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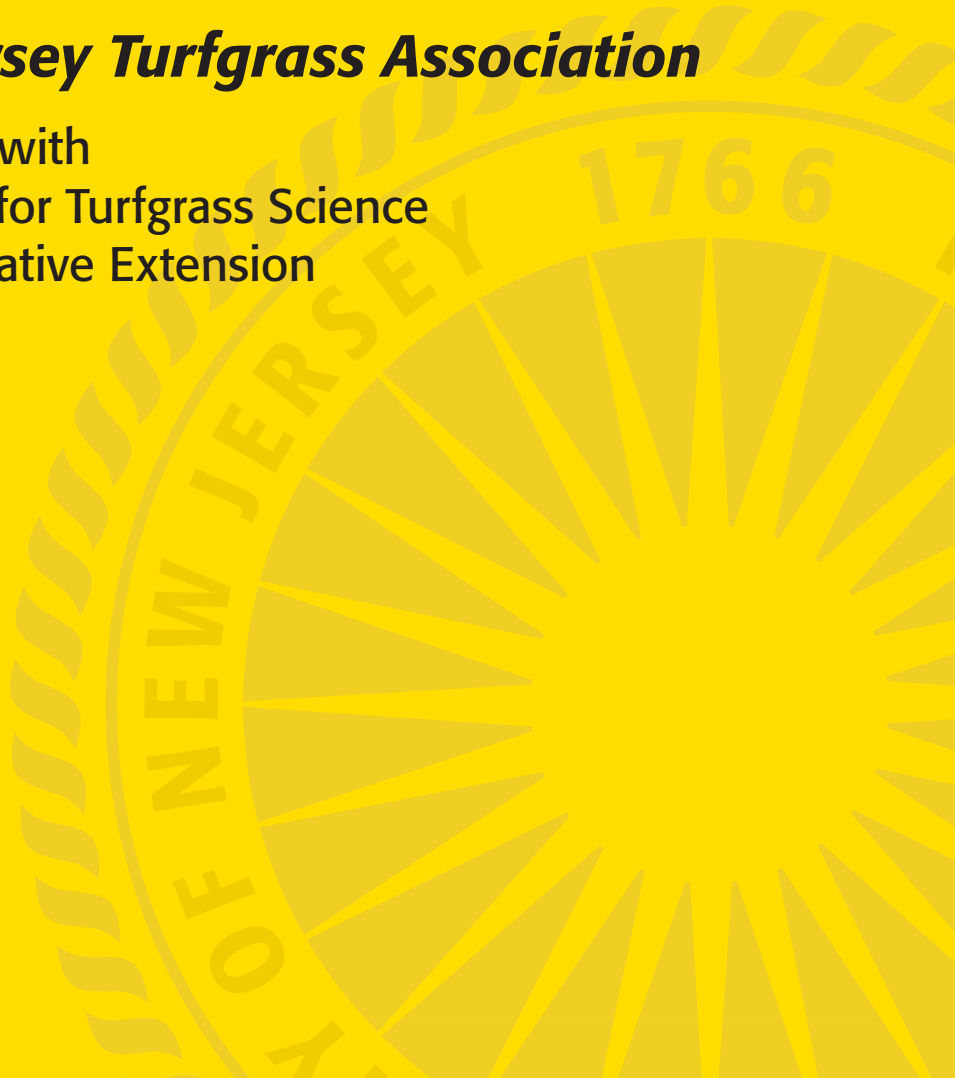

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The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. Through this forum, these professionals also reach a more general audience, which includes the public.

This publication includes lecture notes of papers presented at the 2006 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

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The fine fescues include several species from the genus *Festuca*. They are commonly identified by their very fine leaf texture. The species used for turf include both bunch types: Chewings fescue (*Festuca rubra* L. subsp. *fallax* (Thuill.) Nyman), hard fescue (*F. brevipila* R. Tracey), sheeps fescue (*F. ovina* L.), and blue fescue (*F. glauca* Vill.)]; and rhizomatous types: slender creeping red fescue (*F. rubra* L. var. *littoralis* Vasey ex Beal) and strong creeping red fescue (*F. rubra* L. subsp. *rubra*).

Fine fescues are well suited for dry-land and low maintenance regimes because they tolerate drought and shade and have a low requirement for nitrogen fertility. Compared to Chewings and hard fescues, strong creeping and slender creeping red fescues spread by producing rhizomes and thus tend to have a more open turf canopy. Of the two, the strong creeping red fescues are more rhizomatous and have a more open growth habit. Hard and Chewings fescues are bunch type grasses, and compared to slender and strong creeping red fescues, most of the recently released cultivars have improved turf-type characteristics, higher density, and finer leaf texture. Hard fescues also have lower nutrient requirements, better disease resistance under low maintenance, and a slower growth rate. Sheeps fescues and blue fescues have stiff, bluish-green leaves and require little maintenance. *Deschampsia* and *Koeleria* are two emerging turfgrass species that are well-adapted to low maintenance, but lack heat and traffic tolerance.

Strong creeping red fescue is often used as a companion grass in mixtures with complementary Kentucky bluegrasses that have similar color, growth habit, and density. The strong creeping red fescues often have better establishment and seedling vigor than most Kentucky bluegrasses. After establishment, the fescues dominate in heavily shaded areas where Kentucky bluegrass is not competitive. Hard fescues are used for soil erosion control in low maintenance areas, and sheeps fescues are used for stabilization of sandy soils and banks along irrigation canals. The sheeps and blue fescues are used in wildflower mixes for soil stabilization and for their brilliant bluish foliage in the ornamental landscape setting.

Fine fescues grow best under reduced nitrogen (N) fertilization. Ideally, fine fescue should be fertilized with no more than 1 to 2 lb N/1000 ft^2 per year (Turgeon, 2005). Hard, blue, and sheeps fescues require less N than the other species. With the exception of Chewings fescue, which can be mown closely to a 0.5-inch height of cut, the other fine fescue species do not tolerate a low height of cut; they can tolerate mowing heights of 1.5 to 2.0 inches, but perform best above 2.5 inches.

