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# **2004 RUTGERS TURFGRASS PROCEEDINGS**

of the

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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, Cook College, 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 2004 New Jersey Turfgrass Expo. 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

Yuanhong Han, Pedro Perdomo, James A. Murphy, William A. Meyer, Stacy A. Bonos,  
William K. Dickson, Dirk A. Smith, Ronald F. Bara, and Melissa M. Wilson<sup>1</sup>

The fine fescues are comprised of several species from the genus *Festuca*. These species have fine to very narrow leaves and can persist under limited soil water availability and low nitrogen fertility. There are six species commonly used as turfgrass: Chewings fescue (*Festuca rubra* L. subsp. *falax* Thuill.), hard fescue (*F. brevipila* (Hack.) Krajina, formerly *F. longifolia* Thuill.), sheeps fescue (*F. ovina* L.), and blue fescue (*F. glauca* Lam) are bunch type, whereas slender creeping red fescue (*F. rubra* L. subsp. *littoralis*, formerly *F. rubra* L. subsp. *trichophylla* Gaud.) and strong creeping red fescue (*F. rubra* L. subsp. *rubra* Gaud.) have a rhizomatous growth habit.

Chewings fescues form a dense, attractive turf. Newer hard fescue cultivars have improved turf-type characteristics. Although similar in density and texture to the Chewings fescues, they have lower nutrient requirements, better disease resistance under low maintenance, and a slower growth rate. Hard fescues are frequently used for soil erosion control in low maintenance areas.

The rhizomatous growth habit of strong creeping and slender creeping red fescues tends to produce a more open turf. This characteristic is more prominent in strong creeping red fescues, however, so they tend to have a more open growth habit than the slender creeping red fescues. Strong creeping red fescues are often used as a companion grass in mixtures with Kentucky bluegrass because they have similar color, growth habit, and density. The strong creeping red fescues have better establishment and seedling vigor than Kentucky bluegrass. After establishment the fescues can dominate in heavily shaded areas.

Sheeps and blue fescues have stiff, bluish-green leaves and require little maintenance. Sheeps fes-

cues are used for stabilization of sandy soil and banks along irrigation canals. In addition to their conservation usage, sheeps and blue fescues have aesthetic value and are often used in wildflower mixes both for soil stabilization and for their attractive bluish foliage.

Fine fescues have excellent shade and drought tolerance. They prosper where irrigation and fertilization are limited. Ideally, fine fescues should be fertilized with no more than 1 to 2 lb nitrogen per 1000 ft<sup>2</sup> per year. Hard, blue, and sheeps fescues require less nitrogen nutrition than the other species. With the exception of Chewings fescues, which can be mown to a 0.25-inch height of cut in cool climates, the other fine fescue species do not tolerate a low mowing height. Mowing heights of 1.5 to 2.0 inches are feasible, but these species perform best above 2.5 inches.

Many fine fescues contain *Neotyphodium* endophytes, which are fungi that grow in the crown and leaf sheath tissues of the turfgrass plant and maintain a symbiotic relationship with the host. Cultivars carrying endophytes exhibit enhanced tolerance to insect, disease, and environmental stress, which is attributed to alkaloid compounds that result from the endophyte-plant symbiosis. Incorporation of endophytes into improved plant material provides an efficient way to increase stress tolerance.

Breeding efforts continue to enhance turf characteristics of the fine fescues and improve resistance to diseases, insects, and environmental stresses. The Rutgers breeding program, in cooperation with the National Turfgrass Evaluation Program (NTEP), is involved in an extensive program that evaluates many cultivars and experimental selections for turf performance.

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<sup>1</sup>Graduate Assistant, County Agricultural Agent, Associate Extension Specialist in Turfgrass Management, Professor, Assistant Professor, Turfgrass Research Farm Supervisor, Principal Laboratory Technician, Principal Laboratory Technician, and Head Greenhouse and Field Technician, respectively, New Jersey Agricultural Experiment Station, Cook College, Rutgers, The State University of New Jersey, New Brunswick, NJ 08901-8520.

## PROCEDURES

Fine fescue trials were conducted at the Rutgers Plant Biology and Pathology Research and Extension Farm at Adelphia, NJ (Tables 1, 2, and 4) and the Rutgers Horticultural Research Farm II at North Brunswick, NJ (Table 3). All tests were established in open areas with good air circulation. All entries were seeded in 3 X 5 ft plots at a seeding rate of 3.7 lb/1000 ft<sup>2</sup>. Plots were replicated three times in a randomized complete block design.

Tests were fertilized at different nitrogen rates, mown at different heights, and subjected to varying levels of drought stress depending on the objective of the test during the evaluation period (Table 5). After establishment, tests were irrigated only to avoid severe drought stress and dormancy and were mowed frequently to avoid excessive accumulation of clippings. At Adelphia, broadleaf weeds were controlled with spring or fall applications of 2,4-D and Banvel; a spring application of Dimension was used to control annual grassy weeds; and Merit was applied in June for grub control. At North Brunswick, Dimension was applied in spring to control annual grassy weeds; and Merit was applied in May to control grubs.

The four tests were evaluated throughout the year by visually rating for turf quality (Tables 1 to 4). Turf quality is a subjective rating that is based on density, texture, uniformity, color, growth habit, and lack of damage from diseases or insects. Tests were occasionally evaluated for individual characteristics such as density (Tables 3, 4), seedling establishment (Table 3), color (Tables 3, 4), green cover (Tables 3, 4), and resistance to leaf spot (caused by species of *Bipolaris* and *Drechslera*) (Table 4), summer patch (caused by *Magnaporthe poae*) (Table 3), and dollar spot (caused by *Sclerotinia homoeocarpa*) (Table 2). Most ratings were taken using a 1 to 9 scale with 9 representing the best turf quality or most desirable characteristic. Ratings for green cover were taken either as percent turf cover per plot or using the 1 to 9 scale (Tables 3, 4). All data were summarized and subjected to an analysis of variance. Means were separated using the least significant difference (LSD) mean separation test.

