

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

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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 tolerance 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 23 (JUNE), July 12 (2 WAT/3 WAT), July 21 (4 WAT), August 4 (6 WAT), and September 2, 2005 (9 WAT) using a three foot CO₂ powered boom sprayer calibrated to deliver 40 gpa using two, flat fan, 11004 nozzles at 40 psi.

The creeping bentgrass and rough bluegrass were mowed with a reel mower at one half inch with clippings removed 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 evaluated eight times during the study (Table 1). Creeping bentgrass treated with mesotrione twice, had unacceptable phytotoxicity until the August 14, 2005 rating date. Creeping bentgrass treated three times with mesotrione had unacceptable phytotoxicity on all eight rating dates. Rough bluegrass treated with MON 44951 or Velocity at any rate or time or application schedule had unacceptable phytotoxicity. Rough bluegrass treated with mesotrione had unacceptable phytotoxicity on three rating dates (June 28, July 6, and Aug 14). Tall fescue treated with MON 44951 had unacceptable phytotoxicity on all but the first rating date except for the 0.25, 0.3, and 0.5 oz/A rate applied four times (July 6 rating date). Tall fescue treated with Velocity 80WP had unacceptable phytotoxicity on July 6 and July 21 rating dates. Following applications of Velocity 17.6WG phytotoxicity was unacceptable on the July 21 rating date. Tall fescue treated with mesotrione three times had unacceptable phytotoxicity on the

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August 1 rating date. Perennial ryegrass treated with MON 44951 or Velocity at any rate or application schedule had unacceptable phytotoxicity on the July 21 rating date. Additionally, perennial ryegrass treated with MON 44951 at the 0.25 oz/A rate and applied four times had unacceptable phytotoxicity on the August 1 rating date. Only Kentucky bluegrass treated with any formulation of Velocity had unacceptable phytotoxicity on all rating dates except June 28.

The percent green vegetation was rated once during the study on October 6, 2005 (Table 2). Creeping bentgrass treated with mesotrione had significantly less green vegetation than untreated. Only rough bluegrass treated with MON 44951 at 0.25 oz/A applied twice or any rate of mesotrione had green vegetation that was not significantly different than untreated. Only tall fescue treated with any formulation of Velocity or any rate of mesotrione had green vegetation that was not significantly different than untreated. Perennial ryegrass treated with MON 44951 at 0.5 oz/A applied three or four times and MON 44951 at 0.3 oz/A applied four times had significantly less green vegetation than untreated. Only Kentucky bluegrass treated with any formulation of Velocity had significantly less green vegetation than untreated.

Although further evaluations need to be conducted, it appears that selective post emergence suppression of creeping bentgrass, rough bluegrass, and tall fescue could be accomplished in certain turfgrass swards.

Table 2. Evaluations of percent green vegetation of fairway height creeping bentgrass.

Creeping Bentgrass				
Treatment	Form	Rate (oz/A)	Timing	(% Green Veg¹) 10/6/2005
MON 44951	WG	0.25	JUNE/3/6 WAT	100.0a
MON 0818	L	0.25 % V/V		
MON 44951	WG	0.5	JUNE/3/6 WAT	100.0a
MON 0818	L	0.25 % V/V		
MON 44951	WG	0.25	JUNE/3 WAT	100.0a
MON 0818	L	0.25 % V/V		
MON 44951	WG	0.5	JUNE/3 WAT	100.0a
MON 0818	L	0.25 % V/V		
MON 44951	WG	0.25	JUNE/3/6/9 WAT	100.0a
MON 0818	L	0.25 % V/V		
CHECK				100.0a
MON 44951	WG	0.5	JUNE/3/6/9 WAT	100.0a
MON 0818	L	0.25 % V/V		
VELOCITY	80WP	60 G A/A	JUNE/2 WAT	100.0a
VELOCITY	17.6WG	60 G A/A	JUNE/2 WAT	100.0a
MON 44951	WG	0.3	JUNE/3/6/9 WAT	100.0a
MON 0818	L	0.25 % V/V		
MESOTRIONE	4SC	0.187 LB A/A	JUNE/2 WAT	86.7b
X 77	L	0.25 % V/V		
MESOTRIONE	4SC	0.187 LB A/A	JUNE/2/4 WAT	20.0c
X 77	L	0.25 % V/V		

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

Table 2(continued). Evaluations of percent green vegetation of fairway height rough bluegrass.

Rough Bluegrass				
Treatment	Form	Rate (oz/A)	Timing	(% Green Veg¹) 10/6/2005
MON 44951	WG	0.25	JUNE/3/6 WAT	1.0c
MON 0818	L	0.25 % V/V		
MON 44951	WG	0.5	JUNE/3/6 WAT	1.0c
MON 0818	L	0.25 % V/V		
MON 44951	WG	0.25	JUNE/3 WAT	91.7a
MON 0818	L	0.25 % V/V		
MON 44951	WG	0.5	JUNE/3 WAT	50.0b
MON 0818	L	0.25 % V/V		
MON 44951	WG	0.25	JUNE/3/6/9 WAT	1.0c
MON 0818	L	0.25 % V/V		
CHECK				100.0a
MON 44951	WG	0.5	JUNE/3/6/9 WAT	1.0c
MON 0818	L	0.25 % V/V		
VELOCITY	80WP	60 G A/A	JUNE/2 WAT	2.3c
VELOCITY	17.6WG	60 G A/A	JUNE/2 WAT	2.3c
MON 44951	WG	0.3	JUNE/3/6/9 WAT	1.0c
MON 0818	L	0.25 % V/V		
MESOTRIONE	4SC	0.187 LB A/A	JUNE/2 WAT	100.0a
X 77	L	0.25 % V/V		
MESOTRIONE	4SC	0.187 LB A/A	JUNE/2/4 WAT	98.3a
X 77	L	0.25 % V/V		

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

Table 2(continued). Evaluations of percent green vegetation of lawn height tall fescue.