Fine fescues that contain the *Neotyphodium* endophyte can exhibit enhanced tolerance to insects, diseases, and environmental stress (Smiley et al., 2005). This endophyte is a fungus that grows in the crown and leaf sheath tissues of the turfgrass plant. The impact of this endophyte on plant growth is generally not apparent during periods of low environmental stress; under stressful conditions, however, the endophyte-plant relationship produces compounds that improve resistance to many above ground feeding insects, some diseases such as red thread (caused by the fungus *Laetisaria fuciformis*) (Popay and Bonos, 2005), and some abiotic stresses, including drought.

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Breeding efforts continue to enhance turf characteristics of the fine fescues and improve resistance to diseases, insects, and environmental stresses. Incorporation of endophytes into improved plant material provides an efficient way to increase stress tolerance. 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.

PROCEDURES

Fine fescue trials were conducted at the Horticultural Research Farm II at North Brunswick, NJ (Table 1), and the Rutgers Plant Biology and Pathology Research and Extension Farm at Adelphia, NJ (Tables 2 to 4). An additional low maintenance test consisting of the fine fescues, tall fescue (*Festuca arundinacea* Schreb.), Texas x Kentucky bluegrass hybrids (*Poa arachnifera* Torr. x *P. pratensis* L. hybrids), Kentucky bluegrass (*P. pratensis* L.), colonial bentgrass (*Agrostis capillaris* L.), and selections of *Deschampsia* was conducted at the Rutgers Plant Biology and Pathology Research and Extension Farm at Adelphia, NJ (Table 5).

Tests at Adelphia were established in open areas with good air circulation. The trial at North Brunswick was in an area with less air circulation and thus with higher disease pressure. All fine fescue and entries were seeded in 3 x 5 ft plots at a rate of 3.7 lb seed/1000 ft^2. In the low maintenance trial tall fescue, Texas x Kentucky bluegrass hybrids, Kentucky bluegrass, *Deschampsia*, and colonial bentgrass were seeded in 3 x 5 ft plots at a rate of 3.7, 2.2, 2.2, 2.2, and 0.5 lb seed/1000 ft^2, respectively. Plots were replicated three times in a randomized complete block design.

Tests were fertilized at different N rates, but held at the same mowing height (Table 6). After establishment, tests were irrigated only to avoid severe drought stress and dormancy. Plots were mowed frequently to avoid excessive accumulation of clippings. At Adelphia, broadleaf weeds were controlled with spring or fall applications of 2,4-D, dicamba, and MCPP; Dimension (dithiopyr) was used in spring and fall to control annual grassy weeds; and Merit (imidacloprid) was applied in July for grub control. At North Brunswick, Dimension was applied to control annual grassy weeds; Merit was applied in July for grub control; and Dylox (trichlorfon) was applied in August for cutworm control.

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, brightness, uniformity, color, growth habit, and damage due to diseases or insects. Other ratings include seedling establishment, percent cover, resistance to crown or stem rust (caused by *Puccinia graminis* or *P. coronata*, respectively) and drought tolerance. All ratings, except percent cover, were taken using a 1 to 9 scale, where 9 represents the best turf quality, best establishment, or least disease. Percent cover was taken on a 0 to 100 scale, where 100 represents complete turfgrass cover. All data were subjected to analysis of variance. Means were separated using Fisher's protected least significant difference (LSD) means separation 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 the comparison of cultivars and selections within a species. In Tables 4 and 5, entries are ranked according to their turf quality average for 2006. Additional characteristics observed in various tests are discussed below.

Turf Quality

In general, the hard and strong creeping red fescues performed better than the other species; many selections formed a dense, attractive turf (Tables 1 to 4). Although improvement in the turf quality of *Deschampsia*, *Koeleria*, and blue, sheeps, and slender creeping red fescues continues, these species still rank lower than the others in overall turf quality (Tables 1 to 5). It is interesting to note that hard fescue x blue fescue hybrids show dramatic improvement when compared to their poor quality relatives (blue fescue) (Tables 2 and 3). This demonstrates the rapid progress that is possible when improving open-pollinated turfgrass species.

The ten top-ranked entries in the low maintenance test (Table 5) were hard and strong creeping red fescues, demonstrating that many of the fine fescues can outperform other high quality turfgrass species under low maintenance management regimes. In general, the turf quality of SR 5130 and Zodiac Chewings fescue, Gotham, Firefly, and Predator hard fescue, and Fortitude, Epic, and Musica strong creeping red fescue was good.

Establishment

Establishment in the fine fescues varied among the cultivars within any given species (Table 4). SR 3150 hard fescue established very well, as did Ambassador and Ambrose Chewings fescues and Aberdeen and SR 5210 strong creeping red fescues.

Percent Cover

Percent cover is a measure of the competitive ability of a turfgrass on a long-term basis; cultivars and selections with more complete cover are better able to persist under a given environment, whereas poor percent cover is characteristic of a declining turf stand. Cover for Zodiac Chewings fescue and Cardinal strong creeping red fescue was almost 100% after 3 years of growth (Table 1). Cover for the hard fescues Oxford and Scaldis was much less, ranging from 67 to 33%, respectively.

Low Maintenance Cultivar Evaluation

In 2005, eight cool-season turfgrass species (hard, strong creeping red, and Chewings fescues, tall fescue, Kentucky bluegrass, Texas x Kentucky bluegrass hybrids, colonial bentgrass, and *Deschampsia* sp.) were evaluated under low maintenance conditions at the Plant Biology Research and Extension farm at Adelphia, NJ (Table 5). This study is important as many of the lawns in NJ are maintained under low maintenance regimes and there are increased efforts to reduce fertilizer and irrigation inputs to turfgrass areas. To simulate a low-maintenance lawn typically found in New Jersey, the turf in this trial received a total of 2 lb N/1000 ft^2 per year, and no supplemental irrigation was applied. Plots were mowed with a Toro Groundsmaster rotary mower once per week at 2.5 inches (Table 6).

In general, the fine fescues exhibited the best turf quality under low maintenance (Table 5). The turf quality of HOE and Nordic hard fescues was best, followed by the OR1 Comp, OR3 Comp, and OR2 Comp strong creeping red fescue selections. The performance of Ambassador Chewings fescue was the highest among the other Chewings fescues included in the trial. A03TB-417 was the top performing Texas x Kentucky bluegrass hybrid, and Zinfandel and Princeton P-105 were among the best performing Kentucky bluegrass cultivars.

