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In Cooperation with  
Rutgers Center for Turfgrass Science  
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# **2019 RUTGERS TURFGRASS PROCEEDINGS**

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

This publication includes lecture notes of papers presented at the 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  
Dr. Bruce B. Clarke, Coordinator

# RESPONSE OF KENTUCKY BLUEGRASS TO TRAFFIC DURING 2019

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## INTRODUCTION

Kentucky bluegrass (*Poa pratensis* L.) is frequently established on sports fields and other highly trafficked recreational surfaces in New Jersey and throughout temperate climates in the United States.

Machines have been used by researchers to assess Kentucky bluegrass and other turfgrasses response to wear and/or traffic (wear and compaction). The Rutgers Center for Turfgrass Science has principally employed the Rutgers Wear Simulator (RWS; Bonos et al., 2001) and Cady Traffic Simulator (CTS; Henderson et al., 2005) to impart wear and traffic, respectively.

We have previously compared the RWS and CTS – operated independent of one another – for effects on turfgrass (Park et al., 2013; Park et al., 2014; Park et al., 2016a). Moreover, we have reported the results of operating both the RWS and CTS in the same strip across entries of the 2012 National Turfgrass Evaluation Program (NTEP) Tall Fescue (*Schedonorus arundinaceus* [Schreb.] Dumort.) Test (Park et al., 2015; Park et al., 2016b; Park et al., 2018) and 2017 NTEP Kentucky Bluegrass Test (Park et al., 2019).

The objective of this study was to further assess the traffic tolerance of entries in the 2017 NTEP Kentucky bluegrass Test using a combination of the RWS and CTS during summer and autumn 2019.

## MATERIALS AND METHODS

### Evaluation Trial

The 2017 NTEP Kentucky bluegrass Test (89 official entries) was seeded at 2.2 lb of seed per 1000 ft<sup>2</sup> into 8- x 6-ft plots on 18 September 2017 on a well-drained loam (sand=44%; silt=41%; clay=15%)

at Rutgers Hort. Farm No. 2 in North Brunswick, NJ. An unknown Kentucky bluegrass entry was also included in the evaluation. Entries were replicated three times.

Soil testing in September 2017 determined that the soil pH was 5.9; soil phosphorous (P) and soil potassium (K) were 244 and 271 lb per acre, respectively. Calcitic lime was applied to the test area at 10 lb per 1000 ft<sup>2</sup> in December 2017. The test was mowed approximately 2 to 3 times per week with a reel mower 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 Kentucky bluegrass developing severe drought stress symptoms.

A total of 3.6 lb of N per 1000 ft<sup>2</sup> was applied to the trial in 2019: 0.5, 0.7, 0.6, 0.7, 0.6, and 0.5 lb N per 1000 square feet on 5 April, 25 April, 31 May, 2 August, 5 September, and 10 October 2019, respectively.

### Pest Management During 2019

Pests were managed so that Kentucky bluegrass entry responses to traffic were not confused with responses to pests. Postemergence annual bluegrass (*Poa annua* L.) suppression was achieved using ethofumesate (Prograss EC; Bayer CropScience, Cary, NC) during winter 2018-19. Crabgrass (*Digitaria* spp.) was controlled preemergence using dithiopyr (Dimension 2EW; Corteva Agriscience, Wilmington, DE); white grubs were controlled preventatively using chlorantraniliprole (Acelepryn; Syngenta Crop Protection, LLC, Greensboro, NC); and summer patch disease (caused by *Magnaporthe poae* Landschoot and Jackson) was preventatively managed using azoxystrobin+difenoconazole (Briskway Fungicide; Syngenta Crop Protection, LLC,

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Greensboro, NC) and azoxystrobin+propiconazole (Headway Fungicide; Syngenta Crop Protection, LLC, Greensboro, NC).

### **Traffic Application**

Traffic was applied as strip-plot to approximately ½ of each plot of Kentucky bluegrass. The other approximate ½ of each plot did not receive traffic. During summer, thirty-two traffic passes were applied using a combination of the RWS and the CTS (4 pass wk<sup>-1</sup> with each machine during a 4 wk traffic period) from 1 to 24 July 2019. Autumn traffic consisted of a total 28 traffic passes (14 RWS passes and 14 fourteen passes with a vibratory pavement roller). Initially, two passes with the RWS and two passes with the roller were made during 11 to 23 September 2019; this intensity of traffic was deemed insufficient. Traffic intensity was increased to 4 passes wk<sup>-1</sup> with each machine during 1 to 8 October 2019.

The RWS was operated at a ground speed of 2.5 miles per hour (mph) and 250 rpm for the paddles; the CTS was operated in the forward direction at a speed of 1.0 mph. The pavement roller (~2500 lb) was operated at 2.4 mph with the vibration function engaged. Subsequent passes with each machine were made in the opposite direction.

### **Evaluation of Trafficked Strips**

Trafficked and non-trafficked portions of each plot were evaluated at the conclusion of summer- and autumn-applied traffic in 2019. Uniformity of turf cover was visually evaluated using a 1 to 9 scale where 9 equaled the most uniform turf cover. Plots were also evaluated for fullness of turf canopy (FTC) using a 0 to 100% scale where 100% equaled a full canopy.

A Canon PowerShot G16 (Canon USA, Inc., Lake Success, NY) digital camera was positioned to capture images of plots within an enclosure equipped with artificial lighting. Individual digital image size was 3000 x 4000 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 8 mm.

Images were imported into TurfAnalyzer (Green Research Services, LLC, Fayetteville, AR) for digital image analysis of green cover (0 to 100% scale; 100%=complete green cover) using a hue range of 50 to 107 and a saturation range of 0 to 100.

Data were analyzed using a 2 x 90 factorial of traffic and entries arranged in a strip-plot design. Horizontal strips were the trafficked and non-trafficked levels. Vertical strips were the 90 Kentucky bluegrass 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 Non-Trafficked Plots**

Visual turf quality in the absence of traffic (i.e., overall appearance, turf color, uniformity, density, mowing quality, reduced rate of vertical growth, leaf texture, and freedom from insect and/or disease damage) was rated from April through October 2019 using a 1 to 9 scale where 9 equaled the best turf quality.

Spring green-up was visually rated on 16 April 2019 and seedhead development was evaluated on 29 May 2019. A 1-9 scale was utilized for these ratings where 9 equaled the best spring green-up and least seedheads.

These data were analyzed as a single factor randomized complete block design and means were separated using the Fisher's protected least significant difference (LSD) test at  $p \leq 0.05$ .

## **RESULTS**

Kentucky bluegrass had poorer uniformity of turf cover, lower FTC and reduced green cover in the trafficked strip compared to the non-trafficked strip during summer and autumn 2019 (Table 1). Performance of entries for each parameter depended on the level of traffic during both seasons.

### **Response to Traffic During Summer 2019**

Entries with the best uniformity of turf cover after summer traffic were BAR PP 7K426, A16-17, BAR PP 71213, BAR PP 7309V, Barvette HGT, DLFPS-340/3549, KH3492, Yellowstone (A12-7), Jersey (NAI-A16-3), Finish Line (NAI-14-178), PST-K15-172, DLFPS-340/3552, PPG-KB 1131, and PST-K15-167 (Table 2). Among these entries, the uniformity of turf cover of BAR PP 7K426, A16-17, BAR PP 71213, BAR PP 7309V, Barvette HGT, and DLFPS-340/3549 was unaffected by traffic. Entries with the poorest uniformity of turf cover after summer traffic were NAI-14-132, Aviator II (NAI-15-84), J-1319, Pivot, DLFPS-340/3364, RAD-1776, DLFPS-340/3553, NK-1, and NAI-15-80.

