

Seedhead Suppression of Fairway Height Annual Bluegrass

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Introduction

This study was conducted on a mature sward of annual bluegrass (*Poa annua*) and creeping bentgrass (*Agrostis stolonifera*) at the Valentine Turfgrass Research Center, Penn State University, University Park, PA. The objective of the study was to determine if selected materials applied in the spring could suppress annual bluegrass seedhead populations under simulated golf course fairway conditions.

Methods and Materials

This study was a randomized complete block design with three replications (Figure 1). Treatments were applied on 4 April (PRE-BOOT), 12 April (BOOT) and 1 May, 2014 (4 WAT) using a three foot CO₂ powered boom sprayer calibrated to deliver 40 gpa using one, flat fan, TP9504EVS nozzle at 40 psi (Figure 2). The initial treatment was applied at the pre-boot stage of growth of the annual bluegrass.

The test site consisted of approximately 95 percent annual bluegrass and 5 percent creeping bentgrass at the initiation of the study.

Turfgrass populations were visually evaluated for the percent seedhead coverage in order to evaluate the test material's ability to suppress annual bluegrass seedheads. The test site was mowed at 0.50 inches three times a week with a reel mower. Turfgrass was irrigated on an as needed basis to prevent moisture stress.

Data was analyzed with ARM 8.5.0 using Duncan's New MRT at the 0.5 percent significant level.

Results and Discussion

Phytotoxicity was evaluated five times during the study (Table 1). On the first two rating date, 5 May and 13 May, there was some unacceptable (above 3) turfgrass phytotoxicity. No unacceptable phytotoxicity was observed for the remainder of the study.

Turfgrass color was rated five times during the study (Table 2). As would be expected, when turfgrass phytotoxicity was found that was a decrease in turfgrass color. This was observed on the first rating date, 5 May only.

Annual bluegrass seedhead populations were rated five times during the study (Table 3). The amount of annual bluegrass seedhead found on the site over the test period varied. It is evident that the peak seedhead production was noted on 13 May and again on 21 May as non-treated turfgrass had 90% and 80% coverage of seedheads respectively. There is a notable trend in the data. The addition of Civitas and Harmonizer to Embark reduced the seedheads (some dates significantly) than turfgrass treated with Embark alone. Also the combination of products revealed that when a lower rate of Embark was employed (24 oz vs 48 oz) seedhead suppression was achieved.

In conclusion, it is apparent that the addition of Civitas and Harmonizer made a significant difference in the PGRs efficacy in this study under these conditions in the suppression of annual bluegrass seedheads.

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Table 1. Evaluations of an annual bluegrass and creeping bentgrass mix at fairway height for phytotoxicity, where 1 = no phytotoxicity, 3 = acceptable, and 10 = dead turf in 2014. Treatments were applied on April 4 and 12, and May 1, 2014.

Treatment	Form	Rate oz/M	Timing	(-----Phytotoxicity-----)				
				5/5	5/13	5/21	5/28	6/3
CIVITAS	98 EC	8	BOOT	7.0 a	4.0 a	1.7 ab	2.0 a	1.0
HARMONIZER		0.5	BOOT					
EMBARK T/O	0.2 SL	48 FL OZ/A	BOOT					
EMBARK T/O	0.2 SL	48 FL OZ/A	BOOT	5.3	3.0	2.3	1.3	1.7
UNTREATED CHECK				1.0	1.0	1.3	1.7	3.0
CIVITAS	98 EC	8	BOOT	5.7	2.0	1.0	1.7	1.3
HARMONIZER		0.5	BOOT					
EMBARK T/O	0.2 SL	24 FL OZ/A	BOOT					
EMBARK T/O	0.2 SL	24 FL OZ/A	BOOT	1.3	1.3	1.3	2.3	3.0
CIVITAS	98 EC	8	PRE-BOOT / 4WAT	1.3	1.0	1.0	1.7	1.7
HARMONIZER		0.5	PRE-BOOT / 4WAT					
PRIMO MAXX	1 EC	0.125	PRE-BOOT / 4WAT					
PROXXY	2 SL	5	PRE-BOOT / 4WAT					
PRIMO MAXX	1 EC	0.125	PRE-BOOT / 4WAT	2.0	1.0	1.0	2.3	2.3
PROXXY	2 SL	5	PRE-BOOT / 4WAT					
CIVITAS	98 EC	16	BOOT	4.0	1.7	1.7	1.0	1.7
HARMONIZER		1	BOOT					
EMBARK T/O	0.2 SL	24 FL OZ/A	BOOT					
EMBARK T/O	0.2 SL	24 FL OZ/A	BOOT	3.3	1.7	1.0	2.3	1.7

Table 2. Color ratings taken on a scale of 0 to 10 where 0 = brown turf, 7 = acceptable, and 10 = dark green of an annual bluegrass, creeping bentgrass simulated fairway in 2014. Treatments were applied on April 4 and 12, and May 1, 2014.

