.7	5.0
62	PPG-TF 248	5.2	5.1	5.4	6.7	5.3
63	Annapolis	5.2	5.7	4.7	4.7	3.7
64	PST-5DAW-15	5.2	5.5	4.8	6.0	4.7
65	Shenandoah Elite	5.1	5.7	4.6	4.7	3.7
66	PST-5MCD	5.1	5.5	4.7	4.7	4.3
67	LS 1200	5.1	5.3	5.0	5.3	3.0
68	PST-5SQB-BS	5.1	5.2	5.0	4.7	5.7
69	PST-53D2	5.0	5.4	4.7	6.3	4.7
70	PST-5BYOB	5.0	5.3	4.6	6.0	4.0

(Continued)

Table 2. Tall fescue turf trial, 2016 (continued).

	Cultivar or Selection	Turf Quality[1] 2017-2018 Avg.	Turf Quality[1] 2017 Avg.	Turf Quality[1] 2018 Avg.	Brown Patch[2] July 2017	Brown Patch[2] Aug. 2018
71	Embrace	4.9	5.4	4.4	6.0	3.0
72	Maestro	4.9	5.5	4.3	5.0	3.3
73	Finelawn H2O	4.9	5.2	4.5	3.7	3.3
74	Terrano	4.9	5.4	4.3	5.3	4.3
75	Dynamic II	4.8	5.3	4.4	3.7	3.3
76	Thor	4.8	5.3	4.3	5.0	3.7
77	Diablo	4.8	5.5	4.1	6.0	3.0
78	Faith	4.8	5.2	4.3	5.0	3.7
79	Rowdy	4.8	5.4	4.1	6.0	3.7
80	Dynamite LS	4.8	5.6	3.9	6.3	3.3
81	Firecracker SLS	4.7	5.3	4.2	6.3	3.0
82	EGC	4.7	5.1	4.4	6.7	4.7
83	PST-5LYM	4.7	4.9	4.5	6.7	4.7
84	Moondance	4.7	4.7	4.7	6.7	5.0
85	Xtender	4.7	5.4	4.0	4.3	2.3
86	PST-5BRK	4.7	5.3	4.1	6.0	3.0
87	Meridian	4.6	5.3	4.0	4.0	2.3
88	PST-5MINI-14	4.6	4.9	4.3	5.0	4.0
89	PST-525D	4.6	5.2	4.0	5.7	3.7
90	Swagger	4.6	5.0	4.1	4.7	4.0
91	PST-5ZIP	4.6	5.1	4.0	4.0	3.7
92	Trinity	4.5	4.8	4.3	5.3	4.7
93	Renegade DT	4.5	5.2	3.8	4.7	2.7
94	LLT-338	4.5	5.1	3.9	4.3	3.7
95	GO-ATO	4.5	4.9	4.1	4.0	3.3
96	LLT-630	4.4	5.1	3.7	5.3	4.3
97	Duration	4.4	5.0	3.8	5.3	4.0
98	Firaces	4.4	5.0	3.9	4.3	2.7
99	Falcon H2O	4.4	5.0	3.9	5.7	4.3
100	Endeavor II	4.4	4.7	4.1	5.7	3.3
101	PST-5SDS	4.4	4.9	3.8	5.3	2.7
102	Thunderstruck	4.3	5.2	3.3	4.0	2.3
103	Ares	4.3	4.9	3.6	5.7	3.0
104	Falcon IV	4.2	4.8	3.6	5.0	4.3
105	PST-5BPO	4.2	4.8	3.6	6.0	2.3

(Continued)

Table 2. Tall fescue turf trial, 2016 (continued).

	Cultivar or Selection	Turf Quality[1] 2017-2018 Avg.	Turf Quality[1] 2017 Avg.	Turf Quality[1] 2018 Avg.	Brown Patch[2] July 2017	Brown Patch[2] Aug. 2018
106	Fesnova	4.2	4.7	3.7	5.0	3.7
107	Greenkeeper	4.2	4.7	3.7	6.0	3.3
108	Renagade H2O	4.2	4.8	3.6	3.7	4.3
109	Persuasion	4.2	4.7	3.6	5.3	3.7
110	GO-AO	4.2	4.7	3.7	4.3	3.0
111	Shenandoah III	4.2	4.6	3.7	4.0	3.7
112	PST-5STAR	4.2	4.6	3.7	4.7	3.0
113	PST-5T20	4.2	4.8	3.5	4.0	2.7
114	Tribute II	4.1	4.5	3.7	3.3	2.7
115	LLT-652	4.1	4.3	3.8	4.7	4.0
116	Tar Heel II	4.1	4.6	3.5	4.7	4.0
117	RainDance	4.0	4.5	3.5	4.3	2.3
118	Sequester	4.0	4.3	3.7	5.0	3.3
119	Stingray	4.0	4.6	3.3	3.7	3.0
120	Saltillo	3.9	4.8	3.0	5.0	1.3
121	LLT-809	3.9	4.5	3.3	3.0	3.0
122	Sungazer	3.9	4.2	3.6	3.7	3.0
123	PST-5BGR	3.9	4.5	3.3	5.7	2.3
124	ATV	3.8	4.6	3.1	4.7	2.7
125	LLT-404	3.8	4.4	3.2	4.0	3.0
126	LLT-816	3.7	4.4	3.0	4.0	2.0
127	LLT-810	3.7	4.2	3.2	4.3	3.7
128	PST-5SIS	3.6	4.1	3.1	5.3	2.3
129	LLT-621	3.5	4.2	2.8	3.3	2.3
130	LLT-825	3.4	4.3	2.6	4.7	1.3
131	LLT-993	3.4	4.0	2.9	2.7	2.0
132	Scorpion II	3.4	3.5	3.4	3.7	3.0
133	GO-FNKY	3.4	3.4	3.5	3.3	2.3
134	GO-FKYT	3.4	3.7	3.1	2.3	3.3
	LSD at 5% =	0.7	0.8	0.9	1.9	2.1

