inches had a maximum of 13.5 days vase life with most less than 10 days. The tallest fronds, those emerging in June with a height at 7 weeks of 25 inches, had a vase life of only 3.5 days. Correlating the b factor, which indicates the slope of the quadratic growth equation with vase life, produces a correlation of −0.96, again indicating the rate of growth may influence the length of vase life. Regressions for growth of fronds emerging June, September, December and March are shown in Fig. 1. The slope of the curves clearly indicate that if rate of initial growth is high, vase life is short.

Table 2. Correlation coefficient of vase life to growth.

Ht (7 wk)/vase life	−0.82
b-quadratic equation/vase life	−0.96

The results of this research suggest that efforts should be made to reduce the rapid growth of leatherleaf fern, primarily by reducing fertilizer and water during the months when emerging fiddleheads are expected to have shortened vase life. Harvesting fronds immediately after maturity may also maximize vase life.

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EVALUATION OF OVERSEEDED TURFGRASSES FOR PUTTING GREENS[1]

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Additional index words. wear tolerance, dollar spot disease, bermudagrass, *Cynodon* spp.

Abstract. **Putting greens in the southern United States are overseeded during the winter months to provide a contrast in color, improve the playing surface, and primarily to provide a medium for wear to minimize damage to dormant turf. Forty-one cool-season turfgrass species, blends, or mixtures were evaluated for overseeding suitability. Overseeding plots were established on a 'Tifgreen' bermudagrass** (Cynodon **spp.) putting green. Turf quality, disease incidence and wear tolerance were evaluated periodically. Nineteen of the 41 overseeded grasses were equal in turf quality. Differences were noted in tolerance to traffic and dollar spot disease** (Sclerotinia homeocarpa **F. T. Bennett).**

Putting greens in the southern United States are overseeded during winter months for 3 primary reasons: 1) to provide a contrast in color, 2) to improve the playing surface, and 3) to provide a medium for wear to minimize damage to dormant turf (2). Continued development and release of new cool-season turfgrass cultivars requires continuous screening for proper recommendations to the turfgrass industry. The objective of this study was to evaluate cool-season species, blends, and mixtures for overseeding suitability.

Methods and Materials

Overseeded plots were established on a 'Tifgreen' bermudagrass putting green at the Turfgrass Field Laboratory, Institute of Food and Agricultural Sciences, Gainesville, FL. All turfgrasses in Table 1 were seeded on November 10, 1983 except 'Medalist', 'Medalist 6', and 'Medalist 7' which were seeded on November 28, 1983. The entire area was lightly vertical-mowed in 1 direction to remove excess thatch just prior to seeding. Plots, 1 x 3 m, were hand seeded in 4 replications and the entire area was then topdressed using fumigated topsoil. Seed and topdressing were worked into the semi-dormant bermudagrass using a stiff broom. The following rates of seeding were used:

	Rate	
	g/m^2	lb./1000 ft^2
Perennial ryegrass (*Lolium perenne* L.)	175	35
Perennial ryegrass + rough bluegrass (*L. perenne* + *Poa trivialis* L.)	100	20
Perennial ryegrass + fine-leafed fescue (*L. perenne* + *Festuca rubra* L.)	150	30
Perennial ryegrass + rough bluegrass + (*L. perenne* + *P. trivialis* + *F. rubra*) fine-leafed fescue	125	25

Turfgrasses included in the study are presented in Table 1.

After seeding, plots were irrigated with 3 mm of water 3 times daily until germination at 10 days following seeding. Mowing commenced at a height of 8 mm (5/16 inch) for the first 2 weeks after seedling emergence and then height-of-cut was lowered to 6 mm (1/4 inch) for the re-

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Table 1. Turfgrasses evaluated at Gainesville, FL for overseeding during the 1983-84 study period and their composition.

