

Response of Tall Fescue Turf to Applications of Sulfentrazone

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Abstract

Applications of sulfentrazone were applied to 2.75" mowed tall fescue under hot-humid desert conditions to assess post application response. A uniform decrease in color occurred shortly after application at the 0.375 lb. AI/A rate. The effect was short lived and tended to be minimal in split application treatments. Leaf cupping/twisting was exacerbated from applications of sulfentrazone, especially at the 0.375 lb. AI/A rate. At 0.125 and 0.250 lb. AI/ rates, the leaf cupping was much less noticeable. Percent plot showing the leaf cupping symptoms was also rate dependent and generally ranked with degree of effect. Leaf cupping dissipated rapidly after 14 days after treatment. Color changes were minor, while leaf cupping was the more noticeable symptom response on tall fescue from applications of sulfentrazone.

Introduction

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

Materials and Methods

A five year old stand of 100% tall fescue 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 included rates from 0.125, 0.250 to 0.375 lbs. AI/A. In addition, a second application (for additional split application combination 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 and imazaquin were 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 appropriate 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 CO₂ backpack sprayer was used at 28 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)

Mean color scores ranged from 5.8 to 7.3 at three days after the initial treatment. The highest rate of sulfentrazone had the lowest numerical turf color mean score of 5.8. This was not unacceptable, but the turf was a different shade of green than the non-treated control turf. The two lower rates had mean color scores of 6.4 to 7.0. Halsulfuron caused no change in color whatsoever (mean = 7.2) (Table 1).

Tall fescue did exhibit a noticeable leaf twisting or cupping of the turf from the sulfentrazone treatments, especially at the high rate (0.375 lb. AI/A). The average degree of twisting scores were 4.5 for the 0.375 lb. treatments. This relates to a moderate to severe effect. At 0.250 lb. AI/A, the twisting was still evident, but not as severe in degree. This rate received a mean twisting score of 3.0 which was slight to moderate, which may or may not be noticeable to the casual observer. Halsulfuron caused slightly more leaf twisting at its 1x rate (0.062 lb. AI/A) than sulfentrazone at the 0.125 lb. AI/A rate, each with twisting (injury) scores of 2.6 and 1.8, respectively. The control plot had a mean twisting score of 1.3, from the youngest unexpended leaf under hot humid conditions (Table 2).

The percentage of the plot (0-100%) exhibiting the leaf twisting/cupping response was generally related to the degree of injury. The greatest amount of affected turf was 70% for sulfentrazone at the 0.375 lb. AI/A rate. For sulfentrazone, the response was rate dependent. All treatments caused some leaf twisting. Note that surfactants were not included during applications (Table 2).

July 5, 1996 (7 DAT/7)

Mean color scores ranged from 5.5 to 7.7 at 5 days after the initial treatments were applied. Sulfentrazone at the 0.375 lb. AI/A rate had slightly lower than desirable color, but it was certainly not objectionable. Both of the other sulfentrazone rates had mean color scores of 6.5-6.6. Halsulfuron turf had a very good color (mean = 7.5), while the untreated turf scored a mean of 7.7 (Table 1).

Leaf twisting/cupping was still strongly evident at 7 DAT, especially at the 0.375 lb. AI/A (high) rate. The mean score for this treatment was 3.6 (slight to moderate). The check had no leaf twisting at 7 DAT/1. Likewise, the percent of the turf showing these responses were related to sulfentrazone rates. The halsulfuron (oddly enough) did have the second largest amount of the turf showing leaf twisting symptoms (24%) with only the 0.375 lb. AI/A of sulfentrazone with a greater amount (42%) (Table 2)..

July 12, 1996 (14 DAT/1)

Color scores were very similar among treated turfs by 14 days after the first treatment and the herbicide application effect was non-significant. Sulfentrazone treated turf color mean scores ranged from 5.7 to 5.9, with halsulfuron receiving a 6.7 mean color score. The untreated turf scored 7.0 (Table 1).

By two weeks after the first treatment, injury scores (twisting/cupping) were slight to slight/moderate, with mean scores ranging from 1.8 to 2.5 among treated turf. The control plots scored 1.3. The percent plot showing any twisting/cupping response decreased likewise, as well. Treated turf ranged from 4% to 19% of the plot exhibiting symptoms. Sulfentrazone at 0.375 lb. AI/A and halsulfuron at 0.062 lb. AI/A had the greatest extent of leaf twisting, being 19% and 11% of the plot, respectively (Table 2).