[1] 9 = best turf quality
[2] 9 = least disease

Table 3. Performance of tall fescue cultivars and selections in a turf trial established in September 2017 at Adelphia, NJ.

	Cultivar or Selection	Turf Quality[1] 2018 Avg.	Green Cover[2] (%) Oct. 2018	Brown Patch[3] 3 Aug. 2018	Brown Patch[3] 20 Aug. 2018	Brown Patch[3] Aug. 2018 Avg.
1	Bullseye LTZ	7.0	81.7	7.7	7.7	7.7
2	AH1	7.0	71.7	8.0	7.0	7.5
3	AH2	6.9	68.3	8.7	7.3	8.0
4	TD2	6.9	73.3	6.3	6.7	6.5
5	NAI-ST5-R13	6.9	66.7	7.7	6.7	7.2
6	3N2	6.7	66.7	7.7	7.0	7.3
7	NAI-ROS-IY	6.7	65.0	7.3	6.7	7.0
8	PPG-TF 249	6.7	60.0	6.7	7.0	6.8
9	PPG-TF 250	6.7	63.3	6.7	6.3	6.5
10	NAI-ST5-R5	6.7	56.7	8.0	7.3	7.7
11	Genius	6.7	78.3	7.7	7.3	7.5
12	TMT1	6.6	61.7	7.0	7.3	7.2
13	JS-DTT	6.5	71.7	7.7	7.0	7.3
14	NAI-ST5-R9	6.5	68.3	7.3	7.0	7.2
15	PPG-TF 252	6.5	65.0	7.7	7.3	7.5
16	TF 426	6.4	71.7	7.3	6.7	7.0
17	PPG-TF 304	6.4	65.0	9.0	7.0	8.0
18	NAI-ROS-RR	6.4	63.3	7.3	6.7	7.0
19	PPG-TF 308	6.4	66.7	8.3	7.0	7.7
20	PPG-TF 300	6.3	53.3	7.3	7.0	7.2
21	WB2	6.3	58.3	8.3	6.0	7.2
22	BPS	6.3	56.7	7.7	6.0	6.8
23	NAI-ST5-R8	6.3	61.7	6.3	6.0	6.2
24	NAI-ST5-R1	6.2	70.0	7.3	6.7	7.0
25	TF 420	6.2	63.3	6.3	6.7	6.5
26	NAI-ST5-R7	6.2	70.0	6.7	6.0	6.3
27	TF 431	6.2	66.7	7.0	6.0	6.5
28	LTD	6.1	65.0	7.7	6.3	7.0
29	ZRC1	6.1	61.7	7.7	6.3	7.0
30	RC2	6.1	61.7	8.3	6.7	7.5
31	PPG-TF 292	6.1	66.7	7.7	5.7	6.7
32	PPG-TF 244	6.1	75.0	6.3	6.3	6.3
33	PPG-TF 307	6.0	63.3	8.0	6.0	7.0
34	DLFPS-321/3678	6.0	68.3	6.3	7.3	6.8
35	PPG-TF 283	6.0	58.3	7.7	5.7	6.7

(Continued)

Table 3. Tall fescue turf trial, 2017 (continued).

