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Performance of Bentgrass Cultivars and Selection Under Putting Green and Fairway Conditions in Michigan

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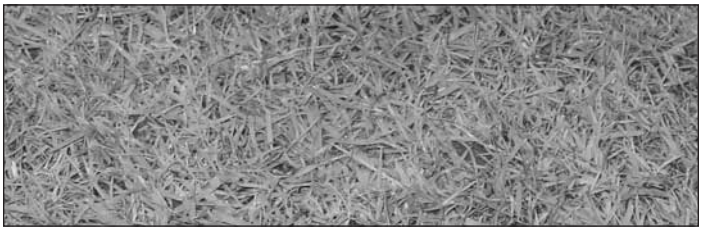
Michigan State University participates in the National Turfgrass Evaluation Program (NTEP). The NTEP is a self-supporting, non-profit organization sponsored by the U.S. Department of Agriculture (USDA) in Beltsville, Md. The program was designed to develop and coordinate uniform evaluation trials over the years for all turfgrass species in the United States. The collected data for each year are statistically analyzed and published in progress reports and on the Internet. This information can be used to determine if a cultivar is well suited and adapted to local areas or various management practices.



Bentgrass species are native to western Europe. Bentgrass is the most widely used cool-season grass for golf courses, putting greens, tees and closely mowed fairways in the United States. The genus *Agrostis* is made up of more than 200 species. Six species are used as turfgrass:

Creeping bentgrass, a fine-textured, stoloniferous species, is best known for its tolerance of low mowing heights. It is often maintained as low as 0.1 inch.

Creeping bentgrass also provides an excellent turf for golf course fairways and tees when mowed between 0.1 and 0.5 inch. Its use on fairways has increased rapidly in recent years. It is used in the cool, temperate and warm, humid environments of the United States.

Colonial bentgrass or brown top, a fine-textured, bright green, bunch-type grass, has very high shoot density. It is a weak spreading bentgrass (short stolons and rhizomes) with better resistance to dollar spot disease than creeping bentgrass. It is very susceptible to brown patch disease. In northern Europe and New Zealand, it has been used as a lawn grass. It is better adapted to mowing heights of 0.4 to 0.75 inch and, thus, is better adapted to golf course fairways and tees than greens. The grass is used for turf in some northeastern and northwestern states.

Dry-land bentgrass is tufted and similar in adaptation and appearance to colonial bentgrass except that it has a blue- to gray-green color. It has a short rhizome and forms a dense, uniform turf at mowing heights of 0.5 to 1 inch. It is very heat and drought tolerant.

Velvet bentgrass is the finest textured of the bentgrasses and the most beautiful of all turfgrasses. It is primarily used on putting greens. It can tolerate very close mowing, cold and shade. Velvet bentgrass can be used on fairways if the fertility level is kept low; with a high N level, it forms excessive thatch.

Idaho bentgrass is a bunch-type grass with no rhizomes or stolons. Native to the western United States, it has a dull green color. It is being promoted for overseeding dormant Bermuda grass golf greens.

Red top is coarse textured and grayish green with rhizomes and no stolons. It was used as a nursery grass for establishment of Kentucky bluegrass, but because of its poor appearance and persistence, this practice is discouraged.

Material and Methods: The NTEP bentgrass test for putting greens and fairways was established in September 1997 at the Hancock Turfgrass Center at Michigan State University. The list included 28 commercial cultivars and selected experimental lines (Table 1). The trial seeded on modified soil meeting U. S. Golf Association green specifications was mowed six days a week at a height of 0.160 inch. The entire test site received full sunlight. Three replication plots of each entry were used in this test, and plots were arranged in a randomized complete block design. The test received between 3 and 4 pounds of nitrogen per 1,000 square feet each year split into three to four applications. The tests were core aerified in the fall of each year and irrigated frequently during the summer.

Bentgrass quality evaluation: Bentgrass quality is rated from 9 (outstanding or ideal) to 1 (poorest or dead). A rating of 6 or above is generally considered acceptable. Quality rating is based on a combination of color, density, uniformity and texture.

