

# Summary of the 2003 NTEP Bentgrass Trial

Doug Karcher<sup>1</sup>, Mike Richardson<sup>1</sup>, Aaron Patton<sup>2</sup>, and Josh Landreth<sup>1</sup>

**Additional index words:** *Agrostis stolonifera*, *Agrostis canina*, turfgrass, cultivars, turf color, density, dollar spot, brown patch, aerification recovery, putting green

Karcher, D., M. Richardson, A. Patton and J. Landreth. 2008. Summary of the 2003 NTEP Bentgrass Trial. Arkansas Turfgrass Report 2007, Ark. Ag. Exp. Stn. Res. Ser. 557:12-16.



Photo by John Kauffman

Bentgrass putting green with early-morning dew

**Summary.** Creeping bentgrass continues to be the prevailing turfgrass species used for golf course putting greens throughout northern and central Arkansas. Identifying cultivars that are well-adapted to the region remains a central focus of the University of Arkansas turfgrass research program. The National Turfgrass Evaluation Program is the predominant means by which cultivars are tested throughout North America. A bentgrass cultivar trial, including selections of creeping and velvet bentgrass was planted in the fall of 2003 at the University of Arkansas Research and Extension Center (Fayetteville, Ark.). The trial was maintained under golf course putting green conditions and data on turfgrass quality, color, density, dollar spot and brown patch inci-

dence, and recovery from core aerification were collected. On average, the velvet bentgrass cultivars were rated low in turf quality due to their lack of heat tolerance. Among the creeping bentgrass entries, the cultivars that consistently had the best turf quality throughout the trial were, 007, Tyee, Shark, Authority, Penn A-1, Declaration, and MacKenzie. There were significant differences among cultivars with regard to turf color, density, dollar spot, brown patch, and recovery from aerification.

**Abbreviations:** NTEP, National Turfgrass Evaluation Program

<sup>1</sup> University of Arkansas, Department of Horticulture, Fayetteville, Ark. 72701

<sup>2</sup> University of Arkansas, Cooperative Extension Service, Department of Horticulture, Fayetteville, Ark. 72701

Creeping bentgrass (*Agrostis stolonifera*) provides the most uniform and fastest surface for golf course putting greens in northern and central Arkansas and in environments throughout the transition zone. Over the past several decades, improvements in density, heat tolerance and disease resistance have made this species ideal for putting greens.

The National Turfgrass Evaluation Program (NTEP) is an organization within the US Department of Agriculture that annually oversees turfgrass cultivar evaluation experiments at various sites throughout the US and Canada. Each turfgrass species is tested on a four to five year cycle at sites throughout the growing region for that particular species. The University of Arkansas has been an active participant in the NTEP and was awarded a site for the 2003 NTEP Bentgrass Trial which included both creeping bentgrass and velvet bentgrass (*Agrostis canina*) cultivars. This report will summarize the data from the past four growing seasons of the 2003 NTEP Bentgrass Trial at Fayetteville, Arkansas.

## Materials and Methods

This cultivar trial was planted in October 2003 at the University of Arkansas Research and Extension Center in Fayetteville on a sand-based rootzone that was constructed according to USGA recommendations. Twenty six cultivars were officially included in the 2003 NTEP Bentgrass Trial and an additional four cultivars were included at the Arkansas site (L-93, Penn A-2, Penn G-2, and SR 1020) due to their common use in this region (Table 1). Each entry was broadcast seeded into four replicate 8 by 8 ft plots at a seeding rate of 0.5 lb / 1000 ft<sup>2</sup>. A 3-ft border of Crenshaw creeping bentgrass, which is particularly susceptible to dollar spot (*Sclerotinia homeocarpa*), was established around the plots to increase dollar spot disease pressure across the experimental area. Plots were maintained under golf course putting green conditions, with a mowing height of 0.125 inch and monthly nitrogen applications of 0.5 lb N / 1000 ft<sup>2</sup> per month of active growth. Irrigation was applied during

establishment as needed to promote germination and thereafter to avoid drought stress.

Cultivars were visually rated for turfgrass quality monthly through the duration of the trial using a 1 to 9 scale, where 9 represents ideal dark green, dense, uniform turf and 1 represents dead turf. Turf density was evaluated up to twice per season on a 1 to 9 scale, where 9 represents ideal density and 1 represents very poor density. Turf color was visually rated one to two times per growing season using a 1 to 9 scale, where 9 represents ideal dark green color and 1 represents yellow/brown color. Two separate outbreaks of dollar spot occurred in June and August 2005 and an outbreak of brown patch (*Rhizoctonia solani*) occurred in July 2006. During each disease outbreak, disease severity was rated on a 1 to 9 scale where 9 represents turf completely infected with disease and 1 represents no disease present. Turf recovery at approximately 2 weeks following core aeration was visually rated in April 2006 and September 2007 on a 1 to 9 scale where 9 represents complete turf recovery and 1 represents no recovery.

