# Evaluation of Mowing Practices and Perennial Ryegrass Overseeding on Experimental Bermudagrass Cultivars Under Athletic Field Traffic

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**Abstract**

Bermudagrass [*Cynodon dactylon* (L.) Pers.] is the most commonly used turfgrass on athletic fields in the southern United States. Tifton varieties such as 'Tifway' and 'Tifsport' are popular choices for athletic fields. Recently, several new Tifton varieties have been developed. Research regarding the impact of mowing practices, perennial ryegrass overseeding, and simulated traffic on the performance of these new bermudagrass varieties is limited. A two year study was conducted at the University of Tennessee to evaluate the performance of eight Tifton bermudagrass varieties under simulated athletic field traffic. Three commercially available ('Tifway', 'Tifsport', and 'Tifton 11') and five experimental ('2004-76', '2004-83', '2004-78', 'ST-5' and '2004-77') varieties were subjected to simulated traffic, two mowing, and two overseeding treatments. Each plot was mowed, or mowed and groomed, three days a week until trafficking was initiated in late fall. Plots were overseeded with perennial ryegrass [*Lolium perenne* (L.)] on 22 September 2006 and 1 October 2007 at 67 g $m^{-2}$. After each trafficking event digital image analysis was performed to quantify turfgrass quality, color, and percent green cover. Surface hardness was measured using the Clegg Soil Impact Tester (Data not shown). Mowing practice had major effect on turfgrass quality and percent green cover in both years, although effects of grooming were only observed in year two. When trafficked, the non-overseeded experimental variety 2004-78 and the overseeded experimental variety ST-5 had the greatest overall turfgrass quality and cover.

**Introduction**

The safety of turfgrass playing surfaces used for athletic competitions is a major concern to athletes and field managers. The hardness of an athletic field playing surface can be reduced by

maintaining uniform, dense, resilient turf under traffic. Other factors such as overseeding and mowing may also affect the playability and safety of a field under traffic.

The most common turfgrass species used on athletic fields in the transition zone is bermudagrass [*Cynodon dactylon* (L.) Pers. x *C. traansvalensis* Burtt-Davy] due to its recuperative potential and ability to tolerate high temperatures extremes in summer (Christians, 2004).

While turfgrass breeders thoroughly research the quality, density, color, disease resistance and cold tolerance of new varieties before introducing them into the marketplace, information on the traffic tolerance of these new varieties is often limited.

In 2006 and 2007, a study was conducted at the East Tennessee Research and Education Center at the University of Tennessee (Knoxville, TN) to compare the performance of three commercially available and five experimental bermudagrass varieties subjected to simulated traffic and two overseeding and mowing treatments

**Objectives:**
To determine:

1. Which of the eight bermudagrass varieties performed best under simulated traffic.
2. Effects of mowing treatments (mowing + grooming or only mowing) on bermudagrass quality and percent cover.
3. Effects of overseeding on bermudagrass quality and percent cover.

**Materials and Methods**

The experimental design was a three factor randomized complete block design with three replications. The three factors were bermudagrass [*Cynodon dactylon* (L.) Pers. x *C. traansvalensis* Burtt-Davy] variety (Tifton 11, Tifsport, Tifway, ST-5, 2004-76, 2004-77, 2004-78, and 2004-83); mowing treatment (mowing only or mowing with grooming); and perennial ryegrass [*Lolium perenne* (L.)] overseeding (overseeded and not overseeded). Plots were 5 x 3 m. Mowing treatments were applied

three times per week with a Textron reel mower set to a 2.2 cm mowing height. The grooming blade was set 2.5 mm below the height of mowing. The grooming component of the mowing treatment was stopped on 25 August 2006 and 26 August 2007. The overseeding treatment (perennial ryegrass at 675 kg $ha^{-1}$) was applied on 20 September 2006 and 1 October 2007. Traffic was applied to the experimental area using the Cady Traffic Simulator (CTS) (Henderson et al*.,* 2005). Traffic was applied two times per week beginning 25 August 2006 and 28 August 2007 and concluding on 27 November 2006 and 29 November 2007 (20 simulated games). Traffic treatments were withheld for one week following perennial ryegrass overseeding to enable seed germination and seedling emergence. Plots were irrigated as needed to maintain active plant growth. Plots were fertilized both years with ammonium nitrate (34-0-0) at rate of 5 g N $m^2$ from May through September and with a complete fertilizer (23-6-12) at a rate of 5 g N $m^2$ from October and November. Data collection included digital image analysis using a light box and SigmaScan Pro© to determine turfgrass quality, color, and percent cover (Karcher et al*.*, 2007). Statistical analysis was performed using Proc MMAOV in the SAS system for color, quality, and percent green cover data.