Entries with the highest FTC after summer traffic were BAR PP 7K426, Barvette HGT, A16-17, BAR PP 7309V, BAR PP 71213, PST-K15-172, DLFPS-340/3549, Jersey (NAI-A16-3), and KH3492 (Table 2). The FTC of BAR PP 7K426 was not decreased with summer traffic. Entries with the lowest FTC after summer traffic were NK-1, DLFPS-340/3553, and NAI-15-80.

Entries with the highest green cover after summer traffic were PST-11-7, Prosperity, A16-17, PPG-KB 1131, DLFPS-340/3552, BAR PP 7K426, BAR PP 7309V, DLFPS-340/3494, A11-26, DLFPS-340/3550, United (NAI-13-14), J-3510, New Moon (PST-15-177), PST-K15-167, BAR PP 71213, Selway, Midnight, Twilight (NAI-13-132), Blue Devil, DLFPS-340/3549, BAR PP 79494, DLFPS-340/3556, PST-K15-172, Jersey (NAI-A16-3), DLFPS-340/3500, After Midnight, KH3492, DLFPS-340/3455, and Bombay (GO-22B23) (Table 2). Among these entries, the green cover of the following entries was not affected by summer traffic: BAR PP 7K426, PPG-KB 1131, PST-11-7, BAR PP 7309V, and Prosperity. The entry with the lowest green cover after summer traffic was NAI-15-80.

### **Response to Traffic During Autumn 2019**

Entries with the best uniformity of turf cover after autumn traffic were Barvette HGT, BAR PP 71213, PST-K15-167, PST-K15-172, Yellowstone (A12-7), DLFPS-340/3549, A16-17, BAR PP 7K426, and RAD 553 (Table 3). The uniformity of turf cover of each of these entries was not affected by autumn traffic. Entries with the poorest uniformity of turf cover after autumn traffic were A16-7, A12-34, NAI-14-122, Comanche (NAI-14-176), Heartland (NAI-14-187), PPG-KB 1320, A99-2897, DLFPS-340/3446, RAD-1776, A06-8, Pivot, NAI-14-132, Aviator II (NAI-15-84), DLFPS-340/3364, J-1319, DLFPS-340/3553, NK-1, NAI-15-80, and PST-K15-157.

Barvette HGT and BAR PP 71213 had the highest FTC after autumn traffic; the FTC of Barvette HGT was not affected by traffic (Table 3). Entries with the lowest FTC after autumn traffic were Aviator II (NAI-15-84), J-1319 DLFPS-340/3553, DLFPS-340/3364, NK-1, PST-K15-157, and NAI-15-80.

Entries with the greatest green cover after autumn traffic were Finish Line (NAI-14-178), Barvette HGT, A16-17, Prosperity, BAR PP 71213, PST-11-7, A11-26, DLFPS-340/3494, RAD 553, PST-K11-118,

and KH3492 (Table 3). The green cover of forty-one Kentucky bluegrass entries was not reduced after autumn traffic. NK-1, NAI-15-80, and PST-K15-157 had the least green cover after autumn traffic.

### **Performance of Kentucky Bluegrass Without Traffic Stress**

Without traffic stress, Kentucky bluegrass entries with the best average turf quality during 2019 were Bombay (GO-22B23), Jersey (NAI-A16-3), After Midnight, Starr (GO-2628), Cloud (GO-2425), A11-26, KH3492, PST-K11-118, PST-K15-172, J-2726, Prosperity, Finish Line (NAI-14-178), and Yellowstone (A12-7) (Table 4). Entries with the poorest average turf quality during 2019 were DLFPS-340/3364, NAI-15-80, and NK-1.

Kentucky bluegrass entries with the best multi-year average turf quality during 2018-2019 were Bombay (GO-22B23), Jersey (NAI-A16-3), Starr (GO-2628), A11-26, After Midnight, Cloud (GO-2425), J-2726, KH3492 (Table 4). Other entries with very good multi-year average turf quality ( $\geq 7.0$ ) during 2018-2019 were Prosperity, PST-K15-172, PST-K11-118, PPG-KB 1131, PST-K15-167, BAR PP 71213, J-1138 Blue Devil, Finish Line (NAI-14-178), DLFPS-340/3549, and J-3510.

Kentucky bluegrass entries that exhibited moderate to poor ( $< 5.0$ ) multi-year turf quality during 2018-2019 were MVS-130, A99-2897, DLFPS-340/3446, NAI-14-122, A13-1, Heartland (NAI-14-187), A12-34, Blue Knight, PST-K13-141, Comanche (NAI-14-176), A10-280, Aviator II (NAI-15-84), A16-7, PST-K15-157, NAI-14-132, Kenblue, and Amaze (NAI-14-133) (Table 4). Entries with the poorest multi-year average turf quality during 2018-2019 were NK-1, DLFPS-340/3364, NAI-15-80.

Entries with the best spring green-up on 16 April 2019 were Barvette HGT, A11-40, BAR PP 7236V, KH3492, PST-K11-118, Finish Line (NAI-14-178), DLFPS-340/3553, BAR PP 71213, DLFPS-340/3455, Jersey (NAI-A16-3), A11-38, Barserati (BAR PP 110358), Orion (PST-K13-143), PPG-KB 1304, Kenblue, and AKB3128 (Table 4). Kentucky bluegrass entries with the poorest spring green-up were PST-11-7, A10-280, Blue Devil, United (NAI-13-14), J-1319, Blue Knight, J-1138, BAR PP 79494, NAI-14-128, Comanche (NAI-14-176), J-2726, DLFPS-340/3494, MVS-130, NAI-14-122, Heartland (NAI-14-187), Twilight NAI-14-132, Amaze (NAI-14-133).

Fifty-six Kentucky bluegrass varieties and experimental selections expressed the fewest seedheads on 29 May 2019 (Table 4). Entries that exhibited exceptionally few seedheads (= 9.0) were Barvette HGT, A11-40, DLFPS-340/3455, PPG-KB 1304, Kenblue, A16-17, Selway, LTP-11-41, DLFPS-340/3444, DLFPS-340/3549, A11-26, and RAD-1776. AKB3128 had the most seedheads on this rating date. Other entries exhibiting moderately high seedhead production (< 6.0) were A15-6, BAR PP 7309V, DLFPS-340/3500, NAI-15-80, A16-7, A99-2897, BAP PP 79366, New Moon (PST-K15-177), DLFPS-340/3551, A12-34, DLFPS-340/3364, and DLFPS-340/3552.

## DISCUSSION

National Turfgrass Evaluation Program tests are an excellent resource for non-biased data concerning the performance of commercially available turfgrass cultivars and experimental selections. Traffic tolerance and turfgrass quality are important selection criteria for high traffic sports fields, general grounds and lawns, and sod production fields.

This research on traffic tolerance and turfgrass quality is also important for the turfgrass seed industry. Thirty-one entries of the 2017 NTEP Kentucky Bluegrass Test (89 total entries) are commercially available as of the printing of these Proceedings in July 2020. Seed company decision-makers can use these data for commercialization of experimental selections.

