



Iron Sulfate and Urea Interactions for Dollar Spot Control

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OBJECTIVE

To determine how applications of iron sulfate interact with applications of urea 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 10 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 two XR Teejet AI 8004 VS nozzles. All treatments were agitated by hand and applied in the equivalent of 1.5 gallons of water per 1000 ft². All treatments were initiated on May 17th and subsequent applications were made at 7, 14, 28, or 42-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 pressure was very high during much of July and August, with non-treated controls averaging over 90 foci per plot on the July 12th rating date and 150 foci per plot on the August 8th rating date. On the August 8th rating date, 9 of the 14 treatments significantly reduced dollar spot relative to the non-treated control and iron sulfate applied alone at a 7-day interval provided the most effective dollar spot control. However, none of the treatments controlled dollar spot to an acceptable level for most golf courses on the August 8th rating date. Of particular surprise was the control failure observed with Emerald fungicide, which may indicate resistance to Emerald may be present at the research site.

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

Treatment	Rate	Application Interval	Application Code ^b	Dollar Spot Severity ^a		
				Jul 12	Aug 8	Sep 7
1 Non-treated control				92.5a	162.8abc	13.0a
2 Urea	0.1 lb N/1000ft ²	7 day	CDEFGHIJKLM-NOPQRTUV	51.8b	156.0abc	8.5a
3 Urea	0.2 lb N/1000ft ²	14 day	CEGIKMOQSU	42.8bc	139.8b-e	11.0a
4 Urea	0.2 lb N/1000ft ²	14 day	CEGIKMOQSU	24.5bcd	120.8b-e	12.8a
Emerald	0.18 oz/1000ft ²	28 day	CGKOS			
5 Urea	0.2 lb N/1000ft ²	14 day	CEGIKMOQSU	24.8bcd	94.5ef	22.5a
Emerald	0.18 oz/1000ft ²	42 day	CIOU			
6 Iron Sulfate	6 oz/1000ft ²	7 day	CDEFGHIJKLM-NOPQRTUV	3.0d	69.5f	2.5a
7 Iron Sulfate	6 oz/1000ft ²	14 day	CEGIKMOQSU	29.5bcd	168.3ab	5.3a
8 Iron Sulfate	6 oz/1000ft ²	14 day	CEGIKMOQSU	32.8bcd	147.5a-d	6.0a
Emerald	0.18 oz/1000ft ²	28 day	CGKOS			
9 Iron Sulfate	6 oz/1000ft ²	14 day	CEGIKMOQSU	13.8cd	155.8abc	2.0a
Emerald	0.18 oz/1000ft ²	42 day	CIOU			
10 Urea	0.1 lb N/1000ft ²	7 day	CDEFGHIJKLM-NOPQRTUV	7.5d	97.5ef	5.0a
Iron Sulfate	6 oz/1000ft ²					
11 Urea	0.2 lb N/1000ft ²	14 day	CDEFGHIJKLM-NOPQRTUV	25.8bcd	128.5b-e	7.3a
Iron Sulfate	6 oz/1000ft ²					
12 Urea	0.2 lb N/1000ft ²	14 day	CEGIKMOQSU	16.8cd	100.5def	6.3a
Iron Sulfate	6 oz/1000ft ²	14 day	CEGIKMOQSU			
Emerald	0.18 oz/1000ft ²	28 day	CGKOS			
13 Urea	0.2 lb N/1000ft ²	14 day	CEGIKMOQSU	10.3d	128.3b-e	0.0a
Iron Sulfate	6 oz/1000ft ²	14 day	CEGIKMOQSU			
Emerald	0.18 oz/1000ft ²	42 day	CIOU			
14 Emerald	0.18 oz/1000ft ²	28 day	CGKOS	23.3bcd	118.3c-f	13.3a
15 Emerald	0.18 oz/1000ft ²	42 day	CIOU	5.3d	195.5a	18.0a
LSD P=0.05				31.92	49.68	14.45

^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).

