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This publication includes lecture notes of papers presented at the 2007 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.

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EFFICACY OF SELECTED FUNGICIDES FOR THE CONTROL OF DOLLAR SPOT ON A CREEPING BENTGRASS FAIRWAY

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Fungicides were evaluated in 2007 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 Norton 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 15.5-0-0 (0.2 lb nitrogen (N)/1000 ft²) on 11 May and 34-0-0 (0.3 lb N/1000 ft²) on 9 and 23 June. Dimension 1E was applied on 17 May (24 fl oz/acre) and Dimension 40WP on 7 June (6.3 oz/acre) for pre-emergence weed control. Daconil Ultrex 82.5WDG (4.8 oz/1000 ft²) was sprayed on 12 May to control dollar spot prior to the initiation of the study. ProStar 70W (2.75 oz/1000 ft²) was applied on 11 and 22 July to suppress brown patch (caused by *Rhizoctonia solani*). Insect pests were controlled with Merit 75WSP (0.185 oz/1000 ft²) on 27 June and Talstar GC 0.67F (0.3 oz/1000 ft²) on 14 June and 8 August. The site was aerified to a depth of 3.5 inch with 0.5-inch hollow tines on 4-inch centers and topdressed with a sand root zone mix on 3 June. 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 ft² with a CO₂ powered sprayer at 30 psi using TeeJet 8003VS flat fan nozzles. Treatments (trt) were initiated on 23 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 infec-

tion centers per plot on 1, 11, 20, and 30 June, 10 and 20 July, 2, 13, and 23 August and 5 September; the percent turf area infested with copper spot (caused by *Gloeocercospora sorghii*) on 23 August and 3 September; and for the percentage of the soil/leaf surface covered with blue-green algae (cyanobacteria) on 23 August. Turf quality was rated on 22 August using a 1 to 9 scale, where 9 = best turf quality and 6 = acceptable quality. Fungicide residue on foliage was recorded on 20 June using a 1 to 5 scale, where 1 = no residue, 2 = slight white or green residue, 3 = moderate white or green residue, 4 = extensive white or green residue, and 5 = foliage completely covered with white or green residue. Data were subjected to analysis of variance and means were separated using the Waller-Duncan *k*-ratio *t*-test (*k* = 100).

Dollar spot was first observed on 23 May and became uniform throughout the study area by 1 June (Table 1A). Disease severity ranged from 3 to 116 lesion centers per plot on untreated turf (Tables 1A and 1B), which was considered a low to high level of dollar spot infestation, respectively. Dollar spot peaked on 30 June and then declined in July and August to a low to moderate level (21 to 45 lesion centers per plot on untreated turf). Less than 10 infection centers per plot represented an acceptable level of disease control in this study. Approximately half of the treatments provided adequate protection during the application period (23 May to 1 August). Of these entries, RU192514-D (trts 18, 19), Tourney 50WDG @ 0.37 oz (trt 21), Spectator Ultra 1.3EC @ 1.0 fl oz every 14 days (trt 36), Spectator Ultra 1.3EC + Manicure Ultra 82.5WDG (trt 40), 3336 Plus 19.4F (trt 42), 3336 Plus 19.4F + CLEXP-8 50WP (trts 46, 47), Emerald 70WG (trts 53, 54), Rutgers Program #1 (trt 59), and Trinity 1.67SC (trt 62) provided season-long control of

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dollar spot (23 May to 5 September). Tartan 2.4SC (trts 1, 2), Tourney 50WDG (trt 20), EX 190 2.5SC @ 0.52 fl oz (trt 24), ARY-0534001 SC @ 0.7 fl oz + Disarm 480SC @ 0.2 fl oz (trt 31), Lynx 2SC (trt 35), Spectator Ultra 1.3EC @ 2.0 fl oz every 21 days (trt 37), Manicure Ultra 82.5WDG (trt 38), Manicure 6F (trt 39), 26/36 39.3F (trt 41), Chipco 26GT (trt 55), Curalan 50EG (trt 57), Daconil Ultrex 82.5WDG (trt 58), Instrata 3.6SE (trt 60), Concert 4.3SE (trt 61), and Banner MAXX 1.3ME (trt 65) afforded excellent residual control (i.e., through 23 August, 22 to 29 days after the last application). EXC3523E 6SC @ 2.0 fl oz every 14 days (trt 14) and ARY-0534001 SC @ 0.35 fl oz + Disarm 480SC @ 0.1 fl oz (trt 29) also provided good to excellent control of dollar spot through 1 August.

All entries in this study effectively suppressed copper spot on 23 August and 5 September (Table 1C), except for Daconil Weather Stik 6F @ 3.6 fl oz every 21 days on 23 August (trt 5), RU192514-D (trts 18, 19, which actually enhanced disease severity on both rating dates compared to untreated turf), CLEXP-8 50WP (trts 43, 44), 3336 Plus 19.4F @ 4.0 fl oz + CLEXP-8 50WP @ 2.0 oz (trt 46), CX-2250 (trts 51, 52), and Emerald 70WG @ 0.18 oz every 21 days (trt 54).

Of the entries evaluated for fungicide residue on 20 June, all products applied every 21 days @ 3.6 fl oz (trts 5, 7, 9, 11, 13, and 15) had a slight to moderate residue on the foliage (Table 1C) 14 days after the second application. Excellent suppression of algae was observed on 23 August (Table 1C) for turf treated with Tartan 2.4SC (trt 1), Daconil Weather Stik 6F (trts 4, 5), EXC3523A 6SC @ 3.6 fl oz (trt 7), EXC3523B 6SC (trts 8, 9), EXC3523C 6SC @ 3.6 fl oz (trt 11), EXC3523D SC (trts 12, 13), EXC3523E 6SC @ 2.0 fl oz (trt 14), A15935 5.2SC (trt 17), RU192514-D @ 2.4 fl oz (trt 19), Daconil Ultrex 82.5WDG (trts 34, 58), Manicure Ultra 82.5WDG (trt 38), Manicure 6F (trt 39), Spectator Ultra 1.3EC + Manicure Ultra 82.5WDG (trt 40), CLEXP-8 50WP @ 4.0 oz (trt 44), 3336 Plus 19.4F @ 4.0 fl oz + CLEXP-8 50WP @ 4.0 oz (trt 47), Rutgers Program #1 (trt 59), and Instrata 3.6SE (trt 60).

