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ON-SITE TESTING OF BENTGRASS AND BERMUDAGRASS CULTIVARS FOR GOLF COURSE PUTTING GREENS

INTRODUCTION

There is growing interest within the golfing industry to develop on-site testing of turfgrass cultivars. This concept is not new, but has not been a common practice in recent years. Therefore, the Golf Course Superintendents Association of America (GCSAA), United States Golf Association Green Section (USGA), and the National Turfgrass Evaluation Program (NTEP) have agreed to revitalize on-site testing of turfgrass cultivars on golf courses, particularly on putting greens. This project conducts evaluations of new bentgrass and bermudagrass cultivars on USGA specification putting greens constructed at golf courses across the country. This on-site testing program is designed to provide scientific information of a more applied nature about putting green turfgrass cultivar performance.

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.

A five-person committee composed of Dr. Jeff Nus, GCSAA Research Director; Dr. Mike Kenna, USGA Research Director; Mr. James Moore, USGA Construction Education Coordinator, Mr. Kevin Morris, NTEP Executive Director; and Dr. Bob Shearman, NTEP Special Projects Coordinator determined the trial site locations and the trial specifics. Input from golf course superintendents, USGA agronomists and turfgrass researchers assisted the committee members' decision making process.

Location & Number of Trial Sites

These cultivar evaluation trials are jointly sponsored and supported by the GCSAA, USGA-Green Section, and NTEP. The USGA funded the construction of USGA specification greens for the trials. Trial sites are located on golf courses near a land grant university with a turfgrass research program or in a major metropolitan area which is readily accessible to a university turfgrass scientist. Sixteen (16) regional evaluation trial sites have been established. Trials are located in: a) northern locations for bentgrasses, b) southern locations for bermudagrass, and c) transition zone locations for both species. Trials are located where golfers practice putting and/or chipping. Host clubs provide daily maintenance of the putting green site at their own expense.

Trial Specifics

The NTEP functions as the coordinating agent for the cultivar trials. These trials are five years in duration. Trials are conducted under mutually agreed upon guidelines, procedures, and funding outlined in a research agreement agreed to and signed by the appropriate representatives of GCSAA, USGA, and NTEP and each research cooperator (i.e. university turfgrass researcher). Trials are conducted at each location under the leadership of the assigned research cooperator. These persons are responsible for establishing and conducting the trial, and collecting and transferring the data to NTEP according to the research agreement.

Trials are maintained by the golf course superintendent at each location using management procedures common to their golf course, the geographical area and in consultation with the research cooperator. No special management practices are prescribed as these trials are intended to receive real-world golf course conditions and stresses.

ON-SITE TESTING (continued)

These trials are conducted principally with commercially available, named cultivars. Experimental lines that will be commercially available in the near future (i.e. before the end of the test cycle) were also included in these trials at the sponsoring company's discretion.

The NTEP administers the program and its funding, sets the advisory committee and gathers their input and recommendations for each species trial. The NTEP organizes and distributes the seed and vegetative materials which constitute the entries for each trial location. The NTEP provides the maintenance and data collection protocols to each site; collects, analyzes and disseminates the performance data in annual and final reports; and conducts an annual site visit for each trial.

For more information or additional copies of reports, please contact:

Kevin Morris, Executive Director
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Beltsville Agricultural Research Center-West
Building 002, Room 013
Beltsville, Maryland 20705 USA

NTEP reports can also be found on the World Wide Web at <http://www.ntep.org/ntep> or <http://hort.unl.edu/ntep>.

ON-SITE PUTTING GREEN TEST LOCATIONS

Golf Course	Location	Superintendent	Research Cooperator
<i>Bentgrass only</i>			
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 Point 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. Clark Throssell, 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
<i>Bentgrass and Bermudagrass</i>			
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	Mike Vogt	Dr. John Dum, University of Missouri
SCGA Members Club	Murrieta, California	John Martinez	Dr. Robert Green, University of California-Riverside
<i>Bermudagrass only</i>			
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

USGA/GCSAA/NTEP ON-SITE BERMUDAGRASS TEST

Entries and Sponsors

Entry No.	Name	Sponsor
1	MS-Supreme	Mississippi State University
2	TifEagle	Georgia Seed Development Commission
3	Mini-Verde	Thomas Bros. Grass Co.
4	Tifdwarf	Standard Entry
5	Champion	Coastal Turf, Inc.
6	Tifgreen	Standard Entry
7	Floradwarf	Florida Turfgrass Foundation

TABLE A. 1998 MANAGEMENT - ON-SITE BERMUDAGRASS TEST AT BIRMINGHAM, AL (COUNTRY CLUB OF BIRMINGHAM)