## RESULTS AND DISCUSSION

Data presented in Tables 1 and 2 are grouped by species and ranked by the multiple year quality average. Tables 3 and 4 are ranked by turf quality in 2004.

This was done to facilitate comparison of cultivars and selections within a species.

### Turf Quality

Considerable improvements have been made in overall turf quality of newer fine fescues compared to early cultivars. Chewings and hard and strong creeping fescues generally performed better than the other species. Although improvement in the turf quality of blue, sheeps, and slender creeping red fescues continues, these species still rank lower than the others in turf quality (Tables 1 to 4).

### Establishment

Establishment in the fine fescues was not well correlated with turf quality within any given species in the 2003 test at North Brunswick (Table 3). Some cultivars or selections with good establishment showed poor turf quality (Oracle, Boreal, etc.), whereas many cultivars or selections with good turf quality were slow to establish (SRX 51G, Fortitude, etc.).

### Disease Resistance

In the 2002 test at Adelphia, hard fescues exhibited the best resistance to dollar spot (Table 2). The most resistant cultivar or selections included PST HE-1, HF 2nd-02, SPE comp, and Firefly. Good resistance was also evident in some cultivars and selections of the strong creeping red fescues (Fortitude and FRR-NGS-02); however, resistance of Chewings fescues to dollar spot was relatively low (Table 2). Most cultivars or selections showed high to moderate resistance to leaf spot in the 2003 test at Adelphia, although a few strong creeping red fescues were poorly resistant (Table 4). The Koeleria cultivar Barkoel showed good resistance (7.0) to leaf spot (Table 4). In the 2004 test at North Brunswick, hard fescues exhibited less resistance to summer patch than Chewings and strong creeping red fescues (Table 3).

## SUMMARY

Breeding efforts continue to improve turf characteristics in the fine fescues. The area of insect and disease resistance is also an important focus of the Rutgers program. We continue to look at the use of endophytes to supplement breeding efforts to improve the natural ability of a cultivar to persist under stress.

The successful efforts of the breeding program are well documented in the superior quality exhibited by many of the newer experimental selections; however, further improvements are still needed.

#### **ACKNOWLEDGMENTS**

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Table 1. Performance of fine fescue cultivars and selections in a turf trial seeded in September 2001 at Adelphia, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			
	2002-2004 Avg.	2002 Avg.	2003 Avg.	2004 Avg.
<b>CHEWINGS FESCUE</b>				
1 EC4601	6.0	6.1	6.3	5.8
2 ACF 188	5.9	5.9	6.0	5.7
3 OO-CFRc	5.5	5.4	5.5	5.6
4 01-2	5.5	5.4	5.7	5.4
5 C8-1-4CHU	5.4	5.3	5.5	5.4
6 FCATCX	5.3	5.0	5.6	5.3
7 ACF 195	5.3	5.3	5.4	5.1
8 SRX 5NJD	5.2	4.9	5.6	5.0
9 ACF 189	5.1	4.9	5.3	5.2
10 FC77	5.1	5.0	5.2	5.1
11 01-3	5.1	5.0	5.1	5.1
12 Shadow II	5.0	4.5	5.2	5.2
13 ZFRC 8328	5.0	4.8	5.3	4.8
14 Silhouette	5.0	4.8	5.0	5.1
15 SRX 51GG	4.9	4.8	4.9	5.0
16 01-1	4.7	4.8	4.6	4.8
17 ACF 193	4.6	5.1	4.7	4.2
18 ACF 198	4.6	4.9	4.7	4.3
19 FRC B-98	4.4	4.5	4.6	4.2
20 Bridgeport	4.4	4.3	4.5	4.5
21 SRX51FF	4.3	4.6	4.3	4.1
22 SRX 51II	4.2	4.4	4.0	4.1
23 Lucinda	4.2	4.1	4.2	4.2
24 Victory	4.1	4.0	3.9	4.4
25 C8-9-4EC-99	4.0	4.0	4.0	4.1
26 SR 5100	4.0	3.9	3.9	4.2
27 FC62	4.0	3.8	4.1	4.1
28 C8-1-4SU-2001	3.9	4.3	3.6	3.9
29 01-ORCHF-T	3.8	4.2	3.9	3.4
30 Sandpiper	3.8	3.7	3.8	3.7
31 01-ORCHF-SHY	3.7	4.4	3.7	3.1
32 01-ORCHF-M	3.2	4.1	2.9	2.4

(Continued)

Table 1 (continued).