Turfgrass	Species[z]	Cultivar components	Seed Co.
Ovation	PR	—	O. M. Scott & Sons
Loretta	PR	—	O. M. Scott & Sons
Winter Turf I	PR	40% Loretta 30% Derby 20% Pennfine 10% Victa	O. M. Scott & Sons
Pennant	PR	—	E. F. Burlingham & Sons
Pennant + Belle	PR	50% Pennant 50% Belle	E. F. Burlingham & Sons
Pennant + Koket	PR + CF	70% Pennant 30% Koket	E. F. Burlingham & Sons
Pennant + Belle + Koket	PR + CF	35% Pennant 35% Belle 30% Koket	E. F. Burlingham & Sons
Pennant + Belle + Pennfine + Koket		25% Pennant 25% Belle 25% Pennfine 25% Koket	E. F. Burlingham & Sons
Futura Plus	PR	50% Fiesta 25% Dasher 25% Blazer	Pickseed West, Inc.
Fiesta	PR	—	Pickseed West, Inc.
Blazer	PR	—	Pickseed West, Inc.
Dasher	PR	—	Pickseed West, Inc.
PSW	PR	—	Pickseed West, Inc.
PhD	PR	40% Derby 30% Gator 30% Regal	International
Gator	PR	—	International
Derby	PR	—	International
Regal	PR	—	International
PhD/Sabre	PR + RB	97% PhD 3% Sabre	International
Pennfine + Manhattan II	PR	50% Pennfine 50% Manhattan II	Whitney/Dickinson Seeds, Inc.
Citation	PR	—	Turf-Seed, Inc.
Manhattan II	PR	—	Turf-Seed, Inc.
Birdie II	PR	—	Turf-Seed, Inc.
CBS	PR	50% Citation 25% Birdie 25% Omega	Turf-Seed, Inc.
CBS II	PR	33% Citation II 33% Birdie II 33% Omega II	Turf-Seed, Inc.
Citation II	PR	—	Turf-Seed, Inc.
2DF	PR	—	Turf-Seed, Inc.
Omega II	PR	—	Turf-Seed, Inc.
Palmer	PR	—	Lofts Seed, Inc.
Repell	PR	—	Lofts Seed, Inc.
Cowboy	PR	—	Lofts Seed, Inc.
Prelude	PR	—	Lofts Seed, Inc.
Marvel Green Supreme	PR	33% Cowboy 33% Prelude 33% Palmer	Lofts Seed, Inc.
Marvel Green Shade	PR + CF + RB	60% Marvel Green Supreme 25% Jamestown 15% Sabre	Lofts Seed, Inc.
Marvel Green Supreme + Jamestown	PR + CF	70% Marvel Green Supreme 30% Jamestown	Lofts Seed, Inc.
Marvel Green Supreme + Sabre	PR + RB	85% Marvel Green Supreme 15% Sabre	Lofts Seed, Inc.
Resort	PR	33% Premier 33% Pennant 33% Horizon	Carter Seed & Fertilizer Co.
Rebel	PR	33% Premier 33% Pennant 33% Pronto	Carter Seed & Fertilizer Co.
Horizon	PR	—	Carter Seed & Fertilizer Co.
Medalist	PR	50% Pennfine 50% Delray	Northrup King
Medalist 6	PR	40% Goalie 30% Pennfine 30% Eton	Northrup King
Medalist 7	PR	60% Delray 20% Goalie 20% Eton	Northrup King

[z]PR = Perennial Ryegrass; RB = Rough Bluegrass; CF = Chewings Fescue; IR = Intermediate Ryegrass.

mainder of the study. All plots were treated with metalaxyl (Subdue) at 32 ml/100 m^2 (1 fl oz/1000 ft^2) at 2-week intervals for the first 6 weeks. Plots were fertilized 2 weeks after seeding at a rate of 5 g N/m^2 (1.0 lb. N/1000 ft^2) with a 16-4-8 fertilizer and then monthly thereafter. Irrigation was applied to supplement rainfall as necessary.

Evaluations were performed weekly for the first month and biweekly for the remainder of the study period. Turf quality as a visual evaluation was determined on a 1 to 10 scale, 10 = best. On February 13, 1984, wear tolerance treatments were initiated. An empty, water ballast roller with golf shoes and spikes affixed was run over the plots 10 times per day for 2 weeks in order to simulate golf traffic. Subsequent damage and recovery estimates to traffic were made. An outbreak of dollar spot disease occurred in February 1984. Dollar spot counts were made on February 24, 1984 for all plots.

