

EXECUTIVE SUMMARY

EVALUATING BERMUDAGRASS FOR PUTTING GREENS

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The experiment consists of 12 bermudagrass ecotypes or cultivars, each planted in replicated blocks on USGA or native soil putting greens. The objective of the research was to evaluate these bermudagrasses to determine their suitability as putting green grasses in the southeastern United States. Beginning in June, 1996 mowing heights of 1/8 and 3/16 inch were superimposed over the grasses. Grasses were mowed 6 out of 7 days, with grasses receiving the 1/8-inch mowing height treatment often double-mowed to prevent scalping and poor turf quality.

Data collection included: 1) evaluations of mole cricket damage (no significant difference due to grass type found), 2) quality ratings, 3) stimpmeter readings, 4) overseed quality ratings, 5) seedhead production counts, and, 6) spring greenup ratings. An additional study was initiated which evaluated ecotype/cultivar response to herbicide application. Preliminary evidence in this study indicates differences in ecotype/cultivar response to various herbicides.

Average stimpmeter readings for the grasses were greater at the 1/8 inch mowing height than at the 3/16 inch mowing height. Average stimp distances at the 1/8 inch height were 6.6 on June 28 and 8.2 feet on Sept. 19, and average distance at the 3/16 inch height were 6.4 on June 28 and 7.3 feet on Sept. 19. Stimpmeter readings were always higher on the USGA green when compared to those obtained on the native soil green. Grasses with high quality turf that had the best stimpmeter readings were TW72 and the ecotype Lakewood, a selection from the Lakewood C.C. in New Orleans.

The ecotype from the Mobile #10 green of the Mobile C.C. (AL.) always had the fastest spring greenup, but this grass also exhibited undesirable traits of seedhead production and poor turf quality later in the season. None of the other *C. dactylon* x *C. transvaalensis* hybrids demonstrated superior ability to green up in the spring. In later quality ratings the grasses TW72, Mobile #9, T596, Texas and the Industry Check all exhibited high turf quality ratings. The ecotype from the #9 green of the Mobile Country Club and the cultivar TW72 both performed well at the 1/8-inch mowing height. These two grasses did not produce seedheads, as did several of the other grasses (Mobile #10, Lakewood, Tifgreen, Tifdwarf).

Variants of Tifdwarf showed differences in phenotypic behavior, and some of these ecotypes (Mobile #9) show promise as putting green grasses. The cultivar TW72 performed well in most tests, and tolerates a 1/8 inch mowing height very well. This mowing height was very stressful to many of the grasses, especially Tifgreen.

Percentage time devoted to research: PI (10%), Technicians and student labor (35%)

Summary of expenditures (fiscal year):

Salaries (Graduate student)	8,250.03
Student labor	1,286.25
Materials/supplies	5,088.54
<u>Indirect Costs</u>	<u>2,339.97</u>
Total	16,964.79

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AUBURN, AL

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This annual report discusses 1996 research results from the bermudagrass cultivar/ecotype project at Auburn University. The objective of this research is to evaluate bermudagrass cultivars or ecotypes on both USGA and native soil putting greens.

The experiment consists of 12 bermudagrass ecotypes or cultivars, each planted in replicated blocks on USGA or native soil putting greens (Table 1). Each cultivar main block is 3 feet wide and 25 feet long. Beginning in June, 1996 each cultivar main block was split in half, and mowing heights of 1/8 and 3/16-inch were superimposed over the grasses. Mowing at these heights continued until October, 1996, when both greens were overseeded with *Poa trivialis*. A uniform 3/16 inch mowing height will be applied until the spring transition, when the 1/8 and 3/16 mowing heights will be reapplied for 1997. Traffic was applied every day using a simulated traffic tool studded with golf spikes.

Three additional test sites were established in the spring of 1996, all consisting of large unreplicated plots on golf course practice putting greens. Participating courses are: 1) Burningtree Country Club, Decatur, AL., 2) Azalea City Golf Course, Mobile, AL, and, 3) Tupelo Country Club, Tupelo, MS. Data collection from these sites will only consist of visual ratings of turf quality, and other data the superintendent may wish to collect.

Table 1. Bermudagrass cultivars/ecotypes planted at Auburn University test site.

<u>Cultivar or ecotype</u>	<u>Location/supplier</u>	<u>Type</u>
Tifdwarf	Mobile #9 green, AL	ecotype
Tifdwarf [†]	Mobile #10 green, AL	ecotype
Tifgreen [†]	GA experiment station	cultivar
Tifdwarf [†]	GA experiment station	cultivar
Tifdwarf [†]	Lakewood C.C., LA	ecotype
Tifdwarf	Texas	ecotype
Tifdwarf	Turf industry check	cultivar
T596	GA experiment station	cultivar
‡TW72 [†]	GA experiment station	cultivar
Tifdwarf	Gulfshores, AL	ecotype
2747-OK	Oklahoma State	C. transvaalensis
2352-OK	Oklahoma State	C. transvaalensis

[†] selected grasses planted at the 3 participating golf course sites.

