

2003 RUTGERS Turfgrass Proceedings



THE NEW JERSEY TURFGRASS ASSOCIATION

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RUTGERS COOPERATIVE RESEARCH & EXTENSION
NEW JERSEY AGRICULTURAL EXPERIMENT STATION
RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY
NEW BRUNSWICK

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2003 RUTGERS TURFGRASS PROCEEDINGS

of the

New Jersey Turfgrass Expo December 9-11, 2003 Trump Taj Mahal Atlantic City, New Jersey

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 2003 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.

Special thanks are given to those who have submitted papers for this proceedings, to the New Jersey Turfgrass Association for financial assistance, and to those individuals who have provided support to the Rutgers Turfgrass Research Program at Cook College, Rutgers, The State University of New Jersey.

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, Melissa M. Wilson, and Eric Watkins¹

The fine fescues include several species from the genus *Festuca*. They are characterized by fine to very narrow leaves. Among the species used for turf, 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 types, 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 limited rhizomatous growth habits.

Fine fescues have excellent shade tolerance. Compared to cool-season turfgrasses such as Kentucky bluegrass and perennial ryegrass, they have low water and fertility requirements and can persist in sites where irrigation and fertilization are restricted. Chewings fescues form a dense attractive turf. Newer hard fescue cultivars have improved turf-type characteristics and are more similar in density and texture to the Chewings fescues. Hard fescues also have lower nutrient requirements, better disease resistance under low maintenance, and a slower growth rate. Hard fescues are more frequently used for soil erosion control in low maintenance areas.

The strong creeping red fescues are more strongly rhizomatous and 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 often dominate in heavily shaded areas.

Sheeps fescues and blue fescues have stiff, bluish-green leaves and require minimal maintenance. Sheeps fescues are used for stabilization of sandy soils 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 are best maintained under reduced nitrogen fertilization. Ideally, fine fescue should be fertilized with no more than 1 to 2 lb nitrogen per 1000 ft² per year. Hard, blue, and sheeps fescues require less nitrogen nutrition than the other fine fescue species. Fine fescue species do not tolerate a low height of cut with the exception of Chewings fescues, which can be mown closely to 0.5 inches. The other fine fescue species can tolerate mowing heights of 1.5 to 2.0 inches.

Many fine fescues contain *Neotyphodium* endophytes, which are fungi that grow in the intercellular spaces of the crown and leaf sheath tissues of the turfgrass plant and maintain a symbiotic relationship with its host. Cultivars that possess endophytes can exhibit enhanced tolerance to insect, disease, and environmental stress, which is attributed to the alkaloid compounds produced by the endophyte. 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

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

cultivars and experimental selections for turf performance.

PROCEDURES

Fine fescue trials were conducted at the Rutgers Plant Science Research and Extension Farm at Adelphia, NJ (Tables 2, 3, 4, and 5) and at the Rutgers Snyder Research and Extension Farm at Pittstown, NJ (Table 1). All tests except the shade-study test (Table 5) were established in open areas with good air circulation. In the shade-study test, each replicated plot was established between two pecan trees of roughly the same size. All entries were seeded in 3 X 5 ft plots. Seeding rate was 3.7 lb/1000 ft² for fine fescue and tall fescue entries and 2.2 lb/1000 ft² for Kentucky bluegrass and Deschampsia entries. Plots were replicated three times in a randomized complete block design.

Tests were fertilized at different nitrogen rates, mowed at different heights, and subjected to varying levels of drought stress depending on the objective of the test during the evaluation period (Table 6). After establishment, tests were irrigated infrequently to avoid severe drought stress and dormancy. Plots were mowed frequently enough to avoid excessive accumulation of clippings. At Adelphia, broadleaf weeds were controlled with spring or fall applications of Weedar (2,4-D), Banvel, and Super Trimec; a spring application of Dimension was used for preemergence control of annual grassy weeds; and Merit was applied in July for grub control. At Pittstown, Trimec 992 was applied in spring to control the broadleaf weeds and Dimension was applied for preemergence control of annual grassy weeds.

The five tests were evaluated throughout the year by visually rating for turf quality. Turf quality is a subjective rating that is based on density, texture, uniformity, color, growth habit, and damage from diseases or insects. Other ratings taken include seedling establishment (Tables 4 and 5) and resistance to red thread (caused by *Laetisaria fuciformis*) (Table 3), dollar spot (caused by *Sclerotinia homeocarpa*) (Table 2), and crown rust (caused by *Puccinia coronata*) (Table 5). All ratings were taken using a 1 to 9 scale with 9 representing the best turf quality, best establishment, or least disease. Data were subject to analysis of variance, and means were separated using the least significant difference (LSD) multiple comparisons test.

RESULTS AND DISCUSSION

Data presented in Tables 1 through 3 are grouped by species and ranked by their multiple-year quality average. This was done to facilitate comparison of cultivars and selections within a species. Table 4 is ranked by turf quality in 2003. In Table 5, cultivars of all species are ranked together by quality average.

Turf Quality

Compared to early cultivars, considerable improvements have been made on the overall turf quality of fine fescues. In the 1998 test at Pittstown (Table 1), hard fescues performed better than all the other species. The best performing cultivars or selections were Oxford, Viking, SRX 3961, ABT-HF-2, Berkshire, ABT-HF-3, Heron, and Hardtop. They formed dense, uniform, and attractive turf plots.

