

# RUTGERS

New Jersey Agricultural  
Experiment Station

## **2008 Turfgrass Proceedings**

***The New Jersey Turfgrass Association***

In Cooperation with  
Rutgers Center for Turfgrass Science  
Rutgers Cooperative Extension



# **2008 RUTGERS TURFGRASS PROCEEDINGS**

of the

## **New Jersey Turfgrass Expo December 9-11, 2008 Trump Taj Mahal Atlantic City, New Jersey**

The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. Through this forum, these professionals also reach a more general audience, which includes the public.

This publication includes lecture notes of papers presented at the 2008 New Jersey Turfgrass Expo. Publication of these lectures provides a readily avail-

able source of information covering a wide range of topics and includes technical and popular presentations of importance to the turfgrass industry.

This proceedings also includes research papers that contain original research findings and reviews of selected subjects in turfgrass science. These papers are presented primarily to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

Special thanks are given to those who have submitted papers for this proceedings, to the New Jersey Turfgrass Association for financial assistance, and to Barbara Fitzgerald, Marlene Karasik, and Ann Diglio for administrative and secretarial support.

Dr. Ann Brooks Gould, Editor  
Dr. Bruce B. Clarke, Coordinator

## EFFICACY OF SELECTED FUNGICIDES AND BIORATIONAL PRODUCTS FOR THE CONTROL OF DOLLAR SPOT ON A CREEPING BENTGRASS FAIRWAY, 2008

Bruce B. Clarke, Pradip R. Majumdar, Dennis Fitzgerald, J. P. Chung Yew, Alison Burnett, Mark Peacos, Sawan Gunasekera, Tracy J. Lawson, Katherine E. Clarke, William K. Dickson, and Joseph B. Clark<sup>1</sup>

Fungicides were evaluated in 2008 for their ability to control dollar spot (caused by *Sclerotinia homoeocarpa*) at the Rutgers Turf Research Farm in North Brunswick, NJ on creeping bentgrass (*Agrostis stolonifera*) maintained under golf course fairway conditions. Turf was established September 1996 on a Nixon loam with a pH of 6.0. Mowing was performed three times weekly at a height of 0.375 inches with clippings collected. The site was irrigated as needed to prevent drought stress.

Fertilizer was applied as 20-0-0 (0.15 lb nitrogen (N)/1000 ft<sup>2</sup>) and 46-0-0 (0.5 lb N/1000 ft<sup>2</sup>) on 27 April, 34-0-0 (0.5 lb N/1000 ft<sup>2</sup>) on 7 May and 26 August, and 20-20-20 (0.2 lb N/1000 ft<sup>2</sup>) on 25 July. Dimension 2EW (12 fl oz/A) was applied on 1 May and 26 June for pre-emergence weed control. ProStar 70W (2.9 oz/1000 ft<sup>2</sup>) was applied on 15 July to suppress brown patch (caused by *Rhizoctonia solani*). Localized dry spots were suppressed with the wetting agent Tricure 100LC (6.0 oz/1000 ft<sup>2</sup>) on 8 May, 10 June, 12 July, and 2 August. Insect pests were controlled with Telstar GC 0.67F (0.25 oz/1000 ft<sup>2</sup>) on 8 July. Plots were 3 x 5 ft and were arranged in a randomized complete block with four replications.

Fungicides were applied in water equivalent to 1.9 gal/1000 ft<sup>2</sup> with a CO<sub>2</sub> powered sprayer at 30 psi using TeeJet 8003VS flat fan nozzles. Treatments (trt) were initiated on 21 May when environmental conditions were conducive to dollar spot development. Fungicides were reapplied at the appropriate intervals as indicated in Tables 1A, 1B, and 1C. Turf was visually evaluated for number of dollar spot infection centers per plot on 9 and 19 June, 1, 11, and 21 July, 1, 11, 21, and 29 August, and 11 and 22

September, and for percent turf area infested with copper spot (caused by *Gloeocercospora sorghii*) on 11 and 21 August. Turf quality was rated on 20 August using a 1 to 9 scale, where 9 = best turf quality and 5 = acceptable quality. No phytotoxicity was observed during the study period. Data were subjected to analysis of variance and means were separated using the Waller-Duncan *k*-ratio *t*-test (*k* = 100).

A natural infestation of dollar spot was first observed on 3 June and became uniform throughout the study by 9 June (Table 1A). The disease progressed gradually during the study period peaking at 71 lesion centers per plot on 11 September on untreated turf (Tables 1A and 1B). This was considered a moderate level of dollar spot infestation and thus a good evaluation of the ability of a product to control this disease under commercial golf course fairway conditions. Less than 10 infection centers per plot represented an acceptable level of disease control for this study.

All entries in this study provided adequate dollar spot protection during the application period (21 May to 6 August) except for SARS-346 40WP @ 0.1 oz (trt 13), Sync 100XL (trt 26), Influx Color (trt 27), CX-24 F (trt 36), EXC3953 0.65GR (trt 40), Andersons Fungicide VII 0.59GR (trt 42), and CX 3205 EC (trt 44). All other treatments afforded good to excellent residual control of dollar spot (i.e., at least until 21 August; 22 to 68 days after the last application) except for SARS-351 20SC 0.5 fl oz every 28 days (trt 21), EXC3951 0.65GR (trt 39), and Daconil Ultrex 82.5WDG @ 3.2 oz every 14 days (trt 54), which did not adequately protect turf from the dollar spot epidemic after 11 August.

---

<sup>1</sup>Extension Specialist in Turfgrass Pathology, Senior Laboratory Technician, Research Assistant, Research Assistant, Graduate Assistant, Senior Greenhouse and Field Technician, Research Assistant, Principal Laboratory Technician, Research Assistant, Turfgrass Research Farm Supervisor, and Principal Laboratory Technician, respectively, New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey, New Brunswick, NJ 08901-8520.

