

Evaluation of Turfgrass Species for Use on Putting Greens (2002)

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Summary

Eleven bentgrasses (*Agrostis palustris* Huds.) and four annual bluegrasses (*Poa annua* L.) were established at the Red Deer Golf and Country Club in August of 1999. These grasses were evaluated for their overall quality and suitability for use on putting greens.

Eight of the ten bentgrasses tested demonstrated qualities superior or equal to those expressed by the standard entry, Penncross, with Penn A-4 being the best overall cultivar for 2002. The annual bluegrass biotypes tested started slowly in the spring, but significantly improved in quality over the rest of the season. Peterson's Creeping Bluegrass scored the highest for the bluegrass biotypes.

Introduction

Traditionally, the creeping bentgrass cultivar, Penncross, has been the most commonly used turfgrass cultivar for putting greens in the Canadian Prairie Provinces. However, this cultivar is not without its weaknesses. The inability of Penncross to effectively compete with other weedy grass species and its mottled colour in both the spring and the fall, have led to the development of new bentgrass cultivars. This trial was established to evaluate these new cultivars for their suitability for use on the Canadian Prairies.

Annual bluegrass (*Poa annua* L.) can be routinely found encroaching into bentgrass greens and in some cases completely dominating the green's plant population. Many turf professionals have chosen not to control, but rather to convert to annual bluegrass greens to utilize this strong competitive characteristic. Researchers have been studying annual bluegrass and are in the process of conducting seed multiplication to ensure the seed is commercially available in the future. Three biotypes of annual bluegrass and one creeping bluegrass have been included in this study to evaluate their performance under green maintenance conditions.

Materials and Methods

Eleven cultivars of creeping bentgrass, three biotypes of annual bluegrass and one creeping bluegrass were seeded on a bentgrass nursery at the Red Deer Golf and Country Club on August 19, 1999. The bentgrass cultivar Penncross was designated as a standard, against which the attributes of the other entries were compared (Table 1).

Plots are replicated four times in a Randomized Complete Block Design (RCBD). The plots measured 1.5m by 2m. The rootzone is a sand/peat mixture. The plots were maintained at a mowing height of 0.150" and were fertilized at a rate of 0.5kg N/100m² (1b N/1000ft²) per growing month. The area was routinely irrigated to avoid physiological drought stress to the turf. A preventative snow mould fungicide program was applied in the fall of each year.

Table 1. Grasses used in the Putting Green Trial 2002, Red Deer Golf & Country Club.

Botanical Name	Common Name	Cultivar
<i>Agrostis palustris</i> Huds	Creeping Bentgrass	Penn A-4
<i>Agrostis palustris</i> Huds	Creeping Bentgrass	Penn A-1
<i>Agrostis palustris</i> Huds.	Creeping Bentgrass	Southshore
<i>Agrostis palustris</i> Huds.	Creeping Bentgrass	Imperial
<i>Agrostis palustris</i> Huds.	Creeping Bentgrass	Penn G-2
<i>Agrostis palustris</i> Huds.	Creeping Bentgrass	Penn G6
<i>Agrostis palustris</i> Huds.	Creeping Bentgrass	Seaside II
<i>Agrostis palustris</i> Huds.	Creeping Bentgrass	Loft's L-93
<i>Agrostis palustris</i> Huds.	Creeping Bentgrass	18 th Green
<i>Agrostis palustris</i> Huds.	Creeping Bentgrass	Penncross
<i>Agrostis palustris</i> Huds.	Creeping Bentgrass	Cato
<i>Poa reptans</i>	Creeping bluegrass	Petersen's
<i>Poa annua</i> L.	Annual bluegrass	97 Quilt I-25
<i>Poa annua</i> L.	Annual bluegrass	97 Quilt I-15
<i>Poa annua</i> L.	Annual bluegrass	97 Quilt I-12

The plots were evaluated, on a monthly basis, for three quality factors that contribute significantly to the overall appearance of the turf. Scoring of the plots was based on the National Turfgrass Evaluation Program (NTEP) protocols.

The first of these quality factors evaluated was colour. A numeric value was assigned to describe the colour of the turf. Colour was evaluated on the uniformity and the brilliance of the hue. These values ranged from a 1 for brown dormant turf to a 9 for a very uniform dark green-coloured appearance. A score of 5 is considered acceptable for most turf applications.

The second quality factor was area cover. The NTEP system evaluates area cover based on how effectively a specific cultivar or biotype performed as a ground cover. The presence of weed species or voids in the turf cover is a crucial consideration in evaluating the effectiveness of the turf. A numeric value was assigned to describe the area coverage of the turf. These values ranged from a 1 for a complete absence of turf to a 9 for a very uniform tightly knit turf covering. A score of 5 is considered acceptable for most turf applications.

