

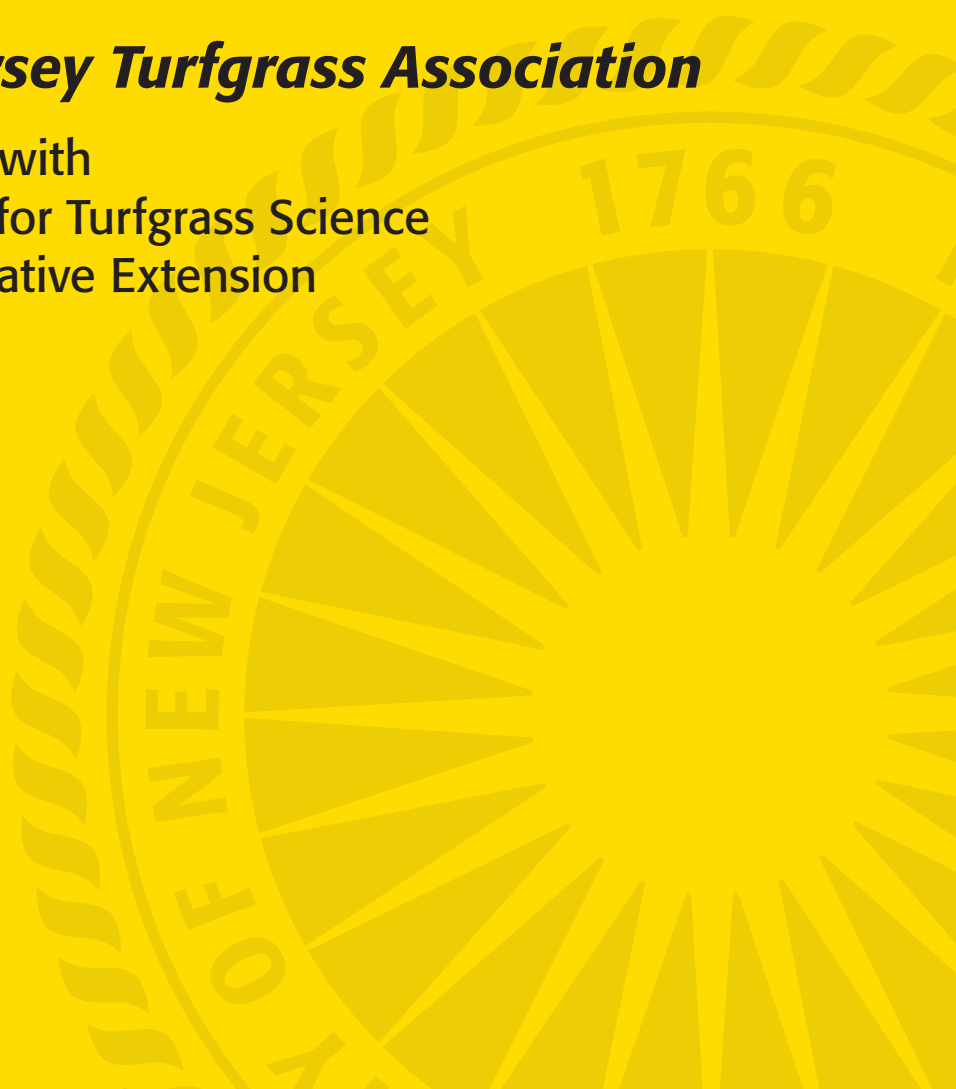
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In Cooperation with
Rutgers Center for Turfgrass Science
Rutgers Cooperative Extension



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

CONTROL OF DOLLAR SPOT ON A CREEPING BENTGRASS GREEN WITH FUNGICIDES AND BIORATIONAL PRODUCTS

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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 greens conditions. Turf was established September 1996 on a Norton loam with a pH of 6.2. Mowing was performed daily at a height of 0.125 inches with clippings collected. The site was irrigated as needed to prevent drought stress.

Fertilizer was applied as 34-0-0 (0.2 lb nitrogen (N)/1000 ft²) on 22 April and 9 June, 15.5-0-0 (0.2 lb N/1000 ft²) on 11 and 26 May, and 21-0-0 (0.2 lb N/1000 ft²) on 13 September. 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 24 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 24 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 11, 20, and 30 June, 10 and 20 July, 2, 14 and 29 August, and 6, 17, and 27 September, and for the percentage of the soil/leaf surface covered with blue-green algae (cyanobacteria) on 23 August. Turf quality was rated on 20 June and 22 August using a 1 to 9 scale, where 9 = best turf quality and 6 = acceptable quality. Phytotoxicity was evaluated on 22 August using a 1 to 5 scale, where 1 = no foliar discoloration, 2 = slight chlorosis or necrosis, 3 = moderate chlorosis or necrosis, 4 = severe chlorosis or necrosis, and 5 = all turf dead. Fungicide residue on foliage was recorded on 13 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 5 June and became uniform throughout the study by 11 June (Table 1A). Disease severity ranged from 14 to 39 lesion centers per plot on untreated turf (Tables 1A and 1B), which was considered a low to moderate level of dollar spot infestation, respectively. Less than 10 infection centers per plot represented an acceptable level of disease control for this study. All fungicide entries provided good to excellent control of dollar spot throughout the application period (24 May to 9 August), except for EX 190 2.5SC @ 0.13 fl oz (trt 44), EcoGuard L + NoburN (trt 89), JS 007 50W (trt 99), GW 317 50W (trt 100), SV 017 50W (trt 102), DA 003 50W (trt 104), and GW 354 50W (trt 105). Season-long control (24 May to 27 September) was afforded turf treated with RU192514D-07

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@ 1.5 fl oz (trt 4), 2.0 fl oz (trt 5), and 2.4 fl oz (trt 36), RU192514D-07 + RU192514A-07 (trt 6), RU192514D-07 + RU192514B-07 (trt 7), Emerald 70WG (trts 8, 9), Daconil Weather Stik 6F @ 3.6 fl oz every 21 days (trt 11), GF-1948 1.22EW @ 1.0 fl oz (trt 50) and 2.0 fl oz (trt 52) every 14 days, GF-1948 1.22EW @ 0.5 fl oz + Daconil Ultrex 82.5WDG @ 3.2 oz every 14 days (trt 53), Eagle 20EW @ 2.4 fl oz (trt 62), Banner MAXX 1.3ME @ 2.0 fl oz (trts 64 and 111), Spectator Ultra 1.3EC + Manicure Ultra 82.5WDG (trt 69), Insignia 20WG (trt 77), SARS-346 40WP @ 0.75 oz every 21 days (trt 80), SARS-346 40WP + 3336 50WP (trts 82, 83), and SARS-351 20SC @ 1.0 (trt 85) and 1.5 fl oz (trt 86). All other entries in this study provided excellent residual control (i.e., at least until 6 September, 28 to 49 days after the last application) except for Heritage TL 0.8ME (trt 31), Tourney 50WDG @ 0.18 oz (trt 42), GF-1948 1.22EW @ 1.0 fl oz every 21 days (trt 51), LEM17 50WDG + DPX-YT669 22.5SC (trt 75), EcoGuard L (trt 87) and EcoGuard Program #1 (trt 88), CLEXP-16 F @ 0.27 fl oz (trt 90), DK 037 50W (trt 98), VN 004 50W (trt 101), and LK 016 50W (trt 103).

Entries containing chlorothalonil applied every 14, but not 21 days (i.e., Daconil Weather Stik 6F [trt 10], Daconil Ultrex 82.5WDG [trts 1, 47, 48, 53, 57, 69, 95, and 96], Manicure Ultra 82.5WDG [trt 67], and Manicure 6F [trt 68]), Lynx 2SC (trt 114), and the experimental products EXC3523A 6SC (trt 12), EXC3523B 6SC (trt 14), EXC3523C 6SC (trt 16), EXC3523D 6SC (trt 18), and A15935 5.2SC (trt 34) had a slight to moderate fungicide residue on the foliage (Table 1B) on 13 June (6 days after the second application), except for Heritage TL 0.8ME + Daconil Weather Stik 6F (trt 33).

Excellent suppression of algae was observed on 23 August for turf treated with several products in this

study (Table 1C). The following entries had significantly less algal cover than untreated turf: Chipco Signature 80WG + Daconil Ultrex 82.5WDG (trt 1), Chipco Signature 80WG + Banner MAXX 1.3ME (trt 2), Daconil Weather Stik 6F @ 2.0 fl oz (trt 10), A15935 5.2SC (trt 34), Tourney 50WDG (trts 37, 38), Daconil Ultrex 82.5WDG @ 3.7 oz (trt 48), GF-1948 1.22EW + Daconil Ultrex 82.5WDG (trts 53, 54), Banner MAXX 1.3ME + Daconil Ultrex 82.5WDG (trts 57, 58), Daconil Ultrex 82.5WDG @ 3.2 oz (trts 59, 60), Eagle 20EW @ 2.4 fl oz (trt 62), Spectator Ultra 1.3EC @ 1.0 oz (trt 65), Manicure Ultra 82.5WDG (trt 67), EcoGuard Program #1 (trt 88), Rutgers Program #1 (trt 97), and Banner MAXX 1.3ME @ 2.0 oz every 14 days (trt 111).

