

# Post Emergence Control of Broadleaf Weeds and Phytotoxicity Evaluations

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## Introduction

Broadleaf weed control and turfgrass 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 to perennial ryegrass.

## Methods and Materials

All plots were rated by recording the population of dandelion, white clover, and buckhorn plantain species prior to the application of any treatment, on a plot by plot basis. The rating was conducted by way of visual interpretation. This was repeated following the application of materials and a percent control of the population was produced. The test plots were 18 ft<sup>2</sup> and had approximately 75 percent broadleaf weed cover.

The study was a randomized complete block design with three replications. Applications were applied on June 8 (PRE-TILL), June 29 (21 DAT), July 27 (42 DAT), July 23 (1-2 TILL), August 10 (21 DAT), and August 31, 2012 (42 DAT) using a three foot CO<sub>2</sub> powered boom sprayer (Figure 1) calibrated to deliver 80 gpa using one, flat fan, TP9508EVS nozzle at 40 psi .

The test site (Figure 2) 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

Perennial ryegrass phytotoxicity was rated eight 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, September 7, 2012, all treated turfgrass revealed a significant reduction in the dandelion, white clover, and buckhorn plantain populations when compared to non treated turfgrass. In some instances nearing or achieving 100% reduction of the weed population.

A high level of safety and weed control resulting from this mixture was observed. The utilization of these tank mixtures will add to the turfgrass manager's array of options to control weeds in the turfgrass community.

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**Table 1.** Evaluations of perennial ryegrass phytotoxicity where 0 = dead turf, 7 = acceptable, and 10 = no phytotoxicity in 2012.

Treatment	Form	Rate oz/A	Timing	-----Rye Phytotoxicity-----			
				6/15	6/22	6/29	7/6
TENACITY	4SC	5	PRE TILL/21 DAT	10.0	9.2	10.0	10.0
TURFLON ESTER	4EC	16	PRE TILL/21 DAT				
ACTIVATOR 90	L	0.25% v/v	PRE TILL/21 DAT				
CHECK				10.0	10.0	10.0	10.0
TENACITY	4SC	5	PRE TILL/42 DAT	10.0	9.3	10.0	10.0
TURFLON ESTER	4EC	16	PRE TILL/42 DAT				
ACTIVATOR 90	L	0.25% v/v	PRE TILL/42 DAT				
TENACITY	4SC	5	1-2 TILL/21 DAT	10.0	10.0	10.0	10.0
TURFLON ESTER	4EC	16	1-2 TILL/21 DAT				
ACTIVATOR 90	L	0.25% v/v	1-2 TILL/21 DAT				
TENACITY	4SC	5	1-2 TILL/42 DAT	10.0	10.0	10.0	10.0
TURFLON ESTER	4EC	16	1-2 TILL/42 DAT				
ACTIVATOR 90	L	0.25% v/v	1-2 TILL/42 DAT				

**Table 1 (cont).** Evaluations of perennial ryegrass phytotoxicity where 0 = dead turf, 7 = acceptable, and 10 = no phytotoxicity in 2012.

Treatment	Form	Rate oz/A	Timing	-----Rye Phytotoxicity-----			
				7/13	8/4	8/11	8/20
TENACITY	4SC	5	PRE TILL/21 DAT	10.0	10.0	10.0	10.0
TURFLON ESTER	4EC	16	PRE TILL/21 DAT				
ACTIVATOR 90	L	0.25% v/v	PRE TILL/21 DAT				
CHECK				10.0	10.0	10.0	10.0
TENACITY	4SC	5	PRE TILL/42 DAT	10.0	10.0	10.0	10.0
TURFLON ESTER	4EC	16	PRE TILL/42 DAT				
ACTIVATOR 90	L	0.25% v/v	PRE TILL/42 DAT				
TENACITY	4SC	5	1-2 TILL/21 DAT	10.0	10.0	10.0	10.0
TURFLON ESTER	4EC	16	1-2 TILL/21 DAT				
ACTIVATOR 90	L	0.25% v/v	1-2 TILL/21 DAT				
TENACITY	4SC	5	1-2 TILL/42 DAT	10.0	10.0	10.0	10.0
TURFLON ESTER	4EC	16	1-2 TILL/42 DAT				
ACTIVATOR 90	L	0.25% v/v	1-2 TILL/42 DAT				

**Table 2.** Percent control of the dandelion, white clover, and buckhorn plantain populations following applications of selected herbicides in 2012.