The final quality factor evaluated in the trial was density. Turf density, a measure of the number of shoots per unit area, has a major role in the playability of a turf surface. Once again, the NTEP system uses numeric values to describe the density of the turf. These values ranged from a 1 for a weak turf stand to a 9 for a very uniform close knit appearance. A score of 5 is considered acceptable for most turf applications.

Results and Discussion

Colour Assessment

All of the plots had successfully overwintered and due to the cold spring had just broken dormancy seven days prior to the first spring rating. When rated for turf colour, the first significant difference observed was a strong contrast in the shade of green between the bentgrass types and the bluegrass types. The bluegrass biotypes tended to consistently display a lighter hue of green than that displayed by the bentgrasses. This inherent difference is reflected in the lower initial scores of the bluegrass entries (Table 2).

The cultivar Penn A-1 ranked the best for spring colour, while three other bentgrass cultivars: Penn G-6, Imperial and Southshore, scored better or equal to the standard, Penncross. Of the bluegrasses, none of biotypes produced a spring colour with sufficient intensity to equal that of Penncross.

Through out the entire season the turf colour of the bentgrass cultivars, except for the cultivars 18th Green and Seaside II, was scored as better or equal to the colour of the standard, Penncross. As for the bluegrasses, their display of color improved over the season and by the August rating period, all the biotypes demonstrated a colour equal to that of Penncross. Most of the bentgrass cultivars maintained their colour into the fall, while the colour displayed by the bluegrasses tended to decline slightly as fall approached.

Table 2. Colour Ratings Putting Green Trial 2002, Red Deer Golf & Country Club.

Cultivars	May	June	July	August	Sept	Oct	Superior or Equal to Penncross
Penncross	5.00 ABC	7.00 B	7.25 B	7.25 ABC	8.00 A	7.00 A	
18 th Green	4.25 DE	7.75 A	7.25 B	6.25 C	7.50 B	6.50 AB	3 out 6 Ratings
Lofts L-93	4.75 BCD	7.25 AB	7.50 AB	7.75 AB	8.00 A	6.75 A	6 out 6 Ratings
Imperial	5.00 ABC	7.00 B	7.75 AB	7.00 BC	8.00 A	7.00 A	6 out 6 Ratings
Penn A-4	4.50 CD	7.25 AB	7.75 AB	8.25 A	8.00 A	6.75 A	6 out 6 Ratings
Cato	4.75 BCD	7.00 B	7.25 B	7.50 AB	8.00 A	6.75 A	6 out 6 Ratings
Penn A-1	5.50 AB	7.25 AB	7.25 B	7.00 BC	8.00 A	7.25 A	6 out 6 Ratings
Penn G-2	4.75 BCD	7.25 AB	7.50 AB	7.75 AB	8.00 A	7.00 A	6 out 6 Ratings
Penn G-6	5.25 AB	7.25 AB	8.00 A	7.50 AB	8.00 A	6.75 A	6 out 6 Ratings
Southshore	5.00 ABC	7.25 AB	7.50 AB	7.75 AB	8.00 A	7.00 A	6 out 6 Ratings
Seaside II	4.75 BCD	6.25 C	6.25 C	6.25 C	6.75 C	5.75 B	2 out 6 Ratings
Peterson's	3.75 EF	5.00 D	6.50 C	6.75 BC	6.00 D	5.75 B	1 out 6 Ratings
97 Quilt I-15	3.25 F	5.00 D	6.00 C	7.00 BC	6.50 C	5.75 B	1 out 6 Ratings
97 Quilt I-25	3.50 F	5.00 D	6.50 C	6.25 C	6.50 C	5.75 B	1 out 6 Ratings
97 Quilt I-12	3.50 F	5.00 D	6.00 C	6.25 C	6.00 D	6.50 AB	2 out 6 Ratings
LS_{0.05}	0.66	0.74	0.73	1.03	0.41	0.82	

* Values that have the same letter as a suffix are not significant from each other

Area Cover Assessment

At the beginning of the season, the bentgrasses generally scored better for area cover than the bluegrasses (Table 3). The Quilt series of annual bluegrasses were slowest in establishing an acceptable turf cover. As the season progressed, all of the grasses in the trial established strong turf canopies and scored high on the NTEP scale. Seven bentgrass cultivars: 18th Green, Imperial, Cato, Penn G-2, Penn G-6, Southshore, Seaside II, and the bluegrass, Peterson's maintained a season long cover which was superior or equal to the area coverage of the standard, Penncross.

