Creeping Bentgrass Phytotoxicity and Control Evaluation of Lawn Height 'Midnight' Kentucky Bluegrass

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Introduction

Phytotoxicity and control evaluations were conducted on a stand of mature 'Midnight' Kentucky bluegrass (*Poa pratensis*) and creeping bentgrass (*Agrostis stolonifera*) at the Valentine Turfgrass Research Center, Penn State University, University Park, Pa. The objective of the study was to determine the phytotoxicity to creeping bentgrass and Kentucky bluegrass as well as efficacy of these compounds to control creeping bentgrass.

Methods and Materials

The study was a randomized complete block design with three replications. Treatments were applied on August 25 (FALL), September 7 (2 WAT), and September 21 (4 WAT), 2004 using a three foot CO_2 powered boom sprayer calibrated to deliver 40 gpa using two, flat fan, 11004 nozzles at 40 psi.

The test site was mowed at one and one half inches twice weekly with a rotary mower with clippings returned to the site.

Results and Discussion

Turfgrass phytotoxicity was rated two times (Table 1). There was no turfgrass phytotoxicity on these two rating dates (Aug 26 & 31, 2004). Creeping bentgrass phytotoxicity was rated seven times (Table 2). Phytotoxicity was rated below acceptable (7.0) on several dates for all treated creeping bentgrass. Conversely, no phytotoxicity was observed on the Kentucky bluegrass at any time (Table 3).

The change in the creeping bentgrass population was evaluated twice (Table 4). On the final rating date, May 26, 2005, turfgrass treated with mesotrione 4SC at 0.125 and 0.187 lb ai/A plus NIS at 0.25 and MSO at 1.0 %v/v, respectively, applied once in the fall were not significantly different than untreated that had a 50% increase in population. The remaining treated turfgrass had a significant reduction of creeping bentgrass compared to untreated turfgrass. Although, not significant from other treated turfgrass, turfgrass treated with mesotrione 4SC at 0.187 followed two weeks later at 0.135 lb ai/A plus MSO at 1 %v/v and mesotrione 4SC at 0.15, 0.233. and 0.15 lb ai/A plus NIS at 0.25 %v/v (FALL, 2 WAT, and 4 WAT respectively) had a 90% or greater reduction of creeping bentgrass.

It would appear that a reduction of a creeping bentgrass population in a mixed creeping bentgrass/'Midnight' Kentucky bluegrass stand is attainable if multiple applications of mesotrione and MSO are applied in the fall of the year.

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Table 1. Evaluations of turfgrass phytotoxicity where 0 = worst, 7 = acceptable, and 10 = no phytotoxicity in 2004.

Treatment	Form	Rate lb ai/A	Timing	(----------Phytotoxicity-------) 8/27	8/31
MESOTRIONE 10.0	4SC	0.125	FALL	10.0	
MSO	L	0.25%V/V	FALL		
MESOTRIONE 10.0	4SC	0.187	FALL	10.0	
MSO	L	0.25%V/V	FALL		
MESOTRIONE	4SC	0.125	FALL/2 WAT	10.0	10.0
MSO	L	0.25%V/V	FALL/2 WAT		
MESOTRIONE 10.0	4SC	0.187/0.125	FALL /2 WAT	10.0	
MSO	L	0.25%V/V	FALL/2 WAT		
MESOTRIONE	4SC	0.187	FALL/2 WAT	10.0	10.0
MSO	L	0.25%V/V	FALL/2 WAT		
CHECK				10.0	10.0
MESOTRIONE	4SC	0.15/0.233/0.15	FALL/2 WAT/4 WAT	10.0	10.0
MSO	L	0.25%V/V	FALL /2 WAT/4 WAT		
MESOTRIONE 10.0	4SC	0.125	FALL	10.0	
MSO	L	1.0%V/V	FALL		
MESOTRIONE 10.0	4SC	0.187	FALL	10.0	
MSO	L	1.0%V/V	FALL		
MESOTRIONE	4SC	0.125	FALL/2 WAT	10.0	10.0
MSO	L	1.0%V/V	FALL /2 WAT		
MESOTRIONE	4SC	0.187/0.125	FALL/2 WAT	10.0	10.0
MSO	L	1.0%V/V	FALL /2WAT		
MESOTRIONE	4SC	0.187	FALL/2 WAT	10.0	10.0
MSO	L	1.0%V/V	FALL/2 WAT		
MESOTRIONE 10.0	4SC	0.15	FALL /2 WAT/4 WAT	10.0	
MSO	L	1.0%V/V	FALL /2 WAT/4 WAT		