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

The response from treatments was much less severe after the split application treatments were applied, as the herbicide treatment effect was highly non-significant for color, injury (twisting/cupping), or the percent plot showing symptoms, which indicated no difference between treatments. Turfgrass color ranged from 5.7 to 7.0, showing a close range of scores, all of which were acceptable (Table 1). Leaf twisting mean scores ranged from 1.3 to 3.3, with sulfentrazone at the 0.375/0.125 lb. AI/A split rate having the greatest degree of twisting (3.3), followed by halsulfuron at 2.7. The response for split treatments was rate dependent among sulfentrazone treated tall fescue. The high combination rate was slightly noticeable to the average observer (Table 2).

At the close of the test, the halsulfuron treated turfs had the greatest amount of percent plot injury at 20% and 17% respectively for single and repeat applications of halsulfuron. Sulfentrazone at 0.375/0.125 lb. AI/A had 17% plot symptom expression. Note that there were no true treatment difference for this variable on this date.

Conclusions

1. Initial application of sulfentrazone on tall fescue turf under hot humid conditions showed:
 - a). A slight decrease in color, which was acceptable.
 - b). An exacerbated leaf cupping or twisting of the youngest leaf blades, which was most noticeable at the highest application rate of 0.375 lb. AI/A.
2. These effects lasted about two weeks.
3. Halosulfuron treated turf did not cause the lighter color formation of tall fescue after treatment, but it did produce the second largest amount and degree of leaf twisting/cupping at the label rate of 0.062 lb. AI/A (the 1x label rate for this product).
4. Minimal discoloration occurred after split applications (where applicable) were applied.

Table 1. Turfgrass color¹ response of tall fescue to applications² of sulfentrazone and halosulfuron. University of Arizona, Summer of 1996.

Treatment	Rate lb. A/A ³	01 July 3 DAT/1	05 July 7 DAT/1	12 July 14 DAT/1	08 August 35 DAT/1:3 DAT/2
Sulfentrazone	0.125	6.4	6.6	5.9	6.0
Sulfentrazone	0.250	7.0	6.5	5.9	6.7
Sulfentrazone	0.375	5.8	5.5	5.7	6.3
Sulfentrazone	0.125/0.125	--	--	--	6.0
Sulfentrazone	0.250/0.250	--	--	--	6.7
Sulfentrazone	0.375/0.125	--	--	--	5.7
Halosulfuron	0.062	7.2	7.5	6.7	7.0
Halosulfuron	0.062/0.062	--	--	--	6.0
Control	none	7.3	7.7	7.0	6.7
Test Mean ⁴		6.7	6.7	6.1	6.3
LSD Value ⁵		1.2	1.7	1.7	NA

¹Color response (1-9). 1 = dead, 9 = darkest green possible. Values are the mean of six plots for first three evaluation dates and value of three plots for 08 August ratings.

²Initial applications made on 28 June, 1996. Split (second) application made to appropriate plots in 31 July, 1996.

³All rates in lbs. active ingredient/per acre.

⁴Test Mean = Mean of all plots on each evaluation date.

⁵LSD 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. Response of tall fescue to applications¹ of sulfentrazone and halsulfuron. University of Arizona, Summer of 1996.

<u>Treatment²</u>	<u>Rate lb. A/A³</u>	<u>01 June 3 DAT/1 Injury⁴ % plot⁵</u>	<u>05 July 7 DAT/1 Injury % plot</u>	<u>12 July 14 DAT/1 Injury % plot</u>	<u>02 August DAT/1:3 DAT/2 Injury % plot</u>
Sulfentrazone	0.125	1.8	1.3	1.8	1.7
Sulfentrazone	0.250	3.0	1.8	2.2	1.3
Sulfentrazone	0.375	4.5	3.6	2.5	2.3
Sulfentrazone	0.125/0.125	--	--	--	1.7
Sulfentrazone	0.250/0.250	--	--	--	2.0
Sulfentrazone	0.375/0.125	--	--	--	3.3
Halsulfuron	0.062	2.6	2.4	2.0	2.7
Halsulfuron	0.062/0.062	--	--	--	2.7
Control	none	1.3	1.0	1.3	1.7
Test Mean ⁶		2.8	2.2	2.0	2.2
LSD Value ⁷		2.0	1.2	0.9	NA

¹Initial application made on June 28, 1996. Repeat (split) application made on July 30, 1996.

²Foliar application to established tall fescue turf.

³All rates in lbs. active ingredient/acre.

⁴Injury in form of leaf cupping or twisting (1-6). 1 = none, 4 = moderate, 6 = severe.

⁵Percent plot (0-100%) exhibiting any injury symptom.

⁶Test Mean = mean of all plots on each respective test date.

⁷LSD Value = LSD mean separation statistic. Numerical difference between two treatment means must be larger than the LSD value for true treatment differences to occur.