Turf quality was acceptable (greater or equal to 6.0) for almost all entries on 22 August (Table 1C). No phytotoxicity was observed for any of the treatments in this study.

Table 1A. Efficacy of selected fungicides for the control of dollar spot on a creeping bentgrass fairway: Rutgers University, 2007.

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ²	Number of Lesion Centers per Plot ¹					
			1 June	11 June	20 June	30 June	10 July	20 July
1 Tartan 2.4SC	1.5 fl oz	21	1.5 a-d	8.0 g-m	0.0 o	8.0 j-p	3.3 j-p	12.3 d-n
2 Tartan 2.4SC	2.0 fl oz	21	0.8 b-d	4.5 h-m	0.0 o	4.0 l-p	1.8 m-p	5.3 i-p
3 Headway 1.39EC	1.0 fl oz	21	1.5 a-d	20.0 ef	10.8 h-o	13.5 j-l	5.8 e-p	9.3 g-p
4 Daconil Weather Stik 6F	2.0 fl oz	14	0.5 b-d	2.5 j-m	9.0 j-o	2.8 m-p	7.5 c-n	11.8 e-o
5 Daconil Weather Stik 6F	3.6 fl oz	21	1.0 a-d	12.3 e-k	4.5 m-o	10.3 j-p	8.3 c-m	14.3 d-k
6 EXC3523A 6SC	2.0 fl oz	14	1.0 a-d	4.8 h-m	14.0 g-o	3.0 m-p	3.8 i-p	8.5 g-p
7 EXC3523A 6SC	3.6 fl oz	21	0.8 b-d	2.0 j-m	4.0 no	14.3 i-k	11.3 c-f	37.3 b
8 EXC3523B 6SC	2.0 fl oz	14	1.8 a-d	6.5 g-m	25.3 f-g	5.3 k-p	4.0 i-p	7.8 g-p
9 EXC3523B 6SC	3.6 fl oz	21	2.3 a-d	3.3 h-m	0.8 no	3.3 m-p	4.8 g-p	22.0 c-e
10 EXC3523C 6SC	2.0 fl oz	14	2.0 a-d	4.8 h-m	19.5 f-k	12.0 j-n	11.5 c-f	26.0 c
11 EXC3523C 6SC	3.6 fl oz	21	2.5 a-d	10.8 f-m	6.5 k-o	22.5 g-i	12.5 cd	21.3 c-f
12 EXC3523D 6SC	2.0 fl oz	14	1.3 a-d	6.3 g-m	30.5 f	7.8 j-p	11.3 c-f	23.3 cd
13 EXC3523D 6SC	3.6 fl oz	21	0.0 d	3.5 h-m	3.0 no	12.8 j-m	11.8 c-e	38.5 b
14 EXC3523E 6SC	2.0 fl oz	14	1.5 a-d	0.5 lm	9.8 i-o	0.3 p	1.8 m-p	7.5 g-p
15 EXC3523E 6SC	3.6 fl oz	21	0.5 b-d	9.8 g-m	2.3 no	7.3 j-p	3.8 i-p	23.0 cd
16 Heritage TL 0.8ME	1.0 fl oz							
+ Daconil Weather Stik 6F	2.0 fl oz	14	1.5 a-d	8.5 g-m	14.3 g-o	3.3 m-p	3.3 j-p	5.0 i-p
17 A15935 5.2SC	2.5 fl oz	14	0.0 d	7.8 g-m	19.0 f-l	6.5 k-p	8.8 c-k	23.0 cd
18 RU192514D	1.2 fl oz	14	2.0 a-d	0.0 m	0.0 o	0.3 p	0.0 p	0.0 p
19 RU192514D	2.4 fl oz	14	0.5 b-d	0.0 m	0.0 o	0.0 p	0.0 p	0.0 p
20 Tourney 50WDG	0.18 oz	14	1.0 a-d	1.8 k-m	2.8 no	0.5 p	2.0 l-p	3.8 i-p
21 Tourney 50WDG	0.37 oz	14	0.5 b-d	0.8 lm	0.0 o	0.0 p	0.0 p	0.0 p
22 EX 190 2.5SC	0.13 fl oz	14	0.8 b-d	10.0 f-m	25.8 fg	24.5 f-h	9.0 c-j	13.0 d-l
23 EX 190 2.5SC	0.26 fl oz	14	0.5 b-d	10.8 f-m	21.5 f-j	4.8 k-p	1.5 n-p	1.5 m-p
24 EX 190 2.5SC	0.52 fl oz	14	0.5 b-d	3.3 h-m	5.5 l-o	1.3 o-p	0.5 o-p	0.0 p
25 Heritage TL 0.8ME	1.0 fl oz	14	2.5 a-d	10.0 f-m	54.5 e	66.3 e	20.0 b	36.8 b
26 Disarm 480SC	0.18 fl oz	14	1.3 a-d	13.8 e-h	49.8 e	28.3 fg	13.8 c	26.3 c
27 Disarm 480SC	0.36 fl oz	14	0.5 b-d	2.8 i-m	21.0 f-j	4.8 k-p	2.3 k-p	0.8 o-p
28 ARY0534001 SC	0.18 fl oz							
+ Disarm 480SC	0.05 fl oz	14	1.0 a-d	8.8 g-m	22.8 f-i	3.3 m-p	10.0 c-i	21.0 c-f