In the other tests, the Chewings, hard, and strong creeping fescues generally performed better than the other species. Although improvement in turf quality of blue, sheeps, and slender creeping red fescues continues, these species still rank lower than the others in turf quality (Tables 2 to 4).

Establishment

Establishment in the fine fescues varied among the cultivars and selections within any given species in the 2002 test at Adelphia (Table 4). Among Chewings fescues, Long Fellow II performed best in both establishment and turf quality. Other cultivars or selections with good establishment, however, did not have better turf quality. Similar inconsistencies between establishment and turf quality were observed in hard and strong creeping red fescues.

Disease Resistance

In the 2000 test at Adelphia (Table 2), most fine fescues cultivars and selections showed excellent resistance to dollar spot, especially the Chewings fescues. Hard fescues exhibited best red thread resistance, while most strong creeping red fescues in the 2001 test at Adelphia (Table 3) were highly susceptible to the disease. However, several selections of strong creeping red fescues (01-1, 01-2, 01-3, and TL2) showed good resistance to red thread. The level of resistance to red thread among the Chewings fescues varied.

Shade-Study

Fine fescues and tall fescues have shown better shade tolerance than the other species evaluated. In the shade-study test at Adelpia (Table 5), the best 16 performers were either fine fescues or tall fescues. Kentucky bluegrass and Deschampsia did not perform well under shaded conditions. Fine fescues, tall fescue, and Kentucky bluegrass exhibited good resistance to crown rust under shade, while many Deschampsia cultivars and selections were susceptible to this disease.

SUMMARY

Breeding efforts continue to improve turf-type characteristics in the fine fescues. Resistance to insects and diseases is also an important focus of the Rutgers program. We continue to look at the use of

endophytes to supplement breeding efforts to improve a cultivar's natural ability to persist under stress. The successful efforts of the Rutgers fine fescues breeding is well documented in the superior quality exhibited by many of the newer experimental selections; however, further improvements are still needed.

ACKNOWLEDGMENTS

New Jersey Agricultural Experiment Station Publication No. D-12180-14-04. This work was conducted as part of NJAES Project No. 12264, supported by the New Jersey Agricultural Experiment Station, State, and Hatch Act Funds, the Rutgers Center for Turfgrass Science, other grants, and gifts. Additional support was received from the United States Golf Association, the New Jersey Turfgrass Association, and the National Turfgrass Evaluation Program.

Table 1. Performance of fine fescue cultivars and selections in a turf trial seeded in September 1998 at Pittstown, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----					
	1999-2003 Avg.	1999 Avg.	2000 Avg.	2001 Avg.	2002 Avg.	2003 Avg.
CHEWINGS FESCUE						
1 Longfellow II	5.1	5.1	5.1	5.6	5.2	4.5
2 Pick FRC A-93	5.0	5.3	4.4	4.7	4.9	5.4
3 ABT-CHW-2	4.9	5.2	4.7	4.9	5.1	4.5
4 Ambrose	4.8	5.3	4.6	4.8	4.6	4.9
5 Pick FRC B-93	4.8	5.5	4.7	4.8	4.2	4.9
6 Shadow II	4.7	5.4	4.8	4.6	3.8	4.8
7 FC 49	4.6	5.2	4.2	4.8	4.0	4.9
8 Hood	4.6	5.0	4.5	4.8	4.1	4.8
9 BAR CHF 8 FUS 2	4.6	5.1	4.7	4.8	4.2	4.3
10 Intrigue	4.6	5.2	4.2	4.6	4.4	4.6
11 Ambassador	4.6	5.1	4.4	4.8	4.0	4.5
12 Wrigley	4.5	5.4	4.4	4.7	4.3	3.9
13 FC 39	4.5	5.2	4.3	4.6	3.7	4.5
14 FC11	4.5	5.1	4.2	4.4	3.9	4.7
15 Silhouette	4.5	5.3	3.9	4.4	4.3	4.4
16 MB-63	4.5	5.1	4.1	4.2	4.4	4.4
17 FC 51	4.5	5.1	4.1	4.6	4.1	4.3
18 Treazure	4.4	4.6	4.3	4.8	3.7	4.4
19 Tiffany	4.4	4.8	4.0	4.3	3.9	4.7
20 Culombra	4.4	5.0	4.1	4.5	4.1	4.1
21 Banner III	4.3	5.3	4.3	4.2	3.5	4.4
22 Pick FRC 2-96	4.3	4.9	3.9	4.3	4.2	4.3
23 Victory RS	4.3	4.9	4.1	4.6	3.5	4.3
24 ABT-CHW-1	4.2	5.1	3.8	4.5	3.7	4.1
25 Sandpiper	4.2	4.7	3.7	4.2	4.2	4.4
26 ACF 083	4.2	4.9	4.2	4.2	3.7	3.9
27 Victory II	4.2	4.7	4.0	4.3	3.9	3.9
28 Victory	4.1	4.7	3.9	4.3	3.4	4.3
29 FC 28	4.1	5.0	3.8	4.1	3.5	4.2
30 FC 50	4.1	5.0	4.1	4.3	3.2	3.8
31 Bridgeport	4.1	4.8	3.6	4.3	3.5	4.2
32 Brittany	4.0	4.8	3.9	4.3	3.5	3.7
33 SR 5100	4.0	4.4	3.5	4.2	4.0	4.0
34 Magic	4.0	4.6	4.0	3.8	3.4	4.2
35 Pick FRC A-97	3.9	4.7	3.3	3.4	3.7	4.4