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Table 1. Uniformity of cover, fullness of turf canopy, and green cover as affected by traffic and Kentucky bluegrass entry during summer and autumn 2019.

	-----Summer Traffic <sup>1</sup> -----			-----Autumn Traffic <sup>2</sup> -----		
	Uniformity of Turf Cover <sup>3</sup>	Fullness of Turfgrass Canopy <sup>4</sup>	Green Cover <sup>5</sup>	Uniformity of Turf Cover	Fullness of Turfgrass Canopy	Green Cover
	1 to 9 Scale	-----0 to 100% Scale-----		1 to 9 Scale	-----0 to 100% Scale-----	
Level of Traffic						
No Traffic	8.8	93	92	8.7	95	89
Traffic	5.0	53	63	4.6	45	80
Source of Variation						
Traffic	**	**	**	***	**	**
Entry	***	***	***	***	***	***
Traffic x Entry	***	***	***	***	***	***
CV (%)	13.0	10.3	9.0	11.7	9.8	4.5

<sup>1</sup>Thirty-two machine passes were applied using the Rutgers Wear Simulator (RWS; 16 passes) and Cady Traffic Simulator (CTS; 16 passes) during 1 to 24 July 2019.

<sup>2</sup>Twenty-eight machine passes were applied using the RWS (14 passes) and a vibratory pavement roller (14 passes) during 11 September to 8 October 2019.

<sup>3</sup>9 = most dense, uniform canopy

<sup>4</sup>100% = full canopy

<sup>5</sup>100% = complete green cover; measured by digital image analysis

\*\* ,\*\*\* Significant at the 0.01 and 0.001 probability level, respectively.

Table 2. Uniformity of turf cover, fullness of turfgrass canopy, and green cover as affected by the interaction of Kentucky bluegrass entry and traffic during summer 2019. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.)

Kentucky bluegrass entry		-----Summer 2019 Traffic <sup>1</sup> -----						
		Uniformity of Turf Cover <sup>2</sup>		Fullness of Turfgrass Canopy <sup>3</sup>		Green Cover <sup>4</sup>		
		No Traffic	Traffic	No Traffic	Traffic	No Traffic	Traffic	
		1 to 9 Scale			0 to 100% Scale			
1	A16-17	9.0	8.0	97	75	95	81	
2	BAR PP 7K426	9.0	8.0	95	82	91	79	
3	BAR PP 71213	9.0	7.7	98	73	90	74	
4	BAR PP 7309V	9.0	7.7	95	75	92	79	
5	Barvette HGT	9.0	7.3	100	77	80	60	
208	6	DLFPS-340/3549	9.0	7.3	100	72	93	73
	7	Finish Line (NAI-14-178)	9.0	7.0	95	68	94	67
	8	KH3492	9.0	7.0	100	70	94	71
	9	Yellowstone (A12-7)	9.0	7.0	98	67	93	69
	10	PST-K15-172	9.0	7.0	100	73	90	72
	11	Jersey (NAI-A16-3)	9.0	7.0	98	72	95	72
	12	PST-K15-167	9.0	6.7	95	68	91	75
	13	PPG-KB 1131	8.7	6.7	95	67	92	80
	14	DLFPS-340/3552	9.0	6.7	93	68	94	80
	15	PST-11-7	8.7	6.3	92	60	94	82
16	A11-26	9.0	6.3	98	65	93	77	
17	DLFPS-340/3500	9.0	6.3	95	63	92	72	
18	Babe	9.0	6.3	95	63	91	64	
19	Blue Devil	9.0	6.3	95	62	94	73	
20	Bombay (GO-22B23)	9.0	6.3	98	67	92	70	

(Continued)



Table 2. Uniformity of turf cover, fullness of turfgrass canopy, and green cover as affected by the interaction of Kentucky bluegrass entry and traffic during summer 2019. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.)

Kentucky bluegrass entry	-----Summer 2019 Traffic <sup>1</sup> -----					
	Uniformity of Turf Cover <sup>2</sup>		Fullness of Turfgrass Canopy <sup>3</sup>		Green Cover <sup>4</sup>	
	No Traffic	Traffic	No Traffic	Traffic	No Traffic	Traffic
	1 to 9 Scale			0 to 100% Scale		
21 Blue Gem (NAI-13-9)	8.7	6.3	97	63	93	69
22 Prosperity	9.0	6.0	97	60	95	81
23 RAD 553	9.0	6.0	93	58	90	67
24 After Midnight	9.0	6.0	97	63	93	71
25 Twilight (NAI-13-132)	9.0	6.0	95	62	93	73
26 DLFPS-340/3455	9.0	6.0	93	60	95	70
27 NuRush (J-3510)	9.0	6.0	95	60	94	75
28 United (NAI-13-14)	9.0	6.0	93	62	93	75
29 Paloma (PST-K13-139)	9.0	6.0	98	63	90	61
30 J-1138	9.0	6.0	95	63	91	63
31 BAP PP 79366	8.7	6.0	95	60	90	69
32 Selway	9.0	5.7	97	60	95	74
33 A11-38	9.0	5.7	98	62	91	67
34 DLFPS-340/3556	8.0	5.7	92	58	93	73
35 DLFPS-340/3548	9.0	5.7	93	55	89	68
36 BAR PP 79494	9.0	5.7	95	62	92	73
37 PST-K13-141	8.3	5.7	93	52	87	52
38 AKB3179	9.0	5.7	100	58	90	68
39 DLFPS-340/3494	9.0	5.3	93	53	95	78
40 Midnight	9.0	5.3	93	55	91	73

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(Continued)

Table 2. Uniformity of turf cover, fullness of turfgrass canopy, and green cover as affected by the interaction of Kentucky bluegrass entry and traffic during summer 2019. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.)

Kentucky bluegrass entry	-----Summer 2019 Traffic <sup>1</sup> -----						
	Uniformity of Turf Cover <sup>2</sup>		Fullness of Turfgrass Canopy <sup>3</sup>		Green Cover <sup>4</sup>		
	No Traffic	Traffic	No Traffic	Traffic	No Traffic	Traffic	
	1 to 9 Scale			0 to 100% Scale			
41	Cloud (GO-2425)	9.0	5.3	95	58	92	65
42	A16-1	9.0	5.3	88	50	91	62
43	AKB3128	9.0	5.3	92	53	92	65
44	A16-2	9.0	5.0	100	53	93	58
45	New Moon (PST-K15-177)	8.7	5.0	90	55	94	75
46	Unknown	9.0	5.0	93	52	94	68
47	J-2726	9.0	5.0	97	52	92	66
48	Blue Knight	9.0	5.0	92	52	91	62
49	DLFPS-340/3550	8.7	5.0	93	52	95	75
50	PST-K11-118	9.0	4.7	97	50	95	65
51	Shamrock	9.0	4.7	95	48	93	63
52	DLFPS-340/3444	9.0	4.7	95	52	94	62
53	A11-40	9.0	4.7	98	50	95	58
54	Syrah (LTP-11-41)	9.0	4.7	95	50	97	61
55	Skye	9.0	4.7	97	52	92	60
56	A15-6	8.0	4.7	83	50	95	66
57	MVS-130	8.7	4.7	92	50	90	62
58	BAR PP 7236V	9.0	4.3	92	47	93	58
59	Barserati (BAR PP 110358)	8.7	4.3	95	48	95	53
60	A10-280	8.7	4.3	87	45	96	61

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(Continued)

Table 2. Uniformity of turf cover, fullness of turfgrass canopy, and green cover as affected by the interaction of Kentucky bluegrass entry and traffic during summer 2019. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.)

