

Phytotoxicity and Control Evaluations of Selected Materials on Creeping Bentgrass, Rough Bluegrass, Tall Fescue, Perennial Ryegrass, and Kentucky Bluegrass

J. A. Borger and M.B. Naedel¹

Introduction

Phytotoxicity and tolerance evaluations were conducted on a stand of mature fairway height 'Penneagle' creeping bentgrass (*Agrostis stolonifera*), fairway height 'Winter Play' rough bluegrass (*Poa trivialis*), lawn height 'Plantation' tall fescue (*Festuca arundinacea* S.), lawn height 'Jet-Elite' perennial ryegrass (*Lolium perenne* L.), and lawn height 'Park' Kentucky bluegrass (*Poa pratensis*) at the Valentine Turfgrass Research Center, Penn State University, University Park, Pa. The objective of the study was to determine the phytotoxicity and control of selected materials on creeping bentgrass, rough bluegrass, tall fescue, perennial ryegrass, and Kentucky bluegrass.

Methods and Materials

The study was a randomized complete block design with three replications. Treatments were applied on June 30 (JUNE) and July 20 (3 WAT) using a three foot CO₂ powered boom sprayer calibrated to deliver 40 gpa using one, flat fan, 11004E nozzle at 40 psi.

The creeping bentgrass and rough bluegrass were mowed with a reel mower at one half inch with clippings removed from the test site and the tall fescue, perennial ryegrass, and Kentucky bluegrass were mowed at one and one half inches with clippings returned to the site.

Results and Discussion

Turfgrass phytotoxicity was rated five times for all turfgrass species during the study (Table 1). For all species, on the July 11 and 27, 2006 rating dates, all treated turfgrass was rated less than acceptable (7.0) for phytotoxicity. None of the treated or non treated turfgrass (all species) revealed any phytotoxicity on any of the remaining rating dates.

The percent control of each species was rated five times during the study (Table 2). Certainty applied to creeping bentgrass did not reduce the stand during the study. The percent control was variable during the study for the other species. On the final rating date, November 20, 2006, rough bluegrass treated with Certainty was reduced by at least 85 % or greater, significantly more than untreated. On this rating date, tall fescue treated with Certainty was also reduced by 90 % or greater, significantly more than untreated. Perennial ryegrass and Kentucky bluegrass treated with the high rate of Certainty revealed 26.7% and 28.3% control (respectively) significantly more than untreated.

Additional research should be conducted to evaluate the reduction of the perennial ryegrass and Kentucky bluegrass found in this research. This perennial ryegrass and Kentucky bluegrass stand reduction has not occurred in past research at Penn State. Certainty applications to creeping bentgrass in order to reduce the sward of rough bluegrass appears to be safe to the bentgrass and an effective measure for rough bluegrass reduction.

¹Instructor and Research Technician, respectively, Department of Crop and Soil Sciences, Penn State University, University Park, Pa, 16802

Table 1. Evaluations of fairway height ‘Penneagle’ creeping bentgrass phytotoxicity where 0 = worst, 7 = acceptable and 10 = no phytotoxicity in 2006.

Creeping Bentgrass				(-----Phytotoxicity-----)				
Treatment	Form	Rate	Timing	7/11	7/27	8/29	10/25	11/20
		LB A/A						
CERTAINTY	75WG	0.035	JUNE/3 WAT	6.0	5.8	10.0	10.0	10.0
NIS	L	0.25 % V/V	JUNE/3 WAT					
CHECK				10.0	10.0	10.0	10.0	10.0
CERTAINTY	75WG	0.047	JUNE/3 WAT	5.0	5.3	10.0	10.0	10.0
NIS	L	0.25 % V/V	JUNE/3 WAT					

Table 1 (continued). Evaluations of fairway height ‘Winter Play’ rough bluegrass phytotoxicity where 0 = worst, 7 = acceptable and 10 = no phytotoxicity in 2006.

Rough Bluegrass				(-----Phytotoxicity-----)				
Treatment	Form	Rate	Timing	7/11	7/27	8/29	10/25	11/20
		LB A/A						
CERTAINTY	75WG	0.035	JUNE/3 WAT	5.0	4.0	10.0	10.0	10.0
NIS	L	0.25 % V/V	JUNE/3 WAT					
CHECK				10.0	10.0	10.0	10.0	10.0
CERTAINTY	75WG	0.047	JUNE/3 WAT	4.0	3.5	10.0	10.0	10.0
NIS	L	0.25 % V/V	JUNE/3 WAT					

Table 1 (continued). Evaluations of lawn height ‘Plantation’ tall fescue phytotoxicity where 0 = worst, 7 = acceptable and 10 = no phytotoxicity in 2006.

Tall Fescue				(-----Phytotoxicity-----)				
Treatment	Form	Rate	Timing	7/11	7/27	8/29	10/25	11/20
		LB A/A						
CERTAINTY	75WG	0.035	JUNE/3 WAT	6.3	1.0	10.0	10.0	10.0
NIS	L	0.25 % V/V	JUNE/3 WAT					
CHECK				10.0	10.0	10.0	10.0	10.0
CERTAINTY	75WG	0.047	JUNE/3 WAT	6.0	1.0	10.0	10.0	10.0
NIS	L	0.25 % V/V	JUNE/3 WAT					

Table 1 (continued). Evaluations of lawn height 'Jet Elite' perennial ryegrass phytotoxicity where 0 = worst, 7 = acceptable and 10 = no phytotoxicity in 2006.