With few exceptions, turf quality was acceptable (at or above 6.0) for most entries on 20 June and 22 August (Table 1C). Slight foliar chlorosis or necrosis was noted on 22 August (Table 1C) for turf treated with Chipco Signature 80WG + Daconil Ultrex 82.5WDG (trt 1), Chipco Signature 80WG + Banner MAXX 1.3ME (trt 2), RU192514D-07 + RU192514A-07 (trt 6), Daconil Weather Stik 6F @ 2.0 fl oz (trt 10), EXC3523D 6SC (trt 18), EXC3523E 6SC (trt 20), Rhapsody AS + Daconil Ultrex 82.5WDG (trt 47), Daconil Ultrex 82.5WDG @ 3.7 oz (trt 48), GF-1948 1.22EW @ 2.0 fl oz (trt 52), GF-1948 1.22EW @ 0.5 fl oz + Daconil Ultrex 82.5WDG @ 3.2 oz every 14 days (trt 53), Banner MAXX 1.3ME @ 0.5 fl oz + Daconil Ultrex 82.5WDG @ 3.2 oz every 14 days (trts 57), Daconil Ultrex 82.5WDG @ 3.2 oz (trts 59, 60), Eagle 20EW @ 2.4 fl oz (trt 62), Manicure Ultra 82.5WDG (trt 67), Manicure 6F (trt 68), Spectator Ultra 1.3EC + Manicure Ultra 82.5WDG (trt 69), and Daconil Ultrex 82.5WDG @ 1.8 oz (trt 95). Foliar toxicity dissipated after 7 to 10 days. No phytotoxicity was observed for any other treatment.

Table 1A. Control of dollar spot on a creeping bentgrass green with fungicides and biorational products: Rutgers University, 2007.

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ²	Number of Lesion Centers per Plot ¹					
			11 June	20 June	30 June	10 July	20 July	2 Aug.
1 Chipco Signature 80WG 4.0 oz								
+ Daconil Ultrex 82.5WG 3.2 oz		14	0.3 e	0.5 l-n	0.0 l	0.0 l	0.0 n	0.0 l
2 Chipco Signature 80WG 4.0 oz								
+ Banner MAXX 1.3MC 0.5 fl oz		14	0.0 e	1.3 j-n	0.5 kl	0.0 l	3.5 k-n	0.8 l
3 RU192514D07 1.0 fl oz		14	0.8 de	0.5 l-n	0.0 l	0.0 l	0.0 n	0.0 l
4 RU192514D07 1.5 fl oz		14	1.0 de	0.0 n	0.0 l	0.3 l	0.0 n	0.0 l
5 RU192514D07 2.0 fl oz		14	1.0 de	0.3 mn	0.3 l	0.0 l	0.0 n	0.0 l
6 RU192514D07 1.5 fl oz								
+ RU192514A07 2.0 fl oz		14	0.0 e	0.0 n	0.0 l	0.0 l	0.0 n	0.0 l
7 RU192514D07 1.5 fl oz								
+ RU192514B07 0.5 fl oz		14	1.0 de	0.3 mn	0.0 l	0.0 l	0.0 n	0.0 l
8 Emerald 70WG 0.13 oz		14	1.3 de	0.3 mn	0.0 l	0.0 l	0.0 n	0.0 l
9 Emerald 70WG 0.18 oz		14	0.5 e	0.3 mn	0.0 l	0.0 l	0.0 n	0.5 l
10 Daconil Weather Stik 6F 2.0 fl oz		14	0.3 e	0.0 n	0.0 l	0.0 l	2.0 l-n	2.0 kl
11 Daconil Weather Stik 6F 3.6 fl oz		21	0.5 e	1.5 j-n	0.0 l	0.0 l	0.5 n	0.0 l
12 EXC3523A 6SC 2.0 fl oz		14	0.3 e	0.5 l-n	0.0 l	0.0 l	0.5 n	0.3 l
13 EXC3523A 6SC 3.6 fl oz		21	0.5 e	0.3 mn	0.0 l	0.5 kl	1.5 l-n	1.0 kl
14 EXC3523B 6SC 2.0 fl oz		14	1.3 de	4.5 g-n	1.3 kl	0.3 l	3.0 k-n	1.8 kl
15 EXC3523B 6SC 3.6 fl oz		21	0.0 e	0.0 n	0.3 l	0.0 l	1.8 l-n	1.0 kl
16 EXC3523C 6SC 2.0 fl oz		14	1.3 de	1.3 j-n	0.5 kl	0.8 kl	2.8 k-n	1.5 kl
17 EXC3523C 6SC 3.6 fl oz		21	0.8 de	0.8 k-n	0.5 kl	0.0 l	0.5 n	0.0 l
18 EXC3523D 6SC 2.0 fl oz		14	0.5 e	1.0 j-n	0.5 kl	0.8 kl	4.3 i-n	4.8 h-l
19 EXC3523D 6SC 3.6 fl oz		21	0.3 e	1.0 j-n	0.0 l	0.0 l	0.3 n	0.3 l
20 EXC3523E 6SC 2.0 fl oz		14	0.5 e	0.8 k-n	0.3 l	0.0 l	1.5 l-n	1.0 kl
21 EXC3523E 6SC 3.6 fl oz		21	0.0 e	0.8 k-n	0.0 l	0.0 l	1.8 l-n	0.0 l
22 A7402 2.1EC 0.16 fl oz		14	1.3 de	2.5 h-n	0.8 kl	0.0 l	4.5 h-n	0.5 l
23 A7402 2.1EC 0.31 fl oz		14	1.3 de	1.0 j-n	0.0 l	0.0 l	0.0 n	0.0 l
24 A7402 2.1EC 0.62 fl oz		14	0.0 e	0.0 n	0.0 l	0.0 l	0.0 n	0.0 l
25 A7402 2.1EC 0.94 fl oz		14	0.0 e	0.0 n	0.0 l	0.0 l	0.0 n	0.0 l
26 Banner MAXX 1.3ME 0.5 fl oz		14	1.0 de	2.5 h-n	0.5 kl	0.3 l	2.3 k-n	0.5 l

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(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ²	Number of Lesion Centers per Plot ¹					
			11 June	20 June	30 June	10 July	20 July	2 Aug.
27 Banner MAXX 1.3ME	1.0 fl oz	14	0.8 de	2.0 i-n	0.0 l	0.0 l	1.0 mn	1.0 kl
28 Banner MAXX 1.3ME	1.5 fl oz	14	0.3 e	1.3 j-n	0.0 l	0.0 l	0.5 n	0.0 l
29 A6780 1.3ME	0.5 fl oz	14	2.5 c-e	0.3 mn	0.0 l	0.0 l	3.5 k-n	0.0 l
30 A6780 1.3ME	1.0 fl oz	14	2.0 c-e	2.5 h-n	0.5 kl	0.5 kl	1.3 mn	0.0 l
31 Heritage TL 0.8ME	1.0 fl oz	14	0.8 de	8.3 d-g	3.5 i-l	7.3 e-g	9.3 f-h	6.3 g-k
32 3336 50WP	1.44 oz	14	0.0 e	0.5 l-n	0.5 kl	0.8 kl	1.3 mn	1.5 kl
33 Heritage TL 0.8ME	1.0 fl oz							
+ Daconil Weather Stik 6F	2.0 fl oz	14	1.3 de	2.3 i-n	0.5 kl	0.0 l	0.5 n	0.5 l
34 A15935 5.2SC	2.5 fl oz	14	0.3 e	1.8 j-n	0.0 l	0.0 l	1.3 mn	0.5 l
35 RU192514D07	1.2 fl oz	14	0.8 de	0.3 mn	0.0 l	0.0 l	0.0 n	0.0 l
36 RU192514D07	2.4 fl oz	14	0.0 e	0.0 n	0.0 l	0.0 l	0.0 n	0.0 l
37 Tourney 50WDG	0.18 oz	14	1.3 de	1.3 j-n	0.3 l	0.0 l	4.0 j-n	1.5 kl
38 Tourney 50WDG	0.37 oz	14	0.5 e	0.0 n	0.0 l	0.0 l	0.5 n	0.5 l
39 EX 190 2.5SC	0.13 fl oz	14	0.8 de	2.0 i-n	0.5 kl	0.0 l	1.8 l-n	1.0 kl
40 EX 190 2.5SC	0.26 fl oz	14	0.5 e	0.5 l-n	0.0 l	0.0 l	0.5 n	0.5 l
41 EX 190 2.5SC	0.52 fl oz	14	0.5 e	1.0 j-n	0.0 l	0.0 l	0.0 n	0.0 l
42 Tourney 50WDG	0.18 oz	21	2.8 c-e	1.8 j-n	1.3 kl	2.8 h-l	6.0 g-m	4.3 h-l
43 Tourney 50WDG	0.37 oz	21	2.0 c-e	2.0 i-n	0.5 kl	0.5 kl	2.5 k-n	0.5 l
44 EX 190 2.5SC	0.13 fl oz	21	4.8 c	4.3 g-n	7.8 e-i	7.5 d-g	12.8 ef	8.8 f-h
45 EX 190 2.5SC	0.26 fl oz	21	2.3 c-e	1.8 j-n	0.8 kl	2.3 i-l	4.8 h-n	1.8 kl
46 EX 190 2.5SC	0.52 fl oz	21	1.0 de	0.8 k-n	0.0 l	0.5 kl	1.5 l-n	0.5 l
47 Rhapsody AS	5.0 fl oz							
+ Daconil Ultrex 82.5WG	1.8 oz	14	2.0 c-e	3.3 h-n	0.8 kl	0.0 l	1.5 l-n	0.5 l
48 Daconil Ultrex 82.5WG	3.7 oz	14	1.0 de	1.3 j-n	0.3 l	0.0 l	0.0 n	0.0 l
49 GF1948 1.22EW	0.5 fl oz	14	0.8 de	1.5 j-n	0.0 l	0.0 l	3.0 k-n	1.3 kl
50 GF1948 1.22EW	1.0 fl oz	14	0.3 e	0.5 l-n	0.0 l	0.0 l	0.0 n	0.0 l
51 GF1948 1.22EW	1.0 fl oz	21	1.3 de	2.0 i-n	1.5 kl	1.3 kl	5.0 h-n	3.8 i-l
52 GF1948 1.22EW	2.0 fl oz	14	0.5 e	0.3 mn	0.0 l	0.0 l	0.0 n	0.0 l
53 GF1948 1.22EW	0.5 fl oz							
+ Daconil Ultrex 82.5WG	3.2 oz	14	0.0 e	0.0 n	0.0 l	0.0 l	0.0 n	0.0 l

