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Evaluating Bermudagrass Cultivars for Traffic Tolerance and Recuperative Ability

University of Florida research shows bermudagrasses that possess better wear tolerance and faster divot recovery.

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A modified Cady traffic simulator was used to apply traffic once per week during the study period.

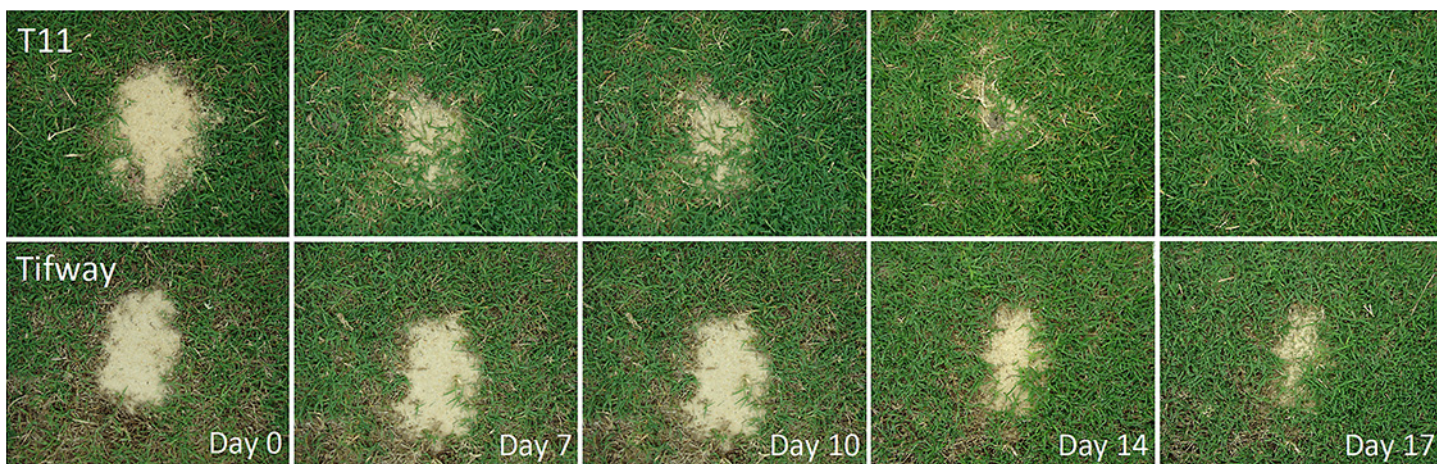
For more than 40 years, Tifway (419) has been the industry standard for golf course fairways in the Southeast. Over this time, Tifway has proven to provide good color, density, fine leaf texture, and growth rate. Yet in the past few years, superintendents have started turning to new bermudagrass cultivars that, along with other attributes such as increased shade tolerance, are thought to have higher wear tolerance and faster recovery. However, there is

limited research comparing the performance of new bermudagrass cultivars to industry standards.

This study was set up to investigate genetic color, density, turf quality, and divot recovery of eight bermudagrass cultivars. In this study, industry standards Tifway, TifSport, Floratex, and Riviera were compared with newer cultivars Celebration, TifGrand, T11, and Hybrid1. The objectives of this study were to characterize a typical response of these bermudagrass

cultivars to varying rates of traffic, establish fertility recommendations for each of the cultivars studied under high- and low-traffic conditions, and determine the influence of fertility and traffic on the recovery rate of each cultivar.

This study was conducted at the University of Florida Plant Science Research and Education Unit located in Citra, Florida. Plots were maintained as a golf course fairway and were mowed three times per week at 0.5



T11 recovers faster from divot injury than Tifway bermudagrass. Photos show the same divot in each plot (treatments — no traffic; 0.75 lb. N/1000ft²) from the date the divot was removed to 17 days after injury.

inch height of cut. Three rates of fertilizer were applied (0.5, 0.75, and 1.0 lb. N/1000ft²) using a 15-5-15 turf fertilizer blend with 50% slow release nitrogen in a split application every two weeks. Half of each plot then received traffic, while the other half was left untrafficked. Divots were taken from each of the plots twice in the fall of 2009 and once to date in 2010. Visual ratings of color, quality, and density were collected, along with digital pictures. Digital images were subjected to digital image analysis (DIA) to determine percent green cover and dark green color index (DGCI).

WEAR TOLERANCE

Traffic was simulated during the growing season using a modified Cady traffic simulator. Turf density was reduced by 10-20% in plots receiving traffic treatments. The data indicate a significant difference in traffic tolerance between bermudagrass cultivars. Celebration produced the darkest green color while Celebration and TifGrand maintained the highest plant density under the weekly traffic treatments. Tifway and TifSport had the lowest density as evaluated by DIA. Tifway, TifSport, Floratex, and Riviera consistently yielded the lightest green turf of all the cultivars. Differences in percent cover have yet to be seen in 2010, as traffic damage had not amounted to a significant level when this article was written. After a year and a half of data collection, Celebration has exhibited the best traffic

tolerance of all the cultivars, keeping the highest density and darkest green color throughout the study.

No differences were observed in visual turf quality, color, or density as a result of fertility treatments. This is supported by digital image analysis, which also indicated no relationship between nitrogen rate and percent green cover or dark green color index values. This result indicates that there may have been some residual fertilizer effects from previous applications, or current nitrogen rates are too narrow in range to establish differences in growth response.

