1995
RUTGERS
Turfgrass Proceedings

THE NEW JERSEY TURFGRASS ASSOCIATION

In Cooperation With

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

1995 RUTGERS TURFGRASS PROCEEDINGS

of the

New Jersey Turfgrass Expo
December 12-14, 1995
Taj Mahal Casino-Resort
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 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 1995 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 includes technical research papers containing original research findings and reviews covering selected subjects in turfgrass science. The primary objective of these papers is 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 Turf Research Program at Cook College - Rutgers, The State University of New Jersey.

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

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The fine fescues include a number of species that all possess rather fine, bristle-like leaves. The species used in the New Jersey area include Chewings fescue (*Festuca rubra* L. subsp. *commutata* Gaud.), hard fescue (*F. longifolia* Thuill.), strong creeping red fescue (*F. rubra* L. subsp. *rubra*), slender creeping red fescue (*F. rubra* L. subsp. *litoralis* (Meyer) Auguier), sheeps fescue (*F. ovina* L.), and blue fescue (*F. glauca* Lam.). The fine fescues survive well under low levels of water and nitrogen fertility and are most persistent when mowed at a high cutting height. Of the cool-season grasses commonly used for turf, fine fescues are more tolerant of infertile, dry soils and often predominate where there is competition from trees and shrubs for nutrients and moisture. For these reasons, fine fescues are an excellent choice for low maintenance turfs.

The fine fescues prefer a cool climate and can form an extremely attractive turf during the cooler spring and fall months. These grasses may not perform well during hot, humid summers, however, particularly if they are overfertilized, grown in poorly drained soils, or mowed too closely. In addition, poor summer performance is intensified by their susceptibility to many of the common disease and insect pests associated with cool-season turfgrasses.

To improve the performance and attractiveness of fine fescues, plant breeders at Rutgers University and elsewhere have developed varieties that exhibit a darker green color, lower growth habit, increased disease resistance, and improved summer performance. In addition, efforts have been made to find and utilize endophytes that are naturally associated with these grasses. The presence of endophytes is often associated with increased resistance to certain important insect pests and may also increase tolerance to summer stress.

The variety improvement process at Rutgers University involves extensive field evaluation of new material developed in our breeding program as well as the evaluation of cultivars or selections developed by other breeders. In addition, turfgrass researchers at Rutgers participate in the National Turfgrass Evaluation Program (NTEP), which is coordinated jointly by the United States Department of Agriculture, the Agricultural Research Service, and the National Turfgrass Foundation.

PROCEDURES

Fine fescue turf trials were conducted at three sites in New Jersey. One test was established at the Rutgers Snyder Research Farm in Pittstown, NJ (Table 1), three at the Rutgers Plant Science Research Farm in Adelphia, NJ (Tables 2, 4, and 5), and two at the Turfgrass Research Facility in North Brunswick, NJ (Tables 1 and 3).

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The Snyder Research Farm is located in the west-central portion of New Jersey at an elevation somewhat higher than the Adelphia or North Brunswick sites. The soil at this farm is a silt-loam and is fertile, well drained, and has a very good moisture holding capacity. These factors may account for the fewer summer stress problems observed at this location. All tests except the one in North Brunswick were situated in open areas with good air circulation. The North Brunswick site was bordered on one side by a mature wood, which may have reduced air circulation and increased turf canopy temperatures.

The test at Pittstown (Table 1) was established by hand seeding 6 x 6 ft plots with 2 lb seed/1000 ft^2. In all other tests, 3 x 5 ft plots were seeded at a rate of 3.7 lb/1000 ft^2. Plots were replicated at least three times, and the tests were established using a randomized complete block design. Tests were fertilized at different nitrogen rates, mowed at different heights, and subjected to varying levels of moisture stress depending on the objective of the test during the evaluation period (Table 6). After establishment, tests were only irrigated to avoid severe drought stress and dormancy. The plots were mowed at intervals frequent enough to avoid excessive accumulation of clippings, and clippings were not collected. Weed control consisted of a yearly spring application of a preemergence herbicide for crabgrass and other annual grasses, and a broadleaf weed control herbicide applied in either the spring or fall. Insecticides or fungicides were not routinely applied to any tests.

All tests were evaluated by visually rating each plot throughout the year. Tests were regularly rated for quality on a scale of 1 to 9, where 9 represented the most desirable turf. Turf quality is a subjective rating which is based on density, texture, uniformity, color, growth habit, freedom from disease or insect damage, and overall appearance. To help reduce personal bias, turf quality ratings were made by various people throughout the growing season and were averaged. Tests were also evaluated for other characteristics, such as seedling vigor, as conditions warranted. These attributes were rated using the same scale as turf quality, where 9 represents the most desirable characteristic (e.g., most rapid seedling establishment, etc.).

RESULTS AND DISCUSSION

In all tables, data were grouped within species and ranked by using the multiple year average. This method makes it easier to compare the different varieties within a species. Generally, hard fescues as a group tended to perform best, followed by the sheeps and Chewings fescues, and then by the strong and slender creeping red fescues.

