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The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. Through this forum, these professionals also reach a more general audience, which includes the public.

This proceedings 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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TALL FESCUE PERFORMANCE AT RUTGERS HORT. FARM NO. 2 DURING 2020

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INTRODUCTION

Tall fescue (*Schedonorus arundinaceus* [Schreb.] Dumort. syn. *Festuca arundinacea* Schreb. syn. *Lolium arundinaceum* [Schreb.] Darbysh.) is frequently established on sports fields and other recreational surfaces in New Jersey due to its wear tolerance and adaptation to Mid-Atlantic climatic conditions (Beard, 1973). The evaluation of tall fescue traffic tolerance continues to be a research priority at Rutgers Center for Turfgrass Science.

The Rutgers Wear Simulator (RWS; Bonos et al., 2001) and Cady Traffic Simulator (CTS; Henderson et al., 2005) are used to impart traffic stresses on turf plots at Rutgers Hort. Farm No. 2. The traffic tolerance of entries comprising the 2012 National Turfgrass Evaluation Program (NTEP) Tall Fescue test were assessed using a combination of the CTS and RWS; results were reported in previous Rutgers Turfgrass Proceedings (Park et al., 2014, 2015, 2016, 2018).

The 2018 NTEP Tall Fescue test was seeded at Rutgers Hort. Farm No. 2 in September 2018. The response of these entries to autumn 2019 traffic as well as the performance of these entries in the absence of traffic was recently described by Park and Murphy (2020). The objective of this report is to summarize the performance of cultivars and experimental selections in the 2018 NTEP Tall Fescue Test subjected to summer traffic during 2020.

MATERIALS AND METHODS

Evaluation Trial

The 132 entries of the 2018 Tall Fescue Trial were seeded at 6.0 lb seed per 1000 ft^2 into 5 x 6-ft plots on a well-drained loam (sand=44%; silt=31%; clay=25%) at Rutgers Hort. Farm No. 2 in North Brunswick, NJ on 21 September 2018.

Soil samples were extracted from two depths in June 2020: 0 to 1.0-inch (including organic matter); and 1.0 to 6.7-inch. Soil test results from 0.0 to 1.0-inch indicated that the soil pH was 5.2; soil phosphorous (P) and potassium (K) were 107 and 644 lb per acre (Mehlich 3), respectively. The soil pH was 5.5 at the 1.0 to 6.7-inch depth; soil P and K were 110 and 344 lb per acre, respectively.

A total of 2.9 lb N per 1000 ft^2 was applied during 2020 (0.6, 0.5, 0.6, 0.5 and 0.7 lb N per 1000 ft^2 on 16 March, 23 April, 12 May, 15 June, and 6 September 2020, respectively). Calcitic lime (79 lb per 1000 ft^2) was applied to the test area during autumn 2020 based on soil test results.

The test was mowed approximately two times per week at a height of 1.5-inch. Evapotranspiration data were used to guide irrigation system programming with the primary goal to avoid excessive wetness or tall fescue developing severe drought stress symptoms.

Weed, disease, and insect pests were controlled during 2020 to improve assessment of tall fescue entry responses to traffic. Herbicides were applied for postemergence suppression of annual bluegrass (*Poa annua* L.) during autumn 2019 (ethofumesate) and spring 2020 (amicarbazone + mesotrione). Preemergence control of crabgrass (*Digitaria* spp.) and preventative control of white grubs (*Phyllophaga* spp.) were achieved using dithiopyr and chlorantraniliprole, respectively. Turfgrass diseases including brown patch (caused by *Rhizoctonia solani*), gray leaf spot (caused by *Pyricularia grisea*), dollar spot (caused by *Clarireedia jacksonii*) and *Pythium* spp. were controlled preventatively by rotating fungicide active ingredients: fluazinam, cyazofomid, penthiopyrad, azoxystrobin+propiconazole, thiophanate-methyl, and chlorothalonil.