DIVOT RECOVERY

To determine the recuperative potential of each cultivar, a standardized divot

was taken from each of the plots and regrowth was tracked using DIA. Divots were removed from the plots using a divot machine designed and constructed at the University of Florida. Two sets of divots were taken at different times during the fall of 2009, with additional divot recovery analysis continuing through the summer of 2010. The driving factor in recovery speed was genetic, as certain cultivars recovered faster than others.

Data have shown that under no traffic, Floratex and T11 recovered from divot damage faster than all other cultivars during the first two weeks. In plots receiving traffic, Celebration, Floratex, Hybrid1, Riviera, and T11 all performed similarly and all recovered faster than Tifway, TifSport, and



Designed and constructed at the University of Florida, a specialized divot machine was used to produce uniform divots on each plot.

TifGrand. Data from 2009 indicate that the recovery of divots under traffic was 10-20% slower than it was for divots receiving no traffic. Data from 2010 show little difference between traffic and non-trafficked plots as not enough damage has occurred to be effective. Similar to wear tolerance data, fertility rate was not a factor in recovery speed in either 2009 or 2010. Two more sets of divots are scheduled for the 2010 growing season to collect additional information on which cultivar recovers most quickly from divot injury.

CONCLUSION

The results of this study are preliminary, as the majority of the 2010 data has yet to be collected; however, they do support the idea that there are better alternatives to Tifway for high traffic areas. Superintendents can see increased wear tolerance with Celebration and TifGrand, and faster divot recovery with T11 and Floratex. While there may not be one grass that can do it all, installing T11 on tees and Celebration in high traffic areas of the golf course can help the turf recover more quickly and provide golfers with a better all-around playing surface. Regrassing entire fairways may not be an option at every golf course, but using these grasses on small-scale projects can increase the wear tolerance of the course and provide a dark green, dense playing surface.

In the past, Tifway was the grass of choice and was installed on the majority of golf courses, but with the new cultivars available today, superintendents have options. Whether it is building a new course, renovating an old one, or just converting a tee, there are more cultivars to consider than just going with the standard.

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Table 1
Percent Green Cover

Cultivar	2009			2010		
	August	September	October	April	May	June
Celebration	59.7 c	89.7 a	87.6 a	72.8 ab	86.5 ab	96.1 abc
Floratex	80.9 a	84.3 b	74.6 cd	61.6 d	87.7 ab	92.3 c
Hybrid1	85.4 a	93.1 a	79.3 bc	77.1 a	91.9 a	94.6 abc
Riviera	84.0 a	89.9 a	70.4 d	75.4 ab	86.4 ab	93.5 bc
T11	66.0 bc	89.8 a	79.2 bc	72.2 abc	92.1 a	98.1 a
Tifgrand	88.2 a	90.7 a	84.5 ab	68.2 abcd	80.1 b	97.1 ab
Tifsport	70.4 b	76.8 c	62.8 e	66.7 bcd	79.5 b	87.9 d
Tifway	89.2 a	83.2 b	68.6 de	63.3 cd	84.8 ab	94.6 abc

Percent green cover for eight bermudagrass cultivars receiving simulated traffic. Means with the same letter on a given date were not significantly different ($P = 0.05$).

Table 2
Dark Green Color Index

Cultivar	2009				2010		
	August	September	October	November	April	May	June
Celebration	0.569 abc	0.650 a	0.652 a	0.592 a	0.606 a	0.690 a	0.632 a
Floratex	0.558 c	0.570 d	0.585 cde	0.558 bc	0.553 cd	0.641 cd	0.576 c
Hybrid1	0.580 abc	0.629 b	0.593 cd	0.583 a	0.582 b	0.671 ab	0.607 b
Riviera	0.566 bc	0.599 c	0.572 e	0.547 c	0.572 b	0.656 bc	0.607 b
T11	0.569 abc	0.612 bc	0.602 bc	0.555 bc	0.567 bc	0.682 a	0.651 a
Tifgrand	0.592 a	0.564 d	0.619 b	0.560 b	0.552 cd	0.656 bc	0.634 a
Tifsport	0.565 bc	0.564 d	0.576 de	0.562 b	0.553 cd	0.643 cd	0.580 c
Tifway	0.585 ab	0.573 d	0.575 de	0.555 bc	0.539 d	0.627 d	0.603 b

Dark Green Color Index (DGCI) for eight cultivars of bermudagrass receiving weekly traffic treatments. The DGCI was created by Karcher and Richardson (2003) to measure the relative dark green color of an image. Means with the same letter on a given date were not significantly different ($P = 0.05$).

Table 3
Percent Divot Recovery

Cultivar	Days After Injury					
	0	7	10	14	17	20
Celebration	0.0 a	35.3 b	58.4 bc	80.6 b	90.6 c	94.7 abc
Floratex	0.0 a	55.8 a	72.7 a	92.2 a	96.8 ab	97.8 ab
Hybrid1	0.0 a	30.8 b	48.4 c	76.4 b	92.6 abc	94.3 abc
Riviera	0.0 a	30.8 b	47.6 c	79.3 b	90.0 c	92.2 c
T11	0.0 a	55.8 a	70.2 ab	93.1 a	97.9 a	98.6 a
Tifgrand	0.0 a	30.0 b	49.9 c	78.5 b	90.3 c	93.3 bc
Tifsport	0.0 a	29.8 b	49.3 c	79.9 b	93.3 abc	94.5 abc
Tifway	0.0 a	33.0 b	45.7 c	77.4 b	91.9 bc	92.8 bc

Percent divot recovery of each of eight bermudagrass cultivars in the absence of traffic from day of injury until 20 days after injury during 2010. Means with the same letter on a given date were not significantly different ($P = 0.05$).