Overall, the strong creeping red fescues exhibited the best seedling vigor (Table 5) and the most rapid rate of establishment. These grasses and the slender creeping red fescues greened up earliest in the spring. Quality ratings for strong creeping red fescues are usually lower than other fine fescues because they are the most susceptible to leafspot, red thread, pink patch, and dollar spot. The last three diseases can be especially destructive on turf maintained under very low fertility, such as the test maintained at the Pittstown location (Table 1).

The strong and slender creepers produce rhizomes and form a less dense turf than the other fine fescues. This, in addition to thinning caused by diseases, can result in a significant loss in turf quality. The creeping type of fine fescues also tend to be the least aggressive and produce less thatch than the hard or Chewings fescues. This helps to make them more compatible in mixtures with Kentucky bluegrass and ryegrass, a popular combination for general utility and lawn turf areas. It would, therefore, be very desirable for turf growers to have attractive, disease

resistant varieties available. Fortunately, desirable characteristics, such as a darker green color, lower growth habit, and better leaf spot resistance, continue to improve through breeding efforts.

Since its establishment in 1989, the Pittstown test reported in Table 1 received extremely low maintenance. This low maintenance regime included no fertilization, no supplemental irrigation after the first few months of establishment, and a high height of cut (3 inches). Under these conditions, performance of the hard and sheep fescues were consistently much better (refer to the 1992-1995 turf quality average) than the other fine fescues, particularly with regard to turf density and color during periods of summer stress. Performance of the creeping types, however, was poor due to severe thinning caused by disease and the invasion of crabgrass and other weeds. Under conditions of low fertility, these injured turfs were very slow to recover. Although the Chewings fescues maintained fairly good density under low maintenance conditions, turf quality was poor in the hot, dry summer months due to a loss of color. Alternatively, the hard fescues consistently maintained an attractive, bright green color during the summer stress period at both the Pittstown and North Brunswick locations (Table 1).

Turf cover ratings made in June 1994 and November 1995 on the 1989 test in North Brunswick (Table 1) illustrate a rather common situation found in many tests. As the test matured, it became apparent that many entries with superior quality and density ratings suddenly degenerated and became thin. This phenomenon is common for many of the turf species, especially when maintained under conditions of higher nitrogen fertility. In this particular case, the North Brunswick test had been subjected to very low maintenance until the spring of 1995, at which time two separate applications of nitrogen were made and the field was irrigated as needed to avoid drought stress. Prior to this, turf cover ratings for the hard fescues on June 27, 1994 were very good. Following fertilization, however, turf density ratings on November 3, 1995 were poor; the only entry with more than 50% turf cover was 'Reliant with endophyte.' A combination of factors including disease and insect damage during the summer were likely responsible for this reduction in turf cover. Typically, such plots will regain normal density and coverage over time and will once again form a very attractive turf. This phenomenon of cyclical performance is one reason it is important to observe varieties for many years and not to draw conclusions about performance based on only one or two years of data.

ACKNOWLEDGMENTS

New Jersey Agricultural Experiment Station Publication No. E-12264-7-96. This work was conducted as part of NJAES Project No. 12264, supported by New Jersey Agricultural Experiment Station, State, and Hatch Act funds, the Center for Turfgrass Science, other grants, and gifts. Additional support was received from the United States Golf Association-Golf Course Superintendents Association of America Research Fund, 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 October 1989 at Pittstown, NJ and in October 1989 at North Brunswick, NJ (bold and italicized column headings). (Includes 1989 National Test - NTEP.)

		---Turf Quality[1]---		---------Green Color[2]---------			Crabgrass (%)	--------Turf Density[4]--------				***---Turf Cover[5]---***
	Cultivar or Selection	1992-1995 Avg.	1995 Avg.	Jul. 27 1995	Jul. 30 1993	***Jun. 27 1994***[3]	Jul. 27 1995	Jul. 27 1995	Jul. 30 1994	Jul. 30 1993	***Jun. 27 1994***[3]	***Nov. 3 1995 (%)***[3]
	CHEWINGS FESCUES											
1	Bargreen	5.6	5.3	4.0	1.7	3.7	0.0	6.7	6.7	7.7	6.7	53.3
2	Waldorf	5.4	5.0	4.0	2.3	4.0	2.7	7.0	6.0	7.3	6.0	53.3
3	Trophy	5.3	4.7	4.3	3.0	4.7	2.3	7.3	6.7	7.0	6.3	18.7
4	Proformer	5.3	4.4	3.3	1.7	2.0	0.7	7.3	7.3	8.0	7.0	68.3
5	Treazure	5.3	4.5	3.3	1.7	2.0	4.0	7.7	7.7	8.0	7.0	68.3
6	Southport	5.2	4.5	3.3	2.0	2.7	6.7	7.7	7.3	7.3	7.0	79.3
7	Tiffany	5.1	4.4	2.7	1.0	2.0	1.3	7.7	7.3	7.7	7.0	66.7
8	Jamestown II	5.1	4.4	3.7	1.3	2.7	0.7	7.0	7.7	8.0	7.0	93.0
9	Atlanta	5.1	5.1	4.3	2.7	3.7	3.3	7.0	6.0	7.0	5.7	50.0
10	SR 5000	5.1	4.5	3.0	1.7	2.7	0.3	7.3	7.3	8.0	7.0	86.7
11	89.LKR	5.0	4.6	3.7	2.0	3.3	1.3	7.3	6.3	7.7	7.0	80.0
12	Dignity	5.0	4.4	3.0	1.3	3.3	1.0	7.3	6.7	7.7	6.3	61.7
13	Bridgeport	5.0	4.3	3.3	1.7	3.3	0.7	7.3	7.0	7.3	6.7	88.0
14	Enjoy	5.0	4.5	3.7	1.7	2.7	1.0	7.0	6.3	8.0	5.7	73.3
15	PST-4FE	4.9	4.5	3.7	1.7	2.3	3.7	7.0	5.7	7.7	6.3	60.0
16	Epsom	4.9	4.8	3.3	2.3	4.0	4.3	7.0	5.0	7.0	5.7	35.3
17	Shadow	4.9	4.4	4.7	1.7	3.7	4.3	6.7	7.3	7.3	6.0	75.0
18	Fernando	4.9	4.7	4.7	2.7	4.7	1.7	6.7	5.7	6.7	6.7	19.3
19	Longfellow E-	4.9	4.2	3.3	1.7	2.3	1.7	7.0	6.3	7.3	6.7	83.3
20	Simone	4.9	4.6	4.0	1.7	4.0	6.0	6.3	5.3	6.7	6.3	22.7

