Effect of Mesotrione on Sod Quality of Tifway Bermudagrass

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Additional index words: *Cynodon dactylon*

McCalla J., M. Richardson, J. Boyd, and A. Patton. 2009. Effect of mesotrione on sod quality of Tifway bermudagrass. Arkansas Turfgrass Report 2008, Ark. Ag. Exp. Stn. Res. Ser. 568:50-53.

Photo by Mike Richardson

Sod harvested from mesotrione-treated plots

Summary. Commercial sod production has been taking place since the 1920's. Sod growers must have weed-free, high-quality sod to sell their product. The objective of this trial was to evaluate the effects of mesotrione, a relatively new herbicide in the turfgrass market, on sod regrowth after harvest and sod strength at the time of harvest. Tifway bermudagrass sod was harvested on 24 May 2008 and five different rates of mesotrione were applied at different timings during the regrowth of the sod. Herbicide injury and turfgrass cover were evaluated seven days after each herbicide application. Sod was harvested three weeks after final herbicide application (17 October 2008) and percent harvestable sod and sod strength were evaluated. There were no significant effects of mesotrione on turfgrass coverage for any of the application dates. There were no significant differences for herbicide injury except for the final application date, when the highest rates of mesotrione caused more severe injury than other rates. The highest rate (0.5 lb ai/A) of mesotrione applied at six and nine weeks after initial treatment had a negative effect on sod quality and produced less harvestable sod with weaker sod strength compared to most other treatments. There were no significant differences between any of the treatments at label rates (less than 0.5 lbs ai/A annually) in regard to sod strength.

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Commercial sod production began in the United States around 1920 (Mitchell and Dickens, 1979). High-quality sod is generally characterized as healthy, strong enough for handling, and weed free. Bermudagrass (*Cynodon* spp.) is the most widely-used grass for sod production in the southern United States and can often be harvested multiple times in a growing season. For producers to harvest two crops in a single season, growers must develop and follow stringent fertilizer and pesticide applications. Proper herbicide timing in sod production not only affects the appearance of the grass but may also affect the sod strength and rooting ability after harvest (Sharpe et. al, 1989).

Mesotrione (Tenacity) 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; mesotrione provides turf producers with another option to control these weeds. With the recent introduction of mesotrione to the turfgrass industry, studies are needed to evaluate its effectiveness on weed control and how it may adversely affect the grass in different situations such as sod production.

Bermudagrass in typically injured by mesotrione (Boyd, 2008). This phytotoxicity (injury) may be less problematic in certain situations such as sod farms, since the phytotoxicity is short-lived and the turf can recover from injury prior to harvesting and marketing the sod. However, there have been no studies to date to investigate the effects of mesotrione on bermudagrass sod production. The objective of this trial was to evaluate mesotrione for phytotoxicity and how it affects regrowth and sod strength of bermudagrass.

Materials and Methods

This study was conducted at the University of Arkansas Agricultural Research and Extension Center in Fayetteville, Ark. on a hybrid bermudagrass (cultivar Tifway) area that was established with sprigs in the summer of 2003.

Sod was initially harvested from the entire experimental area using a Gandy Jr. sod cutter (18-inch width) on 24 May 2008 and 2-inch ribbons were left between the harvested strips. Herbicide applications were initiated 14 days after sod harvest. Mesotrione (2-[4-(methylsulfonyl)-2-nitrobenzoyl]-1,3-cyclohexanedione), was applied at five different rates, including an untreated control, across four different timings (Table 1). Herbicides were applied using a 4-ft boom sprayer with CO_2 as the propellant at a spray volume of 30 gal/A. Herbicide plot size was 5 × 25 ft. The turf was maintained at a lawn height of cut (2.0 inches) throughout the study. The plot area received 0.5 lb N/1000 ft^2 every 14 days until 100% cover was reached after harvesting and then once per month at 1.0 lb N/1000 ft^2 until sod harvest. There were four replications of each treatment.

Injury and cover ratings were taken seven days following each herbicide application. Injury was rated on a 1-9 (with 1 = no injury and 9 = dead turf) and turfgrass coverage was measured using digital image analysis (Richardson et al., 2001). A single strip of sod was harvested from each herbicide plot on 17 October 2008, which corresponded to three weeks after the final herbicide application date. Each plot yielded 10 pads of sod that were 18 inches wide by 30 inches long. Each piece of sod was lifted after harvest and determined to be a harvestable piece of sod if it did not break during the lifting. Percent harvestable sod was calculated from each plot as the number of pieces that could be lifted divided by ten. Five sod pads were sampled, if available, from each plot and measured for sod strength using a previously described sod stretcher (Sorochan et al., 1999; McCalla et al., 2008).

Results and Discussion

There was no significant injury from herbicide applications except on the final treatment date. At seven days after the final treatment application, the high rate of mesotrione (0.50 lb ai/A), caused significantly more injury than the 0.25-lb

ai/A rate, which had significantly more injury than the other two rates and the untreated control (data not shown). There were no significant differences in turfgrass coverage between treatments following any of the herbicide applications. The experimental area had full turf coverage at eight weeks after the initial sod harvest.

The highest rate of mesotrione produced significantly less harvestable sod than all other treatments with the exception of the 0.156-lb ai/A treatment, with only 58% being harvestable (Table 2). There were no statistical differences in harvestable sod between 0.25, 0.125, and the untreated check. There were minimal statistical differences in sod strength among the treatments. However, the highest rate (0.5-lb ai/A) of mesotrione did have weaker sod strength than the 0.25-lb ai/A treatment. The sod strength results are similar to other studies that have evaluated the effects of herbicides on sod strength (Turner et al., 1990; Christians and Dant, 2002; and Sharpe et al., 1989). In those studies, herbicide applications did not adversely affect sod tensile strength when compared to the untreated check.

In summary, mesotrione had minimal effect on sod strength when compared to the untreated check, but the highest rate (2 applications of 0.50-lb ai/A) did reduce the amount of harvestable sod compared to other treatments. Mesotrione application is recommended to not exceed 0.50-lb ai/A per year, so the highest rate in this study exceeded label rates. For the label rates, the sod recovered and was ready for harvest approximately eight weeks after initial harvest and there was little to no injury resulting from herbicide applications. Collectively, these data suggest that mesotrione may be safely used in bermudagrass sod production at lower rates with minimal effects on sod quality and appearance. A second harvest is planned for early spring 2009.

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Table 1. Herbicide timings and rates used in the study. The initial mesotrione treatment was applied on 6 June 2008.

Treatment	Rate	Timing
	lbs. a.i. / acre	
Untreated		
Mesotrione	0.125	Initial treatment, 3 WAIT[Z], 6 WAIT, and 9 WAIT
Mesotrione	0.156	3 WAIT, 6 WAIT, and 9 WAIT
Mesotrione	0.25	6 WAIT and 9 WAIT
Mesotrione	0.50	6 WAIT and 9 WAIT

[Z]WAIT – weeks after initial treatment

Table 2. Harvestable sod and sod strength, as measured as the peak force to break the sod. Sod was harvested on 10 Oct. 2008.

Treatment	Rate	Harvest	Strength
	(lb. a.i. / acre)	%	force (lbs.)
Untreated		87.5	109.5
Mesotrione	0.125	97.5	106.4
Mesotrione	0.156	72.5	108.8
Mesotrione	0.25	85.0	121.2
Mesotrione	0.50	57.5	97.1
LSD(0.10)		22.5	18.4