Table 3. Area Cover Ratings Putting Green Trial 2002, Red Deer Golf & Country Club.

Cultivars	May	June	July	August	Sept	Oct	Superior or Equal to Penncross
Penncross	5.75 A	6.25 ABC	6.50 A	6.75 ABC	7.50 AB	7.75 A	6 out 6 Ratings
18 th Green	5.50 A	6.75 AB	6.50 A	6.00 C	7.75 AB	7.25 AB	5 out 6 Ratings
Lofts L-93	5.75 A	5.75 BC	7.00 A	7.00 AB	8.00 A	7.00 B	6 out 6 Ratings
Imperial	5.50 A	6.75 AB	7.25 A	6.75 ABC	8.00 A	7.25 AB	5 out 6 Ratings
Penn A-4	5.50 A	7.25 A	7.50 A	7.50 A	8.00 A	7.00 B	6 out 6 Ratings
Cato	5.75 A	6.00 BC	7.00 A	6.75 ABC	7.75 AB	7.25 AB	5 out 6 Ratings
Penn A-1	5.75 A	5.75 BC	7.25 A	6.50 BC	7.50 AB	7.00 B	6 out 6 Ratings
Penn G-2	5.75 A	6.25 ABC	7.25 A	6.50 BC	8.00 A	7.25 AB	6 out 6 Ratings
Penn G-6	5.75 A	6.50 ABC	7.50 A	6.75 ABC	8.00 A	7.25 AB	6 out 6 Ratings
Southshore	5.75 A	6.75 AB	7.25 A	7.00 AB	8.00 A	7.25 AB	6 out 6 Ratings
Seaside II	5.75 A	6.25 ABC	7.25 A	6.50 BC	7.50 AB	7.25 AB	6 out 6 Ratings
Peterson's	5.00 AB	5.50 CD	7.00 A	6.25 BC	7.75 AB	7.25 AB	3 out 6 Ratings
97 Quilt I-15	4.00 C	4.50 DE	7.00 A	6.75 ABC	7.25 B	7.00 B	4 out 6 Ratings
97 Quilt I-25	4.25 BC	4.00 E	7.50 A	6.50 BC	7.50 AB	7.25 AB	5 out 6 Ratings
97 Quilt I-12	4.00 C	5.75 BC	7.00 A	6.25 BC	7.50 AB	7.25 AB	6 out 6 Ratings
LS_{0.05}	0.92	1.22	1.11	0.93	0.61	0.50	

* Values that have the same letter as a suffix are not significant from each other

Density Assessment

The density ratings, at the beginning of the season, were generally better for the bentgrasses than for the annual bluegrasses (Table 4). Penn A-4 consistently produced a very tightly knit turf and was scored as the top cultivar in this category. The bluegrasses were slower developing this spring and, it was not until the June rating, that the density of the bluegrass biotypes: Petersen's, and Quilt I-12 were scored as equal to the turf density displayed by the standard Penncross. As the season progressed, the turf density of all the bluegrasses continued to improve.

Table 4. Density Ratings Putting Green Trial 2002, Red Deer Golf & Country Club.

Cultivars	May	June	July	August	Sept	Oct	Superior or Equal to Penncross
Penncross	5.00 A	6.25 BCD	6.50 C	6.50 BCD	7.75 A	7.00 AB	6 out 6 Ratings
18 th Green	4.75 A	6.50 BCD	6.75 BC	6.25 CD	8.00 A	7.00 AB	6 out 6 Ratings
Lofts L-93	4.50 ABC	6.25 BCD	7.50 AB	6.75 BCD	8.00 A	7.00 AB	6 out 6 Ratings

