calcareous or poorly aerated soils prone to nutrient deficiencies, such plants, weakened by the loss of most of their root system, may never fully regain their former vigor unless an intensive program of foliar and soil fertilization is followed.

In many tropical plants, nematode damage to the roots can decrease the effectiveness of the roots in absorbing micronutrients (4). Deficiency symptoms of Fe or Mn are often the only visible symptoms of a nematode infestation. Although nematodes have been reported on roots of a few species of palms, they are usually not regarded as serious pests of palms and seldom cause the kinds of nutritional deficiencies so often observed on other tropical plants.

Temperature plays a major role in determing the rate of active nutrient absorption (8). Many micronutrient deficiencies are transient in Florida for this reason. The most common temperature induced nutritional problem in palms is Mn deficiency. During cool winter months root activity, and hence nutrient and water uptake, is greatly reduced. Shoot growth is also reduced and often ceases altogether. In the spring when warm air temperatures return and growth resumes, new leaves often exhibit severe Mn deficiency symptoms since the supply of micronutrients needed for production of these leaves was absorbed primarily during the cooler winter months. Only after several months of growth in warm soil will the roots have absorbed sufficient micronutrients to produce healthy leaves.

Palms also vary genetically in their ability to extract various nutrients from the soil, both among species and among individuals within a species. For example, palms of the genus *Phoenix* are the most susceptible of all palms to Mg deficiency, whereas others such as *Washingtonia sp.* have never been observed with Mg deficiency (3). Within coconut palms (*Cocos nucifera*), 'Jamaica Tall' coconuts are fairly resistant to Mg deficiency in south Florida, but 'Malayan Dwarf' coconuts are fairly susceptible. Even within the 'Malayan Dwarf' cultivar, plants with golden petioles and fruits are much more susceptible to Mg deficiency than those with green petioles and fruits.

In conclusion, the presence of recognizable nutritional deficiency symptoms in palms does not necessarily imply that the soil is deficient in that particular element or that application of a fertilizer containing that element will alleviate the symptoms. It is essential for effective treatment of palm nutritional disorders that any cultural or environmental causes of the deficiency be corrected prior to applying any corrective fertilizers.

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COMPARISON OF COOL-SEASON TURFGRASSES FOR OVERSEEDING PUTTING GREENS

C. H. PEACOCK, A. E. DUDECK[1]
Ornamental Horticulture Department, IFAS
University of Florida
Gainesville, FL 32611

AND

UDAY K. YADAV[2]
Florida Cooperative Extension Service
2350 E. Michigan St.
Orlando, FL 33806

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Abstract. **Overseeding putting greens with cool-season turfgrasses is a recommended practice in warm-season turfgrass areas during the winter months to improve and protect the playing surface. Simultaneous experiments compared cool-season turfgrass cultivars and species suitability for overseeding bermudagrass putting greens. Fifty-six cool-season turfgrasses were evaluated at Gainesville, Fla. for turf quality, color, texture, and wear tolerance. Twenty-one of these had equal seasonal quality ratings, while 33 had above average mean scores. Turf color, texture, and wear tolerance differences were also noted. Turfgrasses established at Longwood, Fla. compared species and seeding rates. Aggressive bermudagrass growth late into winter effectively competed with cool-season turfgrass establishment. Perennial ryegrass was found to provide excellent quality turf with faster establishment and more effective competition against the semidormant bermudagrass.**

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[1]Assistant and Associate Professor
[2]Area Horticultural Agent

Overseeding putting greens in warm-season turfgrass areas provides improved playing surfaces during the winter months when the bermudagrass is dormant or semidormant. This practice also protects the permanent turf from excessive wear (1). Turfgrass breeding programs have resulted in a proliferation of cool-season turfgrass cultivars for the golf course superintendent to use in overseeding. The objective of this study was to: 1) evaluate cool-season cultivars for overseeding suitability and 2) to examine seeding rates for the most commonly used overseeding species.

