

Safety of MON 44951 Before and After Seeding of Creeping Bentgrass

Zac Reicher and Dan Weisenberger

Background/Objective:

Plans are underway to commercialize MON 44951 for postemergence *Poa trivialis* control in creeping bentgrass fairways, tees, and roughs of golf courses in the Midwest and Northeast US. If *Poa trivialis* is successfully controlled, voids in the turf will be created that likely require reseeding. Therefore it is important to determine if and when creeping bentgrass can be seeded into a Batallion application or when Batallion can be applied over a new creeping bentgrass seeding.

Site Information

Location:	William H. Daniel Research and Diagnostic Center, W. Lafayette, IN.
Soil Type:	Starks-Fincastle silt loam
Soil pH:	7.2
Soil Organic Matter (%):	3.0
Turfgrass Species:	'Penncross' creeping bentgrass (<i>Agrostis palustris</i>)
Turf Condition:	New seeding
Turf Management: Mowing Height cm (in):	1.25 (0.5)
Fertilization:	New seeding
Irrigation:	To prevent moisture stress
Testing on Site Previous Year:	None
Target Pest:	NA
Growth Stage:	NA

Application Information

Application Date:	28 Aug	4 Sept	9 Sept	18 Sept	26 Sept	2 Oct
Application Time:	9:00 AM	8:00 AM	11:30 AM	8:30 AM	8:00 AM	9:30 AM
Air Temperature C⁰(F⁰):	25 (77)	16 (60)	26 (78)	18 (64)	11 (53)	10 (50)
Relative Humidity(%):	65	78	47	68	66	44
Wind Speed m s⁻¹ (mph):	1 (2)	3 (6)	1 (2)	Calm	2 (5)	2 (5)
Soil Temperature(7.6 cm depth) C⁰(F⁰):	24 (75)	19 (66)	26 (78)	18 (64)	13 (56)	8 (46)
Soil Moisture:	Dry	Moist	Moist	Moist	Wet	Moist
Spray Volume L ha⁻¹ (gal 1000 ft⁻²):						
Spray Pressure:				35psi		
Spray Nozzle:				8003		
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:

Applications of MON 44951 made between 1 week before seeding (WBS) and up to 3 weeks after emergence (WAE) were extremely damaging to the creeping bentgrass seedlings, reducing cover up to 90 % compared to the check by 23 Oct or preventing germination all together. However, MON 44951 applied 2 WBS at 0.25 or 0.5 oz/A did not reduce creeping bentgrass cover compared to the untreated checks at any time during the study. Applied 2 WBS, 0.25 oz/A was marginally safer than 0.5 oz/A, both of which were safer than 1.0 oz/A.

Table 1. Percent creeping bentgrass cover^a after MON 44951 applications made before or after seeding 'Penncross' creeping bentgrass.

Treatment	Rate of application	Application timing ^b	2 Oct	9 Oct	15 Oct	23 Oct
	oz product/A					
MON 44951	0.25	2 WBS	33.3	80.0	93.7	95.0
MON 0818	0.25 ^c					
MON 44951	0.5	2 WBS	23.3	60.0	85.0	90.0
MON 0818	0.25 ^c					
MON 44951	1.0	2 WBS	18.3	51.7	73.3	78.3
MON 0818	0.25 ^c					
MON 44951	0.25	1 WBS	1.0	3.0	9.7	10.0
MON 0818	0.25 ^c					
MON 44951	0.5	1 WBS	0.0	0.0	0.7	1.3
MON 0818	0.25 ^c					
MON 44951	1.0	1 WBS	0.0	0.0	0.0	0.0
MON 0818	0.25 ^c					
MON 44951	0.25	0 WBS	1.0	2.0	4.0	5.3
MON 0818	0.25 ^c					
MON 44951	0.5	0 WBS	0.0	0.0	0.0	0.0
MON 0818	0.25 ^c					
MON 44951	1.0	0 WBS	0.0	0.0	0.0	0.0
MON 0818	0.25 ^c					
MON 44951	0.25	1 WAE	0.0	0.0	0.0	0.0
MON 0818	0.25 ^c					
MON 44951	0.5	1 WAE	0.0	0.0	0.0	0.0
MON 0818	0.25 ^c					
MON 44951	1.0	1 WAE	0.0	0.0	0.0	0.0
MON 0818	0.25 ^c					
MON 44951	0.25	2 WAE	30.0	41.7	20.0	11.7
MON 0818	0.25 ^c					
MON 44951	0.5	2 WAE	28.3	35.0	13.3	3.0
MON 0818	0.25 ^c					
MON 44951	1.0	2 WAE	11.0	13.3	5.0	0.3
MON 0818	0.25 ^c					
MON 44951	0.25	3 WAE		43.3	25.0	10.0
MON 0818	0.25 ^c					
MON 44951	0.5	3 WAE		43.3	23.3	4.0
MON 0818	0.25 ^c					
MON 44951	1.0	3 WAE		50.0	31.7	3.3
MON 0818	0.25 ^c					
Check			35.0	75.0	92.0	93.3
Check 2			31.7	76.7	90.7	92.3
LSD (0.05)			15.3	17.6	10.3	7.1

