UCRTRAC Accumulative Research Summary
Section D: Unbiased Cultivar Evaluations
Project 2

Title: USGA, GCSAA, and NTEP On-Site Testing Program for Bentgrass and Bermudagrass Cultivars on USGA Specification Golf Course Putting Greens, 1997-2001.

Objective: To evaluate 18 bentgrass and seven bermudagrass cultivars on a representative, in-use putting green located on a golf course.

- Primary data include seedling vigor or establishment rate, genetic color, spring greenup, leaf texture, turfgrass quality ratings, and stimpmeter readings. Secondary data may include wear, disease and insect resistance, winter color, drought and frost tolerance, percent living ground cover, and thatch/mat accumulation.

- This is a national study, so an additional objective is to evaluate the performance of bentgrass and bermudagrass cultivars for both local and regional adaptation and a broader adaptation across the United States. Information from this project is valuable to the golfing industry. These studies will determine the adaptation of grasses for golf course use. In addition, information obtained from on-site testing will be of particular value to plant breeders, researchers, extension educators, USGA agronomists, golf course architects, and superintendents, who need to select the best adapted putting green cultivars for a particular regional climate. There are eight locations that are evaluating bentgrass only, five locations that are evaluating bentgrass and bermudagrass, and three locations that are evaluating bermudagrass only (Tables 1 and 2).

- Two practice greens were constructed during summer 1997.

- The bentgrass trial was seeded 25 Sept. 1997 and included three 5.0- x 10.0-ft replicate plots for each bentgrass cultivar. The green was opened for play in May 1998.

- The bermudagrass trial was sprigged 11 to 18 June 1998 and included three 5.0- x 10.0-ft replicate plots for each bermudagrass cultivar. The green was opened for play in July 1999.

Location: Practice putting greens located at the SCGA Members' Club at Rancho California, Murrieta, Calif.

Duration: 5 years, including year of establishment (1997 – 2001).

Funding Source: USGA, GCSAA, NTEP
(Note: Considerable assistance from John Martinez, Mark Louder, Jay Cantacessi, and their staff.)

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Findings:
Overall data for selected measurements and sites are shown in Tables 3 to 5. For more information, go to the NTEP website at http://www.ntep.org.

Status: A 5-year study was completed. Information associated with this study was presented at a San Diego GCSA monthly meeting, at a PACE annual meeting, and at a Hi-Lo Desert GCSA annual meeting. Information associated with this study was published in NTEP Progress Reports and *Better Turf Thru Agronomics*.

Table 1. On-site putting green locations.

Golf course	Location	Superintendent	Research cooperator
Bermudagrass only			
Country Club of Mobile	Mobile, Alabama	Ron Wright	Dr. Bryan Unruh, University of Florida
Jupiter Island Club	Hobe Sound, Florida	Rob Kloska	Dr. John Cisar, University of Florida
Lakeside Country Club	Houston, Texas	Mike Sandburg	Dr. Richard White, Texas A&M University
Bentgrass and Bermudagrass			
Bent Tree Country Club	Dallas, Texas	Keith Ihms	Dr. Milt Engelke, Texas A&M University
Country Club of Birmingham	Birmingham, Alabama	Lee McLemore	Dr. Elizabeth Guertal, Auburn University
Country Club of Green Valley	Green Valley, Arizona	Mike Bates	Dr. David Kopec, University of Arizona
The Missouri Bluffs	St. Charles, Missouri	Alan Zelko	Dr. Barb Corwin, University of Missouri
SCGA Members' Club	Murrieta, California	John Martinez	Dr. Robert Green, University of California-Riverside
Bentgrass only			
Crystal Springs Golf Course	Burlingame, California	Ray Davies	Dr. Ali Harivandi, California Cooperative Extension
Fox Hollow at Lakewood	Lakewood, Colorado	Bruce Nelson	Dr. Tony Koski, Colorado State University
Lassing Pointe Golf Course	Florence, Kentucky	Jerry Coldiron	Dr. A. J. Powell, University of Kentucky
North Shore Country Club	Glenview, Illinois	Dan Dinelli	Dr. Tom Voigt, University of Illinois
Purdue University Kampen Course	West Lafayette, Indiana	Jim Scott	Dr. Zac Reicher, Purdue University
Snoqualmie Ridge C. C.	Snoqualmie, Washington	Tom Wolff	Dr. Gwen Stahnke, Washington State University
Westchester Country Club	Rye, New York	Joe Alonzi	Dr. James Murphy, Rutgers University
Westwood Golf Course	Vienna, Virginia	Walter Montross	Dr. David Chalmers, Virginia Tech University

Table 2. USGA/GCSAA/NTEP on-site bermudagrass and bentgrass tests.