(Continued)

Table 1 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----						
	1999-2003 Avg.	1999 Avg.	2000 Avg.	2001 Avg.	2002 Avg.	2003 Avg.	
CHEWINGS FESCUE (cont.)							
36	Jamestown II	3.6	4.1	3.4	3.3	3.5	3.9
37	FLED	3.4	4.0	2.9	3.5	3.1	3.7
HARD FESCUE							
1	Oxford	6.3	5.6	6.0	6.4	6.9	6.7
2	Viking	6.3	5.7	6.3	6.6	6.8	6.0
3	SRX 3961	6.2	5.6	6.6	6.5	6.7	5.8
4	ABT-HF-2	6.2	5.8	6.0	6.3	6.5	6.2
5	Berkshire	6.1	5.9	5.9	5.9	6.8	6.0
6	ABT-HF-3	5.8	5.4	5.8	5.8	6.6	5.5
7	Heron	5.8	5.9	6.0	6.0	5.6	5.5
8	Hardtop	5.8	5.3	5.3	5.7	6.2	6.2
9	Eureka II	5.7	5.1	5.5	6.0	6.1	5.9
10	Osprey	5.7	5.3	5.3	5.8	6.5	5.7
11	FL 54	5.7	5.4	5.7	5.8	5.9	5.8
12	Pick GBM	5.6	5.4	6.0	5.6	6.2	5.0
13	Nordic	5.6	5.0	5.2	6.0	6.1	5.7
14	Stonehenge	5.6	5.3	5.5	6.0	5.5	5.6
15	Chariot	5.6	5.1	5.3	5.7	6.0	5.7
16	LL 22	5.5	5.1	5.7	5.4	5.9	5.6
17	Attila E	5.5	5.2	5.3	5.8	5.7	5.6
18	EL 20	5.5	5.4	5.5	6.0	5.5	5.2
19	Scaldis II	5.5	5.3	5.5	5.8	5.2	5.7
20	Syn 4U6	5.5	5.3	5.2	5.3	5.9	5.8
21	EL 41	5.5	5.3	5.6	5.3	5.5	5.5
22	Discovery	5.4	4.9	4.8	5.6	6.0	5.9
23	ABT-HF 4	5.4	5.2	5.4	5.7	5.5	5.4
24	Reliant II	5.4	5.3	5.3	5.7	5.6	5.3
25	Pick FF A-97	5.4	5.3	5.1	5.5	5.6	5.4
26	Minotaur	5.4	5.0	5.0	5.5	5.9	5.4
27	Rescue 911	5.4	5.1	4.9	5.3	5.9	5.5
28	PST-4HM	5.3	5.2	5.1	5.4	5.4	5.7
29	Spartan	5.2	5.0	4.9	5.4	5.0	5.5
30	MB-82	5.1	4.9	5.2	5.2	4.8	5.2

(Continued)

Table 1 (continued).

		-----Turf Quality ¹ -----					
Cultivar or Selection	1999-2003 Avg.	1999 Avg.	2000 Avg.	2001 Avg.	2002 Avg.	2003 Avg.	
HARD FESCUE (cont.)							
31	Scaldis	5.0	5.3	4.9	5.0	5.0	5.1
32	Defiant	5.0	4.9	4.9	5.1	5.2	4.8
33	Pick FF 6-94	4.9	4.7	4.8	5.2	5.3	4.6
34	PST-4MB	4.9	4.9	4.8	5.0	5.1	4.6
35	Warwick	4.4	3.2	4.2	4.7	4.8	5.0
36	Pick FOD-93	4.2	4.7	4.2	4.4	3.9	4.0
37	Pick FOG-93	3.8	4.3	3.7	3.8	3.3	3.8
38	18909	3.6	3.5	2.8	3.1	3.8	4.6
SLENDER CREEPING RED FESCUE							
1	BAR SCF 8 FUS3	5.2	5.8	5.5	4.6	5.1	5.4
2	ASR 049	4.7	5.5	4.8	4.2	4.1	4.8
3	Dawson E+	4.4	4.7	4.2	4.1	4.4	4.3
4	Seabreeze	4.3	4.6	4.6	4.1	3.7	4.5
STRONG CREEPING RED FESCUE							
1	Pick FDM	5.2	5.2	5.0	5.1	5.1	5.6
2	Aberdeen	5.2	5.4	5.1	5.1	5.1	5.2
3	Cindy Lou	5.1	4.8	4.9	5.2	5.1	5.8
4	Jasper II	4.9	5.1	4.7	5.0	4.5	5.2
5	Florentine	4.9	5.4	4.8	4.5	4.3	5.4
6	ABT-CR-2	4.9	5.0	4.9	4.8	4.2	5.4
7	ABT-CR-3	4.8	5.1	4.9	4.7	4.6	4.9
8	SRX 52961	4.8	4.5	4.6	4.6	4.5	5.6
9	Navigator	4.7	4.6	4.6	4.7	4.4	5.3
10	ASC 082	4.5	4.9	4.3	4.3	4.4	4.5
11	Bargena III	4.4	4.9	4.2	4.4	4.1	4.5
12	SR 5210	4.4	4.0	4.0	4.5	4.3	5.2
13	Pathfinder	4.4	4.7	4.6	4.6	3.7	4.5
14	PST-4FR	4.4	5.1	4.4	4.4	3.4	4.7
15	Inverness	4.4	4.8	4.6	4.3	4.2	4.2
16	FR 46	4.4	4.9	4.8	3.9	3.9	4.4
17	DGSC 94	4.2	4.7	4.1	4.3	3.6	4.3
18	Rose	4.2	4.8	4.3	4.1	3.7	4.0
19	Jasper	4.2	4.7	4.1	4.7	3.4	4.0
20	Salsa	4.1	4.2	4.1	3.8	4.0	4.6