Table 1 (continued).

	Cultivar or Selection	---Turf Quality[1]--- 1992-1995 Avg.	1995 Avg.	---------Green Color[2]--------- Jul. 27 1995	Jul. 30 1993	***Jun. 27 1994***[3]	Crabgrass (%) Jul. 27 1995	--------Turf Density[4]-------- Jul. 27 1995	Jul. 30 1994	Jul. 30 1993	***---Turf Cover[5]--- Jun. 27 1994***[3]	***Nov. 3 1995 (%)***[3]
	CHEWINGS FESCUES (continued)											
21	Shadow E+	4.8	4.1	3.0	2.0	2.3	2.3	7.3	7.3	7.3	7.0	56.7
22	Camaro	4.7	4.6	3.7	2.0	3.3	4.0	6.0	5.3	6.3	7.0	68.3
23	Dover	4.7	4.3	2.3	1.3	3.0	8.3	6.3	5.3	7.0	5.3	58.3
24	Molinda	4.6	4.2	3.0	1.3	3.0	3.3	6.7	5.7	6.3	6.0	63.3
25	Scarlet	4.6	4.7	3.7	2.3	5.0	6.7	6.0	5.0	6.7	6.0	22.0
26	Mary	4.5	4.2	2.3	1.7	3.0	3.3	6.3	5.7	6.3	5.7	50.0
27	Banner	4.5	4.1	3.3	1.3	2.7	2.7	6.7	6.7	6.7	6.7	66.7
28	Jamestown	4.5	4.1	2.7	2.0	2.7	3.3	7.0	5.7	7.0	7.3	92.3
29	Wilma	4.4	3.7	2.7	1.0	3.0	11.7	7.0	6.0	7.0	5.0	53.3
30	Rainbow	4.4	4.4	3.3	1.7	3.7	4.3	6.3	5.3	6.3	5.0	36.7
31	Capitol	4.2	3.9	3.3	1.0	4.0	2.0	6.3	4.3	5.3	5.7	25.0
32	Raymond	4.2	3.9	3.7	1.0	3.0	4.7	5.7	4.7	6.0	6.3	17.7
33	ERG-1143	4.2	3.8	4.0	2.3	4.0	8.3	6.0	4.3	6.3	4.7	31.7
34	Barlander	4.2	4.0	4.7	2.7	4.3	10.0	5.7	3.7	4.7	4.3	21.7
35	Barnica	4.1	3.8	3.7	1.3	3.0	2.3	5.7	5.0	6.7	5.7	53.3
36	Puma	4.1	3.9	3.7	2.3	3.0	4.0	7.0	4.3	6.7	6.3	61.7
37	Koket	3.9	3.9	4.7	2.0	5.0	5.0	5.7	4.3	5.7	5.7	53.3

Table 1 (continued).

