

# Greens-height Creeping Bentgrass cv. Emerald Evaluation of Fungicides

## RFR-A1030

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### Introduction

Evaluations of 18 fungicide treatments for control of dollar spot and brown spot, as well as effect on turf quality, were conducted in green-height creeping bentgrass cv. Emerald, at the Iowa State University Horticulture Station, Ames, IA.

### Materials and Methods

Plots of creeping bentgrass (cv. Emerald) were maintained at 0.16-in. cutting height. On June 1, plots were inoculated with rye grain infested with *Sclerotinia homoeocarpa*. Fungicides, selected for activity against dollar spot, were applied using a backpack sprayer at 30 psi and a dilution rate of 5 gal/1,000 sq ft. The experimental design was a randomized complete block with four replications. All subplots measured 4 ft x 5 ft. Spray applications were initiated on June 7, except for treatments 18 and 19, which were initiated May 24. Re-applications were made at recommended intervals until August 17.

Periodic assessments of disease symptoms were made on July 2, 15, and 26, and August 18. Visual estimates of brown patch severity were made with a qualitative scale of 0–5, where 0 = no disease; 1 = 1–5 percent; 2 = 6–10 percent; 3 = 11–25 percent; 4 = 26–50 percent; 5 = > 50% plot symptomatic. Dollar spot was rated as percent plot displaying symptoms. A turf quality

assessment was made using a qualitative rating scale of 1 to 10 (1 = poorest, 10 = best, 6 = adequate). Data were analyzed using the GLM procedure in SAS, and mean separations were determined using Fisher's protected LSD at  $P \leq 0.05$ .

### Results and Discussion

Weather in central Iowa during July and August broke all-time records for rainfall, heat, and humidity, culminating in widespread flooding August 11 to 13.

Brown patch pressure was moderate to severe, and intensified as the season progressed, whereas dollar spot pressure peaked in late July and declined in August. There were significant differences among treatments in ability to suppress brown patch, and most of the tested products suppressed brown patch significantly ( $P \leq 0.05$ ) in comparison with the unsprayed check (Table 1).

Dollar spot pressure was light to moderate. Many treatments differed significantly from each other on July 2 and July 26 (Table 2).

Turf quality also varied significantly among treatments; there was a gradual decline in quality across the rating dates, but some treatments maintained acceptable quality despite the challenging weather conditions (Table 3). No conspicuous phytotoxicity symptoms were observed during the trial, although Treatment 11 subplots exhibited either a deeper green coloration or a slight browning on July 15 and 26.

### Acknowledgements

We thank Chris Blume and the Turfgrass Research Area crew for maintenance of turf.