Rust Resistance

Rust is a low nitrogen disease that can affect turfgrasses during the spring, early summer, and fall months. In the low maintenance test seeded September 2005 at Adelphia (Table 5), Texas x Kentucky bluegrass hybrids and Kentucky bluegrass were susceptible to stem rust, whereas *Deschampsia* sp. were susceptible to crown rust. Selections A03TB-417 and A03TB-431 Texas x Kentucky bluegrass hybrids showed no sign of either rust disease. Within *Deschampsia*, the selection LSD Comp was very tolerant of crown rust. Since this is a common problem within the species, this result may prove promising for the advancement of the species. Tall fescue, the fine fescues, and colonial bentgrass exhibited good resistance to both rust pathogens in this trial.

Drought Tolerance

The ability of a plant to withstand prolonged periods of drought is an extremely important trait, especially in areas where irrigation is costly and impractical. The hard fescues, including Nordic and Oxford, showed excellent drought tolerance (Table 5). Chewings fescue, on the other hand, exhibited some susceptibility to drought. Zinfandel, A96-1201, Diva, and Bedazzled Kentucky bluegrass were very drought tolerant compared to other Kentucky bluegrasses such as Starburst and Moonlight, which were quite intolerant. Both tall fescues and colonial bentgrasses exhibited moderate drought tolerance. The *Deschampsia* cultivars and selections were the most drought susceptible compared to the other species in the trial.

SUMMARY

Breeding efforts continue to improve turf-type characteristics in the fine fescues. In an effort to increase the overall sustainability of the turfgrass system, special attention is paid by the Rutgers breeding program to drought, insect, and disease resistance. The goal of the program is to develop turfgrasses adapted to stressful conditions in order to improve quality with fewer inputs. We continue to look at the use of endophytes to supplement breeding efforts, thus improving a cultivar's natural ability to persist under stress. The success of these efforts is well documented by the excellent quality exhibited by many of the newer experimental selections; further improvements, however, are always a priority.

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REFERENCES

Popay, A. J., and S. A. Bonos. 2005. Biotic responses in endophytic grasses. Pages 163-185 *in*: C.A. Roberts, C.P. West, and D.E. Spires, eds. Neotyphodium in Cool Season Grasses. Blackwell Publishing.

Smiley, R. W., P. H. Dernoeden, and B. B. Clarke. 2005. Compendium of Turfgrass Diseases, 3rd ed. APS Press, St. Paul, MN.

Turgeon, A.J. 2005. Turfgrass Management, 7th ed. Prentice Hall, N.J. p. 415.

Table 1. Performance of fine fescue cultivars and selections in a turf trial seeded in September 2003 at North Brunswick, NJ. (Includes all entries of the 2003 National Fine Fescue Test - NTEP.)

	Cultivar or Selection	Turf Quality[1] 2004-2006 Avg.	Turf Quality[1] 2004 Avg.	Turf Quality[1] 2005 Avg.	Turf Quality[1] 2006 Avg.	Cover Oct. 2006 (%)
	CHEWINGS FESCUE					
1	Zodiac	5.7	6.5	4.9	5.8	98.0
2	7 Seas	5.5	6.3	4.7	5.5	91.7
3	DP 77-9885	5.1	6.2	4.5	4.7	86.7
4	Compass	4.9	5.8	4.2	4.8	90.0
5	SR 5130	4.9	6.9	4.3	3.5	65.0
6	IS-FRC 17	4.8	6.0	4.1	4.3	89.3
7	Ambassador	4.4	5.2	3.7	4.2	88.3
8	Longfellow II	4.4	5.6	3.6	4.0	84.3
9	DP 77-9886	4.4	5.3	3.9	3.9	66.7
10	Treazure II	4.0	6.2	3.3	2.6	60.0
11	Jamestown 5	3.8	4.6	3.3	3.6	86.7
12	Intrigue	3.7	4.9	3.2	3.1	.
13	Culumbra II	3.6	5.1	3.4	2.5	43.3
14	Cascade	2.8	3.8	2.6	2.1	43.3
	HARD FESCUE					
1	Gotham	4.7	5.8	4.8	3.4	48.3
2	Spartan II	4.5	5.6	4.5	3.5	58.3
3	Oxford	4.4	4.8	4.4	4.0	66.7
4	Predator	4.3	4.6	4.0	4.2	61.7
5	Berkshire	4.2	4.7	4.3	3.6	56.7
6	Firefly	3.9	5.1	3.7	3.0	56.7
7	Reliant IV	3.9	5.3	3.8	2.7	41.7
8	Minotaur	3.7	3.9	3.5	3.6	.
9	SRX 3K	3.4	3.9	3.1	3.3	51.7
10	SR 3000	3.4	4.0	3.4	2.9	50.0
11	Chariot	3.1	4.1	3.1	2.2	.
12	Scaldis	2.8	3.1	2.9	2.5	33.3
	SLENDER CREEPING RED FESCUE					
1	Seabreeze	3.4	3.8	2.8	3.5	75.0
2	Shoreline	2.9	4.6	2.8	1.3	40.0
3	Dawson E	2.4	3.5	2.1	1.6	31.7

(Continued)

Table 1 (continued).