Disease evaluation: Disease evaluation is based on bentgrass cultivar or experimental line resistance, using the 1 to 9 rating scale with 1 = no resistance (susceptible) or 100 percent damage by disease, and 9 = complete resistance or no damage.

Results: The performance of many newer creeping bentgrass cultivars is better than that of the older cultivars. Among the creeping bentgrasses, there was a range in turfgrass quality and susceptibility to dollar spot, brown patch and snow mold diseases. This variability in turfgrass quality and disease resistance indicates that the potential exists to develop good bentgrass quality with disease-resistant cultivars through breeding and selection.

The bentgrass cultivars with the highest average turfgrass quality (Table 1) for four consecutive years were L-93, A-1, A-2, A-4, PST-A2E and Vesper (velvet bentgrass). Other cultivars showing high turfgrass quality were G-1, ABT-CRB-1, SYN96-3, SRX 1NJH, CIS AP-5, G-6, Bengal, Imperial and SR 7200. Entries that ranked lowest in turfgrass quality Pennlinks, Bavaria, Pencross, Backspin and Crenshaw (Table 1).

Among the creeping bentgrasses evaluated, ABT-CRB-1, G-6, Brighton, SYN 96-3, SYN 96-2 and SRX 1NJH showed good resistance to dollar spot disease in this trial (Table 2). Others — such as Providence, SR 7200 and Bavaria (both are velvet bentgrass), Backspin and Crenshaw — were extremely susceptible (Table 2). In general, the Michigan trial of velvet bentgrass shows high susceptibility to dollar spot disease, but the Wisconsin trial showed high resistance to the same disease.

Crenshaw, Backspin and Century were highly susceptible to brown patch disease; L-93, A-1, A-2, SRX 1NJH and G-1 were generally more resistant in both Michigan and Kansas state trials (Table 2).

The entries that were most severely damaged by snow mold disease were CIS AP-5, PST-A2E, Vesper, SR 7200, Century, Backspin, Brighton and SR 1119. A-1, A-2, A-4, G-1, SYN 96-1 and Imperial showed the least damage in both Michigan and Utah state trials (Table 2).

Among the creeping bentgrass cultivars evaluated for fairway trial, L-93, SR 1119, Trueline and PST-OVN showed good turfgrass quality. Colonial bentgrass cultivars performed poorly in the same trial (Table 3).

Table 1: Turfgrass quality of creeping and velvet bentgrass cultivars and selected lines (1999-2002) in putting green conditions trial seeded in September 1997 in East Lansing, Mich.

Entry	Type	- - - - - - - - - - Quality - - - - - - - - - -				Average quality
		1999	2000	2001	2002	1999-2002
L-93	creeping	6.1	7.1	7.4	6.5	6.8
PENN A-1	creeping	6.4	7.3	7.2	6.3	6.8
PENN A-2	creeping	6.3	7.3	7.1	6.2	6.7
PENN A-4	creeping	6.6	7.0	6.9	6.1	6.6
SRX 1NJH	creeping	5.7	6.7	7.0	6.1	6.4
PENN G-1	creeping	6.0	7.0	7.1	6.0	6.5
ABT-CRB-1	creeping	6.3	7.0	6.9	5.8	6.5
ISI AP-5	creeping	6.3	6.5	6.9	5.8	6.4
PENN G-6	creeping	6.0	6.8	7.1	5.8	6.4
PST-A2E	creeping	6.6	7.1	7.1	5.8	6.6
VESPER (PICK MVP)	velvet	6.9	7.5	6.1	5.8	6.6
BENGAL (BAR AS 8FIS2)	creeping	6.5	6.7	6.9	5.7	6.4
BRIGHTON (SRX 1120)	creeping	5.7	6.7	7.1	5.7	6.3
PICK CB 13-94	creeping	5.3	6.4	7.2	5.7	6.1
SR 1119	creeping	6.2	6.5	7.0	5.7	6.3
SYN 96-1	creeping	6.2	6.8	6.9	5.7	6.4
SYN 96-2	creeping	6.4	6.3	7.3	5.7	6.4
SYN 96-3	creeping	6.4	6.8	7.2	5.7	6.5
BAR CB 8US3	creeping	6.5	6.1	7.1	5.6	6.3
IMPERIAL	creeping	6.1	6.6	7.2	5.6	6.4
SRX 1BPAA	creeping	6.1	6.7	7.0	5.6	6.3
PENNLINKS	creeping	5.0	6.3	7.0	5.5	5.9
PROVIDENCE	creeping	5.7	6.2	7.0	5.5	6.1
SR 7200	velvet	6.8	6.8	6.5	5.5	6.4
BAVARIA	velvet	5.5	5.8	6.9	5.4	5.9
CENTURY	creeping	6.2	6.2	7.2	5.4	6.2
PENCROSS	creeping	5.1	6.3	6.8	5.4	5.9
BACKSPIN	creeping	5.9	6.0	6.6	5.3	5.9
CRENSHAW	creeping	5.9	5.7	6.9	5.2	5.9
LSD[2]		0.5	0.4	0.7	0.3	0.5