Entry name	Sponsor
Bermudagrass	
MS-Supreme	Mississippi State University
TifEagle	Georgia Seed Development Commission
Mini-Verde	Turfgrass America
Tifdwarf	Standard Entry
Champion	Coastal Turf, Inc.
Tifgreen	Standard Entry
Floradwarf	Florida Turfgrass Foundation
Bentgrass	
L-93	Simplot Turf / Jacklin Seed
Putter	Simplot Turf / Jacklin Seed
Cato	Pickseed West, Inc.
Crenshaw	ProSeeds Marketing, Inc.
Grand Prix (LCB-103)	LESCO, Inc.
Penncross	Standard entry
Backspin	Turf Merchants, Inc.
Trueline	Turf Merchants, Inc.
Providence	Seed Research of Oregon
SR 1020	Seed Research of Oregon
SR 1119	Seed Research of Oregon
Viper	Cebeco International Seeds, Inc.
Century	ProSeeds Marketing, Inc.
Imperial	ProSeeds Marketing, Inc.
Penn A-1	Tee-2-Green Corp.
Penn A-4	Tee-2-Green Corp.
Penn G-6	Tee-2-Green Corp.
Penn G-1	Tee-2-Green Corp.

Table 3. Overall visual quality ratings (scale: 1-9, 9 = best), overall visual genetic color ratings (scale: 1-9, 9 = dark green), and overall visual leaf texture ratings (scale: 1-9, 9 = very fine) for seven cultivars of bermudagrass maintained as an on-site putting green at eight sites (National), at the SCGA Members' Club at Rancho California, Murietta, Calif. (CA), and at the Country Club of Green Valley, Green Valley, Ariz. (AZ) from 1998 to 2001[z].

	Overall visual quality			Overall visual genetic color			Overall visual leaf texture		
Name	National	CA	AZ	National	CA	AZ	National	CA	AZ
Champion	6.3	7.1	5.4	6.7	7.6	6.3	7.4	7.2	7.8
Floradwarf	6.1	6.5	5.8	6.5	6.4	5.4	6.6	6.8	5.6
Mini-Verde	6.7	7.3	6.1	7.2	7.7	7.0	7.6	7.2	8.2
MS-Supreme	6.2	7.5	6.1	6.3	7.8	6.4	7.0	7.2	7.5
Tifdwarf	6.0	6.2	6.4	6.5	6.6	6.7	6.6	5.9	7.5
Tifeagle	6.5	6.9	6.8	6.8	7.6	7.1	7.1	6.8	7.7
Tifgreen	5.1	6.4	6.6	5.3	6.3	7.2	5.6	5.9	6.5
LSD value[y]	0.4	0.4	0.7	0.4	0.5	0.8	0.6	0.5	0.5

[z] For more information, go to the NTEP website at http://www.ntep.org or see the following NTEP reports: 2001 data year – NTEP No. 02-8; 2000 data year – NTEP No. 01-16; 1999 data year – NTEP 00-7; 1998 data year – NTEP 99-4.

[y] To determine statistical differences among entries, subtract one entry's mean from another entry's mean. Statistical differences occur when this value is larger than the corresponding LSD value (LSD 0.05).

Table 4. Overall visual quality ratings (scale: 1-9, 9 = best), overall visual genetic color ratings (scale: 1-9, 9 = dark green), and overall visual leaf texture ratings (scale: 1-9, 9 = very fine) for 18 cultivars of bentgrass maintained as an on-site putting green at 13 sites (National), at the SCGA Members' Club at Rancho California, Murietta, Calif. (S-CA); at Crystal Springs GC, Burlingame, Calif. (N-CA); and at the Country Club of Green Valley, Green Valley, Ariz. (AZ) from 1998 to 2001[z].