Imperial	5.25 A	6.75 ABC	7.50 AB	7.25 AB	8.00 A	7.00 AB	6 out 6 Ratings
Penn A-4	4.75 AB	7.75 A	7.75 A	7.75 A	8.00 A	7.00 AB	6 out 6 Ratings
Cato	5.00 A	6.50 BCD	7.25 ABC	7.00 ABC	8.00 A	7.00 AB	6 out 6 Ratings
Penn A-1	5.00 A	6.50 BCD	6.50 C	6.50 BCD	7.75 A	7.00 AB	6 out 6 Ratings
Penn G-2	5.00 A	6.50 BCD	7.00 ABC	7.00 ABC	8.00 A	7.00 AB	6 out 6 Ratings
Penn G-6	5.00 A	6.50 BCD	7.75 A	6.75 BCD	8.00 A	7.00 AB	6 out 6 Ratings
Southshore	5.00 A	7.00 AB	7.50 AB	7.25 AB	8.00 A	7.25 A	6 out 6 Ratings
Seaside II	4.50 ABC	6.00 BCD	7.00 ABC	6.25 CD	7.50 A	6.75 B	6 out 6 Ratings
Peterson's	3.75 CD	5.50 DEF	6.50 C	6.00 D	7.50 A	7.00 AB	5 out 6 Ratings
97 Quilt I-15	4.00 BCD	4.75 EF	7.00 ABC	7.00 ABC	7.75 A	7.00 AB	4 out 6 Ratings
97 Quilt I-25	3.50 D	4.50 F	6.75 BC	6.25 CD	7.50 A	6.75 B	4 out 6 Ratings
97 Quilt I-12	3.50 D	5.75 CDE	6.75 BC	6.50 BCD	7.50 A	6.75 B	5 out 6 Ratings
LS_{0.05}	0.86	1.04	0.96	0.91	0.52	0.48	

* Values that have the same letter as a suffix are not significant from each other

Quality Assessment

The colour, area cover and density ratings for each variety were averaged to create a monthly quality score. An overall quality rating was calculated to rank the grasses from 1 to 15 according to their overall seasonal performance. Penn A-4 was scored as the best overall cultivar for 2002. The bentgrass varieties performed well, with eight of the ten varieties scoring higher than the standard, Penncross. The bluegrasses did not fair as well, as all of biotypes scored lower than the standard, Penncross. While, not performing well in the spring, the bluegrasses did significantly improve their scores over the rest of the season. By the August Rating, the turf quality of the bluegrass biotypes was scored as equal to the turf quality displayed by the standard Penncross. Peterson's Creeping Bluegrass ranked the highest of the bluegrasses for the overall quality in 2002. (Table 5).

Table 5. Quality Ratings Putting Green Trial 2002, Red Deer Golf & Country Club.

Cultivar	May	June	July	August	Sept	Oct	Overall
1. Penn A-4	4.90A	7.43 A	7.68 AB	7.80 A	8.00 A	6.90 ABCD	7.12
2. Southshore	5.23A	7.00 AB	7.40 ABCD	7.35 AB	8.00 A	7.15 AB	7.02
3. Penn G-6	5.33A	6.73 AB	7.75 A	6.98 BC	8.00 A	7.00 ABC	6.97
4. Imperial	5.23A	6.83 AB	7.50 ABC	7.00 ABC	8.00 A	7.08 AB	6.94
5. Penn G-2	5.15A	6.65 AB	7.25 ABCDE	7.08 ABC	8.00 A	7.08 AB	6.87
6. Lofts L-	5.00A	6.40	7.33	7.15 AB	8.00	6.93	6.80

93		B	ABCDE		A	ABCD	
7. Cato	5.15A	6.50 B	7.15 ABCDE	7.08 ABC	7.93 A	7.00 ABC	6.80
8. Penn A-1	5.43A	6.50 B	7.00 ABCDE	6.65 BCD	7.75 A	7.08 AB	6.74
9. Penncross	5.25A	6.48 B	6.75 CDE	6.83 BCD	7.75 A	7.23 A	6.71
10. 18 th Green	4.83AB	7.00 AB	6.83 CDE	6.08 D	7.75 A	6.93 ABCD	6.57
11. Seaside II	5.00A	6.18 BC	6.83 CDE	6.33 CD	7.28 B	6.58 D	6.37
12. Peterson's	4.15 BC	5.35 CDE	6.65 DE	6.33 CD	7.08 B	6.68 CD	6.04
13. 97 Quilt I-15	3.78 C	4.75 DE	6.65 DE	6.93 BC	7.18 B	6.58 D	5.98
14. 97 Quilt I-12	3.65 C	5.50 CD	6.58 E	6.33 CD	7.00 B	6.83 BCD	5.98
15. 97 Quilt I-25	3.73 C	4.50 E	6.90 BCDE	6.33 CD	7.18 B	6.58 D	5.87
LS_{0.05}	0.71	0.88	0.79	0.80	0.39	0.39	

* Values that have the same letter as a suffix are not significant from each other

Conclusions

Eight of the ten bentgrasses tested demonstrated qualities superior or equal to those expressed by the standard entry, Penncross, with Penn A-4 being the best overall cultivar for 2002. The annual bluegrass biotypes tested started slowly in the spring, but significantly improved in quality over the rest of the season. Peterson's Creeping Bluegrass scored the highest for the bluegrass biotypes.

This site will continue to be evaluated in order to assess the performance characteristics of these cultivars and biotypes over time.

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