

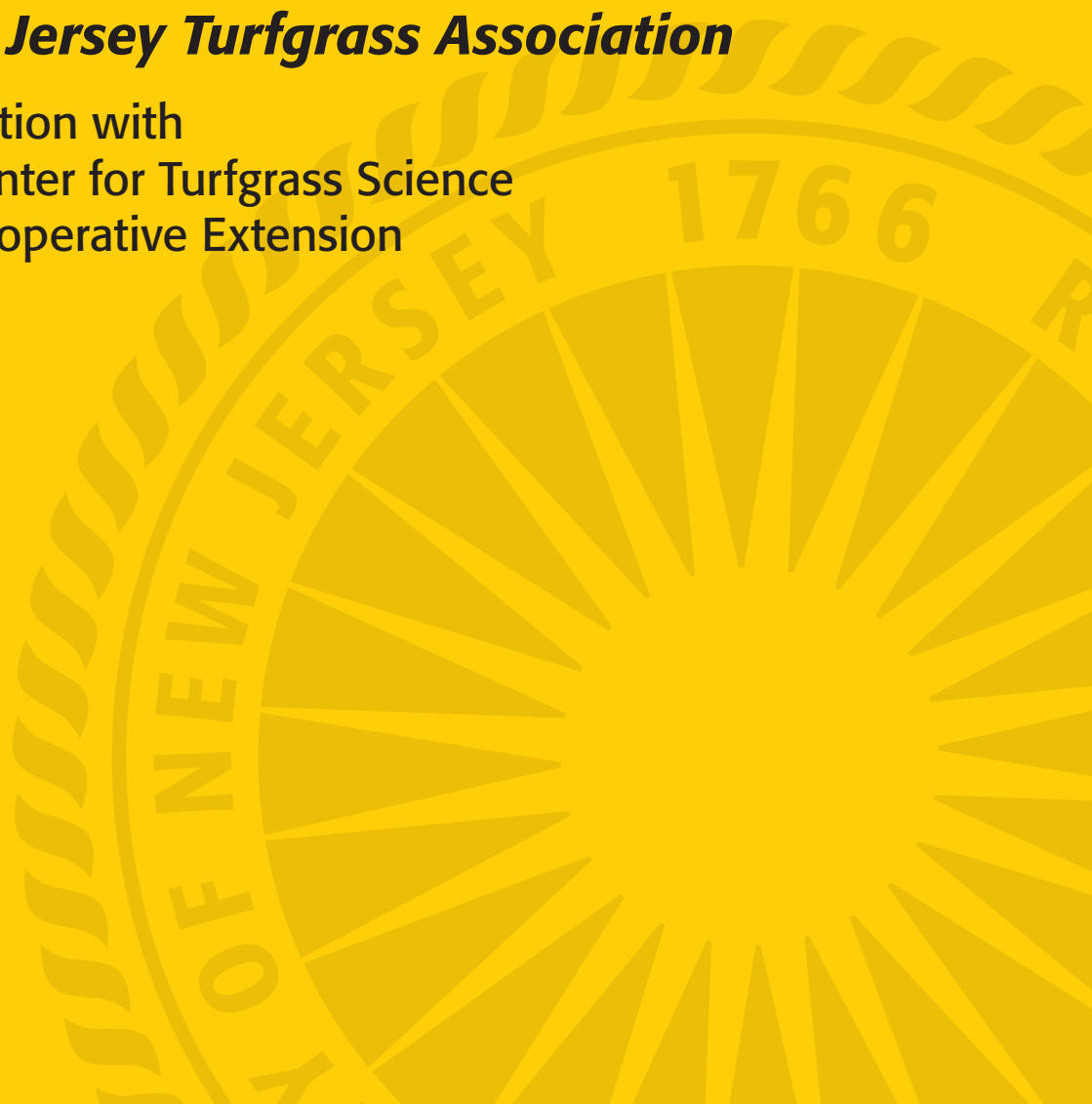
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The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State 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 2015 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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Dr. Ann Brooks Gould, Editor
Dr. Bruce B. Clarke, Coordinator

PERFORMANCE OF FINE FESCUE CULTIVARS AND SELECTIONS IN NEW JERSEY TURF TRIALS

Trent M. Tate, Austin L. Grimshaw, Dirk A. Smith, Ronald F. Bara, Melissa M. Mohr,
Eric N. Weibel, Stacy A. Bonos, and William A. Meyer¹

The fine fescues (*Festuca* spp.) are a group of cool-season grasses that have distinct, fine-textured leaves. Compared to other cool-season grasses, the fine fescues are better adapted to cool, dry, and shaded environments. This species group is tolerant of infertile and acidic soils and drought conditions and exhibit the best performance under lower fertility levels. The fine fescues perform best in well drained soils and are not suited for saturated soil conditions (Murphy, 1996). In general, these grasses have poor heat tolerance and lack tolerance to excessive nitrogen fertilization during periods of high temperatures (Meyer and Funk, 1989).