Materials and Methods

Simultaneous experiments were conducted during the winter of 1984-85 at 2 locations. Evaluation of cool-season turfgrasses was conducted on a 'Tifgreen' bermudagrass putting green at the Turfgrass Field Laboratory, IFAS, Gainesville, Fla. All turfgrasses in Table 1 except bentgrasses were seeded at 850 Pure Live Seed per dm^2 on 9 Nov. 1984. Both bentgrass cultivars were seeded at 10 g/m^2, which approximates 1700 seed per dm^2. Just prior to overseeding, the entire area was lightly vertical-mowed in 2 directions to remove excess thatch. Plots 1.5 x 1.5 m were hand seeded in 3 replications and the entire area was topdressed using fumigated native topsoil. Bentgrass, bluegrass, and redtopgrass seed were mixed with topdressing material prior to seeding to add bulk for ease of distribution. Seed and topdressing were worked into the semidormant bermudagrass using a stiff broom.

After seeding, plots were irrigated with 3 mm of water 3 times daily for 10 days following seeding. Mowing at a height of 8 mm continued for the first 2 weeks after seedl-

Table 1. Turfgrasses evaluated at Gainesville, Fla. for overseeding during the 1984-85 study period and their composition.

Turfgrass	Components[z]	Sponsor
Loretta	Loretta PR	O. M. Scotts
Winter Turf III	60% Caravelle PR	"
	20% Derby PR	"
	20% Pennant PR	"
Winter Turf I	40% Loretta PR	"
	30% Derby PR	"
	20% Pennfine PR	"
	10% Victa KB	"
Winter Turf V	60% Loretta PR	"
	20% Manhattan II PR	"
	20% Sabre RB	"
Ovation	Ovation PR	"
Bianca	Bianca PR	Western Seed Co.
Master	Master PR	"
Brenda	Brenda PR	"
Ranger	Ranger PR	"
Argyle	Argyle KB	Heart Seed Co.
Pennant	Pennant PR	E. F. Burlingham
Burlingham #1	70% Pennant PR	"
	30% Koket CF	"
Burlingham #2	70% Pennant PR	"
	30% Belle PR	"
Burlingham #3	35% Pennant PR	"
	35% Belle PR	"
	30% Koket CF	"
Champion Blend	33% Palmer PR	Seed Research, Inc.
	33% Premier PR	"
	33% Prelude PR	"
Birdie II	Birdie II PR	Turf-Seed, Inc.
Citation II	Citation II PR	"
2DF	2DF PR	"
CBS II	33% Omega II PR	"
	33% Birdie II PR	"
	33% Citation II PR	"
Omega II	Omega II PR	Turf-Seed, Inc.
Manhattan II	Manhattan II PR	"
Huntsville	Huntsville KB	Jacklin Seed Co.
Streaker	Streaker RT	"
PSU-111	PSU-111 PR	Penn. State Univ.
PSU-222	PSU-222 PR	"
PSU-333	PSU-333 PR	"
All*Star	All*Star PR	J. & L. Adikes
Barry	Barry PR	Barenbrug Breeding
BAR Lp 412	BAR Lp 412 PR	"
Lp 80-1	Lp 80-1 PR	"
Cowboy	Cowboy PR	Loft's Seed, Inc.
Yorktown II	Yorktown II PR	"
Marvelgreen		"
Prelude	Prelude PR	"
Marvelgreen 3 + 1	75% Marvelgreen Supreme	"
	25% Jamestown CF	"
Marvelgreen Supreme	33% Palmer PR	"
	33% Prelude PR	"
	33% Cowboy PR	"
Par 3	33% Palmer PR	"
	33% Prelude PR	"
	33% Pennant PR	"
Palmer/Prelude	50% Palmer PR	"
	50% Prelude PR	"
Palmer	Palmer PR	"
WSC 001	75% WSC 002 PR	"
	25% WSC 003 PR	"
V.I.P.	33% Manhattan II PR	Turf Merchants, Inc.
	33% Barry PR	"
	33% Pennfine PR	"
Tando	Tando PR	Barenbrug Breeding
Tara-Green Supreme	40% Tara PR	Hubbard Seed & Supply
	30% Prelude PR	"
	30% Repell PR	"
Tara-Green	40% Tara PR	"
	30% Prelude PR	"
	30% Palmer PR	"
Tara	Tara PR	"
Marvelgreen Classic	60% Palmer PR	Loft's Seed, Inc.
	25% Jamestown CF	"
	15% Sabre RB	"
Loft's #1	50% Cowboy PR	"
	50% Agree IR	"
Marvelgreen + Sabre	85% Marvelgreen Supreme	"
	15% Sabre RB	"
Agree	Agree IR	"
PhD w/Sabre	30% Derby PR	International Seeds
	30% Regal PR	"
	20% Gator PR	"
	20% Sabre RB	"
Dixie Green P. Rye Blend	40% Derby PR	International Seeds
	40% Regal PR	"
	20% All*Star PR	"
Dixie Green Overseeding Mix	75% Derby PR	"
	25% Highlight CF	"
Dixie Green w/Sabre	40% Derby PR	International Seeds
	40% Highlight CF	"
	20% Sabre RB	"
PhD	40% Derby PR	"
	40% Regal PR	"
	20% Gator PR	"
Penncross	Penncross CB	None
Penneagle	Penneagle CB	None

