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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 2021 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. James A. Murphy, Coordinator

ESTABLISHMENT AND EVALUATION OF THE 2020 NTEP FINELEAF FESCUE TEST AT RUTGERS HORT. FARM NO. 2 DURING 2020-2021

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INTRODUCTION

Fine fescue syn. fineleaf fescue (*Festuca* spp.) is a group of turfgrass species that can be established as home lawn, municipal grounds, parkland, and utility turfs where lower input maintenance practices are employed (that is, less frequent mowing and fewer irrigation, nitrogen [N], and pesticide inputs). Fine fescues are also used in seed mixtures on golf courses for their adaptability and appearance in minimally mowed locations. Fine fescues is common term used to refer to the species: creeping red fescue (*Festuca rubra* ssp. *rubra*), slender creeping red fescue (*Festuca rubra* ssp. *littoralis*), Chewings fescue (*Festuca rubra* ssp. *commutata,* synonym *Festuca rubra* ssp. *fallax*), sheep fescue (*Festuca ovina,* synonym *Festuca ovina* ssp. *hirtula*), and hard fescue (*Festuca brevipila*).

Fourteen locations were selected for the standard evaluation of the 2020 National Turfgrass Evaluation Program (NTEP) Fineleaf Fescue Test, including Rutgers University (Rutgers Plant Science Research and Extension Farm, Adelphia, NJ). Rutgers University was awarded an ancillary test for the purposes of evaluating entry susceptibility to summer patch disease (caused by *Magnaporthe* [*Magnaporthiopsis*] *poae*); this trial was established at Rutgers Hort. Farm No. 2, North Brunswick, NJ.

This Proceedings article reports on the establishment of the 2020 NTEP Fineleaf Fescue Test at Rutgers Hort. Farm No. 2 and performance of cultivars and experimental selections during 2021.

MATERIALS AND METHODS

Evaluation Trial

The forty-three (43) entries of the 2020 NTEP Fineleaf Fescue Test were seeded at 4.4 lb seed per 1000 ft^2 into 4- x 6-ft plots at Rutgers Hort. Farm No. 2 in North Brunswick, NJ on 3 September 2020. A mixture (Campus Demonstration Mixture) of 'Navigator' creeping red fescue (25% by weight) + 'Radar' Chewings fescue (25%) + 'Beacon' hard fescue (25%) + 'Seabreeze GT' slender creeping red fescue (25%) was also included in the test.

Soil testing during 2020 indicated that the trial was grown on a loam (sand=42%; silt=39%, and clay=20%) and the soil pH was 5.2. Available phosphorous (P) and potassium (K) were 292 and 219 lb per acre (Mehlich 3), respectively.

The trial and seeded border was fertilized at 1.0 lb N per 1000 ft^2 using a 14-7-14 at seeding. An additional 0.7 lb N per 1000 ft^2 was applied using a 16-0-8 fertilizer on 28 September 2020 to facilitate turfgrass establishment.

A total of 1.7 lb N per 1000 ft^2 was applied to the test during 2021 using split applications of 16-0-8 (0.5, 0.6, and 0.7 lb N per 1000 ft^2 on 13 April, 15 September, and 25 October 2021, respectively).

The test was mowed no more than once per week at a height of 2.5-inch; mowing was withheld during periods of high air temperature where fine fescue exhibited slow shoot growth. Irrigation was supplied as needed to avoid developing severe drought stress symptoms.

Trial evaluation

Turf establishment was assessed on 25 September 2020 (22 days after seeding) by visually rating groundcover using a 0 to 100% scale where 100% equaled complete groundcover.

Spring green-up was rated on 30 April 2021; turfgrass quality was evaluated each month during April through October 2021; leaf spot (caused by

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Drechslera spp.) was rated on 28 June 2021; and genetic color was assessed on 27 October 2021. Each of these parameters was visually evaluated using a 1 to 9 rating where 9 equaled the best spring green-up, best turfgrass quality, least disease, and darkest green color. A natural infection of *Magnaporthiopsis* spp. causing summer patch was not observed in the test area during 2021.

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

Entries with the greatest groundcover on 25 September 2020 were PPG-FRR 127 Brittany 2, DLF-FRR-3128, PST-4SHAD, PPG-FRC 127, DLFPS-FRC-3105, PPG-FRR 132, Seabreeze GT, Boreal, PPG-FRC-130, PVF-MVP-2020, PST-4SWTM, STB1, BYE, 5Z2, BAR FRC 130, Kevin, 5Z5, BAR FRL 122, NAI-CHU1, and PVF-HSY+ (Table 1). Entries with the least ground cover were BAR FT 132, Resolute, Foxfire 2, SPHD-20, DA5-RHF, NAI-HTB2, Gladiator, NAI-HAQ1+2, and Quatro.

