

## Evaluation of Long Term Tolerance of Roundup Ready Creeping Bentgrass to Roundup PRO

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**Background/Objective:** Continuous use of Roundup PRO to control weeds in RRCB poses bentgrass tolerance questions and needs to be defined. 1) Evaluate the long-term tolerance of Roundup Ready creeping bentgrass to Roundup PRO. 2) Evaluate control of *Poa annua* and other weeds in Roundup Ready creeping bentgrass.

### Site Information

<b>Location:</b>	William H. Daniel Research and Diagnostic Center
<b>Turfgrass Species:</b>	Creeping bentgrass
<b>Turf Condition:</b>	good
<b>Turf Management:</b>	<b>Mowing Height in:</b> 0.5
	<b>Fertilization:</b> 2.5 lbs/1000 ft <sup>2</sup> /yr
	<b>Irrigation:</b> To prevent moisture stress
<b>Target Pest:</b>	NA
<b>Growth Stage:</b>	seeded 22 Aug 2002
	Treated with Roundup on 23 Sep 2002

### Application Information

<b>Spray Volume gal 1000 ft<sup>2</sup>:</b>	2
<b>Spray Equipment:</b>	CO <sub>2</sub> backpack
<b>Experimental Design:</b>	Randomized complete block
<b>Replications:</b>	3
<b>Plot Size ft:</b>	5 X 5

### Preliminary Results:

There have been no significant effects from the treatments to date. This study will continue throughout 2005.

**Table 1.** Quality<sup>a</sup> of creeping bentgrass in 2003.

Treatment	Rate of application	Application timing <sup>b</sup>	18 April	4 June	11 June	1 July	18 July	21 Aug	7 Sept	22 Sept	15 Oct
	qt/A										
Roundup Pro	1.0	May, July, Sep	5.3	6.3	5.7	7.0	7.0	4.3	6.7	6.3	6.7
Roundup Pro	2.0	May, July, Sep	5.7	6.3	6.0	7.0	7.0	4.3	7.0	7.0	6.7
Roundup Pro	4.0	May, July, Sep	5.7	6.3	6.0	7.0	7.0	4.7	7.0	7.0	7.0
Roundup Pro	1.0	Apr, June, Sep, Nov	6.0	6.7	6.0	7.0	7.0	4.3	7.0	7.0	6.7
Roundup Pro	2.0	Apr, June, Sep, Nov	5.7	6.7	6.0	7.0	7.0	4.3	7.0	7.0	7.0
Roundup Pro	4.0	Apr, June, Sep, Nov	5.3	6.3	5.7	7.0	7.0	4.3	7.0	6.7	6.7
Roundup Pro	0.25	May, Oct	6.0	7.0	6.3	7.0	7.0	4.3	6.7	7.0	6.7
Roundup Pro	2.0	May, Oct	5.7	6.7	6.3	7.0	7.0	4.7	7.0	6.7	6.7
Dimension	2.0	Apr	5.7	6.7	6.0	7.0	7.0	4.0	6.7	7.0	6.7
Roundup Pro	2.0	May									
Trimec for Bent	2.0	Oct									
Dimension	2.0	Apr	5.7	6.7	6.0	7.0	7.0	4.0	7.0	7.0	6.7
Trimec for Bent	2.0	May, Oct									
Trimec for Bent	2.0	May, Oct	6.0	6.0	6.0	7.0	7.0	4.7	7.0	6.7	7.0
Dimension	2.0	June, Sep, Nov									
Dimension	2.0	Apr	5.7	6.7	6.0	7.0	7.0	4.3	7.0	6.3	7.0
Trimec for Bent	2.0	May, Oct									
Prograss	2.0	Sep, Oct, Nov									
Roundup Pro	0.25	Apr, June, Aug, Nov	5.7	7.0	6.0	7.0	7.0	4.3	7.0	7.0	7.0
Roundup Pro	2.0	1 in 05	5.7	6.3	6.0	7.0	7.0	4.0	6.7	6.7	6.7
LSD (0.05)			NS	NS	NS	NS	NS	NS	NS	NS	NS

<sup>a</sup> Quality was rated on a scale of 1 to 9 where 1 = no turf, 5 = acceptable turf, and 9 = ideal quality.

<sup>b</sup> Application timing is month of application in 2003 and 2004.