(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ²	Number of Lesion Centers per Plot ¹					
			1 June	11 June	20 June	30 June	10 July	20 July
29 ARY0534001 SC.....0.35 fl oz + Disarm 480SC.....0.1 fl oz		14	1.3 a-d	3.3 h-m	1.0 no	0.0 p	0.8 op	4.8 i-p
30 ARY0534001 SC.....0.35 fl oz + Disarm 480SC.....0.1 fl oz		21	1.5 a-d	21.0 e	8.0 k-o	31.8 f	10.5 c-g	26.0 c
31 ARY0534001 SC.....0.7 fl oz + Disarm 480SC.....0.2 fl oz		21	1.0 a-d	13.3 e-i	4.0 no	17.0 h-j	3.8 i-p	3.8 i-p
32 Disarm 480SC.....0.18 fl oz + Daconil Ultrex 82.5WDG..... 1.8 oz		14	0.0 d	12.5 e-j	69.3 d	11.3 j-o	9.0 c-j	12.8 d-m
33 Disarm 480SC.....0.18 fl oz /Lynx 2SC.....0.47 fl oz		Alt ³	1.3 a-d	13.8 e-h	27.0 fg	9.5 j-p	4.8 g-p	14.8 d-j
34 Daconil Ultrex 82.5WDG..... 1.8 oz		14	1.5 a-d	7.5 g-m	28.3 f	8.3 j-p	11.0 c-h	20.5 c-f
35 Lynx 2SC.....0.47 fl oz		14	0.0 d	8.5 g-m	18.3 f-m	1.3 op	2.5 j-p	5.5 h-p
36 Spectator Ultra 1.3EC1.0 fl oz		14	1.5 a-d	7.5 g-m	7.0 k-o	3.0 m-p	0.0 p	1.3 n-p
37 Spectator Ultra 1.3EC2.0 fl oz		21	1.0 a-d	12.3 e-k	5.8 k-o	8.5 j-p	5.5 e-p	7.8 g-p
38 Manicure Ultra 82.5WDG 3.25 oz		14	1.0 a-d	2.8 i-m	9.0 j-o	1.8 op	2.8 j-p	1.8 l-p
39 Manicure 6F3.6 fl oz		14	0.8 b-d	3.8 h-m	0.0 o	0.0 p	0.0 p	0.5 op
40 Spectator Ultra 1.3EC2.0 fl oz + Manicure Ultra 82.5WDG..... 3.25 oz		14	0.0 d	0.0 m	0.0 o	0.0 p	0.0 p	0.0 p
41 26/36 39.3F.....4.0 fl oz		21	0.8 b-d	0.0 m	0.0 o	0.0 p	0.0 p	1.0 n-p
42 3336 Plus 19.4F.....4.0 fl oz		21	0.3 cd	1.8 k-m	0.5 no	1.0 p	1.5 n-p	4.5 i-p
43 CL EXP – 8 50WP ⁴ 2.0 oz		21	0.8 b-d	1.3 lm	3.5 no	5.0 k-p	8.8 c-k	16.5 c-h
44 CL EXP – 8 50WP ⁴ 4.0 oz		21	1.0 a-d	0.0 m	0.0 o	0.5 p	3.5 i-p	13.3 d-k
45 CL EXP – 9 1.2 oz		21	1.0 a-d	48.3 c	27.5 fg	12.3 j-m	7.0 d-o	7.3 h-p
46 3336 Plus 19.4F.....4.0 fl oz + CL EXP – 8 50WP ⁴ 2.0 oz		21	1.5 a-d	0.0 m	0.0 o	0.0 p	0.0 p	0.0 p
47 3336 Plus 19.4F.....4.0 fl oz + CL EXP – 8 50WP ⁴ 4.0 oz		21	1.0 a-d	0.0 m	0.0 o	0.0 p	0.0 p	0.0 p
48 Untreated check.....—		—	3.0 a-c	72.8 a	86.0 bc	105.8 b	43.3 a	49.0 a
49 Untreated check.....—		—	3.3 ab	64.5 a-b	78.5 cd	102.3 bc	40.0 a	40.0 ab
50 Untreated check.....—		—	3.8 a	62.8 b	92.8 ab	115.3 a	38.8 a	45.0 ab

(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ²	Number of Lesion Centers per Plot ¹					
			1 June	11 June	20 June	30 June	10 July	20 July
51 CX2250	1.0 oz	7 ⁵	1.8 a-d	38.8 d	77.8 cd	94.8 cd	3.5 i-p	10.5 f-p
52 CX2250	2.0 oz	7 ⁵	1.8 a-d	34.8 d	83.0 bc	92.8 d	5.5 e-p	18.5 c-g
53 Emerald 70WG	0.13 oz	14	2.0 a-d	7.0 g-m	4.5 m-o	1.8 op	0.0 p	0.0 p
54 Emerald 70WG	0.18 oz	21	0.8 b-d	6.5 g-m	2.0 no	3.0 m-p	1.3 n-p	0.0 p
55 Chipco 26GT	4.0 fl oz	14	0.8 b-d	5.0 h-m	6.5 ko	2.8 m-p	1.8 m-p	3.5 j-p
56 Insignia 20WG	0.9 oz	14	2.5 a-d	11.0 f-l	24.0 f-h	6.5 k-p	1.5 n-p	13.0 d-l
57 Curalan 50EG	1.0 oz	14	0.5 b-d	4.3 h-m	6.5 k-o	2.0 n-p	2.0 l-p	1.5 m-p
58 Daconil Ultrex 82.5WDG.....	3.2 oz	14	0.3 cd	1.0 l-m	1.8 no	0.0 p	0.0 p	5.0 i-p
59 Rutgers Program #1.....	—	Var ⁶	1.3 a-d	9.5 g-m	5.0 m-o	1.8 op	1.0 n-p	0.0 p
60 Instrata 3.6SE	4.0 fl oz	21	0.5 b-d	2.3 j-m	0.0 o	2.8 m-p	2.3 k-p	1.8 l-p
61 Concert 4.3SE.....	5.4 fl oz	21	0.5 b-d	3.8 h-m	1.3 no	8.0 j-p	5.3 f-p	5.0 i-p
62 Trinity 1.67SC	1.0 fl oz	14	0.3 cd	8.5 g-m	14.5 g-n	3.0 m-p	4.3 h-p	3.0 k-p
63 Trinity 1.67SC	1.5 fl oz	21	0.0 d	15.8 e-g	7.0 k-o	12.5 j-m	8.5 c-l	15.0 d-i
64 Headway 1.39ME.....	1.25 fl oz	21	1.0 a-d	16.3 e-g	3.8 no	10.3 j-p	5.5 e-p	8.8 g-p
65 Banner MAXX 1.3ME.....	1.0 fl oz	14	0.5 b-d	5.0 h-m	2.5 no	0.3 p	0.0 p	0.0 p
66 Untreated check.....	—	—	3.8 a	67.5 ab	99.3 a	116.3 a	43.0 a	37.0 b
		INT ⁷	DAT ⁸	DAT	DAT	DAT	DAT	DAT
		7	—	—	—	—	5	2
		14	9	5	14	10	5	2
		21	9	19	7	17	5	15