Season-long control of dollar spot (21 May to 22 September) was only afforded to turf treated with RU192514D-08 EC (trts 1, 2), RU192514J-08 EC @ 0.79 fl oz (trt 5) or 1.57 fl oz (trt 6), RU192514J-08 EC @ 0.79 fl oz + RU192514B-08 ME @ 0.50 fl oz (trt 8), Emerald 70WG @ 0.13 oz every 14 days (trt 28) or @ 0.18 oz every 21 days (trt 29), RU21196A-08 SC @ 0.21 fl oz (trt 45) or 0.32 fl oz (trt 46), RU21196A-08 SC + RU21196B-08 SC (trts 47 to 50), RU21196A-08 SC + RU21196C-08 SC (trts 51, 52). Curalan 50EG (trt 37) and Curalan 50EG + HM02101 44L (trt 38) applications, which were initiated on 2 July, provided excellent curative control of dollar spot from 11 July through 29 August (37 days after the last application). Pegasus 6L (trt 62), Daconil Weatherstik 6F (trt 65), and Daconil Ultrex 82.5WDG @ 1.8 oz (trt 66) were applied on 21 August and 4 September and provided acceptable disease control through the end of the study (22 September, 18 days after the last spray).

A natural outbreak of copper spot was observed in the study from mid- to late-August (Table 1C). On 11 August, compared to untreated turf (trt 60), copper spot severity was greater in turf treated with RU192514D-08 EC @ 1.26 fl oz (trt 2) and was

equivalent in plots treated with RU192514D-08 EC @ 0.63 fl oz (trt 1), SARS-346 40WP @ 0.1 oz (trt 13), Influx Color (trt 27), Emerald 70WG @ 0.13 oz (trt 28), and Emerald 70WG @ 0.18 oz every 21 days (trt 29) or every 28 days (trt 55). By 29 August, disease severity had intensified to 31% on untreated turf. Although no treatments enhanced disease and many entries reduced the severity of copper spot compared to untreated turf on that date, only the following treatments provided complete control: RU192514B-08 ME @ 1.0 fl oz (trt 10), Trinity 1.67SC @ 1.0 fl oz (trt 30), 26/36 39.3F (trt 32), EXC3951 0.65GR (trt 39), Headway 1.39EC (trt 41), RU21196A-08 SC + RU21196B-08 SC (trts 47 to 50), RU21196A-08 SC + RU21196C-08 SC (trts 51, 52), EXC4084 0.65GR (trt 53), Pegasus HPX 6F (trt 61), Pegasus 6L (trt 62), PEX 6015 82.5WDG (trt 63), Pegasus 82.5DF (trt 64), Daconil Weatherstik 6F (trt 65), and Daconil Ultrex 82.5WDG (trt 66).

Turf quality was acceptable (greater or equal to 5.0) for all entries in this study on 29 August (Table 1C) and was inversely associated with dollar spot severity.

Table 1A. Efficacy of selected fungicides and biorationals for the control of dollar spot on a creeping bentgrass fairway: Rutgers University, 2008.

Treatment	Rate per 1000 sq ft	Application Interval (days) <sup>2</sup>	Number of Lesion Centers per Plot <sup>1</sup>					
			9 June	19 June	1 July	11 July	21 July	1 Aug.
1 RU192514D-08 EC .....	0.63 fl oz	14	0.0 h	0.0 f	1.8 i-k	1.0 i	0.0 g	0.0 j
2 RU192514D-08 EC .....	1.26 fl oz	14	0.3 h	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j
3 RU192514J-08 EC .....	0.196 fl oz	14	0.5 gh	0.3 f	2.0 i-k	2.3 hi	1.3 fg	1.3 h-j
4 RU192514J-08 EC .....	0.393 fl oz	14	0.3 h	0.0 f	0.0 k	0.0 i	0.3 g	0.3 ij
5 RU192514J-08 EC .....	0.785 fl oz	14	0.0 h	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j
6 RU192514J-08 EC .....	1.57 fl oz	14	0.0 h	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j
7 RU192514J-08 EC .....	0.393 fl oz	14	0.0 h	0.0 f	0.0 k	0.0 i	0.5 fg	0.3 ij
+ RU192514B-08 ME .....	0.503 fl oz							
8 RU192514J-08 EC .....	0.785 fl oz	14	0.0 h	0.0 f	0.0 k	0.0 i	0.3 g	0.0 j
+ RU192514B-08 ME .....	0.503 fl oz							
9 RU192514B-08 ME .....	0.503 fl oz	14	0.0 h	0.0 f	0.8 i-k	1.0 i	2.0 fg	6.3 e-g
10 RU192514B-08 ME .....	1.01 fl oz	14	0.5 gh	0.0 f	0.5 jk	0.8 i	0.5 fg	4.5 e-i
11 Curalan 50EG .....	1.0 oz	21	0.0 h	0.0 f	0.5 jk	0.0 i	0.0 g	0.0 j
12 Curalan 50EG .....	1.0 oz	21	2.8 c-e	0.3 f	3.0 h-k	1.0 i	0.5 fg	0.0 j
+ HM021 44L .....	0.2 fl oz							
13 SARS-346 40WP .....	0.1 oz	21	0.8 gh	1.0 f	11.8 ef	8.0 ef	4.3 e-g	8.5 de
14 SARS-346 40WP .....	0.2 oz	21	0.8 gh	0.5 f	5.8 g-j	2.8 hi	1.0 fg	3.0 g-j
15 SARS-346 40WP .....	0.3 oz	21	0.5 gh	0.0 f	4.3 h-k	2.5 hi	0.8 fg	0.8 h-j
16 SARS-346 40WP .....	0.4 oz	21	0.0 h	0.0 f	3.0 h-k	1.8 hi	1.0 fg	0.3 ij
17 SARS-346 40WP .....	0.6 oz	21	0.0 h	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j
18 SARS-351 20SC .....	0.25 fl oz	14	0.0 h	0.0 f	0.0 k	0.0 i	0.0 g	1.0 h-j
19 SARS-351 20SC .....	0.5 fl oz	14	0.0 h	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j
20 SARS-351 20SC .....	0.5 fl oz	21	0.0 h	0.0 f	0.5 jk	0.3 i	0.3 g	0.5 h-j
21 SARS-351 20SC .....	0.5 fl oz	28	0.0 h	0.0 f	0.0 k	2.5 hi	2.5 e-g	0.3 ij
22 Banner MAXX 1.3ME .....	1.0 fl oz	21 <sup>3</sup>	0.0 h	0.0 f	4.5 h-k	1.0 i	0.0 g	0.0 j
23 Banner MAXX 1.3ME .....	1.0 fl oz	21 <sup>3</sup>	0.5 gh	0.3 f	5.3 g-k	1.0 i	0.0 g	0.0 j
+ Sync 100XL .....	0.16 fl oz							
24 Banner MAXX 1.3ME .....	1.0 fl oz	21 <sup>3</sup>	0.3 h	0.0 f	3.8 h-k	3.0 hi	2.8 e-g	1.5 h-j
+ Influx Color .....	1.27 fl oz							

