# Effect of Mesotrione on Overwintering and Spring Green-up of Seeded Bermudagrass

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Photo by Mike Richardson

Bleaching injury on Riviera bermudagrass with mesotrione.

**Summary.** Seeded bermudagrass is most susceptible to weed infestations and winter injury during its first growing season. The objective of this trial was to evaluate the effects of mesotrione, applied in the fall to two seeded bermudagrass cultivars, on winter injury and spring green-up. The two seeded bermudagrass cultivars tested were Princess-77 and Riviera, which are considered cold-sensitive and cold-resistant, respectively. This trial was seeded in the late summer of 2008 and was concluded once the turf canopy reached 100% cover the following summer. There were 4 treatments in this trial, including 4 sequential applications of 0.125 lb a.i./acre, 2 sequential applications of 0.25 lb a.i./acre and 2 sequential applications of 0.5 lb a.i./acre. Turfgrass coverage ratings were documented using digital image analysis. Significant reductions in grass cover were observed on both cultivars in the fall for all herbicide treatments. Spring green up was slightly delayed due to herbicide treatment, especially with the cold-sensitive cultivar, Princess-77, when mesotrione was applied at the highest rate.

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The improved quality of seeded bermudagrass (*Cynodon dactylon*) cultivars has led to their widespread use over the last few years. Several factors have been shown to affect the successful establishment of these cultivars. It is also well known that several of these new seeded varieties have superior cold tolerance once established (Richardson et al., 2004). Riviera and Yukon have significantly better winter survival than several other varieties of seeded and vegetatively-propagated bermudagrass (Morris, 2002; Richardson, et al., 2004).

Seeded bermudagrass has also shown excellent tolerance to postemergence herbicides during establishment (McCalla et al., 2004; McElroy et al., 2005; Patton et al., 2007). Mesotrione (Tradename Tenacity™, Syngenta, Wilmington, Del.) is a relatively new herbicide in turfgrass systems and has both pre- and post-emergence activity on broadleaf weeds and annual grasses (Gardner, 2008). Annual grassy weeds such as crabgrass are the most common in turf, and mesotrione provides turf managers with another option to control these weeds.

Mature bermudagrass in typically injured by mesotrione (Boyd, 2008) as the plant tissue turns white (bleaching), then necrotic within three to five days (Fig. 3). This phytotoxicity would be unacceptable in most turfgrass situations, but may be less problematic in situations such as sod production, since the phytotoxicity is short-lived and the turf can recover from injury. However, there have been no studies to date to investigate the effects of mesotrione on bermudagrass injury going into the fall and how it may adversely effect green-up the following spring. The objective of this trial was to evaluate mesotrione for phytotoxicity in the fall and how it affects regrowth the following spring on Princess-77 and Riviera seeded bermudagrass.

**Materials and Methods**

This study was conducted at the University of Arkansas Agricultural Research and Extension Center in Fayetteville Ark. on newly established Princess-77 and Riviera seeded bermudagrass during the fall 2008 and the spring 2009. Both Princess-77 and Riviera seeded bermudagrass were planted in June 2008 at a rate of 1.0 lb pure live seed/1000 $ft^2$. Both plot areas were fertilized at a rate of 1.0 lb N/1000 $ft^2$ monthly from July-September. Herbicide treatments were applied using a $CO_2$-propelled single nozzle boom with 8001 VS nozzle at a volume of 40 gallons per acre and a spray shield was used to prevent drift between plots. Plots were 4 by 4 ft. There were four treatments in this trial, including 4 sequential applications of 0.125 lb a.i./acre, 2 sequential applications of 0.25 lb a.i./acre, 2 sequential applications of 0.5 lb a.i./acre, and an untreated control. A nonionic surfactant was included with each herbicide treatment at a rate of 0.25% v/v.

Turfgrass coverage ratings were collected using digital image analysis (Richardson et al., 2001). Photos were taken beginning the week following the first herbicide treatment (22 August 2008) and concluded once dormancy was reached in the fall. In the spring, photos were also taken beginning 18 March 2009 and were concluded 22 May 2009.