Additional grasses tested at the 3 participating golf course sites:

Champion	Coastal turf	cultivar
MS Supreme	Mississippi State	cultivar
FloraDwarf	Florida	cultivar

‡ All data concerning TW72 not available for general release - confidential until patent is obtained.

Because of mismanagement of the plots extremely heavy thatch had developed on the putting greens (Table 2). Thus, in May, 1996 every plot was stripped as sod, and the grasses were allowed to regrow. Heavy topdressing was used to smooth the green, and spot applications of topdressing were applied to fill uneven spots that had developed in the USGA green. All additional management practices are provided in Table 3.

Table 2. Thatch depth of bermudagrasses on USGA and native soil greens (April 12, 1996).

Grass	USGA	native
	----- cm -----	
TW72	4.8 (0.1) [†]	4.5 (0.3)
Gulfshores	5.1 (0.2)	4.5 (0.2)
Mobile #9	4.9 (0.2)	4.3 (0.1)
Mobile #10	5.0 (0.4)	4.2 (0.2)
Lakewood	4.7 (0.2)	4.2 (0.2)
Texas	4.5 (0.4)	4.1 (0.2)
Tifdwarf	4.5 (0.3)	4.1 (0.3)
T596	4.4 (0.3)	3.9 (0.3)
Industry check	4.7 (0.3)	4.1 (0.2)
Tifgreen	5.0 (0.4)	3.8 (0.2)
OK 2747	4.5 (0.4)	3.5 (0.3)
OK 2352	4.5 (0.3)	3.4 (0.3)

[†] numbers in parentheses represent standard deviation about the mean.

Table 3. Management practices associated with USGA and native soil putting greens.

June 20, 1996	Aerify and topdress each green 2 lbs N/1000 ft ² in June
July, 1996	2.0 lbs N/1000 ft ²
August, 1996	2.0 lbs N/1000 ft ²
September, 1996	1.0 lb N/1000 ft ²
October, 1996	Verticut and overseed (10 lbs Poa trivialis 'Sabre'/1000 ft ²) 1.0 lb N/1000 ft ²

Plots were mowed June-October at 1/8 or 3/16-inch 6 days out of 7. Due to severe scalping of turf plots receiving 1/8 mowing height were double cut for 4 weeks in late August and early September.

Data collection included: 1) mole cricket evaluation on Nov 21, 1995 (no significant difference in feeding due to grass type found), 2) quality ratings on Nov 23, 1995, May 31, 1996, July 12, 1996 and Sept 18, 1996, 3) overseeding quality rating on March 26, 1996, 4) seedhead production rating on July 12, 1996, 5) spring greenup rating on March 16, 1996, and, 6) morning and afternoon stimpmeter readings on June 28, 1996 and Sept 19, 1996.

Data collected before mowing height variables were imposed:

Green type (USGA or native) did not affect grass quality on Nov 23 or May 31, although overseeding quality, thatch production and spring greenup were all affected by the type of putting green. When averaged over both putting greens only the Mobile #10 grass consistently rated at the bottom in quality (Table 4).

Table 4. Quality ratings of bermudagrass cultivars/ecotypes, averaged over putting green type.

<u>Grass</u>	<u>Nov 23, 1996[‡]</u>	<u>May 31, 1996</u>
Tifdwarf	7.9 a [†]	4.5 c
Mobile #9	7.8 a	5.0 ab
Gulfshores	7.5 ab	3.9 c
Industry check	7.5 ab	4.5 abc
Lakewood	7.4 ab	4.0 c
Tifgreen	7.4 ab	4.4 bc
TW72	7.3 abc	4.9 ab
T596	7.3 abc	4.9 ab
Texas	7.0 bcd	5.1 a
OK2747	6.9 bcd	4.1 c
OK 2352	6.6 cd	3.9 c
Mobile #10	6.5 d	1.5 d

10: highest quality

[†] numbers within each date followed by the same letter are not significantly different at $\alpha = 0.05$.

[‡] Ratings based on appearance of *Poa trivialis*

The Mobile #10 grass suffered from winterkill, and low ratings reflect the patchiness of the turf as a result of that winterkill. Interestingly, the Mobile #10 grass is always the darkest green grass (Table 5), and it also has a very fine texture. This grass always scores highest in spring greenup ratings (significantly higher than any other grass), usually followed by the two *transvaalensis* selections. Unfortunately, the Mobile #10 grass produces many seedheads, a characteristics which renders it undesirable as a putting green grass. However, it might show promise as breeding stock for future crosses.

The Gulfshores ecotype consistently showed chlorotic spots, regardless of type of putting green. No specific diseases were isolated from the grass, and the cause of the off-color is not known at this time.

Table 5. Spring greenup of bermudagrass as affected by green type.