	Cultivar or Selection	Turf Quality[1] 2004-2006 Avg.	2004 Avg.	2005 Avg.	2006 Avg.	Cover Oct. 2006 (%)
	STRONG CREEPING RED FESCUE					
1	Fortitude	6.0	6.5	5.5	6.0	87.7
2	Epic	5.8	6.4	5.4	5.8	66.7
3	Pick CRF 1-03	5.8	6.1	5.1	6.1	93.3
4	Cardinal	5.7	6.3	4.9	5.9	90.3
5	Cindy Lou	5.6	5.5	5.2	6.3	.
6	Wendy Jean	5.4	6.0	4.8	5.6	71.7
7	DLF-RCM	5.4	5.7	4.7	6.0	81.7
8	DP 77-9360	5.3	5.0	5.1	5.7	88.3
9	IS-FRR 29	5.1	5.5	4.5	5.2	83.3
10	DP 77-9578	5.0	5.3	4.4	5.2	75.0
11	DP 77-9579	4.9	5.1	4.0	5.6	89.3
12	C-SMX	4.7	5.5	4.2	4.5	71.7
13	Pathfinder	4.7	4.6	4.6	5.1	92.7
14	PST-8000	4.7	5.7	4.0	4.4	83.3
15	Foxfire	4.4	5.4	3.6	4.3	83.3
16	BMXC-502	4.4	5.2	3.6	4.4	80.0
17	Celestial	4.4	5.4	3.6	4.0	83.3
18	Razor	4.3	4.7	3.8	4.3	75.0
19	Jasper II	4.1	5.4	3.1	3.7	76.7
20	Audubon	3.9	4.5	3.3	3.8	76.7
21	IS-FRR 23	3.8	4.2	3.2	3.9	80.0
22	C03-4676	3.7	4.4	3.5	3.3	60.0
23	Splendor	3.5	4.4	2.9	3.3	70.0
24	Navigator	3.5	4.3	2.9	3.2	.
25	Musica	3.2	5.3	3.0	1.3	21.7
26	Shademaster	2.8	2.8	2.7	2.8	41.7
27	Oracle	2.4	2.5	2.5	2.4	31.7
28	Boreal	2.1	2.2	2.0	2.1	28.3
	SHEEPS FESCUE					
1	Quatro	3.2	3.9	3.3	2.6	41.7
	LSD at 5% =	0.7	0.7	0.9	1.4	28.6

[1]9 = best turf quality

Table 2. 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 Fine Fescue Test - NTEP.)

	Cultivar or Selection	Turf Quality[1] 2004-2006 Avg.	2004 Avg.	2005 Avg.	2006 Avg.
	CHEWINGS FESCUE				
1	SR 5130	6.4	6.6	6.3	6.2
2	PST-Syn-4TL	5.9	5.8	6.3	5.6
3	IS-FRC 17	5.8	5.8	5.9	5.9
4	Zodiac	5.8	5.6	6.1	5.6
5	RAD-FC3	5.8	5.7	6.1	5.5
6	IS-FRC 12	5.7	5.8	6.0	5.4
7	Longfellow II	5.6	5.8	5.6	5.5
8	Treazure II	5.5	5.4	6.0	5.2
9	RAD-FCPCX	5.5	5.7	5.5	5.3
10	Ambassador	5.5	5.1	5.5	5.8
11	Culumbra II	5.3	5.8	4.6	5.7
12	Compass	5.3	5.1	5.4	5.6
13	Ambrose	5.3	4.9	5.6	5.4
14	7 Seas	5.2	5.4	4.6	5.7
15	IS-FRC 8	5.2	5.5	4.9	5.1
16	RAD-FCCX	5.2	5.5	4.8	5.2
17	Dp 77-9886	4.9	4.8	5.1	4.9
18	PST-Syn-4CH3	4.8	5.1	4.5	5.0
19	SRX 51FF	4.8	5.0	4.6	5.0
20	Shadow II	4.8	4.9	4.8	4.8
21	PST-Syn-4RC	4.8	5.3	4.5	4.5
22	Dp 77-9885	4.8	5.1	4.4	4.8
23	SRX OH51H	4.7	5.0	4.5	4.7
24	Treasure	4.7	4.7	5.0	4.4
25	B2CF	4.7	5.1	4.1	4.8
26	Intrigue	4.6	5.1	4.0	4.8
27	J-5	4.6	4.6	4.6	4.6
28	PST-Syn-4TY	4.6	4.7	4.9	4.2
29	03-CHFSHHY	4.5	4.8	4.1	4.7
30	Bar CHF 8FUS2	4.5	5.0	4.0	4.6
31	Bargreen	4.4	4.5	4.6	4.3
32	Brittany	4.4	4.7	4.1	4.5
33	PST-Syn-4FRC	4.3	4.5	4.2	4.3
34	Cascade	4.1	4.0	4.2	4.0
35	Jamestown II	3.5	3.7	3.1	3.9

(Continued)

Table 2 (continued).

	Cultivar or Selection	Turf Quality[1] 2004-2006 Avg.	2004 Avg.	2005 Avg.	2006 Avg.
	HARD FESCUE				
1	Pick HF # 2	6.5	6.2	6.7	6.7
2	IS-FL 36	6.5	5.7	6.9	6.8
3	IS-FL 35	6.4	5.9	6.6	6.7
4	Firefly	6.3	5.9	6.7	6.4
5	Predator	6.3	5.7	6.7	6.6
6	Gotham	6.3	5.8	6.7	6.4
7	PST-4HES Bulk	6.1	5.7	6.3	6.4
8	SR 3150	6.1	5.3	6.5	6.5
9	SRX NJU	6.1	5.7	6.4	6.1
10	Reliant IV	6.0	5.6	6.1	6.1
11	Berkshire	5.9	5.5	6.2	6.2
12	4HM	5.9	5.4	6.4	6.0
13	Oxford	5.9	5.6	6.0	5.9
14	PST-Syn-4NY	5.8	5.5	5.9	6.1
15	RAD-FLPCX	5.7	5.2	5.7	6.1
16	IS-FL 29	5.6	5.2	5.7	5.9
17	SR 3100	5.5	5.3	5.6	5.7
18	Fortitude	5.5	5.6	5.5	5.5
19	SRX 3324	5.5	5.0	6.0	5.5
20	PST-Syn-4HT	5.4	4.9	5.6	5.8
21	Osprey	5.4	4.9	5.6	5.7
22	SRX 3STDNE	5.4	5.1	5.3	5.7
23	Discovery	5.3	4.9	5.3	5.8
24	03-XHF	5.3	4.8	5.4	5.6
25	Aurora	5.2	4.8	5.4	5.5
26	Hardtop	5.2	4.8	5.4	5.4
27	Stonehenge	5.2	4.6	5.3	5.5
28	Ecostar	5.2	4.5	5.4	5.5
29	4BIL	5.1	4.8	5.2	5.3
30	SR 3000	5.1	4.7	5.3	5.2
31	Chariot	5.1	4.7	5.0	5.4
32	Reliant II	5.0	4.6	5.0	5.4
33	SRX 3K	5.0	4.8	5.2	4.9
34	03-HFEXP	5.0	4.6	4.9	5.5
35	Nordic	4.9	5.3	4.3	5.1

(Continued)

Table 2 (continued).