There are many species and subspecies of fine fescue, but only six are generally used as turfgrasses. There are three subspecies of *F. rubra*: strong creeping red fescue (*F. rubra* L. *rubra*), slender creeping red fescue (*F. rubra* L. var. *littoralis* Vasey ex Beal), and Chewings fescue [*F. rubra* L. subsp. *fallax* (Thuill.) Nyman]. Both the strong creeping red and slender creeping red fescues are referred to as creeping red fescues because they spread by rhizomes. As the name infers, the strong creeping red fescues have a more aggressive spreading habit than slender creeping red fescues. Chewings fescue is a dense and low growing bunch type grass with the greatest tolerance to low mowing heights in comparison to the other fine fescues.

Hard fescue (*F. brevilipa* R. Tracey) is a bunch type grass that spreads by tillering. It has a dark green color and forms a dense cover. Compared to Chewings fescue, hard fescue is considered to be more tolerant of heat, drought, and low fertility. The species is widely used in many low maintenance situations due to increased disease resistance, even under low maintenance conditions.

Sheeps (*F. ovina* L.) and blue (*F. glauca* Vill.) fescues are the least widely used species of the fine fescues. They are bunch-type and have a wide variation in color from blue or green to a silvery-blue or silvery-green. These two species are rarely used in seed mixtures because of their color. They have a non-aggressive growth habit which makes them a good addition to wildflower mixes to aid in the prevention of erosion and to add an interesting color to the mix. These species are also becoming more popular in ornamental landscapes due to their color.

When heavily fertilized (>3 lb nitrogen annually), fine fescues can become soft, succulent, and thatchy, which makes them more susceptible to diseases and summer stresses. A fertilizer rate of 1 to 2 lb nitrogen per 1000 ft² per year applied in 0.5 lb increments is ideal for fine fescues. The increasing demand for lower fertilizer and water usage makes fine fescues an option for use in certain situations to address some of these issues.

Many of the newer fine fescue cultivars contain a *Neotyphodium* endophyte that improves drought tolerance, resistance to above ground feeding insects, and in some cases, diseases such as red thread, caused by *Laetisaria fuciformis*, and dollar spot, caused by *Sclerotinia homoeocarpa* (Bonos et al., 2005; Clarke et al., 2006; Kuldau and Bacon, 2008). The presence of endophyte can reduce the need for chemical inputs normally used to treat for insects and diseases. *Neotyphodium* is a non-pathogenic fungus that grows intercellularly within the above-ground plant tissue. The beneficial effects of the endophyte are often very evident under stress conditions.

Although the Rutgers turfgrass breeding program has improved many of the characteristics desired for a

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

superior fine fescue turf, further work is needed, particularly in the areas of disease and insect resistance and wear tolerance. Rutgers continues to cooperate with the National Turfgrass Evaluation Program (NTEP), which evaluates many cultivars, collections, and experimental selections for turf performance across a wide range of geographical locations.

PROCEDURES

Three fine fescue turf trials were conducted at the Rutgers Biology and Pathology Research and Extension Station in Adelphia, NJ (Tables 1 to 3). All tests consisted of 3 x 5 ft plots. The fine fescues were sown at 3.7 lb per 1000 ft².

Plots were replicated three times in a randomized complete block design. Tests were maintained at different fertility levels and mowing heights depending on the objectives of the test as well as the occurrence of disease or insects. Mowing height and fertilizer inputs of all tests are shown in Table 4. All tests (Tables 1 to 3) were treated with pre-emergent and post-emergent herbicides (Dimension and Super Trimec) to control grassy and broadleaf weeds. Applications were made in the spring and fall according to label instructions. In addition, the trials were irrigated to prevent severe stress and were mowed 1 to 2 times a week with rotary mowers to avoid excessive accumulation of clippings.

EVALUATION

All tests were visually rated throughout the year on a scale of 1 to 9, where 9 represented the most desirable turf quality. Turf quality is a subjective characteristic that includes density, texture, color, growth habit, damage due to diseases or insects, and overall performance. Trials were rated monthly throughout the growing season for turf quality as well as for other characteristics including resistance to diseases such as net blotch (or *Helminthosporium* leaf spot), caused by *Drechslera dictyoides*. Plots were rated by different evaluators to help minimize personal biases towards a particular trait.

Data for all trials were statistically analyzed using analysis of variance, and means were separated using Fisher's protected least significant difference (LSD) means separation test. Results in Tables 1 to 3 are presented with selections grouped according

to species and ranked according to best overall, multiple-year turf performance (Tables 1 and 2) or turf quality average assessed in 2015 (Table 3).

Care should be used when drawing conclusions from some of these trials. First, these tests were grown as monocultures in full sun. These conditions tend to cause different stresses that may not occur under other conditions. Second, the 2014 test (Table 3) was in its first year of evaluation. Some cultivars perform much differently during establishment than they do after a mature sod has developed.

RESULTS AND DISCUSSION

Turf Quality

As a group, the hard fescues were rated highest for average turf quality, followed closely by the Chewings and strong creeping fescues (Tables 1 to 3).

For the 2012 trial (Table 1), the highest quality Chewings fescue selections and cultivars were PPG-FRC 112, 7W2 comp, and PSG 50C3, while those with the lowest quality were SDOC3, PSG SDPR2, and Koket. The highest quality hard fescue selections and cultivars were H575 comp, 7H7 comp, and MNHD, while the lowest quality hard fescues Rescue 911, Stonehenge, Brigade, Spartan, and PST-SYN-4NOD. The highest quality strong creeping red fescue selections and cultivars were PSFC09-2, 7C3 Comp, and FRR-102, while those of lowest quality were Oracle, Boreal, and 07-1FF.