	Cultivar or Selection	---Turf Quality[1]--- 1992-1995 Avg.	1995 Avg.	---------Green Color[2]--------- Jul. 27 1995	Jul. 30 1993	***Jun. 27 1994***[3]	Crabgrass (%) Jul. 27 1995	--------Turf Density[4]-------- Jul. 27 1995	Jul. 30 1994	Jul. 30 1993	***---Turf Cover[5]--- Jun. 27 1994***[3]	***Nov. 3 1995 (%)***[3]
	HARD FESCUES											
1	PST-4AG E-	7.5	7.2	8.3	7.7	8.0	0.0	8.0	9.0	8.7	7.7	29.0
2	SR 3100 E+	7.4	6.6	7.3	8.3	8.0	0.0	8.7	9.0	8.7	7.0	43.3
3	Reliant E+	7.2	6.6	8.3	7.7	8.0	0.0	8.0	9.0	8.7	6.0	59.7
4	Discovery E+	7.2	6.5	8.3	7.7	7.7	0.0	8.0	9.0	8.7	8.0	31.7
5	SR 3000 E-	7.1	6.4	8.3	8.0	7.7	0.0	7.7	8.7	9.0	7.0	15.7
6	Reliant E-	7.1	6.3	8.3	8.0	8.0	0.0	8.3	9.0	8.0	6.3	28.3
7	Warwick E+	7.0	6.4	8.0	7.7	7.7	0.0	7.7	8.7	8.3	7.0	26.7
8	Brigade	6.9	6.5	8.0	7.3	8.0	0.0	8.0	8.3	8.3	7.3	41.7
9	Aurora E-	6.9	6.3	7.7	7.7	7.7	0.0	7.7	8.7	8.7	6.7	44.0
10	Attila E-	6.9	6.2	7.3	7.0	7.7	0.0	7.7	8.3	8.7	4.3	27.3
11	Aurora	6.9	6.2	8.3	7.3	8.0	0.0	7.7	9.0	8.7	7.7	34.0
12	Silvana E-	6.8	6.1	7.7	7.3	8.0	0.0	8.0	7.7	8.0	6.7	40.0
13	Serra	6.8	6.3	7.3	7.3	7.7	0.0	7.7	7.3	8.3	6.7	41.7
14	Scaldis	6.8	6.3	7.7	7.3	8.0	0.0	7.7	8.0	8.3	8.3	50.0
15	Biljart E-	6.6	5.6	7.3	8.0	7.0	0.0	7.0	8.3	8.3	5.7	23.3
16	Bardur	6.5	5.6	6.7	7.7	7.0	0.0	6.0	8.0	8.7	6.0	3.0
17	Valda	6.4	5.9	6.7	6.7	8.0	2.3	7.7	7.3	7.0	8.0	20.3
18	Barreppo E-	6.1	5.9	7.7	7.0	7.0	1.0	6.7	7.0	7.0	6.3	17.0

Table 1 (continued).

	Cultivar or Selection	---Turf Quality[1]--- 1992-1995 Avg.	1995 Avg.	---------Green Color[2]--------- Jul. 27 1995	Jul. 30 1993	***Jun. 27 1994***[3]	Crabgrass (%) Jul. 27 1995	--------Turf Density[4]-------- Jul. 27 1995	Jul. 30 1994	Jul. 30 1993	***---Turf Cover[5]--- Jun. 27 1994***[3]	***Nov. 3 1995 (%)***[3]
	SHEEPS FESCUES											
1	Eureka E-	6.7	6.3	7.7	7.0	7.0	1.0	8.3	8.3	8.3	6.3	41.3
2	Bighorn	6.6	6.1	7.0	6.3	6.7	0.3	8.0	7.0	8.3	6.7	25.7
3	MX 86	5.7	5.4	6.3	6.0	6.0	13.3	7.0	6.0	6.7	8.3	94.7
	SLENDER CREEPING RED FESCUES											
1	Barcrown	4.7	4.6	7.0	4.3	7.0	4.0	4.7	5.3	4.3	4.3	15.0
2	Seabreeze	4.7	4.5	6.0	4.3	6.3	14.0	5.3	4.3	4.7	5.0	45.0
3	Smirna	4.3	4.5	5.3	4.0	7.0	25.0	5.3	3.0	5.0	4.3	18.3
4	Dawson	4.3	4.5	7.0	4.7	6.3	15.7	5.0	2.3	4.0	4.3	43.3
5	Barlotte	4.3	4.4	5.0	3.7	6.3	12.3	4.3	2.3	4.0	3.7	35.0
6	Marker	4.1	4.1	5.7	4.7	6.0	28.3	4.3	3.7	4.7	4.0	30.0
7	HF-138	3.6	3.9	5.7	4.3	5.7	35.0	5.0	2.7	4.0	6.0	42.0
8	Barskol	3.3	3.5	4.7	4.3	6.7	26.7	4.7	2.0	4.3	5.0	21.7
9	Napoli	3.3	3.5	6.0	3.7	7.0	45.0	5.0	2.0	3.0	5.0	13.3
10	Comfort	3.2	3.3	6.0	4.0	6.0	32.7	4.7	2.3	3.7	5.7	23.7
	STRONG CREEPING RED FESCUES											
1	Jasper	4.5	4.5	6.0	4.0	6.3	17.7	4.7	3.7	6.7	5.7	32.0
2	PST-4R3 E+	4.5	4.5	5.7	4.3	5.0	15.0	6.0	4.7	6.0	7.3	83.0
3	PST-43F	4.1	4.0	5.3	3.3	5.3	21.7	5.0	3.3	6.0	6.7	71.7
4	PST-4CB	4.1	4.1	5.0	4.0	5.3	34.0	4.7	3.0	5.7	6.3	85.0
5	PST-4NI	4.0	4.0	5.0	3.7	6.0	30.0	4.3	3.3	5.7	6.0	47.7

Table 1 (continued).

