

# Bermudagrass Cultivars Differ in Their Traffic Tolerance

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**Additional index words:** Cady traffic simulator, turfgrass coverage, wear

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Close-up view of the Cady traffic simulator

Photo by Mike Richardson

**Summary.** Bermudagrass is the most widely used turfgrass species for golf courses and sports fields in the southern U.S. and transition zone. Continuous trafficking from play or equipment can reduce bermudagrass coverage and turf quality. This study evaluated 42 bermudagrass cultivars for their traffic tolerance. Traffic was applied in fall 2007 and summer 2008 with a Cady traffic simulator to evaluate traffic tolerance. Twelve cultivars were rated highest in traffic tolerance in at least nine of 10 dates including Barbados, Celebration, OKC 70-18, Premier, Riviera, Sovereign, Southern Star, SWI-1003, SWI-1046, Tifton No. 1,

Tifton No. 4, and Tifway. The cultivars Arizona Common, Ashmore, and B-14 had relatively poor traffic tolerance as they ranked in the top statistical category a maximum of only two out of 10 rating dates. These results demonstrate that several bermudagrass cultivars possess superior traffic tolerance, and some have poor traffic tolerance. Selecting improved, traffic tolerant bermudagrasses will help reduce maintenance inputs and increase sustainability of golf courses and athletic fields.

**Abbreviations:** TPI, turf performance index

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Bermudagrass (*Cynodon* spp.) is the most widely used turfgrass species within the state of Arkansas and throughout the southern U.S. and transition zone, due to its low establishment costs, aggressive growth rate, adaptation to a wide range of mowing heights, and its drought and traffic tolerance. Regular traffic that occurs on sports fields, golf courses, and residential areas can be detrimental to bermudagrass growth. Previous research has identified traffic tolerant cultivars (Youngner, 1961; Shearman and Beard, 1975), but more research is needed to examine the traffic tolerance of new bermudagrass cultivars. The objective of this study was to quantify differences in bermudagrass cultivars' traffic tolerance.

### Materials and Methods

This study was conducted in the fall of 2007 and summer of 2008 to evaluate seasonal differences in traffic tolerance within bermudagrass cultivars. The study was located at the University of Arkansas Research and Extension Center in Fayetteville, Ark. and utilized the National Turfgrass Evaluation Program 2002 National Bermudagrass Test (Morris, 2007). There were a total of 42 cultivars in the study including 30 cultivars that are currently commercially available. Plot size was 6 by 6 ft, and there were three replications of each cultivar. Plots were maintained under golf course fairway or sports field conditions, with a mowing height of 0.5 inch and monthly applications of 1.0 lb N/1000ft<sup>2</sup> during the growing season. Traffic was applied weekly using a Cady traffic simulator (Henderson et al., 2005). Once each week for four consecutive weeks, four passes in the forward direction were made to each plot. Traffic was applied to half of each plot for fall traffic evaluations and the other half of each plot was used for summer traffic evaluations.

Digital images were taken prior to each traffic application and after the final traffic application to evaluate damage. Digital image analysis was used to evaluate the amount of green turfgrass cover as affected by the traffic simulator (Richardson et al, 2001). Turf Performance Index

(TPI) was used to compare differences among the cultivars. Turf Performance Index was determined as the number of times each cultivar was ranked in the highest statistical category.

### Results and Discussion

Coverage data from fall 2007 was difficult to determine because the plants entered into dormancy prior to the last traffic date. This made it difficult to determine if green turf coverage was affected by traffic or by the plants losing their green pigment as they entered winter dormancy. There were five collection dates used to calculate a TPI rating for both fall 2007 and summer 2008. The fifth and final collection date used to calculate the TPI for fall 2007 was in the spring 2008 after complete green-up had occurred (Table 1).

In the fall 2007, Premier and Tifway were the only two cultivars that were in the top statistical group on all five rating dates. In the summer 2008, there were 27 cultivars that ranked in the top statistical category for all five rating dates and these would include Aussie Green, Barbados, Celebration, CIS-CD7, GN-1, Midlawn, Mohawk, NuMex Sahara, OKC 70-18, Premier, Patriot, Riviera, Southern Star, Sovereign, Sundevil II, Sunstar, SWI-1003, SWI-1014, SWI-1046, Tifsport, Tift No. 1, Tift No. 2, Tift No. 3, Tift No. 4, Tifway, Transcontinental, and Yukon.