305

(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft	Application Interval (days) <sup>2</sup>	Number of Lesion Centers per Plot <sup>1</sup>					
			9 June	19 June	1 July	11 July	21 July	1 Aug.
25 Banner MAXX 1.3ME.....1.0 fl oz								
+ Sync 100XL .....0.16 fl oz								
+ Influx Color .....1.27 fl oz		21 <sup>3</sup>	0.8 gh	0.5 f	8.0 f-h	3.5 g-i	2.5 e-g	0.0 j
26 Sync 100XL.....0.16 fl oz		21 <sup>3</sup>	2.0 e-g	7.3 cd	23.3 d	37.3 c	29.3 c	42.3 b
27 Influx Color .....1.27 fl oz		21 <sup>3</sup>	2.5 d-f	8.8 bc	31.5 a-c	38.0 c	33.0 bc	45.8 ab
28 Emerald 70WG ..... 0.13 oz		14	0.3 h	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j
29 Emerald 70WG ..... 0.18 oz		21	0.5 gh	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j
30 Trinity 1.67SC .....1.0 fl oz		14	0.3 h	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j
31 Trinity 1.67SC .....1.5 fl oz		21	0.0 h	0.0 f	3.0 h-k	0.0 i	0.0 g	0.5 h-j
32 26/36 39.3F.....4.0 fl oz		21	0.0 h	0.0 f	0.3 k	0.0 i	0.0 g	0.0 j
33 3336 Plus 19.4F.....4.0 fl oz								
+ CX-08 50WP..... 2.0 oz		21	0.0 h	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j
34 3336 Plus 19.4F.....3.0 fl oz								
+ CX-08 50WP..... 1.5 oz		21	0.0 h	0.0 f	0.3 k	0.0 i	0.3 g	0.5 h-j
35 CX-15 40WP..... 1.0 oz		21	0.0 h	0.0 f	0.0 k	0.0 i	0.0 g	1.0 h-j
36 CX-24 F.....5.5 fl oz		21	1.0 f-h	0.5 f	13.8 e	8.0 ef	6.8 e	7.5 d-f
37 Curalan 50EG ..... 1.0 oz		Cur 21 <sup>4</sup>	4.5 ab	1.0 f	11.5 ef	3.8 g-i	1.3 fg	0.0 j
38 Curalan 50EG ..... 1.0 oz								
+ HM0201 44L .....0.2 fl oz		Cur 21 <sup>4</sup>	4.3 a-c	0.5 f	10.0 e-g	2.0 hi	0.3 g	0.0 j
39 EXC3951 0.65GR ..... 64.0 oz		21 <sup>5</sup>	3.8 a-d	1.0 f	3.8 h-k	3.8 g-i	2.5 e-g	4.0 f-j
40 EXC3953 0.65GR ..... 64.0 oz		21 <sup>5</sup>	4.8 a	0.3 f	8.0 f-h	7.0 e-g	4.0 e-g	4.8 e-h
41 Headway 1.39EC.....1.5 fl oz		21	1.0 f-h	0.5 f	4.3 h-k	1.5 i	1.0 fg	0.0 j
42 Andersons Fungicide VII 0.59GR . 32.0 oz		21 <sup>5</sup>	2.8 c-e	3.8 e	13.8 e	18.8 d	13.8 d	11.3 d
43 Prophecy 0.72GR ..... 40.0 oz		21 <sup>5</sup>	0.3 h	0.3 f	6.0 g-i	5.5 f-h	4.0 e-g	2.8 g-j
44 CX 3205EC .....2.68 fl oz		7	3.0 b-e	6.3 d	27.8 cd	40.5 c	34.8 b	34.8 c
45 RU21196A-08 SC .....0.21 fl oz		14	0.0 h	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j
46 RU21196A-08 SC .....0.315 fl oz		14	0.0 h	0.0 f	4.8 g-k	0.0 i	0.0 g	0.0 j
47 RU21196A-08 SC .....0.21 fl oz								
+ RU21196B-08 SC .....0.252 fl oz		14	0.0 h	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j
48 RU21196A-08 SC .....0.262 fl oz								
+ RU21196B-08 SC .....0.315 fl oz		14	0.0 h	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j