Table 1A (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ²	Number of Lesion Centers per Plot ¹					
			11 June	20 June	30 June	10 July	20 July	2 Aug.
54 GF1948 1.22EW	1.0 fl oz							
+ Daconil Ultrex 82.5WG	3.2 oz	21	0.3 e	0.3 mn	0.0 l	0.0 l	0.0 n	0.0 l
55 3336 50WP	2.16 oz	21	0.5 e	0.0 n	0.0 l	0.0 l	0.0 n	0.0 l
56 Banner MAXX 1.3ME	1.0 fl oz	21	2.0 c-e	1.5 j-n	0.8 kl	1.0 kl	2.0 l-n	1.0 kl
57 Banner MAXX 1.3ME	0.5 fl oz							
+ Daconil Ultrex 82.5WG	3.2 oz	14	1.5 c-e	0.5 l-n	0.0 l	0.0 l	0.0 n	0.0 l
58 Banner MAXX 1.3ME	1.0 fl oz							
+ Daconil Ultrex 82.5WG	3.2 oz	21	0.0 e	0.0 n	0.0 l	0.0 l	0.0 n	0.0 l
59 Daconil Ultrex 82.5WG	3.2 oz	14	0.5 e	1.3 j-n	0.0 l	0.0 l	0.8 n	0.0 l
60 Daconil Ultrex 82.5WG	3.2 oz	21	0.3 e	0.3 mn	0.0 l	0.0 l	2.3 k-n	3.0 i-l
61 Eagle 20EW	1.2 fl oz	14	4.3 cd	5.5 e-m	2.0 kl	1.8 i-l	4.8 h-n	1.0 kl
62 Eagle 20EW	2.4 fl oz	14	0.5 e	0.8 k-n	0.0 l	0.0 l	0.0 n	0.0 l
63 Chipco 26GT 2SC	4.0 fl oz	14	0.8 de	0.5 l-n	0.0 l	0.0 l	0.8 n	0.0 l
64 Banner MAXX 1.3ME	2.0 fl oz	14	1.0 de	0.8 k-n	0.0 l	0.0 l	0.0 n	0.0 l
65 Spectator Ultra 1.3EC	1.0 fl oz	14	1.0 de	0.5 l-n	0.0 l	0.0 l	0.5 n	0.0 l
66 Spectator Ultra 1.3EC	2.0 fl oz	21	1.0 de	0.8 k-n	0.0 l	0.0 l	1.0 mn	2.5 i-l
67 Manicure Ultra 82.5WDG	3.25 oz	14	0.8 de	0.8 k-n	0.0 l	0.0 l	0.0 n	0.3 l
68 Manicure 6F	3.6 fl oz	14	0.3 e	0.0 n	0.0 l	0.0 l	0.0 n	0.0 l
69 Spectator Ultra 1.3EC	2.0 fl oz							
+ Manicure Ultra 82.5WDG	3.25 oz	21	0.0 e	0.0 n	0.0 l	0.0 l	0.0 n	0.0 l
70 LEM17 20SC	0.47 fl oz	14	2.0 ce	1.8 j-n	0.8 kl	1.5 j-l	2.3 k-n	2.5 i-l
71 LEM17 50WDG	0.2 oz	14	2.5 ce	2.8 h-n	3.0 i-l	4.0 g-l	4.3 i-n	4.8 h-l
72 LEM17 50WDG	0.3 oz	14	2.0 ce	1.5 j-n	1.0 kl	2.5 h-l	4.0 j-n	3.3 i-l
73 LEM17 50WDG	0.4 oz	14	1.8 ce	1.5 j-n	1.0 kl	1.8 i-l	3.5 k-n	2.8 i-l
74 LEM17 50WDG	0.5 oz	14	1.8 ce	1.5 j-n	0.8 kl	1.3 kl	3.3 k-n	2.0 kl
75 LEM17 50WDG	0.2 oz							
+ DPXYT669 22.5SC	0.28 fl oz	14	1.0 de	1.5 j-n	0.5 kl	2.0 i-l	4.5 h-n	3.8 i-l
76 DPXYT669 22.5SC	0.28 fl oz	14	0.3 e	1.3 j-n	1.3 kl	1.5 j-l	3.0 k-n	1.0 kl
77 Insignia 20WG	0.9 oz	14	0.5 e	1.3 j-n	0.3 l	0.0 l	0.5 n	0.0 l
78 Curalan 50EG	1.0 oz	14	1.3 de	0.3 mn	0.0 l	0.0 l	1.8 l-n	2.3 j-l

(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ²	Number of Lesion Centers per Plot ¹					
			11 June	20 June	30 June	10 July	20 July	2 Aug.
79 SARS346 40WP	0.5 oz	14	0.5 e	2.0 i-n	0.0 l	0.0 l	0.0 n	0.0 l
80 SARS346 40WP	0.75 oz	21	1.0 de	1.0 j-n	0.0 l	0.0 l	0.0 n	0.0 l
81 SARS346 40WP	1.0 oz	28	0.3 e	0.3 mn	0.0 l	0.0 l	1.0 mn	0.0 l
82 SARS346 40WP	0.4 oz							
+ 3336 50WP	1.44 oz	14	0.5 e	0.0 n	0.0 l	1.0 kl	0.0 n	0.0 l
83 SARS346 40WP	0.4 oz							
+ 3336 50WP	2.16 oz	21	0.3 e	0.0 n	0.0 l	0.0 l	0.0 n	0.0 l
84 SARS351 20SC	0.5 fl oz	14	0.0 e	0.0 n	0.0 l	0.0 l	0.0 n	0.0 l
85 SARS351 20SC	1.0 fl oz	14	0.0 e	0.3 mn	0.0 l	0.0 l	0.0 n	0.0 l
86 SARS351 20SC	1.5 fl oz	14	0.0 e	0.0 n	0.0 l	0.0 l	0.0 n	0.0 l
87 EcoGuard L.....	20.0 fl oz	7	1.0 de	2.5 h-n	5.3 f-k	5.5 g-i	8.8 f-j	6.3 g-k
88 EcoGuard Program #1	—	7 ³	3.0 c-e	5.8 e-l	9.5 ef	10.5 c-e	9.8 fg	10.8 e-g
89 EcoGuard L.....	20.0 fl oz							
+ NoburN.....	3.0 fl oz	7	2.8 c-e	7.0 e-i	8.5 e-h	11.0 cd	12.8 ef	10.0 fg
90 CLEXP16 F	0.27 fl oz	14	3.0 c-e	6.3 e-j	4.3 h-l	5.3 g-j	9.0 f-i	7.5 f-i
91 CLEXP16 F	0.6 fl oz	14	2.3 c-e	4.3 g-n	1.3 kl	1.0 kl	4.3 i-n	2.5 i-l
92 CL EXP – 9 WG	0.6 oz	14	2.3 c-e	0.5 l-n	0.0 l	0.0 l	1.8 l-n	0.5 l
93 3336 Plus 19.4F.....	2.0 fl oz							
+ Spotrete 4F	4.0 fl oz	14	0.0 e	0.0 n	0.0 l	0.0 l	0.0 n	0.5 l
94 Disarm 480SC.....	0.18 fl oz	14	2.0 c-e	3.3 h-n	2.5 kl	1.8 i-l	6.0 g-m	2.8 i-l
95 Daconil Ultrex 82.5WDG.....	1.8 oz	14	1.8 c-e	2.3 i-n	0.8 kl	0.8 kl	2.8 k-n	3.0 i-l
96 Daconil Ultrex 82.5WDG.....	2.0 oz	14	1.5 c-e	2.5 h-n	1.3 kl	0.8 kl	2.3 k-n	3.0 i-l
97 Rutgers Program #1.....	—	Var ⁴	1.8 c-e	2.0 i-n	1.0 kl	0.0 l	0.5 n	1.3 kl
98 DK 037 50W.....	0.42 oz	14	4.3 cd	7.5 d-h	9.8 e	7.5 d-g	9.8 fg	8.8 f-h
99 JS 007 50W	0.42 oz	14	3.5 c-e	11.8 d	15.3 d	14.5 ab	17.8 b-d	16.8 bc
100 GW 317 50W	0.42 oz	14	3.5 c-e	9.8 de	8.8 e-g	12.8 bc	15.3 c-e	17.5 bc
101 VN 004 50W	0.42 oz	14	2.5 c-e	6.0 e-k	4.8 g-l	6.8 fg	9.3 f-h	10.3 f-g
102 SV 017 50W.....	0.42 oz	14	4.8 c	9.5 d-f	7.0 e-j	9.8 c-f	15.0 c-e	15.8 cd
103 LK 016 50W	0.42 oz	14	1.0 de	4.0 g-n	4.0 i-l	4.5 g-k	7.3 g-k	7.3 f-j
104 DA 003 50W.....	0.42 oz	14	1.0 de	4.8 f-n	4.3 h-l	6.0 gh	9.8 fg	12.0 d-f

