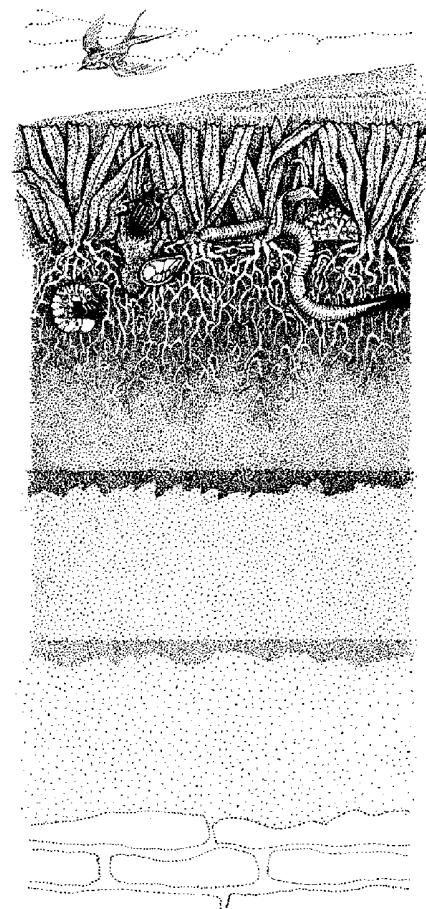


CUTT

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NTEP Evaluation of Bentgrass Cultivars for Greens

In 1923, U.S. Department of Agriculture Agristologist, Dr. Charles Piper, and Agronomist, Dr. Russell Oakley, wrote *Turf for Golf Courses*. In the chapter, “The Important Turf Plants”, they wrote: “Unquestionably the finest commercial grass for putting greens in the North is Creeping Bent.” Back then, Creeping Bent was *Agrostis stolonifera* and the seed came from south Germany (hence the name South German Bent). Several other bentgrasses, such as Rhode Island Bent (*Agrostis vulgaris*), Velvet Bent (*Agrostis canina*) and Redtop (*Agrostis alba*) also were mentioned as grasses used on golf courses. Interestingly, creeping bentgrass became *Agrostis palustris* in the United States and remained *Agrostis stolonifera* in Europe. It is widely thought now that the South German bents were mostly Browntop or Colonial bentgrasses (*Agrostis tenuis*) with small amounts of creeping and velvet. ■

Until the mid 1950s, bentgrasses were established vegetatively from the C-series with varieties such as Cohansey, Washington, Congressional, and the now infamous Toronto. Establishment by seed meant that you planted either South German or Seaside. Then in 1955, Penncross, a seeded bentgrass (the standard by which all future varieties would be measured) was released by Dr. H. Burton Musser of Penn State University. Penncross is quick to establish and recover from injury due in part to its aggressive nature and extensive lateral growth. Penncross seed is produced from the random crossing of three vegetatively propagated strains

in the field. The next 20 years would see the release of very few bentgrass cultivars, and not until 1978 did Dr. Joe Duich, also from Penn State, release the first serious competitor in Penneagle. Penneagle is considered less aggressive and more upright than Penncross. Many of the management standards and equipment in use today were developed to maintain Penncross.

After relying on Penncross for over 40 years there now are approximately 25 commercially available bentgrasses for golf courses. The last several years have brought an explosion of cultivars to meet the increased demand from golf

This Times

1. *NTEP Evaluation of Bentgrass Cultivars for Greens*
2. *Short Cutts*
 - Turfgrass Disease CD-ROM
 - Human Resource Management book
 - New Construction Educator at USGA
 - Turfgrass Information Directory
 - Low Input Lawn Care
3. *Scanning the Journals*
6. *Turfing the Net*
7. *Football Field Maintenance*
12. *Ground Ivy Control*

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Twenty-eight experimental and commercially available bentgrass cultivars were tested on USGA sand based and native silty loam greens.

As the number of available cultivars increases, research will be needed to understand the potential of bentgrass blends to provide a consistent playing surface.

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NTEP Bentgrass Evaluation

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course construction and renovation. The objective of these studies is to evaluate the visual quality of bentgrass cultivars maintained on USGA sand based or native soil rootzones.

Experimental Methods

Twenty-eight experimental and commercially available bentgrass cultivars were seeded at 0.75#/M on May 22, 1994 on 10,000 ft² of green area, divided in half, with 5,000 ft² constructed on a native Batavia silt loam soil with pH 6.8, and 5,000 ft² constructed to meet the 1993 USGA specifications with a calcareous sand pH 7.7. To avoid confusion, the USGA green will be referenced as the sand-based green.

Fertilizer applications are made to supply 2 to 3 lbs. of N/M/year with Greens Grade Lebanon Country Club 18-4-10. Plots are mowed daily with walking greens mowers during the summer and a triplex mower in the spring and fall set at 0.156 in. in April, then raised to 0.187 in. in May, 0.156 in. for June through August, and back to 0.187 in. in September. Irrigation is supplied to maintain adequate moisture in the profile. However, an outbreak of algae on the sand-based green indicated that the greens were overwatered. Significant reductions in irrigation were made starting in July.