Kentucky bluegrass entry	-----Summer 2019 Traffic <sup>1</sup> -----					
	Uniformity of Turf Cover <sup>2</sup>		Fullness of Turfgrass Canopy <sup>3</sup>		Green Cover <sup>4</sup>	
	No Traffic	Traffic	No Traffic	Traffic	No Traffic	Traffic
	1 to 9 Scale			0 to 100% Scale		
61 A13-1	8.0	4.3	87	45	91	63
62 Starr (GO-2628)	9.0	4.3	98	52	93	60
63 Orion (PST-K13-143)	9.0	4.3	97	45	87	43
64 NAI-14-128	9.0	4.3	97	52	89	62
65 Comanche (NAI-14-176)	8.7	4.3	93	48	87	55
66 DLFPS-340/3551	8.3	4.0	87	45	94	60
67 DLFPS-340/3438	8.0	4.0	88	45	94	59
68 A06-8	8.0	4.0	88	42	96	59
69 Kenblue	8.7	3.7	93	42	91	51
70 PST-T14-39	9.0	3.7	93	43	94	50
71 PPG-KB 1320	8.7	3.7	92	42	92	52
72 PPG-KB 1304	8.7	3.7	88	42	95	58
73 A99-2897	8.0	3.7	87	40	94	59
74 AKB3241	8.7	3.7	92	40	92	51
75 NAI-14-122	9.0	3.7	93	40	90	53
76 DLFPS-340/3446	8.7	3.7	92	42	91	49
77 PST-K15-157	8.7	3.7	93	40	90	49
78 A12-34	8.0	3.3	83	38	95	62
79 A16-7	8.0	3.0	87	33	90	52
80 Amaze (NAI-14-133)	8.3	3.0	88	35	89	53

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(Continued)

Table 2. Uniformity of turf cover, fullness of turfgrass canopy, and green cover as affected by the interaction of Kentucky bluegrass entry and traffic during summer 2019. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.)

Kentucky bluegrass entry	Summer 2019 Traffic <sup>1</sup>					
	Uniformity of Turf Cover <sup>2</sup>		Fullness of Turfgrass Canopy <sup>3</sup>		Green Cover <sup>4</sup>	
	No Traffic	Traffic	No Traffic	Traffic	No Traffic	Traffic
	1 to 9 Scale			0 to 100% Scale		
81 Heartland (NAI-14-187)	8.7	3.0	95	35	89	40
82 NAI-14-132	8.3	2.7	88	30	87	45
83 Aviator II (NAI-15-84)	8.3	2.7	87	33	91	43
84 Pivot	8.3	2.3	92	30	81	37
85 DLFPS-340/3364	8.0	2.3	85	32	88	44
86 J-1319	8.7	2.3	88	32	92	46
87 DLFPS-340/3553	9.0	2.0	93	25	94	38
88 RAD-1776	9.0	2.0	95	30	85	41
89 NK-1	7.3	1.3	75	27	88	35
90 NAI-15-80	8.3	1.3	92	15	90	22
Columns (down) LSD at 5% =	1.5		13		12	
Rows (across) LSD at 5% =	1.7		14		14	

<sup>1</sup>Thirty-two machine passes were applied using the Rutgers Wear Simulator (16 passes) and Cady Traffic Simulator (16 passes) during 1 to 24 July 2019.

<sup>2</sup>9 = most dense, uniform canopy

<sup>3</sup>100% = full canopy

<sup>4</sup>100% = complete green cover; measured by digital image analysis

Table 3. Uniformity of turf cover, fullness of turfgrass canopy, and green cover as affected by the interaction of Kentucky bluegrass entry and traffic during autumn 2019. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.)

Kentucky bluegrass entry		-----Autumn 2019 Traffic <sup>1</sup> -----						
		Uniformity of Turf Cover <sup>2</sup>		Fullness of Turfgrass Canopy <sup>3</sup>		Green Cover <sup>4</sup>		
		No Traffic	Traffic	No Traffic	Traffic	No Traffic	Traffic	
		1 to 9 Scale			0 to 100% Scale			
1	A16-17	9.0	7.0	98	63	96	91	
2	BAR PP 7K426	8.7	7.0	93	72	93	81	
3	BAR PP 71213	9.0	8.0	98	77	93	90	
4	BAR PP 7309V	9.0	6.0	98	60	94	84	
5	Barvette HGT	9.0	8.7	100	87	94	92	
213	6	DLFPS-340/3549	9.0	7.0	98	68	91	85
	7	Finish Line (NAI-14-178)	9.0	5.7	100	53	91	94
	8	KH3492	9.0	5.7	98	57	94	88
	9	Yellowstone (A12-7)	9.0	7.0	98	67	93	87
	10	PST-K15-172	9.0	7.3	98	72	90	87
	11	Jersey (NAI-A16-3)	9.0	6.0	98	58	91	85
	12	PST-K15-167	9.0	7.3	100	72	89	87
	13	PPG-KB 1131	9.0	5.7	97	52	87	83
	14	DLFPS-340/3552	9.0	6.3	95	62	92	78
	15	PST-11-7	9.0	6.3	97	60	85	90
16	A11-26	9.0	6.0	98	57	91	89	
17	DLFPS-340/3500	9.0	5.0	95	47	90	87	
18	Babe	9.0	5.7	100	57	94	87	
19	Blue Devil	9.0	5.3	100	50	86	85	
20	Bombay (GO-22B23)	9.0	5.7	100	50	89	84	

(Continued)

Table 3. Uniformity of turf cover, fullness of turfgrass canopy, and green cover as affected by the interaction of Kentucky bluegrass entry and traffic during autumn 2019. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.)

Kentucky bluegrass entry		-----Autumn 2019 Traffic <sup>1</sup> -----					
		Uniformity of Turf Cover <sup>2</sup>		Fullness of Turfgrass Canopy <sup>3</sup>		Green Cover <sup>4</sup>	
		No Traffic	Traffic	No Traffic	Traffic	No Traffic	Traffic
		1 to 9 Scale			0 to 100% Scale		
21	Blue Gem (NAI-13-9)	9.0	4.0	95	38	83	78
22	Prosperity	9.0	6.3	100	58	83	90
23	RAD 553	9.0	6.7	97	62	94	88
24	After Midnight	9.0	4.7	100	45	79	87
25	Twilight (NAI-13-132)	9.0	5.0	98	50	84	84
26	DLFPS-340/3455	9.0	5.7	95	53	94	84
27	NuRush (J-3510)	9.0	5.3	100	48	88	84
28	United (NAI-13-14)	9.0	4.7	95	45	86	83
29	Paloma (PST-K13-139)	9.0	6.0	100	60	92	83
30	J-1138	9.0	5.0	98	47	87	82
31	BAP PP 79366	8.7	5.0	95	47	92	81
32	Selway	9.0	6.3	100	60	92	86
33	A11-38	9.0	6.3	98	60	91	85
34	DLFPS-340/3556	8.7	5.7	93	52	88	85
35	DLFPS-340/3548	9.0	4.0	97	38	88	83
36	BAR PP 79494	8.7	4.0	95	40	89	83
37	PST-K13-141	9.0	4.7	92	45	94	83
38	AKB3179	9.0	5.3	98	52	92	79
39	DLFPS-340/3494	8.3	5.7	95	55	88	89
40	Midnight	9.0	5.0	97	47	86	86

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(Continued)

Table 3. Uniformity of turf cover, fullness of turfgrass canopy, and green cover as affected by the interaction of Kentucky bluegrass entry and traffic during autumn 2019. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.)