ESTABLISHMENT		FERTILIZATION			HERBICIDES		
Planting date	11-Jun-98	Date(s)	Product	Rate (lbs./M)	Date(s)	Product	Rate (oz./M)
Problems during	None						
		August 1998	KNO3, methylene urea	1 lb. N	Three times per year	Bensulide	
		August 1998	P2O5	1/2 lb. P			
FACTORS OF PLAY		August 1998	K2O	1 lb. K			
		September 1998	KNO3, methylene urea	1 lb. N			
Date opened for play	not yet opened	September 1998	P2O5	1/2 lb. P	INSECTICIDES		
Date closed for play		September 1998	K2O	1 lb. K			
Type of spikes allowed	softspikes	Oct.-Dec. 1998	20-5-20	0.10 lb. N	Date(s)	Product	Rate (oz./M)
Uses of green	will be used for chipping, bunker shots	2-4x/month					
					None		
MOWING							
Initial height	0.275"						
Current height	0.15"				OTHER PRODUCTS		
Frequency	6 days/week						
Type of mower	walking				Date(s)	Product	Rate (oz./M)
Rollers used	2-3 times/month						
Groomers used	groom every time green is mowed. Blades set .005" below bedknife.				None		
		FUNGICIDES					
CULTIVATION		Date(s)	Product	Rate (oz./M)	NOTES/COMMENTS		
Aerfication - dates	Sept. 1998 - 5/8" hollow				Since the bermuda has been overseeded with poa trivialis, we have been spraying with our weekly bentgrass fungicide & fertilizer mix. The bermuda was covered this winter when nighttime temps. dropped below 27 degrees F.		
Aerification - type	hydroject - 2x/month, March-November	every 2-3 wks, July - mid-Dec.	Alternate Banol, Alliette, Heritage and Subdue with either Mancozeb or Daconil	labeled preventative rates			
Verticutting	once per week- July-Sept.						
Dates of topdressing	once per week- July-Sept.						
Other cultural practices	None						

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TABLE B. 1998 MANAGEMENT - ON-SITE BERMUDAGRASS TEST AT MOBILE, AL (COUNTRY CLUB OF MOBILE)

ESTABLISHMENT		FERTILIZATION			HERBICIDES		
Planting date	18-Jun-98	Date(s)	Product	Rate (lbs./M)	Date(s)	Product	Rate (oz./M)
Problems during	None						
		Preplant	13-13-13		None		
			19-25-13	1 lb. N per week			
FACTORS OF PLAY		Winter 1998		0.5 lb. N per month			
Date opened for play	20-Aug-98						
Date closed for play	not closed						
Type of spikes allowed	softspikes only						
Uses of green	putting, chipping, pitching				INSECTICIDES		
					Date(s)	Product	Rate (oz./M)
MOWING						Dursban	
						Orthene	
Initial height	1/4"	FUNGICIDES					
Current height	5/32"						
Frequency	7 days/week	Date(s)	Product	Rate (oz./M)			
Type of mower	walking						
Rollers used			Heritage	preventative	OTHER PRODUCTS		
Groomers used			Subdue Maxx	preventative			
			Koban	preventative	Date(s)	Product	Rate (oz./M)
CULTIVATION			Daconil				
			ProStar		None		
Aerfication - dates	None		LESCO Manicure				
Aerification - type							
Verticutting	bi-weekly						
Dates of topdressing	May-Sept.: every week				NOTES/COMMENTS		
	Oct.-Apr.: every other week						
Other cultural practices	Rolled once per week				All varieties grew in quickly. The establishment cover slowed down spread by about a week.		

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TABLE C. 1998 MANAGEMENT - ON-SITE BERMUDAGRASS TEST AT GREEN VALLEY, AZ (COUNTRY CLUB OF GREEN VALLEY)

ESTABLISHMENT		FERTILIZATION			HERBICIDES		
Planting date	July 1998	Date(s)	Product	Rate (lbs./M)	Date(s)	Product	Rate (oz./M)
Problems during	Established from plugs only - 40 per plot	Summer 1998	21-7-14	3.5-3.75 lbs. N	None		
		INSECTICIDES					
FACTORS OF PLAY					Date(s)	Product	Rate (oz./M)
Date opened for play	not yet open				None		
Date closed for play							
Type of spikes allowed							
Uses of green	putting				OTHER PRODUCTS		
MOWING					Date(s)	Product	Rate (oz./M)
Initial height					August 1998	Ferromec	4
Current height					Sept. 1998	Ferromec	4
Frequency					October 1998	Ferromec	4
Type of mower	walking						
Rollers used	smooth roller				NOTES/COMMENTS		
Groomers used							
		FUNGICIDES					
CULTIVATION					Irrigation system would not support stolon establishment. Plugs produced raised turf by late Fall 1998. In April 1998, renovated all plots via special core aeration and lowering turf via cup cutter and re-setting plugs. Following aggressive aeration and rolling, green will open for play June 15, 1999		
Aerification - dates	None	Date(s)	Product	Rate (oz./M)			
Aerification - type		None					
Verticutting							
Dates of topdressing	None						
Other cultural practices	None						