¹ 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).

² Fungicides were applied on 23 May (all treatments, except treatments 43, 44, 46, 47, 51, and 52), 30 May (treatments 43, 44, 46, 47, 51, and 52 initiated), 6 June (14-day treatment), 13 June (21-day treatment), 20 June (14-day treatment), 5 July (7-, 14-, and 21-day treatments), 11 July (7-day treatment), 18 July (7- and 14-day treatments), 25 July (7- and 21-day treatments), and 1 August (7- and 14-day treatments).

(Continued)

Table 1A (continued).

- ³ Alternation of fungicides on a 14-day schedule, where treatment 33 received Disarm 480SC (0.18 fl oz) on 23 May, 20 June, and 18 July and Lynx 2SC (0.47 fl oz) on 6 June, 5 July, and 1 August.
- ⁴ CL EXP – 8 (treatments 43, 44, 46, and 47) was applied as a 25WP on 23 May and as a 50WP from 13 June to 25 July.
- ⁵ Treatments 51 and 52 (CX-2250 at 1 and 2 oz/1,000 sq ft, respectively) were applied to wet foliage in 0.5 gal water per 3 x 5 ft plot with a watering can after 4:30 PM on a 21-day (23 May and 13 June) or 7-day (5, 11, 18, and 25 July and 1 August) schedule. Prior to the transition from a 21- to 7-day schedule on 5 July, turf receiving treatments 51 and 52 were oversprayed with Daconil Ultrex 82.5WDG (5.0 oz) on 29 June to enhance symptom remission.
- ⁶ Variable spray program, where treatment 59 (Rutgers Program #1) consisted of Emerald 70WG (0.13 oz) on 23 May, Banner MAXX 1.3 ME (1.0 fl oz) on 6 June, Daconil Ultrex 82.5WDG (2.75 oz) on 20 June, Chipco Signature 80WG (4.0 oz) + Lynx 2SC (1.0 fl oz) on 5 July, Subdue MAXX 2ME (1.0 fl oz) + Curalan 50EG (1.0 oz) + Daconil Ultrex 82.5WDG (1.8 oz) on 18 July, and Banol 6SC (1.1 fl oz) + Insignia 20WG (0.9 oz) on 1 August.
- ⁷ Spray intervals in days.
- ⁸ Days after treatment (DAT) for each spray interval.

Table 1B. Efficacy of selected fungicides for the control of dollar spot on a creeping bentgrass fairway: Rutgers University, 2007.