	Cultivar or Selection	Turf Quality[1] 2018 Avg.	Green Cover[2] (%) Oct. 2018	Brown Patch[3] 3 Aug. 2018	Brown Patch[3] 20 Aug. 2018	Brown Patch[3] Aug. 2018 Avg.
36	PPG-TF 299	6.0	60.0	7.3	5.7	6.5
37	PPG-TF 231	6.0	66.7	6.7	5.3	6.0
38	NAI-CT2	6.0	60.0	7.7	6.0	6.8
39	PPG-TF 285	6.0	73.3	7.7	5.3	6.5
40	RC3	5.9	58.3	8.0	6.7	7.3
41	PPG-TF 303	5.9	55.0	8.0	5.7	6.8
42	PPG-TF 233	5.9	71.7	6.0	6.0	6.0
43	TF 424	5.9	75.0	6.3	5.0	5.7
44	RS4	5.9	48.3	7.3	6.3	6.8
45	3B2	5.9	60.0	7.3	5.3	6.3
46	PPG-TF 305	5.8	58.3	8.3	5.7	7.0
47	PPG-TF 306	5.8	61.7	7.7	6.0	6.8
48	TF 427	5.8	65.0	7.3	6.0	6.7
49	BBS	5.8	66.7	6.3	6.3	6.3
50	PPG-TF 295	5.8	66.7	6.7	5.3	6.0
51	PPG-TF 251	5.8	51.7	6.0	5.7	5.8
52	DLFPS-321/3677	5.7	70.0	7.7	6.7	7.2
53	PPG-TF 248	5.7	63.3	7.0	5.3	6.2
54	NAI-ST5-R6	5.7	51.7	4.3	4.7	4.5
55	3N1	5.7	56.7	8.0	6.3	7.2
56	NAI-ST5-R11	5.7	53.3	7.3	7.0	7.2
57	PPG-TF 254	5.7	56.7	7.0	6.7	6.8
58	PST-5LSS	5.7	50.0	7.0	6.7	6.8
59	Titanium 2LS	5.7	43.3	7.3	6.3	6.8
60	PPG-TF 245	5.7	53.3	7.0	5.7	6.3
61	NSE	5.6	58.3	7.7	6.3	7.0
62	RDC	5.6	65.0	5.0	6.3	5.7
63	NAI-ST5-R4	5.6	63.3	4.3	3.7	4.0
64	NAI-ST5-R19	5.6	50.0	7.3	6.0	6.7
65	TF 416	5.6	63.3	7.0	6.3	6.7
66	Annapolis	5.6	60.0	6.3	5.7	6.0
67	NAI-ST5-R15	5.6	50.0	6.3	7.0	6.7
68	Maestro	5.6	58.3	7.0	5.0	6.0
69	TF 430	5.6	58.3	6.7	5.3	6.0
70	Technique	5.6	80.0	7.0	4.7	5.8

(Continued)

Table 3. Tall fescue turf trial, 2017 (continued).

	Cultivar or Selection	Turf Quality[1] 2018 Avg.	Green Cover[2] (%) Oct. 2018	Brown Patch[3] 3 Aug. 2018	Brown Patch[3] 20 Aug. 2018	Brown Patch[3] Aug. 2018 Avg.
71	NAI-ST5-R21	5.5	55.0	8.0	6.3	7.2
72	Reflection	5.5	60.0	8.0	5.7	6.8
73	DLFPS-321/3679	5.5	65.0	6.0	5.7	5.8
74	Thor	5.5	71.7	7.7	5.7	6.7
75	Copious	5.4	63.3	6.0	5.3	5.7
76	PPG-TF 229	5.4	60.0	5.0	3.7	4.3
77	NAI-ST5-R17	5.4	46.7	7.3	6.3	6.8
78	NAI-ST5-R3	5.4	56.7	7.0	5.7	6.3
79	Xtender	5.4	58.3	7.7	4.7	6.2
80	Firecracker SLS	5.4	51.7	6.7	5.0	5.8
81	Padre 2	5.4	65.0	6.7	4.7	5.7
82	PPG-TF 232	5.4	68.3	6.3	4.7	5.5
83	PPG-TF 230	5.4	65.0	5.7	4.3	5.0
84	Spyder LS	5.3	56.7	6.0	5.3	5.7
85	TF 395	5.3	71.7	5.3	5.7	5.5
86	LTNS TF Blend 1	5.3	53.3	7.7	5.3	6.5
87	TF 400	5.3	58.3	6.3	6.0	6.2
88	TF 418	5.3	51.7	6.7	5.3	6.0
89	PPG-TF 176	5.3	51.7	6.7	6.0	6.3
90	Supersonic	5.3	51.7	7.7	4.7	6.2
91	Faith	5.3	55.0	7.0	4.7	5.8
92	Merida	5.3	65.0	6.3	5.0	5.7
93	NAI-ST5-R14	5.3	43.3	6.7	4.3	5.5
94	Unitus	5.3	66.7	6.0	4.7	5.3
95	Bloodhound	5.2	65.0	7.7	5.7	6.7
96	TF 396	5.2	58.3	7.3	5.3	6.3
97	TF 269 SEL M2	5.2	66.7	6.0	6.0	6.0
98	RAD-TF123	5.2	53.3	6.0	5.7	5.8
99	TF 423	5.2	56.7	7.7	5.0	6.3
100	Rowdy	5.2	66.7	5.3	4.0	4.7
101	MET-3	5.1	63.3	7.3	5.0	6.2
102	Valkyrie LS	5.1	61.7	7.0	4.3	5.7
103	PPG-TF 234	5.1	65.0	5.3	3.7	4.5
104	TF 425	5.1	51.7	6.7	4.0	5.3
105	Trinity	5.1	70.0	7.0	5.3	6.2

(Continued)

Table 3. Tall fescue turf trial, 2017 (continued).