An aggressive grooming and topdressing program was initiated in 1995 to adjust surface integrity with an 80% sand-20% peat mix twice per month in spring and fall, and once per month in summer. Core cultivation with 5/8 in. hollow tines was performed in September and plugs harvested. Fungicides are applied on a curative basis only. A slip-wear traffic device fitted with golf spikes imposed golfer traffic that simulated 150 rounds six times per week (900 rounds per week).

Visual quality ratings were recorded monthly during the growing season on a scale of 1 to 9 (1=poor quality, 6=minimum acceptable quality, 9=ideal turf). Disease and other pest incidence ratings are also taken on a scale of 0 to 9 (0=no pest damage evident, 9=severe pest damage).

Results

Turfgrass quality in 1995 was significantly below the quality for 1994. Many plots suffered under intense heat stress, regular topdressing and traffic imposed with the slip-wear traffic simulator. The regular surface disruption resulted in thinning of several cultivars that lead to algae development on the sand-based greens. Regardless of the rootzone, only 50% of the cultivar had acceptable quality ratings in July

and less than 20% were acceptable in August. Most cultivars recovered by September.

The introduction of the Penn series (A-1, A-4, G-2, G-6) seems to have set a new standard for bentgrass green cultivars. Specifically, A-1 and A-4 produce an upright, high shoot density turf that will provide championship conditions. A-1 and A-4 appeared to develop a puffy nature from observations at the various mowing heights during the season.

Several synthetic materials from the Texas A&M program, with exceptional heat tolerance, performed in the top 20% of all cultivars on the sand-based green. Interestingly, most of them did not perform as well as the native soil, possibly because of adequate soil moisture that kept the rootzone cooler than the sand. The experimental cultivar ISI-Ap-89150 performed at the top of the sand-based trial and almost at the bottom on the native soil.

Summary and Conclusions

Bentgrass selection has become more complex with the increased availability of many new cultivars with different growth habits and stress tolerance. Additionally, as evidenced in the 1995 data, many cultivars perform differently depending on the rootzone.

Several cultivars seem to provide consistent quality regardless of environmental conditions, rootzone and pest infestations. Still, experimental materials such as the synthetic cultivars (syn) and the new Penn series could be attractive options, however, time will tell. As the number of available cultivars increases, research will be needed to understand the potential of bentgrass blends to provide a consistent playing surface.

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CORNELL UNIVERSITY TURFGRASS TEAM

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Table 1. Data from the 1993 National Turfgrass Evaluation Program Bentgrass Green Trial on Native Soil Greens.

Cutlivar	Visual Quality							1995 Quality Mean	Pest Damage*	
	Spring Color	May	June	July	August	Sept.	Fall Color		Yellow Tuft	Brown Patch
A-1	6.1	6.6	7.1	6.9	6.3	7.0	7.7	6.8	1.0	0.3
Syn 92-1-93	6.1	6.9	7.4	6.3	5.8	6.5	7.1	6.6	1.7	0.3
Penncross	6.8	6.0	6.5	6.5	6.2	6.9	7.6	6.4	1.0	0.3
18th Green	5.5	6.6	7.2	5.9	5.5	6.2	6.8	6.3	2.2	1.0
Providence	6.8	5.9	6.4	6.5	6.2	6.0	6.7	6.2	2.5	0.7
Cato	6.5	5.9	6.4	6.4	5.8	6.4	7.1	6.2	2.3	1.0
PRO/Cup	6.5	5.9	6.3	6.1	6.0	6.6	7.3	6.2	2.0	0.7
SR 1020	6.1	5.9	6.4	5.9	5.9	6.6	7.2	6.1	1.3	0.3
Syn 92-2-93	6.1	6.1	6.6	6.0	5.6	6.2	6.8	6.1	2.3	0.3
BAR As 493	6.1	6.0	6.5	6.1	5.6	6.2	6.9	6.1	2.3	0.0
Syn 92-5-93	6.5	6.4	6.9	5.8	5.2	5.8	6.4	6.0	2.3	0.0
G-6	6.5	6.3	6.8	5.9	5.3	5.9	6.5	6.0	2.7	1.3
Trueline	6.5	5.4	5.8	6.8	5.7	6.3	6.9	6.0	2.0	0.0
A-4	6.8	5.8	6.3	6.0	5.6	6.2	6.9	6.0	1.7	0.7
G-2	6.5	5.8	6.3	6.3	5.4	6.0	6.7	6.0	2.8	0.7
Southshore	6.8	5.8	6.3	6.1	5.5	6.2	6.8	6.0	2.2	1.5
Regent	6.8	5.8	6.3	5.7	5.6	6.3	6.9	5.9	1.8	0.0
L-93	6.8	5.8	6.3	5.8	5.5	6.2	6.8	5.9	2.7	1.0
Pennlinks	6.8	5.9	6.4	5.6	5.5	6.2	6.8	5.9	1.3	0.0
Syn-1-88	6.5	5.6	6.1	5.8	5.7	6.3	6.9	5.9	2.3	0.7
Seaside	6.8	5.4	5.8	6.1	5.7	6.3	7.0	5.9	1.8	0.5
BAR Ws 42102	5.8	5.8	6.2	5.6	5.5	6.1	6.7	5.8	2.3	0.3
Tendeq	6.1	5.8	6.3	5.7	5.3	5.9	6.5	5.8	3.0	1.0
MSUEB	6.8	5.4	5.8	5.4	5.6	6.2	6.8	5.7	2.2	0.0
Crenshaw	5.8	5.2	5.6	5.7	5.4	6.0	6.6	5.6	3.8	0.7
ISI-Ap-89150	6.8	5.2	5.6	5.5	5.2	5.8	6.4	5.5	2.7	1.0
Lopez	6.8	4.9	5.3	5.8	5.0	5.6	6.1	5.3	2.8	0.3
DG-P	6.1	5.2	5.7	5.0	4.9	5.5	6.0	5.3	3.0	0.0
LSD (0.05)	0.3	0.5	0.4	0.5	0.2	0.5	0.6	0.3	0.4	0.2

