

Summary of the 2008 NTEP Bentgrass Putting Green Trial-Establishment

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Additional index words: *Agrostis stolonifera*, *Agrostis canina*, creeping bentgrass, velvet bentgrass, turfgrass, cultivars, putting green, digital image analysis.

Summerford, J., D. Karcher, M. Richardson, and A. Patton 2009. Summary of the 2008 NTEP bentgrass putting green trial-establishment. Arkansas Turfgrass Report 2008, Ark. Ag. Exp. Stn. Res. Ser. 568:132-136.



Photo by Josh Summerford

Establishment of the 2008 NTEP bentgrass putting green trial

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 2008 at the Arkansas Agricultural Research and Extension Center in Fayetteville, Ark. The trial was maintained

at a mowing height of 0.200" and an application rate of 0.5 lb N/1000 ft² per growing month during establishment. Data on turfgrass establishment, including visual estimates of germination vigor and digital image analysis measurements of green coverage, were collected. On average, the creeping bentgrass cultivars had higher green turf coverage compared to the velvet bentgrass cultivars. There were significant differences among cultivars with regard to establishment vigor.

Abbreviations: NTEP, National Turfgrass Evaluation Program

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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 and Northern United States. 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 U.S. Department of Agriculture that annually oversees turfgrass cultivar evaluation experiments at various sites throughout the U.S. 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 2008 NTEP Bentgrass Putting Green Trial, which included both creeping bentgrass and velvet bentgrass (*Agrostis canina*) cultivars. When seeding a new putting green, rapid establishment is important because golf facility revenue is dependent on the playability of the putting greens. Rapid establishment also reduces weed pressure over time resulting in a more uniform surface. The objective of this study is to evaluate the establishment rate of all species and cultivars included in the 2008 NTEP Bentgrass Trial at Fayetteville, Ark.

Materials and Methods

This cultivar trial was planted on 30 September 2008 at the Arkansas Agricultural Research and Extension Center in Fayetteville on a sand-based rootzone that was constructed according to USGA recommendations. Nineteen cultivars were officially included in the 2008 NTEP Bentgrass Putting Green Trial (Table 1) and an additional eleven cultivars were included at the Arkansas site (Crystal Bluelinks, CY-2, MacKenzie, Crenshaw, Penn A-4, Penn G-1, Penn G-2, Penn G-6, Shark, SR 1020, and Tyee) due to either their common use in this region or superior performance in a previous cultivar trial. Each entry was broadcast seeded into four replicate 6 by 6 ft plots at a seeding rate of 1.1 lb/1000 ft².

Milorganite fertilizer (6-2-0) was applied with the seed at a rate of 1 lb N/1000 ft² to provide adequate nutrition for germination. Following seeding, each plot was individually raked to ensure even distribution of the seed as well as to increase seed-to-sand contact. Irrigation was applied five times daily, in the absence of rainfall, to ensure adequate moisture for germination, and as needed to avoid drought stress following germination. Plots were maintained at a mowing height of 0.200 inch, beginning at eight weeks after planting, and nitrogen was applied at 0.5 lb N/1000 ft² per month of active growth.

Plots were visually rated for seedling vigor on a 1 to 9 scale (1 = no germination, 9 = excellent germination) on 17 October 2008 (approximately 3 wks after seeding). Cultivars were evaluated weekly using digital image analysis to determine percent turfgrass coverage. Two digital images were taken per plot using a light box to ensure uniform lighting conditions throughout all evaluations.

Results and Discussion

Establishment vigor. There were significant differences in establishment vigor among bentgrass cultivars on the 17 October 2008 evaluation date (Table 1). Thirteen bentgrass cultivars ranked in the top statistical group for establishment vigor, including twelve creeping bentgrass cultivars and one velvet bentgrass cultivar. The twelve creeping bentgrass cultivars were LTP-FEC, CY-2, Crystal Bluelinks, Shark, Alpha, Declaration, Penn A-4, Penn G-1, Penncross, T-1, MacKenzie, and Penn A-1. The velvet bentgrass cultivar that also ranked in the top group was Villa; however Villa did not have significantly higher establishment vigor than the other velvet bentgrass, SR7200, in this trial. Four creeping bentgrass cultivars were in the lowest ranking group for establishment vigor, including HTM, L-93, V8, and Penn A-2.