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ³	Number of Lesion Centers per Plot ¹				Copper Spot ²	
			2 Aug.	13 Aug.	23 Aug.	5 Sept.	23 Aug.	5 Sept.
1 Tartan 2.4SC	1.5 fl oz	21	4.3 n-s	2.0 k-n	6.0 j-p	23.5 d-l	0.0 d	0.8 g
2 Tartan 2.4SC	2.0 fl oz	21	1.3 r-s	2.3 k-n	1.0 p	17.0 g-q	0.0 d	0.0 g
3 Headway 1.39EC	1.0 fl oz	21	4.8 n-s	2.3 k-n	10.3 g-p	33.0 de	0.0 d	0.0 g
4 Daconil Weather Stik 6F	2.0 fl oz	14	12.5 i-p	5.0 i-n	3.3 n-p	17.8 g-q	1.0 d	1.0 fg
5 Daconil Weather Stik 6F	3.6 fl oz	21	4.3 n-s	15.3 d-g	17.3 b-i	17.0 g-q	11.5 b	4.0 fg
6 EXC3523A 6SC	2.0 fl oz	14	12.5 i-p	3.8 j-n	0.8 p	13.0 j-t	0.8 d	3.3 fg
7 EXC3523A 6SC	3.6 fl oz	21	13.5 h-o	12.5 e-h	8.8 h-p	12.5 k-t	6.5 b-d	0.8 g
8 EXC3523B 6SC	2.0 fl oz	14	13.8 h-n	4.0 j-n	1.3 p	8.5 o-t	0.0 d	6.0 e-g
9 EXC3523B 6SC	3.6 fl oz	21	9.3 j-s	18.0 c-e	14.3 c-l	14.8 i-s	2.5 cd	2.5 fg
10 EXC3523C 6SC	2.0 fl oz	14	18.8 e-j	3.8 j-n	1.0 p	15.5 h-s	0.0 d	5.0 fg
11 EXC3523C 6SC	3.6 fl oz	21	4.5 n-s	6.3 h-n	14.0 c-l	21.3 d-p	5.5 b-d	2.5 fg
12 EXC3523D 6SC	2.0 fl oz	14	17.0 f-k	4.3 j-n	4.8 k-p	15.5 h-s	2.3 cd	1.0 fg
13 EXC3523D 6SC	3.6 fl oz	21	16.5 g-k	17.3 c-f	17.0 c-i	21.5 d-p	6.0 b-d	1.8 fg
14 EXC3523E 6SC	2.0 fl oz	14	14.5 h-m	3.0 k-n	5.0 k-p	13.8 i-t	2.0 cd	5.3 fg
15 EXC3523E 6SC	3.6 fl oz	21	8.5 k-s	23.3 bc	23.5 bc	22.5 d-n	3.8 cd	3.0 fg
16 Heritage TL 0.8ME	1.0 fl oz							
+ Daconil Weather Stik 6F	2.0 fl oz	14	11.0 i-q	8.0 h-m	14.8 c-k	21.3 d-p	0.0 d	1.0 fg
17 A15935 5.2SC	2.5 fl oz	14	34.0 bc	17.3 c-f	18.8 b-g	16.5 g-r	8.5 bc	1.5 fg
18 RU192514D	1.2 fl oz	14	0.0 s	0.0 n	0.0 p	3.5 r-t	23.0 a	59.3 a
19 RU192514D	2.4 fl oz	14	0.0 s	0.0 n	0.0 p	0.8 t	20.0 a	53.8 a
20 Tourney 50WDG	0.18 oz	14	4.0 o-s	0.5 mn	1.0 p	14.8 i-s	0.0 d	0.0 g
21 Tourney 50WDG	0.37 oz	14	0.8 s	0.0 n	0.5 p	8.3 o-t	0.0 d	0.0 g
22 EX 190 2.5SC	0.13 fl oz	14	13.0 i-p	8.8 g-l	18.0 b-h	64.3 b	0.0 d	0.0 g
23 EX 190 2.5SC	0.26 fl oz	14	2.3 q-s	4.3 j-n	12.5 e-o	28.3 d-h	0.8 d	0.0 g
24 EX 190 2.5SC	0.52 fl oz	14	0.5 s	0.0 n	3.3 n-p	23.3 d-m	0.0 d	0.0 g
25 Heritage TL 0.8ME	1.0 fl oz	14	58.0 a	45.8 a	33.5 a	28.8 d-g	2.0 cd	1.5 fg
26 Disarm 480SC	0.18 fl oz	14	37.5 b	26.5 b	33.5 a	49.3 c	1.5 d	0.8 g
27 Disarm 480SC	0.36 fl oz	14	16.3 g-l	5.8 h-n	16.0 c-j	57.5 bc	1.5 d	0.0 g
28 ARY0534001 SC	0.18 fl oz							
+ Disarm 480SC	0.05 fl oz	14	27.8 c-e	18.3 c-e	13.8 c-m	18.8 f-p	4.8 cd	0.5 g

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ³	Number of Lesion Centers per Plot ¹				Copper Spot ²	
			2 Aug.	13 Aug.	23 Aug.	5 Sept.	23 Aug.	5 Sept.
29 ARY0534001 SC.....0.35 fl oz + Disarm 480SC.....0.1 fl oz		14	7.0 l-s	2.8 k-n	13.0 d-n	22.8 d-n	0.0 d	0.0 g
30 ARY0534001 SC.....0.35 fl oz + Disarm 480SC.....0.1 fl oz		21	17.8 f-k	19.3 c-e	23.0 bc	31.3 d-f	3.3 cd	1.5 fg
31 ARY0534001 SC.....0.7 fl oz + Disarm 480SC.....0.2 fl oz		21	2.3 q-s	2.0 k-n	4.3 l-p	21.3 d-p	0.0 d	0.0 g
32 Disarm 480SC.....0.18 fl oz + Daconil Ultrex 82.5WDG..... 1.8 oz		14	26.0 c-f	19.5 b-e	26.8 ab	47.3 c	4.0 cd	0.0 g
33 Disarm 480SC.....0.18 fl oz /Lynx 2SC.....0.47 fl oz		Alt ⁴	20.0 e-i	12.3 e-i	3.8 m-p	11.0 k-t	0.0 d	0.0 g
34 Daconil Ultrex 82.5WDG..... 1.8 oz		14	11.8 i-q	1.5 l-n	8.5 h-p	13.0 j-t	2.3 cd	4.3 fg
35 Lynx 2SC.....0.47 fl oz		14	4.0 o-s	0.0 n	0.0 p	12.3 k-t	0.0 d	0.0 g
36 Spectator Ultra 1.3EC1.0 fl oz		14	0.5 s	0.5 mn	0.0 p	9.0 o-t	0.0 d	0.0 g
37 Spectator Ultra 1.3EC2.0 fl oz		21	1.3 rs	2.0 k-n	9.0 g-p	26.5 d-i	0.0 d	1.0 fg
38 Manicure Ultra 82.5WDG..... 3.25 oz		14	4.0 o-s	1.0 l-n	2.8 n-p	18.3 f-q	0.0 d	0.0 g
39 Manicure 6F3.6 fl oz		14	9.0 k-s	1.8 k-n	2.5 op	19.5 f-p	0.0 d	1.8 fg
40 Spectator Ultra 1.3EC2.0 fl oz + Manicure Ultra 82.5WDG..... 3.25 oz		14	0.0 s	0.0 n	0.0 p	1.0 t	0.0 d	0.0 g
41 26/36 39.3F.....4.0 fl oz		21	0.5 s	0.5 mn	2.8 n-p	11.3 k-t	0.0 d	0.8 g
42 3336 Plus 19.4F.....4.0 fl oz		21	6.3 m-s	4.0 j-n	4.5 l-p	9.5 n-t	0.0 d	4.5 fg
43 CL EXP – 8 50WP ⁵ 2.0 oz		21	19.3 e-i	9.5 g-k	6.8 j-p	13.0 j-t	1.3 d	16.8 b
44 CL EXP – 8 50WP ⁵ 4.0 oz		21	19.8 e-i	9.5 g-k	3.5 n-p	8.8 o-t	11.5 b	15.8 bc
45 CL EXP – 9 1.2 oz		21	0.5 s	0.0 n	2.3 op	20.5 e-p	0.0 d	0.0 g
46 3336 Plus 19.4F.....4.0 fl oz + CL EXP – 8 50WP ⁵ 2.0 oz		21	0.0 s	0.0 n	0.0 p	8.3 o-t	0.0 d	6.3 d-g
47 3336 Plus 19.4F.....4.0 fl oz + CL EXP – 8 50WP ⁵ 4.0 oz		21	0.0 s	0.0 n	0.5 p	10.0 m-t	0.0 d	2.5 fg
48 Untreated check.....—		—	24.8 d-g	23.3 bc	21.3 b-f	21.3 d-p	2.0 cd	14.0 bc
49 Untreated check.....—		—	22.8 d-h	23.0 bc	22.8 b-d	23.3 d-m	3.8 cd	13.3 b-d
50 Untreated check.....—		—	25.5 c-g	21.5 b-d	22.5 b-d	22.5 d-n	2.0 cd	13.3 b-d

