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THE NEW JERSEY TURFGRASS ASSOCIATION

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# **1996 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 University 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. It also allows these professionals to reach a more general audience, which includes the public. Articles appearing in these proceedings are divided into two sections.

The first section includes lecture notes of papers presented at the 1996 New Jersey Turfgrass Expo. Publication of the New Jersey Turfgrass Expo Notes provides a readily available source of information covering a wide range of topics. The Expo Notes include technical and popular presentations of importance to the turfgrass industry.

The second section represents performance of turfgrass cultivars and selections in New Jersey turf trials. The primary objective of these papers is to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

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Dr. Ann B. Gould, Editor  
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## PERFORMANCE OF FINE FESCUE CULTIVARS AND SELECTIONS IN NEW JERSEY TURF TRIALS

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The fine fescues (*Festuca* spp.) consist of several species of very fine-leaved, cool-season turfgrasses that do not require intensive management. The species typically used in New Jersey include the bunch type: Chewings fescue (*F. rubra* L. subsp. *commutata* Gaud.), hard fescue (*F. longifolia* Thuill.), and sheeps or blue fescue (*F. ovina* L.); and the rhizomatous type: slender creeping red fescue (*F. rubra* L. subsp. *trichophylla* Gaud. or subsp. *litoralis* [Meyer] Auguier) and strong creeping red fescue (*Festuca rubra* L. subsp. *rubra* Gaud.).

Both the strong and slender creeping red fescues have rhizomes and a spreading growth habit that produce a more open turf. One difference between these two species is that the slender creeping red fescues have fewer, shorter rhizomes than do strong creeping red fescues. In addition, the strong creeping red fescues are better adapted to New Jersey's hot, humid summers and are often mixed with other grasses such as Kentucky bluegrass and perennial ryegrass.

Chewings fescues have a bunch-type growth habit, form a denser turf than the strong creeping red fescues, and tend to be more disease resistant and persistent under lower maintenance. Otherwise, the Chewings fescues are similar in adaptation to strong creeping red fescues.

Sheeps, or blue, fescues require little maintenance and do poorly under intensive cultural management. They possess a bunch type, non-creeping growth habit and stiff, bluish-green leaves. For short term benefits of soil stabilization and aesthetics, sheep fescues are often used in wildflower mixes. Their bunch-type growth habit and bluish-green color can enhance the ornamental features of a meadow-like landscape.

The hard fescues are similar in appearance to sheeps fescues, but have wider, tougher, less bluish leaves, and are more tolerant of higher fertility and moist soil conditions. Improved varieties of hard fescue have more turf-like characteristics similar in density and texture to the Chewings fescues, but with lower nutrient requirements and a slower growth rate.

Fine fescues can withstand harsher conditions than other cool-season grasses and are tolerant of droughty, infertile, acidic soils and shady locations. They are intolerant of poorly drained, wet soils and high fertility. Fine fescues will persist in sites where cultural inputs are minimal or nonexistent and will compete successfully with other grasses when sunlight, nutrients and water are limited (as is often the case under tree canopies). Because of their persistence and lower management needs, fine fescues are used to stabilize soils and in reclamation efforts. Once established, they can often survive for years without fertilization, supplemental irrigation, or

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chemical inputs. Fine fescues form a dense, soft-looking turf cover that can be quite attractive. Golf courses often permit deep roughs of fine fescue to grow tall and produce seed heads.

Over fertilization (such as high nitrogen) and close mowing can reduce fine fescue populations in a turf of mixed species by reducing heat tolerance during summer stress. High nitrogen can also increase plant succulence, resulting in decreased resistance to insects and disease. For good persistence, fine fescues should be fertilized with less than 2.0 pounds of nitrogen/1000 ft<sup>2</sup> per year and mowed at a height of 3 inches.

Fine fescues that contain the *Neotyphodium* (= *Acremonium*) endophyte possess enhanced stress tolerance and resistance to diseases and insects, which can be important features in a low maintenance turf. *Neotyphodium* is a fungus that lives symbiotically within plant tissues. In exchange for nutrients, the endophyte produces compounds that improve the plant's resistance to external stresses. It is believed that the endophyte was once a pathogenic fungus that evolved over the years to form this symbiotic relationship with some turfgrass species. In some endophyte-infected grasses, the stromata (fungal structures) of the endophyte may develop in place of an inflorescence and inhibit seed production. This malady is called choke and may lower the commercial value of the cultivar or selection.