Samples of those turfgrasses that were pure perennial ryegrasses were taken to determine seed weight and seeding density. Four random samples of 100 seeds each were weighed to the nearest 0.1 mg.

Results and Discussion

Seed weights of the pure perennial ryegrass cultivars are presented in Table 2. There was considerable variation in seed weight and therefore seed number. There was no correlation between seed weight and overall seasonal turf quality ($r = -0.37$). Increased seed number and seedling density apparently did not play a significant role in turf quality.

Table 2. Seed weights of the perennial ryegrass cultivars being evaluated for overseeding during the 1983-84 study.

Cultivar	Seed wt.[z] (mg)	No. seed/lb.
Birdie	211.9 a[w]	217,391
Manhattan II	194.4 b	233,515
Omega II	192.4 b	235,942
Horizon	190.7 b	238,033
Pennant	189.5 b	239,590
2DF	188.0 bc	241,502
Citation	186.5 bc	243,471
Dasher	175.4 def	258,852
Citation II	172.7 defg	262,929
Derby	171.7 efg	264,353
Palmer	171.6 efg	264,615
Repell	168.6 fg	269,324
Prelude	166.1 gh	273,264
Regal	158.8 hi	285,948
Cowboy	158.1 hi	287,106
Ovation	154.5 i	293,832
Blazer	154.1 i	294,595
Gator	153.7 i	295,458
Fiesta	136.4 j	332,869
Loretta	112.5 k	403,412

[z]Average of 100 seeds in 4 replications.
[w]Mean separation in columns using the Waller Duncan k-ratio t-test, 5% level.

Seedling vigor is probably more important than seed number in performance over the growing season.

Turf quality ratings are presented in Table 3. Seasonal averages indicated that a number of cultivars performed well. Best overall quality (P = .05) was produced by 'Fiesta', 'Loretta', 'Winter Turf I', 'PhD', 'Gator', 'Derby', 'Regal', 'Citation', 'Manhattan II', 'CBS', 'Citation II', 'Omega II', 'Palmer', 'Repell', 'Cowboy', 'Prelude', 'Marvelgreen Supreme', 'Marvelgreen Supreme/Jamestown', and 'Rebel'. Thus of the 41 cultivars evaluated, 19 were within the uppermost confidence interval.

Initial quality ratings were superior for 'PhD/Sabre', 'Loretta' and 'Ovation'. 'PhD/Sabre', and 'Marvelgreen Shade' had superior quality through mid-December. On December 23, 1983, 'PhD/Sabre', 'Loretta', 'Marvelgreen Shade', and 'Marvelgreen/Sabre' had the highest turf quality. A severe freeze on December 24 and 25, 1983 dropped night temperatures from 60°F on December 23 (15.6°C) to 13°F (−10.6°C) and severely damaged many of the perennial ryegrass cultivars and blends. Quality ratings on January 6, 1984 indicated performance on plots whose overseeding mixtures contained a rough bluegrass (Table 3) was superior, probably due to better cold tolerance (1). While there were quality differences among perennial ryegrasses, there was little shift in overall rankings among cultivars or mixtures indicating few differences in cold tolerance. 'Horizon' and 'Resort' were most affected by the cold exposure.

There was excellent recovery of the perennial ryegrasses during February from the December cold damage. By February 19, 1984 there were few differences in quality among the cultivars. This persisted into late March. Reduced turf quality was noted at the March 24, 1984 rating for those mixtures containing rough bluegrass (Table 3). This was due to a very high incidence of dollar spot (Table 4). When temperatures rose above 85°F (29°C) in late April, differences were noted in turf quality indicating better heat and drought tolerance. 'Citation', 'Cowboy', 'Fiesta', 'Marvelgreen Supreme', 'Marvelgreen Supreme/Jamestown', 'Pennant/Belle', 'Pennant/Koket', 'Pennant/Belle/Koket/Pennfine', and 'Omega II' performed best during this period. 'Citation', 'Cowboy', 'Marvelgreen Supreme/Jamestown', 'Marvelgreen Supreme' and 'Omega II' all exhibited excellent turf quality into the transition period, although considerable overlap exists in statistical rankings.