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Application of Wear and Traffic Stresses

Traffic was initiated during autumn 2019 and was applied to this test as a strip-plot across approximately ½ of each tall fescue plot (Park and Murphy, 2020). The other approximate ½ of each plot did not receive traffic (no traffic). Summer 2020 traffic consisted of 36 traffic passes using a combination of the RWS (18 passes) and CTS (18 passes) from 6 July to 20 August 2020. Machine passes during summer 2020 were made across the same strip-plot in which passes were made during autumn 2019. The RWS was operated at ground speed of 2.5 miles per hour (mph) and 250 rpm for the paddles. The CTS was operated at a speed of 1.0 mph in the forward direction. Every other pass of each machine was made in the opposite direction.

Evaluation of the Effects of Traffic

Tall fescue entries within traffic and no traffic strip-plots were visually assessed for uniformity of turf cover (1 to 9 scale; 9=most complete turf cover) and fullness of turfgrass canopy (0 to 100% scale; 100% = full canopy) after summer 2020 traffic. Images of tall fescues within traffic and no traffic strip-plots were captured using a digital camera (Canon PowerShot G12; Canon USA, Inc., Lake Success, NY) positioned in an enclosed box equipped with artificial lighting. Individual digital image size was 1600 x 1200 pixels and camera settings included a shutter speed of 1/40 s, and aperture of F2.8, and ISO of 100 and a focal length of 7 mm.

Images were imported into SigmaScan Pro (v. 5.0, SPSS, Inc., Chicago, IL) to determine green cover (0 to 100% scale; 100%=complete green cover). A hue range of 50 to 107 and a saturation range of 0 to 100 were used in the software to identify green leaves in the images.

Annual bluegrass encroachment into tall fescue with traffic and no traffic strip-plots was visually evaluated on 28 October 2020; a 0 to 100% scale was used where 100% equaled complete annual bluegrass cover.

These data were analyzed using a 2 × 132 factorial of traffic and tall fescue entries arranged in a strip-plot design with three replications. Horizontal strip-plots were the level of traffic (no traffic and traffic). Vertical strip-plots were the 132 tall fescue entries. Data were subjected to analysis of variance and means were separated using the Fisher's protected least significant difference (LSD) test at $p \leq 0.05$.

Evaluation of Tall Fescue in the Absence of Traffic

The no traffic strip across each tall fescue plot was visually assessed for spring green-up on 30 March 2020 and turfgrass quality each month from April through October 2020. A 1 to 9 rating was utilized for both parameters where 9 equaled the best spring green-up and turfgrass quality.

Analysis of variance was performed on these data as a single factor randomized complete block design with three replications. Means were separated using Fisher's protected least significant difference (LSD) test at $p \leq 0.05$.

RESULTS

Generally, traffic reduced the uniformity of turf cover, fullness of turfgrass canopy (FTC), and green cover of tall fescue during summer 2020 (Table 1). Additionally, there was greater annual bluegrass cover in traffic strip-plots compared to the no traffic strip-plots on 28 October 2020. There were no green cover differences among tall fescue entries regardless of the traffic level. There were differences among tall fescue entries for uniformity of turf cover, FTC, annual bluegrass cover. The FTC response among tall fescue entries depended on the level of traffic.

Nearly one-half of the tall fescue cultivars and experimental selections in the test (61 entries) had the best uniformity of turf cover across both traffic levels; 62 entries had the poorest uniformity of turf cover (Table 2).

All entries had lower FTC when trafficked compared to no traffic (Table 2). Entries with the greatest FTC after summer traffic were GLX ACED (PST-5DART), Degas (LTP-TF-111), RH3, PPG-TF-306, TF456, DLFPS-321/3699, Moondance, PPG-TF-231, PPG-TF-318, Paramount, TD2, DLFPS-321/3696, K18-RS6, Grande 3, PST-5DC24, PPG-TF-313, JT 233, AST8118LM, PST-5GLBS, PPG-TF-267, O'Keefe (OLTP-TF-122), TF445, Firehawk SLT, ZRC1, PPG-TF-338, K18-ROE, PST-5BYOB, 3B2, Hemi, Raptor III, 3N1, DLFPS-321/3707, and NAI-ROS4. Fifty-four (54) entries had the lowest FTC after traffic; entries with exceptionally low FTC after traffic (< 30%) were NAI-FQZ-17, AH1, GO-AOMK, SE5STAR, NAI-ST5, ATF 1768, BAR-FA8230, RAD-TF 115 (Turbo SS), and SETFM2.