Fine fescues are an important turfgrass for low management sites, especially today, with the emphasis on lower chemical inputs. Research efforts continue to enhance the turf-type qualities of fine fescues and improve resistance to diseases, insects, and environmental stresses.

## PROCEDURES

Fine fescue trials were conducted at two sites in New Jersey. Test 1 was established at the Turfgrass Research Facility at North Brunswick, NJ (Table 1), and Tests 2, 3, and 4 were established at the Rutgers Plant Science Research Farm at Adelphia, NJ (Tables 2, 3, and 4). All tests consisted of 3 X 5 ft plots replicated three times in a randomized complete block design. Plots were seeded at a rate of 3.7 lbs/1000 ft<sup>2</sup> and, to avoid stress, were irrigated after establishment. Since clippings were not collected, tests were mowed frequently to avoid excess clipping accumulation. The rate of nitrogen applied and mowing height varied for each test and depended on test objectives. The maintenance history of each test is described in Table 5. Tests 1 and 2 (Tables 1 and 2) contain all the entries of the National Turfgrass Evaluation Program Fine-leaf Fescue Test as well as additional standards and experimental selections.

All tests were evaluated by visually rating plots during the growing season. Turf plots were regularly rated for quality on a scale of 1 to 9 where 9 represented the most desirable turf. Since turf quality is highly subjective, ratings were taken by several people to avoid personal bias. Visual quality ratings represent the overall appearance of the plot and include color, uniformity, texture, density, and freedom from disease or insect damage. Separate visual ratings were also taken for turf color (Tables 1, 2, and 4), leaf texture (Tables 1 and 2), percent turf cover (Table 2), summer discoloration (Table 2), and seedling vigor (Table 4). Tests were analyzed using an analysis of variance procedure; means were separated using a least significant difference (LSD) value.

## RESULTS AND DISCUSSION

Entries are grouped in Tables 1 through 4 by species or subspecies and ranked according to the multi-year, turf quality average. Turf plots with higher quality ratings generally exhibited a high shoot density, fine leaf texture, dark green color, and lower incidence of environmental stress and pest damage.

In most tests, hard fescue cultivars and selections had the best turf quality based on the multi-year average. Since sheeps and blue fescues do not perform well under conditions of low mowing, high nitrogen fertility, and moist soil conditions, the relatively low quality ratings of these fescues were likely due to the moderately high level of maintenance (Table 5).

As implied in the name, fine fescues are noted for their fine textured leaves (Tables 1 and 2). Leaf texture can vary among cultivars and selections due to genetic differences and can be affected by shoot density. As shoot density increases, competition among tillers increases and the leaf texture (blade width) typically becomes finer. Turf density and percent cover ratings in 1996 indicated that considerable differences in durability and persistence existed among cultivars and selections (Table 2). Lower turf cover ratings were often associated with a coarser leaf texture rating in November 1996 (Table 2).

Color ratings of fine fescues demonstrated that the darkness of green color varies among cultivars and selections (Tables 1, 2, and 4). Although darkness of green color can be a significant component of turf quality, features such as density and percent cover are often primary determinants of turf quality. Moreover, density and percent cover are characteristics of particular importance for soil stabilization of low maintenance sites.

Differences in seedling vigor were observed among cultivars and selections seeded in September 1995 (Table 4). Seedling vigor is an important factor in the establishment of newly seeded turf and can be affected by genetic, environmental, and management factors. Generally, sheeps or blue fescues and hard fescues exhibited lower seedling vigor than Chewings and strong creeping red fescues.

July discoloration ratings from the test seeded in September 1993 at Adelphia (Table 2) were largely an indication of the degree of tolerance to the various maladies that affected the plots. These turfs were afflicted by a number of pests that can cause discoloration of turf, including chinch bugs, summer patch, and red thread.

Fine fescues containing the *Neotyphodium* endophyte exhibited better tolerance to environmental stresses and better resistance to certain disease and insect pests than fine fescues that do not contain the endophyte. This trend can be observed in the tables where many of the endophyte-containing cultivars and selections rank high in the multi-year quality ratings (Tables 1 and 2). The use of endophyte-enhanced turfgrasses offers the benefit of added pest control in a low management situation. Research efforts are currently directed toward incorporating various endophytes into improved varieties and understanding the mechanisms of plant performance in endophyte-enhanced turfgrass. Other fine fescue breeding efforts have resulted in lower, denser, turf-type growth, higher seed yield, tolerance of saline soils, and improved resistance to powdery mildew, net blotch, red thread, and dollar spot. In addition, research continues to identify turfs that have improved resistance to insect pests and contain non choke-inducing endophytes.