Trt	Products and rates per 1,000 sq ft	Interval (days)	Brown patch severity 0-5 <sup>z</sup>			
			Jul 2	Jul 15	Jul 26	Aug 18
1	Unsprayed check.....	---	2.3 a <sup>x</sup>	3.3 a	4.8 a	5.0 a
2	BASF BAS 67300 (granular) 2.25 lb .....	28	0 d	0.5 de	0.5 d	0.3 f
3	BASF BAS 67300 (granular) 3.0 lb .....	28	0 d	0.8 c-e	0.8 d	1.0 c-f
4	BASF Insignia 20WG 0.9 oz + Trinity SC 1.0 fl oz.....	28	0.3 cd	0.8 c-e	0.5 d	0.5 ef
5	BASF Heritage G (granular) 3.0 lb .....	28	0.3 cd	0.5 de	1.3 cd	0.8 d-f
6	BASF 640 F SC 1.93 fl oz .....	14	1.0 bc	0.8 c-e	0.8 d	2.5 b-e
7	BASF 640 F SC 2.89 fl oz .....	14	1.0 bc	1.0 b-e	1.3 cd	4.3 ab
8	Bayer Reserve 4.8 SC 2.5 fl oz.....	14	1.0 bc	1.3 b-d	0.3 d	0.5 ef
	2 <sup>nd</sup> spray Reserve 4.8 SC 2.5 fl oz	14				
	3 <sup>rd</sup> spray Reserve 4.8 SC 2.5 fl oz	7				
	4 <sup>th</sup> spray Reserve 4.8 SC 2.5 fl oz	7				
	5 <sup>th</sup> spray Reserve 4.8 SC 2.5 fl oz	7				
	6 <sup>th</sup> spray Reserve 4.8 SC 2.5 fl oz	7				
9	Bayer Reserve 4.8 SC 3.2 fl oz.....	14	0.3 cd	0.8 c-e	0.3 d	1.8 c-f
10	Bayer Reserve 4.8 SC 3.6 fl oz.....	14	0 d	0.3 de	0 d	2.8 b-d
11	Bayer Concert EC 5.0 fl oz.....	14	0 d	0.3 de	0 d	1.0 c-f
12	Bayer Interface SC 3.0 fl oz.....	14	0 d	0 e	0 d	1.5 c-f
13	Bayer Interface SC 4.0 fl oz.....	14	0 d	0 e	0 d	0.3 f
14	Bayer Interface SC 5.0 fl oz.....	14	0 d	0.3 de	0.3 d	1.5 c-f
15	Bayer Iprodione Pro 2 SC 4.0 fl oz.....	14	1.8 b	1.8 bc	2.8 b	2.5 b-e
16	Bayer Emerald SG 0.13 oz.....	14	1.0 bc	2.0 b	2.5 bc	1.5 c-f
17	Bayer Honor GR 0.83 oz.....	14	0 d	0 e	0 d	1.3 c-f
	2 <sup>nd</sup> spray Honor GR 0.83 oz					
	3 <sup>rd</sup> spray Iprodione Pro 2 SC 4.0 fl oz					
	4 <sup>th</sup> spray Honor GR 0.83 oz					
	5 <sup>th</sup> spray Honor GR 0.83 oz					
18	Bayer Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.2 oz...	14	0.3 cd	0 e	0 d	3.0 a-c
	2 <sup>nd</sup> spray Chipco Signature 80WG 4.0 oz + Triton Flo SC 0.5 fl oz					
	3 <sup>rd</sup> spray Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.2 oz					
	4 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Reserve 4.8 SC 3.6 fl oz					
	5 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.2 oz					
	6 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Chipco 26 GT 4.0 oz					
	7 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Reserve 4.8 SC 3.6 fl oz					
19	Bayer Chipco Signature 80WG 4.0 oz + Tartan SC 1.5 fl oz.....	14	0 d	0 e	0 d	0.5 ef
	2 <sup>nd</sup> spray Chipco Signature 80WG 4.0 oz + Tartan SC 1.5 fl oz					
	3 <sup>rd</sup> spray Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.67 oz					
	4 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Reserve 4.8 SC 3.6 fl oz					
	5 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Reserve 4.8 SC 3.6 fl oz					
	6 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Tartan SC 1.5 fl oz					
	7 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.67 oz					
LSD (0.05)			0.90	1.04	1.44	2.23

<sup>x</sup>Means followed by the same letter are not significantly different within column according to Fisher's protected LSD at  $P \leq 0.05$ .

<sup>z</sup>Disease rating scale 0 = no disease; 1 = 1-5%; 2 = 6-10%; 3 = 11-25%; 4 = 26-50%; 5 = > 50% plot symptomatic.