Eighty-two (82) entries had the least annual bluegrass cover on 28 October 2020; BAR 9FE MAS and Kentucky-31 had the greatest annual bluegrass cover (Table 2). Other entries with 30% or more annual bluegrass cover were JT-517, Tango, PST-5DZM, BAR-FA8230, NAI-FQZ-17, NAI-TUE, and OG-WALK.

Performance of Tall Fescue Without Traffic

Forty-three (43) cultivars and experimental selections had the best average turf quality during 2020; Kentucky-31 and OG-WALK had the poorest average turf quality during 2020 (Table 3). Other entries with poor average turf quality (< 4.0) during 2020 were PST-5MINK, PST-5THM, Bandit, Grand Prix (FC15-01P), ATF 1768, AST8218LM, RAD-TF 115 (Turbo SS), Escalade, Naturally Green, BAR-FA8230, Palomar, BAR 9FE MAS, and BAR FA 8228.

Twenty-four (24) entries had the best average turf quality during 2019-2020; seventy-four entries maintained acceptable or better (≥ 6.0) average turf quality during 2019-2020 (Table 3). Fifteen (15) cultivars and experimental selections exhibited poor average turf quality (< 4.0) during 2019-2020; Kentucky 31 had the poorest average turf quality during these two seasons.

Twenty-six (26) entries exhibited the best spring green-up on 30 March 2020 (Table 3). Twenty-three (23) entries exhibited poor spring green-up (< 4.0); entries with the poorest spring green-up were DLFPS-321/3696, RAD-TF0.0, Copious TF, JT 233, Bonfire (JS-DTT), DLFPS-321/3708, Tango, NAI-TUE, PST-5DC24, GO-AOMK, NAI-FQZ-17, RAD-TF 115 (Turbo SS), and PST-5MINK.

DISCUSSION

The 132 cultivars and experimental selections that comprise this trial represent a wide breadth of tall fescue germplasm and breeding efforts; average turf quality means during 2019 through 2020 were 1.0 to 8.3. National Turfgrass Evaluation Program results at Rutgers University and other NTEP university partners are particularly beneficial for seed company personnel charged with making decisions on whether to commercialize experimental selections.

Sports field managers, golf course superintendents, landscapers, sod producers and other turfgrass practitioners can use NTEP results to make data-based cultivar decisions for the facilities they manage. Results also provide university extension and outreach personnel a means to deliver non-biased recommendations to end users in the form of presentations, reports, and fact sheets.

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Table 1. Uniformity of cover, fullness of turf canopy, and green cover as affected by traffic and tall fescue entry during summer 2020.

	25 Aug. 2020			
	Uniformity of Turf Cover[1]	Fullness of Turfgrass Canopy[2]	Green Cover[3]	Annual bluegrass[4] 28 Oct. 2020
	---1 to 9 Scale---	----------0 to 100% Scale----------		
Level of Traffic[5]				
No Traffic	8.9	97	84	11
Traffic	4.1	43	48	28
Source of Variation				
Traffic	*	**	*	***
Entry	**	***	NS	***
Traffic x Entry	NS	*	NS	NS
CV (%)	15.8	14	12.9	31.9

[1]9 = most complete turf cover
[2]100% = full canopy
[3]100% = complete green cover; measured by digital image analysis
[4]100% = complete annual bluegrass cover
[5]Thirty-six traffic passes were made using a combination of the Rutgers Wear Simulator (18 passes) and Cady Traffic Simulator (18 passes) during 6 July to 20 August 2020
NS,*,**,*** Nonsignificant and significant at the 0.05, 0.01 and 0.001 probability level

Table 2. Uniformity of turf cover and annual bluegrass cover as affected by tall fescue entry and fullness of turfgrass canopy as affected by the interaction of tall fescue entry and traffic during summer 2020. (Includes all entries of the 2018 National Turfgrass Evaluation Program (NTEP) Tall Fescue Test.)