For the 2013 trial (Table 2), the highest quality hard fescue selections and cultivars were 7H5, DA1 Comp, and DA3 Comp, while the lowest quality entries were 4-12FF-3, 5-12FF-8, and 5-12FF-5. The highest quality Chewings fescue selections and cultivars were 7W3 Comp, 3W4 Comp, and PPG-FRC 114, while those of lowest quality were PSG 50C3, PST-4CHY, and Ambassador. The highest quality strong creeping red fescue selections and cultivars were 7C5 Comp, 2-10 Frr Bulk, Z13-01, and 7C6 Comp and the lowest quality strong creeping red fescues were Oracle, 5-12FF-4, and Boreal.

For the 2014 trial (Table 3), which includes all entries from the 2014 NTEP Fine Fescue Trial, the highest quality hard fescue selections and cultivars were Minimus¹, Rescue 911, 7H6, and 7HF, while the lowest quality hard fescue entries were Sword¹,

¹ NTEP Entry (Table 3).

Miser, and Beudin¹. The highest quality Chewings fescue selections and cultivars were C571, Radar¹, and DLF-FRC 3338¹ and the lowest quality entries were BAR 6FR 126¹, Shadow III, and Survivor. The highest quality strong creeping red fescue selections and cultivars were 14R3, DLFPS-FRR/3068¹, C14-OS3¹, and 7C34¹, while the lowest quality strong creeping red fescue selections and cultivars were 4GRP, Oracle, and Boreal¹.

Disease Resistance

The performance of the entries in the 2014 trial (Table 3) includes ratings for net blotch (*Helminthosporium* leaf spot). Symptoms of this disease begin as tiny brown spots on the leaves that expand, become oval or square, and coalesce to form a net-like pattern on the leaf. Net blotch appears in the turf stand as a yellow or brown, general thinning of the turf. In general, the hard, blue, and sheeps fescues were the most resistant to net blotch, while the strong creeping red fescues were the most susceptible. The most resistant hard fescue selections and cultivars were Minimus¹ and 7H7¹, while the least resistant hard fescues were PST-4BND¹, DLFPS-FL/3060¹, and Miser. The most resistant Chewings fescue selections and cultivars were BAR VV-VP3-CT¹, C571, RAD-FC44¹, Treasure II, and Survivor, while the least resistant selections and cultivars were 4C30D and 14W2. The most resistant strong creeping red fescue selections and cultivars were Soilguard, C14-OS3¹, 14R3, and DLFPS-FRR/3068¹, while those that were least resistant were 7C34¹, Oracle, and Boreal¹.

SUMMARY

Overall, it is encouraging to see that many of the higher-ranking fine fescues within all species are new experimental selections. Although advances in breeding efforts continue, there is still need for increased seed production and considerable improvement in resistance to red thread and to summer patch (caused by *Magnaporthe poae*), particularly in the hard fescues.

One little-studied area that could make a significant impact on the use of fine fescues in a wider array of situations is the improvement of wear tolerance, particularly under drought stress conditions. Breeding efforts at Rutgers continue in an effort to develop high quality turfgrasses with the ability to make a great environmental impact with minimal environmental cost.

ACKNOWLEDGMENTS

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Table 1. Performance of fine fescue cultivars and selections in a turf trial seeded in September 2012 at Adelphia, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----				
	2013-2015 Avg.	2013 Avg.	2014 Avg.	2015 Avg.	
CHEWINGS FESCUE					
1	PPG-FRC 112	5.7	6.5	5.5	5.0
2	7W2 comp	5.5	5.9	5.4	5.1
3	PSG 50C3	5.5	6.0	5.4	5.0
4	C572 comp	5.3	6.0	5.3	4.7
5	PPG-FRC 107	5.3	5.9	5.3	4.8
6	7W3 comp	5.3	5.7	5.0	5.1
7	7W4 comp	5.2	5.4	5.3	5.0
8	Radar	5.2	5.9	5.0	4.6
9	Fairmont	5.1	5.8	4.8	4.9
10	PPG-FRC 110	5.1	6.0	4.7	4.7
11	SR 5130	5.1	5.7	4.9	4.7
12	PPG-FRC 109	5.0	5.8	4.7	4.7
13	FRC 103	4.9	5.5	4.9	4.4
14	OC1	4.9	4.9	4.7	5.0
15	PS4BRT-34	4.8	5.3	4.4	4.8
16	7W1 Comp	4.8	5.0	4.8	4.5
17	Heathland	4.8	5.3	4.4	4.7
18	Longfellow II	4.7	4.9	4.6	4.6
19	Longfellow 3	4.7	4.7	4.6	4.7
20	Ambassador	4.7	5.3	4.3	4.4
21	PST-4CHY	4.5	4.6	4.1	4.7
22	Enchantment	4.4	4.8	4.0	4.6
23	PST-4CHT	4.4	5.2	3.9	4.3
24	PSG 51SPRS	4.4	4.7	4.0	4.7
25	Shadow II	4.4	4.4	3.9	4.9
26	Survivor	4.4	4.9	4.0	4.2
27	Compass	4.3	4.5	4.3	4.3
28	PST-4SHR	4.3	4.5	3.8	4.6
29	Rushmore	4.3	4.4	4.0	4.4
30	PSG 5ISPE	4.2	4.5	3.6	4.6
31	Ambrose	4.2	4.4	3.9	4.4
32	Columbra II	4.1	4.4	3.5	4.3
33	SDOC3	4.0	3.4	4.2	4.6
34	PSG SDPR2	4.0	4.0	3.6	4.4
35	Koket	3.5	3.3	3.3	4.0