	Cultivar or Selection	---Turf Quality[1]--- 1992-1995 Avg.	1995 Avg.	---------Green Color[2]--------- Jul. 27 1995	Jul. 30 1993	***Jun. 27 1994***[3]	Crabgrass (%) Jul. 27 1995	--------Turf Density[4]-------- Jul. 27 1995	Jul. 30 1994	Jul. 30 1993	***---Turf Cover[5]--- Jun. 27 1994***[3]	***Nov. 3 1995 (%)***[3]
	STRONG CREEPING RED FESCUES (continued)											
6	Shademaster	3.8	3.5	5.0	3.7	5.3	33.3	4.3	3.0	5.3	6.0	45.0
7	Vista	3.7	3.9	5.0	3.0	5.0	46.7	5.0	3.7	6.3	6.0	47.7
8	Flyer	3.7	3.5	5.3	4.3	5.3	60.0	4.0	2.7	5.7	6.3	58.3
9	Salem	3.6	3.7	4.7	3.7	5.0	56.7	4.3	2.7	5.0	6.0	46.7
10	Ensylva	3.6	3.7	5.0	4.7	5.0	31.7	5.0	2.3	4.3	6.3	41.7
11	Cindy	3.6	3.5	5.3	5.7	5.7	50.0	4.3	3.7	4.3	5.7	65.0
12	WW Rs 138	3.6	3.8	6.7	4.7	5.3	28.3	4.3	2.7	4.7	6.3	68.3
13	Talus	3.5	3.5	6.3	4.7	7.3	38.3	4.3	2.7	4.7	5.7	30.0
14	Herald	3.2	3.1	5.3	4.0	5.7	60.0	4.0	2.3	4.3	5.7	40.0
15	Collo	3.2	3.4	5.3	4.3	6.3	43.3	4.7	2.7	3.7	5.7	21.7
16	Elanor	3.2	3.3	5.7	4.3	6.7	36.7	3.7	2.0	3.0	5.3	53.3
17	Belvedere	3.1	3.3	5.3	3.7	5.7	50.0	3.7	2.0	3.3	6.3	30.0
18	WW Rs 130	3.0	3.4	5.3	3.7	5.3	56.7	3.7	1.7	3.7	5.7	53.3
19	Bargena	2.8	3.3	6.3	4.3	6.0	56.7	3.7	1.7	3.7	6.3	46.7
20	Claudia	2.8	2.9	5.7	3.7	5.3	63.3	3.7	1.7	3.3	6.0	56.7
21	WW Rs 143	2.6	3.0	5.7	4.3	4.0	70.0	3.3	1.7	3.3	5.7	56.7
22	Franklin	2.3	2.1	5.7	4.0	6.3	52.7	3.0	1.0	3.7	5.3	26.7
23	Sylvester	2.3	2.6	6.3	4.7	5.7	37.0	3.7	1.0	3.0	5.3	51.7
24	Boreal	2.2	2.3	5.7	4.0	6.0	76.7	3.0	1.3	3.0	6.0	22.0
25	Revere	1.9	1.9	5.3	3.7	6.0	78.3	2.0	1.0	2.7	3.7	21.7

Table 1 (continued).

	Cultivar or Selection	---Turf Quality[1]--- 1992-1995 Avg.	1995 Avg.	---------Green Color[2]--------- Jul. 27 1995	Jul. 30 1993	***Jun. 27 1994***[3]	Crabgrass (%) Jul. 27 1995	--------Turf Density[4]-------- Jul. 27 1995	Jul. 30 1994	Jul. 30 1993	***---Turf Cover[5]--- Jun. 27 1994***[3]	***Nov. 3 1995 (%)***[3]
	STRONG CREEPING RED FESCUES (continued)											
26	Bargena II	1.8	1.7	5.7	4.3	6.0	73.3	2.0	1.0	2.7	6.0	40.0
27	Sunset	1.8	1.5	5.3	4.0	4.7	81.7	2.0	1.0	2.3	4.3	63.3
	LSD at 5% =	0.8	0.9	1.2	1.1	1.2	20.1	1.3	1.3	1.3	1.6	35.0

[1] 9 = best turf quality
[2] 9 = brightest, freshest green color
[3] Data taken from 1989 test at North Brunswick, NJ
[4] 9 = highest turf density
[5] Turf cover: Jun. 27, 1994: 9 = most turf cover
Nov. 3, 1995: percent cover

Table 2. Performance of fine fescue cultivars and selections in a turf trial seeded September 1991 at Adelphia, NJ.

