

Golf Green Bermudagrass Evaluation and Adaption Trial - 1998

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Abstract

Thirteen relatively new bermudagrass (*Cynodon* spp) genotypes, as well as Tifdwarf and Tifgreen bermudagrass, and Diamond zoysiagrass (*Zoysia matrella*) were established for this study in 1997. After establishment, half of the study was mowed at 0.125 inch and the other half at 0.188 inch. On 28 October, 1997, the study was overseeded in a split-plot design, with one half of each plot overseeded with roughstalk bluegrass (*Poa trivialis*) @ 15 lbs seed/1000 square feet and the other half with perennial ryegrass (*Lolium perenne*) @ 30 lbs seed/1000. After overseeding, all plots were mowed at 0.188 inch throughout the fall, winter, and spring. Mowing height differentials were once again imposed in early summer, 1998. The type of overseeding grass planted in the fall of 1997 affected turf quality throughout the summer of 1998, even though the overseeded grasses themselves had died out by early summer. At the 0.188 inch cutting height, Mini-Verde, Tifeagle, Mobile, MS Supreme, and Champion were rated in the highest statistical grouping for quality on each of the five rating dates where differences occurred whether they had been overseeded with *Poa trivialis* or ryegrass. With all rating dates averaged, Mini-Verde, Tifeagle, Mobile, Lakewood, MS Supreme, Champion, and Tif 94-18 were rated in the top statistical group for quality when overseeded with either *Poa trivialis* or ryegrass. When overseeded with *Poa trivialis*, Floradwarf and Tifdwarf were also rated in the top statistical group. At the 0.125 inch cutting height, only Mini-Verde, Tifeagle, and Champion were rated in the top statistical group for quality on all six rating dates whether they had been overseeded with *Poa trivialis* or ryegrass. When overseeded with ryegrass, Floradwarf was also rated in the top group on all six rating dates. When ratings for all dates were averaged, Mini-Verde, Tifeagle, Champion, MS Supreme, Mobile, Lakewood, and Floradwarf were in the highest group for quality when overseeded with *Poa trivialis*, whereas Miniverde, Tifeagle, and Champion were rated highest for quality when overseeded with ryegrass.

Introduction

Several new bermudagrass (*Cynodon* spp.) genotypes have recently become available, including some dwarf types that may be especially suited for the very low mowing heights of modern high intensity golf putting greens. Thirteen relatively new bermudagrass genotypes, as well as Tifdwarf and Tifgreen bermudagrass, and Diamond zoysiagrass (*Zoysia matrella*) were established for this study, after which they were overseeded with roughstalk bluegrass (*Poa trivialis*) or perennial ryegrass (*Lolium perenne*).

Materials and Methods

All 15 bermudagrass genotypes were planted as 1 inch plugs on 6 inch centers in plots measuring 6 by 5 feet on 28 May, 1997 into a previously fumigated sand based putting green built to United States Golf Association specifications at the Texas A&M University Turfgrass Field Laboratory in College Station, Texas. Diamond zoysiagrass was solid sodded by piecing together strips of sod 1 week later. The plots were arranged into two randomized complete block designs, each with three replications, so that each area could be mowed at a different height of cut when the plots were covered. When establishment was complete, one area was mowed at 0.125 inch and the other at 0.188 inch. Irrigation and fertilization were applied as needed to maintain good turf quality, and the area was topdressed regularly with a sand mix similar to the rootzone to maintain smoothness. On 28 October, 1997, the study was overseeded in a split-plot design, with one half of each plot overseeded with roughstalk bluegrass @ 15 lbs seed/1000 square feet and the other half with perennial ryegrass @ 30 lbs seed/1000. After overseeding, all plots were mowed at 0.188 inch throughout the fall, winter, and spring. Mowing height differentials were once again imposed in early summer, 1998.