Table 2. Dollar spot on greens ISU horticultural farm		Interval (days)	Dollar spot %			
			Jul 2	Jul 15	Jul 26	Aug 18
Trt	Products and rates per 1,000 sq ft					
1	Unsprayed check.....	---	5.0 a <sup>x</sup>	3.3 ab	2.5 bc	0.5 b
2	BASF BAS 67300 (granular) 2.25 lb .....	28	1.0 c-e	2.3 b	6.3 b	1.8 ab
3	BASF BAS 67300 (granular) 3.0 lb .....	28	0.5 de	1.0 b	2.8 bc	1.3 ab
4	BASF Insignia 20WG 0.9 oz + Trinity SC 1.0 fl oz.....	28	1.8 b-e	1.3 b	4.1 bc	1.3 ab
5	BASF Heritage G (granular) 3.0 lb .....	28	4.3 ab	6.8 a	16.3 a	0.8 b
6	BASF 640 F SC 1.93 fl oz .....	14	2.8 a-e	2.0 b	0.3 c	0 b
7	BASF 640 F SC 2.89 fl oz .....	14	1.3 c-e	0.5 b	0 c	0 b
8	Bayer Reserve 4.8 SC 2.5 fl oz.....	14	3.3 a-d	6.5 a	2.5 bc	0 b
	2 <sup>nd</sup> spray Reserve 4.8 SC 2.5 fl oz	14				
	3 <sup>rd</sup> spray Reserve 4.8 SC 2.5 fl oz	7				
	4 <sup>th</sup> spray Reserve 4.8 SC 2.5 fl oz	7				
	5 <sup>th</sup> spray Reserve 4.8 SC 2.5 fl oz	7				
	6 <sup>th</sup> spray Reserve 4.8 SC 2.5 fl oz	7				
9	Bayer Reserve 4.8 SC 3.2 fl oz.....	14	1.8 b-e	3.3 ab	1.0 bc	1.5 ab
10	Bayer Reserve 4.8 SC 3.6 fl oz.....	14	2.5 a-e	2.8 ab	0.5 bc	1.0 ab
11	Bayer Concert EC 5.0 fl oz.....	14	1.5 b-e	2.3 b	0.8 bc	0.3 b
12	Bayer Interface SC 3.0 fl oz.....	14	1.0 c-e	0.5 b	0 c	0 b
13	Bayer Interface SC 4.0 fl oz.....	14	1.3 c-e	0.5 b	0 c	0 b
14	Bayer Interface SC 5.0 fl oz.....	14	0 e	1.0 b	0 c	0.5 b
15	Bayer Iprodione Pro 2 SC 4.0 fl oz.....	14	3.5 a-c	2.0 b	0.5 bc	1.3 ab
16	Bayer Emerald SG 0.13 oz.....	14	0.3 e	0.3 b	0 c	0.3 b
17	Bayer Honor GR 0.83 oz.....	14	0 e	0 b	0 c	0 b
	2 <sup>nd</sup> spray Honor GR 0.83 oz					
	3 <sup>rd</sup> spray Iprodione Pro 2 SC 4.0 fl oz					
	4 <sup>th</sup> spray Honor GR 0.83 oz					
	5 <sup>th</sup> spray Honor GR 0.83 oz					
18	Bayer Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.2 oz	14	2.3 a-e	2.0 b	1.0 bc	3.8 a
	2 <sup>nd</sup> spray Chipco Signature 80WG 4.0 oz + Triton Flo SC 0.5 fl oz					
	3 <sup>rd</sup> spray Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.2 oz					
	4 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Reserve 4.8 SC 3.6 fl oz					
	5 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.2 oz					
	6 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Chipco 26 GT 4.0 oz					
	7 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Reserve 4.8 SC 3.6 fl oz					
19	Bayer Chipco Signature 80WG 4.0 oz + Tartan SC 1.5 fl oz.....	14	1.0 c-e	2.0 b	0.5 bc	0 b
	2 <sup>nd</sup> spray Chipco Signature 80WG 4.0 oz + Tartan SC 1.5 fl oz					
	3 <sup>rd</sup> spray Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.67 oz					
	4 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Reserve 4.8 SC 3.6 fl oz					
	5 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Reserve 4.8 SC 3.6 fl oz					
	6 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Tartan SC 1.5 fl oz					
	7 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.67 oz					
LSD (0.05)			2.79	4.01	5.86	2.87

<sup>x</sup>Means followed by the same letter are not significantly different within column according to Fisher's protected LSD at  $P \leq 0.05$ .

