

Herbicide Control of *Poa trivialis* and Safety on Creeping Bentgrass

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Background/Objective: To determine effectiveness of MON 44940 2.5SC for control of *Poa trivialis* as well the safety to creeping bentgrass from single and/or sequential applications.

Site Information

Location:	William H. Daniel Research and Diagnostic Center, W. Lafayette, IN.		
Soil Type:	Starks-Fincastle silt loam	Starks-Fincastle silt loam	
Soil pH:	5.9	5.9	
Soil Organic Matter (%):			
Turfgrass Species:	L93 creeping bentgrass	Sabre <i>Poa trivialis</i>	
Turf Condition:	Good	Fair	
Turf Management: Mowing Height cm (in):	1.25 (0.5)	1.88 (0.75)	
Fertilization:	4 lbs N/M/YR	4 lbs N/M/YR	
Irrigation:	To prevent moisture stress	To prevent moisture stress	
Testing on Site Previous Year:	None	None	
Target Pest:	Phytotoxicity	Control	
Growth Stage:	Mature	Mature	

Application Information

Application Date:	26 April	10 May	24 May	7 June
Application Time:	8:00 AM	7:30 AM	7:30 am	9:00 am
Air Temperature C⁰(F⁰):	21.4 (71)	20.9 (70)	19.2 (67)	19.8 (68)
Relative Humidity(%):	31	48	42	70
Wind Speed m s⁻¹ (mph):	Calm	Calm	Calm	Calm
Soil Temperature(7.6 cm depth) C⁰(F⁰):	10 (50)	15 (59)	13 (55)	18 (65)
Soil Moisture:	Moist	Moist	Moist	Wet
Spray Volume L ha⁻¹ (gal 1000 ft⁻²):	558 (1.4)			
Spray Pressure:	35psi			
Spray Nozzle:	8001.5			
Spray Equipment:	CO ₂ backpack			
Irrigation After Application:	None			
Experimental Design:	Randomized complete block			
Replications:	3			
Plot Size m (ft):	1.5 X 1.5 (5 X 5)			

Results

All applications MON 44940 caused phytotoxicity to *Poa trivialis*, but this damage was generally limited to lasting only 5 to 6 weeks after application (Table 1). As expected, multiple applications and higher rates enhanced damage. The best treatments in terms of phytotoxicity to *Poa trivialis* was MON 44940 applied 4 times. This treatment was also the best in terms controlling *Poa trivialis* providing only 13% cover by 10 Sep (Table 2). Since this stand was completely covered by *Poa trivialis* prior to the experiment, this is an 87% reduction in cover due to MON 44940. However, this treatment was also the most damaging to the creeping bentgrass causing unacceptable phytotoxicity through 22 June to the creeping bentgrass (Table 2).

It was very obvious that the 4 applications of MON 44940 killed the *Poa trivialis* with regrowth coming from only a few plants later in the season. This compares to the other treatments where the *Poa trivialis* was only injured and regrowth was from plants throughout the entire plot. This is very significant because no herbicides to date have demonstrated selective control of *Poa trivialis*. It appears that multiple applications of MON 44940 have potential for reducing *Poa trivialis* in a creeping bentgrass stand. Slight phytotoxicity to creeping bentgrass could be tolerated given the control of *Poa trivialis*. Clarification of rates, timing of applications, and addition of possible safeners (nitrogen and/or iron) will be needed to optimize control of *Poa trivialis* from MON 44940.

Table 1. Phytotoxicity to *Poa trivialis* from MON 44940 or Prograss.

Treatment	Rate of application	Application timing ^a	8 May	24 May	5 June	17 June
	lbs ai/A					
MON 44940 2.5SC non-ionic surfactant	0.005 0.5 ^b	mid spring	6.3 ^c	8.0	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	5.7	8.3	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.015 0.5 ^b	mid spring	4.7	7.3	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.02 0.5 ^b	mid spring	5.0	8.3	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.005 0.5 ^b	mid spring	7.0	8.7	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.005 0.5 ^b	mid spring	6.7	3.3	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.005 0.5 ^b	2 weeks				
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	5.3	8.0	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	5.7	3.0	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	2 weeks				
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	5.3	2.3	3.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	2 weeks				
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	4 weeks				
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	5.3	3.0	3.3	5.0
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	2 weeks				
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	4 weeks				
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	6 weeks				
Prograss 1.5EC	0.75	mid spring	8.7	7.3	9.0	9.0
check	---		8.3	7.3	9.0	9.0
LSD (0.05)			0.9	1.0	0.3	0.5

^a Mid spring = 26 Apr, 2 weeks = 10 May, 4 weeks = 24 May, and 6 weeks = 7 June.

