

Golf Ball Lie Differs Among Bermudagrass and Zoysiagrass Cultivars – Year 2

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Photo by Jon Trappe

Golf ball lie varies by cultivar.

Summary. Bermudagrass and zoysiagrass are two of the most commonly used turfgrass species on golf course fairways and tees in the southern U.S. However, there are few reports comparing commonly used cultivars of bermudagrass to commonly used cultivars of zoysiagrass. Because golf ball lie is an important characteristic of playability and management of bermudagrass and zoysiagrass fairways, research was conducted to compare ball lie among five cultivars of bermudagrass and seven cultivars of zoysiagrass. Ball lie was similar for all cultivars immediately following mowing. The cultivars Tifsport, Tifway, and Patriot

bermudagrass, and Diamond and Meyer zoysiagrass had the best ball lie after four days of growth, while Palisades zoysiagrass had the poorest ball lie after four days of growth. These results will assist golf course managers in selecting cultivars of bermudagrass and zoysiagrass for golf course fairways or tees that have an improved golf ball lie.

Abbreviations: CD, *Cynodon dactylon*; CDT, *Cynodon dactylon* × *C. transvaalensis*; ZJ, *Zoysia japonica*; ZM, *Zoysia matrella*

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Bermudagrass (*Cynodon* spp.) and zoysiagrass (*Zoysia* spp.) are the predominant turfgrass species used on golf course fairways and tees in Arkansas. Little is known about the ball lie characteristics of bermudagrass and zoysiagrass cultivars. The position at which a golf ball comes to rest in a turf canopy greatly influences how a golfer will attempt their next shot. A golf ball that rests on top of the canopy provides golfers increased control over golf shots (Lowe, 2008). Beard and the United States Golf Association (2002) cited turfgrass species, cultivar, and shoot density as determining factors for ball lie. Others have also stated zoysiagrass provides an enhanced golf ball lie for players to make their shot (Hurley, 1976; Bevard et al., 2005).

Researchers at the University of Arkansas recently developed a method to measure golf ball lie using digital image analysis (Richardson et al., 2010). This method was evaluated on the 2002 bermudagrass and 2002 zoysiagrass National Turfgrass Evaluation Program trials. Little differences among cultivars of bermudagrass and zoysiagrass were reported for plots mown at 0.5 inch, but some differences in golf ball lie were observed for plots mown at 1.0 inch (Richardson et al., 2010). Other work has evaluated the specific management practices that affect ball lie in bermudagrass (Hanna, 2008; McCalla et al., 2008), but none have attempted to quantify differences in ball lie among bermudagrass and zoysiagrass cultivars.

Because golf ball lie is an important characteristic to playability and management of bermudagrass and zoysiagrass fairways, research was conducted to quantify the golf ball lie of bermudagrass and zoysiagrass cultivars. The objective of this research was to quantify the percent of ball exposed (ball lie) for bermudagrass and zoysiagrass cultivars.

Materials and Methods

Five cultivars of bermudagrass and seven cultivars of zoysiagrass were established in the summer of 2007 (Table 1). Plots were maintained under golf course fairway conditions, with a mowing height of 0.5 inch and monthly applications of 1.0 lb N/1000 ft² for bermudagrass and

0.5 lb N/1000 ft² for zoysiagrass during the growing season. Golf ball lie on each cultivar was measured on three dates immediately after mowing and on plots that were not mown for four days. Three golf balls were randomly rolled onto each plot and the amount of ball exposed above the turf canopy was measured using a device developed at the University of Arkansas (Richardson et al., 2010). Each golf ball was considered a subsample and the three subsamples were collected for each plot on each sampling date.

Results and Discussion

Mown turf. Differences existed among cultivars and species of bermudagrass and zoysiagrass for ball lie (percent of ball exposed) in unmown and dormant conditions (Table 1). There were no differences among cultivars and species for ball lie when measured immediately following mowing and ball lie was >90% for all cultivars in mown turf. Richardson et al. (2010) also found greater differences in golf ball lie among bermudagrass and zoysiagrass in taller (1.0 inch) mown turf than turf maintained at fairway height (0.5 inch).