**Table 2.** Percent<sup>a</sup> annual bluegrass in 2003.

Treatment	Rate of application	Application timing <sup>b</sup>	4 June	18 July	21 Aug	7 Sept	22 Sept	15 Oct
	qt/A							
Roundup Pro	1.0	May, July, Sep	0.0	0	0	0	0	0
Roundup Pro	2.0	May, July, Sep	0.0	0	0	0	0	0
Roundup Pro	4.0	May, July, Sep	0.0	0	0	0	0	0
Roundup Pro	1.0	Apr, June, Sep, Nov	0.0	0	0	0	0	0
Roundup Pro	2.0	Apr, June, Sep, Nov	0.0	0	0	0	0	0
Roundup Pro	4.0	Apr, June, Sep, Nov	0.0	0	0	0	0	0
Roundup Pro	0.25	May, Oct	0.0	0	0	0	0	0
Roundup Pro	2.0	May, Oct	0.0	0	0	0	0	0
Dimension	2.0	Apr	0.0	0	0	0	0	0
Roundup Pro	2.0	May						
Trimec for Bent	2.0	Oct						
Dimension	2.0	Apr	1.7	0	0	0	0	0
Trimec for Bent	2.0	May, Oct						
Trimec for Bent	2.0	May, Oct	2.7	0	0	0	0	0
Dimension	2.0	June, Sep, Nov						
Dimension	2.0	Apr	2.0	0	0	0	0	0
Trimec for Bent	2.0	May, Oct						
Prograss	2.0	Sep, Oct, Nov						
Roundup Pro	0.25	Apr, June, Aug, Nov	0.0	0	0	0	0	0
Roundup Pro	2.0	1 in 05	2.7	0	0	0	0	0
LSD (0.05)			1.9	NS	NS	NS	NS	NS

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

<sup>b</sup> Application timing is month of application in 2003 and 2004.

**Table 3.** Percent<sup>a</sup> broadleaf weeds in 2003.

Treatment	Rate of application	Application timing <sup>b</sup>	4 June	18 July	21 Aug	7 Sept	22 Sept	15 Oct
	qt/A							
Roundup Pro	1.0	May, July, Sep	0.0	0	0	0	0	0
Roundup Pro	2.0	May, July, Sep	0.0	0	0	0	0	0
Roundup Pro	4.0	May, July, Sep	0.0	0	0	0	0	0
Roundup Pro	1.0	Apr, June, Sep, Nov	0.0	0	0	0	0	0
Roundup Pro	2.0	Apr, June, Sep, Nov	0.0	0	0	0	0	0
Roundup Pro	4.0	Apr, June, Sep, Nov	0.0	0	0	0	0	0
Roundup Pro	0.25	May, Oct	0.0	0	0	0	0	0
Roundup Pro	2.0	May, Oct	0.0	0	0	0	0	0
Dimension	2.0	Apr	0.0	0	0	0	0	0
Roundup Pro	2.0	May						
Trimec for Bent	2.0	Oct						
Dimension	2.0	Apr	0.0	0	0	0	0	0
Trimec for Bent	2.0	May, Oct						
Trimec for Bent	2.0	May, Oct	0.0	0	0	0	0	0
Dimension	2.0	June, Sep, Nov						
Dimension	2.0	Apr	0.7	0	0	0	0	0
Trimec for Bent	2.0	May, Oct						
Prograss	2.0	Sep, Oct, Nov						
Roundup Pro	0.25	Apr, June, Aug, Nov	0.3	0	0	0	0	0
Roundup Pro	2.0	1 in 05	1.7	0	0	0	0	0
LSD (0.05)			NS	NS	NS	NS	NS	NS

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

<sup>b</sup> Application timing is month of application in 2003 and 2004.

**Table 4.** Quality<sup>a</sup> of creeping bentgrass in 2004.

Treatment	Rate of application	Application timing <sup>b</sup>	7 April	7 May	7 June	9 July	13 Aug	17 Sept	5 Oct	12 Nov	7 Dec
	qt/A										
Roundup Pro	1.0	May, July, Sep	7.0	7.0	6.3	6.0	7.0	7.0	7.0	7.0	6.0
Roundup Pro	2.0	May, July, Sep	7.0	7.0	7.0	6.0	7.0	7.0	7.0	7.0	6.0
Roundup Pro	4.0	May, July, Sep	7.0	7.0	7.0	6.0	7.0	7.0	7.0	7.0	6.0
Roundup Pro	1.0	Apr, June, Sep, Nov	7.0	7.0	7.0	6.0	7.0	7.0	7.0	7.0	6.0
Roundup Pro	2.0	Apr, June, Sep, Nov	7.0	7.0	7.0	6.0	7.0	7.0	7.0	7.0	6.0
Roundup Pro	4.0	Apr, June, Sep, Nov	7.0	7.0	6.7	6.0	6.7	7.0	7.0	7.0	6.0
Roundup Pro	0.25	May, Oct	7.0	7.0	7.0	6.0	7.0	7.0	7.0	7.0	6.0
Roundup Pro	2.0	May, Oct	7.0	7.0	6.7	6.0	6.7	7.0	7.0	7.0	6.0
Dimension	2.0	Apr	7.0	7.0	6.7	6.0	7.0	7.0	7.0	7.0	6.0
Roundup Pro	2.0	May									
Trimec for Bent	2.0	Oct									
Dimension	2.0	Apr	7.0	6.7	7.0	6.0	7.0	7.0	7.0	7.0	6.0
Trimec for Bent	2.0	May, Oct									
Trimec for Bent	2.0	May, Oct	7.0	7.0	7.0	6.0	7.0	7.0	7.0	7.0	6.0
Dimension	2.0	June, Sep, Nov									
Dimension	2.0	Apr	7.0	6.7	7.0	6.0	7.0	7.0	7.0	7.0	6.0
Trimec for Bent	2.0	May, Oct									
Prograss	2.0	Sep, Oct, Nov									
Roundup Pro	0.25	Apr, June, Aug, Nov	7.0	7.0	6.7	6.0	7.0	7.0	7.0	7.0	6.0
Roundup Pro	2.0	1 in 05	7.0	7.0	7.0	6.0	6.7	7.0	7.0	7.0	6.0
LSD (0.05)			NS	NS	NS	NS	NS	NS	NS	NS	NS

<sup>a</sup> Quality was rated on a scale of 1 to 9 where 1 = no turf, 5 = acceptable turf, and 9 = ideal quality.