Cultivars differed in traffic tolerance (Table 4). 'Horizon', 'Marvelgreen Shade', 'Marvelgreen/Sabre', 'Medalist', 'Medalist 6', 'Pennant', 'Pennant/Belle/Koket' and 'Resort' had the least traffic tolerance. All cultivars quickly recovered from damage and there were few differences 2 weeks after traffic ended.

Table 4. Traffic damage ratings and dollar spot incidence on overseeding cultivars.

Cultivar	Damage ratings[z] March 3	Damage ratings[z] March 24	Dollar spot count/m²
2DF	2.25 b-e[y]	1.25 ab	15.8 bc
Birdie	1.75 abc	1.25 ab	5.3 de
Blazer	1.75 abc	1.50 abc	7.3 cde
CBS	2.25 b-e	1.50 abc	6.9 cde
CBS II	1.50 abc	1.00 a	12.7 b-e
Citation	1.25 ab	1.00 a	5.9 cde
Citation II	2.00 a-d	1.50 abc	7.3 cde
Cowboy	2.00 a-d	1.00 a	3.8 de
Dasher	1.75 abc	1.75 abc	9.0 ce
Derby	1.75 abc	1.00 a	6.8 cde
Fiesta	2.00 a-d	1.50 abc	8.6 cde
Futura Plus	1.50 abc	1.00 a	11.3 b-e
Gator	2.00 a-d	1.25 ab	20.6 b
Horizon	3.50 f	2.00 bc	9.9 cde
Loretta	2.00 a-d	2.25 c	14.4 bcd
Manhattan II	1.25 ab	1.25 ab	8.8 cde
Marvelgreen Supreme	1.75 abc	1.00 a	3.8 de
Marvelgreen Shade	3.25 ef	2.25 a	41.8 a
Marvelgreen Supreme/ Jamestown	2.25 b-e	1.00 a	3.8 de
Marvelgreen/Sabre	3.00 def	2.25 c	36.4 a
Medalist	2.50 c-f	1.00 a	3.5 e
Medalist 6	2.50 c-f	1.50 abc	9.9 b-e
Medalist 7	2.25 b-e	1.00 a	6.4 cde
Omega II	1.75 abc	1.25 ab	10.3 b-e
Ovation	2.25 b-e	1.50 abc	12.2 b-e
Palmer	1.75 abc	1.50 abc	9.3 cde
Pennant	2.50 c-f	1.50 abc	8.3 cde
Pennant/Belle	2.00 a-d	1.00 a	4.4 de
Pennant/Koket	2.50 c-f	1.50 abc	3.7 e
Pennant/Belle/Koket	2.50 c-f	1.25 ab	4.7 de
Pennant/Belle/Koket/ Pennfine	2.25 b-e	1.25 ab	8.0 cde
Pennfine/Manhattan II	2.25 b-e	1.75 abc	10.4 b-e
PhD	1.00 a	1.25 ab	8.6 cde
PhD/Sabre	1.75 abc	1.75 abc	36.5 a
PSW[x]	3.00	2.00	2.0
Prelude	1.75 abc	1.00 a	5.6 cde
Rebel	2.00 a-d	1.25 ab	6.9 cde
Regal	2.00 a-d	1.00 a	6.8 cde
Repell	1.50 abc	1.50 abc	9.6 cde
Resort	3.00 def	1.75 abc	5.7 cde
Winter Turf I	2.00 a-d	1.25 ab	9.6 cde

[z]Traffic damage as visual ratings from 1 to 6, 1 = least damage.
[y]Mean separation in columns using the Waller-Duncan k-ratio t-test, 5% level.
[x]Single plot observation.

