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A Final Report: The NTEP Putting Green at North Shore Country Club

PHOTOS COURTESY TOM VOIGT

Editor's Note: This is the first part of a two-part article describing the results of the NTEP putting green research at North Shore Country Club in Glenview, IL. Part one, composed by Tom Voigt, outlines the study protocol and outcomes.

Selecting the best turfgrasses for new plantings or for upgrading existing settings is arguably the most important step in the planning-building-planting process. To achieve a desired quality in the finished product, new and improved cultivars are probably the most useful tools available to turf managers. When a grass is well-suited to a particular use, environment or management scheme, it often requires fewer labor and pesticide inputs than stressed types.

The grow-in phase of the NTEP putting green onsite trial at North Shore Country Club took place August through October, 1997. Above and below, scenes from the grow-in.

Identifying turfgrass cultivars and varieties suited to Illinois is one of the objectives of the turf research program at the University of Illinois, and most of these trials are part of the National Turfgrass Evaluation Program (NTEP). In Urbana, NTEP evaluations of fairway- and putting green-height bentgrasses, Kentucky bluegrasses and tall and fine-leaf fescues are currently ongoing in five different evaluations, each having the objective of identifying the best grasses for use in Illinois. Perennial ryegrass NTEP trials are slated for 2004 planting.

1997 Onsite Bentgrass Trial

While we conduct the majority of NTEP trials at U. S. and Canadian university research facilities, two onsite trials have been conducted on golf courses. In one such trial, warm-season turfs were overseeded at several southern U. S. courses to evaluate different overseeding turfs. Of more interest to Chicago superintendents are the 1997 onsite putting green trials cosponsored by NTEP, GCSAA and USGA that entailed plantings at 16 U. S. courses to evaluate cultivars of creeping bentgrass, Bermudagrass or both species. Locally, we conducted this evaluation of 18 creeping bentgrass cultivars at North Shore Country Club in Glenview.

At least two things made this study exciting. First and foremost, unlike our university-sited trials, this study was subjected to traffic and management rigors that actually take place on real golf courses. University scientists, turfgrass breeders and course superintendents all benefited from this real-world opportunity; it was exciting to be involved in a study that joins the forces of all of these turfgrass and golf course professionals. Second, the results of this study provide insights into the performance of 18 creeping bentgrasses in the Chicago area. This information should prove useful during future golf course construction and renovation projects.

Establishing and Evaluating the Onsite Study

On August 18 and 19, 1997, we seeded 18 creeping bentgrass cultivars (Table 1) into 5′ by 10′ plots at a rate of 25 grams per plot (approximately 1.1 pounds per 1,000 feet). Each plot was replicated three times; the seed bed was a 90:10 USGA-approved sand and Dakota reed sedge root zone amended with

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various naturally occurring organic fertilizers. We mixed the seed with green sand to achieve a uniform distribution, then spread it by hand. A lightweight poly-fiber green cover was placed over the plots and irrigation commenced on September 3.

On September 17, 1997, we evaluated the green for percent cover (Table 2). Because germination was slow due to cool temperatures, we implemented two corrective measures. First was the application of Milorganite to the entire study to darken the soil surface in an attempt to warm the root zone. Second was the determination that additional seeding should be done. This took place on September 24, spreading an additional 12 grams (approximately 0.52 pounds per 1,000 feet) of seed per plot combined with Milorganite to achieve uniform seed distribution. Prior to the second seeding, we undertook a second evaluation (Table 2) and the plots were mowed. We conducted a final evaluation on October 22 (Table 2). During the 1997-98 winter, the plots were covered.

Starting in 1998, the putting green was mowed at 1/8″ and fertilized as follows:

- 4 to 6 pounds N/1,000 ft²/year;
- 0.75 to 1.5 pounds P/1,000 ft²/year; and
- 5 to 6 pounds K/1,000 ft²/year.

We irrigated and topdressed the plots as necessary. The application of various organic and inorganic disease controls, soil conditioners and plant-growth regulators also took place (see *http://www.ntep.org*) over the course of the study.

North Shore C.C. assistant superintendent Dan Garling straightens a sign on the NTEP putting green.