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ³	Number of Lesion Centers per Plot ¹				Copper Spot ² (%)	
			2 Aug.	13 Aug.	23 Aug.	5 Sept.	23 Aug.	5 Sept.
51 CX2250	1.0 oz	7 ⁶	30.3 b-d	10.8 f-j	4.8 k-p	8.0 p-t	5.0 cd	12.8 b-e
52 CX2250	2.0 oz	7 ⁶	24.3 d-g	4.5 j-n	3.0 n-p	9.0 o-t	3.8 cd	14.5 bc
53 Emerald 70WG	0.13 oz	14	0.0 s	0.0 n	0.0 p	5.0 q-t	0.0 d	1.0 fg
54 Emerald 70WG	0.18 oz	21	0.0 s	0.0 n	0.0 p	3.3 st	0.0 d	9.0 c-f
55 Chipco 26GT	4.0 fl oz	14	6.5 m-s	1.0 l-n	6.0 j-p	26.3 d-j	0.0 d	1.3 fg
56 Insignia 20WG	0.9 oz	14	18.8 e-j	0.5 mn	7.5 i-p	78.8 a	0.0 d	0.0 g
57 Curalan 50EG	1.0 oz	14	0.5 s	0.0 n	2.3 op	21.5 d-o	0.0 d	4.5 fg
58 Daconil Ultrex 82.5WDG.....	3.2 oz	14	10.5 i-r	3.8 j-n	6.5 j-p	18.5 f-p	0.0 d	1.5 fg
59 Rutgers Program #1.....	—	Var ⁷	0.0 s	0.0 n	0.0 p	10.3 l-t	0.0 d	0.0 g
60 Instrata 3.6SE	4.0 fl oz	21	0.5 s	0.0 n	3.0 n-p	16.0 g-r	0.0 d	0.0 g
61 Concert 4.3SE.....	5.4 fl oz	21	2.5 q-s	1.3 l-n	7.0 j-p	17.0 g-q	0.0 d	0.0 g
62 Trinity 1.67SC	1.0 fl oz	14	0.0 s	0.0 n	0.0 p	8.3 o-t	0.0 d	0.0 g
63 Trinity 1.67SC	1.5 fl oz	21	3.5 p-s	2.8 k-n	2.3 op	18.3 f-q	0.8 d	0.0 g
64 Headway 1.39ME.....	1.25 fl oz	21	2.8 q-s	5.5 h-n	12.0 f-o	33.5 d	0.0 d	0.0 g
65 Banner MAXX 1.3ME.....	1.0 fl oz	14	2.5 q-s	0.0 n	3.8 m-p	12.3 k-t	0.0 d	0.0 g
66 Untreated check.....	—	—	29.3 b-d	23.8 bc	22.0 b-e	23.8 d-k	2.5 cd	15.3 bc
		INT ⁸	DAT ⁹	DAT	DAT	DAT	DAT	DAT
		7	1	12	22	35	22	35
		14	1	12	22	35	22	35
		21	8	19	29	42	29	42

¹ 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).

² Percent turf area infested with copper spot, caused by *Gloeocercospora sorghii*.

³ Fungicides were applied on 23 May (all treatments, except treatments 43, 44, 46, 47, 51, and 52), 30 May (treatments 43, 44, 46, 47, 51, and 52 initiated), 6 June (14-day treatment), 13 June (21-day treatment), 20 June (14-day treatment), 5 July (7-, 14-, and 21-day treatments), 11 July (7-day treatment), 18 July (7- and 14-day treatments), 25 July (7- and 21-day treatments), and 1 August (7- and 14-day treatments).

(Continued)

Table 1A (continued).

⁴ Alternation of fungicides on a 14-day schedule, where treatment 33 received Disarm 480SC (0.18 fl oz) on 23 May, 20 June, and 18 July and Lynx 2SC (0.47 fl oz) on 6 June, 5 July, and 1 August.

⁵ CL EXP – 8 (treatments 43, 44, 46, and 47) was applied as a 25WP on 23 May and as a 50WP from 13 June to 25 July.

⁶ Treatments 51 and 52 (CX-2250 at 1 and 2 oz/1,000 sq ft, respectively) were applied to wet foliage in 0.5 gal water per 3 x 5 ft plot with a watering can after 4:30 PM on a 21-day (23 May and 13 June) or 7-day (5, 11, 18, and 25 July and 1 August) schedule. Prior to the transition from a 21- to 7-day schedule on 5 July, turf receiving treatments 51 and 52 were oversprayed with Daconil Ultrex 82.5WDG (5.0 oz) on 29 June to enhance symptom remission.

