

Post Emergence Control of Broadleaf Weeds and Phytotoxicity Evaluations

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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. Treatments were applied on May 8 (PRE), May 30 (1-2 LF), June 2 (3 WAT), June 11 (4 WAT), and June 25, 2008 (6 WAT) using a three foot CO₂ powered boom sprayer calibrated to deliver 80 gpa using one, flat fan, 11008E 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 five 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 four times during the study (Table 2). Broadleaf weed control was variable. On the final rating date, July 16th, all treated turfgrass revealed a significant reduction in the buckhorn plantain populations when compared to non-treated turfgrass. Only turfgrass treated A15879 at 0.5 lb ai/A applied PRE/6 WAT, Dimension plus Escalade 2, and Escalade 2 significantly reduced the dandelion populations when compared to non treated. Similarly, only turfgrass treated with A15879 at 0.5 lb ai/A applied PRE/3WAT, Tenacity at 0.25 lb ai/a plus Barricade at 0.75 lbs ai/A applied PRE/3WAT, Dimension plus Escalade 2, A15879 at 0.5 lb ai/A PRE plus Tenacity 3WAT, and Escalade 2 significantly reduced the white clover populations when compared to non treated.

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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 lb ai/A	Timing	(% Phytotoxicity)				
				5/28	6/5	6/18	7/2	7/30
A15879	3.95SC	1	PRE	15.0	0.0	0.0	0.0	0.0
TENACITY	4SC	0.25	PRE	5.0	0.0	0.0	0.0	0.0
BARRICADE	4FL	0.75	PRE					
DIMENSION	2EW	0.25	PRE	0.0	0.0	0.0	0.0	0.0
A15879	3.95SC	1	1-2 LF	0.0	1.7	0.0	0.0	0.0
ACTIVATOR 90	L	0.25% v/v	1-2 LF					
A15879	3.95SC	0.5	PRE/1-2 LF	3.3	0.0	0.0	0.0	0.0
ACTIVATOR 90	L	0.25% v/v	1-2 LF					
A15879	3.95SC	0.5	PRE/3 WAT	3.3	5.0	0.0	0.0	0.0
ACTIVATOR 90	L	0.25% v/v	3 WAT					
CHECK				0.0	0.0	0.0	0.0	0.0
TENACITY	4SC	0.25	PRE/3 WAT	8.3	10.0	0.0	0.0	0.0
BARRICADE	4FL	0.75	PRE/3 WAT					
ACTIVATOR 90	L	0.25% v/v	3 WAT					
A15879	3.95SC	0.5	PRE/4 WAT	6.7	0.0	0.0	0.0	0.0
ACTIVATOR 90	L	0.25% v/v	4 WAT					
A15879	3.95SC	0.5	PRE/6 WAT	1.7	0.0	0.0	0.0	0.0
ACTIVATOR 90	L	0.25% v/v	6 WAT					
DIMENSION	2EW	0.25	PRE	6.7	0.0	0.0	0.0	0.0
ESCALADE 2	SL	2 pt/A	6 WAT					
ACTIVATOR 90	L	0.25% v/v	6 WAT					
A15879	3.95SC	0.5	PRE	6.7	10.0	0.0	0.0	0.0
TENACITY	4SC	0.25	3 WAT					
ACTIVATOR 90	L	0.25% v/v	3 WAT					
ESCALADE 2	SL	2 pt/A	6 WAT	0.0	0.0	0.0	0.0	0.0

