



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 CO₂ 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 ft². All treatments were initiated on May 17th 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 on the experimental area was limited in 2018 due to two significant flooding events in 2018. However, moderate disease pressure was still observed on the August 8th rating date, and 13 of the 18 treatments reduced dollar spot relative to the non-treated control. The most effective dollar spot suppression was observed with the 12 oz iron sulfate rates applied on a 7-day interval. Significant suppression was also observed with the 6 oz iron sulfate rates on a 7-day interval. Water volume did not appear to impact dollar spot suppression no matter the reapplication interval or iron sulfate rate. No treatment provided effective dollar spot suppression at the 14-day interval. The 12 fl oz iron sulfate rates did cause significant blackening of the turf for several days after the application, which may be undesirable depending on the superintendent.

Table 1. Mean number of dollar spots per treatment at fairway height at the OJ Noer Turfgrass Research Facility in Madison, WI during 2018.

| Treatment | Rate | Application Interval | Water Volume | Dollar Spot Severity ^a | | |
|-----------------------|----------------------------|----------------------|-------------------------------|-----------------------------------|---------|--------|
| | | | | Jul 12 | Aug 8 | Sept 7 |
| 1 Non-treated control | | | | 20.5a | 25.5ab | 1.8a |
| 2 Iron Sulfate | 3 oz/1000 ft ² | 7 day | 0.75 gal/1000 ft ² | 1.8a | 16.0a-d | 1.0a |
| 3 Iron Sulfate | 3 oz/1000 ft ² | 7 day | 1.5 gal/1000 ft ² | 0.3a | 10.8c-g | 0.0a |
| 4 Iron Sulfate | 3 oz/1000 ft ² | 7 day | 3.0 gal/ 1000 ft ² | 0.8a | 12.0c-g | 0.0a |
| 5 Iron Sulfate | 6 oz/1000 ft ² | 7 day | 0.75 gal/1000 ft ² | 1.8a | 4.5d-g | 0.0a |
| 6 Iron Sulfate | 6 oz/1000 ft ² | 7 day | 1.5 gal/1000 ft ² | 0.0a | 4.0d-g | 0.0a |
| 7 Iron Sulfate | 6 oz/1000 ft ² | 7 day | 3.0 gal/ 1000 ft ² | 1.8a | 8.5c-g | 0.0a |
| 8 Iron Sulfate | 12 oz/1000 ft ² | 7 day | 0.75 gal/1000 ft ² | 6.5a | 1.8fg | 0.0a |
| 9 Iron Sulfate | 12 oz/1000 ft ² | 7 day | 1.5 gal/1000 ft ² | 0.5a | 2.0efg | 0.0a |
| 10 Iron Sulfate | 12 oz/1000 ft ² | 7 day | 3.0 gal/ 1000 ft ² | 1.3a | 0.8g | 0.0a |
| 11 Iron Sulfate | 3 oz/1000 ft ² | 14 day | 0.75 gal/1000 ft ² | 2.8a | 18.5abc | 0.0a |
| 12 Iron Sulfate | 3 oz/1000 ft ² | 14 day | 1.5 gal/1000 ft ² | 1.0a | 26.0a | 0.0a |
| 13 Iron Sulfate | 3 oz/1000 ft ² | 14 day | 3.0 gal/ 1000 ft ² | 0.0a | 14.5a-e | 0.0a |
| 14 Iron Sulfate | 6 oz/1000 ft ² | 14 day | 0.75 gal/1000 ft ² | 2.0a | 11.5c-g | 0.0a |
| 15 Iron Sulfate | 6 oz/1000 ft ² | 14 day | 1.5 gal/1000 ft ² | 1.5a | 13.8a-f | 0.5a |
| 16 Iron Sulfate | 6 oz/1000 ft ² | 14 day | 3.0 gal/ 1000 ft ² | 0.8a | 8.8c-g | 0.0a |
| 17 Iron Sulfate | 12 oz/1000 ft ² | 14 day | 0.75 gal/1000 ft ² | 3.5a | 13.3b-g | 0.0a |
| 18 Iron Sulfate | 12 oz/1000 ft ² | 14 day | 1.5 gal/1000 ft ² | 2.0a | 6.0c-g | 0.0a |
| 19 Iron Sulfate | 12 oz/1000 ft ² | 14 day | 3.0 gal/ 1000 ft ² | 3.5a | 5.5d-g | 0.0a |
| LSD P=0.05 | | | | 12.23 | 12.55 | 1.33 |

