

## Overseeding Creeping Bentgrass Before or After Application of MON44951

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### Background/Objective:

MON 44951 has shown tremendous promise for control of *Poa trivialis* in creeping bentgrass. However, if *Poa trivialis* is effectively controlled, seeding creeping bentgrass may be necessary to fill in the bare areas. Understanding limitations in seeding before or after application of MON 44951 is required to maximize seeding success.

### Site Information

<b>Location:</b>	W.H. Daniel Research and Diagnostic Center
<b>Soil Type:</b>	Starks-Fincastle silt loam
<b>Soil pH:</b>	7.2
<b>Soil Organic Matter (%):</b>	NA
<b>Turfgrass Species:</b>	'Pennncross' creeping bentgrass
<b>Turf Condition:</b>	Good
<b>Turf Management:</b>	
<b>Mowing Height cm (in):</b>	1.25 (0.5)
<b>Fertilization:</b>	NA
<b>Irrigation:</b>	To prevent moisture stress
<b>Testing on Site Previous Year:</b>	None
<b>Target Pest:</b>	NA
<b>Growth Stage:</b>	Various

### Application Information

<b>Application Date:</b>	2 Aug	10 Aug	16 Aug	23 Aug
<b>Application Time:</b>	9:00am	9:00am	2:10pm	2:45pm
<b>Air Temperature C<sup>0</sup>(F<sup>0</sup>):</b>	24.5 (76)	21.6 (71)	23.8 (75)	28.8 (84)
<b>Relative Humidity(%):</b>	75	63	61	59
<b>Wind Speed m s<sup>-1</sup> (mph):</b>	1.8-3.1 (4-7)	1.8 (4)	0.4-1.3 (1-3)	0.9 (2)
<b>Soil Temperature(7.6 cm depth) C<sup>0</sup>(F<sup>0</sup>):</b>	23.9 (75)	21.7 (71)	26.1 (79)	29.4 (85)
<b>Soil Moisture:</b>	moist	moist	moist	dry
<b>Application Date:</b>	1 Sept	9 Sept	14 Sept	23 Sept
<b>Application Time:</b>	7:30am	9:30am	8:00am	9:00am
<b>Air Temperature C<sup>0</sup>(F<sup>0</sup>):</b>	21.7 (71)	17.3 (63)	20.8 (69)	20.8 (69)
<b>Relative Humidity(%):</b>	80	78	83	65
<b>Wind Speed m s<sup>-1</sup> (mph):</b>	0.4 (1)	2.2 (5)	Calm	Calm
<b>Soil Temperature(7.6 cm depth) C<sup>0</sup>(F<sup>0</sup>):</b>	17.2 (63)	17.8 (64)	21.1 (70)	18.3 (65)
<b>Soil Moisture:</b>	moist	moist	moist	moist
<b>Spray Volume L ha<sup>-1</sup> (gal 1000 ft<sup>-2</sup>):</b>	814 (2)			
<b>Spray Pressure:</b>	35psi			
<b>Spray Nozzle:</b>	8001.5			
<b>Spray Equipment:</b>	CO <sub>2</sub> backpack			
<b>Irrigation After Application:</b>	None			
<b>Experimental Design:</b>	Randomized complete block			
<b>Replications:</b>	3			
<b>Plot Size m (ft):</b>	1.5 X 1.5 (5 X 5)			

**Results:**

- This study was designed as a 3 X 7 factorial, but it has not been fully analyzed as a factorial since this is still preliminary data.
- MON 44951 caused no phytotoxicity to the Penncross creeping bentgrass when applied between 3 weeks before seeding (WBS) and 1 week after emergence (WAE) (Table 1).
- MON 44951 applied 2, 3 and 4 WAE caused visible phytotoxicity, but this lasted for two weeks or less.
- MON 44951 at 0.25 lbs ai/A was the safest application and only applications at 0 WBS, 1, 2, or 3 WAE reduced creeping bentgrass cover measured on 28 Oct (Table 2).
- MON 44951 at 0.50 and 1.0 lbs ai/A reduced creeping bentgrass cover measured on 28 Oct regardless of the application date (Table 2).

**Table 1.** Phytotoxicity<sup>a</sup> to ‘Penncross’ creeping bentgrass seedlings after application of MON 44951 before or after seeding.