(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ²	Number of Lesion Centers per Plot ¹					
			11 June	20 June	30 June	10 July	20 July	2 Aug.
105 GW 354 50W	0.42 oz	14	4.3 cd	9.5 d-f	11.0 e	12.8 bc	14.8 de	15.0 c-e
106 Trinity 1.67SC	0.5 fl oz	14	3.0 c-e	4.5 g-n	1.5 kl	4.0 g-l	6.5 g-l	6.3 g-k
107 Trinity 1.67SC	0.75 fl oz	14	2.8 c-e	4.0 g-n	1.3 kl	1.0 kl	3.0 k-n	2.8 i-l
108 Trinity 1.67SC	1.0 fl oz	14	2.0 c-e	2.8 h-n	1.3 kl	0.8 kl	1.0 mn	1.8 kl
109 Trinity 1.67SC	1.5 fl oz	21	1.8 c-e	0.5 l-n	0.3 l	0.0 l	0.0 n	0.0 l
110 Trinity 1.67SC	2.0 fl oz	14	1.8 c-e	0.8 k-n	0.0 l	0.0 l	0.0 n	0.0 l
111 Banner MAXX 1.3ME	2.0 fl oz	14	0.3 e	0.3 mn	0.0 l	0.0 l	0.0 n	0.0 l
112 Bayleton 50WG	1.0 oz	14	3.5 c-e	2.0 i-n	1.0 kl	0.3 l	0.8 n	0.0 l
113 UTC	—	—	10.5 b	28.5 b	19.8 c	15.8 ab	16.5 b-e	19.0 bc
114 Lynx 2SC	2.0 fl oz	14	1.5 c-e	0.0 n	0.0 l	0.0 l	0.0 n	0.0 l
115 Emerald 70WG	0.18 oz	14	1.0 de	0.5 l-n	0.5 kl	0.0 l	0.0 n	0.0 l
116 Untreated check	—	—	14.5 a	30.3 ab	24.3 b	16.8 a	20.8 ab	19.0 bc
117 Untreated check	—	—	16.0 a	33.5 a	29.3 a	17.8 a	22.5 a	24.8 a
118 Untreated check	—	—	13.3 a	23.3 c	28.3 a	16.0 ab	19.3 a-c	21.0 ab
119 Untreated check	—	—	14.0 a	24.0 c	21.8 bc	16.0 ab	20.5 ab	20.5 ab
		INT ⁵	DAT ⁶	DAT	DAT	DAT	DAT	DAT
		7	4	6	2	5	1	7
		14	4	13	9	5	1	14
		21	18	6	16	5	15	7
		28	18	27	9	19	1	14

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 24 May (all treatments), 31 May (7-day treatment), 7 June (7- and 14-day treatments), 14 June (7- and 21-day treatments), 21 June (7-, 14-, and 28-day treatments), 28 June (7-day treatment), 5 July (7-, 14-, and 21-day treatments), 12 July (7-day treatment), 19 July (7-, 14-, and 28-day treatments), 26 July (7- and 21-day treatments), 2 August (7- and 14-day treatments), and 9 August (7-day treatment).

³ Treatment 88 (EcoGuard Program #1) consisted of EcoGuard L (20.0 fl oz) + Bio B Plus (1.5 fl oz) + NoburN (3.0 fl oz).

(Continued)

Table 1A (continued).

⁴ Variable spray program, where treatment 97 (Rutgers Program #1) consisted of Emerald 70WG (0.13 oz) on 24 May, Banner MAXX 1.3 ME (1.0 fl oz) on 7 June, Daconil Ultrex 82.5WDG (2.75 oz) on 21 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 19 July, Banol 6SC (1.1 fl oz) + Insignia 20WG (0.9 oz) on 2 August, and Eagle 20EW (1.2 fl oz) on 16 August.

⁵ Spray intervals in days.

⁶ Days after treatment (DAT) for each spray interval.

Table 1B. Control of dollar spot on a creeping bentgrass green with fungicides and biorational products: Rutgers University, 2007.

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ³	Number of Lesion Centers per Plot ¹					Residue ² 13 June
			14 Aug.	29 Aug.	6 Sept.	17 Sept.	27 Sept.	
1 Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5WG 3.2 oz		14	0.0 h	1.0 p	0.5 p-r	2.8 q-w	12.0 z'e'-v'	3.0 a
2 Chipco Signature 80WG 4.0 oz + Banner MAXX 1.3MC 0.5 fl oz		14	0.0 h	1.3 op	5.0 m-r	11.5 i-r	22.3 l-x	1.0 h
3 RU192514D07 1.0 fl oz		14	0.0 h	2.0 n-p	0.0 r	2.0 r-w	10.5 z'i'-x'	1.0 h
4 RU192514D07 1.5 fl oz		14	0.0 h	1.5 n-p	0.0 r	1.8 s-w	10.0 z'k'-x'	1.0 h
5 RU192514D07 2.0 fl oz		14	0.0 h	1.3 op	0.0 r	0.3 w	6.8 z'u'-x'	1.0 h
6 RU192514D07 1.5 fl oz + RU192514A07 2.0 fl oz		14	0.0 h	0.5 p	0.0 r	0.8 vw	6.8 z'u'-x'	1.3 gh
7 RU192514D07 1.5 fl oz + RU192514B07 0.5 fl oz		14	0.0 h	3.3 m-p	0.0 r	0.8 vw	7.3 z't'-x'	1.0 h
8 Emerald 70WG 0.13 oz		14	0.0 h	1.5 n-p	0.3 qr	1.3 u-w	6.3 z'v'-x'	1.0 h
9 Emerald 70WG 0.18 oz		14	0.0 h	2.0 n-p	0.0 r	1.0 vw	4.8 z'-x'	1.0 h
10 Daconil Weather Stik 6F 2.0 fl oz		14	1.0 gh	3.8 m-p	3.8 n-r	9.0 j-w	13.3 z'c'-u'	1.5 fg
11 Daconil Weather Stik 6F 3.6 fl oz		21	0.0 h	3.0 n-p	3.0 n-r	2.5 q-w	8.8 z'o'-x'	1.0 h
12 EXC3523A 6SC 2.0 fl oz		14	0.0 h	2.8 n-p	0.3 qr	4.3 o-w	12.0 z'e'-v'	1.5 fg
13 EXC3523A 6SC 3.6 fl oz		21	0.0 h	4.3 l-p	2.8 n-r	6.3 m-w	14.8 y-z'p'	1.0 h
14 EXC3523B 6SC 2.0 fl oz		14	0.3 h	3.5 m-p	5.8 m-r	8.5 j-w	18.8 r-z'd'	1.5 fg
15 EXC3523B 6SC 3.6 fl oz		21	0.3 h	5.3 l-p	8.3 k-r	13.5 g-o	23.5 i-v	1.0 h
16 EXC3523C 6SC 2.0 fl oz		14	0.8 gh	6.3 j-p	5.0 m-r	6.3 m-w	12.5 z'd'-v'	1.3 gh
17 EXC3523C 6SC 3.6 fl oz		21	0.3 h	4.0 m-p	3.5 n-r	5.0 m-w	12.5 z'd'-v'	1.0 h
18 EXC3523D 6SC 2.0 fl oz		14	3.5 e-h	8.0 i-p	5.3 m-r	9.0 j-w	17.5 u-z'h'	1.8 ef
19 EXC3523D 6SC 3.6 fl oz		21	0.3 h	6.5 j-p	6.3 l-r	9.3 j-w	15.0 y-z'o'	1.0 h
20 EXC3523E 6SC 2.0 fl oz		14	0.0 h	2.8 n-p	3.5 n-r	5.8 m-w	15.3 y-z'o'	1.0 h
21 EXC3523E 6SC 3.6 fl oz		21	0.0 h	4.8 l-p	6.3 l-r	8.5 j-w	19.8 p-z'c'	1.0 h
22 A7402 2.1EC..... 0.16 fl oz		14	0.0 h	5.0 l-p	9.0 j-p	12.5 h-p	31.0 c-g	1.0 h
23 A7402 2.1EC..... 0.31 fl oz		14	0.0 h	3.0 n-p	1.5 o-r	4.8 n-w	18.5 s-z'e'	1.0 h
24 A7402 2.1EC..... 0.62 fl oz		14	0.0 h	2.0 n-p	0.0 r	3.5 p-w	10.3 z'j'-x'	1.0 h
25 A7402 2.1EC..... 0.94 fl oz		14	0.0 h	2.5 n-p	0.3 qr	1.8 s-w	11.0 z'h'-x'	1.0 h
26 Banner MAXX 1.3ME..... 0.5 fl oz		14	0.3 h	3.3 m-p	3.5 n-r	8.3 j-w	15.0 y-z'o'	1.0 h