## Results and Discussion

*Turf quality.* There were significant differences in turf quality among bentgrass cultivars throughout the four years of the trial (Table 1). On average, turf quality improved among cultivars throughout the trial (average quality was 5.9 in 2004 and 6.3 in 2007) as the turf matured and increased in density. This trend was not present among the velvet bentgrass cultivars. Many of the velvet bentgrass cultivars had peak turf quality in 2004 or 2005 and then declined over the next two growing seasons, most likely due to poor heat tolerance and excessive thatch accumulation. In the final year of the trial, all of the velvet bentgrass cultivars produced an average turf quality rating of below acceptable (6.0).

The seven creeping bentgrass cultivars that averaged the best turf quality in each of the four growing seasons were 007, Tyee, Shark, Authority, Penn A-1, Declaration, and MacKenzie. When averaged over the four growing seasons, CY-2, T-1,

and Benchmark DSR were also among the best cultivars with regard to turf quality. In the final year of the trial, 13-M, Independence, Kingpin, IS-AP 9, and LS-44 were also among those cultivars with the best turf quality. It should be noted that all of the creeping bentgrass cultivars averaged significantly better turf quality than the older industry standard, Penncross.

*Turf density.* There were significant differences in density among bentgrass cultivars in the trial (Table 2). On average, the velvet bentgrass cultivars were significantly more dense than the creeping bentgrasses. Velvet bentgrasses have potential to provide a superior putting surface if they are established in regions with limited heat stress. Among the creeping bentgrass cultivars, Tyee, MacKenzie, and Shark were the most dense and exhibited significantly improved density over the Penn A and G cultivars (Penn A-1, Penn A-2 and Penn G-2), which were previously described as high-density cultivars. All bentgrass cultivars had better density than the standards, Penncross, and Pennlinks II.

*Turf color.* When averaged over the four seasons of the trial, there were significant differences among bentgrass cultivars with regard to turf color (Table 2). It was difficult rating velvet and creeping bentgrass cultivars in the same trial since the velvets had a more brilliant green color (more color saturation), but were not quite as dark as the creeping cultivars. On average, the velvet bentgrasses were rated significantly higher for genetic color than the creeping bentgrass cultivars. Among the creeping bentgrass cultivars, T-1, 007, Authority, IS-AP 9, and Shark were the top-rated group for turf color.

*Dollar spot.* When averaged across both dollar spot outbreaks in June and August of 2006, there were significant differences in disease severity among bentgrass varieties (Table 2). On average, the creeping bentgrasses were more suscepti-

ble to dollar spot than the velvet bentgrasses. The 18 cultivars that ranked highest for dollar spot severity were all creeping bentgrasses. Among the creeping bentgrass cultivars, the most severely infected with dollar spot were, Bengal, SR 1020, T-1, Independence, Tyee, and Penn G-2, whereas the cultivars with the lowest dollar spot severity were Declaration, Memorial, 13-M, Kingpin, Pennlinks II, and Benchmark DSR.

*Brown patch.* There were a few significant differences among bentgrass cultivars in brown patch severity in July 2006 (Table 2). Only the creeping bentgrass cultivars had brown patch symptoms, with Penn A-1, Authority, Penn A-2, Penn G-2, Pennlinks II, T-1, Kingpin, Penncross, IS-AP 9, Tyee, and Declaration having the most severe brown patch.

*Core aeration recovery.* The velvet bentgrass cultivars recovered more slowly from core aeration than the creeping bentgrasses when averaged over the two recovery rating dates in April 2006 and September 2007 (Table 2). The only creeping bentgrass cultivars that were not ranked in the top statistical group for fast recovery were, SR 1020, L-93, Penn A-2, Authority, T-1, and Shark.

## Conclusions

There were significant differences among bentgrass cultivars with regard to overall turf quality, turf color, density, disease severity, and recovery from core aeration. A more detailed report of the Arkansas NTEP bentgrass data, as well as data from several locations throughout the US, may be obtained at the NTEP web site ([www.ntep.org](http://www.ntep.org)). The University of Arkansas was selected as a site for two new NTEP bentgrass trials (putting green and tee/fairway) to be established in the fall of 2008 and will consist of various new and standard cultivars and will be evaluated over the next several years.

**Table 1. Turf quality ratings for creeping and velvet bentgrass cultivars in the 2003 NTEP Bentgrass trial. Cultivars are listed by rank, from best to worst quality, when averaged over the four years of the trial.**

