

Update on the 1997 National Turfgrass Evaluation Program (NTEP) Bermudagrass Trial - 1998

M. H. Hall, J. E. Gaudreau, R. H. White, W. G. Menn, and G. R. Taylor

Abstract

Nineteen seeded and 10 vegetatively propagated genotypes of bermudagrass (*Cynodon* spp) were planted in July, 1997, irrigated as needed to promote vigorous growth, fertilized at the rate of 0.5 to 0.75 lb N/1000 sq ft per month during the growing season, and mowed at a height of 0.75 inches every 3-4 days with a reel-type mower.

Seeded Genotypes: Entries which received quality ratings in the top statistical category on all rating dates were Princess, OKS 95-1, PST-R69C, SWI-7, J-1224, J-540, Shangri La, and Savannah. Princess plots, while statistically similar to several other plots, received the numerically highest rating on 5 of the 7 rating dates. When ratings for the entire season were averaged, Princess plots were rated significantly higher than plots of NuMex Sahara, Majestic, Sundevil II, Pyramid, and Arizona common. Overall, there were fewer statistical differences among plots of seeded genotypes than among those of vegetatively propagated genotypes. There were no statistical differences among seeded genotypes in winter color or spring greenup.

Vegetative Genotypes: When monthly ratings were averaged for the season, Tifgreen exhibited higher quality than did OKC 19-9, Cardinal, or Mini-Verde. Tifgreen, OKC 18-4, Tifsport (Tift 94), CN 2-9, Midlawn, Tifway, and Shanghai were rated in the highest statistical grouping for quality. Tifway, Tifsport, Midlawn, Cardinal, Mini-Verde, CN 2-9, and Tifgreen exhibited the best winter color, while Shanghai, OKC 19-4, and OKC 19-9 were rated in the lowest statistical group for winter color. Cardinal and Tifway exhibited faster spring greenup than OKC 19-9.

Introduction

A study, sponsored by the National Turf Evaluation Program (NTEP), was planted in late July, 1997, at the Texas A&M University Turfgrass Field Laboratory in College Station, Tx. to compare 19 seeded and 10 vegetatively propagated genotypes of bermudagrass (*Cynodon* spp) (Table 1). This report presents data from the 1998 growing season, the first full year of the study.

Materials and Methods

An area of sandy loam soil which had been fumigated the previous year was selected for planting 29 bermudagrass genotypes. The 19 seeded varieties were planted in one part of the area in a randomized complete block design, and were replicated 3 times. Seeds were weighed out and distributed by hand at the rate of 0.85 lb seed/1000 sq ft into plots measuring 6 by 6 feet, separated by 1.5 foot alleyways, and then covered with a lightweight, porous mat to hold the seed in place. The 10 vegetative genotypes were planted as 1.5 inch square plugs on 1 foot centers in an adjacent area of the same design. All plots were planted 29 July, 1997. The study was irrigated as needed to promote

vigorous growth, fertilized at the rate of 0.5 to 0.75 lb N/1000 sq ft per month during the growing season, and mowed at a height of 0.75 inches every 3-4 days with a reel-type mower.

Results and Discussion

Seeded Genotypes

Quality

Turf quality was visually rated monthly during the growing season, except for October, when the plots were recovering from scalp damage due to mowing delays caused by rain (Table 2). Plots were rated on a 1 to 9 scale as follows: 1 = loss of stand, 5 = minimum acceptable quality for a lawn, 6 = minimum acceptable quality for a sportsfield or golf course fairway, and 9 = perfect turf quality. Entries which received ratings in the top statistical category on all rating dates were Princess, OKS 95-1, PST-R69C, SWI-7, J-1224, J-540, Shangri La, and Savannah. Princess plots, while statistically similar to several other plots, received the numerically highest rating on 5 of the 7 rating dates. When ratings for the entire season were averaged, Princess plots were rated significantly higher than plots of NuMex Sahara, Majestic, Sundevil II, Pyramid, and Arizona common. Overall, there were fewer statistical differences among plots of seeded genotypes than among those of vegetatively propagated genotypes.

Winter Color

Winter color was rated visually on 14 January, 1998 on a 1 to 9 scale, with a rating of 1 corresponding to completely brown (dormant) turf and 9 indicating completely green turf (Table 3). There were no statistical differences in winter color among seeded genotypes, and all exhibited fairly good color, probably due to the mild winter of 1997-98.