(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft	Application Interval (days) <sup>2</sup>	Number of Lesion Centers per Plot <sup>1</sup>					
			9 June	19 June	1 July	11 July	21 July	1 Aug.
49 RU21196A-08 SC .....0.157 fl oz								
+ RU21196B-08 SC .....0.377 fl oz		14	0.0 h	0.0 f	1.5 i-k	0.0 i	0.0 g	0.0 j
50 RU21196A-08 SC .....0.21 fl oz								
+ RU21196B-08 SC .....0.503 fl oz		14	0.0 h	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j
51 RU21196A-08 SC .....0.21 fl oz								
+ RU21196C-08 SC .....0.5 fl oz		14	0.0 h	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j
52 RU21196A-08 SC .....0.21 fl oz								
+ RU21196C-08 SC .....1.0 fl oz		14	0.0 h	0.0 f	0.0 k	0.0 i	0.0 g	0.0 j
53 EXC4084 0.65G..... 64.0 oz		21 <sup>5</sup>	0.5 gh	0.0 f	8.3 f-h	9.8 e	4.8 ef	3.0 g-j
54 Daconil Ultrex 82.5WDG..... 3.2 oz		14	0.3 h	0.0 f	0.0 k	0.5 i	1.5 fg	2.8 g-j
55 Emerald 70WG ..... 0.18 oz		28	0.3 h	0.5 f	0.0 k	1.3 i	1.0 fg	0.5 h-j
56 Curalan 50EG ..... 1.0 oz		14	0.0 h	0.0 f	0.0 k	0.0 i	0.3 g	0.5 h-j
57 Untreated check.....—		—	4.3 a-c	10.8 ab	30.8 bc	48.8 a	36.3 ab	43.5 b
58 Untreated check.....—		—	3.8 a-d	9.3 bc	33.0 a-c	46.5 ab	33.5 bc	44.0 b
59 Untreated check.....—		—	4.8 a	12.8 a	36.8 a	47.0 ab	40.5 a	49.8 a
60 Untreated check.....—		—	4.3 a-c	11.8 a	35.5 ab	44.5 b	34.5 b	45.3 b
		INT <sup>6</sup>	DAT <sup>7</sup>	DAT	DAT	DAT	DAT	DAT
		7	5	1	6	2	5	2
		14	5	1	13	9	5	2
		21	19	7	20	9	19	9
		28	19	1	13	23	5	16

<sup>1</sup> Values are means of four replicates. Means followed by the same letter are not significantly different according to Waller-Duncan *k*-ratio *t*-test (*k*=100). No phytotoxicity was observed for this test.

(Continued)

Table 1A (continued).

---

- <sup>2</sup> Fungicides were applied on 21 May (all treatments except treatments 1 to 12, 36, 37, 38, 39, 40, and 53), 28 May (7-day treatment), 4 June (7- and 14-day treatments), 11 June (7- and 21-day treatments and initiated treatments 11, 12, 39, 40, and 53), 18 June (7-, 14-, and 28-day treatments and initiated treatments 1 to 10), 25 June (7- day treatment), 2 July (7-, 14-, and 21-day treatments and initiated curative treatments 37 and 38), 9 July (7- day treatment), 16 July (7-, 14-, and 28-day treatments, initiated treatment 36, and last application for treatments 1 to 10), 23 July (7- and 21-day treatments), 30 July (7- and 14-day treatments) and 6 August (7- day treatment). Daconil Ultrex 82.5WDG was applied @ 2.75 oz/1,000 sq ft to treatments 1 to 11, 12, 36, 37, 38, 39, 40, and 53 on 21 May and 7 June, and a third time to treatment 36 on 2 July to suppress dollar spot prior to the initiation of these entries.
- <sup>3</sup> Treatments 22 to 27 were applied in 1 gal water per 1,000 sq ft, whereas all other treatments in this trial were applied in 2 gal water per 1,000 sq ft.
- <sup>4</sup> Treatments 37 and 38 were applied on a curative basis on 2 July and then were repeated on 23 July.
- <sup>5</sup> Treatments 39, 40, 42, 43, and 53 were applied to dry foliage and then immediately irrigated with 0.5 gal of water per plot.
- <sup>6</sup> Spray interval in days.
- <sup>7</sup> Days after the last treatment.



Table 1B. Efficacy of selected fungicides and biorationals for the control of dollar spot on a creeping bentgrass fairway: Rutgers University, 2008.

Treatment	Rate per 1000 sq ft)	Application Schedule (days) <sup>2</sup>	Number of Lesion Centers per Plot <sup>1</sup>				
			11 Aug.	21 Aug.	29 Aug.	11 Sept.	22 Sept.
1 RU192514D-08 EC.....	0.63 fl oz	14	0.0 g	0.0 n	0.0 t	4.3 s-u	9.3 p-s
2 RU192514D-08 EC.....	1.26 fl oz	14	0.0 g	0.0 n	0.0 t	2.5 tu	9.5 p-s
3 RU192514J-08 EC.....	0.196 fl oz	14	0.5 g	1.3 n	2.8 n-t	14.8 p-s	21.3 l-p
4 RU192514J-08 EC.....	0.393 fl oz	14	0.0 g	0.0 n	0.8 r-t	13.0 q-t	23.8 k-o
5 RU192514J-08 EC.....	0.785 fl oz	14	0.0 g	0.0 n	0.0 t	2.0 tu	5.8 rs
6 RU192514J-08 EC.....	1.57 fl oz	14	0.0 g	0.0 n	0.0 t	0.0 u	2.3 s
7 RU192514J-08 EC.....	0.393 fl oz						
+ RU192514B-08 ME.....	0.503 fl oz	14	3.8 e-g	0.0 n	1.5 p-t	14.5 p-s	19.5 m-r
8 RU192514J-08 EC.....	0.785 fl oz						
+ RU192514B-08 ME.....	0.503 fl oz	14	0.5 g	0.0 n	0.5 st	4.5 s-u	9.3 p-s
9 RU192514B-08 ME.....	0.503 fl oz	14	0.3 g	5.3 h-n	8.3 i-n	38.8 gh	34.5 g-l
10 RU192514B-08 ME.....	1.01 fl oz	14	0.0 g	0.5 n	4.3 m-t	30.0 h-m	31.3 h-m
11 Curalan 50EG.....	1.0 oz	21	0.3 g	4.0 j-n	12.3 f-j	40.0 f-h	39.5 f-k
12 Curalan 50EG.....	1.0 oz						
+ HM021 44L.....	0.2 fl oz	21	1.3 g	4.5 i-n	10.3 g-l	32.5 g-k	37.5 g-l
13 SARS-346 40WP.....	0.1 oz	21	11.0 d	20.3 de	26.5 c	68.8 c	60.0 a-c
14 SARS-346 40WP.....	0.2 oz	21	2.5 fg	9.0 g-j	18.8 de	50.0 d-f	56.8 b-d
15 SARS-346 40WP.....	0.3 oz	21	0.8 g	4.5 i-n	13.5 e-i	34.5 g-j	46.3 c-g
16 SARS-346 40WP.....	0.4 oz	21	0.0 g	0.3 n	6.5 j-r	23.8 j-q	28.0 j-m
17 SARS-346 40WP.....	0.6 oz	21	0.0 g	0.0 n	4.0 m-t	22.0 k-q	26.0 j-n
18 SARS-351 20SC.....	0.25 fl oz	14	0.0 g	0.0 n	1.5 p-t	14.3 p-s	32.5 g-m
19 SARS-351 20SC.....	0.5 fl oz	14	0.5 g	0.0 n	0.0 t	17.0 n-r	36.0 f-k
20 SARS-351 20SC.....	0.5 fl oz	21	0.0 g	2.5 l-n	7.3 j-p	24.3 i-p	33.8 g-l
21 SARS-351 20SC.....	0.5 fl oz	28	2.8 fg	10.3 gh	17.8 d-f	40.0 f-h	52.3 b-e
22 Banner MAXX 1.3ME.....	1.0 fl oz	21 <sup>3</sup>	0.8 g	2.0 n	7.0 j-p	22.5 k-q	42.5 e-i
23 Banner MAXX 1.3ME.....	1.0 fl oz						
+ Sync 100XL.....	0.16 fl oz	21 <sup>3</sup>	0.0 g	0.0 n	5.3 k-t	20.0 m-r	33.8 g-l
24 Banner MAXX 1.3ME.....	1.0 fl oz						
+ Influx Color.....	1.27 fl oz	21 <sup>3</sup>	3.3 fg	7.8 g-l	15.8 e-g	38.8 gh	38.0 f-j