## **ACKNOWLEDGMENTS**

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Table 1. Performance of fine fescue cultivars and selections in a turf trial seeded September 1993 at North Brunswick, NJ. (Includes 1993 National Fine-leaf Fescue Test - NTEP.)

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Leaf Texture <sup>2</sup> Oct. 1996	Turf Color <sup>3</sup> Nov. 1996
	1994-1996 Avg.	1994 Avg.	1995 Avg.	1996 Avg.		
<b>CHEWINGS FESCUES</b>						
1 Shadow II	6.5	6.5	7.4	5.4	8.0	6.0
2 NJF-93 E+ <sup>4</sup>	6.4	6.5	6.9	5.7	6.3	7.0
3 MB 61-93 E+	6.0	5.9	6.7	5.4	5.0	6.7
4 Ford92 D	5.9	6.3	6.2	5.3	6.7	7.3
5 Brittany E+	5.9	5.6	6.6	5.5	6.7	6.0
6 Magic	5.9	6.0	6.4	5.2	6.3	7.7
7 Eco	5.8	5.4	6.9	5.2	5.7	7.7
8 MG Chewings E+	5.8	5.8	5.9	5.7	8.0	5.3
9 Victory II	5.8	5.6	6.5	5.2	6.3	6.0
10 Tiffany E+	5.8	5.7	6.9	4.7	5.7	6.3
11 MB 64-93	5.7	5.7	6.4	5.1	4.7	7.3
12 SR 5100 E+	5.7	5.7	6.3	5.0	5.3	6.3
13 NJF-93-2	5.6	5.8	6.1	5.0	6.7	7.3
14 Bridgeport	5.6	5.2	6.6	5.1	6.0	6.0
15 Treazure	5.5	5.0	6.2	5.2	7.0	5.5
16 DCH 93 comp	5.5	6.0	5.9	4.7	5.0	7.0
17 Ford92 C	5.5	6.1	5.7	4.7	5.3	8.0
18 Ford92 E-	5.4	5.5	6.0	4.8	5.7	7.7
19 Wx3-FF54	5.3	4.8	6.2	4.8	7.7	6.0
20 TMI-3CE	5.2	5.0	5.8	4.9	6.3	6.0
21 K-2	5.2	4.9	6.5	4.1	5.0	6.7
22 Shadow E+	5.0	4.5	6.1	4.3	5.3	6.3
23 Sandpiper E+	4.9	4.5	6.3	4.0	6.7	6.0
24 Victory E+	4.9	4.6	6.1	3.9	6.0	5.7
25 Jamestown II '92 E+	4.7	4.6	5.0	4.5	7.0	5.7
26 Darwin	4.7	5.1	5.6	3.3	5.7	7.0
27 Jamestown II '93 E+	4.6	4.4	5.2	4.1	6.0	5.3
28 Banner II E+	4.5	4.1	5.7	3.8	5.7	5.7
29 ISI-FC-62 E+	4.5	4.1	5.1	4.2	4.7	6.7
30 MB 66-93	4.4	3.9	5.5	3.7	4.0	7.3