[z]CB = Creeping bentgrass, CF = Chewings fescuegrass, IR = Intermediate ryegrass, KB = Kentucky bluegrass, PR = Perennial ryegrass, RB = Rough bluegrass, RT = Redtopgrass

Table 2. Seasonal performance ratings[z] of turf quality of overseeding turfgrasses for 1984-85 at Gainesville, FL.

Turfgrass	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Mean
Tara-Green	8.67 a[y]	9.00 a	7.67 bcd	9.00 a	9.00 a	8.67 a	8.66 a
Tando	9.00a	9.00 a	8.67 a	8.67 a	8.33 ab	7.67 a	8.55 ab
Omega II	9.00 a	9.00 a	8.33 ab	8.00 a	8.00 ab	8.33 a	8.44 abc
Palmer	9.00 a	8.67 ab	8.00 abc	8.00 a	8.67 a	8.33 a	8.44 abc
Par 3	9.00 a	8.67 ab	7.33 cde	8.00 a	8.67 a	8.67 a	8.39 a-d
Pennant	9.00 a	9.00 a	7.67 bcd	8.33 a	8.00 ab	8.00 a	8.33 a-e
Tara-Green Supreme	8.67 ab	8.67 ab	8.00 abc	8.33 a	8.33 ab	8.00 a	8.33 a-e
Tara	8.67 ab	8.67 ab	7.33 cde	8.00 a	8.67 a	8.33 a	8.28 a-f
Prelude	8.33 abc	9.00 a	7.67 bcd	8.00 a	8.33 ab	8.33 a	8.28 a-f
Palmer/Prelude	8.33 abc	8.67 ab	7.67 bcd	7.67 a	8.67 a	8.67 a	8.28 a-f
PSU-333	8.00 bcd	9.00 a	7.33 cde	8.67 a	8.67 a	8.00 a	8.28 a-f
PhD	8.67 ab	8.67 ab	7.67 bcd	8.00 a	8.33 ab	8.33 a	8.28 a-f
Birdie II	9.00 a	8.67 ab	8.00 abc	8.00 a	8.33 ab	7.67 a	8.28 a-f
Ovation	8.67 a	9.00 a	8.00 abc	8.33 a	7.33 ab	8.00 a	8.22 a-f
Champion	8.00 bcd	8.33 abc	7.00 def	8.00 a	9.00 a	8.67 a	8.17 a-g
Burlingham #2	9.00 a	8.67 ab	7.33 cde	7.67 a	7.67ab	8.33 a	8.17 a-g
Winter Turf V	9.00 a	9.00 a	8.67 a	8.33 a	7.33 ab	6.67 a	8.17 a-g
Marvelgreen Supreme	8.00 bcd	8.67 ab	7.67 bcd	8.00 a	8.33ab	8.33 a	8.17 a-g
Dixie Green PR Blend	8.67 ab	8.67 ab	7.67 bcd	7.67 a	8.00 ab	8.33 a	8.17 a-g
Burlingham #3	7.67 cd	8.67 ab	7.33 cde	8.33 a	8.33 ab	8.33 a	8.11 a-g
Marvelgreen Classic	7.33 d	9.00 a	8.67 a	8.00 a	8.00 ab	7.67 a	8.11 a-g
Yorktown II	8.33 abc	8.67 ab	7.67 bcd	7.67 a	8.00 ab	8.00 a	8.06 b-g
Winter Turf III	8.67 ab	8.67 ab	7.33 cde	8.00 a	7.67 ab	8.00 a	8.06 b-g
CBS II	8.00 bcd	9.00 a	7.33 cde	7.33 a	8.33 ab	8.33 a	8.06 b-g
WSC 001	8.33 abc	8.33 abc	7.67 bcd	8.00 a	8.00 ab	7.67 a	8.00 b-h
PSU-222	8.33 abc	8.67 ab	7.33 cde	8.00 a	8.33 ab	7.33 a	8.00 b-h
Ranger	8.00 bcd	8.00 bc	7.00 def	8.33 a	8.00 ab	8.33 a	7.94 c-h
2DF	9.00 a	8.67 ab	7.33 cde	7.00 a	7.67 ab	8.00 a	7.94 c-h
PSU-III	8.00 bcd	8.67 ab	7.33 cde	7.67 a	8.00 ab	8.00 a	7.94 c-h
