

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 broadleaf plantain (*Plantago major*), in perennial ryegrass and the phytotoxicity of these compounds on perennial ryegrass.

Methods and Materials

The study was a randomized complete block design with three replications. Applications were applied on June 16 (POST) and July 2 (3 WAT), 2014 using a three foot CO₂ powered boom sprayer calibrated to deliver 40 gpa using one, flat fan, TP9504EVS nozzle at 50 psi (Figure 1).

All turfgrass test areas were rated by recording the population of dandelion, white clover and broadleaf 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 ft² and had approximately 75 percent broadleaf weed cover.

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

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

Broadleaf weed phytotoxicity was rated four times during the study and weed epinasty was rated three times during the study (Table 2). All treated weed populations revealed some level of phytotoxicity and epinasty as would be expected.

The control of dandelion, white clover, and buckhorn plantain was rated four times during the study (Table 3 thru 5). Broadleaf weed control was variable. On the final rating date, 7 August, all treated turfgrass revealed a significant reduction in the dandelion, white clover, and buckhorn plantain populations when compared to non-treated turfgrass (Figure 3).

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Table 1. Evaluations of turfgrass phytotoxicity in following a single application of selected herbicides where 1 = no phytotoxicity, 3 = acceptable, and 10 = dead turf.

Treatment	Form Unit	Lb AIA / Gal	Rate pt/A	(-----Rye Phyto-----)						
				7/9	7/11	7/14	7/16	7/23	8/7	
QUALI-PRO 2DQ	L	3.84	2.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TRIMEC TURF	SL	3.22	3.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
TRIPLET SF	SL	3.23	3.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
ESCALADE 2	L	4	2.5	1.0	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	1.0
MILLENNIUM ULTRA 2	SL	3.56	2.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
COOL POWER	SL	3.6	3	1.0	1.0	1.0	1.0	1.0	1.0	1.0
SPEED ZONE	SL	2.2	4	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Table 2. Evaluations of broadleaf weed phytotoxicity and curling in 2014 after one application of post emergence broadleaf weed control where 1 = no phytotoxicity/no curling and 10 = dead.

Treatment	Form Unit	Lb AIA / Gal	Rate pt/A	(-----BL Phyto ¹ -----)					(-----BL Epinasty-----)		
				7/9	7/11	7/14	7/16	7/23	7/9	7/14	7/16
QUALI-PRO 2DQ	L	3.843	2.5	4.0 b	5.7 b	7.0 c	6.3 b	5.0 a	4.7 a	6.7 a	7.3 cd
TRIMEC TURF	SL	3.22	3.5	3.7 b	4.7 bc	8.0 abc	7.3 a	5.3 a	4.3 a	7.0 a	7.7 bcd
TRIPLET SF	SL	3.23	3.5	3.3 b	3.7 c	8.0 abc	7.7 a	4.7 a	4.3 a	7.3 a	7.0 d
ESCALADE 2	L	4	2.5	3.7 b	5.0 bc	8.7 ab	8.3 a	5.7 a	4.0 a	8.3 a	8.7 ab
UNTREATED CHECK				1.0 c	1.0 d	1.0 d	1.0 c	1.0 b	1.0 b	1.0 b	1.0 e
MILLENNIUM ULTRA 2	SL	3.558	2.5	3.7 b	5.0 bc	7.7 bc	8.0 a	4.7 a	5.0 a	7.3 a	7.3 cd
COOL POWER	SL	3.6	3	3.3 b	4.3bc	8.0 abc	8.0 a	5.0 a	5.7 a	7.3 a	8.3 abc
SPEED ZONE	SL	2.2	4	8.7 a	9.0 a	9.0 a	8.3 a	4.0 a	5.3 a	8.3 a	9.0 a

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

Table 3. Percentage control of dandelion following a single application of selected herbicides in 2014.

Treatment	Form Unit	Lb AIA / Gal	Rate pt/A	(-----Dandelion Control ¹ -----)			
				7/11	7/16	7/23	8/7
QUALI-PRO 2DQ	L	3.843	2.5	12.0 a	3.7 a	22.0 bc	74.0 b
TRIMEC TURF	SL	3.22	3.5	3.7 a	17.4 a	53.2 ab	85.6 ab
TRIPLET SF	SL	3.23	3.5	3.7 a	3.7 a	40.7 b	93.3 a
ESCALADE 2	L	4	2.5	0.0 a	0.0 a	44.6 b	85.5 ab
UNTREATED CHECK				0.0 a	0.0 a	0.0 c	0.0 d
MILLENNIUM ULTRA 2	SL	3.558	2.5	11.7 a	15.0 a	54.2 ab	93.5 a
COOL POWER	SL	3.6	3	3.3 a	7.5 a	45.3 b	71.4 b
SPEED ZONE	SL	2.2	4	18.1 a	29.2 a	81.9 a	54.2 c

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

Table 4. Percentage control of white clover following a single application of selected herbicides in 2014.

Treatment	Form Unit	Lb AIA / Gal	Rate pt/A	(-----Clover Control ¹ -----)			
				7/11	7/16	7/23	8/7
QUALI-PRO 2DQ	L	3.843	2.5	5.6 a	21.7 ab	34.8 b	100.0 a
TRIMEC TURF	SL	3.22	3.5	14.5 a	31.7 a	65.5 a	97.1 ab
TRIPLET SF	SL	3.23	3.5	3.7 a	30.0 ab	53.3 ab	100.0 a
ESCALADE 2	L	4	2.5	28.3 a	38.3 a	66.4 a	100.0 a
UNTREATED CHECK				0.0 a	0.0 c	0.0 c	0.0 c
MILLENNIUM ULTRA 2	SL	3.558	2.5	11.7 a	22.5 ab	60.8 ab	100.0 a
COOL POWER	SL	3.6	3	23.4 a	10.4 bc	52.1 ab	90.8 b
SPEED ZONE	SL	2.2	4	13.3 a	35.0 a	70.8 a	100.0 a

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

Table 5. Percentage control of broadleaf plantain following a single application of selected herbicides in 2014.

Treatment	Form Unit	Lb AIA / Gal	Rate pt/A	(-----Plantain Control ¹ -----)			
				7/11	7/16	7/23	8/7
QUALI-PRO 2DQ	L	3.843	2.5	8.3 a	16.7 a	25.0 a	100.0 a
TRIMEC TURF	SL	3.22	3.5	0.0 a	0.0 a	8.3 a	100.0 a
TRIPLET SF	SL	3.23	3.5	0.0 a	5.6 a	44.4 a	100.0 a
ESCALADE 2	L	4	2.5	34.7 a	11.1 a	46.7 a	100.0 a
UNTREATED CHECK				0.0 a	0.0 a	0.0 a	0.0 b
MILLENNIUM ULTRA 2	SL	3.558	2.5	0.0 a	8.3 a	41.7 a	95.0 a
COOL POWER	SL	3.6	3	16.7 a	5.6 a	22.2 a	88.9 a
SPEED ZONE	SL	2.2	4	22.2 a	27.8 a	61.1 a	100.0 a

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