Table 1 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Leaf Texture <sup>2</sup> Oct. 1996	Turf Color <sup>3</sup> Nov. 1996	
	1994- 1996 Avg.	1994 Avg.	1995 Avg.	1996 Avg.			
<b>CHEWINGS FESCUES (continued)</b>							
31	Jamestown II	4.3	4.3	5.2	3.5	5.0	5.3
32	Jamestown II '90	4.3	4.2	4.6	4.0	7.0	5.3
33	Medina	4.2	3.9	5.0	3.8	6.7	6.3
34	Molinda	4.2	4.1	5.2	3.4	5.0	5.0
35	Jamestown II '91	4.0	3.9	4.5	3.7	5.0	5.0
36	Jamestown	3.8	3.7	4.6	3.2	6.0	4.9
37	Cascade	2.8	2.4	3.7	2.4	2.7	4.3
<b>HARD FESCUES</b>							
1	Discovery E+	6.4	6.0	6.8	6.4	8.0	6.3
2	SR 3100 E+	6.0	5.2	6.7	6.2	8.3	6.3
3	MB 82-93 E+	5.7	5.4	6.8	5.0	7.7	7.7
4	Ecostar	5.6	5.6	6.2	5.0	8.7	5.3
5	MB 81-93 E+	5.5	5.4	6.1	5.0	7.3	6.7
6	Aurora E+	5.3	5.0	5.9	5.1	8.3	6.3
7	Nordic	5.3	5.3	5.8	4.7	6.7	5.3
8	Reliant II E+	5.2	5.2	5.9	4.4	8.0	6.0
9	Osprey	5.1	5.3	5.7	4.2	8.0	5.3
10	Brigade	5.0	5.3	5.6	4.1	6.0	6.3
11	Vernon	5.0	5.3	5.5	4.1	6.3	6.7
12	Spartan	4.9	4.9	5.5	4.2	7.0	6.0
13	Scaldis	4.6	4.8	5.2	3.7	7.0	6.3
14	Pamela	4.1	4.0	4.6	3.6	7.3	5.0
<b>SHEEPS AND BLUE FESCUES</b>							
1	Quatro	4.9	5.5	4.9	4.3	7.3	5.3
2	Azure	4.9	5.2	5.1	4.5	5.3	7.7
3	Bighorn	4.2	4.1	4.1	4.4	7.0	6.3
4	Mx-86	3.3	3.9	3.3	2.7	3.3	6.3
5	67135	1.9	1.6	2.1	2.0	4.3	6.0

Table 1 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Leaf Texture <sup>2</sup> Oct. 1996	Turf Color <sup>3</sup> Nov. 1996
	1994- 1996 Avg.	1994 Avg.	1995 Avg.	1996 Avg.		
<b>SLENDER CREEPING RED FESCUES</b>						
1 Seabreeze	4.2	3.9	4.9	3.9	6.3	4.0
2 Dawson	3.3	2.9	3.4	3.5	6.0	3.3
<b>STRONG CREEPING RED FESCUES</b>						
1 PST-4VB E+	6.6	6.2	6.9	6.8	5.3	7.7
2 Shademaster II	6.2	5.6	7.1	5.9	5.7	6.3
3 PST-4ST E+	6.0	5.5	7.0	5.6	4.3	6.3
4 Flyer II	6.0	5.2	6.8	6.0	5.7	6.7
5 PST-4DT E+	5.7	5.1	6.3	5.7	4.7	6.3
6 Jasper E+	5.4	5.1	6.1	5.0	4.7	6.0
7 Wx3-FFG6 E+	4.9	5.1	5.7	3.9	5.0	6.0
8 Aruba	4.5	3.6	5.6	4.3	4.7	3.3
9 Flyer	4.5	3.8	5.6	4.1	4.3	5.3
10 BAR Frr 4ZBD	4.0	4.0	4.5	3.4	2.0	7.0
11 Rondo	3.7	3.1	4.4	3.7	5.0	3.0
12 CAS FR13	3.6	3.6	4.1	3.1	3.3	6.0
13 WVPB-STCR-101	3.4	4.1	3.6	2.5	4.7	6.7
14 BAR UR 204	3.2	2.6	4.2	2.7	5.3	4.7
15 Common Cr	2.7	2.4	2.9	2.6	4.0	5.3
LSD at 5% =	0.6	0.6	0.9	0.7	2.1	1.2

<sup>1</sup> 9 = best turf quality<sup>2</sup> 9 = finest leaf texture<sup>3</sup> 9 = darkest green color<sup>4</sup> E+ = greater than 50 percent fine fescue seed infected with endophyte. Information extracted from: Sun, S., and Smith, D. 1993. Incidence of Endophytic Fungi in Cultivars and Selections of the 1993 National Fine Leaf Fescue Test. Pages 170-171 in: Rutgers Turfgrass Proceedings, Vol. 25.

Table 2. Performance of fine fescue cultivars and selections in a turf trial seeded in September 1993 at Adelphia, NJ. (Includes 1993 National Fine-leaf Fescue Test - NTEP.)