^b Rate of application equals percent volume per volume.

^c Phytotoxicity was rated on a scale of 1 – 9 with 1 = completely brown turf, 7 = acceptable damage, and 9 = no phytotoxicity.

Table 2. Percent cover of *Poa trivialis* after treatment with MON 44940 or Prograss.

Treatment	Rate of application	Application timing ^a	22 June	19 July	10 Sep
	lbs ai/A				
MON 44940 2.5SC non-ionic surfactant	0.005 0.5 ^b	mid spring	98.0 ^c	98.0	88.3
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	97.3	97.7	86.7
MON 44940 2.5SC non-ionic surfactant	0.015 0.5 ^b	mid spring	96.7	97.3	86.7
MON 44940 2.5SC non-ionic surfactant	0.02 0.5 ^b	mid spring	97.7	97.0	86.7
MON 44940 2.5SC non-ionic surfactant	0.005 0.5 ^b	mid spring	98.0	97.7	85.0
MON 44940 2.5SC non-ionic surfactant	0.005 0.5 ^b	mid spring	97.0	97.7	83.3
MON 44940 2.5SC non-ionic surfactant	0.005 0.5 ^b	2 weeks			
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	98.0	98.0	88.3
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	97.0	97.0	80.0
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	2 weeks			
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	80.0	91.7	68.3
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	2 weeks			
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	4 weeks			
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	25.0	23.3	13.3
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	2 weeks			
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	4 weeks			
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	6 weeks			
Prograss 1.5EC	0.75	mid spring	97.3	97.7	86.7
check	---		96.7	97.3	83.3
LSD (0.05)			3.8	4.4	8.6

^a Mid spring = 26 Apr, 2 weeks = 10 May, 4 weeks = 24 May, and 6 weeks = 7 June.

^b Rate of application equals per cent volume per volume.

^c Percent of plot area covered by *Poa trivialis*.

Table 3. Phytotoxicity to bentgrass from MON 44940 or Prograss.

Treatment	Rate of application	Application timing ^a	8 May	24 May	5 June	17 June	22 June
	lbs ai/A						
MON 44940 2.5SC non-ionic surfactant	0.005 0.5 ^b	mid spring	8.7 ^b	9.0	9.0	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	7.3	9.0	8.7	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.015 0.5 ^b	mid spring	6.7	9.0	9.0	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.02 0.5 ^b	mid spring	5.7	9.0	8.7	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.005 0.5 ^b	mid spring	8.0	9.0	9.0	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.005 0.5 ^b	mid spring	8.0	8.7	9.0	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.005 0.5 ^b	2 weeks					
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	7.7	9.0	9.0	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	7.3	8.0	9.0	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	2 weeks					
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	7.7	8.0	6.7	9.0	9.0
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	2 weeks					
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	4 weeks					
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	mid spring	6.7	8.0	7.0	7.0	6.3
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	2 weeks					
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	4 weeks					
MON 44940 2.5SC non-ionic surfactant	0.01 0.5 ^b	6 weeks					
Prograss 1.5EC check	0.75 ---	mid spring	8.7 9.0	9.0 9.0	9.0 9.0	9.0 9.0	9.0 9.0
LSD (0.05)			1.0	0.3	0.5	0.0	0.3

^a Mid spring = 26 Apr, 2 weeks = 10 May, 4 weeks = 24 May, and 6 weeks = 7 June.

^b Rate of application equals percent volume per volume.

^c Phytotoxicity was rated on a scale of 1 – 9 with 1 = completely brown turf, 7 = acceptable damage, and 9 = no phytotoxicity.