Citation II	8.00 bcd	9.00 a	8.00 abc	7.33 a	8.00 ab	7.33 a	7.94 c-h
Manhattan II	8.00 bcd	8.67 ab	7.00 def	7.33 a	8.00 ab	8.67 a	7.94 c-h
Marvelgreen	8.33 abc	8.00 bc	7.67 bcd	7.67 a	8.00 ab	8.00 a	7.94 c-h
Barry	8.00 bcd	8.33 abc	7.00 def	8.33 a	8.00 ab	8.00 a	7.94 c-h
Lofts #1	8.33 abc	9.00 a	7.00 def	7.67 a	8.00 ab	7.33 a	7.89 c-i
Brenda	7.67 cd	9.00 a	7.33 cde	7.67 a	8.00 ab	7.67 a	7.89 c-i
Cowboy	7.33 d	8.67 ab	7.33 cde	7.67 a	8.00 ab	8.33 a	7.89 c-i
All*Star	8.33 abc	8.67 ab	7.33 cde	8.00 a	7.67 ab	7.00 a	7.83 d-j
Marvelgreen + Sabre	7.33 d	9.00 a	8.00 abc	8.00 a	8.00 ab	6.67 a	7.83 d-j
Bianca	8.67 ab	9.00 a	7.67 bcd	7.33 a	7.33 ab	7.00 a	7.83 d-j
Winter Turf I	7.67 cd	8.67 ab	7.33 cde	8.33 a	7.67 ab	7.33 a	7.83 d-j
V.I.P.	8.67 ab	8.00 bc	7.33 cde	8.00 a	7.67 ab	7.33 a	7.83 d-j
Dixie Green O/S Mix	7.67 cd	8.00 bc	7.33 cde	7.67 a	7.67 ab	8.33 a	7.78 e-j
Marvelgreen 3 + 1	7.33 d	8.67 ab	7.67 bcd	7.67 a	8.00 ab	7.33 a	7.78 e-j
Lp 80-1	7.67 cd	9.00 a	8.00 abc	8.00 a	7.00 ab	6.67 a	7.72 f-j
BAR Lp 412	8.00 bcd	8.67 ab	7.33 cde	7.67 a	7.67 ab	7.00 a	7.72 f-j
Burlingham #1	7.33 d	8.33 abc	7.00 def	8.00 a	8.00 ab	7.67 a	7.72 f-j
PhD w/Sabre	5.67 e	8.00 bc	7.00 def	8.67 a	8.33 ab	8.67 a	7.72 f-j
Master	8.33 abc	8.33 abc	6.67 efg	7.33 a	7.67 ab	7.33 a	7.61 g-k
Loretta	7.67 cd	8.00 bc	7.33 cde	8.00 a	7.67 ab	7.00 a	7.61 g-k
Penncross	4.00 f	8.00 bc	7.00 def	8.67 a	8.67 a	8.33 a	7.44 h-k
Penneagle	3.67 fg	7.67 c	7.33 cde	8.00 a	8.67 a	8.67 a	7.33 ijk
Dixie Green w/Sabre	5.33 e	7.67 c	6.00 gh	8.00 a	8.00 a	8.67 a	7.28 jk
Agree	8.33 abc	7.67 c	6.33 fg	7.00 a	6.33 b	7.00 a	7.11 k
Huntsville	3.00 g	7.67 c	6.33 fg	7.67 a	7.00 ab	7.33 a	6.50 l
Streaker	3.67 fg	7.67 c	5.33 h	7.00 a	7.67 ab	7.33 a	6.44 l
Argyle	3.67 fg	7.67 c	6.33 gf	7.33 a	6.33 b	6.67 a	6.33 l

[z]Rated 1 to 9, 9 = best.
[y]Mean separation in columns by the Waller-Duncan K-ratio t-test, 5% level.

ing emergence, and then height-of-cut was lowered to 6 mm for the remainder of the study. All plots were treated with metalaxyl (Subdue) at 60 mg/m^2 at 2-week intervals for the first 4 weeks. Plots were fertilized 2 weeks after seeding with a 16-4-8 fertilizer at a rate of 5 g N/m^2, and then monthly thereafter with a 15-0-15 fertilizer at a rate of 5 g N/m^2. Irrigation was applied to supplement rainfall as necessary.

