

Post Emergence Control of Broadleaf Weeds and Phytotoxicity Evaluations

J. A. Borger, M. B. Naedel, and M. T. Elmore¹

Introduction

Broadleaf weed control and phytotoxicity evaluations were conducted on a stand of mature 'SR-4200' perennial ryegrass (*Lolium perenne* L.) at The Valentine Turfgrass Research Center, Penn State University, University Park, Pa. The objectives of the study were to determine the efficacy of selected broadleaf weed herbicides for the control of dandelion (*Taraxacum officinale*), white clover (*Trifolium repens*), and buckhorn plantain (*Plantago lanceolata*) in perennial ryegrass and the phytotoxicity of these compounds on perennial ryegrass.

Methods and Materials

All plots were rated for the percent dandelion, white clover, and buckhorn plantain, prior to the application of any treatment, on a plot by plot basis. The test plots were 21 ft² and had approximately 80 percent broadleaf weed cover.

The study was a randomized complete block design with three replications. All Treatments were applied on May 14, 2008 (MAY) and then reapplied on June 6, 2008 (3 WAT) using a three foot CO₂ powered boom sprayer calibrated to deliver 40 gpa using one, flat fan, 11004E nozzle at 40 psi.

The test site was mowed at three inches weekly with a rotary mower with clippings returned to the site. The test site was irrigated to prevent moisture stress.

Results and Discussion

Turfgrass phytotoxicity was rated seven times during the study (Table 1). No unacceptable turfgrass phytotoxicity was observed on any rating date.

The control of dandelion, white clover, and buckhorn plantain was rated six times during the study (Table 2). Broadleaf weed control was variable. On the final rating date, August 13th, all treated turfgrass revealed a significant reduction in the buckhorn plantain populations when compared to non-treated turfgrass. Only turfgrass treated with A14203 at 0.156 lb ai/A significantly reduced the dandelion populations when compared to non-treated. With regard to clover control, only turfgrass treated with EXC3937 at 10 oz/A and A14203 at 0.156 lb ai/A did not significantly reduce the white clover populations when compared to non-treated.

¹ Instructor, Research Technician II, and Turfgrass Student, Respectively, Department of Crop and Soil Sciences, Penn State University, University Park, Pa, 16802

Table 1. Evaluations of percent turfgrass phytotoxicity in 2008 where 0-10% = slightly noticeable to researcher but acceptable, 10-30% = noticeable to researcher and homeowner but acceptable, and >30% = unacceptable.

Treatment	Form	Rate % v/v	Timing	(% Phytotoxicity)						
				5/28	6/11	6/18	7/2	7/16	7/30	8/13
TENACITY	4SC	5 oz/A	MAY/3 WAT	8.3	0.0	5.0	0.0	0.0	0.0	0.0
ACTIVATOR 90	L	0.25	MAY/3 WAT							
TENACITY	4SC	8 oz/A	MAY/3 WAT	15.0	0.0	15.0	0.0	0.0	0.0	0.0
ACTIVATOR 90	L	0.25	MAY/3 WAT							
EXC3937	2SC	10 oz/A	MAY/3 WAT	8.3	1.7	8.3	0.0	0.0	0.0	0.0
ACTIVATOR 90	L	0.25	MAY/3 WAT							
CHECK				0.0	0.0	0.0	0.0	0.0	0.0	0.0
EXC3937	2SC	16 oz/A	MAY/3 WAT	11.7	0.0	15.0	0.0	0.0	0.0	0.0
ACTIVATOR 90	L	0.25	MAY/3 WAT							
A14203	50WG	0.156 lb ai/A	MAY/3 WAT	6.7	3.3	8.3	0.0	0.0	0.0	0.0
ACTIVATOR 90	L	0.25	MAY/3 WAT							
A14203	50WG	0.25 lb ai/A	MAY/3 WAT	10.0	0.0	16.7	0.0	0.0	0.0	0.0
ACTIVATOR 90	L	0.25	MAY/3 WAT							

Table 2. Percent control of the dandelion, white clover, and buckhorn plantain populations following applications of selected herbicides.