Green turfgrass coverage. There were significant differences in green turfgrass coverage among bentgrass cultivars for the 10 November 2008 evaluation date (Table 2). This

evaluation date was 6 weeks after planting, and up to this point there was little variation in green turfgrass coverage among cultivars in the trial. On the 10 November evaluation date, only the top four cultivars (Penn G-2, MVS-AP-101, Penn G-1, and Penn G-6) were significantly different from the bottom four (T-1, Tyee, Villa, and SR7200). As a species, the creeping bentgrass cultivars had a higher average, 71.7% coverage, compared to the velvet cultivars, 59.0% coverage, which ranked as the bottom two cultivars for percent coverage on this date. Establishment will continue to be monitored throughout the winter and spring until complete turfgrass coverage is obtained.

Overall, establishment vigor had little bearing on the green turfgrass coverage as the study progressed. There was also little difference among creeping bentgrass cultivars with regard to establishment, indicating that most cultivars in this trial establish at similar rates and therefore other characteristics are more important to cultivar selection than establishment rate. Turfgrass coverage was affected by unseasonably cold temperatures in November and December (Richardson and Stiegler, 2009), resulting in delayed establishment rates toward the end of this evaluation period. Data on turf quality, cover, color, abiotic stress tolerance, and biotic pest resistance will be collected from 2009–2012 for this study and reported in future issues of the Arkansas Turfgrass Report.

Table 1. Turf establishment vigor ratings for creeping and velvet bentgrass cultivars in the 2008 NTEP Bentgrass putting green trial. Cultivars are listed by rank, from best to worst establishment vigor, for the 17 October 2008 evaluation date.

| Entry | Species | Establishment vigor |
|--------------------------------|----------|---------------------|
| | | 17 Oct. |
| | | ----- 1-9 ----- |
| LTP-FEC ^z | Creeping | 7.7 |
| CY-2 ^y | Creeping | 7.0 |
| Crystal Bluelinks ^y | Creeping | 7.0 |
| Shark ^y | Creeping | 7.0 |
| Alpha | Creeping | 6.7 |
| Declaration | Creeping | 6.7 |
| Penn A-4 ^y | Creeping | 6.7 |
| Penn G-1 ^y | Creeping | 6.7 |
| Penncross | Creeping | 6.7 |
| T-1 | Creeping | 6.7 |
| MacKenzie ^y | Creeping | 6.3 |
| Penn A-1 | Creeping | 6.3 |
| Villa | Velvet | 6.3 |
| MVS-AP-101 ^z | Creeping | 6.0 |
| Penn G-2 ^y | Creeping | 6.0 |
| Penn G-6 ^y | Creeping | 6.0 |
| SRP-1BLTR3 ^z | Creeping | 6.0 |
| SRP-1GMC ^z | Creeping | 6.0 |
| Tyee ^y | Creeping | 6.0 |
| A08-TDN2 ^z | Creeping | 5.7 |
| Authority | Creeping | 5.3 |
| SR 1020 ^y | Creeping | 5.3 |
| SR 7200 | Velvet | 5.3 |
| AFM | Creeping | 5.0 |
| PST-OJO ^z | Creeping | 5.0 |
| HTM | Creeping | 4.7 |
| L-93 | Creeping | 4.7 |
| V8 | Creeping | 4.7 |
| Penn A-2 | Creeping | 3.3 |
| <i>LSD</i> _(0.05) | | 1.5 |

^y Not an official entry of the 2008 NTEP bentgrass trial and was included as an Arkansas standard.

^z Entry is experimental and at this time not commercially available.

Table 2. Green turfgrass coverage ratings for creeping and velvet bentgrass cultivars in the 2008 NTEP Bentgrass putting green trial. Cultivars are listed by rank, from highest to lowest percent coverage, for the average green turfgrass coverage.