Plots were evaluated monthly for turf quality on a 1 to 9 scale where 9 = best and acceptable = >6. In February, plots were evaluated for color and texture on a 1 to 9 scale where 1 = light green or coarse and 9 = dark green or fine, respectively. Wear tolerance was determined by running an empty water ballast roller with affixed golf shoe soles over the plots 10 times per day for 2 weeks to simulate golf traffic (2). Subsequent wear tolerance was then assessed on a 1 to 9 scale where 1 = none and 9 = maximum or best tolerance.

Turfgrasses listed in Table 4 were established on a 'Tifway' bermudagrass practice putting green at the Wekiva Golf and Country Club, Longwood, Fla. on 3 Dec. 1984. Plot size, number of replications, establishment, and

maintenance were the same as described above. Plots were evaluated monthly for turf quality and percent cool-season grass cover. In March, relative incidence of *Poa annua* infestation was determined on a 0 to 3 scale, here 0 = no *Poa annua* and 3 = heavy infestation.

All data were subjected to ANOVA and mean separation. Data on percent cover in Table 4 were transformed prior to analysis. An arcsin square root transformation was used for January and February data. March data were subtracted from 100, converted to a percentage, 0.5 added as a constant, and square root was calculated prior to analysis (3).

Results and Discussion

Performance ratings on seasonal turf quality are presented in Table 2. A number of turfgrasses performed well with 21 out of 56 being equivalent in seasonal quality ratings with an average score of 8.3, and 33 out of 56 having seasonal means above the experimental mean. 'Huntsville,' 'Streaker,' and 'Argyle' had the lowest seasonal ratings, although none were considered unacceptable. A severe freeze on 21 Jan. 1985, dropped night temperatures to –12°C. Although several of the overseeding grasses are considered cold tolerant, no statistical differences were found in the December and January turf quality ratings for relative response to freezing temperatures, but those mixtures containing a rough bluegrass tended to have higher ratings. Temperatures were unseasonably warm in late Dec. 1984 and Jan. 1985, so that cold acclimatization of the grasses probably did not occur, regardless of the inherent cold tolerance.

Slow establishing grasses included Kentucky bluegrass, redtopgrass, and bentgrass, which had low turf quality scores at the November rating period (Table 2). Turf quality scores for these grasses remained low through December probably because of intense competition from bermudagrass, which was actively growing late into the season. Once temperatures cooled and bermudagrass became dormant, few differences in turf quality were noted, and February quality ratings showed no statistical differences. This indicates that faster establishing grasses have an advantage over actively growing bermudagrass.

Turf color scores indicated a wide range of visual differences (Table 3). Rough bluegrass has a light-green color and thus usually lower color ratings even in mixtures. Of the 5 turfgrass mixtures that contained rough bluegrass as a component, 3 had color scores lower than 'PhD w/Sabre,' the highest ranking turfgrass containing a rough bluegrass. The 2 turfgrasses containing 'Sabre' that were dark green also contained 'Derby' perennial ryegrass as a component. The lowest color score was 'Winter Turf V,' which contained 60% 'Loretta' and 20% 'Sabre.' 'Loretta' also rated lower than many of the other perennial ryegrasses. The percentage of 'Sabre' in the mixture did not appear to influence turf color since the 2 Marvelgreen mixtures contained the lowest percentage (15%) and they had lower color scores.

The finest textured grasses were the *Agrostis* spp. ('Penncross,' 'Penneagle,' and 'Streaker') and the mixture containing 'Sabre' rough bluegrass (Table 3). Chewings fescuegrass did not produce a finer textured turf. In fact, the most coarse textured turfgrass plot contained 15% 'Sabre' rough bluegrass and 25% 'Jamestown' Chewings fescuegrass.

Table 3. Color, texture, and wear tolerance evaluations of overseeded turfgrasses for 1984-85 at Gainesville, Fla.