⁷ Variable spray program, where treatment 59 (Rutgers Program #1) consisted of Emerald 70WG (0.13 oz) on 23 May, Banner MAXX 1.3 ME (1.0 fl oz) on 6 June, Daconil Ultrex 82.5WDG (2.75 oz) on 20 June, Chipco Signature 80WG (4.0 oz) + Lynx 2SC (1.0 fl oz) 5 July, Subdue MAXX 2ME (1.0 fl oz) + Curalan 50EG (1.0 oz) + Daconil Ultrex 82.5WDG (1.8 oz) on 18 July, and Banol 6SC (1.1 fl oz) + Insignia 20WG (0.9 oz) on 1 August.

⁸ Spray intervals in days.

⁹ Days after treatment (DAT) for each spray interval.

Table 1C. Efficacy of selected fungicides for the control of dollar spot on a creeping bentgrass fairway: Rutgers University, 2007.

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ⁵	Algae ^{1,2} (%) 23 Aug.	Residue ³ 20 June	Turf Quality ⁴ 22 Aug.
1 Tartan 2.4SC	1.5 fl oz	21	6.0 i-p		7.8 a-c
2 Tartan 2.4SC	2.0 fl oz	21	11.0 e-p		7.5 a-d
3 Headway 1.39EC	1.0 fl oz	21	23.0 a-f		7.5 a-d
4 Daconil Weather Stik 6F	2.0 fl oz	14	0.3 p	1.0 e	6.5 c-f
5 Daconil Weather Stik 6F	3.6 fl oz	21	0.8 op	2.5 a	6.3 d-g
6 EXC3523A 6SC	2.0 fl oz	14	14.3 c-o	1.0 e	7.0 a-f
7 EXC3523A 6SC	3.6 fl oz	21	3.0 m-p	2.3 ab	5.8 fg
8 EXC3523B 6SC	2.0 fl oz	14	5.0 j-p	1.0 e	7.5 a-d
9 EXC3523B 6SC	3.6 fl oz	21	1.5 n-p	1.5 de	6.8 b-f
10 EXC3523C 6SC	2.0 fl oz	14	10.0 f-p	1.0 e	8.3 a
11 EXC3523C 6SC	3.6 fl oz	21	1.5 n-p	1.8 cd	6.3 d-g
12 EXC3523D 6SC	2.0 fl oz	14	0.5 op	1.0 e	7.0 a-f
13 EXC3523D 6SC	3.6 fl oz	21	4.5 j-p	2.3 ab	5.8 f-g
14 EXC3523E 6SC	2.0 fl oz	14	1.3 n-p	1.0 e	7.5 a-d
15 EXC3523E 6SC	3.6 fl oz	21	6.8 h-p	2.0 bc	6.0 e-g
16 Heritage TL 0.8ME	1.0 fl oz				
+ Daconil Weather Stik 6F	2.0 fl oz	14	8.0 g-p		7.5 a-d
17 A15935 5.2SC	2.5 fl oz	14	2.0 n-p		6.5 c-f
18 RU192514D	1.2 fl oz	14	8.0 g-p		8.3 a
19 RU192514D	2.4 fl oz	14	1.3 n-p		7.8 a-c
20 Tourney 50WDG	0.18 oz	14	14.8 c-n		7.0 a-f
21 Tourney 50WDG	0.37 oz	14	10.0 f-p		7.3 a-e
22 EX 190 2.5SC	0.13 fl oz	14	19.3 a-i		6.3 d-g
23 EX 190 2.5SC	0.26 fl oz	14	19.5 a-i		7.8 a-c
24 EX 190 2.5SC	0.52 fl oz	14	6.5 h-p		7.8 a-c
25 Heritage TL 0.8ME	1.0 fl oz	14	22.0 a-f		5.3 g
26 Disarm 480SC	0.18 fl oz	14	30.0 a		5.8 fg
27 Disarm 480SC	0.36 fl oz	14	24.5 a-e		6.8 b-f
28 ARY0534001 SC	0.18 fl oz				
+ Disarm 480SC	0.05 fl oz	14	19.5 a-i		6.0 e-g

Table 1C (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ⁵	Algae ^{1,2} (%) 23 Aug.	Residue ³ 20 June	Turf Quality ⁴ 22 Aug.
29 ARY0534001 SC.....	0.35 fl oz				
+ Disarm 480SC.....	0.1 fl oz	14	10.8 e-p		7.0 a-f
30 ARY0534001 SC.....	0.35 fl oz				
+ Disarm 480SC.....	0.1 fl oz	21	25.8 a-d		6.0 e-g
31 ARY0534001 SC.....	0.7 fl oz				
+ Disarm 480SC.....	0.2 fl oz	21	15.0 b-n		7.5 a-d
32 Disarm 480SC.....	0.18 fl oz				
+ Daconil Ultrex 82.5WDG.....	1.8 oz	14	13.0 c-p		6.3 d-g
33 Disarm 480SC.....	0.18 fl oz				
/Lynx 2SC.....	0.47 fl oz	Alt ⁶	22.8 a-f		7.0 a-f
34 Daconil Ultrex 82.5WDG.....	1.8 oz	14	3.8 l-p		7.0 a-f
35 Lynx 2SC.....	0.47 fl oz	14	24.5 a-e		7.3 a-e
36 Spectator Ultra 1.3EC.....	1.0 fl oz	14	20.8 a-g		8.0 ab
37 Spectator Ultra 1.3EC.....	2.0 fl oz	21	21.0 a-g		7.8 a-c
38 Manicure Ultra 82.5WDG.....	3.25 oz	14	0.0 p		7.3 a-e
39 Manicure 6F.....	3.6 fl oz	14	0.8 op		7.8 a-c
40 Spectator Ultra 1.3EC.....	2.0 fl oz				
+ Manicure Ultra 82.5WDG.....	3.25 oz	14	0.0 p		7.8 a-c
41 26/36 39.3F.....	4.0 fl oz	21	11.0 e-p		7.5 a-d
42 3336 Plus 19.4F.....	4.0 fl oz	21	12.3 d-p		7.8 a-c
43 CL EXP – 8 50WP ⁷	2.0 oz	21	16.8 a-m		7.0 a-f
44 CL EXP – 8 50WP ⁷	4.0 oz	21	6.0 i-p		7.0 a-f
45 CL EXP – 9.....	1.2 oz	21	11.3 e-p		8.0 ab
46 3336 Plus 19.4F.....	4.0 fl oz				
+ CL EXP – 8 50WP ⁷	2.0 oz	21	7.5 g-p		7.3 a-e
47 3336 Plus 19.4F.....	4.0 fl oz				
+ CL EXP – 8 50WP ⁷	4.0 oz	21	4.0 k-p		7.8 a-c
48 Untreated check.....	—	—	24.3 a-e		5.8 fg
49 Untreated check.....	—	—	26.5 a-c		5.8 fg
50 Untreated check.....	—	—	20.3 a-h		5.8 fg