Perennial Ryegrass				(-----Phytotoxicity-----)				
Treatment	Form	Rate	Timing	7/11	7/27	8/29	10/25	11/20
		LB A/A						
CERTAINTY	75WG	0.035	JUNE/3 WAT	5.3	2.3	10.0	10.0	10.0
NIS	L	0.25 % V/V	JUNE/3 WAT					
CHECK				10.0	10.0	10.0	10.0	10.0
CERTAINTY	75WG	0.047	JUNE/3 WAT	6.0	2.8	10.0	10.0	10.0
NIS	L	0.25 % V/V	JUNE/3 WAT					

Table 1 (continued). Evaluations of lawn height 'Park' Kentucky bluegrass phytotoxicity where 0 = worst, 7 = acceptable and 10 = no phytotoxicity in 2006.

Kentucky Bluegrass				(-----Phytotoxicity-----)				
Treatment	Form	Rate	Timing	7/11	7/27	8/29	10/25	11/20
		LB A/A						
CERTAINTY	75WG	0.035	JUNE/3 WAT	8.3	5.8	10.0	10.0	10.0
NIS	L	0.25 % V/V	JUNE/3 WAT					
CHECK				10.0	10.0	10.0	10.0	10.0
CERTAINTY	75WG	0.047	JUNE/3 WAT	7.3	5.3	10.0	10.0	10.0
NIS	L	0.25 % V/V	JUNE/3 WAT					

Table 2. Percent control of 'Penneagle' fairway height creeping bentgrass in 2006.

Creeping Bentgrass				(-----% Control-----)				
Treatment	Form	Rate	Timing	7/11	7/27	8/29	10/25	11/20
		LB A/A						
CERTAINTY	75WG	0.035	JUNE/3 WAT	0.0a ¹	0.0a	0.0a	0.0a	0.0a
NIS	L	0.25 % V/V	JUNE/3 WAT					
CHECK				0.0a	0.0a	0.0a	0.0a	0.0a
CERTAINTY	75WG	0.047	JUNE/3 WAT	0.0a	0.0a	0.0a	0.0a	0.0a
NIS	L	0.25 % V/V	JUNE/3 WAT					

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

Table 2(continued). Percent control of fairway height ‘Winter Play’ rough bluegrass in 2006.

Rough Bluegrass								
Treatment	Form	Rate LB A/A	Timing	(-----% Control-----)				
				7/11	7/27	8/29	10/25	11/20
CERTAINTY	75WG	0.035	JUNE/3 WAT	0.0a ¹	81.7b	83.3b	91.7b	86.7a
NIS	L	0.25 % V/V	JUNE/3 WAT					
CHECK				0.0a	0.0c	0.0c	0.0c	0.0b
CERTAINTY	75WG	0.047	JUNE/3 WAT	0.0a	91.7a	96.3a	99.0a	95.0a
NIS	L	0.25 % V/V	JUNE/3 WAT					

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

Table 2(continued). Percent control of lawn height ‘Plantation’ tall fescue in 2006.

Tall Fescue								
Treatment	Form	Rate LB A/A	Timing	(-----% Control-----)				
				7/11	7/27	8/29	10/25	11/20
CERTAINTY	75WG	0.035	JUNE/3 WAT	0.0a ¹	96.3a	97.3a	99.0a	91.0a
NIS	L	0.25 % V/V	JUNE/3 WAT					
CHECK				0.0a	0.0b	0.0b	0.0b	0.0b
CERTAINTY	75WG	0.047	JUNE/3 WAT	0.0a	96.3a	98.3a	99.3a	95.0a
NIS	L	0.25 % V/V	JUNE/3 WAT					

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

Table 2(continued). Percent control of lawn height ‘Jet Elite’ perennial ryegrass in 2006.

Perennial Ryegrass								
Treatment	Form	Rate LB A/A	Timing	(-----% Control-----)				
				7/11	7/27	8/29	10/25	11/20
CERTAINTY	75WG	0.035	JUNE/3 WAT	0.0a ¹	19.2ab	29.2ab	13.8a	12.1ab
NIS	L	0.25 % V/V	JUNE/3 WAT					
CHECK				0.0a	0.0b	0.0b	0.0b	0.0b
CERTAINTY	75WG	0.047	JUNE/3 WAT	0.0a	53.3a	53.3a	25.0a	26.7a
NIS	L	0.25 % V/V	JUNE/3 WAT					

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

Table 2(continued). Percent control of lawn height 'Park' Kentucky bluegrass in 2006.

Kentucky Bluegrass		Rate	Timing	(-----% Control-----)				
Treatment	Form			LB A/A	7/11	7/27	8/29	10/25
CERTAINTY	75WG	0.035	JUNE/3 WAT	0.0a ¹	36.7a	36.7a	11.7ab	18.3ab
NIS	L	0.25 % V/V	JUNE/3 WAT					
CHECK				0.0a	0.0b	0.0b	0.0b	0.0b
CERTAINTY	75WG	0.047	JUNE/3 WAT	0.0a	50.0a	50.0a	26.7a	28.3a
NIS	L	0.25 % V/V	JUNE/3 WAT					

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