(Continued)

Table 1. Fine fescue turf trial, 2012 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----				
	2013-2015 Avg.	2013 Avg.	2014 Avg.	2015 Avg.	
HARD FESCUE					
1	H575 comp	5.6	5.9	5.6	5.4
2	7H7 comp	5.6	5.6	5.6	5.5
3	MNHD	5.6	5.4	5.6	5.7
4	7H2 comp	5.5	5.5	5.4	5.6
5	H571 comp	5.4	5.9	5.1	5.3
6	7H5 comp	5.4	5.7	5.1	5.5
7	BM1 comp	5.3	5.7	5.0	5.3
8	H573 comp	5.3	5.3	5.2	5.4
9	Minimus	5.2	5.0	5.5	5.1
10	PPG-FL 104	5.2	5.1	5.4	5.2
11	SR 3150	5.2	5.0	5.4	5.1
12	TE1 comp	5.1	5.4	4.8	5.2
13	STTH3	5.1	5.4	5.3	4.6
14	7H4 comp	5.1	5.1	5.2	5.0
15	Predator	5.1	5.0	5.3	5.0
16	PSG 3J27F	5.1	5.5	5.1	4.7
17	TE2 comp	5.0	5.4	4.9	4.7
18	7H6 comp	5.0	5.6	4.6	4.8
19	Spartan II	5.0	5.2	4.7	5.1
20	7H1 comp	5.0	5.3	4.6	5.0
21	Beacon	5.0	4.8	4.8	5.2
22	BM2 comp	5.0	5.3	4.6	5.0
23	FL 106	4.9	4.9	4.9	4.9
24	WB	4.7	4.9	4.7	4.6
25	PSG 3TH3	4.7	5.2	4.4	4.6
26	S II LB	4.6	4.6	4.3	4.9
27	Reliant IV	4.6	3.9	4.8	5.0
28	S II LA	4.6	4.6	4.4	4.6
29	Oxford	4.4	4.2	4.2	4.8
30	PST-4BND	4.2	3.8	4.3	4.4
31	Rescue 911	4.0	4.1	3.6	4.3
32	Stonehenge	4.0	3.8	3.7	4.4
33	Brigade	4.0	3.8	3.6	4.4
34	Spartan	3.9	3.7	3.8	4.2
35	PST-SYN-4NOD	3.3	3.4	3.4	3.2

(Continued)

Table 1. Fine fescue turf trial, 2012 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----				
	2013- 2015 Avg.	2013 Avg.	2014 Avg.	2015 Avg.	
STRONG CREEPING RED FESCUE					
1	PSFC09-2	5.0	5.3	4.9	4.8
2	7C3 Comp	4.9	5.4	4.7	4.7
3	FRR-102	4.9	5.3	4.9	4.3
4	7C5 Comp	4.8	5.0	5.1	4.4
5	7C2 Comp	4.8	5.1	4.9	4.5
6	7C4 Comp	4.8	5.0	5.0	4.4
7	7C6 Comp	4.8	5.4	4.8	4.2
8	PPG-FRR-110	4.7	5.1	4.7	4.3
9	FT-3 Comp	4.7	5.1	4.6	4.2
10	OS2	4.7	4.9	4.9	4.2
11	FT-5 Comp	4.6	5.0	4.6	4.2
12	S572 Comp	4.6	5.1	4.6	4.1
13	Marvel	4.5	4.9	4.5	4.3
14	Ruddy	4.5	5.2	4.5	4.0
15	7C1 Comp	4.5	5.1	4.1	4.3
16	PST-SYN-4BEN	4.5	4.6	4.5	4.4
17	PST-SYN-4SHS	4.5	4.8	4.3	4.3
18	Pennington ASC 295	4.4	5.2	3.9	4.2
19	PSG 5R5SIF	4.4	4.9	4.3	3.9
20	PSG 5RJFE	4.4	4.6	4.2	4.3
21	FT-6 Comp	4.4	4.8	4.4	3.9
22	PSG 5RJFL	4.4	4.6	4.4	4.0
23	FT-1 Comp	4.3	4.7	4.6	3.8
24	S571 Comp	4.3	4.9	4.0	4.1
25	Miser	4.3	4.8	4.1	4.0
26	PSG 5RJME	4.3	4.7	4.1	4.0
27	Navigator II	4.2	4.8	3.8	4.1
28	FT-2 Comp	4.2	4.6	4.3	3.7
29	ORC 126	4.2	4.3	4.0	4.1
30	Garnet	4.1	4.6	4.1	3.7
31	Cardinal	4.1	4.6	3.9	3.9
32	Chantilly	4.1	4.6	3.6	4.1
33	Epic	4.1	4.3	4.1	3.8
34	FT-4 Comp	4.1	4.3	3.8	4.0
35	Jasper II	4.1	4.2	4.0	4.0