	Cultivar or Selection	Turf Quality[1] 2018 Avg.	Green Cover[2] (%) Oct. 2018	Brown Patch[3] 3 Aug. 2018	Brown Patch[3] 20 Aug. 2018	Brown Patch[3] Aug. 2018 Avg.
106	Bizem	5.1	60.0	7.0	4.7	5.8
107	Temple	5.1	46.7	7.7	4.0	5.8
108	Foxhound	5.1	63.3	6.7	3.7	5.2
109	TF 422	5.0	65.0	6.0	4.3	5.2
110	TF 417	5.0	60.0	7.7	5.3	6.5
111	TF 403	5.0	58.3	7.3	4.7	6.0
112	NAI-ST5-R2	5.0	51.7	6.0	5.0	5.5
113	PPG-TF 203	5.0	66.7	6.3	4.3	5.3
114	Raptor III	5.0	66.7	7.7	4.7	6.2
115	Screamer LS	5.0	56.7	6.7	5.3	6.0
116	Houndog 8	5.0	58.3	6.0	5.0	5.5
117	TF 429	5.0	53.3	5.3	5.3	5.3
118	NAI-ST5-R10	5.0	61.7	5.3	4.7	5.0
119	Regenerate	4.9	60.0	7.0	5.0	6.0
120	Diablo	4.9	65.0	5.7	3.3	4.5
121	Renegade DT	4.9	58.3	5.3	5.7	5.5
122	Turfway	4.9	53.3	6.3	4.3	5.3
123	Rebounder	4.9	66.7	5.7	4.7	5.2
124	Crossfire 4	4.9	66.7	5.7	4.3	5.0
125	Fesnova	4.9	66.7	5.0	4.0	4.5
126	Meridian	4.9	60.0	6.3	4.0	5.2
127	Embrace	4.9	50.0	5.7	4.3	5.0
128	Falcon IV	4.8	56.7	6.3	5.0	5.7
129	Bullseye	4.8	60.0	5.7	4.7	5.2
130	Rhizing Moon	4.8	56.7	5.7	4.7	5.2
131	Terrano	4.8	66.7	7.3	4.7	6.0
132	Bandit	4.7	56.7	5.3	4.3	4.8
133	PSG PO1	4.7	55.0	5.3	3.3	4.3
134	TF 394	4.7	60.0	6.7	5.0	5.8
135	Rebel V	4.7	55.0	6.7	4.0	5.3
136	TF 308	4.7	50.0	6.3	4.3	5.3
137	NAI-ST5-R20	4.6	55.0	6.7	3.3	5.0
138	LTNS TF Blend 2	4.6	60.0	5.0	3.3	4.2
139	Black Tail	4.6	53.3	6.7	3.7	5.2
140	RAD-TF125	4.6	46.7	5.3	4.7	5.0

(Continued)

Table 3. Tall fescue turf trial, 2017 (continued).

	Cultivar or Selection	Turf Quality[1] 2018 Avg.	Green Cover[2] (%) Oct. 2018	Brown Patch[3] 3 Aug. 2018	Brown Patch[3] 20 Aug. 2018	Brown Patch[3] Aug. 2018 Avg.
141	Finelawn H2O	4.6	56.7	4.3	4.0	4.2
142	RAD-TF114	4.6	61.7	4.0	4.0	4.0
143	Nightcrawler	4.6	58.3	6.3	4.3	5.3
144	Firaces	4.6	66.7	5.7	4.0	4.8
145	RAD-TF110	4.6	55.0	5.0	4.0	4.5
146	Jamboree	4.5	63.3	6.0	4.0	5.0
147	TF 428	4.5	55.0	5.0	3.3	4.2
148	TF 419	4.5	56.7	4.0	4.0	4.0
149	NAI-ST5-R12	4.5	43.3	5.7	4.0	4.8
150	Amity	4.4	65.0	6.3	3.7	5.0
151	Bravo 2	4.4	41.7	3.7	3.7	3.7
152	TF 421	4.4	55.0	6.7	4.0	5.3
153	Firewall	4.4	56.7	6.3	3.3	4.8
154	Dynamite LS	4.4	51.7	5.0	3.3	4.2
155	NAI-ST5-R18	4.3	50.0	6.0	5.0	5.5
156	Catalyst	4.3	48.3	6.7	3.0	4.8
157	RAD-TF112	4.3	58.3	4.7	4.0	4.3
158	Guardian 41	4.3	61.7	5.3	3.0	4.2
159	Avenger II	4.3	46.7	7.3	4.3	5.8
160	Birmingham	4.3	66.7	4.3	2.7	3.5
161	Houndog 6	4.2	63.3	5.3	3.7	4.5
162	Fayette	4.2	51.7	5.3	4.3	4.8
163	Persuasion	4.2	50.0	5.0	4.0	4.5
164	Garrison	4.2	60.0	5.3	3.3	4.3
165	Shenandoah Elite	4.1	55.0	5.7	4.7	5.2
166	Falcon H2O	4.1	51.7	5.3	3.3	4.3
167	NAI-ST5-R16	4.1	51.7	4.3	4.0	4.2
168	Speedway	4.1	51.7	5.0	3.0	4.0
169	Mustang 4	4.0	51.7	6.3	4.3	5.3
170	Renegade H2O	4.0	58.3	4.3	3.0	3.7
171	Crossfire 3	4.0	55.0	4.3	2.7	3.5
172	Essential	3.9	48.3	5.3	3.0	4.2
173	Selkirk	3.9	40.0	6.0	3.3	4.7
174	Grande 3	3.8	56.7	6.0	3.7	4.8
175	GO-MNKY	3.8	58.3	5.0	3.7	4.3

(Continued)

Table 3. Tall fescue turf trial, 2017 (continued).