(Continued)

Table 1 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----						
	1999-2003 Avg.	1999 Avg.	2000 Avg.	2001 Avg.	2002 Avg.	2003 Avg.	
STRONG CREEPING RED FESCUE (cont.)							
21	FR-01-4-25	4.1	4.7	3.8	4.1	3.6	4.4
22	FR 47	4.1	4.2	3.5	4.1	4.0	4.8
23	ASC 172	4.1	4.7	3.5	4.0	3.7	4.5
24	Shademaster II	4.1	4.3	4.1	4.0	3.5	4.5
25	Trapeze	4.0	4.6	4.2	3.9	2.9	4.5
26	FR27	4.0	4.7	3.9	4.1	3.4	3.8
27	Common Creeper	3.9	4.0	4.0	3.9	3.9	3.9
28	Boreal	3.9	4.2	3.7	3.6	4.2	3.9
29	Claudia	3.9	3.3	3.4	3.6	4.1	5.2
30	Syn 42 RR	3.8	4.1	4.1	4.1	2.7	4.0
31	Vista	3.6	4.6	3.8	3.6	2.2	3.7
32	Shademark	3.3	4.0	3.3	3.4	2.4	3.6
BLUE FESCUE							
1	SR 3200	4.3	4.7	4.2	4.4	4.3	3.8
SHEEPS FESCUE							
1	Quatro	5.4	5.1	4.8	5.6	5.9	5.4
2	Azay	4.8	4.4	4.5	4.8	5.0	5.4
3	Bighorn	4.2	4.6	4.2	4.5	4.2	3.7
4	FO 53	4.2	4.7	4.2	3.9	3.9	4.4
5	Teal	3.9	4.6	3.6	3.6	3.6	4.2
6	FO 52	3.9	4.6	3.8	3.8	3.7	3.8
LSD at 5% =		0.5	0.5	0.7	0.7	0.9	0.8

¹9 = best turf quality

Table 2. Performance of fine fescue cultivars and selections in a turf trial seeded in September 2000 at Adelphia, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----				Dollar Spot ² July 2003	
	2001-2003 Avg.	2001 Avg.	2002 Avg.	2003 Avg.		
CHEWINGS FESCUE						
1	COE Comp	6.3	6.1	6.4	6.6	8.7
2	COM Comp	6.3	6.3	6.3	6.2	9.0
3	Seven Seas	5.9	5.8	5.8	6.0	7.3
4	4601	5.8	5.7	5.7	6.1	9.0
5	SRX 51FF	5.2	5.5	4.9	5.1	8.3
6	SRX 5020	5.1	5.7	4.9	4.8	7.3
7	SRX 5111	5.1	5.2	4.9	5.2	8.3
8	SYN 4CHU	5.1	5.4	4.6	5.3	7.3
9	SRX 51HH	5.1	5.1	4.9	5.2	8.7
10	SRX 5NJD	5.0	5.5	4.8	4.7	8.7
11	95M	5.0	5.0	4.7	5.2	8.7
12	00-DFRC	4.9	5.1	4.7	5.0	7.7
13	SRX 51GG	4.8	5.2	4.7	4.4	7.7
14	SUP Comp	4.7	5.2	4.5	4.5	7.0
15	Tiffany	4.7	5.0	4.4	4.6	8.3
16	Shadow II	4.6	5.4	4.5	4.0	7.3
17	FRCA 93	4.6	4.9	4.3	4.6	8.0
18	SR 5100	4.6	4.7	4.7	4.5	8.0
19	FRC-B-93	4.4	4.6	4.0	4.5	8.3
20	Silhouette	4.3	5.0	4.0	3.9	8.0
21	Victory 2	4.2	4.7	4.1	3.8	7.0
22	Sandpiper	4.1	3.9	4.1	4.3	9.0
HARD FESCUE						
1	Predator	5.8	5.2	6.2	6.0	9.0
2	SRX 3961	5.4	5.6	5.9	4.7	8.0
3	SRX 3324	5.2	5.0	5.6	5.1	7.7
4	HOM Comp	5.2	5.4	5.6	4.7	7.0
5	SRX 3STDNE	5.0	4.7	5.4	4.9	8.0
6	HOE Comp	5.0	5.1	5.4	4.4	6.7
7	EL 20	4.8	4.5	5.3	4.6	7.7
8	LL 22	4.8	4.4	5.1	4.8	8.7
9	SRX 3STDE	4.7	4.4	5.3	4.5	8.3
10	FL55	4.7	4.3	5.4	4.5	9.0

(Continued)

