



Biopesticides for the Control of Dollar Spot on Putting Greens

Emma Buczkowski, Kurt Hockemeyer, and Paul Koch, Ph.D
Department of Plant Pathology
University of Wisconsin – Madison

OBJECTIVES

Determine efficacy of multiple biofungicides for their efficacy against dollar spot (*Sclerotinia homeocarpa*) and impact on turf quality on a golf course putting green.

MATERIALS AND METHODS

This study was conducted at the O.J. Noer Turfgrass Research and Education Facility in Madison, WI. The putting green stand is composed of creeping bentgrass (*Agrostis stolonifera* ‘Penncross’) and is maintained at a height of 0.125 inches. There are 10 individual 3 ft by 5 ft plots per replicate organized in a randomized block design with four replicates. Emerald is a synthetic fungicide and was included as a positive control. These treatments are applied using a CO₂ pressurized boom sprayer with two XR Teejet AI8004 nozzles at a pressure of 40 psi. All biopesticides are agitated by hand and applied at 1.5 gallons of water per 1000 ft². The initial treatment application was done on May 23rd, 2018 and all following applications were either made at 14 or 28 day intervals. Number of dollar spot infection centers, chlorophyll content, and turfgrass quality (1-9 scale, 9=excellent and 6=acceptable) measurements were taken immediately prior to biopesticide applications. The taken measurements were subjected to an analysis of variance and means separation test using Fisher’s LSD (P=0.05). Results can be found in tables 1, 2, and 3 below.

RESULTS AND DISCUSSION

Dollar spot pressure was high in 2018, in particular on the August 15th rating date. As expected, Emerald provided the most effective dollar spot suppression. Nortica and Serenade OPTI provided a statistical reduction in dollar spot relative to the non-treated control, though neither provided control that would be considered commercially acceptable. Both Nortica and Serenade OPTI contain strains of *Bacillus* bacteria. No biopesticide or biorational oil tested in this study is recommended for dollar spot suppression under high disease pressure.

Table 1. Mean dollar spot infection centers per trt on creeping bentgrass maintained at putting green height at the OJ Noer Turf Research Facility in Madison, WI during 2018.

Treatment	Application Rate	App Interval	App Dates ^b	Dollar Spot Infection Centers ^a		
				June 6	July 18	Aug 15
1	Non-treated control			5.3 bc	46.3 ab	127.3 ab
2	Emerald	0.18 oz/1000 ft ²	28 Day DHL	0.8 c	4.3 c	13.5 c
3	Nortica	(1 st) 12.9 oz/1000 ft ² (rest) 6.4 oz/1000 ft ²	28 Day D HL	6.5 bc	48.0 ab	88.3 b
4	Timorex gold	0.314 fl oz/1000 ft ²	14 Day DFHJLN	18.3 a	64.0 a	147.5 a
5	Double Nickel LC	4 fl oz/1000 ft ²	14 Day DFHJLN	9.5 abc	48.5 ab	133.0 ab
6	Rhapsody	10 fl oz/1000 ft ²	14 Day DFHJLN	12.8 ab	48.0 ab	105.0 ab
7	Civitas Pre-Mixed	8 fl oz/1000 ft ²	14 Day DFHJLN	5.0 bc	27.0 bc	105.3 ab
8	Actinovate AG Revolution	0.275 oz/1000 ft ² 6 fl oz/1000 ft ²	14 Day DFHJLN DHL	6.0 bc	37.3 ab	105.3 ab
9	Zio	1.84 oz/1000 ft ²	14 Day DFHJLN	3.0 bc	46.8 ab	91.0 ab
10	Serenade OPTI	0.459 oz/1000 ft ²	14 Day DFHJLN	5.8 bc	37.8 ab	83.0 b

^aMeans followed by the same letter do not significantly differ (P=.05, Fisher's LSD).