**Results**

In 2006, mowing without grooming yielded higher turf quality and percent cover ratings than mowing plus grooming. However in 2007, mowing plus grooming resulted in higher turf quality and percent turf cover than mowing without grooming (Figure 1). In both years of the study, after 20 simulated games Tifton 11 and the experimental variety '04-78' maintained higher quality and percent green cover than the other six bermudagrass varieties (Figure 2). With or without perennial ryegrass overseeding, experimental variety '04-83' consistently had the lowest turfgrass quality and percent green cover ratings in both 2006 and 2007 (Figure 2).

**Conclusions**

- After one year, mowing plus grooming provided higher percent cover and turfgrass quality ratings compared to mowing without grooming.
- In non-overseeded plots, Tifton 11 and the experimental variety '04-78' yielded consistently higher percent green cover and quality ratings than the other bermudagrass varieties included in this study.
- Overseeding with perennial ryegrass increased the quality and percent cover of all bermudagrass varieties subjected to simulated traffic treatments.

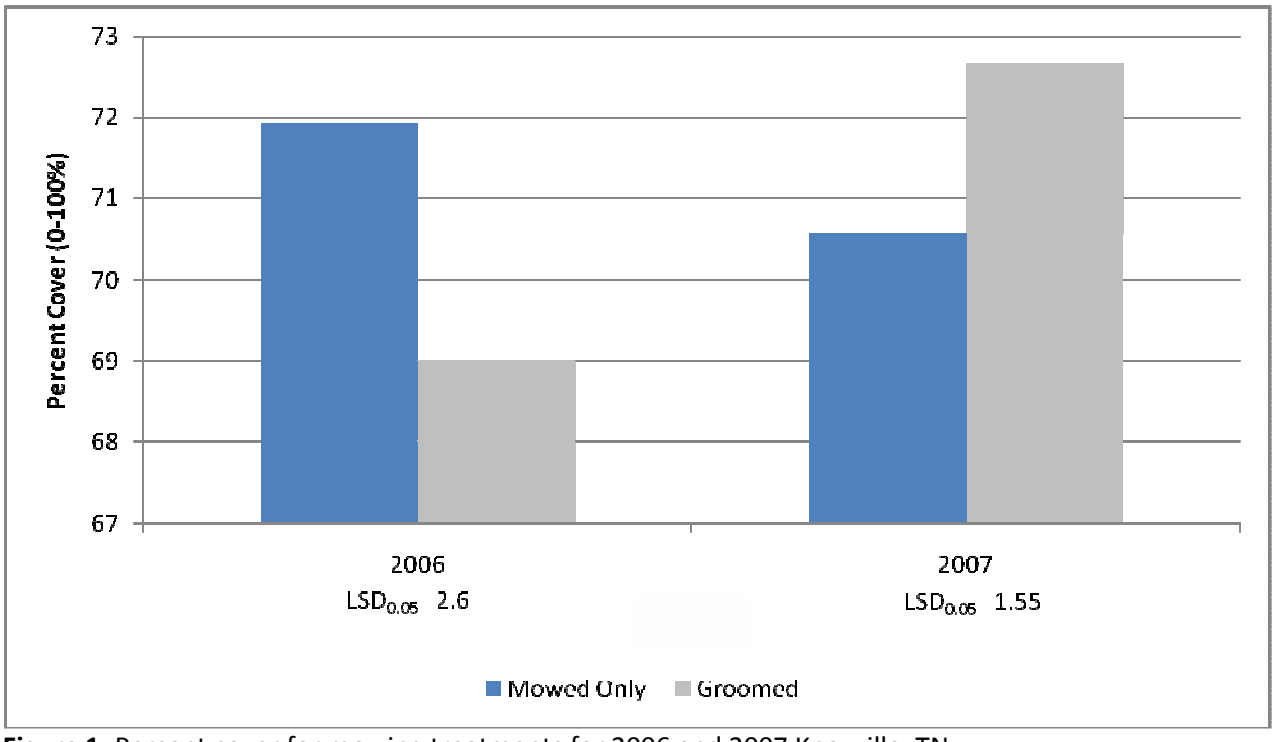


**Figure 1:** Percent cover for mowing treatments for 2006 and 2007 Knoxville, TN

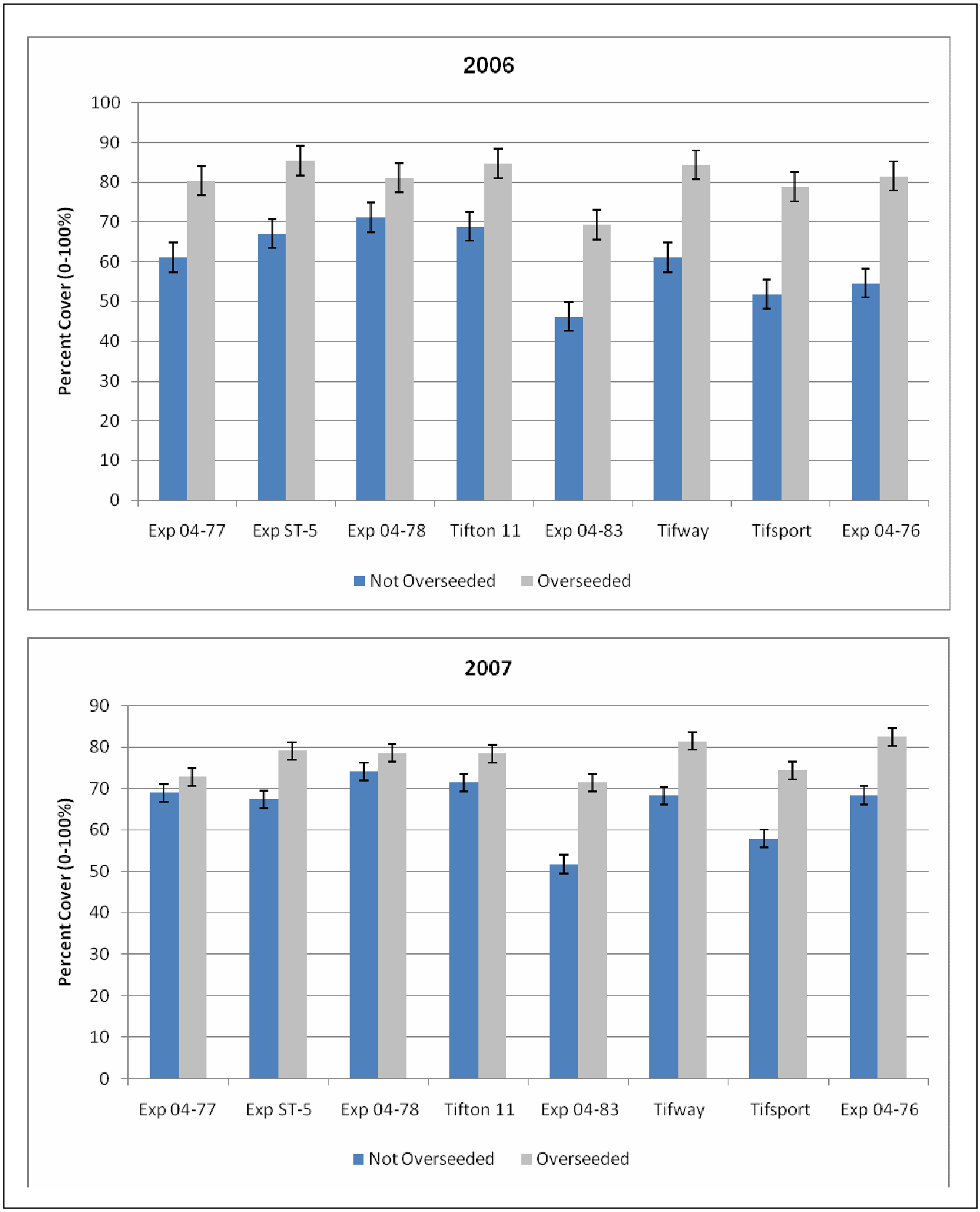


**Figure 2:** Percent cover for variety x overseeding for 2006 and 2007 Knoxville, TN

**Literature Cited**

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