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Shade-Resistant Bermudagrass

Research has produced an improved cultivar.

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Bermudagrass will grow in many different environments, but one shortcoming is its poor shade tolerance. The impact of shade on this putting green is evident, with the resulting poor turf quality.

Bermudagrass (*Cynodon sp.*) is a cosmopolitan grass in that it will grow in many different environments around the world. It has long been the dominant warm-season turfgrass species used on golf courses, athletic fields, and ornamental lawns

across the southern portion of the United States. This is because it produces a very dense, high-quality turf cover and is adapted to tolerate a broad range of soil fertility, pH, texture, and temperatures, along with very good wear and drought tolerance. However,

a major weakness of bermudagrass is poor shade tolerance. Bermudagrass must have light — at least 8 to 10 hours of sunlight per day to produce healthy turf.

As part of the long-running bermudagrass breeding and improvement



Tifway and other bermudagrass hybrids were compared for turf quality while receiving just 40% of the light needed for optimal growth.

Research at the Tifton Experiment Station has focused on identifying shade-tolerant cultivars. Bermudagrass hybrids were selected for more extensive testing to identify the best shade-tolerant hybrids for use in the field.

program at the Tifton Experiment Station, we have been identifying shade-resistant cultivars for a number of years. By shade resistant, we mean a grass that requires less sunlight to produce a desirable or acceptable turf than the current industry standards such as Tifway (419) bermudagrass. The grasses we selected performed well when they received only 40% of the light needed for plant growth (light wave length in the 400 to 650 nm range), compared with plants requiring full sunlight.

We originally planted more than 27,000 triploid ($2n=3x=27$) interspecific hybrids between Common (*Cynodon dactylon*) × African (*C. transvaalensis*) bermudagrasses at Tifton, and selected 448 experimental hybrids from the original hybrids for more detailed test-

ing. Fifty-seven of these experimental hybrids plus five commercial hybrids were planted under the stationary end of a rainout shelter (60% continuous shade). We now have had three of the best of those shade-resistant hybrids in replicated advanced tests (Table 1) since 2003. One hybrid, Tift No. 4, has performed well under shade and non-shade conditions in our plots at Tifton, Ga., and in the National Turfgrass Evaluation Trials (NTEP) since 2003 (non-shade). Tift No. 4 is a dark-green and dense triploid hybrid that was originally selected for its high resistance to tawny mole cricket damage. However, we found that Tift No. 4 also performs well under lower light conditions.

Turf quality is generally rated on a scale of 1 to 9 (where 9 = the best

turf). In replicated plots under a shade regime, Tift No. 4 continues to perform well today. In the 0.5- to 0.65-inch mowed height, non-shade tests of the NTEP trials (mean of 11 states), Tift No. 4 rated 6.8, behind Tifway (7.1) and TifSport (7.0), with an $LSD=0.2$ (needs to be at least this much difference between cultivars to be significant). In the 0.75- to 1.0-inch mowed height, non-shade NTEP trials (11 states), Tift No. 4 rated 6.1, just behind TifSport (6.4), Tifway (6.3), and Patriot (6.2), with an $LSD=0.3$. Table 2 shows the performance of Tift No. 4 by regions. It has performed well in all areas of the USA where it was tested and was in the top 25% of the entries 65% of the time.

Tift No. 4 has performed well in shaded lawns in Roswell and Augusta,

Ga., since 2003, where it is mowed at 1.5 inches height weekly and receives 3 lbs. of nitrogen per 1,000 sq. ft. yearly. It has not needed dethatching and it produces only a few seedheads

under these shade conditions (as well as in our shade tests at Tifton). This hybrid tends to produce more than desirable seedhead numbers in June under non-shade conditions and a

mowing height of 0.5 inch and/or high nitrogen application. Tift No. 4 has been planted in low-light areas on golf courses in Georgia, Alabama, and North Carolina. We have received positive reports from golf course locations where Tift No. 4 has been growing for at least two years.

Why is Tift No. 4 shade resistant? It appears that its dark-green color and its density allow it to produce an acceptable turf under lower light conditions. If low light thins the traditional cultivars, Tift No. 4 will produce a desirable turf. If low light conditions completely kill the traditional cultivars, Tift No. 4 will probably produce a thinner, yet acceptable turf.

In our evaluations, we have been measuring the ability of Tift No. 4 to produce a desirable turf under lower light conditions, but we have not evaluated this hybrid for its ability to compete with tree roots, etc. Tift No. 4 has applications where traditional bermudagrass cultivars are used, yet where light is limiting. We tentatively plan a limited release for Tift No. 4 in 2007.

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Table 1
Turf Quality Ratings (9=Best)
On shade-resistant (ST) bermudagrasses after two years of 60% continuous shade at Tifton, Ga.

Entry	Turf Quality in Shade		
	Test 2	Test 3	Test 4
ST03	7.3	7.5	8.1
ST05 (Tift No. 4)	7.8	7.3	8.6
ST07	7.5	6.5	8.1
Tifway	5.3	4.1	4.8
TifSport	6.0	3.6	5.0
LSD - 5%	1.1	1.1	1.0

Table 2
2005 Turf Quality Ratings in NTEP Trials for Tift No. 4
Compared with commercial cultivars in the transition zone (TZ), southeast (SE), and southwest (SW) regions. Number of states is shown in parentheses after each zone.

Entry	Rank [Rating (9=Best)] for Turf Quality in NTEP Trials (2005)				
	TZ (9)	SE (8)	SW (5)	Overall	% Time in Top 25%
TifSport	2 (6.7)	1 (6.9)	1 (6.4)	1 (6.7)	91
Tifway	2 (6.7)	1 (6.9)	2 (6.3)	2 (6.6)	78
Patriot	1 (6.8)	4 (6.2)	5 (5.7)	4 (6.3)	56
Tift No. 4	4 (6.4)	2 (6.8)	3 (6.1)	3 (6.5)	65
Lowest Rated	13 (5.0)	13 (5.7)	13 (5.6)	13 (5.4)	13
LSD - 5%	(0.3)	(0.3)	(0.3)	(0.2)	



Above left: Although bermudagrass is the dominant species across the southern tier of the United States, its vigor cannot overcome poor light quality. The grass requires at least 8 to 10 hours of sunlight per day to produce a healthy turfgrass stand. Above right: Tift No. 4 has successfully grown in a shaded home lawn situation in Roswell, Georgia, since 2003.