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Turf Density <sup>2</sup> April 1996	Turf Color <sup>3</sup> Nov. 1996	Leaf Texture <sup>4</sup> Nov. 1996	Turf Cover Nov. 1996 (%)	Summer Discoloration <sup>5</sup> July 1996
	1994- 1996 Avg.	1994 Avg.	1995 Avg.	1996 Avg.					
<b>CHEWINGS FESCUES</b>									
1 Shadow II	6.1	5.9	5.8	6.5	6.7	6.7	8.3	90.0	8.3
2 NJF-93 E+ <sup>6</sup>	5.7	6.0	5.2	5.8	5.9	6.5	7.0	81.7	8.0
3 Ford92 Del E+	5.6	6.1	4.9	5.9	5.0	6.3	7.3	86.7	7.3
4 Magic	5.6	6.4	4.8	5.5	4.3	6.3	6.7	86.7	7.7
5 MB 61-93 E+	5.5	5.8	5.3	5.5	5.0	5.7	7.3	85.0	7.3
6 4FE	5.4	5.3	5.3	5.7	6.7	4.7	8.3	90.0	7.7
7 Ford92 Cam E+	5.4	6.2	4.7	5.4	4.7	6.0	6.7	83.3	7.3
8 Victory II	5.4	5.9	5.2	5.1	6.0	6.0	8.0	73.3	7.0
9 MG Chewings E+	5.4	5.3	5.4	5.5	5.3	4.7	7.3	88.3	8.0
10 Ford92 E-	5.3	5.9	4.5	5.6	4.0	6.3	7.0	86.7	7.0
11 SR 5100 E+	5.3	5.5	5.0	5.5	5.7	5.7	9.0	85.0	8.0
12 Brittany E+	5.2	5.5	4.7	5.5	6.0	5.3	8.0	80.0	8.0
13 MB 64-93	5.2	5.7	4.7	5.2	3.7	6.7	7.0	73.3	7.3
14 Tiffany E+	5.1	5.2	4.9	5.3	7.0	5.3	8.7	81.7	7.7
15 DCH93 comp	5.1	6.1	4.5	4.7	3.7	5.0	6.0	80.0	6.7
16 Bridgeport	5.0	5.0	4.5	5.5	5.3	5.0	8.3	83.3	7.7
17 4LD	4.9	4.9	4.9	5.0	5.3	6.0	7.3	80.0	7.3
18 Treazure	4.9	5.1	4.5	4.9	5.4	5.5	7.4	75.9	7.4
19 Jamestown II '90	4.9	4.3	5.0	5.3	6.0	5.3	8.3	86.7	7.3
20 TMI-3CE	4.7	4.9	4.5	4.7	4.0	6.3	8.3	70.0	7.7

Table 2 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Turf Density <sup>2</sup>	Turf Color <sup>3</sup>	Leaf Texture <sup>4</sup>	Turf Cover	Summer Discoloration <sup>5</sup>
	1994-1996 Avg.	1994 Avg.	1995 Avg.	1996 Avg.	April 1996	Nov. 1996	Nov. 1996	Nov. 1996 (%)	July 1996
<b>CHEWINGS FESCUES (continued)</b>									
21 Southport	4.7	5.2	4.2	4.5	4.7	5.3	6.7	55.0	6.7
22 Jamestown II '93 E+	4.6	4.4	4.4	5.0	4.3	5.3	8.0	83.3	7.7
23 Wx3-FF54	4.6	5.1	4.7	4.0	3.7	5.3	8.0	56.7	6.7
24 ISI-FC-62	4.5	4.6	4.0	4.9	3.7	5.7	8.0	80.0	7.3
25 Victory E+	4.5	4.9	4.0	4.6	4.3	5.7	7.3	75.0	7.0
26 Eco	4.5	5.2	3.9	4.3	3.7	6.7	7.0	55.0	7.0
27 Jamestown II '92	4.5	4.5	4.3	4.5	4.3	5.3	7.3	71.7	7.3
28 Shadow E+	4.4	4.5	4.2	4.6	5.0	5.3	8.0	75.0	7.0
29 Banner II	4.4	4.2	3.9	5.0	4.3	5.7	7.7	81.7	7.7
30 Sandpiper	4.3	4.3	3.9	4.5	3.7	5.3	8.7	80.0	7.0
31 Jamestown II '91	4.3	4.2	4.3	4.2	5.0	5.0	8.0	70.0	6.3
32 Darwin	4.2	4.6	4.2	3.9	2.7	6.7	8.0	56.7	5.7
33 Jamestown II	4.2	4.1	4.1	4.4	4.7	5.7	8.3	80.0	7.3
34 K-2	4.2	5.4	4.1	3.0	3.3	6.0	8.3	38.3	5.0
35 Jamestown	3.9	4.0	3.7	4.2	3.7	5.7	7.5	75.8	6.3
36 Medina	3.5	3.5	3.7	3.4	3.0	5.7	6.7	53.3	5.3
37 Molinda	3.3	3.2	3.4	3.3	3.3	5.3	6.7	51.7	5.3
38 MB 66-93	3.1	4.0	2.8	2.5	2.0	6.3	8.7	30.0	4.0
39 Cascade	2.8	2.8	2.3	3.2	2.7	4.7	7.7	45.0	6.0