Results and Conclusions

Although all plots were mowed at the same height after overseeding, the mowing height of the plot before overseeding had an effect on the performance of the overseeded grasses. This was most likely due to turf density differences at overseeding caused by different mowing heights over the course of the summer growing season. Seed to soil contact can easily be affected by turf density, in that denser turf may not allow as much seed to filter down to the soil and become successfully established. The type of overseeding grass planted in the fall of 1997 affected turf quality throughout the summer of 1998, even though the overseeded grasses themselves had died out by early summer.

0.188 Inch Height of Cut

Percent Overseeding Coverage

On the first rating date, there were no significant differences in overseeding coverage among base grass genotypes for either overseeding treatment (Table 1). Tif 94-18 and Tif 94-16 were rated in the highest statistical group on every other rating date whether overseeded with *Poa trivialis* or ryegrass, as was Tif 94-29 except on the second rating date when overseeded with Ryegrass. Only MS Supreme was in the lowest statistical group for both overseeding treatments on all three of the rating dates when there were statistical differences. Tif 94-21, Tifgreen, Floradwarf, and Baby were rated in the lowest statistical group on the last three rating dates when overseeded with ryegrass.

Quality

Plots were visually rated for quality six times during the spring, summer and fall of 1998. The type of grass used for overseeding the previous fall and winter had an effect on turf quality through August. Generally, plots overseeded with *Poa trivialis* exhibited better quality in the spring, and those

overseeded with ryegrass were better in quality during the summer (Table 2). When all ratings were averaged for the year, there was no difference in quality between plots overseeded with *Poa trivialis* and those overseeded with ryegrass. There were statistical differences in quality among bermudagrass genotypes except in July (Table 3). Mini-Verde, Tifeagle, Mobile, MS Supreme, and Champion were rated in the highest statistical grouping on each of the five rating dates where differences occurred whether they had been overseeded with *Poa trivialis* or ryegrass. When overseeded with *Poa trivialis*, Floradwarf was also rated in the highest statistical group on five rating dates. Tif 94-16, Tif 94-21, and Tifgreen were rated in the lowest statistical group on five rating dates regardless of which grass they had been overseeded with. Baby was rated in the lowest group on five rating dates when overseeded with *Poa trivialis*. With all rating dates averaged, Mini-Verde, Tifeagle, Mobile, Lakewood, MS Supreme, Champion, and Tif 94-18 were rated in the top statistical group when overseeded with either *Poa trivialis* or ryegrass. When overseeded with *Poa trivialis*, Floradwarf and Tifdwarf were also rated in the top statistical group. TXTD 67 was also rated in the highest group when overseeded with ryegrass.

0.125 Inch Height of Cut

Percent Overseeding Coverage

For plots which had previously been mowed at 0.125 inch, there were statistical differences in overseeding coverage among base grass genotypes for both overseeding treatments on all rating dates except the last one for plots overseeded with *Poa trivialis* (Table 4). Tif 94-18, Tif 94-16, and Tif 94-29 were rated in the highest statistical group for both overseeding treatments on every rating date where a statistical difference was present. Baby and Tifgreen were rated in the lowest statistical group on every rating date when overseeded with ryegrass. When overseeded with *Poa trivialis*, Tifgreen, Diamond zoysiagrass, MS Supreme, Tifdwarf, Mini-Verde, and Floradwarf were rated in the lowest statistical group on every rating date when differences were present. By 18 March, all plots overseeded with *Poa trivialis* were similar and at least 80 % covered, whereas 10 genotypes overseeded with ryegrass were still less than 80 % covered.