Table 2 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----				Dollar Spot ² July 2003
	2001-2003 Avg.	2001 Avg.	2002 Avg.	2003 Avg.	
HARD FESCUE (cont.)					
11 Osprey	4.7	4.6	5.4	4.1	6.7
12 FL54	4.7	4.0	5.1	5.0	8.3
13 Heron	4.6	4.2	4.9	4.6	8.7
14 SRX 3M01	4.4	4.5	4.9	3.9	8.0
15 Aurora Gold	4.4	4.3	4.9	4.2	7.3
16 Discovery	4.4	4.7	4.9	3.6	7.0
17 SR 3100	4.4	4.8	4.6	3.7	5.3
18 Spartan	4.0	4.0	4.5	3.5	6.3
SLENDER CREEPING RED FESCUE					
1 SRX 55SLG	3.9	4.1	4.0	3.5	6.7
2 Seabreeze	3.6	4.5	3.1	3.1	5.7
3 SRX 55SLCE	3.5	4.1	3.5	3.0	5.3
4 Count	2.3	3.1	2.0	1.9	5.0
5 Dawson E+	1.8	1.2	1.9	2.3	4.7
STRONG CREEPING RED FESCUE					
1 TL3 Comp	6.0	5.9	6.2	5.8	8.7
2 SMX Comp	5.5	5.3	5.4	5.8	8.7
3 TL2 Comp	5.5	5.1	5.4	5.9	8.7
4 DW2	5.4	5.4	5.2	5.6	7.7
5 TL4 Comp	5.4	5.3	5.4	5.5	8.3
6 TL1 Comp	5.2	5.2	5.1	5.3	8.3
7 Jasper II	4.8	5.5	5.0	3.8	5.7
8 SRX 52961	4.4	4.8	4.4	3.9	2.0
9 SYN 4FINO	4.2	4.7	4.3	3.5	6.7
10 SR 5210	3.8	4.0	4.0	3.3	6.0
11 SYN 4CRO	3.6	4.1	3.9	2.7	2.7
12 Jasper	3.6	4.2	3.8	2.7	4.7
13 SR 5200E	2.7	3.0	2.7	2.4	6.0
14 Common Creeper	2.6	2.5	3.0	2.2	5.7

(Continued)

Table 2 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----				Dollar Spot ² July 2003
	2001-2003 Avg.	2001 Avg.	2002 Avg.	2003 Avg.	
SHEEPS FESCUE					
1 Bighorn	3.7	3.5	3.9	3.6	7.7
LSD at 5% =	0.6	0.7	0.8	1.1	2.4

¹9 = best turf quality

²9 = least disease

Table 3. Performance of fine fescue cultivars and selections in a turf trial seeded in September 2001 at Adelphia, NJ.

Cultivar or Selection	-----Turf Quality ¹ -----			Red Thread ² May 2003
	2002-2003 Avg.	2002 Avg.	2003 Avg.	
CHEWINGS FESCUE				
1 EC4601	6.2	6.1	6.3	6.0
2 ACF 188	6.0	5.9	6.0	8.0
3 01-2	5.5	5.4	5.7	6.3
4 OO-CFRc	5.5	5.4	5.5	5.0
5 C8-1-4CHU	5.4	5.3	5.5	5.7
6 ACF 195	5.4	5.3	5.4	8.0
7 FCATCX	5.3	5.0	5.6	5.3
8 SRX 5NJD	5.3	4.9	5.6	6.0
9 ACF 189	5.1	4.9	5.3	6.0
10 FC77	5.1	5.0	5.2	5.7
11 ZFRC 8328	5.1	4.8	5.3	7.0
12 01-3	5.1	5.0	5.1	6.7
13 Silhouette	4.9	4.8	5.0	6.7
14 Shadow II	4.9	4.5	5.2	5.0
15 ACF 193	4.9	5.1	4.7	5.0
16 SRX 51GG	4.9	4.8	4.9	4.7
17 ACF 198	4.8	4.9	4.7	6.0
18 01-1	4.7	4.8	4.6	6.0
19 FRC B-98	4.6	4.5	4.6	6.3
20 SRX51FF	4.5	4.6	4.3	7.0
21 Bridgeport	4.4	4.3	4.5	5.3
22 SRX 51II	4.2	4.4	4.0	5.3
23 Lucinda	4.2	4.1	4.2	6.0
24 01-ORCHF-SHY	4.0	4.4	3.7	6.7
25 01-ORCHF-T	4.0	4.2	3.9	4.7
26 C8-9-4EC-99	4.0	4.0	4.0	7.0
27 FC62	4.0	3.8	4.1	6.7
28 Victory	4.0	4.0	3.9	6.0
29 C8-1-4SU-2001	4.0	4.3	3.6	2.7
30 SR 5100	3.9	3.9	3.9	4.7
31 Sandpiper	3.8	3.7	3.8	5.7
32 01-ORCHF-M	3.5	4.1	2.9	5.3

(Continued)