Tall Fescue Treatment	Form	Rate (oz/A)		Timing	(% Green Veg ¹) 10/6/2005
MON 44951	WG	0.25		JUNE/3/6 WAT	2.3d
MON 0818	L	0.25 % V/V			
MON 44951	WG	0.5		JUNE/3/6 WAT	1.0d
MON 0818	L	0.25 % V/V			
MON 44951	WG	0.25		JUNE/3 WAT	38.3b
MON 0818	L	0.25 % V/V			
MON 44951	WG	0.5		JUNE/3 WAT	25.0c
MON 0818	L	0.25 % V/V			
MON 44951	WG	0.25		JUNE/3/6/9 WAT	2.3d
MON 0818	L	0.25 % V/V			
CHECK					100.0a
MON 44951	WG	0.5		JUNE/3/6/9 WAT	1.0d
MON 0818	L	0.25 % V/V			
VELOCITY	80WP	60 G A/A		JUNE/2 WAT	100.0a
VELOCITY	17.6WG	60 G A/A		JUNE/2 WAT	100.0a
MON 44951	WG	0.3		JUNE/3/6/9 WAT	2.3d
MON 0818	L	0.25 % V/V			
MESOTRIONE	4SC	0.187 LB A/A		JUNE/2 WAT	100.0a
X 77	L	0.25 % V/V			
MESOTRIONE	4SC	0.187 LB A/A		JUNE/2/4 WAT	100.0a
X 77	L	0.25 % V/V			

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

Table 2(continued). Evaluations of percent green vegetation of lawn height perennial ryegrass.

Perennial Ryegrass Treatment	Form	Rate (oz/A)		Timing	(% Green Veg ¹) 10/6/2005
MON 44951	WG	0.25		JUNE/3/6 WAT	96.0ab
MON 0818	L	0.25 % V/V			
MON 44951	WG	0.5		JUNE/3/6 WAT	81.7c
MON 0818	L	0.25 % V/V			
MON 44951	WG	0.25		JUNE/3 WAT	98.7a
MON 0818	L	0.25 % V/V			
MON 44951	WG	0.5		JUNE/3 WAT	98.7a
MON 0818	L	0.25 % V/V			
MON 44951	WG	0.25		JUNE/3/6/9 WAT	95.0ab
MON 0818	L	0.25 % V/V			
CHECK					100.0a
MON 44951	WG	0.5		JUNE/3/6/9 WAT	70.0d
MON 0818	L	0.25 % V/V			
VELOCITY	80WP	60 G A/A		JUNE/2 WAT	99.3a
VELOCITY	17.6WG	60 G A/A		JUNE/2 WAT	100.0a
MON 44951	WG	0.3		JUNE/3/6/9 WAT	88.3bc
MON 0818	L	0.25 % V/V			
MESOTRIONE	4SC	0.187 LB A/A		JUNE/2 WAT	100.0a
X 77	L	0.25 % V/V			
MESOTRIONE	4SC	0.187 LB A/A		JUNE/2/4 WAT	100.0a
X 77	L	0.25 % V/V			

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

Table 2(continued). Evaluations of percent green vegetation of lawn height Kentucky bluegrass.

Kentucky Bluegrass				
Treatment	Form	Rate (oz/A)	Timing	(% Green Veg ¹) 10/6/2005
MON 44951	WG	0.25	JUNE/3/6 WAT	100.0a
MON 0818	L	0.25 % V/V		
MON 44951	WG	0.5	JUNE/3/6 WAT	100.0a
MON 0818	L	0.25 % V/V		
MON 44951	WG	0.25	JUNE/3 WAT	100.0a
MON 0818	L	0.25 % V/V		
MON 44951	WG	0.5	JUNE/3 WAT	100.0a
MON 0818	L	0.25 % V/V		
MON 44951	WG	0.25	JUNE/3/6/9 WAT	100.0a
MON 0818	L	0.25 % V/V		
CHECK				100.0a
MON 44951	WG	0.5	JUNE/3/6/9 WAT	100.0a
MON 0818	L	0.25 % V/V		
VELOCITY	80WP	60 G A/A	JUNE/2 WAT	13.7c
VELOCITY	17.6WG	60 G A/A	JUNE/2 WAT	63.3b
MON 44951	WG	0.3	JUNE/3/6/9 WAT	100.0a
MON 0818	L	0.25 % V/V		
MESOTRIONE	4SC	0.187 LB A/A	JUNE/2 WAT	100.0a
X 77	L	0.25 % V/V		
MESOTRIONE	4SC	0.187 LB A/A	JUNE/2/4 WAT	100.0a
X 77	L	0.25 % V/V		

1 - Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT)