Iron Sulfate and Water Volume Interactions for Turf Quality

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OBJECTIVE

To determine how applications of iron sulfate interact with water carrier volume for controlling dollar spot caused by the fungus *Sclerotinia homoeocarpa* on fairway-height creeping bentgrass.

MATERIALS AND METHODS

The study was conducted at the O. J. Noer Turfgrass Research and Education Facility on a stand of creeping bentgrass (*Agrostis stolonifera*) maintained at 0.5 inches. Individual plots measured 3 feet by 5 feet and were arranged in a randomized complete block design with four replications. Treatments were applied at a nozzle pressure of 40 psi using a CO_2-pressurized boom sprayer equipped with either two XR Teejet 8004 or 80025 VS nozzles, depending on the spray volume. All fungicides were agitated by hand and applied in the equivalent of either 3, 1.5, or 0.75 gallons of water per 1000 ft^2. All treatments were initiated on May 29th and subsequent applications were made at 7 or 14-day intervals. Number of dollar spot foci per plot and turfgrass quality (1-9, 9 being excellent, 6 acceptable, and 1 bare soil) were visually assessed every 2 weeks. Turf quality and disease severity were subjected to an analysis of variance and means separated using Fisher's LSD (P = 0.05). Results of disease severity and turfgrass quality ratings can be found in table 1 and 2, respectively.

RESULTS AND DISCUSSION

Dollar spot did not develop in the experimental plot until early July. All iron sulfate treatments reduced dollar spot severity when compared to the non-treated control. The 7-day spray interval resulted in better control of dollar spot when compared to the 14-day interval, regardless of rate or spray volume. Increasing the rate of iron sulfate resulted in better control of dollar spot regardless of spray interval or spray volume. Trends in changing the spray volume were less apparent but the two larger spray volumes (1.5 and 3.0 gal H2O/1000 ft2) typically resulted in slightly less dollar spot than the low spray volume. Some plant injury was observed in early September and was worse on plots that received the highest rates of iron sulfate at the highest frequency.

Table 1. Mean number of dollar spots per treatment at fairway height at the OJ Noer Turfgrass Research Facility in Madison, WI during 2019.

	Treatment	Rate	Application Interval	Water Volume	Dollar Spot Severity[a]		
					Jul 9	Aug 21	Sep 4
1	Non-treated control				22.1a	142.9a	200.8a
2	Iron Sulfate	3 oz/1000 ft2	7 day	0.75 gal/1000 ft2	4.4bcd	35.2b-f	47.8d-g
3	Iron Sulfate	3 oz/1000 ft2	7 day	1.5 gal/1000 ft2	21.7a	31.3c-f	65.0cde
4	Iron Sulfate	3 oz/1000 ft2	7 day	3.0 gal/ 1000 ft2	7.7a-d	26.0d-g	74.5bcd
5	Iron Sulfate	6 oz/1000 ft2	7 day	0.75 gal/1000 ft2	4.9bcd	15.6e-h	31.5e-i
6	Iron Sulfate	6 oz/1000 ft2	7 day	1.5 gal/1000 ft2	1.7d	10.2f-j	10.0f-i
7	Iron Sulfate	6 oz/1000 ft2	7 day	3.0 gal/ 1000 ft2	2.5cd	6.4g-j	2.0i
8	Iron Sulfate	12 oz/1000 ft2	7 day	0.75 gal/1000 ft2	0.6d	0.7ij	4.8hi
9	Iron Sulfate	12 oz/1000 ft2	7 day	1.5 gal/1000 ft2	1.1d	0.0j	0.0i
10	Iron Sulfate	12 oz/1000 ft2	7 day	3.0 gal/ 1000 ft2	2.7bcd	0.7ij	0.0i
11	Iron Sulfate	3 oz/1000 ft2	14 day	0.75 gal/1000 ft2	14.4abc	71.7b	65.0cde
12	Iron Sulfate	3 oz/1000 ft2	14 day	1.5 gal/1000 ft2	15.8ab	53.2bcd	53.8cde
13	Iron Sulfate	3 oz/1000 ft2	14 day	3.0 gal/ 1000 ft2	6.0a-d	63.9bc	94.0bc
14	Iron Sulfate	6 oz/1000 ft2	14 day	0.75 gal/1000 ft2	20.6a	29.3c-f	45.3d-h
15	Iron Sulfate	6 oz/1000 ft2	14 day	1.5 gal/1000 ft2	13.9abc	14.0e-i	27.8e-i
16	Iron Sulfate	6 oz/1000 ft2	14 day	3.0 gal/ 1000 ft2	13.8abc	24.2d-g	38.5d-i
17	Iron Sulfate	12 oz/1000 ft2	14 day	0.75 gal/1000 ft2	8.1a-d	35.5b-e	51.3def
18	Iron Sulfate	12 oz/1000 ft2	14 day	1.5 gal/1000 ft2	4.3bcd	2.5hij	8.3ghi
19	Iron Sulfate	12 oz/1000 ft2	14 day	3.0 gal/ 1000 ft2	2.8bcd	0.5j	0.0i
				LSD P=0.05	9.39	12.78	42.66