Quality

At the 0.125 inch mowing height, on 3 of the 4 rating dates where there was a difference, and when ratings for all dates were averaged, plots overseeded with ryegrass exhibited higher quality than those overseeded with *Poa trivialis* (Table 5). There were quality differences among genotypes on all six rating dates (Table 6). As with the higher mowing height, bermudagrass quality was affected through the summer by the type of overseeding grass planted the previous fall. Only Mini-Verde, Tifeagle, and Champion were rated in the top statistical group on all six rating dates whether they had been overseeded with *Poa trivialis* or ryegrass. When overseeded with ryegrass, Floradwarf was also rated in the top group on all six rating dates. Tif 94-16, Baby, and Tif 94-29 were rated in the lowest statistical group on all six rating dates when overseeded with ryegrass. Tif 94-16, Baby, Tif 94-21, Tif 94-29, and Tifgreen were rated in the lowest group for quality on at least five of the six rating dates regardless of which grass they had been overseeded with. When ratings for all dates were averaged,

Mini-Verde, Tifeagle, Champion, MS Supreme, Mobile, Lakewood, and Floradwarf were in the highest group for quality when overseeded with *Poa trivialis*, whereas Miniverde, Tifeagle, and Champion were rated highest for quality when overseeded with ryegrass. Diamond zoysiagrass, Tif 94-16, Baby, Tif 94-29, and Tifgreen were rated in the lowest group for the season regardless of which overseeding grass had been used. Tif 94-21 and Tifdwarf were also rated in the lowest group when overseeded with *Poa trivialis*.

Summary

0.188 Inch Height of Cut

The highest percentage of overseeding was produced on Tif 94-18 and Tif 94-16 whether *Poa trivialis* or ryegrass was planted. By 18 March, 14 genotypes which were overseeded with *Poa trivialis* were at least 80 % covered, while only one genotype was 80 % covered by ryegrass.

The type of grass used for overseeding the previous fall and winter had an effect on turf quality through August. Generally, plots overseeded with *Poa trivialis* exhibited better quality in the spring, and those overseeded with ryegrass were better in quality during the summer. Mini-Verde, Tifeagle, Mobile, MS Supreme, and Champion were rated in the highest statistical grouping for quality on each of the five rating dates where differences occurred whether they had been overseeded with *Poa trivialis* or ryegrass. When overseeded with *Poa trivialis*, Floradwarf was also rated in the highest statistical group on five rating dates.

0.125 Inch Height of Cut

Tif 94-18, Tif 94-16, and Tif 94-29 were rated in the highest statistical group for percentage of overseeding present for both overseeding treatments on every rating date where a statistical difference was present. By 18 March, all plots overseeded with *Poa trivialis* were similar and at least 80 % covered, whereas 10 plots overseeded with ryegrass were still less than 80 % covered.

As with the higher mowing height, bermudagrass quality was affected through the summer by the type of overseeding grass planted the previous fall. Mini-Verde, Tifeagle, and Champion were rated in the top statistical group on all six rating dates whether they had been overseeded with *Poa trivialis* or ryegrass. When overseeded with ryegrass, Floradwarf was also rated in the top group on all six rating dates.

References

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Table 1. Visual percent overseeding coverage of 15 bermudagrasses and a zoysiagrass mowed at 0.188 inches and overseeded 28 Oct., 1997 at the Texas A&M University Turfgrass Field Laboratory in College Station, Tx.

Genotype	11/24/97		1/9/98		2/12/98		3/18/98	
	Poa	Ryegrass	Poa	Ryegrass	Poa	Ryegrass	Poa	Ryegrass
Tif 94-18	60.0	21.7	93.3	61.7	94.3	73.3	96.0	78.3
Tifdwarf	56.7	21.7	85.0	23.3	88.3	36.7	88.3	61.7
Tif 94-16	55.0	16.7	93.3	70.0	97.7	76.7	99.3	80.0
Diamond Zoy.	51.7	20.0	80.0	26.7	75.0	33.3	80.0	41.7
TXTD 67	48.3	18.3	81.7	30.0	81.7	35.0	81.0	66.7
Mini-Verde	46.7	16.7	78.3	35.0	81.7	43.3	91.7	76.7
Mobile	46.7	18.3	80.0	33.3	76.7	45.0	85.7	75.0
Tif 94-29	46.7	11.7	90.0	41.7	94.3	68.3	96.0	71.7
Lakewood	46.7	18.3	76.7	21.7	80.0	43.3	90.0	60.0
MS Supreme	46.7	15.0	58.3	18.3	62.7	23.3	79.3	46.7
Tif 94-21	46.7	13.3	81.7	21.7	76.7	33.3	78.3	41.7
Champion	45.0	16.7	76.7	38.3	78.3	46.7	88.3	73.3
Tifgreen	43.3	15.0	83.3	16.7	76.7	30.0	84.3	53.3
Floradwarf	43.3	15.0	76.7	16.7	80.0	26.7	86.7	46.7
Baby	41.7	13.3	76.7	10.0	76.7	20.0	81.0	38.3
Tifeagle	38.3	15.0	75.0	20.0	80.0	28.3	90.0	66.7
MSD _{C0.05} [*]	ns [†]	ns	16.8	14.3	14.2	17.1	9.8	18.1