	Overall visual quality				Overall visual genetic color				Overall visual leaf texture			
Name	National	S-CA	N-CA	AZ	National	S-CA	N-CA	AZ	National	S-CA	N-CA	AZ
Backspin	6.6	6.9	7.1	6.3	5.9	7.3	6.9	5.3	7.2	7.2	8.0	7.3
Cato	6.2	6.8	6.5	5.6	6.5	7.0	6.8	5.7	6.7	6.9	7.5	6.8
Century	6.8	7.3	6.9	6.1	5.8	7.3	6.6	5.0	7.7	7.7	8.0	7.8
Crenshaw	6.4	6.8	7.0	5.8	6.9	7.0	7.1	6.6	6.8	7.0	7.5	6.8
Grand Prix (LCB-103)	6.7	7.1	7.2	6.3	6.0	7.3	6.9	5.1	7.3	7.6	7.9	7.3
Imperial	6.7	6.9	7.2	6.2	6.1	7.3	7.2	5.1	7.3	7.0	7.8	7.4
L-93	6.7	6.9	7.6	6.4	6.9	7.2	7.8	6.4	6.9	7.0	7.8	6.8
Penn A-1	7.0	7.2	7.3	6.2	6.6	7.4	6.8	5.9	7.5	7.9	7.6	7.1
Penn A-4	7.3	7.7	7.5	7.1	6.8	7.6	6.9	6.2	7.9	8.0	7.8	8.1
Penn G-1	6.9	7.2	7.2	6.1	6.7	7.4	7.2	6.1	7.4	7.6	7.5	7.1
Penn G-6	6.7	7.0	7.4	6.1	6.6	7.3	7.2	5.8	7.2	7.6	7.8	6.8
Penncross	5.3	6.2	6.0	5.2	5.5	6.6	5.8	4.7	5.4	6.7	6.3	5.7
Providence	6.3	6.8	6.8	6.2	6.5	7.1	7.2	6.0	6.6	6.7	7.5	6.5
Putter	5.9	6.6	6.7	5.4	5.9	6.9	6.5	5.1	6.2	6.8	7.3	6.3
SR 1020	6.4	6.7	6.9	6.1	6.3	6.8	6.7	5.6	6.8	7.0	7.5	7.0
SR 1119	6.6	6.9	7.2	6.3	7.0	7.2	7.2	6.5	7.0	7.1	7.7	7.3
Trueline	6.1	6.7	6.7	5.9	6.4	7.1	6.8	6.3	6.4	6.8	7.8	6.7
Viper	6.1	6.6	6.9	5.7	6.8	6.7	6.7	6.7	6.6	6.7	7.4	6.8
LSD value[y]	0.1	0.4	0.4	0.6	0.2	0.6	1.4	0.4	0.2	0.5	0.6	0.5

[z] For more information, go to the NTEP website at http://www.ntep.org or see the following NTEP reports: 2001 data year – NTEP No. 02-9; 2000 data year – NTEP No. 01-17; 1999 data year – NTEP 00-8; 1998 data year – NTEP 99-3.

[y] To determine statistical differences among entries, subtract one entry's mean from another entry's mean. Statistical differences occur when this value is larger than the corresponding LSD value (LSD 0.05).

Table 5. Overall visual estimate of *Poa annua* coverage ratings (scale: 1% to 100%) for 18 cultivars of bentgrass maintained as an on-site putting green at the SCGA Members' Club at Rancho California, Murietta, Calif. during 2000 and 2001[z].

Name	Overall percent *Poa annua* coverage[y]	
	2000	2001
Backspin	36	50
Cato	55	72
Century	29	49
Crenshaw	52	56
Grand Prix (LCB-103)	31	48
Imperial	42	61
L-93	49	60
Penn A-1	27	39
Penn A-4	12	26
Penn G-1	24	43
Penn G-6	20	41
Penncross	73	81
Providence	45	69
Putter	58	72
SR 1020	52	71
SR 1119	54	66
Trueline	44	67
Viper	69	75
LSD[x]	13	9

[z] For more information, go to the NTEP website at http://www.ntep.org or see the following NTEP reports: 2001 data year – NTEP No. 02-9 and 2000 data year – NTEP No. 01-17.

[y] There were three individual rating dates during each year.

[x] Mean separation within columns by Fisher's protected LSD test, $P=0.05$.