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TABLE D. 1998 MANAGEMENT - ON-SITE BERMUDAGRASS TEST AT MURRIETA, CA (SCGA MEMBERS CLUB)

ESTABLISHMENT		FUNGICIDES			OTHER PRODUCTS		
Planting date	29-May-98	Date(s)	Product	Rate (oz./M)	Date(s)	Product	Rate (oz./M)
Problems during	None						
		19-Jun-98	Heritage	0.4	10-Jun-98	Turf Partners Eco-Mag	34
		1-Jul-98	Daconil	4	10-Jun-98	Deep Green FeSO4	1.6 lb./M
FACTORS OF PLAY		14-Jul-98	Alliette	4	15-Jun-98	Deep Green FeSO4	1.3 lb./M
		11-Aug-98	Fore	8	19-Jun-98	Roots 1-2-3	34
Date opened for play	not opened in 1998	21-Aug-98	Clearys 3336	8	1-Jul-98	Turf Partners Eco-Mag	34
Date closed for play		2-Sep-98	Subdue	2	4-Aug-98	Turf Partners Eco-Mag	34
Type of spikes allowed		2-Sep-98	Fore	8	25-Aug-98	Turf Partners Eco-Mag	34
Uses of green		14-Sep-98	Daconil 2787	5	14-Sep-98	Roots	17
		24-Oct-98	Subdue	2	22-Sep-98	Roots	34
MOWING		24-Oct-98	Fore	8	8-Oct-98	Roots	17
		25-Nov-98	Fore	8	6-Nov-98	Turf Partners Eco-Mag	34
Initial height	3/8"	22-Dec-98	Chipco 26 GT	6	6-Nov-98	Thio-cal (6% calcium)	68
Current height	1/4"				17-Nov-98	FeSO4	1.6 lbs./M
Frequency	5 days/week				17-Nov-98	Lesco Micro-Mix	34
Type of mower	triplex and walking	HERBICIDES			25-Nov-98	FeSO4	1.3 lbs./M
Rollers used	roller on triplex	Date(s)	Product	Rate (oz./M)			
Groomers used	Jacobsen groomers						
		None					
CULTIVATION					NOTES/COMMENTS		
Aerfication - dates	None	INSECTICIDES					
Aerification - type							
Verticutting	None	Date(s)	Product	Rate (oz./M)			
Dates of topdressing	2-Sep-98						
Other cultural practices	rolled monthly to help level	10-Aug-98	Merit	1.6			

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TABLE D. (CONT'D)