* MSD_{C0.05}, Minimum significant difference between visual percent overseeding means within columns, according to Tukey's Studentized Range Test at $\alpha=0.05$.

[†] ns, no significant difference.

Table 2. Visual quality ratings of 15 bermudagrass genotypes and 1 zoysiagrass genotype mowed at 0.188 inches and overseeded with roughstalk bluegrass or perennial ryegrass in College Station, Texas in 1998.

Overseeding Genotype	Rating Date								1998 Mean
	4/9	4/30	5/20	6/12	7/2	7/22	8/20	9/28	
Ryegrass	5.4*	3.9	5.3	6.2	6.0	6.0	5.8	4.8	5.4
Bluegrass	6.2	5.4	4.4	4.4	5.0	5.2	6.0	4.8	5.2
FLSD _{Q0.05} [†]	0.3	0.5	0.5	0.3	ns [‡]	0.6	0.1	ns	ns

* Visual turfgrass quality ratings based on 1=worst and 9=best possible.

[†] FLSD_{Q0.05}, Fisher's Protected Least Significant Difference for comparison of turfgrass quality ratings within columns.

[‡] ns, No significant difference.

Table 3. Visual quality ratings of 15 bermudagrasses and a zoysiagrass mowed at 0.188 inches at the Texas A&M University Turfgrass Field Laboratory in College Station, Texas in 1998.

Genotype	4/9/98		5/20/98		6/12/98		7/22/98		8/20/98		9/28/98		Overall	
	Poa*	Rye	Poa	Rye	Poa	Rye	Poa	Rye	Poa	Rye	Poa	Rye	Poa	Rye
Miniverde	8.0 [†]	7.7	5.8	6.5	5.0	7.3	5.5	6.7	7.3	7.3	6.3	6.3	6.3	6.8
Tifeagle	7.3	6.0	5.5	6.5	4.8	7.5	5.7	6.0	6.8	6.5	6.2	6.2	6.0	6.2
Mobile	7.3	7.0	4.8	5.8	4.5	6.2	4.7	5.7	7.2	7.2	6.2	6.2	5.7	6.0
Lakewood	7.3	6.0	4.3	5.2	4.8	6.0	4.5	5.0	7.3	7.3	4.8	4.8	5.6	5.5
MS Supreme	6.3	5.3	4.8	5.8	4.7	7.3	5.5	6.0	7.7	7.2	5.3	5.3	5.6	6.0
Champion	7.0	6.0	4.5	6.0	4.5	6.3	4.8	5.7	6.7	6.7	6.2	6.2	5.5	5.8
Floradwarf	6.7	4.3	4.8	5.7	4.3	6.3	4.7	5.7	6.5	5.8	5.8	5.8	5.4	5.3
Tif 94-18	6.7	6.0	5.8	6.3	4.8	7.0	5.8	6.3	4.5	4.5	3.8	3.8	5.3	5.4
Tifdwarf	6.3	4.7	3.8	4.7	4.3	6.2	5.2	5.5	6.7	6.0	4.3	4.3	5.3	5.1
TXTD 67	5.7	4.7	4.2	6.0	4.5	7.2	4.7	5.7	6.2	6.2	4.5	4.5	5.0	5.6
Tifgreen	5.7	5.0	4.5	5.0	4.0	5.7	5.0	6.2	5.7	5.7	4.0	4.0	4.9	5.3
Tif 94-29	6.7	6.7	4.0	4.8	4.0	5.2	5.7	7.0	4.2	4.2	3.2	3.2	4.8	5.2
Tif 94-21	4.3	5.0	3.7	4.7	4.2	6.0	6.5	6.5	4.7	4.3	3.7	3.7	4.6	5.1
Baby	4.7	4.3	3.2	3.8	3.8	5.2	5.3	6.2	5.0	5.0	3.8	3.8	4.4	4.7
Diamond	4.3	3.3	3.3	4.0	3.5	4.5	4.5	6.0	5.3	5.3	6.0	6.0	4.3	4.6
Tif 94-16	5.0	4.3	3.0	4.0	4.0	5.0	5.3	6.2	4.0	4.0	3.0	3.0	4.0	4.4
MSD _{Q0.05} [‡]	2.3	2.5	1.8	2.4	0.9	2.0	2.1	2.2	1.9	2.9	1.3	1.3	1.1	1.5