Grass	USGA ----- greenup rating -----	native -----
Tifdwarf	3.8 (0.5)	3.5 (0.6)
Mobile #9	3.5 (0.6)	3.5 (0.6)
Gulfshores	3.5 (0.6)	3.3 (0.5)
Industry check	3.5 (0.6)	3.5 (0.6)
Lakewood	3.3 (0.5)	3.5 (0.6)
Tifgreen	3.3 (0.5)	3.3 (0.5)
TW72	3.0 (0.0)	3.5 (0.6)
T596	3.8 (0.5)	3.3 (0.5)
Texas	3.5 (0.6)	3.8 (0.5)
OK2747	3.8 (0.5)	6.0 (1.6)
OK 2352	5.0 (1.8)	3.5 (0.6)
Mobile #10	6.6 (0.5)	6.3 (0.3)

10: greenest

Data collected after mowing height variables were imposed:

Stimpmeter readings

Except for morning readings on June 28, 1996, stimpmeter readings were significantly affected by mowing height. When mowing height did affect stimp readings they were always lower in grasses mowed at the 3/16-inch height. Average stimp distances for the 1/8 inch mowing height were 6.6 feet on June 28 (am and pm) and 8.0 (am) and 8.3 (pm) on September 19. Average stimp distances for the 3/16 inch mowing height were 6.5 (am) and 6.3 (pm) feet on June 28 and 7.2 (am) and 7.4 (pm) on September 19.

Morning and afternoon stimpmeter readings were conducted to gain a sense of the growth rates of the grasses. In some cases, however, the stimp reading increased or did not change. Other factors such as fluctuating soil moisture, which would affect green firmness, probably created such results.

Only one set of stimpmeter readings (June 29, am) indicated a significant mowing height by grass type interaction. At all other reading times both the main effects of grass and mowing height affected stimpmeter readings. In general, the Mobile #10, TW72 and Lakewood grasses had the fastest stimpmeter readings. Readings from the Mobile #10 grass, however, were a result of largely bare turf, and not quality cover.

Quality

There was no grass type by mowing height interaction in the July 12 or Sept. 18 quality ratings. Both mowing height and grass type affected quality of the turf. Ratings were consistently higher on the USGA putting green than the native soil putting green. Three grasses that all received significantly low quality ratings were OK2747, OK2352 and Mobile #10. Grasses receiving consistently high quality ratings were TW72 and the Mobile #9 ecotype. These grasses also received high scores when mowed at 1/8 - inch, a mowing height which greatly decreased turf quality of many of the grasses, especially Tifgreen. It appears that mowing at 1/8 -inch is an excellent test to eliminate marginal grasses. Quality ratings of each grass increased as the mowing height increased. Average quality rating for grasses grown on the USGA green was 7.3, as compared to a quality rating of 6.6 on the native soil green.

Table 6. Quality ratings on July 12 as affected by green type, averaged over mowing height.

Grass	July 12	
	USGA -----	native -----
Mobile #9	8.5 a	8.5 ab
TW72	8.3 a	9.0 a
T596	8.0 a	8.1 abc
Texas	7.8 a	7.9 bcd
Industry check	7.6 a	8.1 abc
Tifdwarf	7.6 a	8.1 abc
Gulfshores	6.8 b	8.1 abc
Tifgreen	6.8 b	7.1 d
Lakewood	6.3 bc	7.3 cd
OK2747	5.5 cd	6.1 e
OK2352	5.4 d	5.0 f
Mobile #10	5.4 d	3.9 g

1: poor
9: best

Seedhead Production

The grass ecotypes Lakewood and Mobile #10 produced the most seedheads, with approximately 30% of the grass producing seedheads. The only other grasses that produced seedheads were Tifgreen, Tifdwarf, the Industry Check of Tifdwarf, and

T596, which produced 22, 15, 12 and 12% seedheads, respectively. All remaining grasses did not produce seedheads.

Conclusions

1. Variants of Tifdwarf show differences in phenotypic behavior.
2. A mowing height of 1/8-inch created poor turf quality in many of the grasses. In almost every grass it was necessary to utilize intensive management (double mowing, hand topdressing of spots) to maintain any turf quality.
3. A 1/8-inch mowing height maintained with 6 out of 7 days mowing often created scalped turf.
4. The cultivar TW72 shows promise as a putting green grass for the southeastern United States.
5. The ecotype Mobile #9 should continue to be tested for it's ability to become a bermudagrass cultivar for putting greens.
6. Other ecotypes, especially Mobile #10, might have limited use as selections for breeding programs with *transvaalensis* crosses.

Future Research

1. A study has been initiated to determined the effect of herbicide application of the bermudagrass cultivar and ecotypes. Preliminary ratings indicate the grasses respond quite differently.
2. Spring data collection will also include measurements of node number/length of stolon and shoot density/area.
3. It is anticipated that the 3 worst performing grasses will be eliminated in early spring, and replaced with the three grasses MS Supreme, FloraDwarf and Champion, if the breeders agree to this test.