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Mesotrione Safety at Seeding of Kentucky Bluegrass and Perennial Ryegrass

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Abstract
The objectives of the 2007 Mesotrione Safety at Seeding study were to determine if mesotrione was safe to turf when applied at the time of seeding and if mesotrione was safe when applied after the first mowing of the seeded turf. The secondary objective was to determine the efficacy of weed control by the various treatments.

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Introduction

The objectives of the 2007 Mesotrione Safety at Seeding study were to determine if mesotrione was safe to turf when applied at the time of seeding and if mesotrione was safe when applied after the first mowing of the seeded turf. The secondary objective was to determine the efficacy of weed control by the various treatments.

Materials and Methods

The study was conducted at the Iowa State University Horticulture Research Station, Ames, IA. The study was set up on a bare soil area, which was tilled, compacted, and graded prior to the beginning of the study. The soil in the study area is a disturbed Nicollet clay soil. Soil tests indicated a pH of 7.35, with 14 ppm phosphorus, 95 ppm potassium, and 3.3% organic matter.

The study was designed as a split-plot, with whole plots arranged in a randomized complete block (RCBD) design. The RCBD consisted of four replications and seven treatments (Table 1). The subplots were then seeded with 'Unique' Kentucky bluegrass, at a rate of 1 lb pure live seed/1,000ft^2, and 'Catalina II' perennial ryegrass, at a rate of 4 lbs pure live seed/1000 ft^2, in their respective assigned plots on May 17.

The first treatments were applied May 17. The plots were first mown July 3 and the second application was made July 6. Treatments were applied using a CO_2 backpack sprayer at 40 psi, and a spray volume equivalency rate of three gallons/1,000 ft^2, using TeeJet® 8002VS nozzles.

Results and Discussion

Phytotoxicity. Once the seeds germinated, and the second application was made, there was no observed phytotoxicity to any of the plots.

Percentage cover. The seeded bluegrass plots had no statistical difference of percentage cover until the last data observation date, October 4 (Table 2). As expected, the bluegrass germinated slower than the perennial ryegrass, and, at the July 21 rating date, none of the plots had greater than 15% cover. The final data collection date, however, indicated that all the plots had a twofold increase in percentage cover from the July 21 rating. There appeared to be no harmful effects of the repeated applications of mesotrione to the plots. Along with the siduron treatment, the repeated mesotrione applications had the highest percentage cover ratings, which may be explained by the increased weed control by these treatments.

The seeded perennial ryegrass plots initially had no difference in percentage cover between any of the plots (Table 3). The treatments appeared to have no harmful effects on the seeded ryegrass, as all of the treated plots had a higher percentage cover than did the untreated control plots. As was the case with the bluegrass, the plots treated with the siduron and the repeated mesotrione applications had comparable percentage cover ratings as the single application of mesotrione.

Weed Control. Crabgrass ratings indicated that all treated plots had statistically less crabgrass than the untreated controls, with siduron providing the best control throughout the season (Table 4). There were no differences among any of the mesotrione-treated plots, with the exception of the last crabgrass rating, occurring

on July 21. The only statistical difference was between the single application at the lowest rate of mesotrione and the repeated application of the highest rate of mesotrione.

The plots treated with siduron had the lowest populations of purslane (Table 4). While the siduron provided acceptable control of crabgrass and purslane, it provided very little control of bedstraw. There was no bedstraw found in any of the plots treated with mesotrione at any time, while plots treated with siduron had large populations of bedstraw present (Table 4).

There were no differences between plots in the amount of barnyard grass present. We initially thought there may be some differences between some of the treatments, but the statistical analysis indicated no difference. However, plots treated with siduron had the fewest barnyard grass plants, numerically.

Prostrate spurge ratings were taken once on July 21. Again, the lowest percentage of spurge present was in the plots treated with siduron.

Table 1. Treatments and timings.

Trt	Syngenta ID	Chemical	Product/AI rate	Product/AI rate unit	Converted rate	Converted rate unit	Application timing[3]	Rate per 25 ft^2
1				Control				
2	A12738	Mesotrione	175	ga/ha[1]	2.5	oza/a[2]	A	0.08 mL
	NIS		0.25	% v/v	0.25	% v/v	A	0.7 mL
3	A12738	Mesotrione	210	ga/ha	3	oza/a	A	0.1 mL
	NIS		0.25	% v/v	0.25	% v/v	A	0.7 mL
4	A12738	Mesotrione	280	ga/ha	4	oza/a	A	0.14 mL
	NIS		0.25	% v/v	0.25	% v/v	A	0.7 mL
5	Tupersan	Siduron	6700	ga/ha	6	lb/a	A	3.13 g
6	A12738	Mesotrione	175	ga/ha	2.5	oza/a	A	0.08 mL
	NIS		0.25	% v/v	0.25	% v/v	A	0.7 mL
	A12738	Mesotrione	175	ga/ha	2.5	oza/a	B	0.08 mL
	NIS		0.25	% v/v	0.25	% v/v	B	0.7 mL
7	A12738	Mesotrione	210	ga/ha	3	oza/a	A	0.1 mL
	NIS		0.25	% v/v	0.25	% v/v	A	0.7 mL
	A12738	Mesotrione	210	ga/ha	3	oza/a	B	0.1 mL
	NIS		0.25	% v/v	0.25	% v/v	B	0.7 mL

[1]Grams active per hectare.
[2]Ounce active per acre.
[3]A = first application; B = second application.

Table 2. Percentage cover of Kentucky bluegrass subplots.

Trt[1]	Jun 4	Jun 14	Jul 4	Jul 21	Oct 4
1	1.0	2.3	1.0	2.0	6.3
2	2.0	4.3	11.3	12.5	21.3
3	1.0	3.0	8.8	8.8	22.5
4	1.0	3.5	7.5	11.3	22.5
5	1.0	2.3	9.3	12.5	52.5
6	2.0	4.0	7.5	13.8	28.8
7	1.0	4.0	11.3	13.8	31.3
LSD (0.05)	NS[2]	NS	NS	NS	10

[1]Treatment details are shown in Table 1.
[2]NS = no significant difference.

Table 3. Percentage cover of perennial ryegrass subplots.

Trt[1]	Jun 4	Jun 14	Jul 4	Jul 21	Oct 4
1	15.0	38.8	26.3	30.0	51.3
2	12.5	45.0	67.5	80.0	65.0
3	13.8	43.8	68.8	82.5	63.8
4	13.0	37.5	67.5	80.0	66.3
5	9.3	31.3	55.0	86.3	85.0
6	12.5	40.0	70.0	80.0	65.0
7	13.8	45.0	70.0	83.8	67.5
LSD (0.05)	NS[2]	10.2	7.6	8.5	8.5

[1]Treatment details are shown in Table 1.
[2]NS = no significant difference.