	Tall fescue entry	Uniformity of Turf Cover[1]	Fullness of Turfgrass Canopy[2]		Annual bluegrass[3]
			No Traffic	Traffic[4]	28 Oct. 2020
		1 to 9 Scale	0 to 100% Scale		
1	GLX ACED (PST-5DART)	8.0	95	67	10
2	RH3	7.7	98	65	10
3	Degas (LTP-TF-111)	7.7	98	65	19
4	PPG-TF-306	7.3	100	62	13
5	TF456	7.2	98	62	19
6	DLFPS-321/3699	7.5	100	60	21
7	Moondance	7.3	98	60	23
8	PPG-TF-231	7.0	100	60	17
9	PPG-TF-318	7.0	100	60	18
10	Paramount	7.2	100	58	17
11	K18-RS6	7.3	100	57	10
12	TD2	7.3	100	57	14
13	DLFPS-321/3696	7.3	97	57	14
14	Grande 3	7.2	98	57	23
15	PST-5DC24	6.7	95	55	19
16	PPG-TF-313	7.5	98	53	21
17	JT 233	7.3	100	53	14
18	AST8118LM	7.3	92	53	17
19	PST-5GLBS	6.8	93	53	23
20	PPG-TF-267	6.7	100	53	7
21	O'Keefe (OLTP-TF-122)	7.0	100	52	16
22	TF445	7.0	100	52	18
23	Firehawk SLT	6.7	100	52	28
24	PPG-TF-338	7.2	100	50	13
25	ZRC1	7.2	100	50	18
26	K18-ROE	7.0	97	50	18
27	PST-5BYOB	7.0	93	50	18
28	3B2	7.0	98	50	19
29	Raptor III	6.8	100	50	20
30	Hemi	6.8	95	50	21

(Continued)

Table 2. Uniformity of turf cover and annual bluegrass cover as affected by tall fescue entry and fullness of turfgrass canopy as affected by the interaction of tall fescue entry and traffic during summer 2020. (Includes all entries of the 2018 National Turfgrass Evaluation Program (NTEP) Tall Fescue Test.)

	Tall fescue entry	Uniformity of Turf Cover[1]	Fullness of Turfgrass Canopy[2]		Annual bluegrass[3]
			No Traffic	Traffic[4]	28 Oct. 2020
		1 to 9 Scale	0 to 100% Scale		
31	3N1	6.7	97	50	12
32	DLFPS-321/3707	6.7	100	50	18
33	NAI-ROS4	6.7	100	50	19
34	PPG-TF-336	7.0	100	48	18
35	GO-RH20	6.8	100	48	11
36	Estrena	6.8	100	48	16
37	Fayette	6.7	100	48	14
38	PST-5TRN	6.3	93	48	16
39	RDC	6.7	100	47	13
40	PPG-TF-249	6.7	98	47	13
41	PPG-TF-255	6.7	97	47	14
42	RHL2	6.7	97	47	18
43	K18-NSE	6.7	97	47	22
44	Bonfire (JS-DTT)	6.5	98	47	19
45	PST-5DZM	6.5	95	47	31
46	PPG-TF-315	6.8	97	45	18
47	PST-5GQ	6.8	95	45	19
48	DLFPS-321/3708	6.8	100	45	22
49	PPG-TF-312	6.8	98	45	25
50	PPG-TF-308	6.7	98	45	14
51	PST-5THM	6.7	92	45	16
52	Bullseye	6.7	98	45	18
53	PPG-TF-323	6.7	98	45	18
54	DLFPS-321/3702	6.5	98	45	13
55	ProGold	6.5	97	45	14
56	RS1	6.5	98	45	22
57	JT-517	6.3	98	45	30
58	Padre 2	6.7	97	43	17
59	TMT1	6.7	100	43	18
60	BY-TF-169	6.7	100	43	25

(Continued)

Table 2. Uniformity of turf cover and annual bluegrass cover as affected by tall fescue entry and fullness of turfgrass canopy as affected by the interaction of tall fescue entry and traffic during summer 2020. (Includes all entries of the 2018 National Turfgrass Evaluation Program (NTEP) Tall Fescue Test.)