* In fall, 1997, one half of each plot was overseeded with *Poa trivialis* and the other half with perennial ryegrass.

[†] 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 $\alpha=0.05$

Table 4. Visual percent overseeding coverage of 15 bermudagrasses and a zoysiagrass mowed at 0.125 inches and overseeded 28 Oct., 1997 at the Texas A&M University Turfgrass Field Laboratory in College Station, Tx.

Genotype	11/24/97		1/9/98		2/12/98		3/18/98	
	Poa	Ryegrass	Poa	Ryegrass	Poa	Ryegrass	Poa	Ryegrass
Tif 94-21	61.7	18.3	97.0	81.7	86.7	75.0	80.0	68.3
Tif 94-18	58.3	18.3	99.3	93.3	97.7	88.3	97.7	95.3
Tif 94-16	56.7	18.3	98.3	91.7	99.3	88.3	94.3	88.3
Tif 94-29	56.7	16.7	100	93.3	99.3	86.7	96.7	85.0
Baby	50.0	11.7	83.3	31.7	81.0	43.3	82.7	68.3
Mobile	48.3	16.7	90.0	60.0	86.7	68.3	89.3	85.0
Lakewood	46.7	16.7	92.7	50.0	89.3	60.0	91.7	80.0
Champion	38.3	13.3	94.3	53.3	91.7	55.0	95.0	81.0
Tifgreen	38.3	11.7	86.7	35.0	85.0	41.7	86.7	70.0
TXTD-67	36.7	13.3	86.7	41.7	86.0	46.7	87.7	73.3
Diamond Zoy.	36.7	15.0	78.3	33.3	76.7	40.0	84.3	58.3
Tifeagle	35.0	15.0	85.0	35.0	85.0	38.3	90.0	75.0
MS Supreme	35.0	11.7	86.7	35.0	83.3	38.3	86.0	71.7
Tifdwarf	35.0	15.0	81.7	35.0	83.3	40.0	86.0	73.3
Mini-Verde	31.7	13.3	83.3	38.3	82.7	40.0	86.7	77.3
Floradwarf	31.7	13.3	87.7	45.0	83.3	41.7	87.0	75.0
MSD _{C0.05} *	10.0	4.5	10.2	14.7	7.9	14.2	ns [†]	11.8

* MSD_{C0.05}, Minimum significant difference between visual percent overseeding means within columns, according to Tukey's Studentized Range Test at $\alpha=0.05$.

[†] ns, no significant difference.

Table 5. Visual quality ratings of 15 bermudagrass genotypes and 1 zoysiagrass genotype mowed at 0.125 inches and overseeded with roughstalk bluegrass or perennial ryegrass in College Station, Texas in 1998.