<sup>b</sup> Application timing is month of application in 2003 and 2004.

**Table 5.** Percent<sup>a</sup> annual bluegrass in 2004.

Treatment	Rate of application	Application timing <sup>b</sup>	7 April	7 May	7 June	9 July	13 Aug	17 Sept	5 Oct	12 Nov	7 Dec
	qt/A										
Roundup Pro	1.0	May, July, Sep	0.0	0.0	0.0	0	0	0	0	0	0
Roundup Pro	2.0	May, July, Sep	0.0	0.0	0.0	0	0	0	0	0	0
Roundup Pro	4.0	May, July, Sep	0.0	0.0	0.0	0	0	0	0	0	0
Roundup Pro	1.0	Apr, June, Sep, Nov	0.0	0.0	0.0	0	0	0	0	0	0
Roundup Pro	2.0	Apr, June, Sep, Nov	0.0	0.0	0.0	0	0	0	0	0	0
Roundup Pro	4.0	Apr, June, Sep, Nov	0.0	0.0	0.0	0	0	0	0	0	0
Roundup Pro	0.25	May, Oct	0.0	0.0	0.0	0	0	0	0	0	0
Roundup Pro	2.0	May, Oct	0.0	0.0	0.0	0	0	0	0	0	0
Dimension	2.0	Apr	0.0	0.3	0.0	0	0	0	0	0	0
Roundup Pro	2.0	May									
Trimec for Bent	2.0	Oct									
Dimension	2.0	Apr	0.7	2.0	0.3	0	0	0	0	0	0
Trimec for Bent	2.0	May, Oct									
Trimec for Bent	2.0	May, Oct	0.0	0.0	0.0	0	0	0	0	0	0
Dimension	2.0	June, Sep, Nov									
Dimension	2.0	Apr	0.0	2.3	0.7	0	0	0	0	0	0
Trimec for Bent	2.0	May, Oct									
Prograss	2.0	Sep, Oct, Nov									
Roundup Pro	0.25	Apr, June, Aug, Nov	0.0	0.0	0.0	0	0	0	0	0	0
Roundup Pro	2.0	1 in 05	0.0	2.3	0.3	0	0	0	0	0	0
LSD (0.05)			NS	1.1	NS	NS	NS	NS	NS	NS	NS

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

<sup>b</sup> Application timing is month of application in 2003 and 2004.

**Table 6.** Percent<sup>a</sup> broadleaf weeds in 2004.

Treatment	Rate of application	Application timing <sup>b</sup>	7 April	7 May	7 June	9 July	13 Aug	17 Sept	5 Oct	12 Nov	7 Dec
	qt/A										
Roundup Pro	1.0	May, July, Sep	0.0	0	0	0	0	0	0	0	0
Roundup Pro	2.0	May, July, Sep	0.0	0	0	0	0	0	0	0	0
Roundup Pro	4.0	May, July, Sep	0.0	0	0	0	0	0	0	0	0
Roundup Pro	1.0	Apr, June, Sep, Nov	0.0	0	0	0	0	0	0	0	0
Roundup Pro	2.0	Apr, June, Sep, Nov	0.0	0	0	0	0	0	0	0	0
Roundup Pro	4.0	Apr, June, Sep, Nov	0.3	0	0	0	0	0	0	0	0
Roundup Pro	0.25	May, Oct	0.0	0	0	0	0	0	0	0	0
Roundup Pro	2.0	May, Oct	0.0	0	0	0	0	0	0	0	0
Dimension	2.0	Apr	0.0	0	0	0	0	0	0	0	0
Roundup Pro	2.0	May									
Trimec for Bent	2.0	Oct									
Dimension	2.0	Apr	0.0	0	0	0	0	0	0	0	0
Trimec for Bent	2.0	May, Oct									
Trimec for Bent	2.0	May, Oct	0.0	0	0	0	0	0	0	0	0
Dimension	2.0	June, Sep, Nov									
Dimension	2.0	Apr	0.0	0	0	0	0	0	0	0	0
Trimec for Bent	2.0	May, Oct									
Prograss	2.0	Sep, Oct, Nov									
Roundup Pro	0.25	Apr, June, Aug, Nov	0.0	0	0	0	0	0	0	0	0
Roundup Pro	2.0	1 in 05	0.0	0	0	0	0	0	0	0	0
LSD (0.05)			NS	NS	NS	NS	NS	NS	NS	NS	NS

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

<sup>b</sup> Application timing is month of application in 2003 and 2004.