	Cultivar or Selection	Turf Quality[1] 2018 Avg.	Green Cover[2] (%) Oct. 2018 Avg.	Brown Patch[3] 3 Aug. 2018 Avg.	Brown Patch[3] 20 Aug. 2018 Avg.	Brown Patch[3] Aug. 2018 Avg.
176	Blackwatch 2	3.8	60.0	5.3	3.3	4.3
177	Cannavaro	3.8	30.0	4.7	4.0	4.3
178	Blade Runner II	3.8	48.3	5.0	3.0	4.0
179	Corona	3.8	50.0	3.3	3.0	3.2
180	SR 8650	3.7	60.0	4.3	2.7	3.5
181	GO-MT	3.6	53.3	4.0	3.3	3.7
182	Scorpion II	3.6	43.3	4.3	4.0	4.2
183	Green Hornet	3.6	61.7	5.7	4.0	4.8
184	Grande II	3.5	46.7	5.0	2.7	3.8
185	Thunderstruck	3.4	45.0	3.7	1.7	2.7
186	Rhizing Star	3.3	38.3	4.0	2.7	3.3
187	Cayenne	3.3	51.7	4.0	2.3	3.2
188	GO-FT	2.7	45.0	3.0	3.0	3.0
189	Crewcut II	2.1	33.3	3.3	1.3	2.3
190	GO-FNKY	2.0	40.0	2.3	2.3	2.3
	LSD at 5% =	0.8	13.4	1.8	1.6	1.4

[1] 9 = best turf quality
[2] 100 = highest percent green cover
[3] 9 = least disease

Table 4. Performance of tall fescue cultivars and selections in a turf trial established in September 2018 at Adelphia, NJ.

	Cultivar or Selection	Gray Leaf Spot[1] Oct. 2018	Turf Quality[2] Oct. 2018	Establishment[3] Oct. 2018
1	PW5	8.3	7.7	7.0
2	PW1	8.3	7.0	6.7
3	Copious	8.0	6.7	6.7
4	AH1	7.7	7.3	7.0
5	JS-DTT	7.7	7.3	7.0
6	PW6	7.7	7.3	6.3
7	RW2	7.7	7.0	7.0
8	Maestro	7.7	6.7	7.0
9	PPG-TF 307	7.7	6.7	6.3
10	RS1	7.7	6.7	6.0
11	PPG-TF KS	7.7	6.3	6.3
12	PW3	7.7	6.3	6.0
13	Nightcrawler	7.7	5.7	6.7
14	AH2	7.3	7.3	8.0
15	PPG-TF 304	7.3	7.0	6.3
16	TD2	7.3	7.0	7.0
17	GTO	7.3	6.7	7.3
18	Thor	7.3	6.7	6.7
19	Diablo	7.3	6.3	5.7
20	PST-5FOE	7.3	6.3	7.7
21	PW2	7.3	6.3	6.0
22	Unitus	7.3	6.3	5.7
23	PST-5T24	7.3	6.0	6.0
24	PW4	7.0	6.7	5.3
25	Grande 3	7.0	6.3	6.0
26	PPG-TF 310	7.0	6.3	6.3
27	RH FN-Syn	7.0	6.3	5.3
28	Black Tail	7.0	6.0	6.3
29	PPG-TF 266	7.0	6.0	6.0
30	PPG-TF 317	7.0	6.0	6.7
31	Technique	7.0	6.0	6.0
32	NSE	7.0	5.7	6.7
33	PPG-TF 321	7.0	5.7	7.3
34	PST-5MINI	7.0	5.7	5.3
35	RS4	7.0	5.0	6.0

(Continued)

Table 4. Tall fescue turf trial, 2018 (continued).

	Cultivar or Selection	Gray Leaf Spot[1] Oct. 2018	Turf Quality[2] Oct. 2018	Establishment[3] Oct. 2018
36	BSL	6.7	6.7	7.0
37	Paramount	6.7	6.3	6.7
38	Hot Rod	6.7	6.0	5.0
39	Padre II	6.7	6.0	6.3
40	PPG-TF 232	6.7	6.0	7.7
41	Trinity	6.7	6.0	5.3
42	Valkyrie LS	6.7	6.0	6.7
43	Witchita	6.7	6.0	6.0
44	Embrace	6.7	5.7	6.0
45	Foxhound	6.7	5.7	5.7
46	PPG-TF 319	6.7	5.7	6.7
47	Turfway	6.7	5.7	6.3
48	Dynamite LS	6.7	5.3	5.0
49	PPG-TF 303	6.7	5.3	6.7
50	RAD-TF123	6.7	5.3	5.0
51	ENS	6.3	6.0	4.7
52	GO-18-RH2O-BS	6.3	6.0	6.7
53	HWP	6.3	6.0	6.7
54	BAR FA 8223	6.3	5.7	6.7
55	Firecracker SLS	6.3	5.7	5.3
56	NAI-ST6-18	6.3	5.7	5.3
57	Regenerate	6.3	5.7	6.0
58	Trending	6.3	5.7	5.0
59	Michelangelo	6.3	5.3	6.0
60	NAI-404-18	6.3	5.3	6.0
61	Firaces	6.3	5.0	6.0
62	GO-18-AOMK-BS	6.3	5.0	4.7
63	PST-5ZIP	6.3	5.0	6.7
64	Reflection	6.3	5.0	6.0
65	Rising Moon	6.3	5.0	5.0
66	Supersonic	6.3	5.0	6.3
67	Thunderstruck	6.3	5.0	6.7
68	PPG-TF 235	6.0	6.3	6.3
69	PPG-TF 250	6.0	6.0	6.3
70	PPG-TF 295	6.0	5.7	6.7

(Continued)

Table 4. Tall fescue turf trial, 2018 (continued).

