

# Response of Perennial Ryegrass Under Desert Conditions to Applications of Sulfentrazone Herbicide

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## **Abstract**

*Sulfentrazone was applied to perennial ryegrass turf as single applications at 0.125, 0.250 and 0.375 lb. AI/A, and split application combinations of 0.125/0.125, 0.250/0.250 and 0.375/0.125 AI/A. Respective treatments were applied on June 28 and July 31, 1996. Sulfentrazone caused a decrease in turfgrass color, which was most noticeable at the 0.375 lb. AI/A rate. Decreases in color were generally dependent on application rate. Sulfentrazone caused a slight "pocking" of the turf, which resulted from leaf twisting/cupping. This injury was most evident at seven days after the first application. There was no foliar burning or uneven discoloration however. The turf exhibited a lesser amount of discoloration and injury following the second (split) application.*

## **Introduction**

A field test was devised and conducted to assess the initial tolerance of turf-type perennial ryegrass (*Lolium perenne*) to applications of sulfentrazone herbicide. The test included initial and split application combinations applied to mature perennial ryegrass during desert summer conditions.

## **Materials and Methods**

A five year old stand of perennial ryegrass turf was chosen for this test at the Karsten Turfgrass Research Facility at the University of Arizona. The turf was maintained at a mowing height of 2.75 inches, mowed regularly with a rotary mower and received irrigation to prevent plant stress. Initial applications covered rates from 0.125, 0.250 to 0.375 lbs. AI/A. In addition, a second application (for additional split application treatments) was applied to establish multiple application tolerance using the rate combinations of 0.125/0.125 lb., 0.250/0.250 lb. and 0.375/0.125 lb. AI/A. Halosulfuron was included in the test. Plot size was 5x8" in a RCB design with three replications. Treatments were applied initially on June 28, 1996 with split applications made again (to respective plots only) on July 30, 1996.

Treatments were applied to the foliage using a 3 nozzle boom with 8004 nozzles at a 20 inch spacing. A CO<sub>2</sub> backpack sprayer was used at 20 psi, delivering a 95 gallons/acre final delivery rate. Plots were irrigated 14 hours after application with a normal nightly irrigation. Plots were evaluated periodically for turfgrass color, and any visible signs of injury or related turf response. Data were subjected to the analysis of variance technique and LSD values were calculated as a mean separation statistic.

## **Results and Discussion**

### July 1, 1996 (3 DAT/1)

There was minimal color variance among treated turf at three days after treatment. Mean color scores ranged from 5.4

to 6.7 among treated turfs. There was a slight decrease in color from the 0.375 lb. AI/A rate of sulfentrazone, but it was not objectionable (Table 1.)

Injury response resulted in a slight fading of the turf, resembling a puckering effect of the turf. Close examination revealed a twisting of the leaves. Injury scores were assigned using a scale of 1-6, with 1 = no damage, 4 = moderate, and 6 = severe. Sulfentrazone at the 0.375 lb. AI/A rate caused slight visual damage (mean = 2.4) which is not generally observed by the casual onlooker. Lesser injury occurred on the lower two rates of sulfentrazone. The control itself exhibited some twisting, most likely from summer stress conditions (Table 2).

#### July 5, 1996 (7 DAT/1)

Mean color scores ranged from 5.5 to 6.9 among treated turfs. Color scores decreased with increased rate of sulfentrazone, but only the 0.375 lb. AI/A rate resulted in a mean color value less than the standard acceptable value of 6.0 (Table 1).

By seven days after treatment, the degree of injury was more evident than at three days post treatment. Sulfentrazone at 0.375 lb. AI/A had a mean injury score of 3.0 (slight to moderate). This degree of injury is noticeable to a lay person, but not a serious limitation to the visual performance of the turf. The injury response was directly related to application rate of sulfentrazone (Table 2).

#### July 12, 1996 (14 DAT/1)

Mean color scores ranged from 5.2 to 6.0 for treated turf. The control plots averaged a score of 6.0. Overall turfgrass quality scores were assigned at this time. Quality is an integration of plot density, texture, uniformity of surface and uniformity of color.

All treated plots had mean overall quality values less than the control, which had a mean score of 6.3. A uniformly acceptable turf value is 6.0. A turf receiving a value of 5.0 or less would be of generally lesser quality. The lowest rate of sulfentrazone scored a value of 5.8. Halosulfuron scored a value of 5.5 (Table 1).

#### August 2, 1996 (35 DAT/1:3 DAT/2)

Neither color scores or visible injury were significant due to treatments. There was a noticeable (but statistically non-significant) difference between initial or split application treatments following their application on July 30. Mean color scores ranged from 5.3 to 6.3, as there was very little difference between all plots for overall color (Table 1). Injury scores were much lower after the split application as well. Only sulfentrazone at the 0.375/0.125 lb. AI/A split application treatment caused slight injury (once again, in light pocking of the turf from leaf twisting). The effect was minimal and short lived (Table 2).