Turfgrass	Color[z]	Texture[y]	Wear tolerance[x]
CBS II	9.0 a[w]	7.0 cd	8.3 ab
PhD w/Sabre	8.3 ab	7.0 cd	8.3 ab
Penneagle	8.3 ab	9.0 a	8.3 ab
Streaker	8.3 ab	8.3 ab	6.3 bc
Champion	8.3 ab	7.0 cd	9.0 a
Tara	8.3 ab	7.0 cd	9.0 a
Par 3	7.7 abc	6.3 de	9.0 a
Winter Turf III	7.7 abc	6.3 de	7.7 abc
Penncross	7.7 abc	8.3 ab	7.7 abc
2 DF	7.7 abc	7.0 cd	8.3 ab
PSU-333	7.7 abc	7.0 cd	8.3 ab
Burlingham #1	7.7 abc	7.0 cd	7.0 abc
Burlingham #2	7.7 abc	7.0 cd	7.7 abc
Burlingham #3	7.7 abc	7.0 cd	8.3 ab
Dixie Green w/Sabre	7.7 abc	6.3 de	9.0 a
Cowboy	7.7 abc	7.0 cd	9.0 a
Brenda	7.7 abc	7.0 cd	9.0 a
Marvelgreen Supreme	7.7 abc	7.0 cd	8.3 ab
Dixie Green O/S Mix	7.7 abc	6.3 de	7.7 abc
Marvelgreen 3 + 1	7.7 abc	7.0 cd	8.3 ab
All*Star	7.7 abc	7.0 cd	8.3 ab
Tara-Green	7.7 abc	7.0 cd	9.0 a
Omega II	7.7 abc	7.0 cd	9.0 a
Barry	7.7 abc	6.3 de	8.3 ab
Winter Turf I	7.0 a-d	7.0 cd	9.0 a
Citation II	7.0 a-d	7.0 cd	8.3ab
Ranger	7.0 a-d	7.0 cd	9.0 a
Argyle	7.0 a-d	7.0 cd	5.7 c
Pennant	7.0 a-d	6.3 de	7.3 abc
Yorktown II	7.0 a-d	7.0 cd	9.0 a
Birdie II	7.0 a-d	7.0 cd	8.3 ab
Master	7.0 a-d	7.0 cd	9.0 a
Marvelgreen	7.0 a-d	6.3 de	8.3 ab
Prelude	7.0 a-d	7.0 cd	9.0 a
Loft's #1	7.0 a-d	7.0 cd	9.0 a
Dixie Green PR Blend	7.0 a-d	7.0 cd	7.7 abc
Bianca	7.0 a-d	7.0 cd	7.7 abc
Palmer/Prelude	7.0 a-d	7.0 cd	8.3 ab
Palmer	7.0 a-d	7.0 cd	9.0 a
PhD	7.0 a-d	7.0 cd	9.0 a
V.I.P.	7.0 a-d	7.0 cd	7.0 abc
Tando	7.0 a-d	7.7 bc	8.3 ab
Tara-Green Supreme	7.0 a-d	7.0 cd	8.3 ab
Manhattan II	7.0 a-d	7.0 cd	8.3 ab
PSU-222	7.0 a-d	7.0 cd	8.3 ab
Ovation	6.3 bcd	7.0 cd	9.0 a
Loretta	6.3 bcd	7.7 bc	9.0 a
Huntsville	6.3 bcd	7.0 cd	7.7 abc
Marvelgreen + Sabre	5.7 cd	7.7 bc	7.7 abc
Marvelgreen Classic	5.7 cd	5.7 e	7.0 abc
BAR Lp 412	5.7 cd	7.7 bc	7.7 abc
Lp 80-1	5.7 cd	7.0 cd	7.0 abc
Agree	5.7 cd	7.7 bc	5.7 c
WSC 001	5.7 cd	7.0 cd	9.0 a
PSU-111	5.7 cd	7.7 bc	7.7 abc
Winter Turf V	5.0 d	9.0 a	8.3 ab

[z]Ratings from 1 to 9, 1 = light green, 9 = dark green.
[y]Ratings from 1 to 9, 1 = coarse; 9 = fine.
[x]Ratings from 1 to 9, 1 = none, 9 = maximum.
[w]Means in columns followed by the same letter are not significantly different at the 5% level using the Waller-Duncan K-ratio t-test.

