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 'Jet Elite' 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 ft^2 and had approximately 80 percent broadleaf weed cover.

The study was a randomized complete block design with three replications. All of the treatments were applied on June 7 and one treatment was reapplied June 20, 2005 (2 WAT) 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 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 six times during the study (Table 1). On the June 10th rating date, turfgrass treated with Velocity plus V-10142 had unacceptable phytotoxicity, this continued through the July 6th rating date. On the June 20th rating date, turfgrass treated with Velocity at 30 g ai/A + 2WAT had unacceptable phytotoxicity, this continued through the July 6th rating date. By the final rating date, July 21st, no phytotoxicity was observed.

The change in the broadleaf weed population was rated three times during the study (Table 2). During the study, the change in the dandelion, white clover, and buckhorn plantain populations were somewhat variable. By the final rating date, July 21st, all treated turfgrass had significantly less dandelion and buckhorn plantain populations than untreated. On this date, turfgrass treated with Velocity at 30 g ai/A + 2WAT, V-10142 at 0.5 lb ai/A plus NIS plus Drive at 0.75 lb ai/A, V-10142 at 0.5 lb ai/A plus Turflon at 1 qt/A, Drive at 0.75 lb ai/A plus NIS, and Velocity at 0.25 lb ai/A plus V-10142 at 0.5 lb ai/A had significantly less white clover than untreated.

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Table 1. Evaluations of turfgrass phytotoxicity in 2005 where 0 = worst, 7 = acceptable and 10 = best.

Treatment	Form	Rate	(----------Phytotoxicity----------				
		lb ai/A	6-10	6-20	6-28	7-6	7-21
VELOCITY	80WP	30 g ai/A +2WAT	7.3	5.3	3.0	5.7	10.0
V-10142	75WG	0.5	8.0	9.0	9.0	10.0	10.0
NIS	L	0.25 % v/v					
V-10142	75WG	0.5	8.0	8.0	9.7	10.0	10.0
NIS	L	0.25 % v/v					
DRIVE	75DF	0.75					
V-10142	75WG	0.5	7.0	9.0	9.3	10.0	10.0
TURFLON	4EC	1 qt/A					
DRIVE	75DF	0.75	7.3	9.7	9.3	10.0	10.0
NIS	L	0.25 % v/v					
CHECK			10.0	10.0	10.0	10.0	10.0
TURFLON	4EC	1qt/A	7.0	9.7	9.3	10.0	10.0
V-10147	0.83FL	0.25	8.7	9.7	9.3	10.0	10.0
NIS	L	0.25 % v/v					
V-10147	0.83FL	0.5	8.0	9.3	10.0	10.0	10.0
NIS	L	0.25 % v/v					
V-10147	0.83FL	0.75	7.0	9.0	10.0	10.0	10.0
NIS	L	0.25 % v/v					
VELOCITY	80WP	0.25	6.7	4.3	3.7	6.0	10.0
V-10142	75WG	0.5					

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

Treatment	Form	Rate	(--------June 28, 2005 [1,2]----------			(----------July 6, 2005----------		
		lb ai/A	Dand	Clover	Plant	Dand	Clover	Plant
VELOCITY	80WP	30 g ai/A +2WAT	65.28c	62.10bc	50.00d	79.17b	87.98a	100.00a
V-10142	75WG	0.5	73.21abc	39.05cd	66.67cd	91.67ab	31.90b	100.00a
NIS	L	0.25 % v/v						
V-10142	75WG	0.5	64.76c	91.67ab	94.44ab	95.24a	100.00a	100.00a
NIS	L	0.25 % v/v						
DRIVE	75DF	0.75						
V-10142	75WG	0.5	98.89a	97.76a	98.33a	100.00a	100.00a	100.00a
TURFLON	4EC	1 qt/A						
DRIVE	75DF	0.75	75.99abc	87.83ab	94.44ab	100.00a	100.00a	96.67a
NIS	L	0.25 % v/v						
CHECK			0.00d	0.00e	0.00e	-6.67c	8.33bc	31.11b
TURFLON	4EC	1 qt/A	93.61ab	84.07ab	93.33abc	98.06a	98.52a	93.33a
V-10147	0.83FL	0.25	82.38abc	17.99de	76.67abc	100.00a	0.00c	100.00a
NIS	L	0.25 % v/v						
V-10147	0.83FL	0.5	93.33ab	0.46e	93.33abc	100.00a	3.70c	96.67a
NIS	L	0.25 % v/v						
V-10147	0.83FL	0.75	71.90bc	43.52cd	68.89bcd	91.43ab	13.89bc	88.89a
NIS	L	0.25 % v/v						
VELOCITY	80WP	0.25	84.92abc	64.29abc	91.11abc	100.00a	82.14a	100.00a
V-10142	75WG	0.5						

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

2 - Negative numbers represent an increase in population and positive numbers a decrease in population.

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

Treatment	Form	Rate	(----------July 21, 2005[1,2]---------)		
		lb ai/A	Dand	Clover	Plant
VELOCITY	80WP	30 g ai/A +2WAT	100.00a	87.37a	96.67ab
V-10142	75WG	0.5	83.33a	-51.43c	66.67b
NIS	L	0.25 % v/v			
V-10142	75WG	0.5	97.71a	99.17a	86.67ab
NIS	L	0.25 % v/v			
DRIVE	75DF	0.75			
V-10142	75WG	0.5	98.89a	98.50a	100.00a
TURFLON	4EC	1 qt/A			
DRIVE	75DF	0.75	98.06a	100.00a	82.22ab
NIS	L	0.25 % v/v			
CHECK			0.00b	-18.52bc	0.00c
TURFLON	4EC	1 qt/A	93.61a	84.07a	96.67ab
V-10147	0.83FL	0.25	98.89a	-56.61c	93.33ab
NIS	L	0.25 % v/v			
V-10147	0.83FL	0.5	98.89a	-52.78c	83.33ab
NIS	L	0.25 % v/v			
V-10147	0.83FL	0.75	100.00a	0.93b	94.44ab
NIS	L	0.25 % v/v			
VELOCITY	80WP	0.25	100.00a	94.05a	100.00a
V-10142	75WG	0.5			

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

2 - Negative numbers represent an increase in population and positive numbers a decrease in population.