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft)	Application Schedule (days) <sup>2</sup>	Number of Lesion Centers per Plot <sup>1</sup>					
			11 Aug.	21 Aug.	29 Aug.	11 Sept.	22 Sept.	
25 Banner MAXX 1.3ME.....1.0 fl oz								
+ Sync 100XL .....0.16 fl oz								
+ Influx Color .....1.27 fl oz		21 <sup>3</sup>	0.0 g	3.0 k-n	7.5 j-o	31.3 h-l	37.5 f-k	
26 Sync 100XL .....0.16 fl oz		21 <sup>3</sup>	56.5 a	55.3 ab	55.5 a	82.5 b	45.0 d-h	
27 Influx Color .....1.27 fl oz		21 <sup>3</sup>	59.8 a	58.5 a	57.3 a	77.0 bc	28.8 i-m	
28 Emerald 70WG ..... 0.13 oz		14	0.0 g	0.0 n	0.0 t	0.5 u	5.3 s	
29 Emerald 70WG ..... 0.18 oz		21	0.0 g	0.0 n	0.0 t	1.8 u	5.0 s	
30 Trinity 1.67SC .....1.0 fl oz		14	0.0 g	0.0 n	0.3 st	9.0 r-u	22.0 l-p	
31 Trinity 1.67SC .....1.5 fl oz		21	0.0 g	0.0 n	1.0 q-t	20.0 m-r	27.5 j-m	
32 26/36 39.3F.....4.0 fl oz		21	0.0 g	0.5 n	2.5 n-t	19.5 m-r	32.5 g-m	
33 3336 Plus 19.4F.....4.0 fl oz								
+ CX-08 50WP..... 2.0 oz		21	0.0 g	0.0 n	3.0 n-t	21.3 l-q	36.3 f-k	
34 3336 Plus 19.4F.....3.0 fl oz								
+ CX-08 50WP..... 1.5 oz		21	0.0 g	0.5 n	2.3 o-t	16.3 o-r	28.3 j-m	
35 CX-15 40WP..... 1.0 oz		21	0.0 g	0.0 n	3.5 m-t	18.8 n-r	27.5 j-m	
36 CX-24 F.....5.5 fl oz		21	11.8 d	16.0 ef	23.0 cd	57.5 d	61.3 ab	
37 Curalan 50EG ..... 1.0 oz		Cur 21 <sup>4</sup>	0.0 g	1.5 n	7.3 j-p	30.0 h-m	32.5 g-m	
38 Curalan 50EG ..... 1.0 oz								
+ HM0201 44L .....0.2 fl oz		Cur 21 <sup>4</sup>	0.0 g	0.0 n	7.8 i-o	38.8 gh	46.3 c-g	
39 EXC3951 0.65GR ..... 64.0 oz		21 <sup>5</sup>	8.3 de	12.5 fg	22.5 cd	42.5 e-g	36.3 f-k	
40 EXC3953 0.65GR ..... 64.0 oz		21 <sup>5</sup>	11.8 d	21.8 d	33.0 b	52.5 de	28.0 j-m	
41 Headway 1.39EC.....1.5 fl oz		21	1.0 g	2.0 n	6.0 k-s	21.3 l-q	45.0 d-h	
42 Andersons Fungicide VII 0.59GR . 32.0 oz		21 <sup>5</sup>	6.5 ef	7.8 g-l	15.0 e-h	35.0 g-i	37.5 g-l	
43 Prophecy 0.72GR ..... 40.0 oz		21 <sup>5</sup>	4.0 e-g	2.3 mn	9.3 h-m	26.3 i-o	33.8 g-l	
44 CX 3205EC .....2.68 fl oz		7	30.8 c	28.8 c	37.5 b	100.0 a	70.8 a	
45 RU21196A-08 SC .....0.21 fl oz		14	0.0 g	0.0 n	0.0 t	1.3 u	7.3 q-s	
46 RU21196A-08 SC .....0.315 fl oz		14	0.0 g	0.0 n	0.0 t	0.0 u	7.5 q-s	
47 RU21196A-08 SC .....0.21 fl oz								
+ RU21196B-08 SC .....0.252 fl oz		14	0.0 g	0.0 n	0.0 t	0.5 u	7.5 q-s	
48 RU21196A-08 SC .....0.262 fl oz								
+ RU21196B-08 SC .....0.315 fl oz		14	0.0 g	0.0 n	0.0 t	1.3 u	6.3 rs	