Spring Greenup

Plots were rated visually for spring greenup on 14 April, 1998 on the same 1 to 9 scale as for winter color (Table 4). It should be noted that winter color and spring greenup ratings do not necessarily relate to winter hardiness or cold tolerance. As with winter color, there were no statistical differences in spring greenup among seeded bermudagrass genotypes.

Genetic Color

Genetic color was rated visually during the summer, when the turf was not under any visible stress, on a 1 to 9 scale, with 1 indicating light green and 9 corresponding to dark green (Table 5). Genetic color ratings are not intended to classify any genotypes as superior to others, but rather to provide another characteristic of each genotype.

Vegetative Genotypes

Quality

On two of the seven rating dates, there were no significant differences in visually rated quality among genotypes, and on four of the remaining dates, at least one genotype was rated in the highest statistical group as well as the lowest group, meaning there were not particularly dramatic differences in turf quality among vegetative genotypes in 1988 (Table 6). Overall, Tifgreen exhibited higher quality than did OKC 19-9, Cardinal, or Mini-Verde. Tifgreen, OKC 18-4, Tifsport (Tift 94), CN 2-9, Midlawn, Tifway, and Shanghai were rated in the highest statistical grouping for quality.

Winter Color

Tifway, Tifsport, Midlawn, Cardinal, Mini-Verde, CN 2-9, and Tifgreen exhibited the best winter color, while Shanghai, OKC 19-4, and OKC 19-9 were rated in the lowest statistical group for winter color (Table 7).

Spring Greenup

Among vegetative genotypes, Cardinal and Tifway exhibited faster spring greenup than OKC 19-9 (Table 8).

Genetic Color

There were more differences in visually rated genetic color among vegetative than among seeded genotypes (Table 9). OKC 18-4, Shanghai, and CN 2-9 were darker green than Tifgreen and Cardinal, and Cardinal was lighter green than any other genotype.

References

Hall, M.H., J. E. Gaudreau, R. H. White, W. G. Menn, and G. R. Taylor. 1998. 1997 National Turfgrass Evaluation Program (NTEP) bermudagrass trial. TX Turfgrass Res. – 1998, Consolodated Prog. Rep. TURF 98-27: 12 p. <http://dallas.tamu.edu/pub/>.

SAS Institute. 1988. SAS/STAT: Guide for personal computers. Version 6 edition. SAS Inst., Cary, N.C.

Table 1. 1997 National Bermudagrass Test entries and sponsors.

<u>Seeded Entries</u>	<u>Sponsor</u>
Blue-Muda	Desert Sun Marketing
Majestic	H & H Seed Co.
Pyramid	International Seeds, Inc.
J-1224	Jacklin Seed Co.
Jackpot	Jacklin Seed Co.
Sundevil II	Medalist America
OKS 95-1	Oklahoma State University
Blackjack	Olsen-Fennel Seed Co.
J-540	Olsen-Fennel Seed Co.
Panama	Pure-Seed Testing, Inc.
PST-R69C	Pure-Seed Testing, Inc.
Princess	Seeds West, Inc.
SWI-7	Seeds West, Inc.
SWI-11	Seeds West, Inc.
Arizona common	Standard entry
Mirage	Standard entry
NuMex-Sahara	Standard entry
Savannah	Turf-Seed, Inc.
Shangri La	Zajac Performance Seeds

<u>Vegetative Entries</u>	<u>Sponsor</u>
Cardinal	Bladerunner Farms
CN 2-9	Clemson University
Tift 94 (Tifsport)	W. Hanna - USDA
OKC 18-4	Oklahoma State University
OKC 19-9	Oklahoma State University
Shanghai	Patten Seed Co.
Midlawn	Standard entry
Tifway	Standard entry
Tifgreen	Standard entry
Mini-Verde	Thomas Bros. Grass Co.

Table 2. Visual quality ratings of 19 seeded bermudagrass genotypes in College Station, Texas in 1998.