Table 2. Evaluations of creeping bentgrass phytotoxicity where 0 = worst, 7 = acceptable, and 10 = no phytotoxicity in 2004.

Treatment	Form	Rate	Timing	(----------Phytotoxicity----------)							
		lb ai/A		9/3	9/8	9/16	9/22	9/29	10/6	10/18	
MESOTRIONE	4SC	0.125	FALL		6.7	5.7	6.0	7.0	8.3	10.0	10.0
NIS	L	0.25%V/V	FALL								
MESOTRIONE	4SC	0.187	FALL		7.0	5.7	6.0	6.7	7.7	8.0	10.0
NIS	L	0.25%V/V	FALL								
MESOTRIONE	4SC	0.125	FALL/2 WAT	6.7	5.3	3.0	5.0	4.3	6.7	8.7	
NIS	L	0.25%V/V	FALL/2 WAT								
MESOTRIONE	4SC	0.187/0.125	FALL /2 WAT		5.7	5.3	2.7	4.7	3.7	4.0	7.0
NIS	L	0.25%V/V	FALL/2 WAT								
MESOTRIONE	4SC	0.187	FALL/2 WAT	6.0	5.3	2.3	3.3	5.3	3.3	6.0	
NIS	L	0.25%V/V	FALL/2 WAT								
CHECK				10.0	10.0	10.0	10.0	10.0	10.0	10.0	
MESOTRIONE	4SC	0.15/0.233/0.15	FALL/2 WAT/4 WAT	5.7	5.7	2.7	4.0	3.0	3.0	6.0	
NIS	L	0.25%V/V	FALL /2 WAT/4 WAT								
MESOTRIONE	4SC	0.125	FALL		5.7	4.7	5.0	6.7	5.3	8.3	10.0
MSO	L	1.0%V/V	FALL								
MESOTRIONE	4SC	0.187	FALL		5.7	4.3	5.0	6.3	8.0	9.3	10.0
MSO	L	1.0%V/V	FALL								
MESOTRIONE	4SC	0.125	FALL/2 WAT	7.0	5.3	3.7	5.3	6.0	7.0	9.0	
MSO	L	1.0%V/V	FALL /2 WAT								
MESOTRIONE	4SC	0.187/0.125	FALL/2 WAT	6.0	5.3	3.7	5.0	4.3	6.0	8.7	
MSO	L	1.0%V/V	FALL /2WAT								
MESOTRIONE	4SC	0.187	FALL/2 WAT	5.3	4.3	2.3	3.3	3.3	4.3	6.0	
MSO	L	1.0%V/V	FALL/2 WAT								
MESOTRIONE	4SC	0.15	FALL /2 WAT/4 WAT		6.0	5.0	3.3	4.7	3.0	3.3	4.0
MSO	L	1.0%V/V	FALL /2 WAT/4 WAT								

Table 3. Evaluations of 'Midnight' Kentucky bluegrass phytotoxicity where 0 = worst, 7 = acceptable, and 10 = no phytotoxicity in 2004.