	Cultivar or Selection	Turf Quality[1] 1992-1995 Avg.	1992 Avg.	1993 Avg.	1994 Avg.	1995 Avg.
	CHEWINGS FESCUES					
1	Tiffany	5.8	6.1	5.5	5.9	5.6
2	4LD-91	5.4	6.2	4.7	5.3	5.5
3	Southport	5.1	5.4	5.2	5.1	4.7
4	Bridgeport	5.1	5.4	4.9	5.0	5.0
5	Jamestown II E+	5.0	5.1	4.9	5.3	4.8
6	Jamestown II E-	4.9	5.1	4.9	5.0	4.5
7	Proformer	4.8	5.4	4.4	5.2	4.2
8	Shadow	4.7	5.0	4.5	4.7	4.4
9	Jamestown	4.5	4.3	4.2	4.7	4.7
10	Cook	4.0	4.9	3.6	3.5	3.8
11	Cascade	3.8	4.3	4.0	3.3	3.5
	HARD FESCUES					
1	Discovery	6.3	6.8	6.1	5.7	6.7
2	Nordic	6.1	6.4	5.8	5.9	6.4
3	Warwick	5.9	6.7	5.8	4.9	6.1
4	Aurora E+	5.6	6.3	5.2	5.1	5.9
5	Aurora	5.6	6.6	5.2	5.0	5.6
6	Reliant E-	5.4	5.9	5.3	4.8	5.4
7	Reliant E+	5.3	5.7	5.3	4.8	5.4
	SHEEPS FESCUES					
1	Bighorn E+	5.2	6.9	4.9	5.0	4.2
2	Bighorn	4.3	6.0	3.9	3.6	3.7
3	MX-86	3.3	5.4	2.8	2.6	2.3
	SLENDER CREEPING RED FESCUES					
1	Marker	5.6	6.4	5.4	6.1	4.6

Table 2 (continued).

	Cultivar or Selection	Turf Quality[1] 1992-1995 Avg.	1992 Avg.	1993 Avg.	1994 Avg.	1995 Avg.
	STRONG CREEPING RED FESCUES					
1	4DR	5.2	5.7	5.5	5.3	4.5
2	Syn-4ST	5.2	5.5	5.0	5.2	4.9
3	Shademaster II	5.1	5.9	5.0	4.5	5.0
4	Syn-4BS	5.0	5.5	4.8	5.3	4.5
5	Syn-4BN	5.0	5.5	5.1	5.1	4.4
6	Syn-4TR	4.8	5.5	5.0	4.3	4.5
7	Jasper	4.8	5.1	4.8	5.0	4.3
8	4R3-91	4.5	4.8	4.7	3.9	4.6
9	43F-91	4.5	4.7	4.3	4.7	4.1
10	GW 5101	3.8	4.3	3.4	3.5	4.1
11	Shademaster	3.7	4.7	3.4	3.7	3.1
12	Tasman	3.7	3.5	4.0	3.9	3.5
13	Pennlawn	2.0	2.0	2.2	1.6	2.4
	LSD at 5% =	0.5	0.7	0.7	1.0	0.8

[1] 9 = best turf quality

Table 3. Performance of fine fescue cultivars and selections in a turf trial seeded September 1993 at North Brunswick, NJ. (Includes 1993 National Fineleaf Fescue Test - NTEP.)

		Turf Quality[1]		
	Cultivar or Selection	1994-1995 Avg.	1994 Avg.	1995 Avg.
	CHEWINGS FESCUES			
1	PST-44D	7.0	6.5	7.4
2	MB 61-93	6.3	5.9	6.7
3	NJF-93	6.3	6.2	6.5
4	Tiffany	6.3	5.7	6.9
5	Ford92	6.2	6.0	6.4
6	Ford92 Del E+	6.2	6.3	6.2
7	MB 63-93	6.2	5.4	6.9
8	Brittany	6.1	5.6	6.6
9	MB 64-93	6.1	5.7	6.4
10	Pick 4-91W	6.1	5.6	6.5
11	SR 5100	6.0	5.7	6.3
12	DCH 93 comp	6.0	6.0	5.9
13	Ford92 Cam E+	5.9	6.1	5.7
14	Bridgeport	5.9	5.2	6.6
15	Treasure E+	5.8	5.8	5.9
16	Ford92 E-	5.7	5.5	6.0
17	MB 65-93	5.7	4.9	6.5
18	Treazure E-	5.6	5.0	6.2
19	Wx3-FF54	5.5	4.8	6.2
20	TMI-3CE	5.4	5.0	5.8
21	Darwin	5.4	5.1	5.6
22	PRO 92/20	5.4	4.5	6.3
23	Victory E+	5.4	4.6	6.1
24	Shadow E+	5.3	4.5	6.1
25	Banner II	4.9	4.1	5.7
26	Jamestown II '92	4.8	4.6	5.0
27	Jamestown II '93	4.8	4.4	5.2
28	Jamestown II	4.7	4.3	5.2
29	MB 66-93	4.7	3.9	5.5
30	Molinda	4.6	4.1	5.2

Table 3 (continued).