^aDollar 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 2018.

| Treatment | Rate | Application Interval | Water Volume | Turfgrass Quality ^a | | | |
|------------|---------------------|----------------------------|--------------|--------------------------------|-------|--------|------|
| | | | | Jul 12 | Aug 8 | Sept 7 | |
| 1 | Non-treated control | | | 6.5ab | 5.0f | 6.5a | |
| 2 | Iron Sulfate | 3 oz/1000 ft ² | 7 day | 0.75 gal/1000 ft ² | 7.3a | 5.5def | 7.0a |
| 3 | Iron Sulfate | 3 oz/1000 ft ² | 7 day | 1.5 gal/1000 ft ² | 7.0ab | 5.3ef | 7.0a |
| 4 | Iron Sulfate | 3 oz/1000 ft ² | 7 day | 3.0 gal/ 1000 ft ² | 7.5a | 6.0bcd | 7.0a |
| 5 | Iron Sulfate | 6 oz/1000 ft ² | 7 day | 0.75 gal/1000 ft ² | 7.3a | 5.8cde | 7.0a |
| 6 | Iron Sulfate | 6 oz/1000 ft ² | 7 day | 1.5 gal/1000 ft ² | 6.8ab | 6.3abc | 7.0a |
| 7 | Iron Sulfate | 6 oz/1000 ft ² | 7 day | 3.0 gal/ 1000 ft ² | 7.0ab | 6.8a | 7.0a |
| 8 | Iron Sulfate | 12 oz/1000 ft ² | 7 day | 0.75 gal/1000 ft ² | 6.0bc | 6.5ab | 6.8a |
| 9 | Iron Sulfate | 12 oz/1000 ft ² | 7 day | 1.5 gal/1000 ft ² | 5.0c | 6.3abc | 6.8a |
| 10 | Iron Sulfate | 12 oz/1000 ft ² | 7 day | 3.0 gal/ 1000 ft ² | 6.0bc | 6.3abc | 7.0a |
| 11 | Iron Sulfate | 3 oz/1000 ft ² | 14 day | 0.75 gal/1000 ft ² | 6.8ab | 5.5def | 6.3a |
| 12 | Iron Sulfate | 3 oz/1000 ft ² | 14 day | 1.5 gal/1000 ft ² | 7.0ab | 5.0f | 7.0a |
| 13 | Iron Sulfate | 3 oz/1000 ft ² | 14 day | 3.0 gal/ 1000 ft ² | 7.3a | 5.3ef | 7.0a |
| 14 | Iron Sulfate | 6 oz/1000 ft ² | 14 day | 0.75 gal/1000 ft ² | 7.3a | 5.5def | 7.0a |
| 15 | Iron Sulfate | 6 oz/1000 ft ² | 14 day | 1.5 gal/1000 ft ² | 7.5a | 5.0f | 7.0a |
| 16 | Iron Sulfate | 6 oz/1000 ft ² | 14 day | 3.0 gal/ 1000 ft ² | 6.8ab | 5.8cde | 6.5a |
| 17 | Iron Sulfate | 12 oz/1000 ft ² | 14 day | 0.75 gal/1000 ft ² | 7.3a | 5.3ef | 6.8a |
| 18 | Iron Sulfate | 12 oz/1000 ft ² | 14 day | 1.5 gal/1000 ft ² | 7.3a | 5.8cde | 7.0a |
| 19 | Iron Sulfate | 12 oz/1000 ft ² | 14 day | 3.0 gal/ 1000 ft ² | 7.0ab | 5.8cde | 7.0a |
| LSD P=0.05 | | | | 1.14 | 0.69 | 0.56 | |

^aTurfgrass 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).