Entry	Species	2004	2005	2006	2007	Average
----- turfgrass quality (1 to 9 scale) -----						
007	Creeping	6.6	6.8	7.2	7.7	7.0
Tyee	Creeping	6.9	6.3	7.5	7.3	7.0
Shark	Creeping	6.8	6.3	7.3	7.4	6.9
CY-2 <sup>z</sup>	Creeping	6.1	6.6	7.3	7.5	6.9
Authority	Creeping	6.6	6.3	7.1	7.2	6.8
Penn A-1	Creeping	6.4	6.4	6.9	7.4	6.8
Declaration	Creeping	6.3	6.7	6.8	7.0	6.7
T-1	Creeping	6.7	5.6	6.9	7.1	6.6
MacKenzie	Creeping	6.2	5.9	7.1	6.9	6.5
Benchmark DSR	Creeping	5.7	6.6	6.8	7.0	6.5
LS-44	Creeping	5.9	6.5	6.8	6.9	6.5
Independence	Creeping	6.4	5.7	6.9	7.0	6.5
IS-AP 9 <sup>z</sup>	Creeping	5.9	6.5	6.6	6.9	6.5
Memorial	Creeping	5.8	6.5	6.6	6.8	6.4
13-M <sup>z</sup>	Creeping	5.5	6.6	6.6	7.0	6.4
Alpha	Creeping	5.9	6.1	6.8	6.6	6.4
Kingpin	Creeping	5.7	6.5	6.3	6.9	6.4
Penn A-2 <sup>y</sup>	Creeping	5.8	6.4	6.4	6.5	6.3
Villa	Velvet	6.8	6.8	5.9	5.5	6.3
Penn G-2 <sup>y</sup>	Creeping	5.6	5.9	6.6	6.4	6.1
Bengal	Creeping	6.2	5.2	6.7	6.3	6.1
L-93 <sup>y</sup>	Creeping	5.5	5.9	6.1	6.5	6.0
Pennlinks II	Creeping	5.3	5.5	5.5	5.7	5.5
Venus	Velvet	5.9	6.0	4.9	5.0	5.5
Legendary	Velvet	5.9	5.8	4.7	4.5	5.2
Greenwich	Velvet	6.0	5.5	4.4	4.9	5.2
SR 1020 <sup>y</sup>	Creeping	5.2	4.7	5.8	5.0	5.2
Vesper	Velvet	5.7	5.7	4.8	4.6	5.2
Penncross	Creeping	4.4	5.1	4.7	5.0	4.8
SR 7200	Velvet	5.6	5.4	3.7	3.6	4.6
LSD <sub>(0.05)</sub>		0.75	0.96	0.96	0.83	0.53

<sup>z</sup> Entry is experimental and at this time not commercially available.

<sup>y</sup> Not an official entry of the 2003 NTEP bentgrass trial and was included as an Arkansas standard.

**Table 2. Turf density, color, dollar spot, brown patch, and aerification recovery ratings for creeping and velvet bentgrass cultivars in the 2003 NTEP Bentgrass trial. Cultivars are listed alphabetically within species.**

Entry	Species	Density	Color	Dollar spot	Brown patch	Aerification recovery
----- rating value (1 to 9 scale) -----						
007	Creeping	7.3	6.6	2.8	1.3	6.2
13-M <sup>z</sup>	Creeping	7.0	5.8	1.8	1.0	6.3
Alpha	Creeping	6.9	6.0	4.5	1.3	6.8
Authority	Creeping	7.5	6.4	2.9	3.3	5.8
Benchmark DSR	Creeping	7.1	6.2	2.3	2.0	6.7
Bengal	Creeping	7.0	6.0	5.8	2.0	6.3
CY-2 <sup>z</sup>	Creeping	7.4	6.1	2.8	2.0	6.8
Declaration	Creeping	7.1	6.2	1.3	2.3	6.8
Independence	Creeping	7.2	6.3	5.3	2.0	7.0
IS-AP 9 <sup>z</sup>	Creeping	7.3	6.4	2.7	2.7	6.2
Kingpin	Creeping	6.7	6.3	2.0	2.7	6.8
L-93 <sup>y</sup>	Creeping	6.3	5.7	3.7	1.7	5.8
LS-44	Creeping	7.0	6.3	3.1	1.3	6.2
Mackenzie	Creeping	7.8	6.1	4.0	1.0	6.8
Memorial	Creeping	6.8	5.5	1.5	1.3	6.3
Penn A-1	Creeping	7.2	6.6	3.3	4.3	6.3
Penn A-2 <sup>y</sup>	Creeping	6.5	6.2	3.3	3.3	5.8
Penn G-2 <sup>y</sup>	Creeping	6.5	5.6	4.8	3.0	6.2
Penncross	Creeping	4.8	5.0	2.8	2.7	6.7
Pennlinks II	Creeping	5.3	5.6	2.0	3.0	6.7
Shark	Creeping	7.7	6.4	4.3	1.7	6.0
SR 1020 <sup>y</sup>	Creeping	6.1	6.1	5.8	1.7	5.5
T-1	Creeping	7.4	6.9	5.3	2.7	6.0
Tyee	Creeping	8.1	6.4	4.8	2.3	6.3
Greenwich	Velvet	8.4	6.7	2.5	1.0	4.3
Legendary	Velvet	8.5	6.5	1.8	1.0	3.8
SR 7200	Velvet	7.9	7.1	2.3	1.0	4.0
Venus	Velvet	8.7	6.8	1.8	1.0	4.5
Vesper	Velvet	8.5	7.3	2.2	1.0	4.2
Villa	Velvet	8.9	6.7	2.0	1.0	4.5
LSD <sub>(<math>\alpha = 0.05</math>)</sub>		0.52	0.49	1.15	2.24	0.87

<sup>z</sup> Entry is experimental and at this time not commercially available.

<sup>y</sup> Not an official entry of the 2003 NTEP bentgrass trial and was included as an Arkansas standard.