## **Conclusion**

1. Perennial ryegrass exhibited a slight decrease in color from applications of sulfentrazone.
2. The change in color was almost unperceived at 0.125 and 0.250 lb. AI/A rates.
3. At 0.375 lb. AI/A, the turf was slightly lighter in color, however, it was not limiting or objectionable.
4. Note that summer stress conditions (high solar energy loads, high nighttime temperatures and humidity) are very stressful on perennial ryegrass.
5. Split applications caused minimal effect when applied 35 days after the initial application.
6. All turfs returned to high quality standards with the return of early fall weather conditions.

Table 1. Turfgrass color<sup>1</sup> and quality scores<sup>1</sup> for perennial ryegrass turf after applications of sulfentrazone and halosulfuron. University of Arizona, Summer of 1996.

Treatment	Rate lb. A/A <sup>2</sup>	-----Color-----						----Quality----	
		01 July 3 DAT/1	05 July 7 DAT/1	12 July 14 DAT/1	02 August 35 DAT/1:3 DAT/2	12 July 14 DAT/1	12 July 14 DAT/1		
Sulfentrazone	0.125	6.5	6.9	6.0	6.3		5.8		
Sulfentrazone	0.250	6.7	6.5	5.8	6.3		5.4		
Sulfentrazone	0.375	5.4	5.5	5.2	5.3		5.0		
Sulfentrazone	0.125/0.125	--	--	--	5.7		--		
Sulfentrazone	0.250/0.250	--	--	--	5.7		--		
Sulfentrazone	0.375/0.125	--	--	--	5.7		--		
Halosulfuron	0.062	6.3	6.4	5.5	5.3		5.5		
Halosulfuron	0.062/0.062	--	--	--	5.7		--		
Control	none	7.3	7.0	6.0	6.0		6.3		
Test Mean <sup>3</sup>		6.4	6.5	5.5	5.8		5.5		
LSD Value <sup>4</sup>		1.7	1.6	1.2	1.5		1.4		

<sup>1</sup>Color response (1-9). 1 = dead, 9 = darkest green possible. Quality (1-9). 1 = dead, 9 = best. Values are the means of three replications. Treatments with same rate at initial application are combined (values of six replications) when evaluate before the split applications were applied.

<sup>2</sup>Rates are in lbs. active ingredient/per acre. Treatments applied June 28 and July 31, 1996.

<sup>3</sup>Test Mean = Mean of all plots on each evaluation date.

<sup>4</sup>LSD Value = LSD mean separation statistic. Numerical difference between two treatment means must be larger than the LSD value for true treatment differences to occur.

Table 2. Mean<sup>1</sup> perennial ryegrass injury scores after applications of sulfentrazone and halosulfuron. University of Arizona, Summer of 1996.

<u>Treatment</u> <sup>2</sup>	<u>Rate lb. A/A</u> <sup>2</sup>	<u>1 July 3 DAT/1</u> <u>Injury</u> <sup>3</sup>	<u>05 July 7 DAT/1</u> <u>Injury</u>	<u>2 Aug 35 DAT/1:3 DAT/2</u> <u>Injury % plot</u>
Sulfentrazone	0.125	1.3	1.2	1.0
Sulfentrazone	0.250	1.8	2.0	1.0
Sulfentrazone	0.375	2.4	3.0	1.3
Sulfentrazone	0.125/0.125	--	--	1.7
Sulfentrazone	0.250/0.250	--	--	1.7
Sulfentrazone	0.375/0.125	--	--	2.3
Halosulfuron	0.062	1.7	1.5	1.0
Halosulfuron	0.062/0.062	--	0.0	1.7
Control	none	1.3	1.0	1.0
Test Mean <sup>6</sup>		1.7	1.7	1.4
LSD Value <sup>7</sup>		1.0	0.6	0.9

<sup>1</sup>Values are mean of three replications. Treatments with same application rate at initial application are combined (value of six replications) when evaluate before split applications were applied. Initial application = June 28. Split application = July 30, 1996.

<sup>2</sup>All rates in lbs. active ingredient/per acre.

<sup>3</sup>Injury score (1-6). 1 = none, 4 = moderate, 6 = severe. Injury in form of pocked turf from leaf cupping/twisting.

<sup>4</sup>Test Mean = mean of all plots on each respective test date.

<sup>5</sup>LSD Value = LSD mean separation statistic. Numerical difference between two treatment means must be larger than the LSD value for true treatment differences to occur.