^bApplication dates: D=5/23, F=6/6, H=6/20, J=7/3, L=7/18, N=8/1

Table 2. Mean chlorophyll content per trt on creeping bentgrass maintained at putting green height at the OJ Noer Turfgrass Research Facility in Madison, WI during 2018.

Treatment	Application Rate	App Interval	App Dates ^b	Chlorophyll Content ^a		
				June 6	July 18	Aug 15
1	Non-treated control			233.3 ab	241.3 a	312.3 a
2	Emerald	0.18 oz/1000 ft ²	28 Day DHL	228.5 ab	265.8 a	315.3 a
3	Nortica	(1 st) 12.9 oz/1000 ft ² (rest) 6.4 oz/1000 ft ²	28 Day D HL	240.5 a	258.3 a	316.5 a
4	Timorex gold	0.314 fl oz/1000 ft ²	14 Day DFHJLN	224.3 ab	252.5 a	287.3 a
5	Double Nickel LC	4 fl oz/1000 ft ²	14 Day DFHJLN	230.5 ab	253.0 a	304.5 a
6	Rhapsody	10 fl oz/1000 ft ²	14 Day DFHJLN	229.5 ab	269.3 a	314.8 a
7	Civitas Pre-Mixed	8 fl oz/1000 ft ²	14 Day DFHJLN	231.8 ab	258.8 a	307.5 a
8	Actinovate AG Revolution	0.275 oz/1000 ft ² 6 fl oz/1000 ft ²	14 Day DFHJLN DHL	219.3 b	246.5 a	298.8 a
9	Zio	1.84 oz/1000 ft ²	14 Day DFHJLN	225.8 ab	252.3 a	305.5 a
10	Serenade OPTI	0.459 oz/1000 ft ²	14 Day DFHJLN	223.5 ab	256.0 a	302.3 a

^aMeans followed by the same letter do not significantly differ (P=.05, Fisher's LSD).

^bApplication dates: D=5/23, F=6/6, H=6/20, J=7/3, L=7/18, N=8/1

Table 3. Mean turfgrass quality per trt on creeping bentgrass maintained at putting green height at the OJ Noer Turfgrass Research Facility in Madison, WI during 2018.

Treatment	Application Rate	App Interval	App Dates ^b	Turfgrass Quality ^a			
				June 6	July 18	Aug 15	
1	Non-treated control			7.0 a	7.3 a	5.3 b	
2	Emerald	0.18 oz/1000 ft ²	28 Day	DHL	7.3 a	7.5 a	7.3 a
3	Nortica	(1 st) 12.9 oz/1000 ft ² (rest) 6.4 oz/1000 ft ²	28 Day	D HL	7.3 a	7.8 a	6.0 b
4	Timorex gold	0.314 fl oz/1000 ft ²	14 Day	DFHJLN	7.0 a	6.8 a	5.0 b
5	Double Nickel LC	4 fl oz/1000 ft ²	14 Day	DFHJLN	6.5 a	7.0 a	5.0 b
6	Rhapsody	10 fl oz/1000 ft ²	14 Day	DFHJLN	6.8 a	7.5 a	5.0 b
7	Civitas Pre-Mixed	8 fl oz/1000 ft ²	14 Day	DFHJLN	7.3 a	7.8 a	6.0 b
8	Actinovate AG Revolution	0.275 oz/1000 ft ² 6 fl oz/1000 ft ²	14 Day	DFHJLN DHL	6.8 a	7.3 a	5.3 b
9	Zio	1.837 oz/1000 ft ²	14 Day	DFHJLN	6.8 a	6.8 a	6.0 b
10	Serenade OPTI	0.459 oz/1000 ft ²	14 Day	DFHJLN	6.8 a	7.5 a	6.0 b

^aMeans followed by the same letter do not significantly differ (P=.05, Fisher's LSD).

^bApplication dates: D=5/23, F=6/6, H=6/20, J=7/3, L=7/18, N=8/1