1998 MANAGEMENT - ON-SITE BERMUDAGRASS TEST AT MURRIETA, CA (SCGA MEMBERS CLUB)

FERTILIZATION			FERTILIZATION			Rate (lbs./M)
Date(s)	Product	Rate (lbs./M)	Date(s)	Product		
4-Jun-98	Best 11-55-0	0.4 lbs. N	14-Sep-98	Gold-N-Grow 10-0-0 w/iron		0.03 lbs. N
4-Jun-98	Best 0-0-50	2 lbs. K	14-Sep-98	Peters 20-10-20		0.06 lbs. N
9-Jun-98	Par-Ex 25-4-8	0.55 lbs. N	14-Sep-98	Nutriculture 28-8-18		0.08 lbs. N
10-Jun-98	Turf Partners 1-0-23	0.07 lbs. K	22-Sep-98	Peters 20-10-20		0.06 lbs. N
10-Jun-98	Turf Partners 24-0-0	0.07 lbs. N	22-Sep-98	Gold-N-Grow 10-0-0 w/iron		0.03 lbs. N
10-Jun-98	Nutriculture 28-8-18	0.08 lbs. N	23-Sep-98	Best 10-4-16		0.41 lbs. N
15-Jun-98	Turf Partners 24-0-0	0.07 lbs. N	30-Sep-98	Best 10-4-16		0.41 lbs. N
15-Jun-98	Turf Partners 1-0-23	0.07 lbs. K	8-Oct-98	Gold-N-Grow 10-0-0 w/iron		0.03 lbs. N
16-Jun-98	Best 25-4-8	0.73 lbs. N	8-Oct-98	K-Power 14-0-46		0.06 lbs. N
1-Jul-98	Turf Partners 1-0-23	0.07 lbs. K	8-Oct-98	Peters 20-10-20		0.02 lbs. K
1-Jul-98	Nutriculture 28-8-18	0.08 lbs. N	16-Oct-98	Gold-N-Grow 10-0-0 w/iron		0.03 lbs. N
1-Jul-98	Turf Partners 24-0-0	0.07 lbs. N	16-Oct-98	Peters 20-10-20		0.06 lbs. N
3-Jul-98	Turf Partners 1-0-23	0.07 lbs. K	16-Oct-98	Turf Partners 3-0-14		0.03 lbs. N
3-Jul-98	Nutriculture 28-8-18	0.08 lbs. N	24-Oct-98	Gold-N-Grow 10-0-0 w/iron		0.06 lbs. N
13-Jul-98	Turf Partners 1-0-23	0.28 lbs. N	24-Oct-98	Peters 20-20-20		0.58 lbs. N
13-Jul-98	Nutriculture 28-8-18	0.08 lbs. N	30-Oct-98	Gold-N-Grow 10-0-0 w/iron		0.07 lbs. K
14-Jul-98	Gold-N-Grow 10-0-0 w/iron	0.03 lbs. N	30-Oct-98	Peters 20-10-20		0.02. lbs. N
14-Jul-98	Nutriculture 28-8-18	0.08 lbs. N	31-Oct-98	Best 10-4-16		0.07 lbs. K
16-Jul-98	Best 5-16-22	0.41 lbs. N	6-Nov-98	Turf Partners 1-0-23		0.02. lbs. N
4-Aug-98	Turf Partners 1-0-23	0.07 lbs. K	6-Nov-98	Turf Partners 7-0-0		0.03 lbs. N
4-Aug-98	Turf Partners 24-0-0	0.07 lbs. N	13-Nov-98	Turf Partners 1-0-23		0.08 lbs. N
4-Aug-98	Gold-N-Grow 10-0-0 w/iron	0.03 lbs. N	13-Nov-98	Turf Partners 7-0-0		0.07 lbs. K
11-Aug-98	Turf Partners 1-0-23	0.07 lbs. K	13-Nov-98	Gold-N-Grow 10-0-0 w/iron		0.02 lbs. N
15-Aug-98	Best 25-4-8	0.55 lbs. N	13-Nov-98	Nutriculture 28-8-18		0.02. lbs. N
17-Aug-98	Gold-N-Grow 10-0-0 w/iron	0.03 lbs. N	17-Nov-98	Turf Partners 1-0-23		0.02 lbs. N
17-Aug-98	Nutriculture 28-8-18	0.08 lbs. N	17-Nov-98	Turf Partners 7-32-6		0.07 lbs. K
25-Aug-98	Gold-N-Grow 10-0-0 w/iron	0.03 lbs. N	25-Nov-98	Turf Partners 7-0-0		0.47 lbs. N
25-Aug-98	Nutriculture 28-8-18	0.08 lbs. N	25-Nov-98	Turf Partners 7-32-6		
2-Sep-98	Gold-N-Grow 10-0-0 w/iron	0.03 lbs. N	25-Nov-98	Turf Partners 1-0-23		6.43 lbs. N
9-Sep-98	Peters 20-10-20	0.06 lbs. N	3-Dec-98	Best 10-4-16		5.18 lbs. P
						8.8 lbs. K
				TOTAL - 1998		

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TABLE E. 1998 MANAGEMENT - ON-SITE BERMUDAGRASS TEST AT HOBE SOUND, FL (THE JUPITER ISLAND CLUB)

ESTABLISHMENT		FERTILIZATION			HERBICIDES		
Planting date		Date(s)	Product	Rate (lbs./M)	Date(s)	Product	Rate (oz./M)
Problems during		Fall 1998		1 lb. N per month 1.5 lb. K per month	None		
FACTORS OF PLAY							
Date opened for play							
Date closed for play					INSECTICIDES		
Type of spikes allowed							
Uses of green					Date(s)	Product	Rate (oz./M)
	putting				None		
MOWING							
Initial height							
Current height	1/8"						
Frequency	7 days/week	FUNGICIDES			OTHER PRODUCTS		
Type of mower							
Rollers used		Date(s)	Product	Rate (oz./M)			
Groomers used					Date(s)	Product	Rate (oz./M)
		None					
CULTIVATION					None		
Aerification - dates							
Aerification - type							
Verticutting					NOTES/COMMENTS		
Dates of topdressing	2-4 times per month						
	lightly with dried sand						
Other cultural practices					Irrigation as needed with heavy application every 4-6 days		

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TABLE F. 1998 MANAGEMENT - ON-SITE BERMUDAGRASS TEST AT ST. CHARLES, MO (THE MISSOURI BLUFFS G. C.)