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ³	Number of Lesion Centers per Plot ¹					Residue ² 13 June
			14 Aug.	29 Aug.	6 Sept.	17 Sept.	27 Sept.	
27 Banner MAXX 1.3ME	1.0 fl oz	14	0.0 h	3.8 m-p	4.8 n-r	7.5 l-w	16.0 x-z'l'	1.0 h
28 Banner MAXX 1.3ME	1.5 fl oz	14	0.0 h	2.0 n-p	1.3 p-r	4.3 o-w	14.0 z'a'-s'	1.0 h
29 A6780 1.3ME	0.5 fl oz	14	0.0 h	1.3 op	1.0 p-r	4.0 o-w	15.8 xz'-m'	1.0 h
30 A6780 1.3ME	1.0 fl oz	14	0.0 h	0.3 p	0.0 r	4.3 o-w	13.8 z'b'-t'	1.0 h
31 Heritage TL 0.8ME	1.0 fl oz	14	0.0 h	13.0 h-m	15.8 e-k	20.8 a-h	30.8 d-h	1.0 h
32 3336 50WP	1.44 oz	14	1.8 f-h	8.3 i-p	5.5 m-r	7.5 l-w	14.3 z-z'r'	1.0 h
33 Heritage TL 0.8ME	1.0 fl oz							
+ Daconil Weather Stik 6F	2.0 fl oz	14	0.0 h	4.5 l-p	6.3 l-r	8.5 j-w	20.8 n-z	1.0 h
34 A15935 5.2SC	2.5 fl oz	14	0.3 h	3.3 m-p	2.3 n-r	4.5 o-w	14.5 z-z'q'	1.5 fg
35 RU192514D07	1.2 fl oz	14	0.0 h	3.3 m-p	0.0 r	2.3 q-w	11.5 z'f'-w'	1.0 h
36 RU192514D07	2.4 fl oz	14	0.0 h	2.3 n-p	0.0 r	1.3 u-w	7.5 z's'-x'	1.0 h
37 Tourney 50WDG	0.18 oz	14	0.0 h	3.0 n-p	2.8 n-r	7.5 l-w	20.5 o-z'a'	1.0 h
38 Tourney 50WDG	0.37 oz	14	0.0 h	1.8 n-p	1.0 p-r	2.5 q-w	13.3 z'c'-u'	1.0 h
39 EX 190 2.5SC	0.13 fl oz	14	0.0 h	3.3 m-p	2.5 n-r	5.3 m-w	17.5 u-z'h'	1.0 h
40 EX 190 2.5SC	0.26 fl oz	14	0.0 h	0.8 p	1.8 n-r	5.3 m-w	18.8 r-z'd'	1.0 h
41 EX 190 2.5SC	0.52 fl oz	14	0.0 h	0.8 p	1.8 n-r	4.8 n-w	16.0 x-z'l'	1.0 h
42 Tourney 50WDG	0.18 oz	21	1.0 gh	15.0 g-k	14.0 g-l	17.0 d-k	31.0 c-g	1.0 h
43 Tourney 50WDG	0.37 oz	21	0.0 h	2.3 n-p	2.8 n-r	8.5 j-w	20.8 n-z	1.0 h
44 EX 190 2.5SC	0.13 fl oz	21	3.0 fh	11.3 i-o	19.5 b-h	24.5 a-d	25.3 f-r	1.0 h
45 EX 190 2.5SC	0.26 fl oz	21	0.0 h	8.8 i-p	10.0 i-n	14.3 f-n	26.8 e-o	1.0 h
46 EX 190 2.5SC	0.52 fl oz	21	0.0 h	0.8 p	2.0 n-r	5.3 m-w	11.5 z'f'-w'	1.0 h
47 Rhapsody AS	5.0 fl oz							
+ Daconil Ultrex 82.5WG	1.8 oz	14	0.5 gh	6.0 j-p	8.0 k-r	11.5 i-r	20.8 n-z	1.8 ef
48 Daconil Ultrex 82.5WG	3.7 oz	14	0.0 h	0.8 p	2.0 n-r	5.3 m-w	20.8 n-z	2.3 cd
49 GF1948 1.22EW	0.5 fl oz	14	0.0 h	5.3 l-p	5.0 m-r	10.3 i-v	17.8 t-z'g'	1.0 h
50 GF1948 1.22EW	1.0 fl oz	14	0.0 h	0.3 p	1.8 n-r	4.0 o-w	9.5 z'l'-x'	1.0 h
51 GF1948 1.22EW	1.0 fl oz	21	1.8 f-h	11.5 i-n	9.8 i-o	12.5 h-p	25.0 g-s	1.0 h
52 GF1948 1.22EW	2.0 fl oz	14	0.0 h	3.0 n-p	0.3 qr	1.5 t-w	9.5 z'l'-x'	1.0 h
53 GF1948 1.22EW	0.5 fl oz							
+ Daconil Ultrex 82.5WG	3.2 oz	14	0.0 h	0.0 p	0.0 r	2.0 r-w	9.3 z'm'-x'	2.0 de

