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

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Bentgrass species are native to western Europe. They are the most widely used cool-season grass for golf courses, putting greens, tees and closely mowed fairways in the United State. The genus *Agrostis* comprises more than 220 species. Four species are most commonly used as turfgrass:

Creeping bentgrass, a fine-textured, stoloniferous species that is best known for its tolerance of low mowing heights. It is often maintained at a mowing height as low as 0.1 inch. Creeping bentgrass also provides an excellent turf for golf course fairways and tees when mowed between 0.375 and 0.5 inch. Its use on fairways has increased rapidly in recent years. It is used in both cool-temperate and warm, humid environments of the United States.

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. Velvet bentgrass can be used on fairways if the fertility level is kept low; with a high N level, it forms excessive thatch. The winter hardiness of velvet bentgrass remains suspect.

Colonial bentgrass or brown top is a fine-textured, bright green, bunch-type grass, that has very high shoot density. It is a weak spreading bentgrass (short stolons and rhizomes) that has better resistance to dollar spot disease than creeping bentgrass. It is very susceptible to brown patch disease, however. Identifying sources of colonial bentgrass germ plasm with improved resistance to brown patch continues to be a major objective of the turfgrass breeding program at MSU. 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 so is better adapted to golf course fairways and tees than greens. The grass is used for turf in some northeastern and northwestern states.

Dryland bentgrass is tufted and similar in adaptation and appearance to colonial bentgrass except that it has a blue to gray-green color. There has been confusion over the taxonomic classification of this species. Some believe it to be the same species or even a subspecies of colonial bentgrass. However, lab tests conducted at MSU laboratory confirmed that dry-land bentgrass has 42 chromosomes; colonial bentgrass has 28 chromosomes. It has a short rhizome and forms a dense uniform turf at mowing heights of 0.5 to 1.0 inch. It is very heat- and drought-tolerant.

Two National Turfgrass Evaluation Program (NTEP) trials of bentgrass cultivars and selected lines for putting green and fairway condition trials were established in September 2003 at the Hancock Turfgrass Research Center at Michigan State University. The putting green test comprised 26 commercial cultivars and selected lines of creeping and velvet bentgrass; the fairway test consisted of 28 creeping and colonial bentgrasses (see Table 1 and Table 2). All trials were mowed frequently during periods of active growth. Putting green trials were mowed five times a week with either a triplex or walk-behind reel mower, and fairway trials received three weekly mowings with the triplex mower. The test plots received between 3 and 4 pounds of nitrogen per 1,000 square feet each year split into three to four application. The tests were core aerified in the fall of each year and irrigated frequently during the summer.

The plots were visually evaluated once per month during the growing season for turfgrass quality and other parameters. "Quality" means the overall appearance of the turf plots. Components are density, texture, uniformity, color, and freedom from disease and insect damage. Quality was rated using a scale of 1 to 9, where 9 equals the highest quality. For comparison of the average turfgrass quality of creeping bentgrass grown in similar putting green soils at 10 U.S. locations (Iowa, Illinois, Indiana, Kentucky, New York, Pennsylvania, South Dakota, Virginia and Wisconsin) for 2004-06, see Tables 1 and 2.

Differences between two entries are statistically significant only if the numerical difference between two entries exceeds the LSD value listed in the table. For example, if cultivar 'Declaration' is 2.5 units higher in quality than cultivar 'Penncross', this difference is significant because the LSD value is smaller (0.6). If the LSD value is greater than the numerical difference between the two cultivar, then the difference is not significant. Coefficient of variation indicates the percent variation of the mean. Smaller variation indicates good data validation.

Significant differences in turfgrass quality were found among the bentgrasses in this test during 2004-06. In spite of the differences in growing conditions in 2004, 2005 and 2006, the average turfgrass quality of some improved cultivars varied little among seasons. The entries showing the best seasonal average quality over the three-year test period are listed in the table. For more information, visit **www.ntep.org** under Michigan State University data.

Table 1. Turfgrass quality of creeping and velvet bentgrass cultivars and selected lines (2004-06) in putting green conditions trial seeded in September 2003 in East Lansing, Mich.