	Cultivar or Selection	Turf Quality[1] 1994-1995 Avg.	Turf Quality[1] 1994 Avg.	Turf Quality[1] 1995 Avg.
	CHEWINGS FESCUES (continued)			
31	ISI-FC-62	4.6	4.1	5.1
32	Jamestown II '90	4.4	4.2	4.6
33	Medina	4.4	3.9	5.0
34	Jamestown II '91	4.2	3.9	4.5
35	Jamestown	4.1	3.7	4.6
36	Cascade	3.0	2.4	3.7
	HARD FESCUES			
1	Discovery	6.4	6.0	6.8
2	MB 82-93	6.1	5.4	6.8
3	SR 3100	5.9	5.2	6.7
4	Ecostar	5.9	5.6	6.2
5	MB 81-93	5.8	5.4	6.1
6	Reliant II	5.6	5.2	5.9
7	Nordic	5.5	5.3	5.8
8	Aurora	5.5	5.0	5.9
9	PRO 92/24	5.5	5.3	5.7
10	Brigade	5.4	5.3	5.6
11	MB 83-93	5.4	5.3	5.5
12	Spartan	5.2	4.9	5.5
13	Scaldis	5.0	4.8	5.2
14	Pamela	4.3	4.0	4.6
	SHEEPS AND BLUE FESCUES			
1	Quatro	5.2	5.5	4.9
2	CRF-D1	5.1	5.2	5.1
3	Bighorn	4.1	4.1	4.1
4	Mx-86	3.6	3.9	3.3
5	67135	1.9	1.6	2.1
	SLENDER CREEPING RED FESCUES			
1	Seabreeze	4.4	3.9	4.9
2	Dawson	3.1	2.9	3.4

Table 3 (continued).

	Cultivar or Selection	Turf Quality[1] 1994-1995 Avg.	Turf Quality[1] 1994 Avg.	Turf Quality[1] 1995 Avg.
	STRONG CREEPING RED FESCUES			
1	PST-4VB E+	6.6	6.2	6.9
2	Shademaster II	6.3	5.6	7.1
3	PST-4ST	6.2	5.5	7.0
4	ZPS-4BN	6.0	5.2	6.8
5	PST-4DT	5.7	5.1	6.3
6	Jasper E+	5.6	5.1	6.1
7	Wx3-FFG6	5.4	5.1	5.7
8	Flyer	4.7	3.8	5.6
9	Aruba	4.6	3.6	5.6
10	BAR Frr 4ZBD	4.2	4.0	4.5
11	CAS FR13	3.8	3.6	4.1
12	WVPB-STCR-101	3.8	4.1	3.6
13	Rondo	3.7	3.1	4.4
14	BAR UR 204	3.4	2.6	4.2
15	Common Cr	2.7	2.4	2.9
	LSD at 5% =	0.6	0.6	0.9

[1] 9 = best turf quality

Table 4. Performance of fine fescue cultivars and selections in a turf trial seeded September 1993 at Adelphia, NJ. (Includes 1993 National Fineleaf Fescue Test - NTEP.)

		Turf Quality[1]		
	Cultivar or Selection	1994-1995 Avg.	1994 Avg.	1995 Avg.
	CHEWINGS FESCUES			
1	PST-44D	5.9	5.5	6.3
2	Pick 4-91W	5.7	5.6	5.8
3	NJF-93	5.4	5.6	5.2
4	Ford92	5.4	5.9	4.8
5	Ford92 Del E+	5.4	5.8	4.9
6	Treazure	5.3	5.2	5.4
7	MB 61-93	5.3	5.3	5.3
8	Treasure E+	5.3	5.2	5.4
9	SR 5100	5.3	5.1	5.5
10	4FE	5.3	5.2	5.3
11	Ford92 Cam E+	5.2	5.8	4.7
12	Tiffany	5.2	4.9	5.5
13	Brittany	5.2	5.2	5.1
14	DCH93 comp	5.0	5.6	4.5
15	Ford92 E-	5.0	5.5	4.5
16	Bridgeport	4.9	4.8	5.0
17	MB 64-93	4.9	5.1	4.6
18	TMI-3CE	4.8	4.4	5.1
19	Wx3-FF54	4.7	4.6	4.9
20	Victory E+	4.7	4.8	4.7
21	4LD	4.7	4.5	4.9
22	Southport	4.6	4.9	4.2
23	MB 65-93	4.5	4.8	4.2
24	Jamestown II '90	4.5	4.0	5.0
25	Shadow E+	4.4	4.2	4.6
26	MB 63-93	4.3	4.6	4.1
27	Jamestown II '93	4.3	4.1	4.4
28	Jamestown II '92	4.3	4.2	4.3
29	Jamestown II	4.2	3.7	4.7
30	ISI-FC-62	4.2	4.1	4.4

Table 4 (continued).