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft)	Application Schedule (days) <sup>2</sup>	Number of Lesion Centers per Plot <sup>1</sup>				
			11 Aug.	21 Aug.	29 Aug.	11 Sept.	22 Sept.
49 RU21196A-08 SC .....0.157 fl oz							
+ RU21196B-08 SC .....0.377 fl oz		14	0.0 g	0.0 n	0.0 t	2.0 tu	7.5 q-s
50 RU21196A-08 SC .....0.21 fl oz							
+ RU21196B-08 SC .....0.503 fl oz		14	0.0 g	0.0 n	0.0 t	0.0 u	4.5 s
51 RU21196A-08 SC .....0.21 fl oz							
+ RU21196C-08 SC .....0.5 fl oz		14	0.0 g	0.0 n	0.0 t	1.3 u	5.0 s
52 RU21196A-08 SC .....0.21 fl oz							
+ RU21196C-08 SC .....1.0 fl oz		14	0.0 g	0.0 n	0.0 t	2.5 tu	9.0 p-s
53 EXC4084 0.65G..... 64.0 oz		21 <sup>5</sup>	3.0 fg	4.0 j-n	10.8 g-k	27.5 i-n	48.8 b-f
54 Daconil Ultrex 82.5WDG..... 3.2 oz		14	2.0 fg	11.3 fg	22.5 cd	52.5 de	62.5 ab
55 Emerald 70WG ..... 0.18 oz		28	1.3 g	4.0 j-n	6.8 j-q	17.5 n-r	27.5 j-m
56 Curalan 50EG ..... 1.0 oz		14	0.0 g	0.0 n	3.5 m-t	21.3 l-q	49.3 b-f
57 Untreated check.....— <sup>6</sup>							
58 Untreated check.....— <sup>6</sup>							
59 Untreated check.....— <sup>6</sup>							
60 Untreated check.....—		—	45.8 b	50.3 b	53.0 a	71.3 c	55.0 b-d
61 Pegasus HPX.....2.0 fl oz		14	— <sup>6</sup>	9.5 g-i	5.5 k-t	0.0 u	11.8 o-s
62 Pegasus 6L.....2.0 fl oz		14	— <sup>6</sup>	8.8 g-j	4.5 l-t	0.5 u	9.3 p-s
63 PEX6015 82.5WDG..... 1.8 oz		14	— <sup>6</sup>	8.3 g-j	4.3 m-t	0.0 u	13.0 n-s
64 Pegasus 82.5DF ..... 1.8 oz		14	— <sup>6</sup>	8.5 g-j	5.0 k-t	1.5 u	13.0 n-s
65 Daconil WeatherStik 6F .....2.0 fl oz		14	— <sup>6</sup>	7.5 g-m	4.3 m-t	0.0 u	5.0 s
66 Daconil Ultrex 82.5WDG..... 1.8 oz		14	— <sup>6</sup>	8.8 g-j	7.8 i-o	0.0 u	9.0 p-s
		INT <sup>7</sup>	DAT <sup>8</sup>	DAT	DAT	DAT	DAT
		7	5	15	23	36	47
		14	12	22	30	43	54
		21	19	29	37	50	61
		28	26	36	44	57	68
		— <sup>6</sup>	—	—	8	7	18

(Continued)

Table 1B (continued).

---

- <sup>1</sup> Values are means of four replicates. Means followed by the same letter are not significantly different according to Waller-Duncan *k*-ratio *t*-test (*k*=100). No phytotoxicity was observed for this test.
- <sup>2</sup> Fungicides were applied on 21 May (all treatments except treatments 1 to 12, 36, 37, 38, 39, 40, and 53), 28 May (7-day treatment), 4 June (7- and 14-day treatments), 11 June (7- and 21-day treatments and initiated treatments 11, 12, 39, 40, and 53), 18 June (7-, 14-, and 28-day treatments and initiated treatments 1 to 10), 25 June (7- day treatment), 2 July (7-, 14-, and 21-day treatments and initiated curative treatments 37 and 38), 9 July (7- day treatment), 16 July (7-, 14-, and 28-day treatments, initiated treatment 36, and last application for treatments 1 to 10), 23 July (7- and 21-day treatments), 30 July (7- and 14-day treatments) and 6 August (7- day treatment). Daconil Ultrex 82.5WDG was applied @ 2.75 oz/1,000 sq ft to treatments 1 to 11, 12, 36, 37, 38, 39, 40, and 53 on 21 May and 7 June, and a third time to treatment 36 on 2 July to suppress dollar spot prior to the initiation of these entries.
- <sup>3</sup> Treatments 22 to 27 were applied in 1 gal water per 1,000 sq ft whereas all other treatments in this trial were applied in 2 gal water per 1,000 sq ft.
- <sup>4</sup> Treatments 37 and 38 were applied on a curative basis on 2 July and then were repeated on 23 July.
- <sup>5</sup> Treatments 39, 40, 42, 43, and 53 were applied to dry foliage and then immediately irrigated with 0.5 gal of water per plot.
- <sup>6</sup> Individual replicate plots of treatments 57, 58, and 59 were split in half on 7 August (2.5 x 3 ft subplots designated 61, 62, 63, 64, 65, and 66) and treated with Daconil Ultrex 82.5WDG @ 5.0 oz per 1,000 sq ft to arrest the current dollar spot infestation. No data was taken for treatments 61 to 66 during the recovery period (7 to 21 August). Treatments 61 to 66 were treated with the products and rates described in this table on 21 August and 4 September.
- <sup>7</sup> Spray interval in days.
- <sup>8</sup> Days after the last treatment.

Table 1C. Efficacy of selected fungicides and biorationals for the control of dollar spot on a creeping bentgrass fairway: Rutgers University, 2008.