Table 1C (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ⁵	Algae ^{1,2} (%) 23 Aug.	Residue ³ 20 June	Turf Quality ⁴ 22 Aug.
51 CX2250	1.0 oz	7 ⁸	13.0 c-p		6.0 e-g
52 CX2250	2.0 oz	7 ⁸	8.0 g-p		7.0 a-f
53 Emerald 70WG	0.13 oz	14	17.8 a-k		7.8 a-c
54 Emerald 70WG	0.18 oz	21	11.5 e-p		7.8 a-c
55 Chipco 26GT	4.0 fl oz	14	18.0 a-j		7.8 a-c
56 Insignia 20WG	0.9 oz	14	13.5 c-p		7.5 a-d
57 Curalan 50EG	1.0 oz	14	10.8 e-p		7.8 a-c
58 Daconil Ultrex 82.5WDG.....	3.2 oz	14	0.0 p		7.8 a-c
59 Rutgers Program #1.....	—	Var ⁹	0.0 p		7.8 a-c
60 Instrata 3.6SE	4.0 fl oz	21	2.5 n-p		8.0 ab
61 Concert 4.3SE.....	5.4 fl oz	21	9.8 f-p		7.3 a-e
62 Trinity 1.67SC	1.0 fl oz	14	17.5 a-l		7.8 a-c
63 Trinity 1.67SC	1.5 fl oz	21	9.5 f-p		7.0 a-f
64 Headway 1.39ME.....	1.25 fl oz	21	12.8 d-p		7.8 a-c
65 Banner MAXX 1.3ME.....	1.0 fl oz	14	13.0 c-p		8.0 ab
66 Untreated check.....	—	—	28.5 ab	1.0 e	6.3 d-g
		INT ¹⁰	DAT ¹¹	DAT	DAT
		7	22	—	21
		14	22	14	21
		21	29	7	28

¹ 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).

² Percent soil surface covered with blue-green algae (cyanobacteria).

³ Fungicide residue present on foliage on a 1 to 5 scale where 1 = no residue, 2 = slight white or green residue, 3 = moderate white or green residue, 4 = extensive white or green residue, and 5 = foliage completely covered with white or green residue.

(Continued)

Table 1C (continued).

⁴ Turf quality on a 1 to 9 scale where 9 = best turf quality and 6 = commercially acceptable quality.

⁵ Fungicides were applied on 23 May (all treatments, except treatments 43, 44, 46, 47, 51, and 52), 30 May (treatments 43, 44, 46, 47, 51, and 52 initiated), 6 June (14-day treatment), 13 June (21-day treatment), 20 June (14-day treatment), 5 July (7-, 14-, and 21-day treatments), 11 July (7-day treatment), 18 July (7- and 14-treatments), 25 July (7- and 21-day treatments), and 1 August (7- and 14-day treatments).

⁶ Alternation of fungicides on a 14-day schedule, where treatment 33 received Disarm 480SC (0.18 fl oz) on 23 May, 20 June, and 18 July and Lynx 2SC (0.47 fl oz) on 6 June, 5 July, and 1 August.

⁷ CL EXP – 8 (treatments 43, 44, 46, and 47) was applied as a 25WP on 23 May and as a 50WP from 13 June to 25 July.

⁸ Treatments 51 and 52 (CX-2250 at 1 and 2 oz/1,000 sq ft, respectively) were applied to wet foliage in 0.5 gal water per 3 x 5 ft plot with a watering can after 4:30 PM on a 21-day (23 May and 13 June) or 7-day (5, 11, 18, and 25 July and 1 August) schedule. Prior to the transition from a 21- to 7-day schedule on 5 July, turf receiving treatments 51 and 52 were oversprayed with Daconil Ultrex 82.5WDG (5.0 oz) on 29 June to enhance symptom remission.

⁹ Variable spray program, where treatment 59 (Rutgers Program #1) consisted of Emerald 70WG (0.13 oz) on 23 May, Banner MAXX 1.3 ME (1.0 fl oz) on 6 June, Daconil Ultrex 82.5WDG (2.75 oz) on 20 June, Chipco Signature 80WG (4.0 oz) + Lynx 2SC (1.0 fl oz) 5 July, Subdue MAXX 2ME (1.0 fl oz) + Curalan 50EG (1.0 oz) + Daconil Ultrex 82.5WDG (1.8 oz) on 18 July, and Banol 6SC (1.1 fl oz) + Insignia 20WG (0.9 oz) on 1 August.

¹⁰ Spray intervals in days.

¹¹ Days after treatment (DAT) for each spray interval.



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.