Kentucky bluegrass entry	-----Autumn 2019 Traffic <sup>1</sup> -----					
	Uniformity of Turf Cover <sup>2</sup>		Fullness of Turfgrass Canopy <sup>3</sup>		Green Cover <sup>4</sup>	
	No Traffic	Traffic	No Traffic	Traffic	No Traffic	Traffic
	1 to 9 Scale			0 to 100% Scale		
41 Cloud (GO-2425)	9.0	4.3	100	43	90	83
42 A16-1	9.0	3.7	97	37	92	78
43 AKB3128	8.7	5.0	95	45	91	78
44 A16-2	9.0	5.3	97	52	93	87
45 New Moon (PST-K15-177)	9.0	5.3	98	48	82	87
46 Unknown	9.0	5.0	98	52	91	84
47 J-2726	9.0	5.3	100	53	86	83
48 Blue Knight	8.3	5.0	95	48	85	76
49 DLFPS-340/3550	9.0	4.7	95	45	88	76
50 PST-K11-118	9.0	5.0	97	48	93	88
51 Shamrock	9.0	4.0	97	38	92	85
52 DLFPS-340/3444	8.7	4.7	97	50	91	85
53 A11-40	9.0	4.3	98	42	95	83
54 Syrah (LTP-11-41)	9.0	4.3	100	43	93	77
55 Skye	9.0	4.3	100	40	90	77
56 A15-6	8.3	4.0	87	38	89	77
57 MVS-130	9.0	5.0	100	48	87	74
58 BAR PP 7236V	9.0	5.0	97	50	93	86
59 Barserati (BAR PP 110358)	9.0	4.0	97	42	92	83
60 A10-280	8.3	4.0	87	38	91	81

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(Continued)



Table 3. Uniformity of turf cover, fullness of turfgrass canopy, and green cover as affected by the interaction of Kentucky bluegrass entry and traffic during autumn 2019. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.)

Kentucky bluegrass entry		-----Autumn 2019 Traffic <sup>1</sup> -----						
		Uniformity of Turf Cover <sup>2</sup>		Fullness of Turfgrass Canopy <sup>3</sup>		Green Cover <sup>4</sup>		
		No Traffic	Traffic	No Traffic	Traffic	No Traffic	Traffic	
		1 to 9 Scale			0 to 100% Scale			
61	A13-1	7.7	3.7	83	38	90	81	
62	Starr (GO-2628)	9.0	3.7	100	35	89	79	
63	Orion (PST-K13-143)	9.0	3.7	95	37	90	72	
64	NAI-14-128	9.0	3.7	100	40	84	71	
65	Comanche (NAI-14-176)	9.0	3.0	98	32	84	65	
216	66	DLFPS-340/3551	8.3	3.7	92	35	90	78
	67	DLFPS-340/3438	8.0	3.7	87	40	93	78
	68	A06-8	8.3	2.7	92	28	87	70
	69	Kenblue	9.0	3.3	93	32	94	79
	70	PST-T14-39	9.0	3.7	97	40	90	78
	71	PPG-KB 1320	9.0	3.0	95	35	86	78
72	PPG-KB 1304	8.3	3.3	88	35	88	77	
73	A99-2897	8.0	2.7	85	28	82	77	
74	AKB3241	9.0	3.3	93	37	92	76	
75	NAI-14-122	9.0	3.0	98	32	86	73	
76	DLFPS-340/3446	8.0	2.7	87	30	91	72	
77	PST-K15-157	7.3	1.0	82	13	89	51	
78	A12-34	8.3	3.0	90	28	86	70	
79	A16-7	8.0	3.0	88	30	88	77	
80	Amaze (NAI-14-133)	8.7	3.7	95	37	85	74	

(Continued)

Table 3. Uniformity of turf cover, fullness of turfgrass canopy, and green cover as affected by the interaction of Kentucky bluegrass entry and traffic during autumn 2019. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.)

Kentucky bluegrass entry	-----Autumn 2019 Traffic <sup>1</sup> -----					
	Uniformity of Turf Cover <sup>2</sup>		Fullness of Turfgrass Canopy <sup>3</sup>		Green Cover <sup>4</sup>	
	No Traffic	Traffic	No Traffic	Traffic	No Traffic	Traffic
	1 to 9 Scale			0 to 100% Scale		
81 Heartland (NAI-14-187)	9.0	3.0	100	27	84	64
82 NAI-14-132	9.0	2.7	98	30	83	68
83 Aviator II (NAI-15-84)	7.7	2.0	80	22	87	68
84 Pivot	8.7	2.7	93	28	84	73
85 DLFPS-340/3364	7.0	1.7	75	20	83	67
86 J-1319	8.0	1.7	90	22	77	64
87 DLFPS-340/3553	8.7	1.7	90	22	90	73
88 RAD-1776	8.3	2.7	95	25	94	72
89 NK-1	7.0	1.0	72	15	90	53
90 NAI-15-80	7.0	1.0	75	10	89	51
Columns (down) LSD at 5% =	2.0		12		6	
Rows (across) LSD at 5% =	2.1		13		7	

<sup>1</sup> Twenty-eight machine passes were applied using the Rutgers Wear Simulator (14 passes) and a vibratory pavement roller (14 passes) during 11 September to 8 October 2019.

<sup>2</sup>9 = most dense, uniform canopy

<sup>3</sup>100% = full canopy

<sup>4</sup>100% = complete green cover; measured by digital image analysis

Table 4. Performance of Kentucky bluegrass entries without traffic in a turf trial seeded in September 2017 at North Brunswick, NJ. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.

Kentucky bluegrass entry	-----Turfgrass Quality <sup>1</sup> -----			Spring Green Up <sup>2</sup>	Seedheads <sup>3</sup>
	2018-2019 Avg.	2018 Avg.	2019 Avg.	16 Apr. 2019	29 May 2019
			1 to 9 Scale		
1 Bombay (GO-22B23)	8.4	8.6	8.1	6.3	8.3
2 Jersey (NAI-A16-3)	8.3	8.6	8.1	7.3	8.3
3 Starr (GO-2628)	8.0	8.3	7.8	6.3	8.3
4 A11-26	7.9	8.4	7.4	5.7	9.0
5 After Midnight	7.9	7.8	8.0	3.7	7.7
6 Cloud (GO-2425)	7.8	8.1	7.5	6.0	8.0
7 J-2726	7.5	7.9	7.1	1.0	8.7
8 KH3492	7.5	7.7	7.3	8.0	8.7
9 Prosperity	7.4	7.8	7.0	3.7	6.0
10 PST-K15-172	7.4	7.6	7.2	5.7	8.0
11 PST-K11-118	7.4	7.5	7.2	8.0	8.3
12 PPG-KB 1131	7.2	7.6	6.8	3.7	7.0
13 PST-K15-167	7.1	7.7	6.6	3.3	6.3
14 BAR PP 71213	7.1	7.6	6.7	7.7	8.7
15 J-1138	7.0	8.1	6.0	1.7	8.3
16 Blue Devil	7.0	7.3	6.7	2.0	7.0
17 Finish Line (NAI-14-178)	7.0	7.0	7.0	8.0	8.7
18 DLFPS-340/3549	7.0	7.3	6.7	6.0	9.0
19 NuRush (J-3510)	7.0	7.6	6.4	3.0	8.3
20 A11-38	6.9	7.2	6.7	7.3	8.7

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(Continued)

Table 4. Performance of Kentucky bluegrass entries without traffic in a turf trial seeded in September 2017 at North Brunswick, NJ. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.