<u>Genotype</u>	<u>Rating Date</u>							<u>Overall</u>
	<u>4/9</u>	<u>5/18</u>	<u>6/19</u>	<u>7/23</u>	<u>8/20</u>	<u>9/23</u>	<u>11/30</u>	
Princess	6.0*	7.7	6.3	5.3	7.0	7.0	6.0	6.5
OKS 95-1	6.0	6.3	5.3	5.7	5.7	6.3	5.0	5.8
PST-R69C	5.0	5.3	4.7	4.7	6.3	6.3	5.7	5.6
SWI-7	5.7	6.3	6.0	4.7	6.0	5.7	5.0	5.6
J-1224	5.0	5.3	5.3	6.0	5.7	6.0	5.0	5.5
J-540	4.3	6.0	6.0	5.3	5.3	5.7	5.3	5.4
Panama	5.0	5.3	6.0	5.3	5.0	6.3	5.0	5.4
Shangri La	5.3	5.7	5.0	5.0	5.7	5.7	5.3	5.4
Savannah	4.7	6.0	5.7	5.0	5.7	5.3	5.0	5.3
SWI-11	5.7	6.0	5.3	4.3	4.7	5.0	5.3	5.2
Blue-Muda	4.7	5.7	5.0	5.0	5.0	5.0	5.3	5.1
Blackjack	4.7	5.7	5.3	5.3	5.0	4.7	4.3	5.0
Jackpot	4.3	6.0	5.7	4.7	5.3	5.0	4.3	5.0
Mirage	5.0	5.7	5.0	5.0	4.7	5.3	4.3	5.0
Majestic	4.7	5.3	4.7	4.7	5.0	5.0	4.7	4.9
NuMex-Sahara	4.3	5.7	5.0	4.7	4.7	5.0	4.7	4.9
Sundevil II	4.7	4.7	5.7	5.0	5.0	4.7	3.7	4.8
Pyramid	4.3	5.0	4.7	4.3	4.3	4.7	4.3	4.5
Ariz. common	3.7	5.3	4.7	4.0	4.3	3.7	4.3	4.3
MSD _{Q0.05} [†]	ns [‡]	2.4	ns	1.7	1.9	2.0	1.6	1.6

* Turf quality, visually rated, where 9=best and 1=loss of stand.

[†] MSD_{Q0.05}, Minimum significant difference between visual quality means within columns, according to Tukey's Studentized Range Test at $\alpha=0.05$.

[‡] ns, no significant difference.

Table 3. Visually rated winter color of 19 seeded bermudagrass genotypes on 14 January, 1998, in College Station, Tx.

<u>Genotype</u>	<u>Winter Color</u>
Princess	6.7*
J-540	6.3
Mirage	6.3
Savannah	6.3
Shangri La	6.3
SWI-11	6.3
Arizona common	6.0
Jackpot	6.0
Majestic	6.0
Panama	6.0
PST-R69C	6.0
Sundevil II	6.0
SWI-7	6.0
Blue-Muda	5.7
NuMex Sahara	5.7
Pyramid	5.7
OKS 95-1	5.3
Blackjack	5.0
J-1224	5.0
MSD _{C0.05} [†]	ns [‡]

* Visually rated winter color on a scale of 1 to 9, where 1=brown and 9=green.

[†] MSD_{C0.05}, Minimum significant difference between visually rated winter color means, according to Tukey's Studentized Range Test at $\alpha=0.05$.

[‡] ns, no significant difference.

Table 4. Visually rated spring greenup of 19 seeded bermudagrass genotypes on 14 April, 1998, in College Station, Tx.

<u>Genotype</u>	<u>Spring Greenup</u>
Princess	8.0*
Mirage	7.7
OKS 95-1	7.7
PST-R69C	7.7
Savannah	7.7
Shangri La	7.7
SWI-7	7.7
Panama	7.3
SWI-11	7.3
Blue-Muda	7.0
J-540	7.0
Jackpot	7.0
Majestic	7.0
Sundevil II	7.0
NuMex Sahara	6.7
Arizona common	6.3
Blackjack	6.3
J-1224	6.3
Pyramid	6.3
MSD _{G0.05} [†]	ns [‡]

* Visually rated spring greenup on a scale of 1 to 9, where 1=brown and 9=green.

[†] MSD_{G0.05}, Minimum significant difference between visually rated spring greenup means, according to Tukey's Studentized Range Test at $\alpha=0.05$.

[‡] ns, no significant difference.

Table 5. Visually rated genetic color of 19 seeded bermudagrass genotypes in 1998, in College Station, Tx.