* Disease incidence rated on scale of 0 to 9 where: 0=no disease, 3=objectionable amount of injury, 9=severe injury

Table 2. Data from the 1993 National Turfgrass Evaluation Program Bentgrass Green Trial on Sand-based Greens.

Cutlivar	Visual Quality							1995 Quality Mean	Algae*
	Spring Color	May	June	July	August	Sept.	Fall Color		
ISI-Ap-89150	6.5	6.7	7.2	6.3	6.6	7.4	7.3	6.8	1.5
Syn 92-1-93	5.9	7.2	7.7	6.0	5.9	6.7	7.2	6.7	2.7
A-1	5.9	6.7	7.2	6.2	6.3	7.1	7.4	6.7	1.2
Providence	6.5	7.5	6.9	6.4	5.7	6.7	7.4	6.6	4.0
Syn 92-5-93	6.2	7.1	7.6	6.0	5.9	6.6	7.0	6.6	1.3
Syn 92-2-93	5.9	6.9	7.4	5.9	5.9	6.7	6.8	6.6	2.2
Pennlinks	6.5	6.5	7.0	6.1	6.2	7.0	6.2	6.6	0.7
SR 1020	5.9	6.9	7.4	5.8	6.0	6.8	7.3	6.6	0.8
G-6	6.2	6.6	7.1	6.1	6.1	6.9	7.4	6.6	1.5
Penncross	6.5	7.0	7.5	6.0	5.7	6.4	5.9	6.5	2.8
18th Green	5.3	6.4	6.8	6.2	6.1	6.9	6.7	6.5	2.7
Trueline	6.2	6.9	7.4	6.2	5.6	6.3	6.8	6.5	3.2
G-2	6.2	6.6	7.1	6.1	5.9	6.7	7.5	6.5	3.2
BAR As 493	5.9	6.8	7.3	5.8	5.7	6.5	6.5	6.4	3.3
Syn-1-88	6.2	6.6	7.1	6.0	5.9	6.6	6.4	6.4	2.2
Crenshaw	5.6	6.7	7.2	6.0	5.6	6.3	7.0	6.4	2.3
A-4	6.5	6.5	7.0	6.1	5.7	6.4	7.2	6.3	1.8
L-93	6.5	6.7	7.2	5.9	5.6	6.4	7.2	6.3	3.7
Pro/Cup	6.2	6.4	6.9	5.9	5.6	6.4	6.7	6.2	2.0
Southshore	6.5	6.5	7.0	5.9	5.4	6.1	7.2	6.2	2.7
Tendez	5.9	6.6	7.1	5.2	5.5	6.3	5.7	6.1	1.5
Cato	6.2	6.5	7.0	5.5	5.4	6.1	7.1	6.1	3.3
Regent	6.5	6.7	7.2	5.3	5.3	6.0	6.8	6.1	4.5
DG-P	5.9	6.2	6.7	5.3	5.4	6.1	7.0	5.9	4.2
Seaside	6.5	5.9	6.3	5.8	5.4	6.1	5.0	5.9	3.3
MSUEB	6.5	5.9	6.4	5.7	5.4	6.1	6.6	5.9	2.7
BAR Ws 42102	5.6	5.8	6.2	5.5	5.5	6.2	6.9	5.8	3.5
Lopez	6.5	5.7	6.1	5.2	5.2	5.9	6.8	5.6	3.0
LSD (0.05)	0.3	0.5	0.4	0.5	0.2	0.2	0.4	0.3	0.7

* algae rated on scale of 0 to 9 where: 0=no algae, 3=objectionable amount of algae, 9=severe algae