[1]9=best turf quality

[2]LSD, least significant differences: Subtract one entry's mean from another entry's mean. If this value is larger than the corresponding LSD value, then it is statistically different. (For example, for 1999 results, L-93 was significantly different from PST-AZE, Vesper, Pennlinks, etc.)

Table 2: Turfgrass disease of creeping and velvet bentgrass cultivars and selected lines (1999-2002) in putting green conditions trial seeded in September 1997 in East Lansing, Mich.

		Turfgrass quality[1] ratings					
		Dollar spot[5]		Brown patch[6]		Snow mold[7]	
Entry	Types	MI[1]	WI[2]	MI[1]	KS[3]	MI[1]	UT[4]
L-93	creeping	5.1	7.1	7.3	8.0	5.0	5.7
PENN A-1	creeping	4.8	6.9	7.0	8.0	6.3	8.7
PENN A-2	creeping	5.5	7.1	7.3	7.3	6.0	7.7
PENN A-4	creeping	4.8	5.1	6.2	8.0	6.0	7.0
SRX 1NJH	creeping	6.1	6.0	7.0	7.0	5.3	6.3
PENN G-1	creeping	4.8	5.9	6.8	7.7	5.0	6.0
ABT-CRB-1	creeping	6.8	5.8	6.0	6.7	6.0	6.0
ISI AP-5	creeping	3.8	6.2	5.5	8.0	4.0	6.7
PENN G-6	creeping	6.5	6.1	7.0	7.3	4.7	7.0
PST-A2E	creeping	4.3	7.2	6.3	8.0	4.0	7.3
VESPER (PICK MVP)	velvet	4.5	7.3	6.6	8.0	3.7	5.0
BENGAL (BAR AS 8FIS2)	creeping	4.5	7.0	7.0	7.0	5.7	5.0
BRIGHTON (SRX 1120)	creeping	6.3	6.2	6.3	8.0	4.3	6.7
PICK CB 13-94	creeping	5.7	6.7	6.8	7.3	4.7	7.7
SR 1119	creeping	5.3	6.6	6.0	6.7	4.3	5.7
SYN 96-1	creeping	5.8	5.2	6.0	7.7	6.0	7.0
SYN 96-2	creeping	6.2	4.0	5.8	8.0	5.7	6.3
SYN 96-3	creeping	6.3	5.7	6.1	8.3	5.0	7.0
BAR CB 8US3	creeping	3.5	5.4	5.1	7.0	5.0	6.7
IMPERIAL	creeping	4.0	5.7	6.3	5.7	6.0	7.0
SRX 1BPAA	creeping	5.3	6.3	5.5	7.0	6.0	6.0
PENNLINKS	creeping	6.0	7.3	6.8	7.7	5.3	6.7
PROVIDENCE	creeping	3.3	5.1	5.1	8.0	4.7	7.3
SR 7200	velvet	4.0	8.2	5.8	8.7	3.7	3.3
BAVARIA	velvet	4.1	8.2	5.5	7.3	6.0	4.3
CENTURY	creeping	5.0	4.6	4.6	7.3	4.0	6.7
PENCROSS	creeping	5.1	6.8	6.5	8.3	5.3	4.0
BACKSPIN	creeping	4.0	4.9	4.6	8.0	.0	6.3
CRENSHAW	creeping	4.1	3.8	4.3	7.7	4.7	4.7
LSD[8]		2.1	1.3	1.8	1.6	3.3	3.7