<u>Genotype</u>	<u>Genetic Color</u>
Princess	7.7*
PST-R69C	7.7
Shangri La	7.3
Arizona common	7.0
Blue-Muda	7.0
NuMex Sahara	7.0
OKS 95-1	7.0
SWI-7	7.0
SWI-11	7.0
Jackpot	6.7
Majestic	6.7
J-1224	6.3
J-540	6.3
Mirage	6.3
Panama	6.3
Savannah	6.3
Sundevil II	6.0
Blackjack	5.7
Pyramid	5.7
MSD _{C0.05} [†]	1.8

* Visually rated genetic color on a scale of 1 to 9, where 1=light green and 9=dark green.

[†] MSD_{C0.05}, Minimum significant difference between visually rated genetic color means, according to Tukey's Studentized Range Test at $\alpha=0.05$.

Table 6. Visual quality ratings of 10 vegetatively propagated bermudagrass genotypes in College Station, Texas in 1998.

Genotype	Rating Date							Overall
	4/9	5/18	6/19	7/23	8/20	9/23	11/30	
Tifgreen	5.0*	6.3	6.0	6.3	7.0	7.3	6.7	6.4
OKC 18-4	5.3	7.0	7.0	4.7	5.7	6.7	5.3	6.0
Tift 94	5.0	6.3	6.0	4.7	5.7	7.7	5.0	5.8
CN 2-9	4.3	6.3	6.3	5.7	6.0	6.0	4.7	5.6
Midlawn	5.3	7.0	6.0	4.3	5.3	6.7	4.7	5.6
Tifway	5.3	7.0	6.3	4.7	5.3	6.0	4.7	5.6
Shanghai	5.3	6.7	6.0	4.3	5.0	6.3	4.7	5.5
OKC 19-9	4.3	6.0	5.3	5.0	5.7	6.3	4.3	5.3
Cardinal	5.3	7.0	5.0	4.0	4.3	5.7	4.3	5.1
Mini-Verde	3.3	4.0	4.0	4.3	5.0	6.0	5.3	4.6
MSD _{Q0.05} [†]	ns [‡]	1.9	1.9	2.1	1.6	ns	1.4	1.0

* Turf quality, visually rated, where 9=best and 1=loss of stand.

[†] MSD_{Q0.05}, Minimum significant difference between visual quality means within columns, according to Tukey's Studentized Range Test at $\alpha=0.05$.

[‡] ns, no significant difference.

Table 7. Visually rated winter color of 10 vegetatively propagated bermudagrass genotypes on 14 January, 1998, in College Station, Tx.

<u>Genotype</u>	<u>Winter Color</u>
Tifway	7.7*
Tifsport	7.3
Midlawn	7.0
Cardinal	7.0
Mini-Verde	6.3
CN 2-9	6.3
Tifgreen	6.0
Shanghai	4.3
OKC 18-4	3.3
OKC 19-9	3.0
MSD _{C0.05} [†]	2.6

* Visually rated winter color on a scale of 1 to 9, where 1=brown and 9=green.

[†]MSD_{C0.05}, Minimum significant difference between visually rated winter color means, according to Tukey's Studentized Range Test at $\alpha=0.05$.

Table 8. Visually rated spring greenup of 10 vegetatively propagated bermudagrass genotypes on 14 April, 1998, in College Station, Tx.

<u>Genotype</u>	<u>Spring Greenup</u>
Cardinal	7.7*
Tifway	7.7
TIFT 94	7.3
Tifgreen	7.3
Midlawn	6.7
CN 2-9	6.3
Mini-Verde	6.0
Shanghai	5.7
OKC 18-4	5.7
OKC 19-9	4.7
MSD _{G0.05} [†]	2.9

* Visually rated spring greenup on a scale of 1 to 9, where 1=brown and 9=green.

† MSD_{G0.05}, Minimum significant difference between visually rated spring greenup means, according to Tukey's Studentized Range Test at $\alpha=0.05$.

Table 9. Visually rated genetic color of 10 vegetatively propagated bermudagrass genotypes in 1998, in College Station, Tx.

<u>Genotype</u>	<u>Genetic Color</u>
OKC 18-4	8.0*
Shanghai	8.0
CN 2-9	7.7
Tifway	7.3
TIFT 94	7.3
Midlawn	7.3
Mini-Verde	7.0
OKC 19-9	7.0
Tifgreen	6.0
Cardinal	4.0
MSD _{C0.05} [†]	1.5

* Visually rated genetic color on a scale of 1 to 9, where 1=light green and 9=dark green.

[†] MSD_{C0.05}, Minimum significant difference between visually rated genetic color means, according to Tukey's Studentized Range Test at $\alpha=0.05$.