ESTABLISHMENT		FERTILIZATION			HERBICIDES		
Planting date	10-Jun-98	Date(s)	Product	Rate (lbs./M)	Date(s)	Product	Rate (oz./M)
Problems during	None						
		June	18-5-9	1 lbs. N	Fall	Roundup	spot applied
		July	18-5-9	1 lbs. N			
FACTORS OF PLAY		August	18-5-9	1 lbs. N			
Date opened for play	not yet opened						
Date closed for play							
Type of spikes allowed	softspikes						
Uses of green	putting when opened				INSECTICIDES		
MOWING					Date(s)	Product	Rate (oz./M)
Initial height	3/16"				None		
Current height	3/16"						
Frequency	3 days/week						
Type of mower	walking						
Rollers used	None						
Groomers used	None						
					OTHER PRODUCTS		
CULTIVATION					Date(s)	Product	Rate (oz./M)
Aerfication - dates	None	FUNGICIDES					
Aerfication - type					None		
Verticutting	None	Date(s)	Product	Rate (oz./M)			
Dates of topdressing	monthly through Sept.						
Other cultural practices	None	None					
					NOTES/COMMENTS		

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TABLE G. 1998 MANAGEMENT - ON-SITE BERMUDAGRASS TEST AT DALLAS, TX (BENT TREE COUNTRY CLUB)

ESTABLISHMENT		FERTILIZATION			HERBICIDES		
Planting date	8-Jun-98	Date(s)	Product	Rate (lbs./M)	Date(s)	Product	Rate (oz./M)
Problems during	Extremely hot and dry	8-Jun-98	Milorganite	1 lb. N	None		
FACTORS OF PLAY		July 1998	Scotts 18-9-18	1 lb. N	INSECTICIDES		
		August 1998	Scotts 18-9-18	1 lb. N			
		Sept. 1998	Polygon 0-0-50	1 lb. K			
Date opened for play	October 1998	October 1998	Polygon 0-0-50	1 lb. K	Date(s)	Product	Rate (oz./M)
Date closed for play		November 1998	Polygon 0-0-50	1 lb. K			
Type of spikes allowed	softspikes	December 1998	Polygon 0-0-50	1 lb. K	August 1998	Battle GC	
Uses of green	putting						
MOWING		OTHER PRODUCTS					
Initial height	1/2"				Date(s)	Product	Rate (oz./M)
Current height	1/8"						
Frequency	6 days/week				every two weeks from	Astron	
Type of mower	walking				August - December	FG-20	
Rollers used	None					Knife	
Groomers used	Aug.-Sept.					Now 12-0-12	
CULTIVATION		FUNGICIDES				Now 6-12-3	
						Now 4-4-16	
Aerification - dates	None	Date(s)	Product	Rate (oz./M)		Phlex-Man	
Aerification - type		None				Phlex-Mag	
Verticutting	Once per month in Aug. & Sept.					Renaissance	
Dates of topdressing	Twice per month- July, August, Sept.				monthly from Aug.-Dec.	Perk-Up	
Other cultural practices	Rolled weekly					Maxiplex	
	during establishment with Hydroject in off mode to assist leveling				monthly from July-Dec.	Prevacle	
						Pro-Mag 36	5 lbs./M
NOTES/COMMENTS							
No overseeding this year.							
Used covers to protect three times. Target temp. was 20 degrees F for two hours to be covered.							

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TABLE H. 1998 MANAGEMENT - ON-SITE BERMUDAGRASS TEST AT HOUSTON, TX (LAKESIDE COUNTRY CLUB)

ESTABLISHMENT		FERTILIZATION			HERBICIDES		
Planting date	16-Jun-98	Date(s)	Product	Rate (lbs./M)	Date(s)	Product	Rate (oz./M)
Problems during	None						
		19-Jun-98	14-28-10	1 lb. N	None		
		26-Jun-98	16-8-8	1 lb. N			
FACTORS OF PLAY		3-Jul-98	16-8-8	1 lb. N			
		9-Jul-98	16-8-8	1 lb. N			
Date opened for play	1-Sep-99	22-Jul-98	16-8-8	1 lb. N			
Date closed for play		27-Jul-98	16-8-8	1 lb. N	INSECTICIDES		
Type of spikes allowed	softspikes	4-Aug-98	16-8-8	1 lb. N			
	only	21-Aug-98	16-8-8	1 lb. N	Date(s)	Product	Rate (oz./M)
Uses of green		13-Aug-98	16-8-8	1 lb. N			
		31-Aug-98	20-0-20	1 lb. N	13-Aug-98	Dursban 2G	2 lb./M
MOWING		21-Sep-98	20-0-20	1 lb. N			
		19-Oct-98	20-0-20	1 lb. N			
Initial height	1/4"	9-Nov-98	14-28-10	0.75 lb. N			
Current height	5/32"	14-Dec-98	14-28-10	1 lb. N			
Frequency	7 days/week						
Type of mower	walking						
Rollers used	None				OTHER PRODUCTS		
Groomers used	None	FUNGICIDES					
					Date(s)	Product	Rate (oz./M)
CULTIVATION		Date(s)	Product	Rate (oz./M)			
					None		
Aerification - dates	mid-Feb., mid-March	13-Aug-98	Captan	3			
Aerification - type	water injection	31-Aug-98	Heritage	4			
Verticutting	None	12-Oct-98	Heritage	4	NOTES/COMMENTS		
Dates of topdressing	dusting every 2 weeks						
Other cultural practices	None				Overseeded on 10/26/98 with 12 lb./M poa trivialis		

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TABLE 1.