Table 3 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----			Red Thread ² May 2003	
	2002- 2003 Avg.	2002 Avg.	2003 Avg.		
HARD FESCUE					
1	HE1 comp	6.4	6.7	6.1	8.3
2	SRX 3961	6.1	6.3	5.9	8.3
3	AHF 090	5.9	5.9	5.8	7.3
4	Hardtop	5.7	5.7	5.7	6.0
5	SRX 3324	5.6	5.7	5.4	8.0
6	C8-1-49TH-01	5.5	5.4	5.6	8.3
7	Aurora II	5.5	5.5	5.5	6.7
8	GAFF	5.4	5.5	5.3	6.0
9	AHF 116	5.4	5.6	5.2	8.0
10	SRX 3STDNE	5.3	5.4	5.2	6.7
11	AHF 106	5.3	5.6	5.0	8.0
12	HB1 comp	5.3	5.7	4.9	6.0
13	AHF 114	5.2	5.5	5.0	6.3
14	Rescue 911	5.2	5.5	5.0	8.0
15	SRX 3STDDE	5.2	5.1	5.2	8.0
16	Osprey	5.2	5.1	5.2	7.3
17	Aurora Gold	5.1	5.2	5.0	7.0
18	Discovery	5.1	5.2	5.0	6.3
19	4AU-99	5.0	5.3	4.7	8.3
20	SRX 3M01	5.0	5.1	4.9	7.7
21	Ecostar	4.9	5.2	4.5	6.7
22	Stonehenge	4.8	4.6	5.1	6.7
23	SRX 3BHF	4.8	5.0	4.7	5.7
24	SR 3100	4.8	4.7	4.8	7.3
25	C8-1-4CU-99	4.7	4.7	4.7	7.3
26	01-ORHF EXP	4.3	4.8	3.8	7.3
27	Little Bighorn	4.3	4.3	4.2	6.3
28	DLFJ-102	3.4	3.5	3.3	5.7
29	F052	3.0	3.5	2.6	5.7
30	01-ORHF BGS	2.7	3.0	2.5	6.3
SLENDER CREEPING RED FESCUE					
1	FL55	5.4	5.5	5.3	7.7
2	SRX 55SLCE	4.3	4.3	4.2	5.0
3	SRX 55SLG	4.2	4.2	4.3	4.7
4	Dawson E+	4.0	4.2	3.7	3.3
5	Count	3.5	3.7	3.3	7.3

(Continued)

Table 3 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----			Red Thread ² May 2003	
	2002-2003 Avg.	2002 Avg.	2003 Avg.		
STRONG CREEPING RED FESCUE					
1	01-3	6.5	6.1	6.8	7.0
2	01-1	6.2	6.1	6.4	6.7
3	01-2	6.2	5.9	6.4	5.7
4	FRDW2	5.9	5.6	6.2	4.7
5	TL2	5.9	5.5	6.2	6.7
6	BURF-01	5.7	5.5	5.8	3.7
7	PST-4VLS	5.7	5.9	5.4	2.7
8	Inverness	5.6	5.6	5.6	4.0
9	Jasper II	5.5	5.5	5.5	2.3
10	C8-9-4FR-99	5.5	5.6	5.4	2.7
11	SRX 52961	5.3	5.2	5.3	2.7
12	Florentine	5.2	5.0	5.4	2.7
13	PST-4EL	5.2	5.1	5.2	2.3
14	Fenway	5.0	4.7	5.3	5.3
15	ZFRR93-111	5.0	5.5	4.4	4.0
16	C8-1 Badger	4.8	5.2	4.5	2.0
17	SR 5210	4.8	4.6	5.0	3.7
18	PST-4CR1	4.8	4.8	4.8	3.0
19	4CRE-98	4.8	4.8	4.7	3.0
20	PST-4AZ	4.7	4.9	4.6	3.0
21	4BBL	4.6	4.7	4.4	3.3
22	4FRR-99	4.6	4.5	4.6	3.0
23	PST-4SBU	4.5	4.6	4.5	5.7
24	PST-4FINO	4.5	4.5	4.6	3.0
25	ZFRR93-118	4.4	4.1	4.8	4.3
26	Seabreeze	4.4	4.8	4.1	4.0
27	ASC 251	4.1	4.2	4.0	2.3
28	Salsa	4.1	3.8	4.3	3.7
29	ZFRR93-107X	3.8	4.0	3.6	2.3
30	DLFJ-102	3.6	3.7	3.6	2.7
31	Crestlawn	3.5	3.5	3.4	4.0
32	DLFJ-104	3.4	4.2	2.6	2.3
33	DLFJ-101	3.4	3.2	3.5	4.0
34	DLFJ-103	3.1	3.0	3.1	3.3
35	SR 5200E	2.9	3.0	2.9	2.3
36	DLFJ-105	2.7	2.5	2.8	2.7

(Continued)

Table 3 (continued).

Cultivar or Selection	-----Turf Quality ¹ -----			Red Thread ² May 2003
	2002-2003 Avg.	2002 Avg.	2003 Avg.	
SHEEPS FESCUE				
1 C8-1-4MB	4.9	5.1	4.6	6.3
2 MX-86	2.8	3.2	2.3	3.0
LSD at 5% =	0.6	0.6	0.8	1.8

¹9 = best turf quality

²9 = least disease

Table 4. Performance of fine fescue cultivars and selections in a turf trial seeded in September 2002 at Adelphia, NJ.