	Tall fescue entry	Uniformity of Turf Cover[1]	Fullness of Turfgrass Canopy[2]		Annual bluegrass[3]
			No Traffic	Traffic[4]	28 Oct. 2020
		1 to 9 Scale	0 to 100% Scale		
61	Tango	6.7	98	43	30
62	Monument (PST-5SQB)	6.3	92	43	13
63	Bullseye LTZ	6.3	100	43	16
64	Palomar	5.8	90	43	28
65	COL-TF-148	7.0	98	42	15
66	DLFPS-321/3705	6.7	97	42	20
67	AH2	6.5	100	42	20
68	RH1	6.3	98	42	13
69	DLFPS-321/3693	6.3	100	42	14
70	DLFPS-321/3695	6.2	98	42	18
71	Escalade	6.0	90	42	29
72	DLFPS-321/3703	6.8	98	40	13
73	PST-5MCMO	6.7	95	40	25
74	DLFPS-TF/3552	6.5	100	40	13
75	DLFPS-321/3679	6.3	97	40	18
76	DLFPS-321/3706	6.3	98	40	29
77	Grand Prix (FC15-01P)	6.2	93	40	23
78	AST8218LM	6.0	90	40	23
79	PPG-TF-320	6.5	100	38	15
80	PPG-TF 305	6.5	100	38	27
81	PPG-TF-337	6.3	100	38	17
82	PPG-TF 316	6.3	98	38	18
83	Lifeguard	6.2	97	38	16
84	K18-WB1	6.2	98	38	17
85	Bravo 2	6.2	97	38	21
86	ATF2116	6.2	90	38	25
87	RAD-TF0.0	6.0	95	38	24
88	Copious TF	6.0	97	38	28
89	Dragster	6.8	100	37	28
90	PPG-TF 244	6.7	98	37	11

(Continued)

Table 2. Uniformity of turf cover and annual bluegrass cover as affected by tall fescue entry and fullness of turfgrass canopy as affected by the interaction of tall fescue entry and traffic during summer 2020. (Includes all entries of the 2018 National Turfgrass Evaluation Program (NTEP) Tall Fescue Test.)

	Tall fescue entry	Uniformity of Turf Cover[1]	Fullness of Turfgrass Canopy[2]		Annual bluegrass[3]
			No Traffic	Traffic[4]	28 Oct. 2020
		1 to 9 Scale	0 to 100% Scale		
91	SE5302	6.7	95	37	25
92	PST-5MINK	6.3	92	37	24
93	A-TF31	6.3	95	37	24
94	BAR-TF-134	6.3	98	37	28
95	LBF	6.2	95	37	23
96	NAI-TUE	6.2	97	37	34
97	BGR-TF3	6.0	92	37	18
98	BAR FA 8228	5.8	88	37	21
99	NAI-3N2	6.3	98	35	17
100	PPG-TF-257	6.2	100	35	16
101	PPG-TF-254	6.2	97	35	18
102	PST-5E6	6.2	98	35	23
103	SETF104	6.0	95	35	15
104	PPG-TF-238	6.0	98	35	17
105	Burmingham	6.0	97	35	19
106	Bandit	5.8	93	35	24
107	DLFPS-TF/3553	6.2	98	33	16
108	NT-3	6.2	98	33	17
109	SE5CR1	6.2	97	33	24
110	Naturally Green	5.8	93	33	18
111	OG-WALK	5.2	90	33	35
112	RC4	6.2	100	32	18
113	5LSS	6.0	100	32	12
114	DLFPS-321/3701	6.0	100	32	14
115	PPG-TF-262	6.0	100	32	19
116	DLFPS-321/3694	6.0	100	32	20
117	DLFPS-TF/3550	5.8	98	32	8
118	RHF	5.8	98	32	20
119	SETFM3	5.7	95	32	23
120	BAR 9FE MAS	6.0	90	30	41

(Continued)

Table 2. Uniformity of turf cover and annual bluegrass cover as affected by tall fescue entry and fullness of turfgrass canopy as affected by the interaction of tall fescue entry and traffic during summer 2020. (Includes all entries of the 2018 National Turfgrass Evaluation Program (NTEP) Tall Fescue Test.)