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ³	Number of Lesion Centers per Plot ¹					Residue ² 13 June
			14 Aug.	29 Aug.	6 Sept.	17 Sept.	27 Sept.	
54 GF1948 1.22EW	1.0 fl oz							
+ Daconil Ultrex 82.5WG	3.2 oz	21	0.0 h	1.5 n-p	0.8 p-r	2.3 q-w	10.3 z'j'-x'	1.0 h
55 3336 50WP	2.16 oz	21	0.0 h	1.5 n-p	1.0 p-r	4.8 n-w	13.8 z'b'-t'	1.0 h
56 Banner MAXX 1.3ME	1.0 fl oz	21	0.3 h	8.0 i-p	3.5 n-r	7.5 l-w	18.0 t-z'e'	1.0 h
57 Banner MAXX 1.3ME	0.5 fl oz							
+ Daconil Ultrex 82.5WG	3.2 oz	14	0.0 h	2.8 n-p	1.5 o-r	2.5 q-w	10.8 z'i'-x'	2.5 bc
58 Banner MAXX 1.3ME	1.0 fl oz							
+ Daconil Ultrex 82.5WG	3.2 oz	21	0.0 h	1.5 n-p	1.8 n-r	3.3 p-w	12.8 z'd'-v'	1.0 h
59 Daconil Ultrex 82.5WG	3.2 oz	14	0.0 h	5.5 k-p	2.0 n-r	5.5 m-w	18.5 s-z'e'	2.5 bc
60 Daconil Ultrex 82.5WG	3.2 oz	21	1.5 gh	9.5 i-p	6.3 l-r	9.8 i-w	21.3 m-y	1.0 h
61 Eagle 20EW	1.2 fl oz	14	0.3 h	2.0 n-p	3.5 n-r	8.8 j-w	15.5 y-z'n'	1.0 h
62 Eagle 20EW	2.4 fl oz	14	0.0 h	0.5 p	0.8 p-r	4.8 n-w	9.0 z'n'-x'	1.0 h
63 Chipco 26GT 2SC	4.0 fl oz	14	0.0 h	2.5 n-p	3.8 n-r	5.3 m-w	19.5 q-z'c'	1.0 h
64 Banner MAXX 1.3ME	2.0 fl oz	14	0.0 h	1.8 n-p	1.3 p-r	2.3 q-w	8.3 z'p'-x'	1.0 h
65 Spectator Ultra 1.3EC	1.0 fl oz	14	0.0 h	4.0 m-p	2.0 n-r	4.0 o-w	12.5 z'd'-v'	1.0 h
66 Spectator Ultra 1.3EC	2.0 fl oz	21	0.3 h	7.5 j-p	3.3 n-r	11.3 i-s	23.3 j-w	1.0 h
67 Manicure Ultra 82.5WDG	3.25 oz	14	0.0 h	1.8 n-p	6.5 l-r	4.3 o-w	15.3 y-z'o'	2.8 ab
68 Manicure 6F	3.6 fl oz	14	0.0 h	1.0 p	1.8 n-r	3.8 p-w	13.3 z'c'-u'	1.5 fg
69 Spectator Ultra 1.3EC	2.0 fl oz							
+ Manicure Ultra 82.5WDG	3.25 oz	21	0.0 h	0.3 p	0.3 qr	1.3 u-w	5.0 z'w'-x'	1.0 h
70 LEM17 20SC	0.47 fl oz	14	0.5 gh	1.3 op	2.8 n-r	4.8 n-w	11.5 z'f'-w'	1.0 h
71 LEM17 50WDG	0.2 oz	14	0.5 gh	6.8 j-p	8.8 j-q	11.8 i-q	24.3 h-t	1.0 h
72 LEM17 50WDG	0.3 oz	14	0.0 h	5.3 l-p	7.3 l-r	11.3 i-s	24.0 i-u	1.0 h
73 LEM17 50WDG	0.4 oz	14	0.5 gh	4.3 l-p	6.0 l-r	10.8 i-u	19.8 p-z'c'	1.0 h
74 LEM17 50WDG	0.5 oz	14	0.0 h	4.8 l-p	4.5 m-r	7.0 m-w	14.0 z'a'-s'	1.0 h
75 LEM17 50WDG	0.2 oz							
+ DPXYT669 22.5SC	0.28 fl oz	14	1.3 gh	14.0 h-l	15.5 e-k	18.8 b-i	28.8 e-l	1.0 h
76 DPXYT669 22.5SC	0.28 fl oz	14	0.5 gh	4.8 l-p	7.0 l-r	10.0 i-v	26.8 e-o	1.0 h
77 Insignia 20WG	0.9 oz	14	0.0 h	1.0 p	0.0 r	2.0 r-w	7.8 z'r'-x'	1.0 h
78 Curalan 50EG	1.0 oz	14	0.8 gh	2.8 n-p	4.3 m-r	5.5 m-w	16.3 x-z'k'	1.0 h

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ³	Number of Lesion Centers per Plot ¹					Residue ² 13 June
			14 Aug.	29 Aug.	6 Sept.	17 Sept.	27 Sept.	
79 SARS346 40WP	0.5 oz	14	0.0 h	0.5 p	0.0 r	2.3 q-w	12.0 z'e'-v'	1.0 h
80 SARS346 40WP	0.75 oz	21	0.0 h	0.3 p	0.8 p-r	5.3 m-w	9.5 z'l'-x'	1.0 h
81 SARS346 40WP	1.0 oz	28	0.0 h	2.3 n-p	3.3 n-r	7.0 m-w	16.8 w-z'j'	1.0 h
82 SARS346 40WP	0.4 oz	14	0.0 h	0.5 p	0.0 r	2.5 q-w	8.0 z'q'-x'	1.0 h
+ 3336 50WP	1.44 oz							
83 SARS346 40WP	0.4 oz	21	0.0 h	2.0 n-p	1.8 n-r	3.0 p-w	9.0 z'n'-x'	1.0 h
+ 3336 50WP	2.16 oz							
84 SARS351 20SC	0.5 fl oz	14	0.0 h	2.3 n-p	0.3 qr	3.0 p-w	12.8 z'd'-v'	1.0 h
85 SARS351 20SC	1.0 fl oz	14	0.0 h	2.0 n-p	0.0 r	1.0 vw	9.8 z'k'-x'	1.0 h
86 SARS351 20SC	1.5 fl oz	14	0.0 h	1.0 p	0.3 qr	2.3 q-w	9.8 z'k'-x'	1.0 h
87 EcoGuard L.....	20.0 fl oz	7	0.8 gh	23.5 d-g	22.8 a-f	24.0 a-d	39.8 a	1.0 h
88 EcoGuard Program #1	—	7 ⁴	5.3 c-f	26.3 b-e	18.8 c-h	22.8 a-f	29.3 d-k	1.0 h
89 EcoGuard L.....	20.0 fl oz	7	1.0 gh	25.3 c-f	28.8 a	27.8 ab	37.5 a-c	1.0 h
+ NoburN.....	3.0 fl oz							
90 CLEXP16 F	0.27 fl oz	14	3.3 e-h	15.3 g-j	12.3 h-m	16.8 d-l	25.3 f-r	1.0 h
91 CLEXP16 F	0.6 fl oz	14	0.0 h	3.3 m-p	6.3 l-r	10.8 i-u	23.0 k-w	1.0 h
92 CL EXP – 9 WG	0.6 oz	14	0.0 h	5.5 k-p	3.5 n-r	6.3 m-w	20.0 p-z'b'	1.0 h
93 3336 Plus 19.4F.....	2.0 fl oz	14	0.0 h	1.5 n-p	0.5 p-r	5.3 m-w	11.0 z'h'-x'	1.0 h
+ Spotrete 4F	4.0 fl oz							
94 Disarm 480SC.....	0.18 fl oz	14	0.0 h	6.8 j-p	5.5 m-r	11.0 i-t	32.0 b-e	1.0 h
95 Daconil Ultrex 82.5WDG.....	1.8 oz	14	1.3 gh	7.0 j-p	6.5 l-r	9.0 j-w	18.5 s-z'e'	1.5 fg
96 Daconil Ultrex 82.5WDG.....	2.0 oz	14	0.3 h	8.0 i-p	8.8 j-q	11.3 i-s	20.8 n-z	1.5 fg
97 Rutgers Program #1.....	—	Var ⁵	0.0 h	2.0 n-p	0.8 p-r	3.0 p-w	14.8 y-z'p'	1.0 h
98 DK 037 50W.....	0.42 oz	14	2.5 f-h	15.3 g-j	18.5 c-h	21.3 a-h	35.8 a-d	1.0 h
99 JS 007 50W	0.42 oz	14	4.3 d-g	28.5 b-e	24.8 a-c	26.3 a-c	37.5 a-c	1.0 h
100 GW 317 50W	0.42 oz	14	8.0 bc	29.5 b-e	18.5 c-h	23.3 a-e	30.0 d-i	1.0 h
101 VN 004 50W	0.42 oz	14	2.8 f-h	25.5 c-f	16.3 d-j	17.5 c-j	30.0 d-i	1.0 h
102 SV 017 50W.....	0.42 oz	14	3.5 e-h	28.3 b-e	18.3 c-h	22.8 a-f	31.8 b-f	1.0 h
103 LK 016 50W	0.42 oz	14	5.3 c-f	17.0 f-i	15.0 f-k	14.5 e-m	25.8 e-q	1.0 h
104 DA 003 50W.....	0.42 oz	14	6.8 b-e	24.0 d-f	20.5 b-g	23.5 a-d	28.3 e-l	1.0 h

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ³	Number of Lesion Centers per Plot ¹					Residue ² 13 June
			14 Aug.	29 Aug.	6 Sept.	17 Sept.	27 Sept.	
105 GW 354 50W	0.42 oz	14	7.5 b-d	21.8 e-h	17.3 c-i	23.8 a-d	35.8 a-d	1.0 h
106 Trinity 1.67SC	0.5 fl oz	14	1.3 g-h	5.3 l-p	6.8 l-r	14.5 e-m	26.3 e-p	1.0 h
107 Trinity 1.67SC	0.75 fl oz	14	0.0 h	4.0 m-p	4.3 m-r	7.0 m-w	17.0 v-z'i'	1.0 h
108 Trinity 1.67SC	1.0 fl oz	14	0.0 h	4.0 m-p	5.3 m-r	8.0 k-w	18.0 t-z'e'	1.0 h
109 Trinity 1.67SC	1.5 fl oz	21	0.0 h	1.3 op	1.8 n-r	3.3 p-w	12.5 z'd'-v'	1.0 h
110 Trinity 1.67SC	2.0 fl oz	14	0.0 h	1.8 n-p	4.0 m-r	6.0 m-w	16.8 w-z'j'	1.0 h
111 Banner MAXX 1.3ME	2.0 fl oz	14	0.0 h	0.8 p	0.5 p-r	1.3 u-w	9.5 z'l'-x'	1.0 h
112 Bayleton 50WG	1.0 oz	14	0.0 h	1.8 n-p	3.3 n-r	4.0 o-w	11.5 z'f'-w'	1.0 h
113 Untreated check	—	—	8.8 bc	33.3 a-c	23.3 a-e	23.5 a-d	27.3 e-n	1.0 h
114 Lynx 2SC	2.0 fl oz	14	0.5 g-h	1.8 n-p	0.3 q-r	3.5 p-w	11.3 z'g'-x'	1.8 ef
115 Emerald 70WG	0.18 oz	14	0.0 h	0.5 p	0.3 q-r	2.5 q-w	12.0 z'e'-v'	1.0 h
116 Untreated check	—	—	8.8 bc	34.5 ab	23.8 a-d	23.5 a-d	38.3 ab	1.0 h
117 Untreated check	—	—	9.5 ab	38.8 a	26.8 ab	28.8 a	27.8 e-m	1.0 h
118 Untreated check	—	—	12.5 a	39.0 a	22.8 a-f	21.5 a-g	29.8 d-j	1.0 h
119 Untreated check	—	—	12.3 a	32.0 a-d	22.3 a-f	24.8 a-d	31.0 c-g	1.0 h
		INT ⁶	DAT ⁷	DAT	DAT	DAT	DAT	DAT
		7	5	20	28	39	49	6
		14	12	27	35	46	56	6
		21	19	34	42	53	63	19
		28	26	41	49	60	70	26

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 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.