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

Treatment	Form	Rate lb ai/A	Timing	-----June 5, 2008 ¹ -----			-----June 18, 2008-----		
				Dand	Clover	Plant	Dand	Clover	Plant
A15879	3.95SC	1	PRE	81.2a	14.3ab	100.0a	81.4cd	9.5c	93.3a
TENACITY	4SC	0.25	PRE	78.4a	16.7ab	86.7a	76.1d	11.6c	93.3a
BARRICADE	4FL	0.75	PRE						
DIMENSION	2EW	0.25	PRE	0.0c	0.0b	0.0b	0.0e	0.0c	0.0b
A15879	3.95SC	1	1-2 LF	32.4b	0.0b	53.3a	98.4a	61.6ab	93.3a
ACTIVATOR 90	L	0.25% v/v	1-2 LF						
A15879	3.95SC	0.5	PRE/1-2 LF	91.0a	14.8ab	100.0a	98.9a	46.4b	100.0a
ACTIVATOR 90	L	0.25% v/v	1-2 LF						
A15879	3.95SC	0.5	PRE/3 WAT	73.8a	26.7ab	100.0a	98.1a	61.6ab	100.0a
ACTIVATOR 90	L	0.25% v/v	3 WAT						
CHECK				0.0c	0.0b	0.0b	0.0e	0.0c	0.0b
TENACITY	4SC	0.25	PRE/3 WAT	91.7a	54.2a	86.7a	98.5a	78.6a	100.0a
BARRICADE	4FL	0.75	PRE/3 WAT						
ACTIVATOR 90	L	0.25% v/v	3 WAT						
A15879	3.95SC	0.5	PRE/4 WAT	68.8a	15.5ab	53.3a	94.4ab	21.8c	86.7a
ACTIVATOR 90	L	0.25% v/v	4 WAT						
A15879	3.95SC	0.5	PRE/6 WAT	72.2a	0.0b	66.7a	86.8bc	0.0c	90.0a
ACTIVATOR 90	L	0.25% v/v	6 WAT						
DIMENSION	2EW	0.25	PRE	0.0c	0.0b	0.0b	0.0e	0.0c	0.0b
ESCALADE 2	SL	2 pt/A	6 WAT						
ACTIVATOR 90	L	0.25% v/v	6 WAT						
A15879	3.95SC	0.5	PRE	80.1a	44.1a	86.7a	99.2a	77.0a	100.0a
TENACITY	4SC	0.25	3 WAT						
ACTIVATOR 90	L	0.25% v/v	3 WAT						
ESCALADE 2	SL	2 pt/A	6 WAT	0.0c	0.0b	0.0b	0.0e	0.0c	0.0b

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 lb ai/A	Timing	(------July 2, 2008 ¹ -----)			(------July 16, 2008-----)		
				Dand	Clover	Plant	Dand	Clover	Plant
A15879	3.95SC	1	PRE	35.2cd	0.0c	60.0ab	19.4b	0.0e	93.3a
TENACITY	4SC	0.25	PRE	28.8d	0.0c	33.3ab	3.0b	0.0e	93.3a
BARRICADE	4FL	0.75	PRE						
DIMENSION	2EW	0.25	PRE	0.0e	0.0c	0.0b	0.0b	0.0e	0.0b
A15879	3.95SC	1	1-2 LF	85.5a	30.5b	93.3a	25.8b	9.5cde	100.0a
ACTIVATOR 90	L	0.25% v/v	1-2 LF						
A15879	3.95SC	0.5	PRE/1-2 LF	50.5bcd	21.3bc	60.0ab	23.1b	5.6de	100.0a
ACTIVATOR 90	L	0.25% v/v	1-2 LF						
A15879	3.95SC	0.5	PRE/3 WAT	59.5b	26.7b	50.0ab	19.0b	20.7bcd	93.3a
ACTIVATOR 90	L	0.25% v/v	3 WAT						
CHECK				0.0e	0.0c	0.0b	0.0b	0.0e	0.0b
TENACITY	4SC	0.25	PRE/3 WAT	62.5ab	59.4a	86.7a	8.3b	24.3bc	100.0a
BARRICADE	4FL	0.75	PRE/3 WAT						
ACTIVATOR 90	L	0.25% v/v	3 WAT						
A15879	3.95SC	0.5	PRE/4 WAT	85.0a	12.1bc	66.7a	26.5b	6.1de	100.0a
ACTIVATOR 90	L	0.25% v/v	4 WAT						
A15879	3.95SC	0.5	PRE/6 WAT	83.2a	0.0c	90.0a	76.9a	0.0e	100.0a
ACTIVATOR 90	L	0.25% v/v	6 WAT						
DIMENSION	2EW	0.25	PRE	0.0e	0.0c	0.0b	83.5a	97.9a	93.3a
ESCALADE 2	SL	2 pt/A	6 WAT						
ACTIVATOR 90	L	0.25% v/v	6 WAT						
A15879	3.95SC	0.5	PRE	58.1bc	54.1a	93.3a	16.7b	33.7b	93.3a
TENACITY	4SC	0.25	3 WAT						
ACTIVATOR 90	L	0.25% v/v	3 WAT						
ESCALADE 2	SL	2 pt/A	6 WAT	0.0e	0.0c	0.0b	86.7a	96.7a	93.3a

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