Cultivar or Selection	Turf Quality ¹ 2003 Avg.	Establishment ² Oct. 2002
CHEWINGS FESCUE		
1 Long Fellow II	6.0	8.7
2 SRX 51G	5.9	5.7
3 SRX 51FF	5.7	6.0
4 Ambrose	5.7	6.7
5 Shadow II	5.6	8.0
6 CIS-FRC-12	5.5	6.3
7 4601	5.5	5.3
8 Seven Seas	5.5	6.3
9 FC 3	5.5	5.3
10 00-D	5.5	5.7
11 4CHX bulk	5.4	4.0
12 FC 68	5.4	5.0
13 CIS-FRC-11	5.4	6.7
14 SRX NJD	5.3	5.0
15 FRC A-93	5.2	5.7
16 Victory II	5.2	7.7
17 Ambassador	5.2	5.7
18 FC 2	5.2	3.7
19 SRX 51II	5.1	6.3
20 Treazure	5.1	6.7
21 02-CHFMED	5.1	4.0
22 SR 5100	5.1	7.3
23 FC 1	5.1	4.3
24 BAR CHF-8FUS2	5.1	7.3
25 CIS-FRCL-1	5.0	5.0
26 02-CHFSHHY	5.0	5.0
27 SRX 51HH	5.0	5.0
28 Banner II	4.9	6.3
29 FRC B-98	4.8	6.7
30 FC 51	4.5	4.7
31 Jamestown II	4.5	8.3
32 Victory	4.4	4.7
33 SRX 51LAM	3.5	7.7

(Continued)

Table 4 (continued).

	Cultivar or Selection	Turf Quality ¹ 2003 Avg.	Establishment ² Oct. 2002
HARD FESCUE			
1	SPE comp	6.1	3.7
2	SRX 3961	5.9	5.3
3	PST HE-1	5.9	5.3
4	Oxford	5.8	4.7
5	HF 2nd-02	5.6	5.7
6	GAFF	5.6	6.7
7	SPM comp	5.6	4.0
8	Hard Top	5.4	5.7
9	HOE comp	5.4	6.3
10	Harpoon	5.4	5.3
11	Eureka II	5.4	7.0
12	SR 3100	5.3	5.7
13	02-H-FO	5.3	6.0
14	00-AFF	5.2	5.3
15	Reliant II	5.2	7.0
16	Chariot	5.1	5.7
17	CIS FL-24	5.1	5.7
18	PST-Syn-4BU2	5.0	4.0
19	SRX 3324	5.0	4.7
20	SRX 3STDNE	5.0	4.7
21	FL 55	5.0	4.3
22	SRX 3BHF	5.0	5.0
23	Osprey	4.9	7.7
24	Heron	4.9	6.0
25	FO A-98	4.9	6.0
26	SRX 3K	4.8	4.3
27	Aurora Gold	4.8	6.3
28	FF9-94	4.8	6.0
29	FO B-98	4.8	5.3
30	Minotaur	4.8	6.7
31	FFA-97	4.7	5.0
32	Stonehenge	4.6	4.0
33	PST-4MB	4.4	5.0
34	Little Bighorn	4.4	4.3
35	Aurora II	4.3	4.0

(Continued)

Table 4 (continued).

	Cultivar or Selection	Turf Quality ¹ 2003 Avg.	Establishment ² Oct. 2002
SLENDER CREEPING RED FESCUE			
1	BAR SCF 8FUS	5.4	6.0
2	Seabreeze	5.2	6.7
3	4SU-02	5.1	5.7
4	Dawson E+	4.9	7.0
5	SRX 55Q26	4.7	4.3
6	SRX 55SLE	4.4	4.7
7	SRX 55Q27	4.1	4.0
8	SRX 55Q4	4.1	4.7
9	SRX 55QSLC	4.0	3.0
10	SRX 55Q28	3.8	3.0
11	SRX 55Q25	3.8	3.0
12	PST-Syn-4TU	3.8	2.7
13	PST-Syn-4EU	3.5	2.0
STRONG CREEPING RED FESCUE			
1	TL53 comp	6.1	5.0
2	CIS-FRR-30	5.6	5.7
3	FRR-NGS-02	5.6	6.0
4	00-A FRR	5.6	7.7
5	FR 65	5.6	4.7
6	PST 8000 FF	5.5	6.0
7	FRR-02G	5.4	6.3
8	RCM comp	5.4	6.3
9	TL7 comp	5.4	7.3
10	FRR-02P	5.4	7.0
11	Cindy Lou	5.4	8.0
12	Navigator	5.3	7.7
13	Jasper II	5.2	8.0
14	BMVC-502	5.2	5.7
15	Audubon	5.2	7.3
16	Aberdeen	5.1	6.7
17	Camilla	5.0	8.0
18	CIS-FRR-28	5.0	7.0
19	FR 3	5.0	4.3
20	DW2	5.0	4.3

(Continued)

Table 4 (continued).

	Cultivar or Selection	Turf Quality ¹ 2003 Avg.	Establishment ² Oct. 2002
STRONG CREEPING RED FESCUE (cont.)			
21	RCE comp	5.0	6.7
22	Pathfinder	4.9	7.0
23	CIS-FRR-29	4.9	4.7
24	CIS-FRR-27	4.9	6.0
25	01-FR 1	4.9	7.0
26	CIS-FRR-26	4.8	6.3
27	Florentine	4.8	7.7
28	FR 2	4.8	5.7
29	SRX 52961	4.7	5.3
30	PST-Syn-4VLS	4.6	3.3
31	Bargena II	4.6	6.0
32	PST-4VS bulk	4.5	4.0
33	FRR GHCL	4.4	5.7
34	FR 67	4.3	4.0
35	Inverness	4.3	5.0
36	Fenway	4.2	7.7
37	Florentine RT	4.2	6.7
38	Trapeze BS	4.2	5.7
39	FR 46	4.2	5.3
40	Jasper	4.2	8.3
41	SR 5210	3.9	5.3
42	PST-SYN-4CRY	3.8	3.0
43	PST-SYN-4CRX	3.6	4.7
44	PST-Syn-4TG	3.5	4.3
45	PST-4F2	3.4	4.3
46	SR 5200 E	3.3	8.0
BLUE FESCUE			
1	SR 3200	3.4	6.3

(Continued)

Table 4 (continued).