³ Fungicides were applied on 24 May (all treatments), 31 May (7-day treatment), 7 June (7- and 14-day treatments), 14 June (7- and 21-day treatments), 21 June (7-, 14-, and 28-day treatments), 28 June (7-day treatment), 5 July (7-, 14-, and 21-day treatments), 12 July (7-day treatment), 19 July (7-, 14-, and 28-day treatments), 26 July (7- and 21-day treatments), 2 August (7- and 14-day treatments), and 9 August (7-day treatment).

(Continued)

Table 1B (continued).

⁴ Treatment 88 (EcoGuard Program #1) consisted of EcoGuard L (20.0 fl oz) + Bio B Plus (1.5 fl oz) + NoburN (3.0 fl oz).

⁵ Variable spray program, where treatment 97 (Rutgers Program #1) consisted of Emerald 70WG (0.13 oz) on 24 May, Banner MAXX 1.3 ME (1.0 fl oz) on 7 June, Daconil Ultrex 82.5WDG (2.75 oz) on 21 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 19 July, Banol 6SC (1.1 fl oz) + Insignia 20WG (0.9 oz) on 2 August, and Eagle 20EW (1.2 fl oz) on 16 August.

⁶ Spray intervals in days.

⁷ Days after treatment (DAT) for each spray interval.

Table 1C. Control of dollar spot on a creeping bentgrass green with fungicides and biorational products: Rutgers University, 2007.

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ⁵	Phyto-toxicity ⁴ 22 Aug.	Algae ^{1,2} (%) 23 Aug.	Turf Quality ³	
					20 June	22 Aug.
1 Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5WG 3.2 oz		14	2.5 a	0.8 s		6.8 b-g
2 Chipco Signature 80WG 4.0 oz + Banner MAXX 1.3MC 0.5 fl oz		14	2.0 bc	1.8 q-s		6.3 d-i
3 RU192514D07 1.0 fl oz		14	1.0 f	13.0 d-s		5.8 f-k
4 RU192514D07 1.5 fl oz		14	1.0 f	15.5 b-s		6.3 d-i
5 RU192514D07 2.0 fl oz		14	1.0 f	15.5 b-s		6.5 c-h
6 RU192514D07 1.5 fl oz + RU192514A07 2.0 fl oz		14	1.5 de	16.5 b-s		7.3 a-e
7 RU192514D07 1.5 fl oz + RU192514B07 0.5 fl oz		14	1.0 f	11.0 g-s		6.5 c-h
8 Emerald 70WG 0.13 oz		14	1.0 f	14.5 c-s		6.5 c-h
9 Emerald 70WG 0.18 oz		14	1.0 f	8.8 i-s		7.5 a-d
10 Daconil Weather Stik 6F 2.0 fl oz		14	1.5 de	4.8 n-s		6.5 c-h
11 Daconil Weather Stik 6F 3.6 fl oz		21	1.3 ef	23.0 a-k		6.3 d-i
12 EXC3523A 6SC 2.0 fl oz		14	1.0 f	10.5 h-s		6.8 b-g
13 EXC3523A 6SC 3.6 fl oz		21	1.0 f	12.3 d-s		5.8 f-k
14 EXC3523B 6SC 2.0 fl oz		14	1.0 f	12.3 d-s		7.0 b-f
15 EXC3523B 6SC 3.6 fl oz		21	1.0 f	13.3 d-s		5.8 f-k
16 EXC3523C 6SC 2.0 fl oz		14	1.0 f	18.3 a-q		6.3 d-i
17 EXC3523C 6SC 3.6 fl oz		21	1.0 f	20.8 a-n		6.3 d-i
18 EXC3523D 6SC 2.0 fl oz		14	1.5 de	17.5 b-r		6.3 d-i
19 EXC3523D 6SC 3.6 fl oz		21	1.0 f	16.0 b-s		6.0 e-j
20 EXC3523E 6SC 2.0 fl oz		14	1.5 de	8.5 j-s		7.3 a-e
21 EXC3523E 6SC 3.6 fl oz		21	1.0 f	10.5 h-s		7.3 a-e
22 A7402 2.1EC 0.16 fl oz		14	1.0 f	23.3 a-k		7.5 a-d
23 A7402 2.1EC 0.31 fl oz		14	1.0 f	20.5 a-n		7.3 a-e
24 A7402 2.1EC 0.62 fl oz		14	1.0 f	19.5 a-o		7.5 a-d
25 A7402 2.1EC 0.94 fl oz		14	1.0 f	17.3 b-s		7.5 a-d
26 Banner MAXX 1.3ME 0.5 fl oz		14	1.0 f	13.3 d-s		6.8 b-g

Table 1C (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ⁵	Phyto- toxicity ⁴ 22 Aug.	Algae ^{1,2} (%) 23 Aug.	Turf Quality ³	
					20 June	22 Aug.
27 Banner MAXX 1.3ME	1.0 fl oz	14	1.0 f	11.0 g-s	7.8 a	7.8 a-c
28 Banner MAXX 1.3ME	1.5 fl oz	14	1.0 f	14.3 c-s	7.3 ab	7.5 a-d
29 A6780 1.3ME	0.5 fl oz	14	1.0 f	14.0 c-s		8.0 ab
30 A6780 1.3ME	1.0 fl oz	14	1.0 f	13.8 c-s		7.8 a-c
31 Heritage TL 0.8ME	1.0 fl oz	14	1.0 f	8.3 j-s		7.8 a-c
32 3336 50WP	1.44 oz	14	1.0 f	9.0 i-s		6.5 c-h
33 Heritage TL 0.8ME	1.0 fl oz					
+ Daconil Weather Stik 6F	2.0 fl oz	14	1.3 ef	13.5 d-s		7.5 a-d
34 A15935 5.2SC	2.5 fl oz	14	1.0 f	3.8 o-s		7.5 a-d
35 RU192514D07	1.2 fl oz	14	1.0 f	17.5 b-r		5.3 h-l
36 RU192514D07	2.4 fl oz	14	1.0 f	15.3 b-s		6.3 d-i
37 Tourney 50WDG	0.18 oz	14	1.0 f	3.0 o-s		7.8 a-c
38 Tourney 50WDG	0.37 oz	14	1.0 f	5.3 m-s		7.8 a-c
39 EX 190 2.5SC	0.13 fl oz	14	1.0 f	18.5 a-p		5.8 f-k
40 EX 190 2.5SC	0.26 fl oz	14	1.0 f	19.3 a-o		6.5 c-h
41 EX 190 2.5SC	0.52 fl oz	14	1.0 f	13.0 d-s		7.5 a-d
42 Tourney 50WDG	0.18 oz	21	1.0 f	6.0 l-s		6.5 c-h
43 Tourney 50WDG	0.37 oz	21	1.0 f	9.5 i-s		7.8 a-c
44 EX 190 2.5SC	0.13 fl oz	21	1.0 f	13.0 d-s		5.3 h-l
45 EX 190 2.5SC	0.26 fl oz	21	1.0 f	10.0 h-s		7.0 b-f
46 EX 190 2.5SC	0.52 fl oz	21	1.0 f	8.5 j-s		7.0 b-f
47 Rhapsody AS	5.0 fl oz					
+ Daconil Ultrex 82.5WG	1.8 oz	14	1.8 cd	8.5 j-s		7.0 b-f
48 Daconil Ultrex 82.5WG	3.7 oz	14	2.3 ab	1.0 r-s		6.3 d-i
49 GF1948 1.22EW	0.5 fl oz	14	1.0 f	12.8 d-s		7.3 a-e
50 GF1948 1.22EW	1.0 fl oz	14	1.0 f	14.3 c-s	7.8 a	7.0 b-f
51 GF1948 1.22EW	1.0 fl oz	21	1.0 f	10.8 g-s		6.8 b-g
52 GF1948 1.22EW	2.0 fl oz	14	1.5 de	21.5 a-m	7.3 ab	7.0 b-f
53 GF1948 1.22EW	0.5 fl oz					
+ Daconil Ultrex 82.5WG	3.2 oz	14	2.5 a	3.5 o-s		6.0 e-j

