



Evaluations of postemergence herbicides on seedling zoysiagrass

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Summary. Zoysiagrass is traditionally planted using vegetative methods such as sprigging or sodding. There have been several new seeded cultivars introduced into the market that are adding alternatives to the industry vegetative standards. The major issue with establishing any grass is weed control during establishment. An experiment was conducted at the University of Arkansas researching the herbicide tolerance of newly seeded zoysiagrass. Herbicide treatments were applied 2 weeks after emergence and visual injury ratings were taken several times following treatment application. Herbicide injury was most severe during the first ten days after treatment. Turfgrass cover was only affected by a few treatments when compared to the untreated control. Several of the treatment combinations offer great broad-spectrum control of weeds and caused minimal injury to the seedling turf.

Zoysiagrass has become a major turfgrass species for transition zone environments, where it is used primarily for golf course fairways and tees and home lawns. The major zoysiagrass cultivars that have been used for these applications are vegetatively propagated clones that have been selected for improved turfgrass performance. Recent efforts by turfgrass breeders have led to the development of seed-propagated cultivars of zoysiagrass. These seeded zoysiagrasses have the potential to greatly expand the use of this desirable turfgrass species.

One of the major challenges with the propagation of any species from seed is the control of weeds during establishment. There have been no studies that investigate the use of herbicides during establishment of seeded zoysiagrass. The objective of this study was to determine the tolerance of seedling zoysiagrass to a range of postemergence herbicides.

Materials and methods

In this trial, a single herbicide application date (2 weeks after emergence) was tested. The research plots were established at the University of Arkansas Research and Extension Center in Fayetteville, Ark. Prior to

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the initiation of this study, the plot area was fumigated using methyl bromide. 'Zenith' seeded zoysiagrass was seeded at 48.8 kg PLS ha⁻¹ (1.0 lb PLS / 1000 ft²) on 15 June 2003. Individual plots were 1.22 x 1.52 m (4 x 5 ft.). Herbicides were applied using a CO₂ propelled single nozzle sprayer in association with a high walled framed spray shield to prevent drift between plots. The herbicides were applied at a spray volume of 280 l ha⁻¹ (30 gpa). The herbicides tested and their rates are listed in Table 1. Visual herbicide injury ratings (0-9, 0= no injury and 9= completely dead) were taken periodically following herbicide application. Turfgrass establishment rates were determined at 7, 14, and 21 days after treatment (DAT) using digital image analysis (Richardson et al., 2001).

Results and discussion

The majority of injury observed in this study consisted of yellowing or other discoloration of the leaves. In addition, some of the treatments resulted in a significant loss of turfgrass cover when compared to the untreated control. At 3 DAT, most of the herbicide combinations tested caused significant injury to the seedling turf (Table 1). The combination of Confront + MSMA caused the most severe injury on this date but all combinations caused significantly more injury than the control with the exceptions of both Drive treatments (Table 1). Over the duration of the rating period the most severe injury was from the Acclaim+ Confront treatment which was as high as 8.0 at the 10 DAT rating date. Other treatments that caused significant injury to the seedling turf included Manor + MSMA, Confront + MSMA, flazosulfuron + MSMA, and Revolver + MSMA (Table 1). Herbicide injury peaked within the first 10 days following application for all treatments (Table 1). Injury was still evident at 14 DAT on most plots but had subsided to acceptable levels by 28 DAT (Table 1).

Even though turf injury was high after the application of many of the herbicide combinations, turfgrass cover was only affected by a few of the treatment combinations at the 14 and 21 DAT evaluation dates (Table 2). The plots treated with the Acclaim + Confront combination showed significantly less cover than all other combinations tested at both 14 and 21 DAT while control plots showed near full cover, 96.3% and 97.8%, on both dates (Table 2). In addition, the Manor + MSMA treatments also significantly reduced turfgrass coverage at 14 and 21 DAT compared to the controls (Table 2).

Other herbicide combinations caused various levels of turfgrass injury, but did not significantly reduce the cover on the plots. These included the Trimec Classic + MSMA and Confront + MSMA combinations (Table 2). These two different treatments will offer a broad-spectrum weed control combination that should eliminate any problem weeds during establishment. Trimec and Confront are commonly used broad leaf herbicides while MSMA is a good postemergence grass control herbicide. Drive would also be an excellent treatment to use during establishment for goosegrass and crabgrass control and these treatments caused little to no injury on the seedling zoysiagrass.