	Cultivar or Selection	Turf Quality[1] 1994-1995 Avg.	Turf Quality[1] 1994 Avg.	Turf Quality[1] 1995 Avg.
	CHEWINGS FESCUES (continued)			
31	PRO 92/20	4.2	3.9	4.5
32	Jamestown II '91	4.1	3.9	4.3
33	Banner II	4.0	3.9	4.2
34	Darwin	4.0	3.9	4.1
35	Jamestown	3.8	3.6	4.1
36	Molinda	3.4	3.1	3.7
37	Medina	3.3	2.9	3.7
38	MB 66-93	3.2	3.4	3.1
39	Cascade	2.7	2.4	3.0
	HARD FESCUE			
1	Discovery	6.4	6.6	6.2
2	SR 3100	6.0	6.0	6.0
3	Reliant II	5.8	5.7	5.9
4	MB 81-93	5.8	5.9	5.7
5	Ecostar	5.5	5.6	5.4
6	MB 83-93	5.3	5.6	5.0
7	PRO 92/24	5.3	5.1	5.5
8	Nordic	5.1	5.0	5.3
9	4RU	5.1	5.1	5.1
10	Brigade	5.1	4.9	5.4
11	Warwick	5.0	4.9	5.1
12	Aurora	4.9	4.5	5.4
13	MB 82-93	4.9	5.0	4.8
14	Scaldis	4.9	4.8	5.0
15	Spartan	4.8	4.7	4.9
16	Reliant	4.8	5.1	4.5
17	Attila	4.2	4.5	3.9
18	Pamela	4.0	3.8	4.1

Table 4 (continued).

	Cultivar or Selection	1994-1995 Avg.	1994 Avg.	1995 Avg.
		Turf Quality[1]		
	SHEEPS FESCUES			
1	Quatro	4.8	5.2	4.4
2	4EB	4.5	4.7	4.3
3	Bighorn	4.3	4.6	4.0
4	4BE	4.2	4.6	3.9
5	67135	3.0	2.3	3.9
	SLENDER CREEPING RED FESCUES			
1	Seabreeze	4.7	4.0	5.4
2	Dawson	3.6	2.8	4.3
	STRONG CREEPING RED FESCUES			
1	PST-4VB E+	5.5	4.9	6.1
2	4DR-93	5.2	4.8	5.6
3	Jasper E+	5.2	4.9	5.6
4	PST-4ST	5.1	4.6	5.6
5	4VB E-	5.1	5.1	5.1
6	Shademaster II	5.0	5.1	4.9
7	ZPS-4BN	4.9	4.3	5.6
8	43F-93	4.9	4.4	5.5
9	Syn 4VE	4.9	5.1	4.6
10	4DT-93	4.8	4.5	5.0
11	PST-4DT	4.7	4.4	5.0
12	Wx3-FFG6	4.7	4.8	4.6
13	4PB	4.7	4.6	4.8
14	4BN	4.7	4.4	5.0
15	4R3-93	4.4	4.0	4.9
16	CAS FR13	4.1	3.4	4.8
17	Flyer	3.9	3.5	4.4
18	WVPB-STCR-101	3.8	3.8	3.8
19	Shademaster	3.7	3.9	3.6
20	Aruba	3.6	3.3	3.9

Table 4 (continued).

	Cultivar or Selection	Turf Quality[1] 1994-1995 Avg.	Turf Quality[1] 1994 Avg.	Turf Quality[1] 1995 Avg.
21	Salem	3.5	3.3	3.7
22	Rondo	3.5	2.9	4.1
23	BAR Frr 4ZBD	3.4	3.0	3.8
24	Common Cr	3.3	2.3	4.3
25	BAR UR 204	3.1	2.7	3.6
26	Pennlawn	2.2	2.0	2.5
	LSD at 5% =	0.6	0.7	0.9

[1] 9 = best turf quality

Table 5. Performance of fine fescue cultivars and selections in a turf trial seeded September 1994 at Adelphia, NJ.

	Cultivar or Selection	Turf Quality[1] 1995 Avg.	Seedling Vigor[2] Oct. 1994 Avg.
	CHEWINGS FESCUES		
1	Jamestown II '94	4.3	6.7
2	Banner II	4.3	6.7
3	Cascade	2.5	6.3
	HARD FESCUES		
1	SR 3100	5.6	5.0
2	Rescue	5.5	5.7
3	Discovery	5.4	5.7
4	Reliant '92	5.0	6.3
5	Spartan	4.8	6.3
6	Eureka	4.1	5.3
	SHEEPS FESCUES		
1	Verdome	4.6	5.7
2	Mx-86	3.6	4.7
3	Azay	3.1	6.3
	STRONG CREEPING RED FESCUES		
1	H-Frr Bulk	5.3	6.3
2	H-Frr E+	5.0	6.3
3	BLMT E-	4.8	7.7
4	Cindy	4.4	6.3
5	BLMT E+	4.2	7.7
6	Pennlawn	2.2	8.3
	LSD at 5% =	0.6	0.8

[1] 9 = best turf quality
[2] 9 = most rapid rate of seedling germination and establishment

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

	1989		1990		1991		1992		1993		1994		1995	
	N[1]	Ht[2]	N	Ht	N	Ht	N	Ht	N	Ht	N	Ht	N	Ht
Table 1														
1989 Pittstown	1.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0
1989 North Brunswick	1.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	3.7	3.0
Table 2 (1991 Adelphia)					2.0	1.5	4.1	1.5	0.5	2.0	2.9	1.5	2.8	2.0
Table 3 (1993 North Brunswick)											5.7	1.5	2.0	1.5
Table 4 (1993 Adelphia)											3.8	1.5	3.6	2.0
Table 5 (1994 Adelphia)													4.6	2.0

[1] Annual N applied (lbs/1000 ft^2).
[2] Mowing height in inches.