Wear tolerance among the grasses was exceptional (Table 3). Nineteen exhibited no wear from simulated traffic. All were perennial ryegrasses except for 'Lofts #1,' which was a mixture of 50% perennial ryegrass and 50% intermediate ryegrass, and 'Dixie Green w/Sabre.' The least wear tolerant grasses were 'Streaker' redtopgrass,

Table 4. Turf quality, percent cover, and *Poa annua* infestation ratings of overseeded cool-season turfgrasses at Orlando, Fla.

Cool-season Turfgrass	Seeding rate g/m²	Turf Quality[x] 17 Jan.	18 Feb.	14 Mar.	Avg.	% Cover 17 Jan.	18 Feb.	14 Mar.	Poa[w] annua
PR	125	4.7	5.7	7.7	6.1	36 abc[y]	57 c	99 a	1.6 ab
PR	150	4.7	8.0	8.7	6.6	45 a	94 ab	98 a	2.4 a
PR	195	5.3	8.3	8.7	6.7	45 a	94 ab	94 a	1.3 ab
PR	200	5.0	7.3	9.0	7.0	39 ab	89 ab	83 a	1.0 ab
PR blend	125	5.0	7.7	7.7	6.8	49 ab	93 ab	99 a	2.4 a
PR blend	150	5.0	6.7	8.3	6.3	32 a-d	78 bc	93 a	1.6 ab
PR blend	175	4.7	7.7	9.0	6.6	37 abc	94 ab	94 a	2.4 a
PR blend	200	5.7	8.0	8.7	7.1	58 a	97 ab	93 a	1.6 ab
KB	30	4.0	6.7	8.0	6.6	11 de	77 bc	99 a	1.9 ab
KB	40	4.3	7.0	8.3	6.3	14 cde	85 abc	99 a	2.4 a
CB	10	4.0	6.7	9.0	6.3	14 cde	79 bc	83 a	0.5 b
CB	25	4.0	7.7	8.7	6.1	14 cde	82 abc	89 a	0.6 ab
RB	10	4.0	7.7	9.0	6.4	18 b-d	94 ab	83 a	1.0 ab
RB	20	5.0	8.7	9.0	7.0	32 a-d	99 a	83 a	1.3 ab
RF	100	4.3	6.3	7.7	6.1	13 cde	72 bc	99 a	1.6 ab
RF	150	4.3	7.3	8.7	6.2	10 e	91 ab	89 a	1.3 ab

[z]PR = perennial ryegrass, KB = Kentucky bluegrass, CB = creeping bentgrass, RB = rough bluegrass, RF = red fescuegrass
[y]Means in columns followed by the same letter are not significantly different at the 5% level using the Waller-Duncan k-ratio t-test.
[x]Rated 1 to 9, 9 = best.
[w]Rated 0 to 3 = heavy infestation.

'Agree' intermediate ryegrass, and 'Argyle' Kentucky bluegrass.

Turf quality, percent cover, and *Poa annua* infestation ratings of the cool-season grasses evaluated at Longwood, Fla. are presented in Table 4. Plots were seeded on 3 Dec. 1984, but unseasonably warm temperatures favored bermudagrass growth and effectively competed with the overseeding establishment until 21 Jan. 1985, when a severe freeze occurred. This is reflected in the low turf quality scores on 17 Jan. 1985. All grasses were considered unacceptable for good quality turf. Evaluations after the freeze at the 18 Feb. 1985, rating found acceptable plots (rated >6) with higher perennial ryegrass seeding rates and plots with rough bluegrass. The highest percent turf cover was found on the perennial ryegrass plots. Rough bluegrass at the higher seeding rate also had a higher percent cover than most of the nonryegrass plots. Faster establishment and cold hardiness contributed to this. Red fescuegrass, bentgrass, and Kentucky bluegrasses were all slow to establish. Bentgrasses had the lowest incidence of *Poa annua* infestation, although there were few statistical differences among grasses.

Conclusions

In contrast to the 1983 study (4), inclusion of a rough bluegrass did not enchance performance after exposure to freezing temperatures at Gainesville. This was probably the result of lack of acclimatization time. Perennial ryegrasses provided excellent quality turf with good color, texture, density, and fast establishment. These are all desirable characteristics for overseeding grasses. The proliferation of grasses available for overseeding means more intense competition among seed producers, more competitive prices, and a wider choice of equally good turfgrasses.

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