(Continued)

Table 1. Fine fescue turf trial, 2012 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----				
	2013-2015 Avg.	2013 Avg.	2014 Avg.	2015 Avg.	
STRONG CREEPING RED FESCUE (continued)					
36	PSG 5RJML	4.0	4.2	3.8	4.1
37	FRR 103	4.0	4.4	3.6	4.0
38	PST-4GRY	3.9	4.0	3.6	4.1
39	PST-SYN-4REDY	3.9	4.3	3.4	4.0
40	Cindy Lou	3.8	4.1	3.8	3.7
41	Audubon	3.8	4.0	3.4	4.1
42	SRO 5250	3.8	4.1	3.6	3.8
43	BRSO	3.7	3.7	3.6	3.8
44	ASR OSO	3.7	4.0	3.5	3.6
45	Fortify	3.7	4.0	3.3	3.8
46	Shademaster III	3.7	3.9	3.5	3.7
47	PST-4CRD-U	3.7	4.2	3.3	3.4
48	PST-4SEA	3.7	3.7	3.4	3.8
49	Pathfinder	3.6	3.7	3.6	3.6
50	Foxy II	3.6	4.1	3.2	3.6
51	Xeric	3.6	3.8	3.3	3.7
52	Fenway	3.5	3.5	3.3	3.8
53	PST-4RED	3.5	3.9	3.2	3.4
54	B-RS-G	3.4	3.2	3.3	3.7
55	BRSHSM	3.2	2.8	3.1	3.8
56	BRSHST	3.2	2.6	3.1	3.9
57	Oracle	3.0	2.6	2.9	3.5
58	Boreal	2.9	2.5	2.8	3.4
59	07-1FF	2.5	2.2	2.1	3.1
BLUE FESCUE					
1	AZ BL+7	4.3	4.2	3.9	4.8
2	AZ BL+1	4.2	4.0	3.7	4.7
3	AZ BL+3	4.1	4.6	3.6	4.3
4	AZBL+4	4.1	4.2	3.7	4.4
5	AZ BL+5	4.0	4.2	3.6	4.3
6	AZ BL+9	4.0	4.2	3.7	4.2
7	Azay Blue	3.9	3.7	3.6	4.4
8	AZ BL+14	3.9	3.9	3.6	4.2
9	AZ BL+8	3.8	3.9	3.1	4.3

(Continued)

Table 1. Fine fescue turf trial, 2012 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----			
	2013-2015 Avg.	2013 Avg.	2014 Avg.	2015 Avg.
SHEEPS FESCUE				
1 Marco Polo	4.2	4.2	3.8	4.7
2 Blueray	4.2	4.6	3.8	4.3
3 Big Horn GT	4.1	4.0	4.0	4.3
4 Azure	3.5	3.1	3.1	4.3
SLENDER CREEPING RED FESCUE				
1 Shoreline	3.8	3.9	3.7	3.9
2 Seabreeze GT	3.7	3.7	3.6	3.7
3 Sealink	3.6	3.6	3.4	3.6
4 SRX 5500	2.7	3.0	2.3	2.9
BLENDS				
1 Cutting Edge	3.2	3.8	2.9	2.9
2 3CAN1	3.1	2.9	2.7	3.5
LSD at 5% =	0.4	0.6	0.7	0.5

¹9 = best turf quality

Table 2. Performance of fine fescue cultivars and selections in a turf trial seeded in September 2013 at Adelphia, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----		
	2014-2015 Avg.	2014 Avg.	2015 Avg.
HARD FESCUE			
1 7H5	5.5	5.0	6.1
2 DA1 Comp	5.5	5.4	5.5
3 DA3 Comp	5.5	5.4	5.5
4 DA2 Comp	5.4	5.4	5.4
5 7H4 Comp	5.4	5.4	5.3
6 PPG-FL 106	5.4	5.2	5.5
7 7H2 Comp	5.3	5.3	5.3
8 DA5 Comp	5.3	5.1	5.6
9 DA4 Comp	5.2	4.9	5.5
10 PPG-FL 107	5.2	5.0	5.4
11 PPG-FL 103	5.2	4.8	5.5
12 7H6 Comp	5.2	5.1	5.2
13 PSG TH3	5.1	5.1	5.1
14 Firefly	5.1	5.2	5.0
15 Beacon	5.0	4.5	5.5
16 DA6 Comp	5.0	4.9	5.2
17 7H1 Comp	5.0	5.1	4.9
18 PST-4BND	5.0	5.1	5.0
19 SR 3150	5.0	4.7	5.2
20 7H3 Comp	4.9	5.2	4.6
21 PST-4A10 Bulk	4.9	4.6	5.1
22 PPG-FL 108	4.9	4.4	5.3
23 7H6	4.7	4.4	4.9
24 JF-234	4.7	4.4	4.9
25 Nanook	4.6	4.6	4.7
26 MNHD-12	4.6	4.4	4.9
27 Spartan II	4.6	4.5	4.7
28 Azay Blue	4.5	4.2	4.7
29 Rescue 911	4.4	4.3	4.5
30 Soil Guard	4.2	4.2	4.2
31 Reliant IV	3.7	3.0	4.5
32 4-12FF-3	3.1	3.1	3.1
33 5-12FF-8	3.0	2.7	3.4
34 5-12FF-5	3.0	2.9	3.1