Table 2 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Turf Density <sup>2</sup>	Turf Color <sup>3</sup>	Leaf Texture <sup>4</sup>	Turf Cover	Summer Discoloration <sup>5</sup>
	1994-1996 Avg.	1994 Avg.	1995 Avg.	1996 Avg.	April 1996	Nov. 1996	Nov. 1996	Nov. 1996 (%)	July 1996
<b>HARD FESCUES</b>									
1 Discovery E+	6.4	6.6	6.2	6.3	7.3	7.0	8.3	76.7	7.7
2 SR 3100 E+	6.0	6.3	6.1	5.5	6.4	6.4	7.7	76.7	7.9
3 MB 81-93 E+	5.8	6.1	5.9	5.5	5.7	5.7	8.3	80.0	7.3
4 Reliant II E+	5.6	5.8	5.8	5.1	6.3	5.7	8.3	68.3	8.0
5 Osprey	5.4	5.6	5.6	5.1	6.0	6.0	7.3	61.7	8.0
6 Warwick	5.4	5.4	5.1	5.7	6.0	6.0	8.7	78.3	8.3
7 Vernon	5.3	6.1	5.3	4.6	5.3	6.3	8.3	61.7	7.0
8 4RU	5.3	5.7	5.1	5.2	5.7	6.3	7.3	76.7	7.3
9 Ecostar	5.1	5.6	5.3	4.3	6.0	5.7	8.7	53.3	7.7
10 MB 82-93 E+	5.1	5.3	4.8	5.1	5.0	6.0	7.7	83.3	7.3
11 Brigade	5.0	5.3	5.3	4.6	4.3	6.3	6.7	65.0	7.0
12 Nordic	5.0	5.3	5.0	4.8	6.3	7.0	7.3	68.3	7.0
13 Reliant	5.0	5.4	4.5	5.1	4.7	5.7	7.3	80.0	7.7
14 Scaldis	4.9	5.3	5.0	4.4	5.3	5.7	7.7	68.3	7.0
15 Spartan	4.8	5.1	4.9	4.6	5.3	6.0	8.3	55.0	7.0
16 Aurora E+	4.8	4.9	5.2	4.2	4.7	6.0	9.0	55.0	6.0
17 Attila	4.2	4.9	3.9	3.8	2.7	6.7	7.0	56.7	6.0
18 Pamela	4.0	4.3	3.9	3.7	3.7	5.7	7.3	43.3	5.7

Table 2 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Turf Density <sup>2</sup>	Turf Color <sup>3</sup>	Leaf Texture <sup>4</sup>	Turf Cover	Summer Discoloration <sup>5</sup>
	1994-1996 Avg.	1994 Avg.	1995 Avg.	1996 Avg.	April 1996	Nov. 1996	Nov. 1996	Nov. 1996 (%)	July 1996
<b>SHEEPS AND BLUE FESCUES</b>									
1 4EB E+	4.8	4.8	4.3	5.3	5.7	7.3	8.0	75.0	6.7
2 Bighorn	4.4	4.4	4.0	4.8	4.7	6.3	7.7	70.0	6.3
3 Quatro	4.4	5.4	3.8	4.0	4.3	7.0	8.7	60.0	6.7
4 4BE	4.4	4.7	3.9	4.6	5.0	5.3	7.3	70.0	6.0
5 67135	3.2	2.1	3.3	4.1	3.7	5.7	8.7	73.3	6.7
<b>SLENDER CREEPING RED FESCUES</b>									
1 Seabreeze	4.8	4.4	5.1	4.7	5.0	5.3	8.0	73.3	6.7
2 Dawson	3.5	3.1	3.8	3.8	3.7	4.7	7.3	60.0	6.3
<b>STRONG CREEPING RED FESCUES</b>									
1 PST-4VB E+	5.9	5.5	5.9	6.3	6.3	6.0	7.0	90.0	8.3
2 4DR-93	5.6	5.5	5.6	5.7	5.0	5.7	7.3	78.3	7.7
3 Jasper E+	5.5	5.3	5.4	5.8	6.3	6.3	7.0	91.7	7.7
4 PST-4ST E+	5.4	5.0	5.2	6.1	6.3	5.7	7.3	85.0	7.3
5 Wx3-FFG6 E+	5.2	5.3	4.9	5.5	5.3	5.3	7.3	86.7	7.0
6 4PB	5.2	5.3	4.8	5.5	4.7	5.0	7.3	76.7	7.3
7 Flyer II	5.2	4.7	5.3	5.6	5.3	6.0	8.0	80.0	7.3
8 Shademaster II	5.1	5.5	5.0	4.9	6.0	6.3	6.3	83.3	6.0
9 4DT-93	5.1	5.0	5.0	5.3	5.7	5.7	7.0	81.7	7.7
10 PST-4DT E+	5.1	5.0	4.9	5.3	6.0	5.3	6.7	86.7	7.3