		-----Turf Quality <sup>1</sup> -----			
Cultivar or Selection	2002-2004 Avg.	2002 Avg.	2003 Avg.	2004 Avg.	
<b>HARD FESCUE</b>					
1	HE1 comp	6.2	6.7	6.1	5.9
2	SRX 3961	5.8	6.3	5.9	5.2
3	AHF 090	5.6	5.9	5.8	5.2
4	Hardtop	5.5	5.7	5.7	5.2
5	C8-1-49TH-01	5.4	5.4	5.6	5.1
6	SRX 3324	5.4	5.7	5.4	5.0
7	GAFF	5.4	5.5	5.3	5.4
8	SRX 3STDNE	5.2	5.4	5.2	5.1
9	AHF 116	5.2	5.6	5.2	4.8
10	Discovery	5.2	5.2	5.0	5.5
11	Aurora II	5.2	5.5	5.5	4.5
12	SRX 3STDE	5.2	5.1	5.2	5.2
13	Rescue 911	5.2	5.5	5.0	5.1
14	AHF 106	5.1	5.6	5.0	4.7
15	Osprey	5.1	5.1	5.2	5.0
16	AHF 114	5.1	5.5	5.0	4.8
17	Aurora Gold	5.1	5.2	5.0	5.0
18	HB1 comp	5.0	5.7	4.9	4.3
19	4AU-99	4.9	5.3	4.7	4.7
20	Ecostar	4.9	5.2	4.5	4.8
21	SRX 3M01	4.9	5.1	4.9	4.6
22	Stonehenge	4.7	4.6	5.1	4.6
23	SR 3100	4.7	4.7	4.8	4.6
24	C8-1-4CU-99	4.5	4.7	4.7	4.2
25	SRX 3BHF	4.5	5.0	4.7	3.9
26	01-ORHF EXP	4.2	4.8	3.8	4.0
27	Little Bighorn	4.2	4.3	4.2	4.1
28	DLFJ-102	3.6	3.5	3.3	4.1
29	F052	3.1	3.5	2.6	3.3
30	01-ORHF BGS	2.9	3.0	2.5	3.3
<b>SLENDER CREEPING RED FESCUE</b>					
1	FL55	5.3	5.5	5.3	5.1
2	SRX 55SLCE	4.2	4.3	4.2	4.2
3	SRX 55SLG	4.1	4.2	4.3	3.9
4	Dawson E	4.0	4.2	3.7	4.1
5	Count	3.5	3.7	3.3	3.5

(Continued)

Table 1 (continued).

		-----Turf Quality <sup>1</sup> -----			
Cultivar or Selection	2002-2004 Avg.	2002 Avg.	2003 Avg.	2004 Avg.	
<b>STRONG CREEPING RED FESCUE</b>					
1	01-3	6.2	6.1	6.8	5.7
2	01-1	6.2	6.1	6.4	6.0
3	01-2	5.9	5.9	6.4	5.4
4	TL2	5.9	5.5	6.2	5.9
5	FRDW2	5.7	5.6	6.2	5.3
6	BURF-01	5.5	5.5	5.8	5.2
7	PST-4VLS	5.4	5.9	5.4	4.8
8	Inverness	5.3	5.6	5.6	4.6
9	C8-9-4FR-99	5.2	5.6	5.4	4.7
10	Jasper II	5.1	5.5	5.5	4.2
11	PST-4EL	5.1	5.1	5.2	4.9
12	Fenway	5.0	4.7	5.3	5.0
13	Florentine	4.9	5.0	5.4	4.3
14	SRX 52961	4.9	5.2	5.3	4.1
15	C8-1 Badger	4.8	5.2	4.5	4.6
16	ZFRR93-111	4.7	5.5	4.4	4.3
17	SR 5210	4.7	4.6	5.0	4.6
18	PST-4AZ	4.7	4.9	4.6	4.6
19	4FRR-99	4.7	4.5	4.6	5.0
20	PST-4SBU	4.7	4.6	4.5	5.0
21	4CRE-98	4.7	4.8	4.7	4.5
22	PST-4FINO	4.6	4.5	4.6	4.8
23	PST-4CR1	4.6	4.8	4.8	4.2
24	Seabreeze	4.3	4.8	4.1	4.1
25	4BBL	4.3	4.7	4.4	3.8
26	ZFRR93-118	4.3	4.1	4.8	4.0
27	ASC 251	4.0	4.2	4.0	3.8
28	Salsa	4.0	3.8	4.3	3.9
29	ZFRR93-107X	3.8	4.0	3.6	4.0
30	DLFJ-102	3.7	3.7	3.6	3.8
31	Crestlawn	3.6	3.5	3.4	3.8
32	DLFJ-101	3.5	3.2	3.5	3.8
33	DLFJ-103	3.3	3.0	3.1	3.8
34	DLFJ-104	3.2	4.2	2.6	2.7
35	DLFJ-105	3.0	2.5	2.8	3.7
36	SR 5200E	3.0	3.0	2.9	3.1

(Continued)

Table 1 (continued).

Cultivar or Selection		-----Turf Quality <sup>1</sup> -----			
		2002-2004 Avg.	2002 Avg.	2003 Avg.	2004 Avg.
<b>SHEEPS FESCUE</b>					
1	C8-1-4MB	4.8	5.1	4.6	4.6
2	MX-86	2.9	3.2	2.3	3.2
LSD at 5%=		0.6	0.6	0.8	0.8

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

Table 2. Performance of fine fescue cultivars and selections in a turf trial seeded in September 2002 at Adelphia, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Dollar Spot <sup>2</sup> Aug. 2004
	2003-2004 Avg.	2003 Avg.	2004 Avg.	
<b>CHEWINGS FESCUE</b>				
1 SRX 51G	5.8	5.9	5.7	6.7
2 4601	5.6	5.5	5.6	6.3
3 CIS-FRC-12	5.5	5.5	5.5	7.0
4 FC 68	5.5	5.4	5.7	6.7
5 Long Fellow II	5.5	6.0	5.0	5.3
6 FC 3	5.5	5.5	5.4	6.3
7 CIS-FRC-11	5.4	5.4	5.4	4.7
8 Shadow II	5.4	5.6	5.1	4.3
9 Ambrose	5.4	5.7	5.0	3.3
10 SRX 51FF	5.3	5.7	4.9	5.0
11 4CHX bulk	5.3	5.4	5.1	6.3
12 C-73	5.2	5.5	5.0	4.7
13 00-D	5.2	5.5	4.9	3.0
14 SRX NJD	5.1	5.3	4.9	3.3
15 CIS-FRCL-1	5.1	5.0	5.2	6.0
16 FC 2	5.1	5.2	5.0	6.3
17 FRC A-93	5.0	5.2	4.9	3.7
18 Ambassador	5.0	5.2	4.7	6.0
19 SRX 51II	4.9	5.1	4.7	4.3
20 FC 1	4.9	5.1	4.7	4.0
21 BAR CHF-8FUS2	4.9	5.1	4.7	4.3
22 Treazure	4.9	5.1	4.6	7.0
23 02-CHFHHY	4.8	5.0	4.5	4.7
24 Victory II	4.7	5.2	4.2	3.7
25 SR 5100	4.7	5.1	4.3	3.7
26 02-CHFMED	4.7	5.1	4.2	3.7
27 SRX 51HH	4.7	5.0	4.3	2.7
28 FRC B-98	4.6	4.8	4.3	2.7
29 Banner II	4.4	4.9	3.9	4.7
30 Victory	4.2	4.4	4.0	3.0
31 Jamestown II	4.1	4.5	3.7	2.3
32 FC 51	4.0	4.5	3.5	2.3
33 SRX 51LAM	3.4	3.5	3.2	3.7