	Cultivar or Selection	Turf Quality[1] 2004-2006 Avg.	2004 Avg.	2005 Avg.	2006 Avg.
		HARD FESCUE (cont.)			
36	Minotaur	4.9	4.7	4.8	5.1
37	SRX CA3DE	4.8	5.2	4.1	5.1
38	4CU3	4.7	4.6	4.6	5.0
39	Rescue 911	4.6	4.3	4.4	5.1
40	Scaldis	4.5	4.2	4.6	4.8
		SLENDER CREEPING RED FESCUE			
1	SR 5100	4.9	5.0	4.8	5.0
2	Barcrown II	4.9	5.4	4.2	5.0
3	Shoreline	4.6	5.1	3.9	4.6
4	Seabreeze II	4.6	5.5	3.7	4.5
5	Barcrown	4.4	4.7	4.3	4.1
6	SRX 55SLQ	4.3	4.5	4.1	4.3
7	Seabreeze	4.2	4.9	3.3	4.3
8	Dawson E	4.0	4.1	3.7	4.1
		STRONG CREEPING RED FESCUE			
1	Epic	5.4	5.8	5.1	5.1
2	Musica	5.2	5.1	5.0	5.5
3	PST-Syn-4L8	5.2	5.7	4.9	4.9
4	PST-Syn-48E	5.1	5.2	5.2	5.0
5	Cardinal	5.1	5.2	5.0	5.2
6	SR 5250	5.1	5.1	5.1	5.1
7	Crossbow	5.1	5.8	4.5	5.0
8	Dp 77-9360	5.1	5.2	4.8	5.2
9	C-SMX	5.0	5.1	4.6	5.3
10	Wendy Jean	5.0	5.0	5.0	5.1
11	DLF-RCM	5.0	5.1	5.0	4.9
12	DW2	5.0	5.3	4.5	5.1
13	IS FRR 29	4.9	5.2	4.6	4.9
14	Dp 77-9578	4.8	5.2	4.5	4.8
15	PST-8000	4.8	5.2	4.5	4.8
16	RAD-FRPCCX	4.8	5.1	4.6	4.7
17	Pick CRF 1-03	4.8	5.1	4.6	4.7
18	IS-FRR 23	4.8	5.4	4.5	4.5
19	Foxfire	4.8	4.9	4.5	4.9
20	PST-Syn-4P8	4.7	4.7	4.8	4.7

(Continued)

Table 2 (continued).

	Cultivar or Selection	Turf Quality[1] 2004-2006 Avg.	2004 Avg.	2005 Avg.	2006 Avg.
	STRONG CREEPING RED FESCUE (cont.)				
21	BMXC-502	4.7	5.0	4.5	4.6
22	Splendor	4.7	5.1	4.1	4.8
23	Dp 77-9579	4.6	4.8	4.4	4.6
24	Aberdeen	4.5	4.7	4.4	4.5
25	PST-4UX Bulk	4.5	4.6	4.4	4.5
26	SRX CA529	4.5	4.9	3.9	4.7
27	Razor	4.5	4.9	3.9	4.6
28	Jasper II	4.4	4.7	4.2	4.4
29	Pathfinder	4.4	4.7	4.3	4.4
30	01-Fr-1	4.4	4.7	4.0	4.4
31	Celestial	4.3	4.7	3.8	4.4
32	ASC 266	4.2	4.6	3.9	4.2
33	SR 5210	4.2	4.2	3.9	4.5
34	Navigator	4.2	4.3	3.7	4.5
35	Bargena III	4.2	4.5	3.8	4.2
36	Audubon	4.1	4.7	3.4	4.3
37	Fenway	4.1	3.9	3.9	4.5
38	SRX CA521	4.1	4.2	3.8	4.3
39	C03-4676	4.0	4.3	3.7	4.0
40	PST-Syn-4CRZ	3.9	4.3	3.4	4.0
41	4EL	3.9	4.4	2.9	4.3
42	Aruba	3.8	4.0	3.7	3.5
43	Florentine GT	3.6	3.8	3.2	3.9
44	SR 5200E	3.3	3.4	3.1	3.5
45	Oracle	3.3	3.3	2.8	3.8
46	Shademaster	3.3	3.4	2.7	3.7
47	Bargena II	3.2	3.2	2.8	3.5
48	Boreal	3.1	3.2	2.8	3.4
	HARD x BLUE FESCUE HYBRID				
1	PST-4BUG	5.7	5.6	5.8	5.6
2	SRX 3BH	5.4	5.2	5.3	5.7
3	4MB-BS	4.6	4.6	4.5	4.8
4	Little Bighorn	4.6	4.7	4.4	4.7

(Continued)

Table 2 (continued).

	Cultivar or Selection	2004-2006 Avg.	2004 Avg.	2005 Avg.	2006 Avg.
			Turf Quality[1]		
		BLUE FESCUE			
1	SR 3210	4.2	4.3	4.0	4.4
2	SR 3200	4.0	3.8	4.1	4.1
		SHEEPS FESCUE			
1	Quatro	4.8	4.8	5.0	4.5
		KOELERIA			
1	Barkoel	3.9	4.6	4.0	3.1
	LSD at 5% =	0.4	0.5	0.6	0.6

[1]9 = best turf quality

Table 3. Performance of fine fescue cultivars and selections in a turf trial seeded in September 2004 at Adelphia, NJ.