Overseeding Genotype	Rating Date								1998 Mean
	4/9	4/30	5/20	6/12	7/2	7/22	8/20	9/28	
Ryegrass	5.3*	4.3	5.4	6.0	5.8	4.2	4.7	4.6	5.0
Bluegrass	5.4	5.0	4.5	4.1	4.5	4.1	5.4	4.6	4.7
FLSD _{Q0.05} [†]	ns [‡]	ns	0.5	0.5	0.4	ns	0.2	ns	0.2

* Visual turfgrass quality ratings based on 1=worst and 9=best possible.

[†] FLSD_{Q0.05}, Fisher's Protected Least Significant Difference for comparison of turfgrass quality ratings within columns.

[‡] ns, No significant difference.

Table 6. Visual quality ratings of 15 bermudagrasses and a zoysiagrass mowed at 0.125 inches at the Texas A&M University Turfgrass Field Laboratory in College Station, Texas in 1998.

Genotype	4/9/98		5/20/98		6/12/98		7/22/98		8/20/98		9/28/98		Overall	
	Poa*	Rye	Poa	Rye	Poa	Rye	Poa	Rye	Poa	Rye	Poa	Rye	Poa	Rye
Miniverde	6.3 [†]	6.2	6.2	7.2	5.0	7.0	6.0	6.8	7.8	7.8	6.2	6.2	6.1	6.6
Tifeagle	6.3	5.2	5.3	5.8	4.8	6.5	5.8	6.0	7.2	7.2	6.5	6.5	5.9	6.0
Mobile	6.5	7.5	5.2	5.7	4.3	6.5	4.2	4.2	6.7	5.8	5.0	5.0	5.3	5.7
Lakewood	7.0	5.5	4.8	5.2	4.3	5.7	5.0	4.7	5.5	4.7	4.5	4.5	5.2	5.0
MS Supreme	5.5	5.3	5.3	5.7	4.5	6.2	5.7	5.0	7.8	5.7	4.8	4.8	5.5	5.3
Champion	6.7	6.2	5.0	6.3	4.5	6.3	5.3	5.2	7.0	5.8	5.7	5.7	5.7	5.8
Floradwarf	6.0	5.7	4.7	6.0	4.2	6.7	5.0	5.5	5.5	5.7	6.0	6.0	5.1	5.7
Tif 94-18	5.7	6.0	5.5	7.2	4.8	6.8	3.0	2.7	4.7	3.8	4.2	4.2	4.8	5.1
Tifdwarf	5.0	5.0	3.8	5.0	4.0	6.2	3.3	4.0	4.2	4.0	3.8	3.8	4.2	4.8
TXTD 67	5.3	5.8	4.5	6.2	4.2	7.0	4.2	4.2	5.3	5.0	4.5	4.5	4.8	5.4
Tifgreen	4.7	4.3	4.3	5.0	3.7	5.7	3.0	3.7	3.8	3.5	3.7	3.7	4.0	4.4
Tif 94-29	5.3	5.0	4.0	4.5	3.7	5.0	2.7	2.7	4.3	3.2	3.8	3.8	4.1	4.2
Tif 94-21	3.3	5.3	3.7	5.0	3.7	6.3	2.7	2.3	4.5	3.5	4.0	4.0	3.7	4.8
Baby	4.0	3.8	3.5	4.3	3.8	5.2	3.0	3.7	3.7	3.0	3.3	3.3	3.7	4.1
Diamond	4.0	3.0	3.0	3.7	2.3	4.0	3.3	4.3	4.8	3.5	4.8	4.8	3.5	3.8
Tif 94-16	4.0	4.3	3.3	4.2	3.7	4.7	3.3	3.0	4.0	2.8	3.5	3.5	3.8	4.0
MSD _{Q0.05} [‡]	2.9	2.6	1.6	1.4	1.3	1.3	1.8	1.9	1.9	2.8	1.3	1.3	1.0	0.8

* In fall, 1997, one half of each plot was overseeded with *Poa trivialis* and the other half with perennial ryegrass.

[†] 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 $\alpha=0.05$.