(Continued)

Table 2 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Dollar Spot <sup>2</sup> Aug. 2004	
	2003-2004 Avg.	2003 Avg.	2004 Avg.		
<b>HARD FESCUE</b>					
1	SPE comp	6.2	6.1	6.3	8.7
2	Firefly	6.1	5.6	6.6	8.3
3	SRX 3961	6.0	5.9	6.0	7.7
4	HF 2nd-02	5.9	5.6	6.3	9.0
5	PST HE-1	5.9	5.9	6.0	9.0
6	Oxford	5.7	5.8	5.5	7.7
7	HOE	5.7	5.4	5.9	7.7
8	SRX 3324	5.6	5.0	6.2	7.7
9	Harpoon	5.6	5.4	5.8	7.0
10	02-H-FO	5.4	5.3	5.5	7.3
11	SRX 3STDNE	5.4	5.0	5.8	5.3
12	FL 55	5.3	5.0	5.6	4.3
13	SR 3100	5.3	5.3	5.2	6.3
14	Eureka II	5.3	5.4	5.2	5.0
15	00-AFF	5.3	5.2	5.3	7.0
16	Reliant II	5.3	5.2	5.3	5.0
17	CIS FL-24	5.2	5.1	5.4	7.0
18	PST-Syn-4BU2	5.2	5.0	5.3	6.0
19	SRX 3BHF	5.2	5.0	5.4	4.7
20	Hard Top	5.1	5.4	4.8	7.7
21	Chariot	5.0	5.1	5.0	7.3
22	GAFF	5.0	5.6	4.5	3.7
23	SRX 3K	5.0	4.8	5.2	7.3
24	Osprey	5.0	4.9	5.1	6.3
25	Heron	5.0	4.9	5.0	5.7
26	Minotaur	4.9	4.8	4.9	6.7
27	FFA-97	4.8	4.7	4.9	5.7
28	Aurora II	4.8	4.3	5.2	5.3
29	FO A-98	4.7	4.9	4.6	5.0
30	FO B-98	4.7	4.8	4.5	6.0
31	Aurora Gold	4.6	4.8	4.3	5.7
32	Stonehenge	4.5	4.6	4.4	6.7
33	PST-4MB	4.5	4.4	4.5	2.7
34	FF9-94	4.4	4.8	4.0	3.7
35	Little Bighorn	4.4	4.4	4.4	4.0

(Continued)

Table 2 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Dollar Spot <sup>2</sup> Aug. 2004	
	2003- 2004 Avg.	2003 Avg.	2004 Avg.		
<b>SLENDER CREEPING RED FESCUE</b>					
1	BAR SCF 8FUS	5.0	5.4	4.5	4.0
2	SRX 55Q26	4.6	4.7	4.4	4.3
3	Seabreeze	4.5	5.2	3.8	2.7
4	4SU-02	4.3	5.1	3.5	1.3
5	SRX 55Q4	4.3	4.1	4.5	5.3
6	SRX 55SLE	4.3	4.4	4.1	2.0
7	Dawson E	4.2	4.9	3.5	3.3
8	SRX 55QSLC	4.0	4.0	4.0	3.3
9	SRX 55Q27	4.0	4.1	3.9	3.3
10	PST-Syn-4TU	3.9	3.8	4.1	4.3
11	PST-Syn-4EU	3.9	3.5	4.3	3.7
12	SRX 55Q28	3.9	3.8	3.9	4.0
13	SRX 55Q25	3.7	3.8	3.6	2.7
<b>STRONG CREEPING RED FESCUE</b>					
1	Fortitude	6.0	6.1	5.9	7.3
2	FRR-NGS-02	6.0	5.6	6.3	7.7
3	CIS-FRR-30	5.6	5.6	5.6	8.3
4	PST 8000 FF	5.4	5.5	5.4	5.0
5	00-A FRR	5.4	5.6	5.2	6.7
6	TL7 comp	5.4	5.4	5.3	7.3
7	FRR-02G	5.3	5.4	5.1	6.3
8	FRR-02P	5.3	5.4	5.1	8.0
9	FR 65	5.2	5.6	4.8	4.3
10	RCM comp	5.2	5.4	4.9	7.0
11	Navigator	5.2	5.3	5.0	8.0
12	DW2	5.1	5.0	5.3	8.0
13	BMVC-502	5.1	5.2	4.9	5.3
14	CIS-FRR-29	5.0	4.9	5.1	7.0
15	CIS-FRR-28	5.0	5.0	5.0	5.7
16	RCE comp	5.0	5.0	5.1	6.3
17	CIS-FRR-27	5.0	4.9	5.1	7.0
18	FR 3	5.0	5.0	5.0	5.7
19	CIS-FRR-26	4.9	4.8	5.0	7.3
20	FR 2	4.8	4.8	4.8	6.3

(Continued)