With the introduction of improved seeded zoysiagrass cultivars, weed control during establishment will be a significant issue for turfgrass managers. This study demonstrates that several good postemergence herbicide treatments can be safely used during establishment to control problematic weeds in seedling zoysiagrass turf.

Literature cited

Richardson, M.D., D.E. Karcher, and L.A. Purcell. 2001. Using digital image analysis to quantify percentage turfgrass cover. *Crop Science* 41:1884-1888.

Table 1. Tolerance of 'Zenith' seedling zoysiagrass to several postemergence herbicides applied at 2 weeks after emergence.

Herbicide	Rate	Turfgrass injury due to herbicide†									
		3 DAT	5 DAT	7 DAT	10 DAT	14 DAT	21 DAT	28 DAT	Avg. Injury		
Acclaim + Confront	28 oz / acre + 1.0 pt / acre	3.75	3.75	5.00	8.00	7.00	6.25	2.50	5.18		
Manor + MSMA	0.33 oz / acre + 2.0 lb. ai / acre	4.25	4.75	4.50	6.50	5.75	5.50	3.25	4.90		
Confront + MSMA	1.0 pt / acre + 2.0 lb. ai / acre	5.75	6.75	5.75	3.25	1.50	0.00	0.00	3.28		
Flazosulfuron + MSMA	3.0 oz / acre + 2.0 lb. ai / acre	3.25	4.00	5.00	5.25	3.25	1.50	0.75	3.20		
Revolver + MSMA	17.4 oz / acre + 2.0 lb. ai / acre	5.25	5.00	4.25	4.25	2.25	0.75	0.25	3.10		
Monument + MSMA	0.56 oz / acre + 2.0 lb. ai / acre	4.50	4.00	3.25	3.25	1.50	0.25	0.00	2.40		
Drive + MSMA	0.75 + 2.0 lb. ai / acre	4.75	4.00	1.75	2.75	1.25	0.25	0.25	2.14		
Lontrol + MSMA	0.38 + 2.0 lb. ai / acre	4.50	4.75	2.75	1.25	0.50	0.25	0.00	2.00		
Trimec Classic + MSMA	3.5 pints / acre + 2.0 lb. ai / acre	3.00	2.25	1.25	2.75	1.25	0.00	0.00	1.50		
Drive	0.75 lb. ai / acre	1.25	1.25	2.00	1.00	0.25	0.00	0.00	0.82		
Drive fb Drive	0.5 fb 0.5 lb. ai / acre	1.00	1.00	2.00	1.25	0.25	0.00	0.00	0.78		
Control	Control	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
LSD (0.05)		1.60	1.40	2.50	1.40	1.10	0.90	0.70	0.70		

† - injury ratings were made on a 0-9 scale, with 9 = dead turf and 1 = no injury

Table 2. Turfgrass coverage of 'Zenith' seedling zoysiagrass, as affected by several postemergence herbicides applied at 2 weeks after emergence.

Herbicide	Rate	Turfgrass Coverage†		
		7 DAT	14 DAT	21 DAT
		----- % cover -----		
Acclaim + Confront	28 oz / acre + 1.0 pt / acre	28.10	31.90	44.90
Manor + MSMA	0.33 oz / acre + 2.0 lb. ai / acre	34.70	61.90	61.20
Confront + MSMA	1.0 pt / acre + 2.0 lb. ai / acre	53.50	87.80	93.00
Flazosulfuron + MSMA	3.0 oz / acre + 2.0 lb. ai / acre	50.10	74.80	82.40
Revolver + MSMA	17.4 oz / acre + 2.0 lb. ai / acre	56.20	83.80	91.10
Monument + MSMA	0.56 oz / acre + 2.0 lb. ai / acre	56.00	86.80	90.30
Drive + MSMA	0.75 + 2.0 lb. ai / acre	65.50	94.40	96.40
Lontrol + MSMA	0.38 + 2.0 lb. ai / acre	79.20	96.20	97.90
Trimec Classic + MSMA	3.5 pints / acre + 2.0 lb. ai / acre	56.20	89.50	93.60
Drive	0.75 lb. ai / acre	76.20	91.10	94.30
Drive fb Drive	0.5 fb 0.5 lb. ai / acre	77.00	95.80	97.50
Control	Control	84.40	96.30	97.80
LSD (0.05)		16.60	9.90	10.70

† - turfgrass cover was measured using digital image analysis