CULTIVARS AND SELECTIONS	TYPE	QUALITY[1]					
		2004		2005		2006	
		MI	Average of 10 states	MI	Average of 10 states	MI	Average of 10 states
DECLARATION	Creeping	6.8	6.5	6.6	6.7	6.5	6.6
007 (DSB)	Creeping	6.8	6.5	6.3	6.5	5.9	6.4
SHARK (23R)	Creeping	6.7	6.4	6.4	6.5	6.1	6.4
INDEPENDENCE	Creeping	6.6	6.2	6.5	6.3	6.0	6.0
AUTHORITY (235050)	Creeping	6.6	6.5	6.4	6.7	6.1	6.4
13-M	Creeping	6.5	6.2	5.8	6.5	5.8	6.5
MEMORIAL (A03-EDI)	Creeping	6.4	6.1	5.8	6.6	5.3	6.5
PENN A-1	Creeping	6.4	6.2	5.1	6.3	5.0	6.2
MACKENZIE (SRX 1GPD)	Creeping	6.3	6.2	6.9	6.7	6.9	6.5
BENGAL	Creeping	6.3	6.0	6.1	6.2	5.7	6.1
BENCHMARK DSR	Creeping	6.3	6.0	6.0	6.4	5.8	6.2
CY-2	Creeping	6.3	6.2	5.3	6.6	5.3	6.5
T-1	Creeping	6.2	6.2	5.7	6.4	5.9	6.0
LS-44	Creeping	6.2	6.1	5.5	6.4	5.4	6.3
ALPHA	Creeping	6.1	6.2	5.0	6.2	4.8	6.0
PENNCROSS	Creeping	6.1	5.2	4.6	5.4	4.1	5.3
PENNLINKS II	Creeping	5.9	5.7	4.5	5.8	4.2	5.7
KINGPIN (9200)	Creeping	5.8	6.0	6.2	6.5	6.0	6.5
GREENWICH	Velvet	5.8	5.5	4.7	5.5	4.5	5.1
TYEE (SRX 1GD)	Creeping	5.7	6.2	6.3	6.5	6.4	6.4
IS-AP 9	Creeping	5.7	6.3	5.1	6.5	5.5	6.4
LEGENDARY	Velvet	5.7	5.5	5.1	5.6	4.2	5.2
SR 7200	Velvet	5.7	5.0	4.3	5.1	4.5	4.6
VESPER	Velvet	5.4	5.3	4.5	5.1	3.5	4.8
VILLA (IS-AC 1)	Velvet	5.3	5.5	5	5.6	4.4	5.1
VENUS (EFD)	Velvet	5.3	5.4	4.3	5.4	4.0	5.1
LSD[2]		0.6	0.2	0.8	0.2	1.1	0.3
C.V. (%)[3]		6.1	6.7	9.5	7.6	13	8.7

[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 difference is statistically significant.

[3] C.V. (%), coefficient of variation, indicates the percent variation of the mean.

Table 2. Turfgrass quality of creeping and colonial bentgrass cultivars and selected lines (2004-06) in fairway conditions trial seeded in September 2003 in East Lansing, Mich.