Treatment	Form	Rate oz/A	Timing	((-----June 22, 2012 <sup>1</sup> -----))			((-----July 6, 2012 <sup>1</sup> -----))		
				Dand	Clover	Plant	Dand	Clover	Plant
TENACITY	4SC	5	PRE TILL/21 DAT	100.0a	100.0a	100.0a	100.0a	100.0a	100.0a
TURFLON ESTER	4EC	16	PRE TILL/21 DAT						
ACTIVATOR 90	L	0.25% v/v	PRE TILL/21 DAT						
CHECK				0.0b	0.0b	0.0b	0.0b	0.0b	0.0b
TENACITY	4SC	5	PRE TILL/42 DAT	99.2a	100.0a	100.0a	99.2a	100.0a	100.0a
TURFLON ESTER	4EC	16	PRE TILL/42 DAT						
ACTIVATOR 90	L	0.25% v/v	PRE TILL/42 DAT						
TENACITY	4SC	5	1-2 TILL/21 DAT	0.0b	0.0b	0.0b	0.0b	0.0b	0.0b
TURFLON ESTER	4EC	16	1-2 TILL/21 DAT						
ACTIVATOR 90	L	0.25% v/v	1-2 TILL/21 DAT						
TENACITY	4SC	5	1-2 TILL/42 DAT	0.0b	0.0b	0.0b	0.0b	0.0b	0.0b
TURFLON ESTER	4EC	16	1-2 TILL/42 DAT						
ACTIVATOR 90	L	0.25% v/v	1-2 TILL/42 DAT						

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

**Table 2 (cont).** Percent control of the dandelion, white clover, and buckhorn plantain populations following applications of selected herbicides in 2012.

Treatment	Form	Rate oz/A	Timing	((-----August 3, 2012 <sup>1</sup> -----))			((-----September 7, 2012 <sup>1</sup> -----))		
				Dand	Clover	Plant	Dand	Clover	Plant
TENACITY	4SC	5	PRE TILL/21 DAT	73.9bc	100.0a	100.0a	29.9b	100.0a	100.0a
TURFLON ESTER	4EC	16	PRE TILL/21 DAT						
ACTIVATOR 90	L	0.25% v/v	PRE TILL/21 DAT						
CHECK				0.0d	0.0b	0.0b	0.0c	0.0b	0.0b
TENACITY	4SC	5	PRE TILL/42 DAT	97.8a	100.0a	100.0a	97.8a	100.0a	100.0a
TURFLON ESTER	4EC	16	PRE TILL/42 DAT						
ACTIVATOR 90	L	0.25% v/v	PRE TILL/42 DAT						
TENACITY	4SC	5	1-2 TILL/21 DAT	67.5c	93.3a	100.0a	88.3a	93.3a	100.0a
TURFLON ESTER	4EC	16	1-2 TILL/21 DAT						
ACTIVATOR 90	L	0.25% v/v	1-2 TILL/21 DAT						
TENACITY	4SC	5	1-2 TILL/42 DAT	76.9b	100.0a	100.0a	96.3a	100.0a	100.0a
TURFLON ESTER	4EC	16	1-2 TILL/42 DAT						
ACTIVATOR 90	L	0.25% v/v	1-2 TILL/42 DAT						

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



*Figure 1: CO<sub>2</sub> powered boom sprayer used for applying liquid materials.*



*Figure 2: Representative overview of broadleaf trial. The turfgrass that appears discolored is creeping bentgrass. There was no phytotoxicity found on perennial ryegrass. Photo taken 8/15/12.*