Entries with the best average turf quality during 2021 were PPG-FRC 127, Brittany 2, DLFPS-FRC-3105, and PPG-FRC-130; each of these entries is a Chewings fescue (Table 1). The poorest average turf quality during 2021 was exhibited by NAI-HAQ1+2, Gladiator, Quatro, and Boreal. Other entries that had poor average turf quality (< 4.0) during 2021 were SPHD-20, BAR FO 131, Blue Hornet (PPG-FO-102), Resolute, Seabreeze GT, and Kevin.

Chewings fescue entries tended to exhibit the best spring green-up compared to other fine fescue species. Brittany 2 and BAR FRC 130 (both Chewings fescues) had the best spring green-up on 9 April 2021 and 12 of the 14 entries that had better spring green-up (> 5.0) were Chewings fescues; additionally, the Campus Demonstration Mixture contained Radar Chewings fescue (Table 2). Entries with the poorest spring green-up were PPG-FL 128, SPHD-20, DLFPS-FL-3104, DA5-RHF, PVF-PDB-2020, NAI-HTB2, Gladiator, NAI-HAQ1+2, and Quatro; each of these entries is a hard fescue with the exception of Quatro (sheep fescue).

Jamestown VII, Kevin, and Boreal exhibited the most severe leaf spot on 28 June 2021 (Table 2). Entries with the least observed leaf spot were PVF-PDB-2020, PPG-FRR-134, DLFPS-FL-3104, DLFPS-FRC-3105, PPG-FRR 132, STB1, PPG-FL 128, SPHD-20, DA5-RHF, PPG-FRC 127, NAI-HTB2, Gladiator, NAI-HAQ1+2, PPG-FRC-130, BYE, and Resolute.

Hard fescue entries tended to exhibit darker green genetic color on 27 October 2021 (Table 2). Entries with the darkest green color were PVF-PDB-2020 (hard fescue), NAI-HTB2 (hard fescue), NAI-HAQ1+2 (hard fescue), DLFPS-FL-3104 (hard fescue), SPHD-20 (hard fescue), Resolute (sheep fescue), DA5-RHF (hard fescue), Gladiator (hard fescue), BAR FT 135 (hard fescue), Blue Hornet (PPG-FO-102; sheep fescue), BAR FT 132 (hard fescue), PPG-FL 128 (hard fescue), and Quatro (sheep fescue). Experimental selections with the lightest green color (each a Chewings fescue) were BAR FRC 130, BAR FRC 123, and PST-4SHAD.

DISCUSSION

Turfgrass practitioners can use these and other 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 cultivar recommendations to end users in the form of presentations, reports, and fact sheets.

Table 1. Performance of fine fescue entries at Rutgers Hort. Farm No. 2 in North Brunswick, NJ during establishment in 2020 and 2021; data sorted according to fine fescue species and includes all entries of the 2020 NTEP Fineleaf Fescue Test.

	Fine Fescue Cultivar, Selection or Mixture	Groundcover[1]	Turf Quality[2]						
		25 Sep. 2020	2021 Avg.	April	May	June	July	August	September	October
		0 to 100% scale	1 to 9 scale							
	CHEWINGS FESCUE									
1	PPG-FRC 127	45.0	6.8	6.3	7.3	6.7	5.0	6.0	8.0	8.0
2	Brittany 2	48.3	6.3	7.3	6.3	5.0	4.7	6.0	7.3	7.3
3	DLFPS-FRC-3105	45.0	6.2	6.3	6.3	6.7	4.3	5.7	7.3	6.7
4	PPG-FRC-130	41.7	6.0	5.7	6.3	5.7	4.7	5.0	8.0	6.7
5	NAI-CHU1	35.0	5.7	5.7	5.0	5.7	4.3	4.3	7.7	7.3
6	RAD-FC59	26.7	5.3	5.0	6.0	5.3	4.0	4.7	6.3	6.0
7	PVF-MVP-2020	41.7	5.3	5.0	5.7	5.0	4.3	4.0	7.0	6.0
8	Compass II	28.3	5.2	4.3	5.3	5.7	3.3	4.7	7.0	6.3
9	BAR FRC 130	38.3	5.0	6.3	4.0	4.7	4.0	4.3	6.3	5.0
10	PST-4SWTM	41.7	4.8	6.0	5.0	4.7	3.7	4.3	5.3	4.7
11	Jamestown VII	30.0	4.6	4.3	4.7	3.7	3.3	4.3	7.3	4.3
12	PST-4SHAD	46.7	4.5	6.0	4.3	4.0	3.3	3.3	6.0	4.7
13	BAR FRC 123	28.3	4.5	4.3	4.7	4.3	3.3	4.0	5.7	5.0
	HARD FESCUE									
1	PVF-PDB-2020	31.7	5.8	4.0	6.0	7.3	4.7	5.0	6.0	7.3
2	BAR FT 135	31.7	4.8	4.0	4.7	5.3	3.3	4.7	5.0	6.7
3	PPG-FL 128	26.7	4.8	3.3	4.0	5.7	4.0	5.3	5.0	6.0
4	DA5-RHF	18.3	4.7	3.7	4.3	6.7	3.7	4.3	5.0	5.3
5	NAI-HTB2	18.3	4.6	3.3	3.7	5.3	4.7	4.7	4.7	6.0