Treatment	Form	Rate lb ai/A	Timing	(----------Phytotoxicity----------) 9/3	9/8	9/16	9/22	9/29	10/6	10/18	
MESOTRIONE	4SC	0.125	FALL		10.0	10.0	10.0	10.0	10.0	10.0	10.0
NIS	L	0.25%V/V	FALL								
MESOTRIONE	4SC	0.187	FALL		10.0	10.0	10.0	10.0	10.0	10.0	10.0
NIS	L	0.25%V/V	FALL								
MESOTRIONE	4SC	0.125	FALL/2 WAT	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
NIS	L	0.25%V/V	FALL/2 WAT								
MESOTRIONE	4SC	0.187/0.125	FALL /2 WAT		10.0	10.0	10.0	10.0	10.0	10.0	10.0
NIS	L	0.25%V/V	FALL/2 WAT								
MESOTRIONE	4SC	0.187	FALL/2 WAT	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
NIS	L	0.25%V/V	FALL/2 WAT								
CHECK				10.0	10.0	10.0	10.0	10.0	10.0	10.0	
MESOTRIONE	4SC	0.15/0.233/0.15	FALL/2 WAT/4 WAT	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
NIS	L	0.25%V/V	FALL /2 WAT/4 WAT								
MESOTRIONE	4SC	0.125	FALL		10.0	10.0	10.0	10.0	10.0	10.0	10.0
MSO	L	1.0%V/V	FALL								
MESOTRIONE	4SC	0.187	FALL		10.0	10.0	10.0	10.0	10.0	10.0	10.0
MSO	L	1.0%V/V	FALL								
MESOTRIONE	4SC	0.125	FALL/2 WAT	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
MSO	L	1.0%V/V	FALL /2 WAT								
MESOTRIONE	4SC	0.187/0.125	FALL/2 WAT	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
MSO	L	1.0 %V/V	FALL /2WAT								
MESOTRIONE	4SC	0.187	FALL/2 WAT	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
MSO	L	1.0%V/V	FALL/2 WAT								
MESOTRIONE	4SC	0.15	FALL /2 WAT/4 WAT		10.0	10.0	10.0	10.0	10.0	10.0	10.0
MSO	L	1.0%V/V	FALL /2 WAT/4 WAT								

Table 4. Percent change of the creeping bentgrass population in 'Midnight' Kentucky bluegrass.

Treatment	Form	Rate lb ai/A	Timing	(----------%Change----------) 10/4/04	5/26/05
MESOTRIONE	4SC	0.125	FALL	-8.3d[1,2]	28.3ab
NIS	L	0.25%V/V	FALL		
MESOTRIONE	4SC	0.187	FALL	23.6cd	2.2bc
NIS	L	0.25%V/V	FALL		
MESOTRIONE	4SC	0.125	FALL/2 WAT	61.1abc	74.4ab
NIS	L	0.25%V/V	FALL/2 WAT		
MESOTRIONE	4SC	0.187/0.125	FALL /2 WAT	71.4ab	78.6ab
NIS	L	0.25%V/V	FALL/2 WAT		
MESOTRIONE	4SC	0.187	FALL/2 WAT	66.3ab	51.5ab
NIS	L	0.25%V/V	FALL/2 WAT		
CHECK				-8.3d	-50.0 c
MESOTRIONE	4SC	0.15/0.233/0.15	FALL/2 WAT/4 WAT	76.4a	91.9a
NIS	L	0.25%V/V	FALL /2 WAT/4 WAT		
MESOTRIONE	4SC	0.125	FALL	23.3cd	36.1ab
MSO	L	1.0%V/V	FALL		
MESOTRIONE	4SC	0.187	FALL	1.7d	0.0bc
MSO	L	1.0%V/V	FALL		
MESOTRIONE	4SC	0.125	FALL/2 WAT	30.6bcd	47.8ab
MSO	L	1.0 %V/V	FALL /2 WAT		
MESOTRIONE	4SC	0.187/0.125	FALL/2 WAT	68.3ab	90.0a
MSO	L	1.0%V/V	FALL /2WAT		
MESOTRIONE	4SC	0.187	FALL/2 WAT	67.2ab	76.1ab

MSO	L	1.0%V/V	FALL/2 WAT			
MESOTRIONE	4SC	0.15	FALL	/2 WAT/4 WAT	66.7ab	63.3ab
MSO	L	1.0%V/V	FALL	/2 WAT/4 WAT		

1 - Means followed by same letter do not significantly differ (P=0.05, Duncan's New MRT)
2 – Positive numbers represent a percent decrease and negative numbers a percent increase.