	Tall fescue entry	Uniformity of Turf Cover[1]	Fullness of Turfgrass Canopy[2]		Annual bluegrass[3]
			No Traffic	Traffic[4]	28 Oct. 2020
		1 to 9 Scale	0 to 100% Scale		
121	JT 268	5.8	100	30	18
122	RAD--TF105	5.7	95	30	23
123	Kentucky-31	5.0	77	30	50
124	NAI-FQZ-17	6.0	97	28	33
125	AH1	5.7	100	28	18
126	SE5STAR	5.7	95	28	23
127	GO-AOMK	5.7	95	28	23
128	NAI-ST5	5.8	98	27	28
129	ATF 1768	5.3	92	27	21
130	BAR-FA8230	5.2	88	27	32
131	RAD-TF 115 (Turbo SS)	5.5	92	23	27
132	SETFM2	5.2	90	22	22
	LSD (columns; down) at 5% =	1.3	17		13
	LSD (rows; across) at 5% =	n/a	23		n/a

[1]9 = most complete turf cover

[2]100% = full canopy

[3]100% = complete annual bluegrass cover

[4]Thirty-six traffic passes were made using a combination of the Rutgers Wear Simulator (18 passes) and Cady Traffic Simulator (18 passes) during 6 July to 20 August 2020.

Table 3. Performance of tall fescue entries without traffic in a turf trial seeded in September 2018 at North Brunswick, NJ (Includes all entries of the 2018 National Turfgrass Evaluation Program (NTEP) Tall Fescue Test.)

		Turfgrass Quality[1]			Spring
	Tall fescue entry	2019-2020 Avg.	2019 Avg.	2020 Avg.	Green-up[2] 30 Mar. 2020
1	K18-RS6	8.1	8.3	7.9	6.7
2	JT 268	7.9	8.0	7.9	5.3
3	PPG-TF-313	7.6	7.3	7.9	6.7
4	PPG-TF-238	7.6	7.5	7.7	6.0
5	TD2	7.5	7.3	7.6	7.0
6	K18-NSE	7.3	7.1	7.5	7.0
7	ZRC1	7.3	7.1	7.5	6.3
8	PPG-TF-338	7.3	7.1	7.4	5.0
9	K18-WB1	7.2	7.2	7.1	7.7
10	PPG-TF-312	7.2	7.2	7.2	7.3
11	PPG-TF-231	7.2	6.8	7.6	7.0
12	PPG-TF-262	7.2	6.9	7.6	6.3
13	RH3	7.2	7.1	7.2	6.3
14	Paramount	7.2	6.7	7.7	6.0
15	O'Keefe (OLTP-TF-122)	7.2	7.3	7.0	5.7
16	PPG-TF-267	7.2	6.8	7.6	5.0
17	DLFPS-TF/3552	7.1	6.9	7.3	6.3
18	5LSS	7.1	7.1	7.1	6.3
19	AH2	7.1	7.7	6.4	5.7
20	Estrena	7.0	6.9	7.1	7.0
21	PPG-TF-336	7.0	7.0	7.0	7.0
22	PPG-TF-318	7.0	7.2	6.9	6.3
23	Bullseye LTZ	7.0	6.5	7.5	4.7
24	RC4	7.0	7.0	7.0	4.0
25	TF456	6.9	7.0	6.7	7.3
26	RHF	6.9	7.4	6.4	6.0
27	RDC	6.8	6.2	7.4	7.3
28	DLFPS-321/3693	6.8	6.5	7.1	6.7
29	DLFPS-321/3703	6.8	6.3	7.3	6.0
30	DLFPS-321/3707	6.8	6.2	7.3	6.0

(Continued)

Table 3. Performance of tall fescue entries without traffic in a turf trial seeded in September 2018 at North Brunswick, NJ (Includes all entries of the 2018 National Turfgrass Evaluation Program (NTEP) Tall Fescue Test.)