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>4</sup>	Copper Spot <sup>1,2</sup>		Turf Quality <sup>3</sup>
			11 Aug.	21 Aug.	29 Aug.
1 RU192514D-08 EC .....	0.63 fl oz	14	9.8 ab	12.5 b-h	6.3 g-j
2 RU192514D-08 EC .....	1.26 fl oz	14	10.8 a	18.3 b-d	7.8 b-d
3 RU192514J-08 EC .....	0.196 fl oz	14	3.5 d-g	19.8 b	6.8 e-h
4 RU192514J-08 EC .....	0.393 fl oz	14	0.8 fg	18.0 b-d	7.0 d-g
5 RU192514J-08 EC .....	0.785 fl oz	14	0.0 g	16.8 b-f	7.5 c-e
6 RU192514J-08 EC .....	1.57 fl oz	14	0.0 g	12.5 b-h	7.5 c-e
7 RU192514J-08 EC .....	0.393 fl oz	14	0.0 g	6.3 g-m	7.8 b-d
+ RU192514B-08 ME .....	0.503 fl oz				
8 RU192514J-08 EC .....	0.785 fl oz	14	0.0 g	5.0 h-m	8.0 bc
+ RU192514B-08 ME .....	0.503 fl oz				
9 RU192514B-08 ME .....	0.503 fl oz	14	0.0 g	1.8 k-m	6.0 h-k
10 RU192514B-08 ME .....	1.01 fl oz	14	0.0 g	0.0 m	6.8 e-h
11 Curalan 50EG .....	1.0 oz	21	3.3 e-g	12.0 b-i	6.5 f-i
12 Curalan 50EG .....	1.0 oz	21	2.3 fg	15.0 b-g	6.3 g-j
+ HM021 44L .....	0.2 fl oz				
13 SARS-346 40WP .....	0.1 oz	21	4.3 c-f	10.0 c-k	5.5 j-l
14 SARS-346 40WP .....	0.2 oz	21	0.0 g	8.8 e-m	5.8 i-l
15 SARS-346 40WP .....	0.3 oz	21	0.0 g	8.3 f-m	6.0 h-k
16 SARS-346 40WP .....	0.4 oz	21	0.8 fg	5.0 h-m	6.5 f-i
17 SARS-346 40WP .....	0.6 oz	21	0.0 g	6.3 g-m	6.8 e-h
18 SARS-351 20SC .....	0.25 fl oz	14	0.0 g	5.0 h-m	6.3 g-j
19 SARS-351 20SC .....	0.5 fl oz	14	0.0 g	2.5 j-m	7.3 c-f
20 SARS-351 20SC .....	0.5 fl oz	21	2.3 fg	18.0 b-d	7.0 d-g
21 SARS-351 20SC .....	0.5 fl oz	28	2.0 fg	18.8 bc	7.3 c-f
22 Banner MAXX 1.3ME .....	1.0 fl oz	21 <sup>5</sup>	0.0 g	2.0 k-m	6.8 e-h
23 Banner MAXX 1.3ME .....	1.0 fl oz	21 <sup>5</sup>	0.0 g	2.5 j-m	7.5 c-e
+ Sync 100XL .....	0.16 fl oz				
24 Banner MAXX 1.3ME .....	1.0 fl oz	21 <sup>5</sup>	0.0 g	2.5 j-m	7.0 d-g
+ Influx Color .....	1.27 fl oz				

313

(Continued)

Table 1C (continued).

314

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>4</sup>	Copper Spot <sup>1,2</sup>		Turf Quality <sup>3</sup>
			11 Aug.	21 Aug.	29 Aug.
25 Banner MAXX 1.3ME.....	1.0 fl oz				
+ Sync 100XL .....	0.16 fl oz				
+ Influx Color .....	1.27 fl oz	21 <sup>5</sup>	0.0 g	2.5 j-m	7.0 d-g
26 Sync 100XL.....	0.16 fl oz	21 <sup>5</sup>	0.8 fg	6.3 g-m	5.0 l
27 Influx Color .....	1.27 fl oz	21 <sup>5</sup>	6.0 c-e	18.8 bc	5.5 j-l
28 Emerald 70WG .....	0.13 oz	14	4.3 c-f	16.3 b-f	7.5 c-e
29 Emerald 70WG .....	0.18 oz	21	3.5 d-g	17.5 b-e	7.0 d-g
30 Trinity 1.67SC .....	1.0 fl oz	14	0.0 g	0.0 m	6.5 f-i
31 Trinity 1.67SC .....	1.5 fl oz	21	0.0 g	0.8 lm	7.8 b-d
32 26/36 39.3F.....	4.0 fl oz	21	0.0 g	0.0 m	7.0 d-g
33 3336 Plus 19.4F.....	4.0 fl oz				
+ CX-08 50WP .....	2.0 oz	21	0.0 g	3.8 h-m	8.0 bc
34 3336 Plus 19.4F.....	3.0 fl oz				
+ CX-08 50WP .....	1.5 oz	21	0.0 g	9.5 d-l	7.0 d-g
35 CX-15 40WP .....	1.0 oz	21	0.0 g	12.5 b-h	6.3 g-j
36 CX-24 F.....	5.5 fl oz	21	0.0 g	17.5 b-e	6.3 g-j
37 Curalan 50EG .....	1.0 oz	Cur 21 <sup>6</sup>	1.3 fg	16.3 b-f	6.5 f-i
38 Curalan 50EG .....	1.0 oz				
+ HM0201 44L .....	0.2 fl oz	Cur 21 <sup>6</sup>	0.0 g	9.0 e-l	6.8 e-h
39 EXC3951 0.65GR .....	64.0 oz	21 <sup>7</sup>	0.0 g	0.0 m	8.5 ab
40 EXC3953 0.65GR .....	64.0 oz	21 <sup>7</sup>	0.0 g	11.3 b-j	9.0 a
41 Headway 1.39EC.....	1.5 fl oz	21	0.0 g	0.0 m	7.5 c-e
42 Andersons Fungicide VII 0.59GR .	32.0 oz	21 <sup>7</sup>	0.0 g	4.0 h-m	5.5 j-l
43 Prophecy 0.72GR .....	40.0 oz	21 <sup>7</sup>	0.0 g	1.3 k-m	6.8 e-h
44 CX 3205EC .....	2.68 fl oz	7	0.0 g	4.5 h-m	5.0 l
45 RU21196A-08 SC .....	0.21 fl oz	14	2.3 fg	18.8 bc	7.0 d-g
46 RU21196A-08 SC .....	0.315 fl oz	14	0.0 g	3.3 i-m	6.5 f-i
47 RU21196A-08 SC .....	0.21 fl oz				
+ RU21196B-08 SC .....	0.252 fl oz	14	0.0 g	0.0 m	7.3 c-f

(Continued)

Table 1C (continued).