Table 2 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Turf Density <sup>2</sup>	Turf Color <sup>3</sup>	Leaf Texture <sup>4</sup>	Turf Cover	Summer Discoloration <sup>5</sup>
	1994-1996 Avg.	1994 Avg.	1995 Avg.	1996 Avg.	April 1996	Nov. 1996	Nov. 1996	Nov. 1996 (%)	July 1996
<b>STRONG CREEPING RED FESCUES (continued)</b>									
11 4VB E-	5.0	5.6	5.1	4.4	3.7	6.0	6.3	56.7	6.3
12 43F-93	5.0	4.9	5.5	4.7	5.3	5.7	7.0	68.3	7.0
13 Flyer II	5.0	5.0	5.0	4.9	5.3	5.7	6.7	63.3	6.7
14 4R3-93	5.0	4.3	4.9	5.7	5.3	5.7	7.0	90.0	8.0
15 Syn 4VE	5.0	5.5	4.6	4.8	4.0	6.7	5.7	65.0	7.0
16 CAS FR13	4.4	3.7	4.6	5.0	4.7	5.7	8.0	85.0	7.3
17 Flyer	4.4	4.1	4.1	4.9	5.0	6.0	6.7	83.3	6.3
18 Shademaster	4.3	4.3	3.6	4.9	3.7	5.0	7.3	78.3	7.0
19 BAR Frr 4ZBD	3.8	3.5	3.9	4.1	2.3	6.0	6.3	71.7	6.7
20 WVPB-STCR-101	3.7	4.0	3.2	4.0	3.7	6.0	6.0	70.0	6.0
21 Rondo	3.6	3.2	3.8	3.7	3.3	4.7	7.0	70.0	6.3
22 Salem	3.6	3.6	3.7	3.4	4.3	5.7	6.7	40.0	5.3
23 Aruba	3.5	3.5	3.3	3.8	4.0	4.3	6.3	68.3	6.7
24 Common Cr	3.5	2.8	3.7	3.9	4.0	5.3	6.7	66.7	6.7
25 BAR UR 204	3.4	2.9	2.9	4.3	3.3	5.7	7.3	75.0	6.3
26 Pennlawn	2.6	2.2	2.5	3.2	3.3	5.3	7.3	55.0	6.0

Table 2 (continued).

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----				Turf Density <sup>2</sup>	Turf Color <sup>3</sup>	Leaf Texture <sup>4</sup>	Turf Cover	Summer Discoloration <sup>5</sup>
	1994-1996 Avg.	1994 Avg.	1995 Avg.	1996 Avg.	April 1996	Nov. 1996	Nov. 1996	Nov. 1996 (%)	July 1996
LSD at 5% =	0.6	0.7	1.0	1.0	1.9	1.3	1.6	25.0	1.4

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

<sup>2</sup> 9 = densest turf

<sup>3</sup> 9 = darkest green color

<sup>4</sup> 9 = finest leaf texture

<sup>5</sup> 9 = best color during summer stress

<sup>6</sup> E+ = greater than 50 percent fine fescue seed infected with endophyte. Information extracted from: Sun, S., and Smith, D. 1993. Incidence of Endophytic Fungi in Cultivars and Selections of the 1993 National Fine Leaf Fescue Test. Pages 170-171 in: Rutgers Turfgrass Proceedings, Vol. 25.

Table 3. Performance of fine fescue cultivars and selections in a turf trial seeded September 1994 at Adelphia, NJ.