| Entry | Species | Green turfgrass coverage | | | | | | Average |
|--------------------------------|----------|--------------------------|-------|--------|--------|--------|-------|---------|
| | | 27-Oct | 3-Nov | 10-Nov | 17-Nov | 24-Nov | 2-Dec | |
| | | ------(%)----- | | | | | | |
| Penn G-2 ^y | Creeping | 25.7 | 67.5 | 83.4 | 88.4 | 90.5 | 87.9 | 73.9 |
| MVS-AP-101 ^z | Creeping | 25.4 | 68.9 | 82.9 | 86.5 | 80.3 | 82.9 | 71.2 |
| CY-2 ^y | Creeping | 20.8 | 68.2 | 77.7 | 86.1 | 83.2 | 85.2 | 70.2 |
| Penn G-1 ^y | Creeping | 26.9 | 64.7 | 81.8 | 86.3 | 76.9 | 82.9 | 69.9 |
| Penn G-6 ^y | Creeping | 23.4 | 59.7 | 81.0 | 80.5 | 85.9 | 84.9 | 69.2 |
| Penn A-4 ^y | Creeping | 32.0 | 58.4 | 76.4 | 82.1 | 85.7 | 77.9 | 68.8 |
| Crystal Bluelinks ^y | Creeping | 20.4 | 59.4 | 74.5 | 81.8 | 84.7 | 79.3 | 66.7 |
| Authority | Creeping | 15.2 | 63.2 | 75.6 | 80.7 | 83.0 | 80.6 | 66.4 |
| A08-TDN2 ^z | Creeping | 22.8 | 58.1 | 74.1 | 79.4 | 80.9 | 79.0 | 65.7 |
| LTP-FEC ^z | Creeping | 28.9 | 57.2 | 73.6 | 76.7 | 81.1 | 76.6 | 65.7 |
| Penncross | Creeping | 17.7 | 63.0 | 74.4 | 77.2 | 76.8 | 78.3 | 64.6 |
| Alpha | Creeping | 27.4 | 57.1 | 74.6 | 76.6 | 76.4 | 75.3 | 64.6 |
| Penn A-2 | Creeping | 19.9 | 57.6 | 72.3 | 77.3 | 82.7 | 76.9 | 64.4 |
| SRP-1BLTR3 ^z | Creeping | 25.7 | 58.2 | 71.8 | 80.3 | 76.2 | 73.8 | 64.3 |
| Declaration | Creeping | 21.2 | 58.5 | 72.5 | 76.9 | 80.4 | 76.5 | 64.3 |
| SR 1020 ^y | Creeping | 25.1 | 55.9 | 67.8 | 77.3 | 72.8 | 71.5 | 61.7 |
| V8 | Creeping | 33.9 | 53.6 | 66.0 | 76.4 | 69.7 | 70.7 | 61.7 |
| AFM | Creeping | 38.1 | 50.3 | 65.0 | 70.9 | 73.5 | 70.2 | 61.3 |
| T-1 | Creeping | 37.1 | 52.0 | 64.4 | 73.0 | 70.3 | 70.7 | 61.2 |
| HTM | Creeping | 30.5 | 53.5 | 64.7 | 73.9 | 73.7 | 70.3 | 61.1 |
| Mackenzie ^y | Creeping | 27.1 | 51.8 | 65.5 | 74.3 | 75.9 | 71.6 | 61.0 |
| L-93 | Creeping | 26.8 | 51.9 | 64.9 | 73.3 | 75.9 | 73.1 | 61.0 |
| PST-OJO ^z | Creeping | 24.6 | 52.7 | 68.6 | 75.0 | 73.4 | 71.6 | 61.0 |
| Penn A-1 | Creeping | 18.1 | 57.1 | 68.2 | 76.3 | 73.6 | 71.7 | 60.8 |
| Tyee ^y | Creeping | 35.2 | 47.4 | 63.3 | 75.1 | 70.3 | 68.4 | 60.0 |
| SRP-1GMC ^z | Creeping | 22.5 | 49.8 | 65.6 | 72.4 | 77.1 | 71.8 | 59.9 |
| Shark ^y | Creeping | 32.1 | 48.0 | 65.9 | 71.4 | 64.2 | 69.4 | 58.5 |
| Villa | Velvet | 19.4 | 51.9 | 61.4 | 69.3 | 68.6 | 67.3 | 56.3 |
| SR 7200 | Velvet | 33.0 | 47.3 | 56.5 | 62.6 | 62.1 | 63.0 | 54.1 |
| <i>LSD</i> _(0.05) | | NS | NS | 16.5 | NS | NS | NS | NS |

^y Not an official entry of the 2008 NTEP bentgrass trial and was included as an Arkansas standard.

^z Entry is experimental and at this time not commercially available.