Table 3. Turf quality of greens at ISU horticultural research farm		Interval (days)	Quality rating 1-10 <sup>z</sup>			
			Jul 2	Jul 15	Jul 26	Aug 18
Trt	Products and rates per 1,000 sq ft					
1	Unsprayed check.....	---	5.0 e <sup>x</sup>	5.0 h	4.5 g	3.8 f
2	BASF BAS 67300 (granular) 2.25 lb .....	28	7.5 a-c	7.0 b-f	6.3 d-f	6.5 a-d
3	BASF BAS 67300 (granular) 3.0 lb.....	28	7.3 a-c	6.8 c-g	6.8 c-e	6.8 a-c
4	BASF Insignia 20WG 0.9 oz + Trinity SC 1.0 fl oz.....	28	7.3 a-c	7.0 b-f	7.0 b-e	6.8 a-c
				6.5 d-		
5	BASF Heritage G (granular) 3.0 lb .....	28	6.5 cd	g	5.3 fg	6.3 a-e
6	BASF 640 F SC 1.93 fl oz .....	14	6.5 cd	6.3 e-g	6.5 de	5.5 c-e
				6.5 d-		
7	BASF 640 F SC 2.89 fl oz .....	14	6.5 cd	g	6.5 de	5.0 ef
8	Bayer Reserve 4.8 SC 2.5 fl oz.....	14	6.5 cd	5.8 gh	6.8 c-e	7.3 a
	2 <sup>nd</sup> spray Reserve 4.8 SC 2.5 fl oz	14				
	3 <sup>rd</sup> spray Reserve 4.8 SC 2.5 fl oz	7				
	4 <sup>th</sup> spray Reserve 4.8 SC 2.5 fl oz	7				
	5 <sup>th</sup> spray Reserve 4.8 SC 2.5 fl oz	7				
	6 <sup>th</sup> spray Reserve 4.8 SC 2.5 fl oz	7				
9	Bayer Reserve 4.8 SC 3.2 fl oz.....	14	7.3 a-c	6.8 c-g	7.5 a-d	6.3 a-e
10	Bayer Reserve 4.8 SC 3.6 fl oz.....	14	7.5 a-c	7.3 b-e	7.5 a-d	5.5 c-e
11	Bayer Concert EC 5.0 fl oz.....	14	6.5 cd	5.8 gh	7.0 b-e	7.0 ab
12	Bayer Interface SC 3.0 fl oz.....	14	8.0 a	8.0 ab	8.0 ab	6.3 a-e
13	Bayer Interface SC 4.0 fl oz.....	14	7.5 a-c	8.5 a	8.0 ab	7.0 ab
14	Bayer Interface SC 5.0 fl oz.....	14	8.0 a	8.0 ab	7.8 a-c	6.5 a-d
15	Bayer Iprodione Pro 2 SC 4.0 fl oz.....	14	5.8 de	6.0 f-h	6.3 ef	5.3 de
			6.8 b-			
16	Bayer Emerald SG 0.13 oz.....	14	d	6.3 e-g	6.0 ef	5.8 b-e
17	Bayer Honor GR 0.83 oz.....	14	8.0 a	7.8 a-c	7.5 a-d	6.5 a-d
	2 <sup>nd</sup> spray Honor GR 0.83 oz					
	3 <sup>rd</sup> spray Iprodione Pro 2 SC 4.0 fl oz					
	4 <sup>th</sup> spray Honor GR 0.83 oz					
	5 <sup>th</sup> spray Honor GR 0.83 oz					
18	Bayer Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.2 oz	14	7.0 a-c	7.5 a-d	7.8 a-c	5.0 ef
	2 <sup>nd</sup> spray Chipco Signature 80WG 4.0 oz + Triton Flo SC 0.5 fl oz					
	3 <sup>rd</sup> spray Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.2 oz					
	4 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Reserve 4.8 SC 3.6 fl oz					
	5 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.2 oz					
	6 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Chipco 26 GT 4.0 oz					
	7 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Reserve 4.8 SC 3.6 fl oz					
19	Bayer Chipco Signature 80WG 4.0 oz + Tartan SC 1.5 fl oz.....	14	7.8 ab	7.3 b-e	8.5 a	6.8 a-c
	2 <sup>nd</sup> spray Chipco Signature 80WG 4.0 oz + Tartan SC 1.5 fl oz					
	3 <sup>rd</sup> spray Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.67 oz					
	4 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Reserve 4.8 SC 3.6 fl oz					
	5 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Reserve 4.8 SC 3.6 fl oz					
	6 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Tartan SC 1.5 fl oz					
	7 <sup>th</sup> spray Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5 WG 3.67 oz					
	oz					
LSD (0.05)			1.08	1.19	1.16	1.45

<sup>x</sup>Means followed by the same letter are not significantly different within column according to Fisher's protected LSD at  $P \leq 0.05$ .

<sup>z</sup>A turf quality assessment of 1 to 10 (1 = poorest, 10 = best, 6 = acceptable).