Based on these results, cold weather performance of overseeding grasses was enhanced by inclusion of rough bluegrass in mixtures. However, mixtures with rough bluegrass performed poorly late in the season when temperatures warmed and disease affected rough bluegrass mixtures more than blends or pure perennial ryegrasses or mixtures of ryegrasses with fine fescues. Among perennial ryegrasses, 18 of 30 cultivars or 60% were in the upper confidence interval. This indicates that there are few relative differences in performance among the new turf-type perennial ryegrasses and that management will play a vital role in producing high quality turf.

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Table 3. Seasonal performance ratings[z] of turf quality of overseeding species and cultivars.

Cultivar	November		December			January		February		March		April		Seasonal
	21	30	7	14	23	6	22	4	19	3	24	8	21	average
2DF	6.25 de[y]	7.37 fg	7.50 f-i	7.75 g-j	7.87 f-i	5.75 i-l	6.50 jk	7.12 i	8.62 abc	8.87 a	8.12 d-g	7.00 c-f	6.50 de	7.32 h-k
Birdie	6.37 cde	7.50 efg	7.62 e-i	7.62 h-k	7.87 f-i	6.25 f-j	7.37 d-h	8.25 c-f	8.87 a	8.87 a	8.87 a-d	7.25 b-f	7.37 bcd	7.70 b-f
Blazer	6.50 b-e	7.37 fg	7.25 hi	7.75 g-j	7.75 ghi	6.25 f-j	6.75 h-k	7.37 g-i	8.50 a-d	8.62 a	8.50 a-f	7.37 a-f	7.25 bcd	7.48 e-i
CBS	6.87 bc	8.00 cde	7.87 d-g	8.12 d-g	8.12 d-g	6.50 e-h	7.12 e-j	7.50 g-i	8.62 abc	8.75 a	8.75 a-e	7.37 a-f	7.37 bcd	7.76 a-e
CBS II	6.62 b-e	7.75 d-g	7.75 d-h	7.87 f-i	8.00 e-h	6.50 e-h	7.37 d-h	7.87 d-h	8.62 abc	8.50 a	8.87 a-d	7.37 a-f	7.00 b-e	7.70 b-f
Citation	6.37 cde	7.75 d-g	7.87 d-g	8.00 e-h	7.87 f-i	6.75 d-g	7.25 d-i	7.75 e-i	8.62 abc	8.87 a	9.00 abc	7.75 abc	7.62 bc	7.80 a-d
Citation II	6.50 b-e	7.75 d-g	8.00 c-f	8.25 c-f	8.00 e-h	6.87 c-f	7.25 d-i	7.87 d-h	8.50 a-d	8.62 a	8.75 a-e	7.12 c-f	7.50 abc	7.76 a-e
Cowboy	6.37 cde	7.62 d-g	7.62 e-i	8.00 e-h	8.12 d-g	6.50 e-h	7.25 d-i	8.00 d-g	8.87 a	9.00 a	8.87 a-d	7.37 a-f	7.62 abc	7.78 a-d
Dasher	6.25 de	7.50 efg	7.50 f-i	7.50 i-l	7.37 i	6.12 g-k	6.75 h-k	7.37 g-i	8.50 a-d	8.75 a	8.37 b-f	7.37 a-f	7.25 bcd	7.43 f-j