^bApplication Code C=May 17, D=May 23, E=May 31, F=June 5, G=June 12, H=June 19, I=June 28, J=July 3, K=July 10, L=July 17, M=July 27, N=July 31, O=Aug 9, P=Aug 14, Q=Aug 27, R=Aug 30, T=Sep 12, U=Sep 20, V=Sep 27

Table 2. Mean turfgrass quality per treatment at greens height at the OJ Noer Turfgrass Research Facility in Madison, WI during 2018.

Treatment	Rate	Application Interval	Application Code ^b	Turfgrass Quality ^a		
				Jul 12	Aug 8	Sep 7
1 Non-treated control				5.5cd	4.3de	6.8a
2 Urea	0.1 lb N/1000ft ²	7 day	CDEFGHIJKLM-NOPQRTUV	5.8bcd	4.3de	6.5a
3 Urea	0.2 lb N/1000ft ²	14 day	CEGIKMOQSU	5.8bcd	4.5cde	6.3a
4 Urea	0.2 lb N/1000ft ²	14 day	CEGIKMOQSU	5.5cd	5.0abc	7.0a
Emerald	0.18 oz/1000ft ²	28 day	CGKOS			
5 Urea	0.2 lb N/1000ft ²	14 day	CEGIKMOQSU	6.8abc	5.3ab	7.0a
Emerald	0.18 oz/1000ft ²	42 day	CIOU			
6 Iron Sulfate	6 oz/1000ft ²	7 day	CDEFGHIJKLM-NOPQRTUV	7.3a	5.5a	7.0a
7 Iron Sulfate	6 oz/1000ft ²	14 day	CEGIKMOQSU	5.8bcd	4.3de	6.5a
8 Iron Sulfate	6 oz/1000ft ²	14 day	CEGIKMOQSU	5.8bcd	4.5cde	7.0a
Emerald	0.18 oz/1000ft ²	28 day	CGKOS			
9 Iron Sulfate	6 oz/1000ft ²	14 day	CEGIKMOQSU	7.0ab	4.5cde	7.0a
Emerald	0.18 oz/1000ft ²	42 day	CIOU			
10 Urea	0.2 lb N/1000ft ²	7 day	CDEFGHIJKLM-NOPQRTUV	6.0a-d	5.3ab	6.8a
Iron Sulfate	6 oz/1000ft ²					
11 Urea	0.2 lb N/1000ft ²	14 day	CDEFGHIJKLM-NOPQRTUV	5.8bcd	4.3de	6.8a
Iron Sulfate	6 oz/1000ft ²					
12 Urea	0.2 lb N/1000ft ²	14 day	CEGIKMOQSU	5.0d	4.8bcd	7.0a
Iron Sulfate	6 oz/1000ft ²	14 day	CEGIKMOQSU			
Emerald	0.18 oz/1000ft ²	28 day	CGKOS			
13 Urea	0.2 lb N/1000ft ²	14 day	CEGIKMOQSU	6.0a-d	5.0abc	7.0a
Iron Sulfate	6 oz/1000ft ²	14 day	CEGIKMOQSU			
Emerald	0.18 oz/1000ft ²	42 day	CIOU			
14 Emerald	0.18 oz/1000ft ²	28 day	CGKOS	6.8abc	4.5cde	7.0a
15 Emerald	0.18 oz/1000ft ²	42 day	CIOU	7.0ab	4.0e	7.0a
LSD P=0.05				1.36	0.75	0.58

^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).

^bApplication Code C=May 17, D=May 23, E=May 31, F=June 5, G=June 12, H=June 19, I=June 28, J=July 3, K=July 10, L=July 17, M=July 27, N=July 31, O=Aug 9, P=Aug 14, Q=Aug 27, R=Aug 30, T=Sep 12, U=Sep 20, V=Sep 27