	Cultivar or Selection	Gray Leaf Spot[1] Oct. 2018	Turf Quality[2] Oct. 2018	Establishment[3] Oct. 2018
71	PPG-TF 322	6.0	5.7	5.3
72	RW1	6.0	5.7	7.0
73	PST-5ZRX	6.0	5.3	5.3
74	Standout	6.0	5.3	5.3
75	MET-3	6.0	5.0	6.0
76	Renegade DT	6.0	5.0	5.7
77	Rockwell	6.0	5.0	5.3
78	4th Millennium	6.0	4.7	5.7
79	Firewall	6.0	4.7	6.3
80	Bullseye LTZ	5.7	5.7	6.7
81	Xtender	5.7	5.7	6.3
82	Bullseye	5.7	5.3	6.3
83	Temple	5.7	5.3	6.0
84	Crossfire 3	5.7	5.0	7.0
85	Titanium 2LS	5.7	5.0	6.0
86	Avenger II	5.7	4.7	6.3
87	Bravo 2	5.7	4.7	5.0
88	Fayette	5.7	4.7	5.3
89	Bloodhound	5.7	4.3	5.3
90	Spyder LS	5.7	4.3	5.3
91	Meridian	5.3	5.3	6.0
92	Crossfire 4	5.3	5.0	6.7
93	Fesnova	5.3	4.7	7.3
94	LNSTF1	5.3	4.7	5.3
95	RDC	5.3	4.7	6.3
96	Rowdy	5.3	4.7	6.7
97	Annapolis	5.3	4.3	6.7
98	Bizem	5.3	4.3	6.3
99	Screamer LS	5.3	4.3	6.0
100	PST-5LSS	5.0	5.0	6.7
101	RAD-TF90R	5.0	5.0	5.3
102	Terrano	5.0	4.7	6.3
103	RAD-TF99	4.7	5.3	5.7
104	BAR FA 8268	4.7	5.0	6.7
105	Traverse 2	4.7	4.7	6.0

(Continued)

Table 4. Tall fescue turf trial, 2018 (continued).

	Cultivar or Selection	Gray Leaf Spot[1] Oct. 2018	Turf Quality[2] Oct. 2018	Establishment[3] Oct. 2018
106	Birmingham	4.7	4.3	7.0
107	Finelawn H2O	4.7	4.3	5.7
108	Raptor III	4.7	4.3	5.7
109	Rebounder	4.7	4.3	5.3
110	Falcon IV	4.7	4.0	6.3
111	NAI-TF18-FWN12	4.7	4.0	5.0
112	Tribute II	4.7	3.7	6.7
113	Memphis	4.3	5.0	6.0
114	Merida	4.3	5.0	5.7
115	Mustang 4	4.3	4.3	5.0
116	BAR FA 8269	4.3	4.0	4.3
117	Palomar	4.3	4.0	6.0
118	SR 8650	4.3	4.0	5.7
119	Persuasion	4.3	3.7	4.3
120	RAD-TF112R	4.3	3.7	5.3
121	RAD-TF113	4.3	3.7	5.0
122	Blade Runner II	4.0	3.7	6.3
123	Leonardo	4.0	3.7	5.7
124	Escalante	4.0	3.3	5.0
125	Talladega	4.0	3.3	5.7
126	GO-18-FNKY	3.7	4.7	4.7
127	ORTF-16-1	3.7	1.7	5.3
128	RAD-TF103	3.3	3.7	4.7
129	06-WALK	3.3	3.0	6.7
130	Escalade	3.0	3.0	6.0
	LSD at 5%=	1.4	1.4	1.5

[1]9 = least disease
[2]9 = best turf quality
[1]9 = fastest establishment

Table 5. Performance of tall fescue cultivars and selections in a turf trial established in September 2018 at Adelphia, NJ. Includes all entries in the 2018 National Turfgrass Evaluation Program Test (NTEP).