	Tall fescue entry	Turfgrass Quality[1] 2019-2020 Avg.	Turfgrass Quality[1] 2019 Avg.	Turfgrass Quality[1] 2020 Avg.	Spring Green-up[2] 30 Mar. 2020
31	AH1	6.8	7.1	6.5	5.3
32	RH1	6.7	6.6	6.8	7.0
33	NAI-ROS4	6.7	6.7	6.7	7.0
34	RHL2	6.7	7.1	6.3	6.3
35	COL-TF-148	6.7	7.1	6.3	6.0
36	DLFPS-TF/3550	6.7	6.4	6.9	5.7
37	DLFPS-321/3701	6.7	6.3	7.0	5.0
38	DLFPS-TF/3553	6.7	6.6	6.8	4.7
39	DLFPS-321/3696	6.7	5.8	7.5	3.0
40	PPG-TF 244	6.6	6.4	6.9	6.7
41	NAI-3N2	6.6	6.5	6.7	6.3
42	PPG-TF-308	6.6	7.0	6.3	6.0
43	PPG-TF-337	6.6	6.5	6.7	5.0
44	PPG-TF-315	6.6	6.4	6.9	4.7
45	PPG-TF-254	6.5	6.4	6.7	6.7
46	DLFPS-321/3694	6.5	6.3	6.6	6.7
47	GO-RH20	6.5	6.4	6.6	6.0
48	Raptor III	6.5	6.9	6.2	5.7
49	PPG-TF-320	6.5	7.0	6.1	5.3
50	PPG-TF-306	6.5	6.3	6.7	4.7
51	TMT1	6.5	6.5	6.4	4.7
52	PPG-TF-323	6.5	6.4	6.7	4.3
53	Degas (LTP-TF-111)	6.4	6.2	6.5	7.0
54	PPG-TF-257	6.4	6.5	6.3	5.0
55	DLFPS-321/3699	6.4	6.5	6.3	4.7
56	JT 233	6.4	6.7	6.1	2.7
57	Padre 2	6.3	6.2	6.4	6.7
58	Dragster	6.3	6.6	6.0	6.3
59	DLFPS-321/3695	6.3	6.7	5.9	6.0
60	BY-TF-169	6.3	6.6	6.0	5.7

(Continued)

Table 3. Performance of tall fescue entries without traffic in a turf trial seeded in September 2018 at North Brunswick, NJ (Includes all entries of the 2018 National Turfgrass Evaluation Program (NTEP) Tall Fescue Test.)

		Turfgrass Quality[1]			Spring
	Tall fescue entry	2019-2020 Avg.	2019 Avg.	2020 Avg.	Green-up[2] 30 Mar. 2020
61	PPG-TF-255	6.3	6.1	6.5	4.3
62	BAR-TF-134	6.2	6.4	5.9	6.3
63	RS1	6.2	5.9	6.5	5.3
64	Firehawk SLT	6.2	6.3	6.0	5.0
65	TF445	6.2	6.2	6.1	4.3
66	K18-ROE	6.1	6.2	6.0	7.7
67	PPG-TF 316	6.1	6.0	6.2	5.0
68	NT-3	6.1	6.6	5.7	3.3
69	Bonfire (JS-DTT)	6.1	6.3	6.0	2.7
70	DLFPS-321/3705	6.0	5.8	6.3	6.0
71	3N1	6.0	5.6	6.5	5.3
72	DLFPS-321/3706	6.0	5.9	6.1	5.3
73	PPG-TF-249	6.0	6.0	6.0	4.7
74	PPG-TF 305	6.0	5.9	6.0	4.3
75	DLFPS-321/3702	5.9	5.7	6.0	4.0
76	SE5CR1	5.8	6.0	5.6	5.3
77	DLFPS-321/3708	5.8	5.7	6.0	2.7
78	Fayette	5.7	5.2	6.2	7.7
79	3B2	5.7	5.3	6.0	7.0
80	GLX ACED (PST-5DART)	5.7	5.7	5.8	5.7
81	DLFPS-321/3679	5.7	5.1	6.3	5.3
82	SETF104	5.7	5.7	5.7	4.0
83	Hemi	5.6	6.1	5.2	4.0
84	NAI-ST5	5.5	5.8	5.3	3.7
85	Monument (PST-5SQB)	5.3	5.7	4.9	6.7
86	PST-5TRN	5.3	5.4	5.2	4.7
87	PST-5BYOB	5.1	5.2	5.0	6.3
88	ProGold	5.1	5.2	5.0	5.7
89	A-TF31	5.1	5.4	4.9	4.0
90	NAI-TUE	5.1	5.4	4.8	2.3

(Continued)

Table 3. Performance of tall fescue entries without traffic in a turf trial seeded in September 2018 at North Brunswick, NJ (Includes all entries of the 2018 National Turfgrass Evaluation Program (NTEP) Tall Fescue Test.)