**Results and Discussion**

Mesotrione applications on newly established seeded bermudagrass caused typical injury (Fig. 3) on both cultivars and did significantly reduce the green coverage on several dates going into dormancy (Fig. 1). The levels of injury were similar to what were observed when applications were made during the summer at similar rates on established Tifway bermudagrass (McCalla et al., 2009). The week following the first application of the 0.125 lb a.i./acre application, there was a significant reduction in turfgrass coverage on Riviera when compared to the control (Fig. 1). Coverage was also significantly reduced on both cultivars following the second application of the 0.125 lb a.i./acre treatment (Fig. 1). All treatments were applied at the third application date and significantly reduced coverage at the 0.25 and the 0.5 lb a.i./acre treatments. Following the final herbicide application date, the two highest rates significantly reduced the coverage on both Princess-77 and Riviera. The 0.5 lb treatment had significantly less coverage than all other treatments on both

cultivars (Fig. 1). It is important to note that the most severe injury occurred at the 0.5 lb a.i./acre treatment being applied twice, which exceeds the maximum recommended label rate for annual applications of mesotrione.

The following spring, initial greenup was observed in late March (Fig. 2). There were significant reductions in spring greenup on Riviera treated with mesotrione throughout the spring evaluation at the higher application rates, although most reductions were only 10-20% when compared to the controls. As the Riviera reached 80% turfgrass coverage, differences between treated and untreated plots were minor (Fig. 2). There were no differences in coverage between any treatments on the first two rating dates in the Princess-77 plots (Fig. 2). However, beginning on 11 May 2009, the 0.5 lb/acre rate significantly delayed green-up in Princess-77 compared to all other treatments and the untreated control.

Spring green up of Riviera was only slightly affected by mesotrione and it reached complete coverage before the Princess-77. The cold-sensitive cultivar, Princess-77, also seemed to be more severely affected by fall-applied mesotrione treatments, especially at higher rates. These results suggest that fall applications of mesotrione might cause more winter injury to cultivars that are typically more sensitive to cold temperatures. These trials are currently being repeated during the 2009-2010 winter season.

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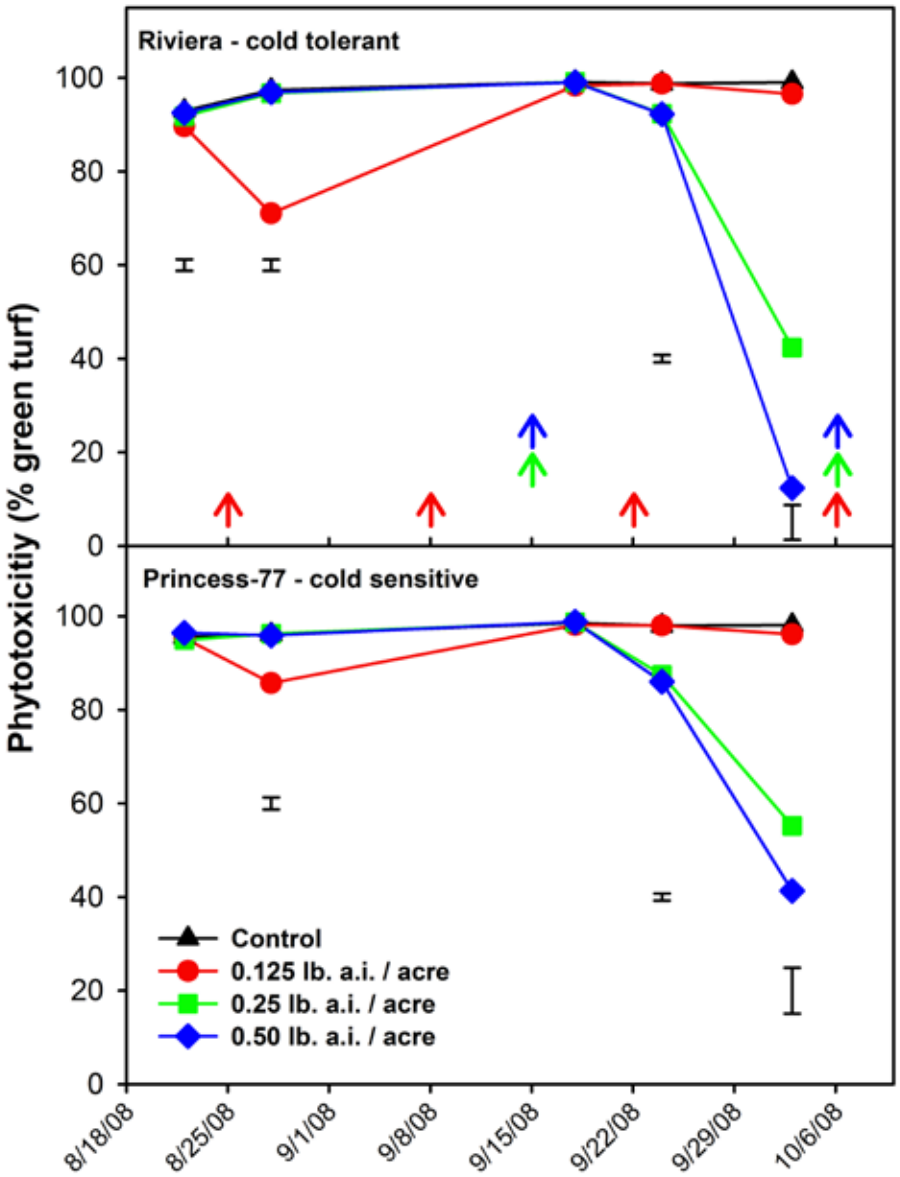


