Pre and Post Emergence Control of Crabgrass and Phytotoxicity Evaluations

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Introduction

Pre and post emergence control of smooth crabgrass (*Digitaria ischaemum*) was evaluated on a mature mono stand of 'Amazing GS' perennial ryegrass (*Lolium perenne* L.) at the Valentine Turfgrass Research Center, Penn State University, University Park, Pa. The objective of the study was to determine the efficacy of selected herbicides for the pre and post emergence control of smooth crabgrass and to evaluate injury to the desired species.

Methods and Materials

This study was a randomized complete block design with three replications. Treatments were applied on April 29 (PRE), June 10 (1 TILLER) and July 2, 2015 (21 DAT) using a three foot CO_2 powered boom sprayer (Figure 1) calibrated to deliver 80 gpa using one, flat fan, TP1108EVS nozzle at 50 psi. Irrigated treatments (*IRRIGATION*) were watered within 10-15 minutes after application. The rate of irrigation was equivalent to 0.1 inch of water/M. Non irrigated treatments, did not receive irrigation but, did receive rainfall on May 1 (PRE) June 14 (1 TILLER) and July 4 (21 DAT) at 0.1, 0.1 and 0.23 inch/M respectively. Following first rainfall the turfgrass was irrigated to prevent moisture stress until the next treatment application.

The site was mowed once per week with a rotary mower at one and a half inches with clippings returned to the site. The study area was irrigated to prevent moisture stress.

The test site was overseeded with a native source of smooth crabgrass in the fall of at least five of the pervious growing seasons. Smooth crabgrass germination was first noted in the test site on May 19, 2015.

Ratings were conducted by way of visual interpretation on a plot by plot basis. Transformations were completed using Abbotts to determine percent control. Weed control was calculated by comparing populations per plot with the untreated plot within each replication.

Results and Discussion

Turfgrass phytotoxicity was rated six times during the study (Table 1). Only treatments with post emergence applications of Tenacity applied at the 5 oz rate plus Activator 90 caused unacceptable levels of phytotoxicity in the form of bleaching. All turf recovered just after 28 DAT.

The percent control of the smooth crabgrass was rated nine times during the study (Table 2). In general, there was a decline in the control of smooth crabgrass found from the first rating date to the last rating date. All treatments with post emergence applications of Tenacity plus Activator 90 provided commercially acceptable (85% or greater) control.

With regard to irrigation, at the conclusion of the study, no significant differences in the reduction of the crabgrass populations were found for control at or above the 85% level.

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Table 1. Evaluations of perennial ryegrass phytotoxicity where 1 = no injury, 3 = acceptable, and 10 = dead following pre and post emergent crabgrass applications in 2015.

Treatment	Form	Rate Lb/A	Timing	(---------RYE PHYTO----------) 5/22	6/9	6/15	6/19	6/24	7/8
BARRICADE *NO IRRIGATION*	65WDG	1.15	PRE	1.0	1.0	1.0	1.0	1.0	1.0
BARRICADE *IRRIGATION*	65WDG	1.15	PRE	1.0	1.0	1.0	1.3	1.0	1.7
TENACITY ACTIVATOR 90 *NO IRRIGATION*	4 SC	8 fl oz/a 0.5 % v/v	PRE	1.0	1.0	1.0	1.0	1.0	1.0
TENACITY ACTIVATOR 90 *IRRIGATION*	4 SC	8 fl oz/a 0.5 % v/v	PRE	1.0	1.0	1.0	1.0	1.0	1.0
UNTREATED CHECK				1.0	1.0	1.0	1.0	1.0	1.0
BARRICADE *IRRIGATION*	65WDG	0.65	PRE/1 TILLER	1.0	1.0	1.0	1.0	1.0	1.0
BARRICADE *IRRIGATION*	65WDG	0.65	PRE	1.0	1.0	2.0	9.0	6.3	3.8
BARRICADE	65WDG	0.5	1 TILLER						
TENACITY ACTIVATOR 90 *NO IRRIGATION*	4 SC	5 fl oz/a 0.5 % v/v							
TENACITY ACTIVATOR 90 *NO IRRIGATION*	4 SC	5 fl oz/a 0.5 % v/v	1 TILLER/21 DAT	1.0	1.0	2.3	9.0	6.0	1.0

Table 2. Percent control of the smooth crabgrass populations following applications of selected herbicides in 2015 where 85 % and greater control is considered commercially acceptable.

Treatment	Form	Rate Lb/A	Timing	(----------CRAB CONTROL[1]----------) 5/22	6/3	6/9	6/19	6/24	7/8	7/24	8/14	9/14
BARRICADE NO IRRIGATION	65WDG	1.15	PRE	66.7 ab	33.3 b	23.3 cd	16.7 b	28.9 b	12.2 b	30.3 d	39.9 b	44.5 b
BARRICADE IRRIGATION	65WDG	1.15	PRE	86.7 ab	46.7 b	33.3 c	16.7 b	11.1 cd	0.0 b	2.8 e	3.7 c	19.6 c
TENACITY ACTIVATOR 90 NO IRRIGATION	4 SC	8 fl oz/a 0.5 % v/v	PRE	33.3 bc	33.3 b	66.7 b	16.7 b	31.1 b	11.1 b	28.3 d	4.4 c	20.1 c
TENACITY ACTIVATOR 90 IRRIGATION	4 SC	8 fl oz/a 0.5 % v/v	PRE	100.0 a	100.0 a	100.0 a	0.0 b	17.8 bc	0.0 b	25.2 d	17.6 c	26.3 bc
UNTREATED CHECK				0.0 c	0.0 b	0.0 d	0.0 b	0.0 d	0.0 b	0.0 e	0.0 c	0.0 d
BARRICADE IRRIGATION	65WDG	0.65	PRE/1 TILLER	100.0 a	100.0 a	96.7 a	86.7 a	75.6 a	76.7 a	53.1 c	16.5 c	28.5 bc
BARRICADE IRRIGATION	65WDG	0.65	PRE	100.0 a	100.0 a	100.0 a	100.0 a	91.8 a	88.7 a	77.0 b	83.4 a	85.8 a
BARRICADE TENACITY ACTIVATOR 90 NO IRRIGATION	65WDG	0.5 5 fl oz/a 0.5 % v/v	1 TILLER									
TENACITY ACTIVATOR 90 NO IRRIGATION	4 SC	5 fl oz/a 0.5 % v/v	1 TILLER/21 DAT	100.0 a	100.0 a	100.0 a	100.0 a	87.3 a	90.9 a	92.3 a	84.5 a	85.0 a

1- Means followed by same letter do not significantly differ (P=0.05, Duncan's New MRT)