Beginning in April 1998, we rated the plots monthly for turfgrass quality using a scale of 1 - 9 where 1 = dead turf, 5 = minimally acceptable turf quality and 9 = perfect turf. These growing-season evaluations continued through October 2002 for a total of 35 ratings over the five-year period. Monthly quality means and overall means appear in Table 3. Table 4 reveals the number of evaluations that each cultivar performance was above the mean for that monthly rating. This number can provide useful insights as far as how one grass compares to others in the study. We are inclined to recommend cultivars that steadily perform above average, rather than pick cultivars that really shine during some months (e.g., cooler spring and autumn months), but perform poorly in other months (e.g., hot summer months). Ball-roll distance measures (Stimpmeter readings) were made on a monthly basis in 1998, but were discontinued thereafter due to small plots with undulating surfaces. The green was open for play in June 1998.

Results of the Study

By October 22, 1997, this study had made a dramatic turnabout; some plots were approaching 100% cover by this date (Table 2). As quality ratings accumulated, several cultivars separated themselves from the rest of the pack, but it is important to

Table 1.
Creeping bentgrass cultivars and suppliers in 1997 NTEP onsite evaluation at North Shore Country Club.

Name	Sponsor	Name	Sponsor
Backspin	Turf Merchants, Inc.	Penn G-1	Tee-2-Green Corp.
Cato	Pickseed West, Inc.	Penn G-6	Tee-2-Green Corp.
Century	Burlingham Seeds, Inc.	Penncross	Standard entry
Crenshaw	Sunbelt Seeds, Inc.	Providence	Seed Research, Inc.
Grand Prix (LCB-103)	LESCO, Inc.	Putter	Jacklin Seed Co.
Imperial	Burlingham Seeds, Inc.	SR 1020	Seed Research, Inc.
L-93.	Loft's Seed, Inc.	SR 1119	Seed Research, Inc.
Penn A-1	Tee-2-Green Corp.	Trueline	Turf Merchants, Inc.
Penn A-4	Tee-2-Green Corp.	Viper	International Seeds, Inc.

remember that based on quality performance (Table 3), ALL of the cultivars had a five-year mean performance greater than 5, the minimally acceptable putting green quality rating. This is testimony to the genetics of the cultivars, as well as to the high-quality care provided by the North Shore Country Club staff.

Five cultivars really stood out in this study. First, all four of the Penn A- and G-series grasses performed in this top group. They were uniquely fine-textured with extremely high density, and at their best, they all produced outstanding putting surfaces. To differentiate between these four grasses, an examination of the data (Tables 3 and 4) reveals that Penn G1 was a slow starter—its performance in April was lower than the other three. Conversely, Penn A4 did not perform as well as the other three grasses in August or September (Table 4) due to brown patch (*Rhizoctonia* spp.) infestations. While none of these grasses was totally free of dollar spot, the infestations were far less severe than in other grasses in this study.

The final member of this top-five group was L-93 creeping bentgrass. L-93, while of higher density and finer texture than older types such as Penncross, was slightly more coarse-textured and less dense than the four Penn A and G types. It nonetheless produced a high-quality putting surface and was generally free of dollar spot. While slow to green in the spring, once L-93 did green up, its genetic color was similar to Penn A4, which was slightly darker green than Penn A1, Penn G1 or Penn G.

Among the other grasses in the study, Crenshaw and Century tended to be more prone to dollar spot infestations than other cultivars examined. Finally, even Penncross creeping bentgrass, while the lowest-rated grass in the study (Table 3) due to its horizontal growth habit and relatively coarse texture, produced putting

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Table 2.
Evaluations in 1997
following seeding of creeping bentgrasses
at North Shore Country Club.[C]

Cultivar	Percent Cover 9/17/97[A]	Seedling Vigor 9/24/97[B]	Percent Cover 10/22/97[A]
L-93	18.3 c-e	5	85
Putter	23.3 e	5.7	78.3
Cato	8.3 ab	4	60
Crenshaw	18.3 c-e	5	78.3
Grand Prix (LCB-103)	8.3 ab	4	65
Penncross	20.0 de	5.3	81.7
Backspin	13.3 a-d	5	71.7
Trueline	15.0 a-e	4.7	73.3
Providence	15.0 a-e	4.3	75
SR 1020	6.7 a	3.7	68.3
SR 1119	6.7 a	3.7	63.3
Viper	8.3 ab	3.7	71.7
Century	11.7 a-d	4.7	71.7
Imperial	18.3 c-e	5	60
Penn A-1	10.0 a-c	4.7	73.3
Penn A-4	11.7 a-d	4.3	68.3
Penn G-6	6.7 a	3.7	66.7
Penn G-1	16.7 b-e	4.7	71.7
LSD 0.05	**8.5**	**NS**	**NS**

[A] *Percent cover is represented as mean of the three replications and is a visual estimate of the percent of the plot covered by living seedlings.*

[B] *Seedling vigor is represented as mean of the three replications and is also a visual estimate of the percent of the plot covered by living seedlings combined with plant height representing the relative speed to a mature sod. It is based on a scale of 1 - 9 where 1 = completely open ground and 9 = maximum plot coverage*

[C] *Results followed by different letters are statistically different at the 0.05 level.*

green turf that would have been acceptable in many other locations.