Treatment	Form	Rate %v/v	Timing	June 11, 2008 ¹			June 18, 2008		
				Dand	Clover	Plant	Dand	Clover	Plant
TENACITY	4SC	5 oz/A	MAY/3 WAT	97.8a	73.2abc	96.7a	99.3a	66.3a	100.0a
ACTIVATOR 90	L	0.25	MAY/3 WAT						
TENACITY	4SC	8 oz/A	MAY/3 WAT	98.0a	88.9a	97.8a	99.4a	88.9a	100.0a
ACTIVATOR 90	L	0.25	MAY/3 WAT						
EXC3937	2SC	10 oz/A	MAY/3 WAT	98.7a	78.3ab	100.0a	98.7ab	62.5a	100.0a
ACTIVATOR 90	L	0.25	MAY/3 WAT						
CHECK				0.0b	0.0d	0.0c	0.0c	0.0b	0.0b
EXC3937	2SC	16 oz/A	MAY/3 WAT	98.7a	53.4c	100.0a	99.3a	74.2a	100.0a
ACTIVATOR 90	L	0.25	MAY/3 WAT						
A14203	50WG	0.156 lb ai/A	MAY/3 WAT	98.0a	70.2abc	86.1b	98.7ab	59.8a	100.0a
ACTIVATOR 90	L	0.25	MAY/3 WAT						
A14203	50WG	0.25 lb ai/A	MAY/3 WAT	98.5a	65.6bc	96.7a	97.7b	69.4a	100.0a
ACTIVATOR 90	L	0.25	MAY/3 WAT						

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

Table 2 (continued). Percent control of the dandelion, white clover, and buckhorn plantain populations following applications of selected herbicides.

Treatment	Form	Rate %v/v	Timing	(------July 2, 2008 ¹ -----)			(------July 16, 2008-----)		
				Dand	Clover	Plant	Dand	Clover	Plant
TENACITY	4SC	5 oz/A	MAY/3 WAT	63.2a	78.4ab	100.0a	49.5a	71.7a	100.0a
ACTIVATOR 90	L	0.25	MAY/3 WAT						
TENACITY	4SC	8 oz/A	MAY/3 WAT	63.6a	84.2ab	70.0a	45.5a	78.9a	100.0a
ACTIVATOR 90	L	0.25	MAY/3 WAT						
EXC3937	2SC	10 oz/A	MAY/3 WAT	67.5a	71.7ab	66.7a	62.0a	58.3a	98.3a
ACTIVATOR 90	L	0.25	MAY/3 WAT						
CHECK				0.0b	0.0c	0.0b	0.0b	0.0b	0.0b
EXC3937	2SC	16 oz/A	MAY/3 WAT	61.1a	86.8a	100.0a	55.6a	67.9a	96.7a
ACTIVATOR 90	L	0.25	MAY/3 WAT						
A14203	50WG	0.156 lb ai/A	MAY/3 WAT	74.9a	59.4b	100.0a	61.3a	27.0b	98.3a
ACTIVATOR 90	L	0.25	MAY/3 WAT						
A14203	50WG	0.25 lb ai/A	MAY/3 WAT	69.2a	69.9ab	100.0a	57.5a	64.8a	100.0a
ACTIVATOR 90	L	0.25	MAY/3 WAT						

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

Table 2 (continued). Percent control of the dandelion, white clover, and buckhorn plantain populations following applications of selected herbicides.

Treatment	Form	Rate %v/v	Timing	(------July 30, 2008 ¹ -----)			(------August 13, 2008-----)		
				Dand	Clover	Plant	Dand	Clover	Plant
TENACITY	4SC	5 oz/A	MAY/3 WAT	8.9b	29.1ab	93.3a	29.2ab	54.8a	100.0a
ACTIVATOR 90	L	0.25	MAY/3 WAT						
TENACITY	4SC	8 oz/A	MAY/3 WAT	6.1b	42.2a	100.0a	9.1b	45.6a	100.0a
ACTIVATOR 90	L	0.25	MAY/3 WAT						
EXC3937	2SC	10 oz/A	MAY/3 WAT	13.2ab	25.0ab	96.7a	29.5ab	41.7ab	98.3a
ACTIVATOR 90	L	0.25	MAY/3 WAT						
CHECK				0.0b	0.0b	0.0b	0.0b	0.0b	0.0c
EXC3937	2SC	16 oz/A	MAY/3 WAT	15.0ab	30.7ab	100.0a	23.3b	52.4a	100.0a
ACTIVATOR 90	L	0.25	MAY/3 WAT						
A14203	50WG	0.156 lb ai/A	MAY/3 WAT	28.8a	20.4ab	95.0a	54.1a	20.4ab	75.0b
ACTIVATOR 90	L	0.25	MAY/3 WAT						
A14203	50WG	0.25 lb ai/A	MAY/3 WAT	3.3b	40.3a	90.0a	15.0b	48.1a	100.0a
ACTIVATOR 90	L	0.25	MAY/3 WAT						

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