	Cultivar or Selection	Turf Quality[1] 2005-2006 Avg.	Turf Quality[1] 2005 Avg.	Turf Quality[1] 2006 Avg.
	CHEWINGS FESCUE			
1	Treazure II	6.1	6.6	5.7
2	PST-SYN-4CHY	5.8	6.0	5.5
3	PST-SYN-4CHM	5.6	5.8	5.3
4	SRX51G	5.5	5.7	5.2
5	Intrigue II	5.5	5.8	5.1
6	Compass	5.4	6.0	4.8
7	PST-SYN-4CH3	5.3	5.5	5.2
8	FR6-JD 03	5.3	5.4	5.2
9	Longfellow	5.3	5.3	5.3
10	Ambassador	5.2	5.5	4.9
11	IS-FRR 23	5.2	5.8	4.6
12	Shadow II	5.2	5.1	5.2
13	SRXOH51H	5.1	5.0	5.1
14	Longfellow II	5.0	5.3	4.7
15	PST-SYN-FRCE	4.8	5.0	4.5
16	SR 5100	4.4	4.4	4.4
17	Culumbra II	4.4	4.5	4.2
18	Ambrose	4.3	4.3	4.3
19	Jamestown II	4.0	3.8	4.1
	HARD FESCUE			
1	IS-FL 35-04	6.7	6.9	6.4
2	IS-FL 36-04	6.7	7.2	6.1
3	IS-FL 28-03	6.5	6.8	6.2
4	RH Comp	6.5	6.7	6.3
5	SRX3961	6.4	6.7	6.1
6	SRX3NJU	6.3	6.9	5.7
7	MH Comp	6.1	6.3	5.9
8	SRXCA396	6.0	6.0	6.0
9	IS-FL 36-03	6.0	6.2	5.9
10	IS-FL 35-03	5.9	6.2	5.6
11	Oxford	5.9	5.9	5.8
12	Viking	5.7	5.9	5.6
13	Nordic	5.6	5.7	5.6
14	BR-HF	5.6	5.5	5.7
15	Eureka II	5.6	5.4	5.7

(Continued)

Table 3 (continued).

	Cultivar or Selection	Turf Quality[1] 2005-2006 Avg.	Turf Quality[1] 2005 Avg.	Turf Quality[1] 2006 Avg.
		HARD FESCUE (cont.)		
16	Reliant	5.5	5.4	5.7
17	PST-4BIL-BS	5.4	5.2	5.5
18	IS-FL 28-04	5.4	5.5	5.2
19	Ecostar	5.3	5.4	5.3
20	Stonehenge	5.3	5.0	5.6
21	Rescue 911	5.3	5.3	5.2
22	Aurora II	5.2	5.2	5.2
23	PST-4CU3	5.1	5.1	5.1
24	04-EXPHF	5.1	4.8	5.3
25	SR 3100	5.0	5.0	4.9
26	SRX 3K	4.7	4.6	4.9
27	Little Bighorn	4.7	4.8	4.6
28	SRXCA3DE	4.5	4.5	4.5
		SLENDER CREEPING RED FESCUE		
1	SRX55R	4.7	5.0	4.5
2	Seabreeze GT	4.7	5.0	4.5
3	Splendor	4.2	4.5	3.9
4	ASR050	4.2	4.1	4.3
5	Dawson	4.1	4.5	3.8
		STRONG CREEPING RED FESCUE		
1	IS-FRR 43	5.2	5.5	4.8
2	LR comp	4.9	5.2	4.5
3	PST-8000	4.8	5.2	4.4
4	Cindy Lou	4.4	4.4	4.4
5	Pathfinder	4.4	4.5	4.4
6	Epic	4.4	4.5	4.3
7	SRX52961	4.3	4.7	3.9
8	ASC-266	4.3	4.5	4.0
9	Celestial	4.3	4.6	3.9
10	SW RSL6032	4.2	4.4	4.1
11	PST-4VS-BS	4.2	4.5	3.9
12	Aberdeen	4.2	4.3	4.1
13	Bar-Fr-4001	4.1	4.2	4.0
14	Foxy	4.1	4.2	3.9
15	Gibraltor	4.1	4.1	4.1

(Continued)

Table 3 (continued).

	Cultivar or Selection	Turf Quality[1] 2005-2006 Avg.	Turf Quality[1] 2005 Avg.	Turf Quality[1] 2006 Avg.
	STRONG CREEPING RED FESCUE (cont.)			
16	SRXCA529	4.1	4.2	3.9
17	SRXCA521	4.1	4.0	4.1
18	Audubon	4.0	4.1	3.9
19	Fenway	4.0	3.8	4.2
20	Vista	4.0	3.9	4.0
21	Inverness	4.0	4.0	3.9
22	SW RSR6046	3.9	4.2	3.5
23	Navigator	3.8	3.9	3.6
24	SW RSR6064	3.6	3.5	3.6
25	SR 5210	3.6	3.4	3.7
26	Aruba	3.5	3.9	3.2
27	Florentine	3.5	3.5	3.5
28	SW CYGNUS	2.9	2.9	2.9
	HARD x BLUE FESCUE HYBRID			
1	SRX3BHO	5.1	5.0	5.1
2	PST-SYN-4BU3-04	4.8	4.8	4.8
	BLUE FESCUE			
1	SR 3200	4.0	4.0	4.0
2	SR 3210	4.0	4.0	4.0
	SHEEPS FESCUE			
1	04-SHF	4.2	4.3	4.1
	KOELERIA			
1	SRX6AA	4.2	4.6	3.7
2	SRX6KOEL	4.1	4.7	3.5
	DESCHAMPSIA			
1	BPP comp	3.1	3.1	3.1
2	SR 6000	2.8	3.2	2.5
3	EDD comp	2.8	3.4	2.1
4	SRX673-21	2.3	1.5	3.0
5	DC-JD 03	2.2	1.9	2.4

(Continued)

Table 3 (continued).

	Cultivar or Selection	Turf Quality[1] 2005-2006 Avg.	Turf Quality[1] 2005 Avg.	Turf Quality[1] 2006 Avg.
		***DESCHAMPSIA* (cont.)**		
6	SRX673-20	2.0	1.5	2.5
	LSD at 5% =	0.7	0.7	0.9

[1]9 = best turf quality

Table 4. Performance of fine fescue cultivars and selections in a turf trial seeded in September 2005 at Adelphia, NJ.