315

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>4</sup>	Copper Spot <sup>1,2</sup>		Turf Quality <sup>3</sup>
			11 Aug.	21 Aug.	29 Aug.
48 RU21196A-08 SC .....0.262 fl oz + RU21196B-08 SC .....0.315 fl oz		14	0.0 g	0.0 m	7.0 d-g
49 RU21196A-08 SC .....0.157 fl oz + RU21196B-08 SC .....0.377 fl oz		14	0.0 g	0.0 m	7.0 d-g
50 RU21196A-08 SC .....0.21 fl oz + RU21196B-08 SC .....0.503 fl oz		14	0.0 g	0.0 m	6.8 e-h
51 RU21196A-08 SC .....0.21 fl oz + RU21196C-08 SC .....0.5 fl oz		14	0.0 g	0.0 m	7.0 d-g
52 RU21196A-08 SC .....0.21 fl oz + RU21196C-08 SC .....1.0 fl oz		14	0.0 g	0.0 m	7.5 c-e
53 EXC4084 0.65G..... 64.0 oz		21 <sup>7</sup>	0.0 g	0.0 m	7.8 b-d
54 Daconil Ultrex 82.5WDG..... 3.2 oz		14	0.0 g	6.3 g-m	7.5 c-e
55 Emerald 70WG ..... 0.18 oz		28	7.5 a-c	31.3 a	6.8 e-h
56 Curalan 50EG ..... 1.0 oz		14	0.0 g	8.3 f-m	7.3 c-f
57 Untreated check..... <sup>8</sup>		—	—	—	5.3 kl
58 Untreated check..... <sup>8</sup>		—	—	—	5.8 i-l
59 Untreated check..... <sup>8</sup>		—	—	—	5.3 kl
60 Untreated check..... <sup>8</sup>		—	7.0 b-d	37.5 a	5.0 l
61 Pegasus HPX.....2.0 fl oz		14 <sup>8</sup>	0.0 g	0.0 m	—
62 Pegasus 6L .....2.0 fl oz		14 <sup>8</sup>	0.0 g	0.0 m	—
63 PEX6015 82.5WDG ..... 1.8 oz		14 <sup>8</sup>	0.0 g	0.0 m	—
64 Pegasus 82.5DF ..... 1.8 oz		14 <sup>8</sup>	0.0 g	0.0 m	—
65 Daconil WeatherStik 6F .....2.0 fl oz		14 <sup>8</sup>	0.0 g	0.0 m	—
66 Daconil Ultrex 82.5WDG..... 1.8 oz		14 <sup>8</sup>	0.0 g	0.0 m	—

(Continued)

Table 1C (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>4</sup>	Copper Spot <sup>1,2</sup>		Turf Quality <sup>3</sup>
			11 Aug.	21 Aug.	29 Aug.
		INT <sup>9</sup>	DAT <sup>10</sup>	DAT	DAT
		7	23	36	2
		14	30	43	2
		21	37	50	9
		28	44	57	16

<sup>1</sup> Values are means of four replicates. Means followed by the same letter are not significantly different according to Waller-Duncan *k*-ratio *t*-test (*k*=100). No phytotoxicity was observed for this test.

<sup>2</sup> Percent turf area infested with copper spot, caused by *Gloeocercospora sorghii*.

<sup>3</sup> Turf quality on a scale of 1 to 9, where 9 = best turf quality and 5 = commercially acceptable quality.

<sup>4</sup> Fungicides were applied on 21 May (all treatments except treatments 1 to 12, 36, 37, 38, 39, 40, and 53), 28 May (7-day treatment), 4 June (7- and 14-day treatments), 11 June (7- and 21-day treatments and initiated treatments 11, 12, 39, 40, and 53), 18 June (7-, 14-, and 28-day treatments and initiated treatments 1 to 10), 25 June (7- day treatment), 2 July (7-, 14-, and 21-day treatments and initiated curative treatments 37 and 38), 9 July (7- day treatment), 16 July (7-, 14-, and 28-day treatments, initiated treatment 36, and last application for treatments 1 to 10), 23 July (7- and 21-day treatments), 30 July (7- and 14-day treatments) and 6 August (7- day treatment). Daconil Ultrex 82.5WDG was applied @ 2.75 oz/1,000 sq ft to treatments 1 to 11, 12, 36, 37, 38, 39, 40, and 53 on 21 May and 7 June, and a third time to treatment 36 on 2 July to suppress dollar spot prior to the initiation of these entries.

<sup>5</sup> Treatments 22 to 27 were applied in 1 gal water per 1,000 sq ft whereas all other treatments in this trial were applied in 2 gal water per 1,000 sq ft.

<sup>6</sup> Treatments 37 and 38 were applied on a curative basis on 2 July and then were repeated on 23 July.

<sup>7</sup> Treatments 39, 40, 42, 43, and 53 were applied to dry foliage and then immediately irrigated with 0.5 gal of water per plot.

<sup>8</sup> Individual replicate plots of treatments 57, 58, and 59 were split in half on 7 August (2.5 x 3 ft subplots designated 61, 62, 63, 64, 65, and 66) and treated with Daconil Ultrex 82.5WDG @ 5.0 oz per 1,000 sq ft to arrest the current dollar spot infestation. No data was taken for treatments 61 to 66 during the recovery period (7 to 21 August). Treatments 61 to 66 were treated with the products and rates described in this table on 21 August and 4 September.

<sup>9</sup> Spray interval in days.

<sup>10</sup> Days after the last treatment.





*Cooperating Agencies:* Rutgers, The State University of New Jersey, U.S. Department of Agriculture, and County Boards of Chosen Freeholders. Rutgers Cooperative Extension, a unit of the Rutgers New Jersey Agricultural Experiment Station, is an equal opportunity program provider and employer.