Derby	6.62 b-e	7.50 efg	7.62 e-i	7.87 f-i	8.00 e-h	6.62 d-h	7.25 d-i	7.62 f-i	8.62 abc	8.75 a	8.87 a-d	7.37 a-f	7.50 abc	7.71 b-f
Fiesta	6.87 bc	8.12 bcd	8.00 c-f	8.62 bc	8.50 b-e	7.25 bcd	7.87 cd	8.37 cde	8.50 a-d	9.12 a	8.00 e-g	7.37 a-f	7.62 abc	8.01 a
Futura Plus	6.50 b-e	7.50 efg	7.75 d-h	7.75 g-j	7.87 f-i	6.25 f-j	7.00 f-k	7.50 g-j	8.87 a	9.25 a	8.75 a-e	7.37 a-f	7.12 b-e	7.65 b-g
Gator	6.75 bcd	7.75 d-g	7.87 d-g	8.12 d-g	8.37 b-f	7.25 bcd	7.50 d-g	8.00 d-g	8.62 abc	8.62 a	8.25 c-g	7.00 c-f	6.75 cde	7.75 a-e
Horizon	6.25 de	7.62 d-g	7.62 e-i	7.75 g-j	8.00 e-h	5.12 lmn	5.50 lm	6.12 j	7.87 cde	8.62 a	8.12 d-g	6.87 def	6.87 b-e	7.08 kl
Loretta	7.50 a	8.62 ab	8.50 bc	8.50 cd	8.75 abc	7.50 bc	8.25 bc	8.50 bcd	8.00 b-e	8.62 a	7.50 g	6.00 g	6.25 e	7.88 abc
Manhattan II	6.62 b-e	7.75 d-g	7.87 d-g	7.62 h-k	7.87 f-i	6.62 d-h	7.25 d-i	7.87 d-h	8.87 a	9.00 a	9.00 abc	7.37 a-f	7.25 bcd	7.76 a-e
Marvelgreen Supreme	6.25 de	7.25 g	7.75 d-h	8.00 e-h	8.25 c-g	7.00 cde	7.62 c-f	8.25 c-f	9.00 a	8.62 a	9.00 abc	7.75 abc	7.62 abc	7.87 abc
Marvelgreen Shade	6.75 bcd	8.50 abc	8.87 ab	9.00 ab	9.25 a	8.25 a	9.37 a	9.25 a	7.75 de	8.50 a	4.50 h	2.75 h	1.50 g	7.25 i-k
Marvelgreen Supreme/Jamestown	6.12 e	7.25 g	7.75 d-h	8.00 c-h	8.12 d-g	6.37 e-i	7.62 c-f	7.87 d-h	9.00 a	9.00 a	9.25 a	8.12 a	8.37 a	7.91 ab
Marvelgreen/Sabre	6.37 cde	7.37 fg	7.76 d-h	8.37 cde	8.87 ab	7.87 ab	8.87 ab	8.87 abc	8.37 a-d	8.37 a	4.50 h	3.00 h	1.50 g	6.93 l
Medalist	—	—	6.12 j	7.00 m	7.37 i	5.50 klm	6.37 k	7.25 h-i	8.75 ab	8.75 a	9.12 ab	7.62 a-d	7.50 abc	7.39 g-j
Medalist 6	—	—	6.00 j	7.12 lm	7.50 hi	5.25 lmn	5.50 lm	6.25 j	8.37 a-d	8.62 a	8.62 a-f	7.12 c-f	7.50 abc	7.07 kl
Medalist 7	—	—	6.37 j	7.12 lm	7.37 i	5.00 mn	5.62 l	6.25 j	8.75 ab	8.75 a	8.75 a-e	7.50 a-e	7.50 abc	7.17 jkl
Omega II	6.75 bcd	7.87 def	8.00 c-f	8.25 c-f	8.12 d-g	6.87 c-f	7.50 d-g	7.87 d-h	8.75 ab	9.12 a	9.00 abc	7.37 e-f	7.62 abc	7.93 ab
Ovation	7.00 ab	8.12 bcd	8.12 cde	8.25 c-f	8.12 d-g	6.75 d-g	7.25 d-i	7.75 e-i	8.50 a-d	8.62 a	7.50 g	6.75 efg	6.75 cde	7.65 b-g
Palmer	6.62 b-e	7.75 d-g	7.75 d-h	8.00 e-h	8.25 c-g	6.62 d-h	7.25 d-i	7.62 f-i	8.62 abc	9.00 a	8.75 a-e	7.50 a-e	7.25 bcd	7.76 a-e