Table 2 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Dollar Spot <sup>2</sup> Aug. 2004	
	2003- 2004 Avg.	2003 Avg.	2004 Avg.		
<b>STRONG CREEPING RED FESCUE (cont.)</b>					
21	Aberdeen	4.7	5.1	4.3	5.0
22	Pathfinder	4.7	4.9	4.5	6.0
23	Audubon	4.6	5.2	4.1	4.7
24	Camilla	4.6	5.0	4.1	4.0
25	Cindy Lou	4.6	5.4	3.7	3.0
26	Jasper II	4.5	5.2	3.9	3.7
27	SRX 52961	4.5	4.7	4.3	4.7
28	FR 67	4.4	4.3	4.4	3.7
29	Fenway	4.3	4.2	4.5	7.3
30	PST-4VS bulk	4.3	4.5	4.1	4.7
31	01-FR 1	4.3	4.9	3.7	3.3
32	Inverness	4.3	4.3	4.3	2.7
33	PST-Syn-4VLS	4.2	4.6	3.8	2.3
34	Florentine	4.2	4.8	3.6	3.7
35	Florentine RT	4.1	4.2	4.0	2.3
36	Bargena II	4.1	4.6	3.6	5.0
37	FRR GHCL	4.0	4.4	3.7	2.7
38	PST-4F2	3.9	3.4	4.4	3.7
39	PST-SYN-4CRY	3.9	3.8	3.9	3.7
40	FR 46	3.8	4.2	3.4	2.0
41	Jasper	3.8	4.2	3.4	4.3
42	Trapeze BS	3.8	4.2	3.3	2.7
43	PST-SYN-4CRX	3.7	3.6	3.8	3.3
44	SR 5210	3.7	3.9	3.5	4.0
45	PST-Syn-4TG	3.5	3.5	3.5	3.7
46	SR 5200 E	3.3	3.3	3.4	3.0
<b>BLUE FESCUE</b>					
1	SR 3200	3.4	3.4	3.4	2.3
<b>KOELERIA</b>					
1	Barleria	4.1	5.2	2.9	3.3
2	Barkoel	3.8	4.5	3.0	1.3

(Continued)

Table 2 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----			Dollar Spot <sup>2</sup> Aug. 2004
	2003-2004 Avg.	2003 Avg.	2004 Avg.	
LSD at 5%=	0.4	0.5	0.6	2.7

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

<sup>2</sup>9 = least disease

Table 3. Performance of fine fescue cultivars and selections in a turf trial seeded in September 2003 at North Brunswick, NJ. (Includes all entries in the 2003 National Fineleaf Fescue Test.)

Cultivar or Selection	Turf Quality <sup>1</sup> 2004 Avg.	Establishment <sup>2</sup> Sept. 2003	Cover (%) June 2004	Summer Patch <sup>3</sup> 2004 Avg.	Cover <sup>4</sup> Oct. 2004	Density <sup>5</sup> Oct. 2004	Color <sup>6</sup> Oct. 2004
<b>CHEWINGS FESCUE</b>							
1 SRX 51G	6.9	3.7	90.0	7.0	7.7	7.3	7.0
2 Zodiac	6.5	5.7	87.3	8.2	8.3	7.3	8.3
3 7 Seas	6.3	4.0	81.7	8.0	8.0	6.3	6.0
4 PST-4TZ	6.2	3.3	87.3	5.5	6.3	8.0	6.7
5 DP 77-9885	6.2	5.0	82.7	8.3	7.0	6.3	4.7
6 IS-FRC 17	6.0	4.3	83.3	6.5	6.7	5.7	6.0
7 ACF 188	5.8	3.3	80.3	6.2	6.0	7.7	4.3
8 Longfellow II	5.6	6.0	89.0	5.7	5.7	7.3	6.0
9 DP 77-9886	5.3	6.0	80.0	7.5	7.7	6.7	4.3
10 Culumbra II	5.1	4.3	78.3	5.5	5.3	6.3	7.0
11 Intrigue	4.9	5.7	82.0	4.5	4.7	6.0	6.0
12 Jamestown 5	4.6	5.0	79.0	4.5	4.3	5.3	5.0
13 Pathfinder	4.6	5.0	63.3	7.2	7.0	3.7	5.7
14 Cascade	3.8	5.7	69.0	3.8	4.3	5.0	3.0
<b>HARD FESCUE</b>							
1 IS-FL 28	5.8	4.0	87.7	4.2	4.0	8.7	6.3
2 Pick HF #2	5.6	4.7	91.3	4.3	3.7	7.3	5.0
3 A01630Rel	5.3	3.3	86.7	4.5	3.3	8.3	5.7
4 Ambassador	5.2	5.3	86.7	4.7	4.7	6.3	7.0
5 Firefly	5.1	2.3	89.0	3.2	3.0	7.7	7.0
6 Berkshire	4.7	6.3	86.7	2.7	3.0	6.3	5.3
7 Predator	4.6	3.0	84.0	2.8	3.7	7.3	5.0
8 Chariot	4.1	3.3	78.3	2.5	3.7	6.3	5.7
9 SR 3000	4.0	2.3	75.0	2.7	2.3	5.0	4.3
10 SRX 3K	3.9	3.3	80.7	2.3	3.0	5.7	3.7
11 Scaldis	3.1	3.7	63.3	2.0	2.7	5.3	4.7
<b>SLENDER CREEPING RED FESCUE</b>							
1 SRX 55R	4.6	5.7	84.3	5.3	5.0	5.0	5.0
2 Seabreeze	3.8	3.0	64.3	2.7	4.0	6.3	3.3
3 Dawson E	3.5	3.3	72.7	2.3	2.7	5.0	3.0

(Continued)

Table 3 (continued).