	Cultivar or Selection	Gray Leaf Spot[1] Oct. 2018	Turf Quality[2] Oct. 2018	Green Cover[3] (%) 2018 Avg.	Green Cover[3] (%) Sept. 2018	Green Cover[3] (%) Oct. 2018
1	JS-DTT	7.3	7.7	75.8	60.0	91.7
2	DLFPS-321/3699	7.3	7.3	70.8	53.3	88.3
3	BAR 9FE MAS	7.3	6.7	67.5	53.3	81.7
4	AH2	7.3	6.7	78.3	65.0	91.7
5	PST-5DART	7.0	6.3	70.0	56.7	83.3
6	COL-TF-148	7.0	6.0	63.3	43.3	83.3
7	AH1	7.0	6.0	70.0	60.0	80.0
8	PPG-TF-255	7.0	6.0	65.0	45.0	85.0
9	Grande 3	6.7	6.3	69.2	50.0	88.3
10	LTP-TF-111	6.7	6.3	58.3	41.7	75.0
11	PST-5THM	6.7	6.0	63.3	55.0	71.7
12	PPG-TF-323	6.7	6.0	64.2	45.0	83.3
13	PPG-TF-315	6.7	5.7	63.3	45.0	81.7
14	Dragster	6.7	5.7	60.0	46.7	73.3
15	TMT1	6.3	6.7	76.7	63.3	90.0
16	DLFPS-321/3696	6.3	6.7	70.8	58.3	83.3
17	NAI-3N2	6.3	6.0	69.2	61.7	76.7
18	DLFPS-321/3693	6.3	5.7	74.2	61.7	86.7
19	PST-5MCMO	6.3	5.7	61.7	50.0	73.3
20	BAR-TF-134	6.3	5.7	69.2	55.0	83.3
21	PPG-TF-254	6.3	5.7	70.0	55.0	85.0
22	LTP-TF-122	6.3	5.3	52.5	31.7	73.3
23	PST-5TRN	6.3	5.3	60.8	46.7	75.0
24	PPG-TF 244	6.3	5.3	62.5	50.0	75.0
25	PPG-TF-338	6.3	5.0	67.5	48.3	86.7
26	JT 233	6.0	5.7	62.5	46.7	78.3
27	AST8218LM	6.0	5.7	59.2	48.3	70.0
28	PPG-TF-308	6.0	5.3	68.3	58.3	78.3
29	NAI-TUE	6.0	5.3	65.0	56.7	73.3
30	Copious TF	6.0	5.0	67.5	56.7	78.3
31	PPG-TF-306	6.0	5.0	60.0	43.3	76.7
32	NAI-ST5	6.0	5.0	59.2	46.7	71.7
33	Moondance	6.0	4.7	67.5	55.0	80.0
34	K18-RS6	6.0	4.7	65.8	53.3	78.3
35	DLFPS-321/3708	6.0	4.3	60.0	46.7	73.3

(Continued)

Table 5. Tall fescue turf trial, 2018 (NTEP) (continued).

	Cultivar or Selection	Gray Leaf Spot[1] Oct. 2018	Turf Quality[2] Oct. 2018	Green Cover[3] (%) 2018 Avg.	Green Cover[3] (%) Sept. 2018	Green Cover[3] (%) Oct. 2018
36	TD2	5.7	6.0	60.8	46.7	75.0
37	AST8118LM	5.7	5.7	67.5	55.0	80.0
38	RDC	5.7	5.3	70.8	61.7	80.0
39	DLFPS-321/3707	5.7	5.3	57.5	41.7	73.3
40	PPG-TF-257	5.7	5.3	61.7	50.0	73.3
41	Bullseye LTZ	5.7	5.3	62.5	48.3	76.7
42	RHF	5.7	5.3	66.7	50.0	83.3
43	DLFPS-TF/3552	5.7	5.0	61.7	45.0	78.3
44	ProGold	5.7	5.0	66.7	56.7	76.7
45	DLFPS-321/3705	5.7	5.0	66.7	51.7	81.7
46	PPG-TF 316	5.7	5.0	60.0	45.0	75.0
47	A-TF31	5.7	5.0	65.8	60.0	71.7
48	TF445	5.7	5.0	62.5	51.7	73.3
49	PST-5GLBS	5.7	4.7	58.3	41.7	75.0
50	RH1	5.7	4.7	58.3	43.3	73.3
51	JT 268	5.7	4.7	59.2	43.3	75.0
52	DLFPS-321/3695	5.3	5.3	65.0	53.3	76.7
53	RS1	5.3	5.3	65.0	51.7	78.3
54	TF456	5.3	5.3	65.8	50.0	81.7
55	5LSS	5.3	5.0	66.7	53.3	80.0
56	DLFPS-TF/3550	5.3	4.7	59.2	40.0	78.3
57	PST-5MINK	5.3	4.7	65.0	53.3	76.7
58	PPG-TF-249	5.3	4.7	69.2	61.7	76.7
59	PPG-TF-313	5.3	4.7	61.7	46.7	76.7
60	K18-NSE	5.3	4.3	55.8	40.0	71.7
61	PST-5BYOB	5.3	4.3	64.2	56.7	71.7
62	BAR-FA8230	5.3	4.3	60.8	55.0	66.7
63	PPG-TF-337	5.3	4.3	60.8	46.7	75.0
64	ZRC1	5.0	5.0	69.2	51.7	86.7
65	ATF 1768	5.0	4.7	61.7	50.0	73.3
66	NAI-ROS4	5.0	4.7	59.2	48.3	70.0
67	SE53D2	5.0	4.7	57.5	46.7	68.3
68	DLFPS-TF/3553	5.0	4.3	60.0	43.3	76.7
69	BY-TF-169	5.0	4.3	53.3	36.7	70.0
70	Lifeguard	5.0	4.3	63.3	56.7	70.0

(Continued)

Table 5. Tall fescue turf trial, 2018 (NTEP) (continued).