Cultivar or Selection		Turf Quality ¹ 2003 Avg.	Establishment ² Oct. 2002
KOELERIA			
1	Barleria	5.2	3.7
2	Barkoel	4.5	4.3
LSD at 5% =		0.5	0.9

¹9 = best turf quality

²9 = best establishment

Table 5. Performance of fine fescue cultivars and selections in a turf trial established in September 2002 at Adelphia, NJ. (Shade study.)

	Cultivar or Selection	Species	Turf Quality ¹	Establishment ²	Crown Rust ³
			2003 Avg.	Oct. 2002	July 2003
1	Ambrose	Chewings	6.2	5.3	8.7
2	Shenandoah II	Tall Fescue	6.1	5.7	8.0
3	Plantation	Tall Fescue	5.9	6.3	8.3
4	Finelawn Elite	Tall Fescue	5.9	6.3	9.0
5	Intrigue	Chewings	5.8	6.3	8.3
6	Mustang 3	Tall Fescue	5.8	6.0	8.3
7	Oxford	Hard Fescue	5.8	5.7	8.7
8	RCE comp	Strong Creeper	5.8	7.0	7.0
9	Prospect	Tall Fescue	5.7	6.0	8.3
10	HOE comp	Hard Fescue	5.6	5.3	8.7
11	Ambassador	Chewings	5.6	6.0	7.7
12	Rebel Exceda	Tall Fescue	5.6	6.3	9.0
13	Bingo	Tall Fescue	5.6	6.0	8.7
14	Seven Seas	Chewings	5.5	5.3	8.3
15	Reliant II	Hard Fescue	5.5	6.0	8.7
16	Signia	Tall Fescue	5.5	5.3	9.0
17	Scorpion	Tall Fescue	5.3	6.3	9.0
18	CRS	Chewings	5.3	7.0	7.3
19	RCM comp	Strong Creeper	5.3	6.3	8.0
20	Minotaur	Hard Fescue	5.3	5.7	8.0
21	Discovery	Hard Fescue	5.2	4.3	8.7
22	Rebel Sentry	Tall Fescue	5.2	5.3	8.3
23	12828	Deschampsia	5.2	5.3	6.7
24	Aurora	Hard Fescue	5.1	5.0	8.0
25	TL53 comp	Strong Creeper	5.1	5.7	7.7
26	Cindy Lou	Strong Creeper	5.1	6.7	6.7
27	Raptor	Tall Fescue	5.0	5.0	8.7
28	A96-1201	Kentucky bluegrass	4.9	6.7	9.0
29	SR 3100	Hard Fescue	4.9	4.0	9.0
30	DCRC	Deschampsia	4.8	6.3	4.3
31	Berkshire	Hard Fescue	4.8	5.0	6.3
32	Biltmore	Tall Fescue	4.8	5.0	9.0
33	DCM	Deschampsia	4.7	5.0	5.7
34	12829	Deschampsia	4.5	4.0	7.0
35	Midnight	Kentucky bluegrass	4.4	5.3	9.0

(Continued)

Table 5 (continued).

	Cultivar or Selection	Species	Turf Quality ¹ 2003 Avg.	Establishment ² Oct. 2002	Crown Rust ³ July 2003
36	12834	Deschampsia	4.3	4.3	8.3
37	Kometa	Deschampsia	4.3	6.3	3.7
38	PST-Syn-DMM	Deschampsia	4.3	5.3	5.0
39	12834	Deschampsia	4.2	4.0	7.3
40	Common Creeper	Strong Creeper	4.2	7.0	5.7
41	Shade Champ	Deschampsia	4.1	5.3	7.3
42	12819	Deschampsia	4.0	4.3	6.7
43	Barcampsia	Deschampsia	3.8	3.0	4.0
44	12814	Deschampsia	3.8	4.0	5.3
45	Sibir	Deschampsia	3.7	4.3	3.7
46	Sonic	Kentucky bluegrass	3.7	6.0	7.0
47	02-AKCD3	Crested dogtail	3.7	4.7	6.3
48	MV #13	Deschampsia	3.5	7.0	3.7
49	META	Deschampsia	3.4	2.0	4.7
50	SR 6000	Deschampsia	3.0	2.3	5.3
51	ZDC	Deschampsia	2.8	2.3	4.3
	LSD at 5% =		0.8	1.4	2.2

¹9 = best turf quality²9 = best establishment³9 = least disease

Table 6. Yearly nitrogen (N) applied and mowing height (Ht) on fine fescue tests established at Adelphia and Pittstown, NJ.

	1998		2000		2001		2002		2003	
	N ¹	Ht ²	N	Ht	N	Ht	N	Ht	N	Ht
Table 1 (1998 Pittstown)	1.9	3.0	1.0	2.5	1.2	2.5	0.9	2.5	1.0	2.5
Table 2 (2000 Adelphia)					2.5	1.5	1.0	1.5	1.0	1.5
Table 3 (2001 Adelphia)							1.0	1.5	1.5	1.5
Table 4 (2002 Adelphia)									2.1	1.5
Table 5 (2002 Adelphia; Shade-study test)									1.25	2.5

¹Annual N applied (lb/1000 ft²)

²Mowing height in inches