[a]Dollar spot rated as number of dollar spot infection centers. Means followed by the same letter do not significantly differ (P=.05, Fisher's LSD).

Table 2. Mean turfgrass quality per treatment at fairway height at the OJ Noer Turfgrass Research Facility in Madison, WI during 2019.

	Treatment	Rate	Application Interval	Water Volume	Turfgrass Quality[a]		
					Jul 9	Aug 21	Sep 4
1	Non-treated control				4.8e	4.0d	4.3f
2	Iron Sulfate	3 oz/1000 ft2	7 day	0.75 gal/1000 ft2	5.3cde	5.3bc	5.3de
3	Iron Sulfate	3 oz/1000 ft2	7 day	1.5 gal/1000 ft2	6.0a-d	5.0c	5.3de
4	Iron Sulfate	3 oz/1000 ft2	7 day	3.0 gal/ 1000 ft2	5.5cde	5.0c	5.3de
5	Iron Sulfate	6 oz/1000 ft2	7 day	0.75 gal/1000 ft2	5.5cde	5.5abc	5.3de
6	Iron Sulfate	6 oz/1000 ft2	7 day	1.5 gal/1000 ft2	7.0a	5.8abc	5.8bcd
7	Iron Sulfate	6 oz/1000 ft2	7 day	3.0 gal/ 1000 ft2	6.0a-d	6.0ab	6.3abc
8	Iron Sulfate	12 oz/1000 ft2	7 day	0.75 gal/1000 ft2	7.0a	5.8abc	6.8a
9	Iron Sulfate	12 oz/1000 ft2	7 day	1.5 gal/1000 ft2	6.3abc	5.8abc	6.5ab
10	Iron Sulfate	12 oz/1000 ft2	7 day	3.0 gal/ 1000 ft2	6.8ab	5.3bc	6.8a
11	Iron Sulfate	3 oz/1000 ft2	14 day	0.75 gal/1000 ft2	5.5cde	5.0c	4.8ef
12	Iron Sulfate	3 oz/1000 ft2	14 day	1.5 gal/1000 ft2	5.8b-e	5.0c	4.8ef
13	Iron Sulfate	3 oz/1000 ft2	14 day	3.0 gal/ 1000 ft2	5.3cde	5.0c	4.8ef
14	Iron Sulfate	6 oz/1000 ft2	14 day	0.75 gal/1000 ft2	5.3cde	5.5abc	5.3de
15	Iron Sulfate	6 oz/1000 ft2	14 day	1.5 gal/1000 ft2	5.5cde	5.5abc	5.8bcd
16	Iron Sulfate	6 oz/1000 ft2	14 day	3.0 gal/ 1000 ft2	5.0de	5.3bc	5.5cde
17	Iron Sulfate	12 oz/1000 ft2	14 day	0.75 gal/1000 ft2	6.0a-d	5.8abc	5.8bcd
18	Iron Sulfate	12 oz/1000 ft2	14 day	1.5 gal/1000 ft2	6.0a-d	6.3a	6.3abc
19	Iron Sulfate	12 oz/1000 ft2	14 day	3.0 gal/ 1000 ft2	6.3abc	6.0ab	6.5ab
				LSD P=0.05	1.06	0.83	0.76

[a]Turfgrass quality was rated visually on a 1 – 9 scale with 6 being acceptable. Means followed by the same letter do not significantly differ (P=.05, Fisher's LSD).