Based on this trial, we can recommend Penn A1, Penn A4, Penn G1, Penn G6 and L-93 for planting on USGA putting greens in the Chicago area. Before planting these grasses, however, check with other Chicago-area superintendents that have been managing these grasses at their courses.

The Future of Onsite NTEP Turfgrass Cultivar Evaluations

Turfgrass cultivar evaluations will continue to play a major role in University of Illinois turf research and outreach activities, and there is no doubt about the value of the onsite studies. Obviously, when seeking information about the performance of individual cultivars for a specific envi-

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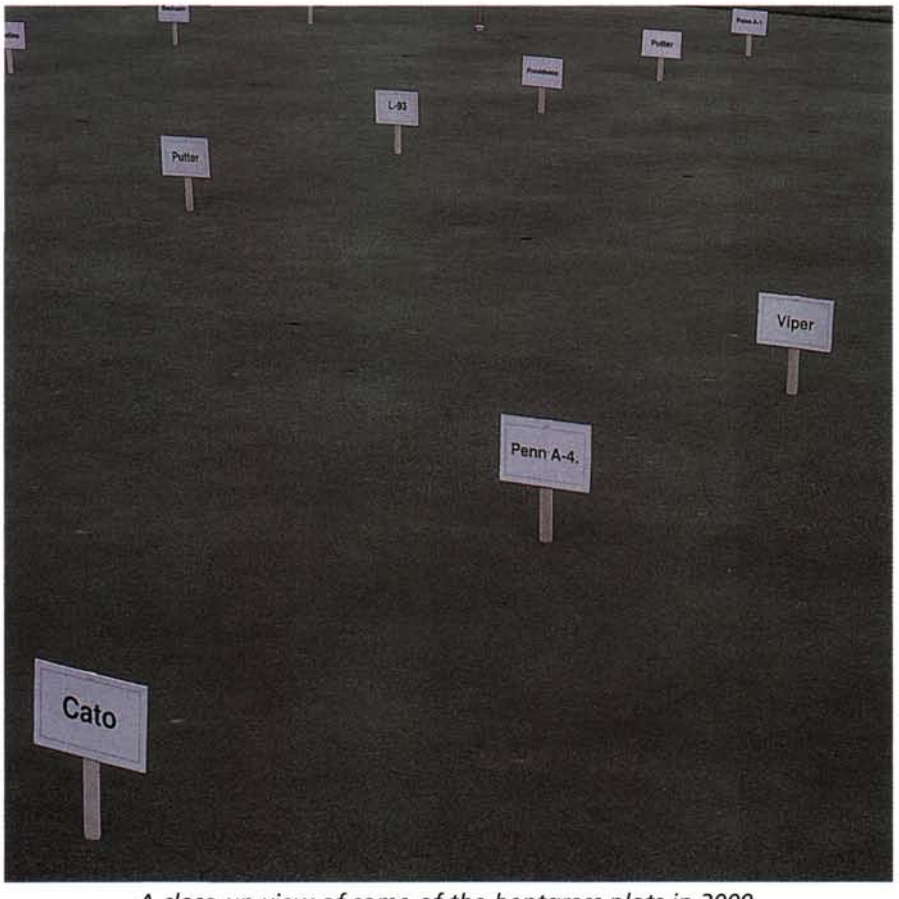
In 2000, North Shore C.C. superintendent Dan Dinelli hosted a regional research meeting at the club, giving attendees a look at the trials in progress.

Table 3.
1998-2002 quality means for NTEP onsite bentgrass trial at North Shore Country Club.[C]