MEAN TURFGRASS QUALITY AND OTHER RATINGS OF BERMUDAGRASS CULTIVARS
IN THE 1998 USGA/GCSAA/NTEP ON-SITE BERMUDAGRASS TEST
AT BIRMINGHAM, AL (COUNTRY CLUB OF BIRMINGHAM) 1/
1998 DATA

NAME	TURFGRASS QUALITY AND OTHER RATINGS 1-9; 9=BEST 2/											
	PERCENT	ESTABLISHMENT		COLOR RATINGS				QUALITY RATINGS				
	ESTABLISHMENT	OVERSEED	ESTABLISHMENT	JUNE	JULY	AUG	SEP	JUN	JUL	AUG	SEP	MEAN
	5 WEEKS	OCTOBER	NOVEMBER									
FLORADWARF	65.0	4.0	3.0	7.0	6.3	6.7	7.0	7.0	5.3	5.0	7.7	6.3
MINI-VERDE	61.7	4.7	3.3	6.7	6.0	6.7	5.7	6.7	4.7	6.7	6.7	6.2
MS-SUPREME	71.7	4.0	2.7	6.7	5.3	6.0	6.0	6.7	5.3	6.0	6.7	6.2
TIFEAGLE	58.3	4.7	2.7	6.3	6.7	6.3	6.3	6.3	4.3	5.7	7.0	5.8
CHAMPION	60.0	4.3	3.0	7.0	6.0	6.3	5.0	6.3	5.0	5.3	6.0	5.7
TIFDWARF	71.7	4.7	3.0	6.0	5.7	6.0	4.3	6.3	5.0	5.3	5.0	5.4
TIFGREEN	76.7	2.3	2.3	6.0	4.7	3.7	2.0	6.0	4.3	3.7	3.0	4.3
LSD VALUE	14.2	1.5	-	0.7	1.3	0.9	1.2	1.1	-	1.2	1.4	0.6
C.V. (%)	10.5	18.6	19.7	5.6	11.6	8.8	13.5	7.3	13.4	11.9	13.6	6.4

1/ 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).

2/ C.V. (COEFFICIENT OF VARIATION) INDICATES THE PERCENT VARIATION OF THE MEAN IN EACH COLUMN.

TABLE 2. MEAN TURFGRASS QUALITY AND OTHER RATINGS OF BERMUDAGRASS CULTIVARS
IN THE 1998 USGA/GCSAA/NTEP ON-SITE BERMUDAGRASS TEST
AT MOBILE, AL (COUNTRY CLUB OF MOBILE) 1/
1998 DATA

TURFGRASS QUALITY AND OTHER RATINGS 1-9; 9=BEST 2/

NAME	LEAF TEXTURE	ESTABLISHMENT RATING	QUALITY RATINGS			
			SEP	OCT	NOV	MEAN
MINI-VERDE	9	5.3	8.5	8.3	8.0	8.3
MS-SUPREME	9	5.5	8.3	8.0	8.0	8.1
FLORADWARF	9	5.3	8.0	7.8	8.0	7.9
CHAMPION	9	5.5	7.5	7.8	7.8	7.7
TIFEAGLE	9	5.8	7.3	7.5	7.5	7.4
TIFDWARF	9	5.8	6.5	6.8	6.8	6.7
TIFGREEN	7	5.8	6.8	6.8	6.5	6.7
LSD VALUE	0	-	0.7	0.6	0.6	0.5
C.V. (%)	0	14.0	6.3	5.9	5.8	4.7

1/ 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).

2/ C.V. (COEFFICIENT OF VARIATION) INDICATES THE PERCENT VARIATION OF THE MEAN IN EACH COLUMN.

TABLE 3. MEAN TURFGRASS QUALITY AND OTHER RATINGS OF BERMUDAGRASS CULTIVARS
IN THE 1998 USGA/GCSAA/NTEP ON-SITE BERMUDAGRASS TEST
AT GREEN VALLEY, AZ (COUNTRY CLUB OF GREEN VALLEY) 1/
1998 DATA