Treatment	Form	Rate oz/M	Timing	Color (-----)				
				5/5	5/13	5/21	5/28	6/3
CIVITAS	98 EC	8	BOOT	6.2	8.0 a	8.0 a	9.0 a	9.0 a
HARMONIZER		0.5	BOOT					
EMBARK T/O	0.2 SL	48 FL OZ/A	BOOT					
EMBARK T/O	0.2 SL	48 FL OZ/A	BOOT	6.5	7.3	8.0	8.3	8.3
UNTREATED CHECK				7.7	7.3	7.0	7.0	7.0
CIVITAS	98 EC	8	BOOT	6.7	8.3	8.0	8.7	8.3
HARMONIZER		0.5	BOOT					
EMBARK T/O	0.2 SL	24 FL OZ/A	BOOT					
EMBARK T/O	0.2 SL	24 FL OZ/A	BOOT	7.3	8.0	7.3	7.0	7.3
CIVITAS	98 EC	8	PRE-BOOT / 4WAT	8.0	8.0	7.0	7.3	8.3
HARMONIZER		0.5	PRE-BOOT / 4WAT					
PRIMO MAXX	1 EC	0.125	PRE-BOOT / 4WAT					
PROXXY	2 SL	5	PRE-BOOT / 4WAT					
PRIMO MAXX	1 EC	0.125	PRE-BOOT / 4WAT	7.7	8.3	7.0	7.3	8.0
PROXXY	2 SL	5	PRE-BOOT / 4WAT					
CIVITAS	98 EC	16	BOOT	6.3	9.0	8.0	8.0	8.3
HARMONIZER		1	BOOT					
EMBARK T/O	0.2 SL	24 FL OZ/A	BOOT					
EMBARK T/O	0.2 SL	24 FL OZ/A	BOOT	7.0	8.0	7.0	8.0	8.0

Table 3. Annual bluegrass seedhead coverage ratings of an annual bluegrass, creeping bentgrass simulated fairway taken in 2014. Treatments were applied on April 4 and 12, and May 1, 2014.

Treatment	Form	Rate oz/M	Timing	(% Seedhead Coverage ¹)				
				5/5	5/13	5/21	5/28	6/3
CIVITAS	98 EC	8	BOOT	0.0 d	0.0 e	1.7 c	6.7 c	6.7 b
HARMONIZER		0.5	BOOT					
EMBARK T/O	0.2 SL	48 FL OZ/A	BOOT					
EMBARK T/O	0.2 SL	48 FL OZ/A	BOOT	3.3 d	11.7 cde	8.3 c	10.0 bc	10.0 ab
UNTREATED CHECK				18.3 a	90.0 a	80.0 a	43.3 ab	46.7 a
CIVITAS	98 EC	8	BOOT	1.7 d	8.3 cde	6.7 c	18.3 bc	21.7 ab
HARMONIZER		0.5	BOOT					
EMBARK T/O	0.2 SL	24 FL OZ/A	BOOT					
EMBARK T/O	0.2 SL	24 FL OZ/A	BOOT	13.3 ab	53.3 b	33.3 bc	53.3 a	43.3 ab
CIVITAS	98 EC	8	PRE-BOOT / 4WAT	6.7 bcd	30.0 bcd	73.3 a	23.3 abc	3.7 b
HARMONIZER		0.5	PRE-BOOT / 4WAT					
PRIMO MAXX	1 EC	0.125	PRE-BOOT / 4WAT					
PROXXY	2 SL	5	PRE-BOOT / 4WAT					
PRIMO MAXX	1 EC	0.125	PRE-BOOT / 4WAT	5.0 cd	33.3 bc	66.7 ab	28.3 abc	5.3 b
PROXXY	2 SL	5	PRE-BOOT / 4WAT					
CIVITAS	98 EC	16	BOOT	0.0 d	5.0 de	6.7 c	5.0 c	5.0 b
HARMONIZER		1	BOOT					
EMBARK T/O	0.2 SL	24 FL OZ/A	BOOT					
EMBARK T/O	0.2 SL	24 FL OZ/A	BOOT	11.7 abc	46.7 b	50.0 ab	31.7 abc	31.7 ab

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