Kentucky bluegrass entry	-----Turfgrass Quality <sup>1</sup> -----			Spring Green Up <sup>2</sup>	Seedheads <sup>3</sup>
	2018-2019 Avg.	2018 Avg.	2019 Avg.	16 Apr. 2019	29 May 2019
			1 to 9 Scale		
21 Skye	6.9	7.1	6.7	6.3	7.7
22 PST-11-7	6.9	7.4	6.4	2.3	7.7
23 Barserati (BAR PP 110358)	6.8	7.2	6.5	7.3	7.7
24 New Moon (PST-K15-177)	6.8	6.9	6.7	6.3	4.7
25 Twilight (NAI-13-132)	6.8	7.5	6.1	2.3	7.0
26 Orion (PST-K13-143)	6.7	7.6	5.9	7.3	7.7
27 A16-2	6.7	6.8	6.6	6.0	7.7
28 PST-T14-39	6.7	6.8	6.6	6.7	8.0
29 Babe	6.7	7.1	6.3	6.7	8.3
30 BAR PP 79494	6.6	7.5	5.8	1.7	6.7
31 Yellowstone (A12-7)	6.6	6.4	6.9	5.7	8.7
32 Barvette HGT	6.6	7.1	6.1	8.3	9.0
33 Paloma (PST-K13-139)	6.5	7.2	5.9	6.0	8.3
34 Midnight	6.5	6.9	6.2	2.7	6.7
35 Blue Gem (NAI-13-9)	6.5	6.8	6.2	3.0	7.7
36 A11-40	6.5	6.6	6.4	8.3	9.0
37 PPG-KB 1304	6.4	6.9	5.9	7.3	9.0
38 BAR PP 7236V	6.4	7.1	5.7	8.3	8.7
39 United (NAI-13-14)	6.4	7.3	5.4	2.0	6.3
40 Selway	6.4	6.6	6.1	6.3	9.0

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(Continued)

Table 4. Performance of Kentucky bluegrass entries without traffic in a turf trial seeded in September 2017 at North Brunswick, NJ. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.

Kentucky bluegrass entry	-----Turfgrass Quality <sup>1</sup> -----			Spring Green Up <sup>2</sup>	Seedheads <sup>3</sup>
	2018-2019 Avg.	2018 Avg.	2019 Avg.	16 Apr. 2019	29 May 2019
			1 to 9 Scale		
41 PPG-KB 1320	6.3	6.4	6.2	4.0	8.0
42 AKB3179	6.3	6.6	6.0	4.0	7.3
43 Shamrock	6.3	6.6	6.0	6.7	8.7
44 DLFPS-340/3548	6.3	6.7	5.8	6.7	8.3
45 DLFPS-340/3500	6.3	6.6	6.0	5.3	5.3
46 J-1319	6.2	7.0	5.5	2.0	6.3
47 A16-17	6.2	6.2	6.2	6.7	9.0
48 Syrah (LTP-11-41)	6.2	6.8	5.6	6.3	9.0
49 DLFPS-340/3550	6.2	6.7	5.7	6.0	6.3
50 BAP PP 79366	6.1	7.0	5.2	4.0	5.0
51 DLFPS-340/3494	6.1	7.0	5.2	1.0	8.0
52 DLFPS-340/3556	6.1	6.8	5.4	3.0	6.3
53 AKB3128	6.0	6.9	5.2	7.0	1.3
54 DLFPS-340/3444	5.9	6.1	5.7	6.3	9.0
55 DLFPS-340/3553	5.9	6.8	4.9	8.0	8.7
56 DLFPS-340/3552	5.9	6.6	5.1	4.7	3.3
57 A16-1	5.8	6.1	5.5	5.7	8.7
58 BAR PP 7K426	5.8	6.3	5.2	5.0	6.3
59 Pivot	5.6	6.4	4.8	4.0	7.7
60 AKB3241	5.5	6.1	5.0	6.3	6.0

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(Continued)

Table 4. Performance of Kentucky bluegrass entries without traffic in a turf trial seeded in September 2017 at North Brunswick, NJ. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.

Kentucky bluegrass entry	-----Turfgrass Quality <sup>1</sup> -----			Spring Green Up <sup>2</sup>	Seedheads <sup>3</sup>
	2018-2019 Avg.	2018 Avg.	2019 Avg.	16 Apr. 2019	29 May 2019
			1 to 9 Scale		
61 DLFPS-340/3455	5.5	5.4	5.6	7.7	9.0
62 A06-8	5.5	5.7	5.2	5.7	6.3
63 DLFPS-340/3551	5.4	6.1	4.6	5.0	4.7
64 Unknown	5.2	5.4	5.1	6.0	8.3
65 BAR PP 7309V	5.2	5.6	4.8	5.3	5.7
66 RAD 553	5.2	6.0	4.3	6.0	8.7
67 A15-6	5.1	5.7	4.6	6.3	5.7
68 RAD-1776	5.1	5.6	4.6	4.3	9.0
69 DLFPS-340/3438	5.0	5.7	4.4	5.7	8.3
70 NAI-14-128	5.0	5.1	5.0	1.3	8.0
71 MVS-130	4.9	4.8	5.0	1.0	7.0
72 A99-2897	4.9	5.9	3.8	4.7	5.0
73 DLFPS-340/3446	4.9	5.4	4.3	6.0	6.7
74 NAI-14-122	4.8	4.6	5.0	1.0	8.0
75 A13-1	4.7	5.7	3.8	5.3	8.7
76 Heartland (NAI-14-187)	4.7	4.6	4.9	1.0	7.3
77 A12-34	4.7	5.2	4.2	4.3	3.7
78 Blue Knight	4.7	5.2	4.1	2.0	7.7
79 PST-K13-141	4.6	4.9	4.2	6.0	6.3
80 Comanche (NAI-14-176)	4.6	4.6	4.6	1.3	8.0

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(Continued)

Table 4. Performance of Kentucky bluegrass entries without traffic in a turf trial seeded in September 2017 at North Brunswick, NJ. (Includes all entries of the 2017 National Turfgrass Evaluation Program (NTEP) Kentucky Bluegrass Test.