	Cultivar or Selection	Gray Leaf Spot[1] Oct. 2018	Turf Quality[2] Oct. 2018	Green Cover[3] (%) 2018 Avg.	Green Cover[3] (%) Sept. 2018	Green Cover[3] (%) Oct. 2018
71	PST-5SQB	5.0	4.3	61.7	51.7	71.7
72	RH3	5.0	4.3	60.0	48.3	71.7
73	Genius	5.0	4.3	59.2	43.3	75.0
74	PPG-TF-336	5.0	4.3	65.0	60.0	70.0
75	Burmingham	5.0	4.3	59.2	50.0	68.3
76	GO-AOMK	5.0	4.3	48.3	33.3	63.3
77	PPG-TF-320	5.0	4.3	59.2	48.3	70.0
78	PPG-TF-238	5.0	4.0	58.3	48.3	68.3
79	PPG-TF-312	5.0	4.0	55.8	40.0	71.7
80	PPG-TF-318	5.0	4.0	62.5	50.0	75.0
81	GO-RH20	5.0	4.0	58.3	45.0	71.7
82	3N1	4.7	4.3	57.5	43.3	71.7
83	DLFPS-321/3701	4.7	4.0	55.8	43.3	68.3
84	PPG-TF-231	4.7	4.0	62.5	51.7	73.3
85	SE5STAR	4.7	4.0	54.2	38.3	70.0
86	SETFM3	4.7	4.0	52.5	41.7	63.3
87	Honeymoon	4.7	4.0	55.8	46.7	65.0
88	Paramount	4.7	3.7	64.2	56.7	71.7
89	PST-5DC24	4.7	3.7	51.7	41.7	61.7
90	PST-5GQ	4.7	3.3	55.8	41.7	70.0
91	DLFPS-321/3679	4.3	4.3	58.3	45.0	71.7
92	K18-ROE	4.3	4.3	56.7	51.7	61.7
93	PST-5E6	4.3	4.3	51.7	38.3	65.0
94	Bullseye	4.3	4.3	53.3	38.3	68.3
95	DLFPS-321/3703	4.3	4.0	51.7	41.7	61.7
96	PPG-TF-267	4.3	4.0	56.7	45.0	68.3
97	DLFPS-321/3706	4.3	3.7	49.2	36.7	61.7
98	K18-WB1	4.3	3.7	52.5	43.3	61.7
99	3B2	4.3	3.7	55.0	43.3	66.7
100	Raptor III	4.3	3.7	58.3	50.0	66.7
101	Palomar	4.3	3.7	66.7	58.3	75.0
102	PPG-TF 305	4.3	3.3	60.0	55.0	65.0
103	BGR-TF3	4.0	4.0	60.0	51.7	68.3
104	Fayette	4.0	4.0	54.2	43.3	65.0
105	Padre 2	4.0	4.0	62.5	55.0	70.0

(Continued)

Table 5. Tall fescue turf trial, 2018 (NTEP) (continued).

	Cultivar or Selection	Gray Leaf Spot[1] Oct. 2018	Turf Quality[2] Oct. 2018	Green Cover[3] (%) 2018 Avg.	Green Cover[3] (%) Sept. 2018	Green Cover[3] (%) Oct. 2018
106	Hemi	4.0	4.0	55.8	40.0	71.7
107	DLFPS-321/3694	4.0	3.7	65.8	55.0	76.7
108	Tango	4.0	3.7	52.5	46.7	58.3
109	DLFPS-321/3702	4.0	3.3	49.2	40.0	58.3
110	Bandit	4.0	3.3	59.2	46.7	71.7
111	RAD-TF105	4.0	3.3	50.0	40.0	60.0
112	SESCR1	4.0	3.0	46.7	36.7	56.7
113	SETFM2	4.0	3.0	50.8	41.7	60.0
114	LBF	3.7	3.7	55.8	48.3	63.3
115	NT-3	3.7	3.3	53.3	45.0	61.7
116	PPG-TF-262	3.7	3.3	50.8	40.0	61.7
117	ATF 2116	3.7	3.0	50.0	40.0	60.0
118	Bravo 2	3.7	3.0	58.3	50.0	66.7
119	NAI-FQZ-17	3.7	3.0	56.7	45.0	68.3
120	OG-WALK	3.7	3.0	55.0	48.3	61.7
121	PST-5DZM	3.7	2.7	46.7	31.7	61.7
122	JT-517	3.3	3.3	51.7	36.7	66.7
123	Firehawk SLT	3.3	3.3	49.2	38.3	60.0
124	SETF104	3.0	3.0	48.3	38.3	58.3
125	Naturally Green	3.0	2.7	65.8	61.7	70.0
126	FC15-01P	3.0	2.7	50.8	38.3	63.3
127	Escalade	3.0	2.3	54.2	46.7	61.7
128	Turbo SS	3.0	2.0	52.5	45.0	60.0
129	BAR FA 8228	2.7	1.7	50.8	41.7	60.0
130	Estrena	2.3	2.0	51.7	48.3	55.0
131	RAD-TF0.0	2.0	1.7	44.2	36.7	51.7
132	Kentucky-31	2.0	1.0	57.5	56.7	58.3
	LSD at 5% =	1.4	1.5	12.3	13.8	14.2

[1] 9 = least disease
[2] 9 = best turf quality
[3] 100 = highest percent green cover

Table 6. Yearly nitrogen (N) applied and mowing height (Ht) on tall fescue tests established at Adelphia, NJ.

	2016		2017		2018	
	Ht[2]	N[1]	Ht	N	Ht	NHt
Table 1 (2015)	2.90	1.5	3.75	1.5	2.25	1.5
Table 2 (2016)			3.50	1.5	3.50	1.5
Table 3 (2017)					4.50	1.5

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