(Continued)

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	Fine Fescue Cultivar, Selection or Mixture	Groundcover[1]	Turf Quality[2]						
		25 Sep. 2020	2021 Avg.	April	May	June	July	August	September	October
		0 to 100% scale	1 to 9 scale							
	HARD FESCUE (continued)									
6	DLFPS-FL-3104	23.3	4.3	3.0	3.3	5.3	4.3	4.3	4.7	5.3
7	BAR FT 132	21.7	4.3	3.7	4.7	5.0	3.0	4.0	4.7	5.0
8	SPHD-20	20.0	3.9	2.7	3.3	5.7	3.3	3.3	4.3	4.7
9	NAI-HAQ1+2	5.3	3.0	1.0	2.0	2.7	3.0	4.0	3.7	4.7
10	Gladiator	7.7	2.8	1.7	2.0	2.7	2.7	3.0	3.3	4.3
	SHEEP FESCUE									
1	BAR FO 131	25.0	3.9	3.7	4.3	4.7	2.7	3.0	4.7	4.0
2	Blue Hornet (PPG-FO-102)	25.0	3.7	3.3	4.3	4.3	3.0	4.0	3.0	4.0
3	Resolute	21.7	3.6	2.7	3.3	3.7	3.3	4.0	4.0	4.3
4	Quatro	5.3	2.6	1.7	2.0	2.7	3.0	2.7	3.0	3.0
	SLENDER CREEPING RED FESCUE									
1	BAR FRL 122	36.7	4.6	5.3	5.0	4.0	3.3	3.3	5.3	5.7
2	Seabreeze GT	43.3	3.6	4.0	3.0	3.7	3.3	3.0	3.7	4.3
	STRONG CREEPING RED FESCUE									
1	PPG-FRR 132	45.0	5.6	5.3	6.0	6.3	5.3	5.3	5.7	5.0
2	BYE	38.3	5.6	5.7	5.3	5.7	5.0	5.3	6.0	6.0
3	5Z5	36.7	5.3	4.3	4.0	5.0	5.0	5.7	6.7	6.7
4	5Z2	38.3	5.3	4.0	3.7	4.7	5.3	5.7	6.3	7.3
5	PPG-FRR 127	51.7	5.3	4.3	4.3	5.0	5.3	5.7	6.0	6.3

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Table 1. Performance of fine fescue entries at Rutgers Hort. Farm No. 2 in North Brunswick, NJ during establishment in 2020 and 2021; data sorted according to fine fescue species and includes all entries of the 2020 NTEP Fineleaf Fescue Test.

	Fine Fescue Cultivar, Selection or Mixture	Groundcover[1]	Turf Quality[2]						
		25 Sep. 2020	2021 Avg.	April	May	June	July	August	September	October
		0 to 100% scale	1 to 9 scale							
	STRONG CREEPING RED FESCUE (continued)									
6	STB1	40.0	5.2	5.0	5.0	5.3	5.3	5.3	5.7	5.0
7	PVF-HSY+	35.0	5.1	3.7	5.0	5.3	5.3	4.7	6.3	5.3
8	Foxfire 2	20.0	4.5	3.7	4.7	5.0	4.0	3.7	5.7	5.0
9	Cardinal II	28.3	4.5	4.0	3.7	5.3	4.7	4.3	4.7	4.7
10	PPG-FRR-134	31.7	4.4	3.3	3.3	5.0	5.3	5.0	5.0	3.7
11	DLF-FRR-3128	48.3	4.3	4.3	4.3	4.7	4.0	3.3	5.0	4.7
12	RAD-FR64	31.7	4.3	3.7	4.3	4.7	3.7	3.3	5.0	5.7
13	Kevin	38.3	3.6	3.3	3.3	3.3	2.3	3.3	4.7	4.7
14	Boreal	43.3	2.2	3.7	2.3	2.0	1.3	1.3	2.7	2.3
	MIXTURE									
1	Campus Demo. Mix	23.3	4.7	4.3	5.3	4.7	4.3	4.0	6.0	4.3
	LSD at 5% =	17.2	0.8	1.4	1.5	1.7	1.5	1.3	1.4	1.5
	CV (%)	33.2	11.0	20.8	20.9	21.0	23.1	19.2	15.7	16.7