Cultivar or Selection		Turf Quality <sup>1</sup> 2004 Avg.	Establishment <sup>2</sup> Sept. 2003	Cover (%) June 2004	Summer Patch <sup>3</sup> 2004 Avg.	Cover <sup>4</sup> Oct. 2004	Density <sup>5</sup> Oct. 2004	Color <sup>6</sup> Oct. 2004
<b>STRONG CREEPING RED FESCUE</b>								
1	Fortitude	6.5	4.7	82.7	7.2	7.7	6.0	8.0
2	5001	6.4	7.3	82.3	5.8	6.0	5.7	7.3
3	IS-FRR 30	6.3	6.0	77.7	7.8	7.7	5.3	6.3
4	Pick CRF 1-03	6.1	5.0	80.0	7.7	7.0	6.0	8.0
5	C03-RCE	6.0	7.0	82.7	6.5	6.7	5.0	7.0
6	PST-8000	5.7	4.3	78.0	6.2	6.0	5.3	8.3
7	DLF-RCM	5.7	7.7	85.7	5.8	5.3	4.3	5.0
8	C-SMX	5.5	4.7	76.3	6.0	5.3	6.0	6.3
9	IS-FRR 29	5.5	4.3	70.0	6.5	6.0	3.7	6.0
10	Cindy Lou	5.5	6.0	73.3	7.3	7.3	4.0	6.7
11	TL1	5.4	4.3	70.0	5.8	6.3	4.7	5.0
12	Celestial	5.4	7.3	80.7	5.5	5.0	5.3	5.7
13	Jasper II	5.4	6.0	76.7	5.7	5.7	5.7	5.7
14	Musica	5.3	5.0	86.0	3.5	3.7	8.3	5.3
15	DP 77-9578	5.3	6.7	74.3	6.7	6.3	5.3	6.3
16	BMXC-502	5.2	3.3	67.7	6.3	6.0	5.3	6.0
17	DP 77-9579	5.1	6.3	72.7	5.7	6.3	6.0	7.3
18	DP 77-9360	5.0	6.0	74.0	5.8	5.3	5.7	7.7
19	Oxford	4.8	4.0	81.0	4.0	4.0	7.3	6.3
20	Razor	4.7	6.0	69.3	5.5	5.7	5.7	5.0
21	Audubon	4.5	4.3	61.7	6.5	5.7	3.7	3.7
22	ASC 245	4.4	3.3	72.0	3.2	4.0	5.3	7.0
23	C03-4676	4.4	6.3	73.3	4.8	5.0	5.7	4.3
24	Navigator	4.3	3.3	68.0	5.5	5.7	4.0	5.0
25	IS-FRR 23	4.2	6.0	76.7	4.0	4.0	3.7	5.0
26	Fenway	3.5	5.7	56.7	5.7	6.0	3.3	3.3
27	Shademaster	2.8	4.3	43.3	4.2	4.7	3.7	2.3
28	Oracle	2.5	8.0	48.3	2.3	3.0	3.7	2.7
29	Boreal	2.2	7.7	51.7	2.0	2.3	3.3	3.0
30	Minotaur	3.9	2.3	70.0	3.5	4.0	6.3	2.3
<b>SHEEPS FESCUE</b>								
1	Quatro	3.9	3.0	79.3	2.7	2.7	7.0	3.3

(Continued)

Table 3 (continued).

Cultivar or Selection	Turf Quality <sup>1</sup> 2004 Avg.	Establishment <sup>2</sup> Sept. 2003	Cover (%) June 2004	Summer Patch <sup>3</sup> 2004 Avg.	Cover <sup>4</sup> Oct. 2004	Density <sup>5</sup> Oct. 2004	Color <sup>6</sup> Oct. 2004
LSD at 5% =	0.7	1.6	8.6	1.7	1.9	2.0	2.5

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

<sup>2</sup>9 = best establishment

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

<sup>4</sup>9 = best turf cover

<sup>5</sup>9 = highest shoot density

<sup>6</sup>9 = darkest green color

Table 4. Performance of fine fescue cultivars and selections in a turf trial seeded in September 2003 at Adelphia, NJ. (Includes all entries of the 2003 National Fineleaf Fescue Test.)

Cultivar or Selection	Turf Quality <sup>1</sup> 2004 Avg.	Cover (%) Sept. 2003	Leaf Spot <sup>2</sup> May 2004	Density <sup>3</sup> Nov. 2004	Color <sup>4</sup> Nov. 2004	
<b>CHEWINGS FESCUE</b>						
1	SRX 51G	6.6	53.3	7.3	6.7	6.3
2	PST-Syn-4TL	5.8	53.3	7.3	6.0	4.3
3	IS-FRC 17	5.8	56.7	7.0	5.7	5.3
4	Culumbra II	5.8	51.7	6.3	5.7	6.3
5	Longfellow II	5.8	55.0	6.7	6.3	6.0
6	IS-FRC 12	5.8	58.3	6.3	5.0	6.0
7	FC 3	5.7	56.7	7.7	4.7	6.0
8	FCPCX	5.7	36.7	8.3	4.7	7.0
9	BUR 4601	5.6	58.3	6.0	6.7	4.7
10	IS-FRC 8	5.5	53.3	6.0	5.7	6.3
11	FCCX	5.5	53.3	7.3	5.3	5.0
12	7 Seas	5.4	45.0	6.0	5.3	5.3
13	PST-4TZ	5.4	58.3	6.3	6.3	4.0
14	PST-Syn-4RC	5.3	53.3	6.7	6.0	4.7
15	FC 68	5.2	55.0	6.7	4.7	5.7
16	FC 69	5.2	53.3	6.7	4.7	6.7
17	Dp 77-9885	5.1	50.0	7.0	5.3	5.3
18	PST-Syn-4CH3	5.1	38.3	6.7	6.3	6.0
19	Intrigue	5.1	63.3	5.7	4.3	4.3
20	ACF-174	5.1	51.7	6.7	5.3	6.7
21	Ambassador	5.1	63.3	6.3	6.0	5.3
22	ACF 188	5.1	43.3	4.7	5.7	4.7
23	B2CF	5.1	28.3	5.3	4.7	7.0
24	SRX 51FF	5.0	58.3	6.7	3.7	4.7
25	SRX OH51H	5.0	58.3	5.3	5.7	6.0
26	Bar CHF 8FUS2	5.0	60.0	5.0	5.3	6.3
27	Shadow II	4.9	68.3	6.0	5.0	4.7
28	Ambrose	4.9	56.7	5.0	6.0	6.3
29	Dp 77-9886	4.8	58.3	4.0	5.3	3.7
30	03-CHFSHHY	4.8	56.7	5.3	4.3	5.7
31	PST-Syn-4TY	4.7	60.0	5.3	5.0	3.7
32	Treasure	4.7	60.0	5.0	4.3	2.7
33	Brittany	4.7	61.7	5.3	5.0	5.7
34	Jamestown 5	4.6	53.3	5.7	4.7	5.0
35	PST-Syn-4FRC	4.5	28.3	6.0	6.0	4.0