Cultivar or Selection	-----Turf Quality <sup>1</sup> -----		
	1995-1996 Avg.	1995 Avg.	1996 Avg.
<b>CHEWINGS FESCUES</b>			
1 Frc 4-92-94	6.0	6.3	5.7
2 MB-64	5.3	5.4	5.1
3 Jamestown II '94	4.3	4.3	4.3
4 Banner II	4.2	4.3	4.0
5 Cascade	2.7	2.5	2.9
<b>HARD FESCUES</b>			
1 SR 3100	5.7	5.6	5.8
2 Rescue	5.4	5.5	5.3
3 MB-81	5.4	5.4	5.3
4 Discovery	5.4	5.4	5.4
5 Reliant '92	5.1	5.1	5.1
6 Spartan	5.0	4.8	5.1
7 Eureka	4.1	4.1	4.2
<b>FESTUCA PSEUDOVINA</b>			
1 Verdome	3.7	4.6	2.8
<b>SHEEPS AND BLUE FESCUES</b>			
1 Azay	3.7	3.1	4.3
2 Mx-86	3.3	3.6	2.9
<b>STRONG CREEPING RED FESCUES</b>			
1 H-Frr Bulk	5.6	5.3	5.8
2 H-Frr E+	5.4	5.0	5.8
3 BLMT E-	5.1	4.8	5.4
4 BLMT E+	4.7	4.2	5.2
5 Cindy	4.4	4.4	4.4

Table 3 (continued).

		-----Turf Quality <sup>1</sup> -----		
Cultivar or Selection		1995-1996 Avg.	1995 Avg.	1996 Avg.
<b>STRONG CREEPING RED FESCUES (continued)</b>				
6	Syn 4CRE	4.3	4.1	4.5
7	Pennlawn	2.4	2.2	2.7
LSD at 5% =		0.5	0.6	0.7

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

Table 4. Performance of fine fescue cultivars and selections in a turf trial seeded September 1995 at Adelphia, NJ.

Cultivar or Selection	Turf Quality <sup>1</sup> 1996 Avg.	Seedling Vigor <sup>2</sup> Nov. 1995	Turf Color <sup>3</sup> March 1996
<b>CHEWINGS FESCUES</b>			
1 Ambassador	5.9	7.7	7.3
2 WS-CF94-Rx	5.7	7.3	6.3
3 Brittany	5.3	6.3	5.3
4 Southport	4.9	6.7	7.0
5 FC 14	4.7	6.3	6.0
6 Jamestown II	4.0	6.0	6.0
7 Shetland	3.6	3.3	3.0
<b>HARD FESCUES</b>			
1 Oxford	6.5	7.0	5.3
2 LTP 4821	6.2	6.3	4.7
3 W5-HF94-Rx	6.1	6.0	4.3
4 Aurora E+	5.4	4.7	4.0
5 Serra E+	5.4	6.3	5.0
6 Med 13	5.2	3.7	3.0
7 Ecostar	5.2	6.3	4.3
8 Reliant	4.8	5.7	4.3
9 Warwick	4.7	5.7	4.7
10 Spartan	4.7	6.3	4.3
<b>SHEEPS AND BLUE FESCUES</b>			
1 LBS-95	4.2	5.7	5.0
2 LGS-95	4.0	5.0	4.0
3 LO44	4.0	3.7	4.3
4 Mx-86	3.5	4.3	5.0

Table 4 (continued).

	Cultivar or Selection	Turf Quality <sup>1</sup> 1996 Avg.	Seedling Vigor <sup>2</sup> Nov. 1995	Turf Color <sup>3</sup> March 1996
<b>STRONG CREEPING RED FESCUES</b>				
1	LTP 4731	4.9	7.0	5.3
2	Pathfinder	4.8	6.7	6.0
3	Audubon	4.7	7.0	5.0
4	R Str Cr-95 E+	4.6	6.7	6.0
5	FR 27	4.6	6.7	5.3
6	PL E+	4.5	7.3	5.0
7	FR 13	4.4	7.7	4.7
8	Salem	4.3	6.7	6.0
9	Wx5-396	3.9	6.7	5.7
	LSD at 5% =	0.5	0.9	1.3

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

<sup>2</sup> 9 = most rapid seed germination and establishment

<sup>3</sup> 9 = darkest green color

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

	1994		1995		1996	
	N <sup>1</sup>	Ht <sup>2</sup>	N	Ht	N	Ht
Table 1 (1993 North Brunswick).....	5.7	1.5	2.0	1.5	2.7	1.5
Table 2 (1993 Adelphia) .....	3.8	1.5	3.6	2.0	3.4	2.0
Table 3 (1994 Adelphia) .....			4.6	2.0	1.4	2.0
Table 4 (1995 Adelphia) .....					2.8	1.5

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

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