	Cultivar or Selection	Turf Quality[1] 2006 Avg.	Establishment[2] Oct. 2006
	CHEWINGS FESCUE		
1	FC 9	6.4	6.3
2	OC2 Comp	6.3	5.7
3	SRX 516	6.0	5.7
4	PST-Syn-4EGC	5.9	5.0
5	PST-Syn-4S111	5.7	5.0
6	OC3 Comp	5.5	6.3
7	Ambassador	5.4	7.0
8	Longfellow II	5.4	6.0
9	IS-FRC 23	5.3	6.3
10	OC1 Comp	5.3	5.3
11	IS-FRC 12	5.0	6.0
12	Ambrose	5.0	7.0
13	Shadow II	5.0	6.3
14	Culumbra II	5.0	6.7
15	SR 5100	4.7	6.0
16	Compass	4.7	6.0
17	JF-3	4.5	5.7
	HARD FESCUE		
1	PST-4HES	5.9	6.0
2	Viking	5.8	5.3
3	SRX CA 396	5.7	5.7
4	SR 3150	5.6	6.7
5	IS-FL 38	5.5	5.0
6	OH1 comp	5.2	4.3
7	PST-4NY	5.1	6.0
8	PST-Syn-4HQG	5.0	5.0
9	SRX NJU	5.0	6.0
10	Aurora II	4.8	5.7
11	SRX CA 3DE	4.7	3.0
12	SRX 3K	4.6	5.0
13	Stonehenge	4.6	5.0
14	Aurora Gold	4.5	5.0
15	PST-Syn-4HEY	4.4	3.3
16	SR 3100	3.7	2.7

(Continued)

Table 4 (continued).

	Cultivar or Selection	Turf Quality[1] 2006 Avg.	Establishment[2] Oct. 2006
	SLENDER CREEPING RED FESCUE		
1	Shoreline	5.5	6.7
2	Seabreeze GT	5.1	7.0
3	Dawson	4.2	4.3
	STRONG CREEPING RED FESCUE		
1	OR3 Comp	6.4	6.0
2	OR2 Comp	6.3	6.0
3	OR4 Comp	6.2	5.7
4	OR1 Comp	6.1	6.0
5	IS-FRR 43	5.5	6.0
6	PST-Syn-48ED	5.3	4.7
7	SR 5250	5.2	6.0
8	IS-FRR 44	5.2	6.0
9	Gibraltor	5.1	6.0
10	FR 8	5.0	6.0
11	FR 7	5.0	5.7
12	Cindy Lou	4.8	6.7
13	Aberdeen	4.8	7.3
14	PST-Syn-48Y	4.6	6.0
15	Swing	4.4	6.7
16	SRX CA 521	4.4	6.0
17	PST-Syn-4SLT	4.3	5.0
18	PST-Syn-48ET	4.3	5.0
19	SRX CA 529	4.3	5.7
20	PST-Syn-4EQG	3.8	4.7
21	SR 5210	3.7	7.0
22	Pathfinder	3.7	5.7
23	Polka	3.5	4.7
24	Audubon	3.4	6.7
	HARD x BLUE FESCUE HYBRID		
1	SRX 3BHO	4.5	5.3
2	PST-4BU3	4.4	6.0
3	Little Bighorn	3.8	6.0
	BLUE FESCUE		
1	SR 3210	4.0	5.0
2	SR 3200	3.5	4.0

(Continued)

Table 4 (continued).

Cultivar or Selection	Turf Quality[1] 2006 Avg.	Establishment[2] Oct. 2006
LSD at 5% =	0.8	0.9

[1]9 = best turf quality
[2]9 = best establishment

Table 5. Performance of fine fescue cultivars and selections in a low maintenance trial seeded in September 2005 at Adelphia, NJ.

	Cultivar or Selection	Species	Turf Quality[1] 2006 Avg.	Establish-ment[2] Oct. 2006	Rust[3] June 2006	Drought Tolerance[4] Aug. 2006
1	HOE	Hard fescue	7.5	6.3	9.0	8.3
2	Nordic	Hard fescue	7.4	6.3	9.0	8.7
3	OR1 Comp	Strong creeping red fescue	7.3	5.7	9.0	7.3
4	OR3 Comp	Strong creeping red fescue	7.3	6.3	9.0	6.7
5	OR2 Comp	Strong creeping red fescue	7.2	5.3	9.0	6.7
6	Oxford	Hard fescue	7.0	6.3	9.0	8.3
7	OH1 Comp	Hard fescue	7.0	4.7	9.0	8.7
8	Stonehenge	Hard fescue	7.0	4.7	9.0	7.7
9	Jasper II	Strong creeping red fescue	6.9	6.7	9.0	5.0
10	OR4 Comp	Strong creeping red fescue	6.8	6.3	9.0	6.3
11	Ambassador	Chewings fescue	6.7	6.0	9.0	2.7
12	Celestial	Strong creeping red fescue	6.6	7.3	9.0	4.3
13	OC3 Comp	Chewings fescue	6.6	5.3	9.0	4.0
14	OC2 Comp	Chewings fescue	6.6	5.3	9.0	4.3
15	A03TB-417	Texas x Kentucky bluegrass hybrid	6.4	3.7	9.0	6.3
16	Zinfandel	Kentucky bluegrass	6.3	5.3	6.7	7.0
17	Cindy Lou	Strong creeping red fescue	6.3	6.7	9.0	4.3
18	Princeton P-105	Kentucky bluegrass	6.2	4.7	6.0	6.3
19	Culumbra II	Chewings fescue	6.1	6.7	9.0	2.3
20	Rembrant	Tall fescue	6.0	5.3	9.0	4.3
21	A02-975	Texas x Kentucky bluegrass hybrid	6.0	3.7	8.3	6.7
22	Falcon IV	Tall fescue	5.9	5.3	9.0	5.0
23	OC1 Comp	Chewings fescue	5.9	5.3	9.0	2.7
24	Ambrose	Chewings fescue	5.9	6.3	9.0	2.3
25	A96-1201	Kentucky bluegrass	5.8	4.7	4.7	8.3

(Continued)

Table 5 (continued).