**Fig. 1. Phytotoxicity, as measured by loss of green cover, for two bermudagrasses treated with various rates and timings of mesotrione. Arrows indicate application timings for the various treatments. Error bars can be used to separate treatments within cultivar at each observation date.**

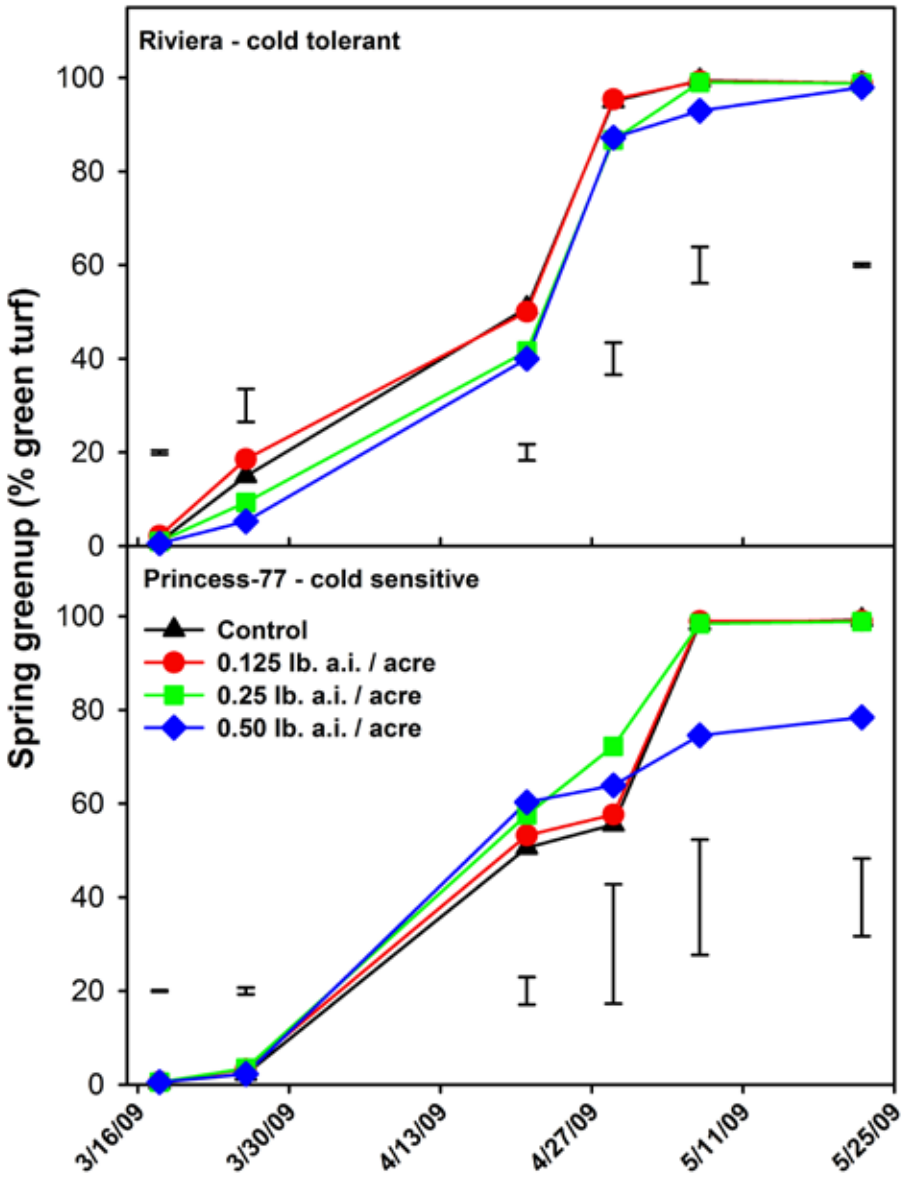


**Fig. 2. Spring green-up of two bermudagrass cultivars treated with various rates and timings of mesotrione the previous fall. Error bars can be used to separate treatments within cultivar at each observation date.**

**Fig. 3. Phytotoxicity following mesotrione treatments on Riviera bermudagrass.**