[1]100% = complete groundcover

[2]9 = best quality

Table 2. Performance of fine fescue entries at Rutgers Hort. Farm No. 2 sorted according to fine fescue species; includes all entries of the 2020 NTEP Fineleaf Fescue Test.

	Fine Fescue Cultivar Selection or Mixture	Spring Green-up[1] 9 April 2021	Leaf Spot[2] 28 June 2021	Color[3] 27 October 2021
		---------- 1 to 9 scale ----------		
	CHEWINGS FESCUE			
1	PPG-FRC 127	6.3	6.0	6.0
2	Brittany 2	8.0	5.3	5.0
3	DLFPS-FRC-3105	6.0	6.3	4.3
4	PPG-FRC-130	6.3	5.7	5.0
5	NAI-CHU1	5.7	4.7	5.3
6	RAD-FC59	4.7	4.7	6.7
7	PVF-MVP-2020	6.3	4.0	5.0
8	Compass II	5.3	5.3	5.0
9	BAR FRC 130	8.0	3.7	3.3
10	PST-4SWTM	5.3	3.7	5.0
11	Jamestown VII	6.0	2.7	4.3
12	PST-4SHAD	6.3	3.3	2.3
13	BAR FRC 123	5.3	3.7	2.7
	HARD FESCUE			
1	PVF-PDB-2020	2.0	7.3	8.7
2	BAR FT 135	3.3	5.0	8.0
3	PPG-FL 128	2.3	6.3	7.3
4	DA5-RHF	2.0	6.3	8.0
5	NAI-HTB2	1.7	6.0	8.7
6	DLFPS-FL-3104	2.0	7.0	8.3
7	BAR FT 132	3.3	4.0	7.7
8	SPHD-20	2.0	6.3	8.3
9	NAI-HAQ1+2	1.3	6.0	8.7
10	Gladiator	1.3	6.0	8.0
	SHEEP FESCUE			
1	BAR FO 131	3.0	3.7	5.3
2	Blue Hornet (PPG-FO-102)	3.0	4.3	8.0
3	Resolute	2.7	5.7	8.3
4	Quatro	1.0	5.0	7.3

(Continued)

Table 2. Performance of fine fescue entries at Rutgers Hort. Farm No. 2 sorted according to fine fescue species; includes all entries of the 2020 NTEP Fineleaf Fescue Test.

	Fine Fescue Cultivar Selection or Mixture	Spring Green-up[1] 9 April 2021	Leaf Spot[2] 28 June 2021	Color[3] 27 October 2021
		---------- 1 to 9 scale ----------		
	SLENDER RED CREEPING FESCUE			
1	BAR FRL 122	6.0	3.3	5.0
2	Seabreeze GT	4.3	4.0	4.7
	STRONG CREEPING RED FESCUE			
1	PPG-FRR 132	3.7	6.3	4.3
2	BYE	3.0	5.7	6.0
3	5Z5	2.7	5.3	6.3
4	5Z2	2.7	5.3	7.0
5	PPG-FRR 127	3.3	4.7	6.3
6	STB1	3.0	6.3	5.0
7	PVF-HSY+	4.3	5.0	5.7
8	Foxfire 2	3.3	5.3	5.3
9	Cardinal II	4.7	5.0	6.0
10	PPG-FRR-134	3.3	7.0	5.7
11	DLF-FRR-3128	3.0	4.7	5.7
12	RAD-FR64	2.7	3.3	7.0
13	Kevin	3.3	2.7	6.3
14	Boreal	3.3	1.0	4.0
	FINE FESCUE MIXTURE			
1	Campus Demo. Mix	5.0	5.0	5.0
	LSD at 5% =	1.6	1.7	1.5
	CV (%)	25.1	20.5	15.5

[1]9 = best spring green-up
[2]9 = least disease
[3]9 = darkest green color