(Continued)

Table 4 (continued).

	Cultivar or Selection	Turf Quality <sup>1</sup> 2004 Avg.	Cover (%) Sept. 2003	Leaf Spot <sup>2</sup> May 2004	Density <sup>3</sup> Nov. 2004	Color <sup>4</sup> Nov. 2004
<b>CHEWINGS FESCUE (cont.)</b>						
36	Bargreen	4.5	60.0	5.3	5.0	3.7
37	Cascade	4.0	56.7	4.7	4.7	4.3
38	Jamestown II	3.7	61.7	3.0	3.3	3.3
<b>HARD FESCUE</b>						
1	Pick HF # 2	6.2	53.3	7.3	7.7	6.7
2	Firefly	5.9	35.0	7.0	7.0	7.7
3	IS-FL 35	5.9	48.3	7.3	8.7	7.3
4	IS-FL 28	5.8	50.0	6.3	8.3	7.3
5	Predator	5.7	46.7	6.3	7.0	6.7
6	PST-4HES bulk	5.7	50.0	7.0	7.7	7.3
7	SRX NJU	5.7	51.7	7.0	7.0	5.0
8	IS-FL 36	5.7	53.3	8.0	8.3	7.0
9	Oxford	5.6	53.3	5.7	7.7	7.0
10	PST-4BUG	5.6	31.7	6.7	7.7	7.0
11	Reliant IV	5.6	53.3	6.0	7.3	6.7
12	TL 53	5.6	48.3	6.0	5.3	6.0
13	PST-Syn-4NY	5.5	55.0	7.0	7.7	5.7
14	Berkshire	5.5	61.7	5.7	6.7	6.7
15	4HM	5.4	55.0	6.0	7.3	6.3
16	SRX 3961	5.3	55.0	7.3	7.0	4.7
17	SR 3100	5.3	51.7	6.7	6.3	6.7
18	Nordic	5.3	43.3	6.7	5.7	5.7
19	FLPCX	5.2	53.3	5.7	6.7	7.3
20	SRX CA3DE	5.2	56.7	6.0	5.7	5.0
21	IS-FL 29	5.2	50.0	6.0	7.0	7.3
22	SRX 3STDNE	5.1	30.0	6.7	6.0	6.7
23	SRX 3324	5.0	50.0	5.7	6.3	6.0
24	PST-Syn-4HT	4.9	53.3	7.0	6.0	5.3
25	Osprey	4.9	58.3	5.3	6.3	5.7
26	Discovery	4.9	53.3	5.7	7.0	6.7
27	SRX 3K	4.8	55.0	5.7	6.3	6.7
28	Aurora II	4.8	56.7	6.0	5.7	5.7
29	4BIL	4.8	48.3	5.0	5.7	6.3
30	03-XHF	4.8	51.7	4.7	5.3	5.7

(Continued)

Table 4 (continued).

	Cultivar or Selection	Turf Quality <sup>1</sup> 2004 Avg.	Cover (%) Sept. 2003	Leaf Spot <sup>2</sup> May 2004	Density <sup>3</sup> Nov. 2004	Color <sup>4</sup> Nov. 2004
<b>HARD FESCUE (cont.)</b>						
31	Hardtop	4.8	53.3	5.7	7.3	6.7
32	SR 3000	4.7	43.3	5.7	5.7	5.3
33	Chariot	4.7	58.3	5.3	4.7	5.0
34	Little Bighorn	4.7	53.3	4.7	5.0	6.7
35	Minotaur	4.7	51.7	5.7	5.7	7.0
36	4CU3	4.6	46.7	5.7	6.0	6.7
37	Stonehenge	4.6	53.3	4.3	5.0	5.7
38	Reliant II	4.6	50.0	6.3	5.0	5.7
39	03-HFEXP	4.6	60.0	4.0	6.7	7.3
40	4MB-BS	4.6	48.3	5.7	4.7	6.7
41	Ecostar	4.5	55.0	5.3	5.7	5.7
42	FL 54	4.4	51.7	4.3	5.7	8.0
43	Rescue 911	4.3	58.3	5.0	6.0	7.0
44	Scaldis	4.2	51.7	4.0	4.3	5.7
45	SRX 3BH	5.2	51.7	6.7	5.3	7.0
<b>SLENDER CREEPING RED FESCUE</b>						
1	Seabreeze II	5.5	56.7	6.7	6.7	3.3
2	Bar SCF 8FUS3	5.4	56.7	6.3	7.0	6.3
3	SRX 55R	5.1	55.0	6.3	7.3	4.3
4	SR 5100	5.0	48.3	7.0	5.0	4.0
5	Seabreeze	4.9	53.3	5.7	6.7	4.0
6	Barcrown	4.7	45.0	6.3	6.0	2.3
7	SRX 55SLQ	4.5	46.7	4.7	4.7	4.0
8	Dawson +	4.1	48.3	5.3	5.0	3.3
<b>STRONG CREEPING RED FESCUE</b>						
1	5001	5.8	60.0	7.7	5.0	4.0
2	FR1M	5.8	61.7	6.3	4.7	5.3
3	PST-Syn-4L8	5.7	51.7	6.0	5.3	6.0
4	Fortitude	5.7	48.3	6.0	5.3	5.3
5	IS-FRR 23	5.4	58.3	5.0	5.7	6.0
6	DW2	5.3	55.0	7.0	4.7	5.0
7	IS-FRR-30	5.2	55.0	6.0	5.3	5.0
8	Dp 77-9578	5.2	60.0	5.0	4.7	5.7
9	PST-8000	5.2	61.7	4.7	5.3	5.7
10	PST-Syn-48E	5.2	45.0	6.3	5.0	6.0

(Continued)

Table 4 (continued).