Kentucky bluegrass entry	-----Turfgrass Quality <sup>1</sup> -----			Spring Green Up <sup>2</sup>	Seedheads <sup>3</sup>
	2018-2019 Avg.	2018 Avg.	2019 Avg.	16 Apr. 2019	29 May 2019
			1 to 9 Scale		
81 A10-280	4.5	4.9	4.1	2.3	7.3
82 Aviator II (NAI-15-84)	4.5	4.7	4.2	4.3	8.7
83 A16-7	4.4	4.7	4.2	3.7	5.3
84 PST-K15-157	4.2	4.7	3.8	6.0	7.7
85 NAI-14-132	4.2	4.6	3.9	1.0	9.0
86 Kenblue	4.1	4.0	4.3	7.3	9.0
87 Amaze (NAI-14-133)	4.1	4.1	4.0	1.0	8.0
88 NK-1	3.0	4.1	2.0	4.0	6.0
89 DLFPS-340/3364	2.9	3.1	2.7	3.0	3.7
90 NAI-15-80	2.6	3.1	2.0	5.0	5.3
LSD at 5% =	0.9	0.9	1.2	1.5	1.4
CV (%)	9.4	9.1	13.1	19.2	11.8

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

<sup>2</sup>9 = best spring green-up

<sup>3</sup>9 = fewest seedheads



Table 3. Performance of tall fescue entries without traffic during 2019 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	-----Turf Quality <sup>1</sup> -----							
	2019 Avg.	April	May	June	July	Aug.	Sep.	Oct.
	1 to 9 scale							
81 SETF104	5.7	5.0	5.7	6.0	6.0	5.7	6.3	5.0
82 3N1	5.6	5.7	4.3	5.3	6.7	5.3	6.3	5.7
83 A-TF31	5.4	5.7	6.3	7.0	5.7	4.0	5.0	4.3
84 NAI-TUE	5.4	5.7	6.3	7.0	5.7	4.0	5.3	4.0
85 PST-5TRN	5.4	5.3	5.7	5.3	5.0	5.0	5.7	5.7
86 3B2	5.3	4.3	5.0	5.3	4.3	4.7	7.3	6.3
87 PST-5BYOB	5.2	5.0	4.7	5.0	5.3	4.7	6.7	5.3
88 SE5302	5.2	5.7	5.7	5.7	5.0	4.3	5.7	4.7
89 Grande 3	5.2	5.7	4.0	5.7	5.7	5.0	6.3	4.3
90 Fayette	5.2	5.0	4.3	5.7	5.0	5.0	6.3	5.0
91 GO-AOMK	5.2	4.3	5.7	5.3	6.3	4.3	6.0	4.3
92 ProGold	5.2	6.7	5.0	5.3	4.7	4.7	5.7	4.3
93 DLFPS-321/3679	5.1	4.7	4.3	5.3	5.3	5.7	6.0	4.7
94 RAD--TF105	5.1	4.3	5.3	6.3	5.0	5.0	5.3	4.3
95 PST-5MCMO	5.0	6.0	4.7	5.0	3.7	5.3	6.0	4.3
96 Bullseye	5.0	5.0	5.0	6.0	5.3	4.0	5.7	3.7
97 AST8118LM	4.9	6.0	5.3	6.0	5.3	3.7	4.7	3.3
98 PST-5GQ	4.8	5.3	4.0	5.0	4.7	4.3	5.7	4.7
99 Birmingham	4.8	5.7	4.7	5.3	4.7	3.7	5.3	4.0
100 PST-5DZM	4.7	5.3	6.0	5.0	5.0	3.3	5.0	3.0

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(Continued)

Table 3. Performance of tall fescue entries without traffic during 2019 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	-----Turf Quality <sup>1</sup> -----							
	2019 Avg.	April	May	June	July	Aug.	Sep.	Oct.
	1 to 9 scale							
101 LBF	4.7	5.3	5.7	5.7	4.7	4.3	4.7	2.3
102 Moondance GLX	4.6	4.3	4.3	3.7	3.7	4.0	6.7	5.7
103 Lifeguard	4.6	5.3	4.3	5.0	3.3	3.7	5.7	5.0
104 RAD-TF131	4.6	4.3	4.3	4.7	4.3	4.7	5.0	4.7
105 SE5STAR	4.6	5.0	4.3	5.7	3.7	3.7	5.7	4.0
106 PST-5GLBS	4.5	5.0	5.0	4.3	4.7	3.3	5.3	4.0
107 BGR-TF3	4.5	4.3	4.3	5.0	5.7	4.0	5.0	3.3
108 SETFM3	4.5	5.0	4.7	5.3	4.3	4.0	5.0	3.3
109 PST-5DC24	4.4	4.0	4.3	5.0	5.0	3.3	5.7	3.3
110 Bravo 2	4.3	4.7	4.7	5.0	4.3	3.3	4.3	4.0
111 AST8218LM	4.3	4.7	4.3	5.0	4.7	4.3	4.0	3.3
112 ATF2116	4.3	5.0	4.3	5.0	4.3	3.7	5.0	3.0
113 PST-5E6	4.2	4.7	4.0	4.0	4.0	3.3	5.7	4.0
114 Tango	4.2	4.7	4.3	4.3	4.7	3.3	4.3	3.7
115 Copious TF	4.1	4.3	4.3	6.3	3.7	3.0	4.7	2.7
116 PST-5THM	4.1	4.7	3.0	3.7	3.7	4.0	5.3	4.3
117 JT-517	4.0	4.7	5.0	5.0	4.0	3.0	4.0	2.7
118 PST-5MINK	4.0	4.0	4.7	4.7	3.7	3.7	4.0	3.3
119 Escalade	4.0	5.3	3.7	4.3	4.0	3.0	4.7	2.7
120 ATF 1768	3.9	4.7	4.3	4.3	3.0	2.7	5.3	3.0

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(Continued)

Table 3. Performance of tall fescue entries without traffic during 2019 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	-----Turf Quality <sup>1</sup> -----							
	2019 Avg.	April	May	June	July	Aug.	Sep.	Oct.
	1 to 9 scale							
121 Bandit	3.9	4.0	3.7	4.7	3.3	3.7	4.3	3.3
122 BAR-FA8230	3.9	5.3	4.0	5.0	3.0	2.7	4.3	2.7
123 BAR 9FE MAS	3.8	6.0	4.0	3.7	3.0	3.0	4.3	2.3
124 Grand Prix (FC15-01P)	3.7	4.3	3.3	4.0	3.7	2.7	4.7	3.3
125 NAI-FQZ-17	3.7	4.7	3.7	4.3	3.3	3.0	3.7	3.0
126 SETFM2	3.6	4.0	3.3	3.7	3.7	3.3	4.3	3.0
127 Naturally Green	3.4	4.3	3.3	4.7	3.3	2.7	3.7	2.0
128 RAD-TF 115 (Turbo SS)	3.3	3.0	3.7	4.3	3.7	3.7	3.0	2.0
129 OG-WALK	2.8	4.3	3.7	3.3	2.3	1.3	2.7	2.0
130 BAR FA 8228	2.8	4.3	3.0	3.7	2.7	2.0	2.7	1.3
131 Palomar	2.6	4.3	2.3	2.3	2.3	1.7	3.7	1.7
132 Kentucky-31	1.1	1.3	1.0	1.0	1.3	1.0	1.0	1.0
LSD at 5% =	1.3	1.9	2.0	2.1	2.0	1.8	1.7	2.0
CV	13.6	22.9	23.2	20.8	20.9	20.2	16.0	22.0