	Cultivar or Selection	Species	Turf Quality[1] 2006 Avg.	Establish-ment[2] Oct. 2006	Rust[3] June 2006	Drought Tolerance[4] Aug. 2006
26	Constitution	Tall fescue	5.7	5.7	9.0	4.7
27	A03TB-718	Texas x Kentucky bluegrass hybrid	5.7	3.0	6.7	5.3
28	Five Point	Tall fescue	5.7	5.0	9.0	4.3
29	Titanium	Tall fescue	5.7	5.0	9.0	4.0
30	A03TB-708	Texas x Kentucky bluegrass hybrid	5.7	4.3	8.3	6.0
31	Tiger II	Colonial bentgrass	5.7	8.7	9.0	5.0
32	2nd Millenium	Tall fescue	5.6	5.7	9.0	4.0
33	A03TB-431	Texas x Kentucky bluegrass hybrid	5.6	3.0	9.0	3.0
34	A99-2559	Kentucky bluegrass	5.6	5.3	5.7	5.0
35	A03TB-559	Texas x Kentucky bluegrass hybrid	5.6	2.7	6.0	5.7
36	LT1 Comp	Colonial bentgrass	5.6	4.7	9.0	5.7
37	Inferno	Tall fescue	5.5	6.3	9.0	4.0
38	A03TB-676	Texas x Kentucky bluegrass hybrid	5.5	5.3	5.7	6.0
39	A99LM-15	Texas x Kentucky bluegrass hybrid	5.4	4.3	6.7	6.0
40	Chochise III	Tall fescue	5.4	5.3	9.0	3.7
41	A04TB-192	Texas x Kentucky bluegrass hybrid	5.3	3.3	8.7	7.3
42	LT2 Comp	Colonial bentgrass	5.3	5.0	9.0	5.3
43	Midnight	Kentucky bluegrass	5.2	6.7	3.7	6.0
44	A97-1287	Kentucky bluegrass	5.2	5.3	6.0	5.7
45	Diva	Kentucky bluegrass	5.2	6.0	6.3	7.0
46	Tar Heel II	Tall fescue	5.1	5.7	9.0	4.0
47	Mustang 3	Tall fescue	5.1	5.3	9.0	4.7
48	A03TB-246	Texas x Kentucky bluegrass hybrid	5.1	3.7	7.7	5.0
49	A04TB-5	Texas x Kentucky bluegrass hybrid	5.1	3.0	4.3	3.3
50	A03TB-668	Texas x Kentucky bluegrass hybrid	5.1	1.7	8.0	6.0

(Continued)

Table 5 (continued).

	Cultivar or Selection	Species	Turf Quality[1] 2006 Avg.	Establish-ment[2] Oct. 2006	Rust[3] June 2006	Drought Tolerance[4] Aug. 2006
51	LT3 Comp	Colonial bentgrass	5.0	3.7	9.0	5.7
52	A02-943	Texas x Kentucky bluegrass hybrid	5.0	3.7	8.3	7.3
53	Blue Fusion	Texas x Kentucky bluegrass hybrid	5.0	4.7	7.3	4.3
54	Sonic	Kentucky bluegrass	4.9	5.0	6.7	6.3
55	Eagleton	Kentucky bluegrass	4.9	6.7	5.3	5.0
56	Bewitched	Kentucky bluegrass	4.8	5.7	3.0	3.7
57	RSP	Kentucky bluegrass	4.8	4.3	5.0	3.3
58	A03TB-568	Texas x Kentucky bluegrass hybrid	4.8	5.0	5.0	5.0
59	Champagne	Kentucky bluegrass	4.7	4.7	3.3	5.0
60	A01-881	Texas x Kentucky bluegrass hybrid	4.7	5.7	5.0	3.7
61	Cabernet	Kentucky bluegrass	4.6	3.7	4.7	4.7
62	Brooklawn	Kentucky bluegrass	4.6	5.0	3.0	4.7
63	Preakness	Kentucky bluegrass	4.5	6.7	5.0	4.7
64	A03TB-795	Texas x Kentucky bluegrass hybrid	4.4	3.3	6.0	4.0
65	Brunswick	Kentucky bluegrass	4.4	4.7	3.7	4.3
66	Bedazzled	Kentucky bluegrass	4.4	6.7	6.7	7.0
67	Unique	Kentucky bluegrass	4.4	6.7	4.3	5.3
68	A03TB-490	Texas x Kentucky bluegrass hybrid	4.4	2.0	3.3	3.7
69	LSD Comp	Deschampsia	4.4	3.7	8.3	3.0
70	ESD Comp	Deschampsia	4.4	4.3	6.3	3.0
71	H94-305	Kentucky bluegrass	4.3	3.7	4.3	4.3
72	A03TB-788	Texas x Kentucky bluegrass hybrid	4.3	2.3	7.3	4.7
73	Dragon	Kentucky bluegrass	4.1	6.0	4.0	5.3
74	Thorough-Blue	Kentucky bluegrass	4.0	6.3	5.3	4.0
75	Starburst	Kentucky bluegrass	4.0	4.0	4.3	3.3

(Continued)

Table 5 (continued).

	Cultivar or Selection	Species	Turf Quality[1] 2006 Avg.	Establish-ment[2] Oct. 2006	Rust[3] June 2006	Drought Tolerance[4] Aug. 2006
76	A03TB-412	Texas x Kentucky bluegrass hybrid	3.6	1.0	8.0	5.3
77	A03TB-361	Texas x Kentucky bluegrass hybrid	3.5	1.7	8.0	3.0
78	Southeast	Tall fescue	3.4	5.3	9.0	6.3
79	Shade Champ	Deschampsia	3.3	4.0	6.7	1.7
80	A03TB-286	Texas x Kentucky bluegrass hybrid	3.2	1.3	6.3	5.7
81	PST-DRM Bulk	Deschampsia	3.2	3.0	5.0	1.7
82	Moonlight	Kentucky bluegrass	3.1	5.3	1.0	3.3
83	Reveille	Texas x Kentucky bluegrass hybrid	2.8	1.0	7.3	4.3
	LSD at 5% =		1.0	1.2	1.6	2.0

[1]9 = best turf quality
[2]9 = best establishment
[3]9 = least disease (stem rust observed on Kentucky bluegrass and Texas x Kentucky bluegrass hybrids; crown rust observed on *Deschampsia*)
[4]9 = most drought tolerant

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

	2004		2005		2006	
	N[1]	Ht[2]	N	Ht	N	Ht
Table 1 (2003 North Brunswick, NTEP)	1.5	1.5	2.6	1.5	1.0	1.5
Table 2 (2003 Adelphia, NTEP)			1.3	1.5	2.5	1.5
Table 3 (2004 Adelphia)			1.5	1.5	1.7	1.5
Table 4 (2005 Adelphia)					1.8	1.5
Table 5 (2005 Adelphia Low Maintenance Test)					2.0	2.5

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

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