		Turfgrass Quality[1]			Spring
	Tall fescue entry	2019-2020 Avg.	2019 Avg.	2020 Avg.	Green-up[2] 30 Mar. 2020
91	GO-AOMK	5.1	5.2	5.1	1.7
92	PST-5MCMO	5.0	5.0	4.9	5.7
93	Grande 3	5.0	5.2	4.8	5.7
94	RAD--TF105	5.0	5.1	4.8	3.7
95	PST-5GQ	4.9	4.8	4.9	3.7
96	Lifeguard	4.8	4.6	5.0	5.7
97	RAD-TF0.0	4.8	4.6	5.0	3.0
98	Moondance	4.7	4.6	4.9	6.0
99	PST-5GLBS	4.6	4.5	4.7	6.3
100	Burmingham	4.6	4.8	4.5	6.3
101	Bullseye	4.6	5.0	4.3	5.7
102	PST-5DZM	4.6	4.7	4.6	5.0
103	SE5302	4.6	5.2	4.0	4.7
104	SETFM3	4.5	4.5	4.5	4.7
105	LBF	4.5	4.7	4.2	4.7
106	Bravo 2	4.5	4.3	4.7	3.7
107	SE5STAR	4.5	4.6	4.4	3.7
108	AST8118LM	4.5	4.9	4.1	3.3
109	Tango	4.5	4.2	4.8	2.7
110	PST-5DC24	4.5	4.4	4.7	2.0
111	BGR-TF3	4.3	4.5	4.1	6.7
112	PST-5E6	4.3	4.2	4.3	6.0
113	ATF2116	4.2	4.3	4.0	5.7
114	JT-517	4.2	4.0	4.3	4.7
115	Copious TF	4.2	4.1	4.3	3.0
116	NAI-FQZ-17	4.1	3.7	4.6	1.3
117	PST-5THM	4.0	4.1	3.9	4.7
118	AST8218LM	3.9	4.3	3.5	3.7
119	PST-5MINK	3.9	4.0	3.9	1.0
120	Bandit	3.8	3.9	3.7	5.7

(Continued)

Table 3. Performance of tall fescue entries without traffic in a turf trial seeded in September 2018 at North Brunswick, NJ (Includes all entries of the 2018 National Turfgrass Evaluation Program (NTEP) Tall Fescue Test.)

		Turfgrass Quality[1]			Spring
	Tall fescue entry	2019-2020 Avg.	2019 Avg.	2020 Avg.	Green-up[2] 30 Mar. 2020
121	SETFM2	3.8	3.6	4.0	4.3
122	ATF 1768	3.7	3.9	3.5	4.0
123	Escalade	3.6	4.0	3.2	6.7
124	Grand Prix (FC15-01P)	3.6	3.7	3.5	4.7
125	RAD-TF 115 (Turbo SS)	3.4	3.3	3.4	1.3
126	Naturally Green	3.3	3.4	3.1	4.3
127	BAR-FA8230	3.3	3.9	2.8	3.3
128	BAR 9FE MAS	3.1	3.8	2.4	4.3
129	BAR FA 8228	2.6	2.8	2.4	4.0
130	OG-WALK	2.5	2.8	2.3	4.0
131	Palomar	2.5	2.6	2.4	3.7
132	Kentucky-31	1.1	1.1	1.0	8.7
	LSD at 5% =	1.1	1.3	1.3	2.2
	CV (%)	12.1	13.6	14.3	26.0

[1]9 = Best turfgrass quality
[2]9 = Best spring green-up