Treatment <sup>b</sup>	Rate of application	Application timing <sup>c</sup>	14 Sept	23 Sept	30 Sept	7 Oct	17 Oct	22 Oct
	lb a.i./A							
MON 44951	0.25	3 WBS	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	0.5	3 WBS	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	1	3 WBS	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	0.25	2 WBS	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	0.5	2 WBS	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	1	2 WBS	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	0.25	1 WBS	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	0.5	1 WBS	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	1	1 WBS	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	0.25	0 WBS	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	0.5	0 WBS	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	1	0 WBS	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	0.25	1 WAE	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	0.5	1 WAE	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	1	1 WAE	9.0	9.0	9.0	9.0	9.0	9.0
MON 44951	0.25	2 WAE	7.0	8.0	8.3	9.0	9.0	9.0
MON 44951	0.5	2 WAE	5.7	5.0	6.0	9.0	9.0	9.0
MON 44951	1	2 WAE	5.7	3.0	1.3	9.0	9.0	9.0
MON 44951	0.25	3 WAE	9.0	7.3	7.7	9.0	9.0	9.0
MON 44951	0.5	3 WAE	9.0	6.3	7.0	9.0	9.0	9.0
MON 44951	1	3 WAE	9.0	6.0	5.7	9.0	9.0	9.0
MON 44951	0.25	4 WAE	9.0	9.0	8.3	7.3	9.0	9.0
MON 44951	0.5	4 WAE	9.0	9.0	7.3	5.3	9.0	9.0
MON 44951	1	4 WAE	9.0	9.0	7.3	3.7	9.0	9.0
Check			9.0	9.0	9.0	9.0	9.0	9.0
LSD (0.05)			0.5	0.9	1.4	0.6	NS	NS

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

<sup>b</sup> All treatments included MON 0818 at 0.25% v/v.

<sup>c</sup> Weeks before seeding (WBS) and weeks after emergence (WAE) of creeping bentgrass.

**Table 2.** Percent cover<sup>a</sup> of ‘Penncross’ creeping bentgrass seedlings after application of MON 44951 before or after seeding.

Treatment <sup>b</sup>	Rate of application	Application timing <sup>c</sup>	14 Sept	23 Sept	30 Sept	7 Oct	17 Oct	22 Oct	28 Oct
	lb a.i./A		-----%-----						
MON 44951	0.25	3 WBS	48.3	88.3	87.3	94.7	97.3	96.0	95.0
MON 44951	0.5	3 WBS	17.3	45.0	46.7	58.3	58.3	68.3	73.3
MON 44951	1	3 WBS	8.3	7.7	11.7	16.7	25.0	30.0	41.7
MON 44951	0.25	2 WBS	21.7	55.0	65.0	78.3	90.0	86.7	85.0
MON 44951	0.5	2 WBS	10.0	13.3	23.3	33.3	41.7	53.3	56.7
MON 44951	1	2 WBS	3.3	1.7	2.0	2.3	4.3	8.0	11.7
MON 44951	0.25	1 WBS	18.3	45.0	48.3	66.7	81.7	81.7	83.3
MON 44951	0.5	1 WBS	3.0	3.0	4.7	3.7	6.7	11.7	16.7
MON 44951	1	1 WBS	0.0	0.0	0.0	1.0	0.7	1.0	2.3
MON 44951	0.25	0 WBS	2.0	3.7	6.7	6.7	11.7	18.3	26.7
MON 44951	0.5	0 WBS	0.3	0.0	1.0	0.7	1.0	3.0	4.0
MON 44951	1	0 WBS	0.0	0.0	0.0	0.0	0.0	0.0	1.0
MON 44951	0.25	1 WAE	0.7	0.0	0.0	0.0	0.3	0.0	1.0
MON 44951	0.5	1 WAE	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MON 44951	1	1 WAE	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MON 44951	0.25	2 WAE	73.3	55.0	38.3	43.3	55.0	65.0	68.3
MON 44951	0.5	2 WAE	70.0	21.7	6.0	8.3	10.0	18.3	25.0
MON 44951	1	2 WAE	71.7	9.0	1.3	2.0	1.3	2.7	4.3
MON 44951	0.25	3 WAE	78.3	68.3	46.7	46.7	60.0	60.0	65.0
MON 44951	0.5	3 WAE	85.0	76.7	30.0	25.0	33.3	38.3	50.0
MON 44951	1	3 WAE	86.7	73.3	11.7	11.7	13.3	16.7	18.3
MON 44951	0.25	4 WAE	85.0	97.0	94.3	88.3	96.3	94.7	96.0
MON 44951	0.5	4 WAE	85.0	96.7	92.0	65.0	51.7	68.3	70.0
MON 44951	1	4 WAE	85.0	95.3	91.7	41.7	25.0	31.7	41.7
Check			83.3	97.7	96.7	98.0	99.0	98.3	98.0
LSD (0.05)			10.6	19.3	17.7	22.3	23.1	23.3	24.7

<sup>a</sup> Percent of the plot area covered by bentgrass.

<sup>b</sup> All treatments included MON 0818 at 0.25% v/v.

<sup>c</sup> Weeks before seeding (WBS) and weeks after emergence (WAE) of creeping bentgrass.