CULTIVARS AND SELECTIONS	TYPE	QUALITY[1]					
		2004		2005		2006	
		MI	Average of 10 states	MI	Average of 10 states	MI	Average of 10 states
CRYSTAL BLUELINKS (PST-OEB)	Creeping	6.4	6.4	6.5	6.5	6.4	6.3
LS-44	Creeping	6.5	6.2	6.5	6.6	6.1	6.2
13-M	Creeping	6.7	6.2	6.1	6.3	6.5	6.2
L-93	Creeping	6.2	6.1	6.3	6.2	6.2	6.1
PENNEAGLE II	Creeping	6.3	6.3	6.2	6.3	6.0	6.1
T-1	Creeping	6.7	6.6	6.5	6.3	6.8	6.0
AUTHORITY (235050)	Creeping	6.6	6.3	6.5	6.0	6.5	6.0
SR 1119	Creeping	6.0	6.0	5.5	5.9	5.0	5.9
PENNLINKS II	Creeping	6.1	6.0	5.5	5.9	4.5	5.8
KINGPIN (9200)	Creeping	6.8	6.3	6.5	6.3	6.0	5.8
DECLARATION	Creeping	6.5	6.6	6.2	6.2	5.8	5.8
MACKENZIE (SRX 1GPD)	Creeping	6.5	6.1	6.4	6.0	6.3	5.8
SR 1150 (SRX 1PDH)	Creeping	6.0	6.0	6.0	5.9	5.8	5.7
BENGAL	Creeping	6.6	6.1	6.1	6.1	6.2	5.7
SHARK (23R)	Creeping	6.8	6.5	6.6	6.3	6.0	5.7
PRINCEVILLE	Creeping	6.0	5.6	4.9	5.7	4.8	5.6
IS-AP 14	Creeping	6.5	6.1	6.0	5.9	5.8	5.6
INDEPENDENCE	Creeping	6.3	5.9	6.3	6.1	6.6	5.6
ALPHA	Creeping	6.3	6.3	6.1	6.1	6.1	5.6
PENNCROSS	Creeping	5.8	5.6	4.6	5.3	4.5	5.5
SEASIDE	Colonial	5.5	4.7	3.5	4.1	3.1	3.8
IS-AT 7	Colonial	6.2	5.5	4.4	5.3	4.1	5.0
PST-9NBC	Colonial	6.0	5.5	4.3	5.1	3.5	4.8
EWTR	Colonial	5.9	5.4	4.2	5.3	3.6	4.8
SR 7150	Colonial	5.5	5.4	4.2	4.9	3.5	4.7
TIGER II	Colonial	5.9	5.4	4.1	5.1	3.8	4.6
PST-9VN	Colonial	5.7	5.2	3.8	4.7	3.4	4.6
BARDOT	Colonial	5.4	5.2	4.0	5.0	3.3	4.5
LSD[2]		0.4	0.2	0.5	0.3	0.8	0.3
C.V. (%)[3]		4.5	6.1	5.4	8.1	9.8	9.9

[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 difference is statistically significant.
[3] C.V. (%), coefficient of variation, indicates the percent variation of the mean.

Sources of Seed

The following list of seed companies is included to help the reader who may not be able to find sources of some varieties of seed — it is not intended as a recommendation of these companies or as an inclusive/exclusive listing.

CSI/GEOTURF INC.
1225 76th Street
Byron Center, MI 49315
Phone: 888-208-5772

J. MOLLEMA & SONS
4660 E. Paris, S.E.
Grand Rapids, MI 49512
Phone: 800-234-4769

MICHIGAN STATE SEED SOLUTIONS
717 N. Clinton
Grand Ledge, MI 48837
Phone: 800-647-8873, 517-627-2164

RHINO SEED AND LANDSCAPE SUPPLY
850 Old US-23
Brighton, MI 48114
Phone: 810-632-5640

SOUTHERN MICHIGAN SEED
48580 County Road 352
Decatur, MI 49045
Phone: 269-423-7051

STANDISH MILLING COMPANY INC.
1331 West Cedar Street
Standish, MI 48658
Phone: 989-846-6911

SWEENEY SEED COMPANY
110 South Washington Street
Mount Pleasant, MI 48858
Phone: 800-344-2482

TRI TURF
3751 Blair Townhall Road
Traverse City, MI 49684
Phone: 800-636-7039

Other Publications in this Series

(The following publications and other materials on lawns, turfgrasses and related topics are available online at: **www.emdc.msue.msu.edu** or from your MSU county Extension office — look under "Government, County" in your phone book.)

E-2910, Establishing a New Lawn Using Seed
E-2911, Nine Steps for Establishing a New Lawn Using Sod
E-2912, Turfgrass Species and Cultivar Selection
E-2913, Calendar for Lawn Care
E-2924, Performance of Kentucky Bluegrass Cultivars in Michigan, 2001-2005
E-3040, Performance of Perennial Ryegrass Cultivars in Michigan, 2005-06
E-3041, Performance of Fine Leaf Fescue Cultivars and Selections in Michigan, 2004-06

For more materials available online, visit the MSU Extension Web site: **www.emdc.msue.msu.edu**

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