(Continued)

Table 2. Fine fescue turf trial, 2013 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----		
	2014-2015 Avg.	2014 Avg.	2015 Avg.
CHEWINGS FESCUE			
1 7W3 Comp	4.9	5.4	4.3
2 3W4 Comp	4.8	5.0	4.6
3 PPG-FRC 114	4.8	5.3	4.2
4 PPG-FRC 107	4.7	5.2	4.2
5 3W1 Comp	4.7	4.9	4.5
6 08-4FC Bulk	4.7	5.0	4.4
7 PPG-FRC 113	4.7	5.1	4.2
8 Radar	4.6	5.1	4.2
9 3W2 Comp	4.6	4.9	4.3
10 08-5FCE+	4.4	5.0	3.9
11 3W3 Comp	4.4	4.6	4.2
12 Ambrose	4.4	4.7	4.1
13 PPG-FRC 115	4.4	4.4	4.3
14 Shadow II	4.3	4.5	4.2
15 SR 5130	4.3	4.6	4.0
16 7W2 Comp	4.3	4.6	4.0
17 Sonar	4.2	4.6	3.9
18 Zodiac	4.2	4.3	4.1
19 Windward	4.2	4.3	4.0
20 PST-4SHR	4.1	4.1	4.1
21 Enchantment	4.1	4.3	3.9
22 J-5	4.1	4.1	4.0
23 PST-4CHT	4.0	4.0	4.0
24 PSG 50C3	3.8	3.6	3.9
25 PST-4CHY	3.7	3.4	4.0
26 Ambassador	3.4	2.8	3.9
STRONG CREEPING RED FESCUE			
1 7C5 Comp	4.8	5.1	4.5
2 2-10 Frr Bulk	4.6	5.1	4.2
3 Z13-01	4.6	5.2	4.0
4 7C6 Comp	4.6	5.0	4.1
5 2-10 Frr-6	4.5	5.0	4.0

(Continued)

Table 2. Fine fescue turf trial, 2013 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----		
	2014- 2015 Avg.	2014 Avg.	2015 Avg.
STRONG CREEPING RED FESCUE (continued)			
6 PPG-Frr 111	4.5	4.8	4.2
7 2-10 Frr-8	4.4	4.9	3.9
8 PPG-Frr-106	4.4	4.9	3.9
9 2-10-Frr-13	4.4	4.7	4.0
10 7C2 Comp	4.3	4.6	4.0
11 2-10-Frr-12	4.3	4.9	3.7
12 Navigator II	4.3	4.6	3.9
13 2-10 Frr-4	4.3	4.6	3.9
14 Wendy Jean	4.2	4.6	3.9
15 PST-4RUE Bulk	4.2	4.4	4.0
16 SR 5250	4.1	4.4	3.8
17 OR126	4.1	4.6	3.6
18 Pathfinder	4.1	3.9	4.3
19 Orbit (PPG-FRR 103)	4.1	4.5	3.6
20 Kent	4.0	4.2	3.8
21 PSG 5RJL-3	4.0	4.4	3.7
22 BMX	4.0	4.4	3.5
23 Audubon	3.9	4.3	3.6
24 Jasper II	3.9	4.4	3.4
25 PSG 5RJL-1	3.9	4.2	3.6
26 Shademaster III	3.9	4.1	3.6
27 FF2	3.8	4.0	3.7
28 PSG 5RJL-4	3.8	4.3	3.3
29 Garnet	3.8	4.0	3.6
30 PSG 5RJL-2	3.8	3.9	3.6
31 Ruddy	3.8	3.5	4.0
32 PST-4GRY	3.7	3.7	3.7
33 Shademaster III	3.7	3.9	3.6
34 Gibraltar Gold	3.7	3.8	3.7
35 PST-4SEA	3.7	3.7	3.7
36 Gibraltar	3.7	3.8	3.6
37 BRSO	3.7	3.9	3.4
38 PST-Syn-4SP24	3.7	3.6	3.7
39 CRF-11-4A	3.5	3.5	3.4
40 PST-4GRP	3.4	3.5	3.2

(Continued)

Table 2. Fine fescue turf trial, 2013 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----		
	2014-2015 Avg.	2014 Avg.	2015 Avg.
STRONG CREEPING RED FESCUE (continued)			
41 BRSG	3.4	3.3	3.4
42 4-12FF-2	3.1	3.1	3.1
43 5-12FF-6	3.1	3.0	3.2
44 4-12FF-5	3.1	2.9	3.2
45 4-12FF-1	3.0	3.0	3.1
46 4-12FF-Bulk	3.0	2.8	3.1
47 5-12FF-Bulk	3.0	2.7	3.3
48 Oracle	2.9	2.8	3.1
49 5-12FF-4	2.8	2.5	3.2
50 Boreal	2.8	2.5	3.2
SLENDER CREEPING RED FESCUE			
1 PPG-FRT 101	4.7	5.1	4.3
2 Shoreline	4.4	4.3	4.4
3 Sealink	4.3	4.3	4.3
4 Seabreeze GT	4.3	4.3	4.2
5 Sea Fire	3.9	4.0	3.7
6 Lighthouse	2.9	2.6	3.2
SHEEPS FESCUE			
1 BlueRay	4.6	4.6	4.6
2 Marco Polo	4.6	4.4	4.7
3 Bighorn GT	4.5	4.5	4.4
4 PPG-FO 102	4.0	4.1	3.9
5 Daisy	3.8	3.6	3.9
BLENDS			
1 Scottish Links	4.2	4.2	4.3
LSD at 5%=	0.5	0.6	0.8

¹9 = best turf quality

Table 3. Performance of fine fescue cultivars and selections in a turf trial seeded in September 2014 at Adelphia, NJ. (Includes all entries from the 2014 NTEP Fine Fescue Trial.)