[1]Michigan average, 1999-2002 rating trial at Michigan State University.

[2]2000 rating trial at the University of Wisconsin, Madison.

[3]1999 rating trial at the University of Kansas.

[4]2001 rating trial at Utah State University.

[5]9=least dollar spot disease.

[6]9=least brown patch disease.

[7]9=least snow mold disease.

[8]LSD, least significant differences: Subtract one entry's mean from another entry's mean. If this value is larger than the corresponding LSD value, then the statistical difference occurs. (See Table 1 footnote).

Table 3: Turfgrass quality of creeping and colonial bentgrass cultivars and selected lines (1999-2002) in fairway conditions trial seeded in September 1997 in East Lansing, Mich.

		Turfgrass quality[1] ratings				
Entry	**Type**	**1999**	**2000**	**2001**	**2002**	**Average, 1999-2002**
SRX 1BPAA	creeping	6.1	4.3	7.4	5.7	5.9
L-93	creeping	6.8	7.1	7.3	5.5	6.7
SR 7100	colonial	5.5	6.3	7.2	5.5	6.1
CENTURY	creeping	6.4	6.5	7.0	5.4	6.3
PUTTER	creeping	6.7	6.6	7.0	5.4	6.4
GRAND PRIX	creeping	6.7	6.6	7.1	5.4	6.4
IMPERIAL	creeping	6.6	6.5	7.2	5.4	6.4
SR 1119	creeping	6.6	6.5	7.4	5.4	6.5
TRUELINE	creeping	6.6	6.5	7.4	5.4	6.5
BRIGHTON (SRX 1120)	creeping	6.4	6.7	7.2	5.3	6.4
RADIANCE GLORY (PST-9HG)	colonial	5.6	6.3	7.0	5.3	6.0
PENN G-6	creeping	6.1	6.7	7.4	5.3	6.4
PENCROSS	creeping	6.3	6.5	7.5	5.3	6.4
PENNEAGLE	creeping	5.8	6.6	7.4	5.3	6.3
PST-9PM	colonial	6.0	6.5	7.2	5.3	6.2
SEASIDE	creeping	4.9	6.1	7.2	5.3	5.9
SRX 7MODD	colonial	5.8	6.4	7.1	5.3	6.1
BACKSPIN	creeping	6.4	6.4	6.9	5.2	6.2
GOLFSTAR	idaho	5.2	6.2	7.2	5.2	5.9
PRINCEVILLE	creeping	6.2	6.7	7.4	5.2	6.4
PST-OVN	creeping	6.9	7.2	7.2	5.2	6.6
SEASIDE II	creeping	6.6	6.7	7.2	5.2	6.4
SRX 7MOBB	colonial	6.2	6.3	7.3	5.2	6.2
TIGER	creeping	5.5	6.3	7.5	5.2	6.1
TIGER II (CIS AT-5)	colonial	5.9	6.6	7.3	5.2	6.2
ABT-COL-2	colonial	6.0	6.6	7.4	5.1	6.3
PROVIDENCE	creeping	6.4	6.5	7.5	5.1	6.4
LSD[2]		1.2	0.4	1.1	0.6	0.8

[1]9=best turf quality

[2]LSD, least significant differences: Subtract one entry's mean from another entry's mean. If this value is larger than the corresponding LSD value, then the statistical difference occurs (See Table 1 footnote).

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