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

Table 4. 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	Ground Cover <sup>1</sup>	Spring Green Up <sup>2</sup>	Gray Leaf Spot <sup>3</sup>
	15 Oct. 2018	16 Apr. 2019	9 Sep. 2019
	0 to 100 % scale	1 to 9 scale	
1 K18-RS6	75	6.7	9.0
2 JT 268	67	6.0	9.0
3 AH2	85	6.7	9.0
4 PPG-TF-238	80	6.3	9.0
5 RHF	65	6.3	9.0
6 TD2	78	6.3	8.7
7 O'Keefe (LTP-TF-122)	65	6.0	9.0
8 PPG-TF-313	70	6.3	8.7
9 PPG-TF-312	58	6.3	9.0
10 K18-WB1	77	6.0	9.0
11 PPG-TF-318	65	6.0	9.0
12 ZRC1	63	6.3	9.0
13 RH3	77	6.3	9.0
14 RHL2	75	6.0	9.0
15 K18-NSE	80	6.7	9.0
16 AH1	75	6.3	9.0
17 PPG-TF-338	80	5.0	9.0
18 5LSS	70	5.7	9.0
19 COL-TF-148	67	5.7	9.0
20 RC4	67	4.7	9.0
21 TF456	72	6.7	9.0
22 PPG-TF-336	77	5.7	9.0
23 PPG-TF-308	67	6.0	9.0
24 PPG-TF-320	78	5.7	9.0
25 Estrena	78	7.0	9.0
26 DLFPS-TF/3552	55	6.0	9.0
27 Raptor III	62	6.3	9.0
28 PPG-TF-262	62	6.0	9.0
29 PPG-TF-267	67	6.0	9.0
30 PPG-TF-231	67	6.7	9.0
31 NAI-ROS4	60	6.3	9.0
32 DLFPS-321/3695	80	6.3	9.0
33 Paramount	52	6.0	9.0
34 JT 233	62	5.7	9.0
35 BY-TF-169	55	6.3	9.0

(Continued)

Table 4. 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	Ground Cover <sup>1</sup>	Spring Green Up <sup>2</sup>	Gray Leaf Spot <sup>3</sup>
	15 Oct. 2018	16 Apr. 2019	9 Sep. 2019
	0 to 100 % scale	1 to 9 scale	
36 DLFPS-TF/3553	67	5.3	9.0
37 NT-3	68	5.3	9.0
38 RH1	70	6.0	9.0
39 Dragster	52	6.3	9.0
40 DLFPS-321/3693	65	5.7	8.7
41 DLFPS-321/3699	70	5.3	9.0
42 PPG-TF-257	60	5.7	9.0
43 Bullseye LTZ	77	5.3	9.0
44 NAI-3N2	70	6.0	9.0
45 TMT1	80	5.3	9.0
46 PPG-TF-337	60	5.3	9.0
47 PPG-TF 244	70	6.0	9.0
48 PPG-TF-254	65	6.0	9.0
49 BAR-TF-134	68	6.7	9.0
50 DLFPS-TF/3550	68	5.3	9.0
51 GO-RH20	72	6.0	9.0
52 PPG-TF-323	53	5.0	9.0
53 PPG-TF-315	63	5.3	9.0
54 DLFPS-321/3703	65	5.0	9.0
55 Bonfire (JS-DTT)	75	5.7	9.0
56 PPG-TF-306	65	5.0	9.0
57 DLFPS-321/3701	57	5.3	9.0
58 DLFPS-321/3694	73	6.3	9.0
59 Firehawk SLT	75	6.7	9.0
60 DLFPS-321/3707	67	6.0	9.0
61 K18-ROE	80	7.0	9.0
62 Degas (LTP-TF-111)	60	6.7	9.0
63 Padre 2	68	6.3	9.0
64 RDC	80	5.7	9.0
65 TF445	77	6.0	9.0
66 Hemi	80	6.0	9.0
67 PPG-TF-255	68	5.3	9.0
68 PPG-TF 316	72	6.0	9.0
69 SE5CR1	58	6.3	9.0
70 PPG-TF-249	68	5.7	9.0

(Continued)

Table 4. 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	Ground Cover <sup>1</sup>	Spring Green Up <sup>2</sup>	Gray Leaf Spot <sup>3</sup>
	15 Oct. 2018	16 Apr. 2019	9 Sep. 2019
	0 to 100 % scale	1 to 9 scale	
71 RS1	72	6.3	8.3
72 PPG-TF 305	75	6.0	9.0
73 DLFPS-321/3706	57	6.3	9.0
74 DLFPS-321/3705	55	5.7	9.0
75 DLFPS-321/3696	73	4.7	9.0
76 NAI-ST5	77	6.3	9.0
77 DLFPS-321/3702	65	5.7	9.0
78 Monument (PST-5SQB)	85	7.0	9.0
79 GLX ACED (PST-5DART)	73	6.0	9.0
80 DLFPS-321/3708	55	4.3	9.0
81 SETF104	67	5.7	8.3
82 3N1	48	6.3	9.0
83 A-TF31	58	6.0	9.0
84 NAI-TUE	68	6.0	9.0
85 PST-5TRN	63	6.3	9.0
86 3B2	58	6.0	9.0
87 PST-5BYOB	82	6.3	9.0
88 SE5302	55	6.0	9.0
89 Grande 3	72	6.3	9.0
90 Fayette	72	6.3	9.0
91 GO-AOMK	55	4.3	9.0
92 ProGold	73	6.7	9.0
93 DLFPS-321/3679	67	5.3	9.0
94 RAD--TF105	73	5.7	9.0
95 PST-5MCMO	62	6.0	9.0
96 Bullseye	78	6.0	9.0
97 AST8118LM	57	5.0	9.0
98 PST-5GQ	60	5.7	9.0
99 Birmingham	80	6.3	9.0
100 PST-5DZM	58	5.7	8.7
101 LBF	70	5.7	9.0
102 Moondance GLX	63	6.0	9.0
103 Lifeguard	87	6.7	9.0
104 RAD-TF131	70	4.0	6.7
105 SE5STAR	67	6.0	9.0

(Continued)

Table 4. 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	Ground Cover <sup>1</sup>	Spring Green Up <sup>2</sup>	Gray Leaf Spot <sup>3</sup>
	15 Oct. 2018	16 Apr. 2019	9 Sep. 2019
	0 to 100 % scale	1 to 9 scale	
106 PST-5GLBS	72	5.3	9.0
107 BGR-TF3	70	6.3	9.0
108 SETFM3	57	5.3	9.0
109 PST-5DC24	47	4.7	9.0
110 Bravo 2	70	6.0	9.0
111 AST8218LM	65	5.3	9.0
112 ATF2116	70	5.3	9.0
113 PST-5E6	53	6.7	9.0
114 Tango	70	6.0	9.0
115 Copious TF	72	5.7	9.0
116 PST-5THM	70	5.7	9.0
117 JT-517	65	5.0	9.0
118 PST-5MINK	45	5.0	8.7
119 Escalade	68	7.0	8.7
120 ATF 1768	63	5.3	9.0
121 Bandit	62	6.0	9.0
122 BAR-FA8230	70	6.3	8.7
123 BAR 9FE MAS	57	5.7	9.0
124 Grand Prix (FC15-01P)	58	6.3	9.0
125 NAI-FQZ-17	67	5.7	9.0
126 SETFM2	57	5.3	9.0
127 Naturally Green	73	5.7	9.0
128 RAD-TF 115 (Turbo SS)	77	3.7	6.0
129 OG-WALK	62	6.7	9.0
130 BAR FA 8228	73	6.0	9.0
131 Palomar	55	7.0	9.0
132 Kentucky-31	98	9.0	9.0
LSD at 5% =	17	1.0	0.5
CV (%)	15.6	10.6	3.3

<sup>1</sup>100% = complete ground cover

<sup>2</sup>9 = best spring green-up

<sup>3</sup>9 = least disease