Cultivar or Selection	Turf Quality ¹ 2015 Avg.	Establishment ² Oct. 2014 Avg.	Leaf Spot ³ June 2015 Avg.
HARD FESCUE			
1 Minimus ⁴	6.1	4.7	8.3
2 Rescue 911	6.0	5.3	8.0
3 7H6	5.9	5.3	7.0
4 7HF	5.9	3.3	7.7
5 14H5	5.8	4.3	7.3
6 DLFPS-FL/3066 ⁴	5.8	5.0	8.0
7 Beacon ⁴	5.8	4.7	8.0
8 Firefly	5.7	5.7	8.0
9 PST-4BND ⁴	5.7	3.3	5.0
10 Chariot	5.7	5.7	6.7
11 14H6	5.7	4.7	8.0
12 7H4	5.6	3.0	7.0
13 14H2	5.6	4.7	7.7
14 14H1	5.6	4.3	7.7
15 7H1	5.5	4.0	7.0
16 Extra Hard	5.5	4.7	7.7
17 14H4	5.5	4.3	8.0
18 14H3	5.5	4.7	7.7
19 MNHD-14 ⁴	5.5	4.7	7.7
20 Gladiator ⁴	5.5	5.0	7.7
21 DLFPS-FL/3060 ⁴	5.4	2.3	5.0
22 AHF188	5.4	5.7	6.7
23 H572	5.4	3.0	8.0
24 Stonehenge	5.4	4.0	7.0
25 4HES	5.4	3.3	6.3
26 7H7 ⁴	5.4	4.7	8.3
27 7H3	5.3	3.0	7.3
28 4BND	5.3	5.0	7.0
29 14H7	5.3	4.7	8.0
30 PPG-FL 106 ⁴	5.3	2.7	8.0
31 Reliant IV	5.3	6.0	7.0
32 PPG-FL 107	5.2	2.7	8.0
33 Oxford	5.2	4.7	6.3
34 DLFPS-FRC/3060 ⁴	5.2	5.7	6.3
35 Nanook	5.2	2.7	7.0

(Continued)

Table 3. Fine fescue turf trial, 2014 (continued).

Cultivar or Selection	Turf Quality ¹ 2015 Avg.	Establishment ² Oct. 2014 Avg.	Leaf Spot ³ June 2015 Avg.
HARD FESCUE (continued)			
36 PPG-FL 108	5.1	4.7	6.3
37 Sword ⁴	4.5	2.3	7.3
38 Miser	4.3	4.3	3.3
39 Beudin ⁴	4.2	5.0	6.0
CHEWINGS FESCUE			
1 C571	5.5	5.7	7.0
2 Radar ⁴	5.4	5.0	6.3
3 DLF-FRC 3338 ⁴	5.4	3.3	4.3
4 PPG-FRC 119	5.3	6.0	6.3
5 PPG-FRC 113 ⁴	5.3	5.7	5.7
6 Enchantment	5.2	6.0	5.3
7 Compass	5.2	6.0	5.0
8 14W1	5.2	4.3	4.7
9 BAR VV-VP3-CT ⁴	5.2	5.0	7.3
10 4SHR-CH	5.1	5.3	5.7
11 Ambrose	5.0	4.7	5.7
12 Shadow II	5.0	4.0	5.3
13 14W4	4.9	4.7	5.3
14 14W3	4.9	5.0	5.0
15 4C30D	4.9	4.3	4.0
16 DLFPS-FRC/3057 ⁴	4.9	5.0	5.7
17 Castle ⁴	4.8	4.7	6.7
18 PPG-FRC 107	4.8	4.0	6.0
19 PPG-FRC 115	4.8	4.3	5.3
20 J-5	4.8	3.7	5.7
21 Sonar	4.8	5.7	6.0
22 4CHT	4.8	3.0	5.0
23 PPG-FRC 114 ⁴	4.8	4.7	6.3
24 RAD-FC44 ⁴	4.8	4.7	7.0
25 Tiffany	4.7	4.3	4.3
26 Treasure II	4.7	2.7	7.0
27 Syn-4SWT-13	4.7	4.3	5.7
28 Fairmont	4.7	4.7	5.7
29 4CHY	4.7	4.3	5.3
30 14W2	4.6	5.0	4.0

(Continued)

Table 3. Fine fescue turf trial, 2014 (continued).