	Cultivar or Selection	Turf Quality <sup>1</sup> 2004 Avg.	Cover (%) Sept. 2003	Leaf Spot <sup>2</sup> May 2004	Density <sup>3</sup> Nov. 2004	Color <sup>4</sup> Nov. 2004
<b>STRONG CREEPING RED FESCUE (cont.)</b>						
11	IS FRR 29	5.2	53.3	5.3	4.3	6.0
12	Dp 77-9360	5.2	50.0	4.3	5.7	5.7
13	Pick CRF 1-03	5.1	50.0	5.3	6.0	5.3
14	FRPCCX	5.1	51.7	6.3	4.7	5.7
15	Musica	5.1	55.0	6.3	6.0	3.3
16	DLF-RCM	5.1	61.7	6.7	4.0	3.7
17	C-SMX	5.1	55.0	5.0	4.7	5.7
18	ASC 245	5.1	51.7	6.3	5.3	5.7
19	SRX 52961	5.1	48.3	4.7	5.3	5.7
20	BMXC-502	5.0	46.7	6.0	4.3	6.3
21	C03-RCE	5.0	63.3	5.0	4.7	4.3
22	TL1	4.9	53.3	5.0	4.3	5.7
23	FR2	4.9	50.0	6.0	4.3	5.7
24	Razor	4.9	63.3	5.0	4.3	5.7
25	SRX CA529	4.9	61.7	6.0	5.0	4.7
26	Dp 77-9579	4.8	58.3	5.0	4.7	5.0
27	Celestial	4.7	68.3	6.3	4.0	5.3
28	Jasper II	4.7	58.3	5.0	3.3	4.7
29	Audubon	4.7	51.7	5.0	3.3	5.7
30	Aberdeen	4.7	63.3	5.3	3.3	4.7
31	PST-Syn-4P8	4.7	51.7	5.3	4.3	5.0
32	Pathfinder	4.7	65.0	4.7	4.7	4.7
33	01-Fr-1	4.7	60.0	4.3	2.7	4.7
34	PST-4UX bulk	4.6	41.7	4.3	5.3	6.3
35	ASC 266	4.6	41.7	4.3	4.0	5.0
36	Bargena III	4.5	36.7	4.7	5.0	6.0
37	4EL	4.4	58.3	4.7	4.7	5.7
38	3FR CX	4.4	48.3	5.3	4.0	4.7
39	C03-4676	4.3	58.3	3.7	3.0	5.7
40	PST-Syn-4CRZ	4.3	40.0	4.0	4.7	5.7
41	Navigator	4.3	51.7	3.7	4.0	5.0
42	SR 5210	4.2	61.7	2.7	4.3	5.7
43	SRX CA521	4.2	61.7	4.3	4.3	5.3
44	Aruba	4.0	63.3	3.0	2.7	2.0
45	Fenway	3.9	61.7	2.7	3.3	4.3

(Continued)

Table 4 (continued).

	Cultivar or Selection	Turf Quality <sup>1</sup> 2004 Avg.	Cover (%) Sept. 2003	Leaf Spot <sup>2</sup> May 2004	Density <sup>3</sup> Nov. 2004	Color <sup>4</sup> Nov. 2004
<b>STRONG CREEPING RED FESCUE (cont.)</b>						
46	PST-4CR1	3.8	63.3	2.7	4.0	5.3
47	Shademaster	3.4	56.7	1.3	3.3	5.0
48	SR 5200E	3.4	56.7	2.0	3.3	3.3
49	Oracle	3.3	70.0	3.0	3.0	4.0
50	Boreal	3.2	71.7	3.0	2.3	3.3
51	Bargena II	3.2	66.7	2.7	3.0	4.0
<b>BLUE FESCUE</b>						
1	SR 3210	4.3	58.3	4.7	4.0	6.0
2	SR 3200	3.8	55.0	3.0	5.7	6.7
<b>KOELERIA</b>						
1	Barkoel	4.6	51.7	7.0	3.0	1.3
<b>SHEEPS FESCUE</b>						
1	Quatro	4.8	58.3	3.7	7.0	5.7
2	F01	4.3	51.7	4.3	5.7	6.7
LSD at 5% =		0.6	9.4	1.4	1.6	1.2

<sup>1</sup>9 = best turf quality<sup>2</sup>9 = least disease<sup>3</sup>9 = highest shoot density<sup>4</sup>9 = darkest green color

Table 5. Yearly nitrogen (N) applied and mowing height (Ht) on fine fescue tests established at Adelphia and North Brunswick, NJ.

	2002		2003		2004	
	N <sup>1</sup>	Ht <sup>2</sup>	N	Ht	N	Ht
Table 1 (2001 Adelphia) .....	1.0	1.5	1.5	1.5	1.5	1.5
Table 2 (2002 Adelphia) .....			2.1	1.5	1.5	1.5
Table 3 (2003 North Brunswick) .....					1.5	1.5
Table 4 (2003 Adelphia) .....					1.3	1.5

<sup>1</sup>Annual N applied (lb/1000 ft<sup>2</sup>)

<sup>2</sup>Mowing height in inches