TURFGRASS QUALITY AND OTHER RATINGS 1-9; 9=BEST 2/

NAME	GENETIC COLOR	LEAF TEXTURE	ESTABLISHMENT RATING	<u>DENSITY RATINGS</u>		<u>PERCENT ESTABLISHMENT RATINGS</u>		<u>QUALITY RATINGS</u>		
				SUMMER	FALL	SUMMER	FALL	OCT	NOV	MEAN
TIFGREEN	8.0	7.3	6.3	5.3	7.3	53.3	86.0	7.3	7.3	7.3
TIFEAGLE	8.0	8.0	6.3	5.3	7.0	50.0	83.3	8.0	6.3	7.2
TIFDWARF	7.7	8.0	6.7	5.7	7.7	55.0	86.0	8.0	6.0	7.0
MS-SUPREME	7.7	8.0	5.3	4.3	6.3	43.3	80.3	7.3	6.0	6.7
CHAMPION	7.7	8.7	5.7	4.7	7.0	43.3	81.0	7.7	5.3	6.5
FLORADWARF	6.0	6.0	8.7	7.7	8.3	75.0	94.7	5.3	7.0	6.2
MINI-VERDE	8.3	9.0	5.0	4.0	6.3	40.0	76.0	6.7	5.0	5.8
LSD VALUE	1.4	0.9	0.9	1.0	0.9	8.3	5.8	1.4	1.0	1.2
C.V. (%)	9.5	6.4	8.9	10.9	7.1	9.6	3.9	10.6	9.4	8.9

1/ 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).

2/ C.V. (COEFFICIENT OF VARIATION) INDICATES THE PERCENT VARIATION OF THE MEAN IN EACH COLUMN.

TABLE 4. TURFGRASS ESTABLISHMENT RATINGS OF BERMUDAGRASS CULTIVARS
IN THE 1998 USGA/GCSAA/NTEP ON-SITE BERMUDAGRASS TEST
AT MURRIETA, CA (SCGA MEMBERS CLUB) 1/
1998 DATA

TURFGRASS ESTABLISHMENT RATINGS 1-9; 9=BEST 2/

NAME	7 WEEKS	10 WEEKS
TIFGREEN	7.3	8.7
MS-SUPREME	7.3	7.7
TIFDWARF	5.7	7.0
CHAMPION	4.7	6.3
FLORADWARF	3.7	6.3
MINI-VERDE	5.0	6.0
TIFEAGLE	4.7	6.0
LSD VALUE	1.3	1.6
C.V. (%)	14.0	12.4

1/ 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).

2/ C.V. (COEFFICIENT OF VARIATION) INDICATES THE PERCENT VARIATION OF THE MEAN IN EACH COLUMN.

TABLE 5.

MEAN TURFGRASS QUALITY AND OTHER RATINGS OF BERMUDAGRASS CULTIVARS 1/
 IN THE 1998 USGA/GCSAA/NTEP ON-SITE BERMUDAGRASS TEST
 AT HOBE SOUND, FL (THE JUPITER ISLAND CLUB) 2/
 1998 DATA

TURFGRASS QUALITY AND OTHER RATINGS 1-9; 9=BEST
 TURFGRASS STIMPETER READINGS MEASURED IN INCHES

NAME	GENETIC COLOR	LEAF TEXTURE	DENSITY FALL	STIMPETER READINGS	PERCENT ESTABLISHMENT RATINGS					QUALITY RATINGS				
					JULY 14	AUG.1	AUG.14	AUG.29	SEP.26	SEP	OCT	NOV	DEC	MEAN
MINI-VERDE	8.7	8.7	8.7	91.0	31.7	60.0	85.0	96.3	99	9.0	7.0	8.7	8.0	8.2
FLORADWARF	7.3	7.3	7.0	104.7	31.7	55.0	86.7	99.0	99	8.7	7.7	7.3	6.7	7.6
TIFEAGLE	7.7	7.7	7.0	89.3	40.0	65.0	85.0	94.3	99	8.0	7.0	7.3	8.0	7.6
CHAMPION	7.7	8.0	7.3	94.7	40.0	63.3	81.7	97.0	99	7.3	6.0	7.0	8.7	7.3
TIFDWARF	7.0	6.0	6.7	92.0	25.0	53.3	80.0	96.0	99	8.0	6.3	7.3	5.7	6.8
MS-SUPREME	6.0	6.7	5.3	89.7	43.3	68.3	91.3	98.3	99	6.7	5.3	6.3	7.0	6.3
TIFGREEN	5.3	4.3	4.3	81.7	38.3	85.0	97.7	99.0	99	4.0	3.0	4.7	3.7	3.8
LSD VALUE	0.9	1.4	0.8	16.8	18.2	21.2	8.2	4.6	-	0.9	1.7	1.2	1.2	0.6
C.V. (%)	7.3	11.6	7.1	8.6	23.1	16.3	5.1	2.2	0	7.1	15.7	9.8	10.9	5.4

1/ 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).

2/ C.V. (COEFFICIENT OF VARIATION) INDICATES THE PERCENT VARIATION OF THE MEAN IN EACH COLUMN.