Cultivar	April[D]	May	June	July	August	September	October	Five-Year Mean
Penn A-1	7.5 h	7.7 gh	8.1 h	7.6 g	7.0 e	7.3 c-e	7.9 g	7.6
Penn A-4	7.3 gh	8.0 h	7.9 gh	7.2 e-g	6.8 c-e	7.3 c-e	7.6 e-g	7.4
Penn G-6	7.2 f-h	7.5 f-h	7.7 f-h	7.3 fg	7.1 e	7.6 de	7.7 fg	7.4
Penn G-1	6.7 d-h	7.5 f-h	7.6 e-h	7.0 d-f	6.9 de	7.3 c-e	7.8 fg	7.3
L-93.	6.9 e-h	7.1 e-g	7.4 d-g	6.9 c-f	6.8 c-e	7.7 e	7.6 e-g	7.2
Backspin	6.5 c-g	7.1 e-g	7.0 c-e	6.7 b-e	6.7 b-e	7.0 b-e	7.3 d-g	6.9
Grand Prix (LCB-103)	6.3 b-e	7.3 fg	7.3 c-f	5.6 a	6.7 b-e	6.7 a-c	6.9 cd	6.9
Imperial	6.4 b-f	7.0 d-f	7.3 c-f	6.6 b-d	6.4 a-d	6.8 a-c	7.1 c-e	6.8
Providence	6.7 d-h	6.9 c-f	7.1 c-f	6.5 b-d	6.3 a-c	6.7 a-c	7.3 c-f	6.8
SR 1119	6.3 b-e	7.0 d-f	7.3 c-g	6.5 b-d	6.8 c-e	6.9 b-e	6.9 cd	6.8
SR 1020	6.3 b-e	7.2 e-g	6.9 cd	6.3 bc	6.3 a-c	6.9 a-d	6.9 cd	6.7
Trueline	6.3 b-e	6.5 b-e	6.9 cd	6.5 b-d	6.9 de	6.6 a-c	7.3 d-g	6.7
Putter	6.3 b-e	6.9 c-f	6.7 c	6.8 c-f	6.4 a-d	6.5 ab	6.7 b-d	6.6
Cato	5.7 ab	6.3 bc	6.9 cd	6.4 bc	6.3 a-c	6.9 a-d	7.3 c-f	6.5
Viper	5.7 a-c	6.1 b	6.7 c	6.1 ab	6.4 a-d	6.5 a-c	6.7 a-c	6.3
Century	5.4 a	6.3 b-d	6.9 cd	6.3 bc	6.2 ab	6.3 ab	6.2 ab	6.2
Crenshaw	5.4 a	6.1 b	6.5 b	6.5 b-d	6.4 a-d	6.5 ab	6.2 ab	6.2
Penncross	5.9 a-d	5.3 a	5.9 a	6.9 c-f	6.0 a	6.1 a	6.1 a	5.8
LSD	**0.05**	**0.8**	**0.7**	**0.6**	**0.6**	**0.6**	**0.8**	**0.6**
Monthly Mean	**6.4**	**6.9**	**7.1**	**6.7**	**6.6**	**6.9**	**7.1**	**6.8**

[C] *Monthly means followed by different letters are statistically different at the 0.05 level.*

[D] *Each cultivar monthly value represents the mean of three replications in each of five years. A 1- 9 scale used where 1 = dead turf, 5 = minimally acceptable turf quality and 9 = perfect turf.*



A close-up view of some of the bentgrass plots in 2000.

ronment and management regime, onsite studies can help us identify the best grasses for Illinois. Unfortunately, at present no additional NTEP onsite putting green evaluations are planned. Because of the expense involved in implementing these studies, support from more than one organization (e.g., NTEP, USGA, GCSAA, etc.) is usually required. If you're interested in seeing onsite studies continued, inform the research committees of these, and other appropriate groups, of your desires.

Acknowledgements

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Table 4.
Number of ratings in which cultivar quality mean surpassed the monthly mean.[E]

Cultivar	April	May	June	July	August	September	October	Five-Year Total
Penn A-1	5	5	5	5	4	4	4	32
Penn G-6	4	4	5	4	5	5	4	31
Penn G-1	3	5	5	5	4	4	4	30
L-93.	4	4	4	3	5	5	5	30
Penn A-4	4	5	5	5	3	3	4	29
Backspin	3	3	1	3	3	5	4	22
Grand Prix (LCB-103)	2	5	4	3	3	2	1	20
Imperial	3	3	3	4	2	2	3	20
SR 1119	2	4	4	1	4	3	1	19
Trueline	3	1	2	2	5	1	4	18
Providence	3	4	2	2	1	1	3	16
SR 1020	2	5	2	0	2	2	2	15
Putter	3	3	0	4	2	1	0	13
Century	1	2	1	3	2	1	1	11
Cato	0	1	1	2	1	2	3	10
Crenshaw	0	1	1	2	1	1	1	7
Penncross	1	0	0	1	1	1	0	4
Viper	0	0	1	0	1	1	0	3

[E] *Monthly ratings totaled 35, one each month April through October in each of five years (1998 through 2002). Thus, the highest rating a cultivar could achieve was 5 for any month and a five-year total of 35.*