Pennant	6.62 b-e	7.62 d-g	7.75 d-h	7.50 i-l	8.00 e-h	6.37 e-i	6.75 h-k	7.62 f-i	8.75 ab	8.75 a	7.87 fg	7.25 b-f	7.00 b-e	7.52 d-i
Pennant/Belle	6.50 b-e	7.37 fg	7.50 f-i	7.25 klm	7.37 i	5.62 j-m	6.62 i-k	7.12 i	8.62 abc	8.87 a	8.62 a-f	7.37 a-f	7.25 bcd	7.39 g-j
Pennant/Koket	6.12 e	7.50 efg	7.25 hi	7.37 j-m	7.50 hi	6.00 hijk	6.50 jk	7.62 f-i	9.00 a	8.62 a	8.62 a-f	7.50 a-e	7.75 ab	7.51 d-i
Pennant/Belle/Koket	6.50 b-e	7.62 d-g	7.62 e-i	7.75 g-j	7.75 ghi	6.12 g-k	7.00 f-k	7.87 d-h	8.75 ab	9.00 a	8 87 a-d	7.75 abc	7.50 abc	7.70 b-f
Pennant/Belle/Koket/Pennfine	6.25 de	7.37 fg	7.37 ghi	7.62 h-k	7.75 ghi	5.62 j-m	6.87 g-k	7.50 g-i	8.87 a	9.25 a	8.87 a-d	7.75 abc	7.62 abc	7.59 c-h
Pennfine/Manhattan II	6.50 b-e	7.62 d-g	7.75 d-h	7.87 f-i	8.12 d-g	6.25 f-j	7.25 d-i	7.50 g-i	8.50 a-d	8.62 a	8.25 c-g	7.25 b-f	6.87 b-e	7.56 d-h
PhD	6.50 b-e	7.62 d-g	8.00 c-f	8.00 e-h	8.00 e-h	6.75 d-g	7.25 d-i	7.50 g-i	8.62 abc	8.87 a	8.50 a-f	7.50 a-e	7.37 bcd	7.73 a-f
PhD/Sabre	7.50 a	8.87 a	9.25 a	9.12 a	9.25 a	8.37 a	9.50 a	9.12 ab	8.50 a-d	8.75 a	4.50 h	2.50 h	3.12 f	7.56 d-h
PSW[x]	6.00	6.50	7.00	7.00	7.00	4.50	6.00	7.00	8.50	9.50	8.00	8.00	8.50	7.23
Prelude	6.50 b-e	7.62 d-g	7.50 f-i	7.87 f-i	8.25 c-g	7.00 cde	7.75 cde	8.25 c-f	8.87 a	9.12 a	8.87 a-d	7.62 a-b	7.37 bcd	7.89 abc
Rebel	6.62 b-e	7.50 efg	7.75 d-h	8.12 d-g	7.87 f-i	6.87 c-f	7.62 c-f	7.87 d-h	8.75 ab	8.75 a	8.37 b-f	7.37 a-f	7.25 bcd	7.76 a-e
Regal	6.37 c-e	7.50 efg	7.87 d-g	7.87 f-i	8.12 d-g	6.75 d-g	6.75 d-g	7.37 d-h	7.75 e-i	8.75 a	8.75 ab	7.87 a-b	7.50 abc	7.79 a-d
Repell	6.62 b-e	7.75 d-g	8.12 cde	8.37 cde	8.62 bcd	7.00 cde	7.50 d-g	8.25 c-f	8.87 a	9.12 a	8.87 a-d	7.12 c-f	7.12 b-e	7.95 ab
Resort	6.37 cde	7.37 fg	7.12 i	7.62 h-k	7.87 f-i	4.75 n	4.87 n	5.87 j	7.50 e	8.25 a	7.87 fg	7.12 c-f	7.37 bcd	6.92 l
Winter Turf I	6.62 b-e	7.87 def	8.25 cd	8.12 d-g	8.25 c-g	6.87 c-f	8.25 bc	8.75 abc	9.00 a	9.00 a	8.75 a-e	6.62 fg	7.00 b-e	7.95 ab

[z]Rated 1 to 10, with 10 = best.
[y]Mean separation in columns by the Waller-Duncan k-ratio t-test, 5% level.
[x]Single observation plot.