^a Percent of the plot area covered by bentgrass.

^b Weeks before seeding or weeks after emergence, seeding was on Sep 9.

^c Rate of application was percent volume per volume.

Table 2. Phytotoxicity^a to creeping bentgrass cover after MON 44951 applications made before or after seeding 'Penncross' creeping bentgrass.

Treatment	Rate of application	Application timing ^b	25 Sept	2 Oct	9 Oct	15 Oct
	oz. product/A					
MON 44951	0.25	2 WBS	9.0	9.0	8.7	9.0
MON 0818	0.25 ^c					
MON 44951	0.5	2 WBS	9.0	9.0	8.3	9.0
MON 0818	0.25 ^c					
MON 44951	1.0	2 WBS	9.0	9.0	8.0	8.7
MON 0818	0.25 ^c					
MON 44951	0.25	1 WBS	9.0	9.0	8.3	8.0
MON 0818	0.25 ^c					
MON 44951	0.5	1 WBS	9.0	9.0	9.0	9.0
MON 0818	0.25 ^c					
MON 44951	1.0	1 WBS	9.0	9.0	9.0	9.0
MON 0818	0.25 ^c					
MON 44951	0.25	0 WBS	9.0	9.0	8.7	8.3
MON 0818	0.25 ^c					
MON 44951	0.5	0 WBS	9.0	9.0	9.0	9.0
MON 0818	0.25 ^c					
MON 44951	1.0	0 WBS	9.0	9.0	9.0	9.0
MON 0818	0.25 ^c					
MON 44951	0.25	1 WAE	5.7	1.0	9.0	9.0
MON 0818	0.25 ^c					
MON 44951	0.5	1 WAE	5.7	1.0	9.0	9.0
MON 0818	0.25 ^c					
MON 44951	1.0	1 WAE	5.3	1.0	9.0	9.0
MON 0818	0.25 ^c					
MON 44951	0.25	2 WAE	9.0	7.7	5.3	6.3
MON 0818	0.25 ^c					
MON 44951	0.5	2 WAE	9.0	8.0	3.0	4.7
MON 0818	0.25 ^c					
MON 44951	1.0	2 WAE	9.0	5.7	5.3	5.0
MON 0818	0.25 ^c					
MON 44951	0.25	3 WAE	9.0	9.0	5.7	6.3
MON 0818	0.25 ^c					
MON 44951	0.5	3 WAE	9.0	9.0	5.0	5.3
MON 0818	0.25 ^c					
MON 44951	1.0	3 WAE	9.0	9.0	3.7	4.7
MON 0818	0.25 ^c					
Check			9.0	9.0	9.0	9.0
Check 2			9.0	9.0	9.0	9.0
LSD (0.05)			0.4	0.6	1.5	1.4

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

^b Weeks before seeding or weeks after emergence, seeding was on Sep 9.

^c Rate of application was percent volume per volume.