After four days of growth. The cultivars Patriot, Tifsport and Tifway bermudagrass had the best ball lie in June, July, and August when measured four days after the last mowing (Table 1). Palisades zoysiagrass had the poorest ball lie in June, July, and August 2009 after four days of growth. When differences existed between species, bermudagrass had a better ball lie. Cultivar rankings were similar when measured in June, July, and August or when the turf was dormant. Richardson et al., (2010) evaluated golf ball lie within species in different studies on cultivars of bermudagrass and zoysiagrass. Although Richardson et al. (2010) reported no differences in ball lie of Patriot, Princess 77, Riviera, Tifsport, and Tifway bermudagrass at a mowing height of 0.5 inch, there were differences among these same cultivars at a mowing height of 1.0 inch. Patriot, Tifsport, and Tifway had a better ball lie than Princess 77, though all cultivars had similar ball lie to Riviera (Richardson et al., 2010).

Dormant turf. Patriot and Riviera bermudagrass were the only two cultivars with ball lie on

untrafficked dormant turf that was higher than Palisades zoysiagrass (Table 1). However, all cultivars had $\geq 92\%$ ball lie on dormant turf. For discussion purposes, cultivars with ball lies greater than or equal to 90% are considered to have a good ball lie. Although differences existed among cultivars on dormant turf, ball lie above 92% indicated that all of the cultivars and species tested provide a good ball lie in dormant conditions.

More research is needed to correlate the percent of ball exposed to the difficulty of a golf shot. Based upon these results, turfgrass managers looking to increase the window between fairway mowings while maximizing golf ball lie should not plant Palisades zoysiagrass. Additionally, golf ball lie can be maximized in less frequently mowed conditions using the bermudagrass cultivars Tifsport, Tifway, and Patriot, or Diamond and Meyer zoysiagrass. These results will assist golf course managers in selecting cultivars of bermudagrass and zoysiagrass for golf course fairways or tees that contain a good golf ball lie. Selecting a cultivar with a good golf ball lie will not only help to improve playing conditions, but may also reduce labor and fuel costs associated with maintaining a golf course fairway or sports field, since mowing frequency can be reduced.

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Table 1. Ball lie (percent ball exposed) of bermudagrass and zoysiagrass cultivars in both mown and unmown conditions across four dates in 2009.

Cultivar	Species	4 days after mowing ^z				Dormant		
		4 Jun ^z	13 Jul	31 Aug	4 Jun			
		-----Mown-----						
		-----4 days after mowing-----						
		-----%-----						
Cavalier	ZM ^x	93.4	90.5	91.6	84.9 bcd ^y	81.8 ab	82.0 c	92.8 d
Diamond	ZM	93.5	94.2	94.0	87.0 abc	76.7 b	86.7 abc	93.1 bcd
El Toro	ZJ	94.3	91.9	94.1	83.4 bcd	72.4 b	81.7 c	92.9 cd
Meyer	ZJ	91.9	91.2	91.5	81.9 cd	87.1 a	84.2 abc	92.8 d
Palisades	ZJ	92.6	94.3	93.0	80.0 d	58.6 c	69.8 d	92.0 d
Patriot	CDT	93.3	90.5	94.7	85.4 abcd	79.0 ab	88.5 abc	95.6 a
Princess 77	CD	94.4	94.1	93.1	89.5 ab	73.6 b	83.3 bc	93.9 abcd
Riviera	CD	92.5	93.0	94.7	81.9 cd	81.2 a	85.9 abc	95.0 abc
TifSport	CDT	93.5	93.8	93.6	92.2 a	78.0 a	92.2 a	93.9 abcd
Tifway	CDT	93.6	93.5	93.5	90.2 ab	77.2 ab	91.4 ab	95.1 ab
Zenith	ZJ	92.3	93.4	93.0	72.0 e	77.6 ab	81.9 c	92.9 cd
Zorro	ZM	93.5	94.3	94.3	80.0 d	72.2 b	82.5 c	93.4 bcd
mean		93.2	92.9	93.4	84.0	76.3	84.2	93.6
Species								
<i>C. dactylon</i>	CD	93.4	93.5	93.9	85.7 ab	77.4	84.6 b	94.4 a
<i>C. dactylon</i> x. <i>C. transvaalensis</i>	CDT	93.5	92.6	93.9	89.3 a	78.1	90.7 a	94.9 a
<i>Z. japonica</i>	ZJ	92.5	92.7	92.9	83.9 b	73.9	79.4 c	92.6 b
<i>Z. matrella</i>	ZM	93.4	93.4	93.3	79.3 c	76.9	83.7 b	93.1 b

^zBall lie expressed as percent ball exposed.^xZJ = *Zoysia japonica*; ZM = *Zoysia matrella*; CD = *Cynodon dactylon*; CDT = *Cynodon dactylon* × *C. transvaalensis*.^yValues in a column followed by the same letter are not significantly different from another (LSD, $\alpha = 0.05$). On dates where letters do not follow means, all treatments were similar.