Cultivar or Selection	Turf Quality ¹ 2015 Avg.	Establishment ² Oct. 2014 Avg.	Leaf Spot ³ June 2015 Avg.
CHEWINGS FESCUE (continued)			
31 Heathland	4.6	3.3	4.7
32 Cascade ⁴	4.5	5.7	4.3
33 BAR 6FR 126 ⁴	4.4	5.0	4.3
34 Shadow III	3.8	2.3	5.7
35 Survivor	3.3	1.3	7.0
SHEEPS FESCUE			
1 Quatro ⁴	5.4	4.7	6.7
2 Marco Polo	5.3	5.7	8.3
3 Blueray	5.3	3.3	8.0
4 Bighorn GT	5.0	3.3	8.7
5 Daisy	4.4	3.3	7.7
BLUE FESCUE			
1 Azure	5.2	4.7	8.3
SLENDER CREEPING RED FESCUE			
1 PPG-FRT 101 ⁴	5.2	5.0	5.0
2 4SEA	4.8	3.7	5.0
3 BAR FRT 5002 ⁴	4.3	3.0	3.3
4 Seabreeze GT ⁴	4.2	2.0	6.0
5 Lighthouse	3.7	6.3	3.0
STRONG CREEPING RED FESCUE			
1 14R3	5.0	5.0	5.7
2 DLFPS-FRR/3068 ⁴	5.0	4.3	5.7
3 C14-OS3 ⁴	4.9	5.3	6.3
4 7C34 ⁴	4.9	3.3	2.7
5 FT345	4.8	3.3	5.0
6 ASC 295	4.8	5.7	5.0
7 Pathfinder	4.7	5.7	3.3
8 14R1	4.7	5.0	3.3
9 14R2	4.7	4.7	4.0
10 DSRxBLMT	4.7	4.3	4.0

(Continued)

Table 3. Fine fescue turf trial, 2014 (continued).

Cultivar or Selection	Turf Quality ¹ 2015 Avg.	Establishment ² Oct. 2014 Avg.	Leaf Spot ³ June 2015 Avg.
STRONG CREEPING RED FESCUE (continued)			
11 PennASC295	4.7	4.7	5.3
12 Marvel ⁴	4.7	5.0	3.3
13 Cardinal	4.6	6.0	4.3
14 PPG-FRR 110	4.6	5.3	4.0
15 14R4	4.6	4.3	4.0
16 PPG-FRR 115	4.5	6.3	4.0
17 Audubon	4.5	5.7	3.7
18 Gibraltar Gold	4.5	5.3	4.0
19 DLF-FRR 6162 ⁴	4.5	5.3	4.3
20 Orbit	4.5	6.7	3.3
21 Navigator II ⁴	4.5	4.7	4.0
22 DLFPS-FRR/3069 ⁴	4.4	3.3	4.3
23 PST-4BEN ⁴	4.4	5.3	4.0
24 Aberdeen	4.4	4.3	4.0
25 4CRD-V	4.4	3.7	4.7
26 RAD-FR47 ⁴	4.4	5.3	4.0
27 Gibraltar	4.3	5.7	4.0
28 RAD-FR35	4.3	4.0	4.3
29 PPG-FRR 111 ⁴	4.3	5.3	3.7
30 Kent ⁴	4.3	6.0	3.3
31 4CRD-P	4.2	5.7	4.0
32 4ED4	4.2	5.3	3.7
33 Soilguard	4.2	1.3	7.0
34 Syn-4SP24	4.2	5.3	3.3
35 Pennlawn	4.2	6.7	3.7
36 4BEN	4.1	5.3	4.3
37 4SP14	4.1	5.3	3.3
38 PST-4DR4 ⁴	4.1	4.7	4.3
39 FF2	4.1	4.7	3.3
40 Fenway	4.1	5.7	3.0
41 Creeper	4.1	2.7	4.7
42 PST-4ED4 ⁴	4.1	5.0	3.3
43 4DR4-BS	4.1	5.3	3.7
44 Shademaster III	4.1	3.7	4.3
45 Crossbow II	4.1	6.0	3.0

(Continued)

Table 3. Fine fescue turf trial, 2014 (continued).

Cultivar or Selection	Turf Quality ¹ 2015 Avg.	Establishment ² Oct. 2014 Avg.	Leaf Spot ³ June 2015 Avg.
STRONG CREEPING RED FESCUE (continued)			
46 RAD-FR33R ⁴	4.1	5.0	4.0
47 4RUE	4.0	5.3	3.3
48 PST-4RUE ⁴	4.0	5.3	4.3
49 4GRY	4.0	3.3	4.0
50 4RED	4.0	4.3	4.0
51 Xeric	3.9	5.3	3.7
52 4GRP	3.7	5.0	3.0
53 Oracle	3.6	6.0	2.7
54 Boreal ⁴	3.4	5.7	2.3
BLENDS			
1 Scottish Links	4.9	4.3	6.7
2 Irish links mixture	4.1	3.0	4.7
LSD at 5%=	0.6	1.4	1.9

¹9 = best turf quality

²9 = best establishment

³9 = least disease

⁴9 = NTEP entry

Table 4. Yearly nitrogen (N) applied and mowing height (Ht) on fine fescue tests established at Adelphia, NJ.

	2013		2014		2015	
	Ht ²	N ¹	Ht	N	Ht	NHt
Table 1 (2012).....	2.5	2.5	1.0	2.5	0.5	2.5
Table 2 (2013).....			1.5	2.5	1.5	2.5
Table 3 (2014).....					1.5	2.5

¹Annual N applied (lb/1000 ft²)

²Mowing height in inches