Notable differences in cultivar traffic tolerance existed across the two seasons. Aussie Green, GN-1, SWI-1014, and Tift No. 3 performed relatively poorly in fall 2007, receiving TPIs of 2, 0, 0, and 0, respectively. However, in summer 2008, each cultivar had much better traffic tolerance, each receiving a TPI of 5. This may indicate that these cultivars perform better in summer months and should not be used in situations where fall traffic will be intensive.

Looking at the results across both seasons, there were 12 cultivars that received a TPI of at least nine out of the ten rating dates including: Barbados, Celebration, OKC 70-18, Premier, Riviera, Southern Star, Sovereign, SWI-1003, SWI-1046, Tift No. 1, Tift No. 4, and Tifway. Arizona Common and Ashmore were two culti-

vars that only ranked in the highest statistical category one time. Statistical analysis was performed to evaluate differences between seeded and vegetative cultivars and no clear differences existed (data not shown).

The ultimate goal of this study is to help golf course and sports field managers select cultivars that have good traffic tolerance and avoid those cultivars with poor traffic tolerance. Although traffic compacts soil and decreases rooting, this study only measured the immediate response of the turf to the simulated wear that it received. These results demonstrate that several bermudagrass cultivars possess superior traffic tolerance, while some have poor traffic tolerance. Selecting improved, traffic tolerant bermudagrasses will help reduce maintenance inputs and increase sustainability of golf courses and athletic fields. Additional data will be collected during bermudagrass spring green-up of plots trafficked in fall 2008.

#### Literature Cited

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**Table 1. Turf performance index (TPI) of 42 bermudagrass cultivars for traffic tolerance over five sampling dates in the fall of 2007 and summer 2008.**

Cultivar	TPI fall 07 <sup>z</sup>	TPI summer 08	TPI Total
Premier <sup>y</sup> (OR 2002)	5	5	10
Tifway <sup>y</sup>	5	5	10
Barbados <sup>y,x</sup> (SWI-1044)	4	5	9
Celebration <sup>y,x</sup>	4	5	9
OKC 70-18	4	5	9
Riviera <sup>y,x</sup>	4	5	9
Southern Star <sup>y,x</sup>	4	5	9
Sovereign <sup>y,x</sup> (SWI-1012)	4	5	9
SWI-1003 <sup>x</sup>	4	5	9
SWI-1046 <sup>x</sup>	4	5	9
Tift No. 1	4	5	9
Tift No. 4	4	5	9
CIS-CD5 <sup>x</sup>	4	4	8
CIS-CD7 <sup>x</sup>	3	5	8
Contessa <sup>y,x</sup> (SWI-1045)	4	4	8
Patriot <sup>y</sup>	3	5	8
Princess 77 <sup>y,x</sup>	4	4	8
Sundevil II <sup>y,x</sup>	3	5	8
Sunspout <sup>y,x</sup> (SWI-1001)	4	4	8
Sunstar <sup>y,x</sup>	3	5	8
Tifspout <sup>y</sup>	3	5	8
Tift No. 2	3	5	8
Veracruz <sup>y,x</sup> (SWI-1041)	4	4	8
Yukon <sup>y,x</sup>	3	5	8
Aussie Green <sup>y</sup>	2	5	7
Midlawn <sup>y</sup>	2	5	7
Mohawk <sup>y,x</sup>	2	5	7
Sunbird <sup>y,x</sup> (PST-R68A)	3	4	7
Transcontinental <sup>y,x</sup>	2	5	7
NuMex Sahara <sup>y,x</sup>	1	5	6
GN-1 <sup>y</sup>	0	5	5
LaPaloma <sup>y,x</sup> (SRX 9500)	2	3	5
MS-Choice <sup>y</sup>	2	3	5
Panama <sup>y,x</sup>	1	4	5
SR 9554 <sup>y,x</sup>	2	3	5
SWI-1014 <sup>x</sup>	0	5	5
Tift No. 3	0	5	5
Sultan <sup>y,x</sup> (FMC-6)	2	2	4
CIS-CD6 <sup>x</sup>	1	2	3
B-14 <sup>x</sup>	1	1	2
Arizona Common <sup>y,x</sup>	0	1	1
Ashmore <sup>y</sup>	1	0	1

<sup>z</sup> Turf Performance Index (TPI) indicates the number of times that particular cultivar was in the highest statistical group.

<sup>y</sup> Indicates commercially available cultivar in 2007([www.ntep.org](http://www.ntep.org)).

<sup>x</sup> Indicates seeded bermudagrass cultivar.