TABLE 6. MEAN TURFGRASS QUALITY AND OTHER RATINGS OF BERMUDAGRASS CULTIVARS
IN THE 1998 USGA/GCSAA/NTEP ON-SITE BERMUDAGRASS TEST
AT ST. CHARLES, MO (THE MISSOURI BLUFFS G. C.) 1/
1998 DATA

TURFGRASS QUALITY AND OTHER RATINGS 1-9; 9=BEST 2/

NAME	GENETIC COLOR	LEAF TEXTURE	PERCENT ESTABLISHMENT RATINGS		QUALITY RATINGS			
			SUMMER	FALL	AUG	SEP	OCT	MEAN
TIFEAGLE	6.0	6.0	46.7	91.7	4.3	5.7	3.0	4.3
TIFDWARF	7.0	6.0	33.3	91.7	3.7	5.3	3.7	4.2
TIFGREEN	5.7	5.0	26.7	96.3	4.0	5.3	3.3	4.2
CHAMPION	5.7	6.3	50.0	99.0	4.7	5.3	2.3	4.1
MINI-VERDE	6.0	6.7	36.7	99.0	4.7	4.7	2.3	3.9
MS-SUPREME	6.0	6.3	33.3	98.3	4.3	4.7	2.3	3.8
FLORADWARF	7.0	6.0	30.0	86.7	3.0	4.3	2.0	3.1
LSD VALUE	0.6	0.7	8.2	3.8	1.0	-	1.0	0.9
C.V. (%)	5.2	6.6	12.9	2.3	12.7	18.8	18.6	11.0

1/ 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).

2/ C.V. (COEFFICIENT OF VARIATION) INDICATES THE PERCENT VARIATION OF THE MEAN IN EACH COLUMN.

TABLE 7. MEAN TURFGRASS QUALITY AND OTHER RATINGS OF BERMUDAGRASS CULTIVARS
IN THE 1998 USGA/GCSAA/NTEP ON-SITE BERMUDAGRASS TEST
AT DALLAS, TX (BENT TREE COUNTRY CLUB) 1/
1998 DATA

TURFGRASS QUALITY AND OTHER RATINGS 1-9; 9=BEST 2/

NAME	GENETIC COLOR	WINTER COLOR	PERCENT ESTABLISHMENT RATINGS			QUALITY RATINGS				
			1 WEEK	5 WEEKS	8 WEEKS	SEP	OCT	NOV	DEC	MEAN
MINI-VERDE	7.7	8.0	66.7	40.0	53.3	8.3	7.0	7.7	7.7	7.7
TIFEAGLE	7.3	7.7	88.3	53.3	36.7	6.7	7.7	7.7	7.0	7.3
FLORADWARF	8.7	7.3	66.7	58.3	63.3	7.7	7.0	7.0	6.7	7.1
TIFDWARF	7.7	5.3	76.7	40.0	26.7	7.0	6.7	6.7	6.0	6.6
CHAMPION	6.7	7.7	91.7	33.3	23.3	5.7	6.3	6.3	7.0	6.3
MS-SUPREME	7.3	7.0	73.3	53.3	80.0	7.3	6.0	6.0	6.0	6.3
TIFGREEN	6.3	3.7	85.0	70.0	80.0	6.0	5.7	6.0	5.0	5.7
LSD VALUE	1.7	1.0	22.0	19.4	19.2	1.4	0.8	0.7	1.1	0.5
C.V. (%)	10.9	9.4	13.6	20.6	21.7	10.5	6.6	6.0	9.6	4.6

1/ 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).

2/ C.V. (COEFFICIENT OF VARIATION) INDICATES THE PERCENT VARIATION OF THE MEAN IN EACH COLUMN.

TABLE 8. MEAN TURFGRASS QUALITY AND OTHER RATINGS OF BERMUDAGRASS CULTIVARS
IN THE 1998 USGA/GCSAA/NTEP ON-SITE BERMUDAGRASS TEST
AT HOUSTON, TX (LAKESIDE COUNTRY CLUB) 1/
1998 DATA

TURFGRASS QUALITY AND OTHER RATINGS 1-9; 9=BEST 2/

NAME	GENETIC COLOR	ESTABLISHMENT RATING	QUALITY RATINGS			
			AUG	SEP	OCT	MEAN
MINI-VERDE	5.0	7.7	5.0	5.7	5.7	5.4
CHAMPION	4.3	6.0	5.0	5.7	5.3	5.3
FLORADWARF	4.7	6.3	4.0	4.7	5.7	4.8
MS-SUPREME	3.3	7.3	3.7	5.0	5.7	4.8
TIFEAGLE	3.0	6.3	3.3	4.7	6.0	4.7
TIFDWARF	3.3	7.0	2.3	3.3	5.0	3.6
TIFGREEN	1.0	7.3	1.0	1.0	1.0	1.0
LSD VALUE	1.9	0.8	1.6	1.3	1.1	1.2
C.V. (%)	28.4	6.6	26.1	17.5	13.0	17.3

1/ 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).

2/ C.V. (COEFFICIENT OF VARIATION) INDICATES THE PERCENT VARIATION OF THE MEAN IN EACH COLUMN.