Table 1C (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ⁵	Phyto- toxicity ⁴ 22 Aug.	Algae ^{1,2} (%) 23 Aug.	Turf Quality ³	
					20 June	22 Aug.
54 GF1948 1.22EW	1.0 fl oz					
+ Daconil Ultrex 82.5WG	3.2 oz	21	1.0 f	3.0 o-s		6.8 b-g
55 3336 50WP	2.16 oz	21	1.0 f	18.8 a-p		7.3 a-e
56 Banner MAXX 1.3ME	1.0 fl oz	21	1.0 f	16.5 b-s		5.5 g-l
57 Banner MAXX 1.3ME	0.5 fl oz					
+ Daconil Ultrex 82.5WG	3.2 oz	14	2.3 ab	2.0 p-s		5.8 f-k
58 Banner MAXX 1.3ME	1.0 fl oz					
+ Daconil Ultrex 82.5WG	3.2 oz	21	1.0 f	5.0 m-s		6.5 c-h
59 Daconil Ultrex 82.5WG	3.2 oz	14	2.3 ab	2.8 o-s		6.0 e-j
60 Daconil Ultrex 82.5WG	3.2 oz	21	1.5 de	5.0 m-s		5.8 f-k
61 Eagle 20EW	1.2 fl oz	14	1.0 f	10.3 h-s	7.8 a	7.3 a-e
62 Eagle 20EW	2.4 fl oz	14	1.5 de	3.8 o-s	7.5 a	7.5 a-d
63 Chipco 26GT 2SC	4.0 fl oz	14	1.0 f	8.3 j-s		7.8 a-c
64 Banner MAXX 1.3ME	2.0 fl oz	14	1.0 f	7.0 k-s	7.3 ab	7.3 a-e
65 Spectator Ultra 1.3EC	1.0 fl oz	14	1.0 f	3.8 o-s		7.8 a-c
66 Spectator Ultra 1.3EC	2.0 fl oz	21	1.0 f	7.8 j-s		7.0 b-f
67 Manicure Ultra 82.5WDG	3.25 oz	14	2.0 bc	3.3 o-s		6.8 b-g
68 Manicure 6F	3.6 fl oz	14	2.0 bc	6.3 l-s		6.0 e-j
69 Spectator Ultra 1.3EC	2.0 fl oz					
+ Manicure Ultra 82.5WDG	3.25 oz	21	2.5 a	6.8 k-s		5.3 h-l
70 LEM17 20SC	0.47 fl oz	14	1.0 f	8.8 i-s		7.0 b-f
71 LEM17 50WDG	0.2 oz	14	1.0 f	19.0 a-o		6.5 c-h
72 LEM17 50WDG	0.3 oz	14	1.0 f	10.0 h-s		6.3 d-i
73 LEM17 50WDG	0.4 oz	14	1.0 f	14.8 c-s		6.8 b-g
74 LEM17 50WDG	0.5 oz	14	1.0 f	18.3 a-q		6.3 d-i
75 LEM17 50WDG	0.2 oz					
+ DPXYT669 22.5SC	0.28 fl oz	14	1.0 f	9.0 i-s		7.8 a-c
76 DPXYT669 22.5SC	0.28 fl oz	14	1.0 f	7.5 k-s		7.8 a-c
77 Insignia 20WG	0.9 oz	14	1.0 f	10.0 h-s		7.5 a-d
78 Curalan 50EG	1.0 oz	14	1.0 f	13.8 c-s		6.0 e-j

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(Continued)

Table 1C (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ⁵	Phyto- toxicity ⁴ 22 Aug.	Algae ^{1,2} (%) 23 Aug.	Turf Quality ³	
					20 June	22 Aug.
79 SARS346 40WP	0.5 oz	14	1.0 f	28.0 a-e		5.5 g-l
80 SARS346 40WP	0.75 oz	21	1.0 f	9.3 i-s		6.0 e-j
81 SARS346 40WP	1.0 oz	28	1.0 f	13.5 d-s		5.8 f-k
82 SARS346 40WP	0.4 oz					
+ 3336 50WP	1.44 oz	14	1.0 f	10.8 g-s		5.5 g-l
83 SARS346 40WP	0.4 oz					
+ 3336 50WP	2.16 oz	21	1.0 f	13.3 d-s		6.0 e-j
84 SARS351 20SC	0.5 fl oz	14	1.0 f	33.8 a		6.3 d-i
85 SARS351 20SC	1.0 fl oz	14	1.0 f	27.8 a-f		7.3 a-e
86 SARS351 20SC	1.5 fl oz	14	1.0 f	27.3 a-g		7.8 a-c
87 EcoGuard L.....	20.0 fl oz	7	1.0 f	9.8 i-s		8.5 a
88 EcoGuard Program #1	—	7 ⁶	1.0 f	3.3 o-s		8.5 a
89 EcoGuard L.....	20.0 fl oz					
+ NoburN.....	3.0 fl oz	7	1.0 f	7.3 k-s		8.5 a
90 CLEXP16 F	0.27 fl oz	14	1.0 f	30.0 a-c		5.5 g-l
91 CLEXP16 F	0.6 fl oz	14	1.0 f	26.5 a-h		6.3 d-i
92 CL EXP – 9 WG	0.6 oz	14	1.0 f	8.5 j-s		6.8 b-g
93 3336 Plus 19.4F.....	2.0 fl oz					
+ Spotrete 4F	4.0 fl oz	14	1.0 f	11.5 e-s		7.0 b-f
94 Disarm 480SC.....	0.18 fl oz	14	1.0 f	18.8 a-p		7.8 a-c
95 Daconil Ultrex 82.5WDG.....	1.8 oz	14	1.5 de	15.0 b-s		5.0 i-l
96 Daconil Ultrex 82.5WDG.....	2.0 oz	14	1.0 f	13.5 d-s		7.5 a-d
97 Rutgers Program #1.....	—	Var ⁷	1.3 ef	5.0 m-s		8.0 ab
98 DK 037 50W.....	0.42 oz	14	1.0 f	11.3 f-s		5.8 f-k
99 JS 007 50W	0.42 oz	14	1.0 f	24.3 a-j		5.0 i-l
100 GW 317 50W	0.42 oz	14	1.0 f	19.0 a-o		5.8 f-k
101 VN 004 50W	0.42 oz	14	1.0 f	14.5 c-s		5.5 g-l
102 SV 017 50W.....	0.42 oz	14	1.0 f	17.8 a-q		4.8 j-l
103 LK 016 50W	0.42 oz	14	1.0 f	15.3 b-s		6.0 e-j
104 DA 003 50W.....	0.42 oz	14	1.0 f	16.0 b-s		5.8 f-k

Table 1C (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ⁵	Phyto- toxicity ⁴ 22 Aug.	Algae ^{1,2} (%) 23 Aug.	Turf Quality ³	
					20 June	22 Aug.
105 GW 354 50W	0.42 oz	14	1.0 f	6.8 k-s		5.3 h-l
106 Trinity 1.67SC	0.5 fl oz	14	1.0 f	8.8 i-s		6.0 e-j
107 Trinity 1.67SC	0.75 fl oz	14	1.0 f	12.0 d-s		6.5 c-h
108 Trinity 1.67SC	1.0 fl oz	14	1.0 f	14.5 c-s		6.5 c-h
109 Trinity 1.67SC	1.5 fl oz	21	1.0 f	18.8 a-p		7.3 a-e
110 Trinity 1.67SC	2.0 fl oz	14	1.0 f	11.0 g-s		7.5 a-d
111 Banner MAXX 1.3ME	2.0 fl oz	14	1.3 ef	5.0 m-s		7.8 a-c
112 Bayleton 50WG	1.0 oz	14	1.0 f	11.5 e-s		5.5 g-l
113 UTC	—	—	1.0 f	22.5 a-l		5.3 h-l
114 Lynx 2SC	2.0 fl oz	14	1.0 f	19.5 a-o		7.0 b-f
115 Emerald 70WG	0.18 oz	14	1.0 f	8.8 i-s		8.0 ab
116 Untreated check	—	—	1.0 f	28.3 a-d	6.0 b	4.5 k-l
117 Untreated check	—	—	1.0 f	26.5 a-h		5.0 i-l
118 Untreated check	—	—	1.0 f	31.3 ab		4.3 l
119 Untreated check	—	—	1.0 f	25.3 a-i		5.3 h-l
		INT ⁸	DAT ⁹	DAT	DAT	DAT
		7	13	14	6	13
		14	20	21	13	20
		21	27	28	6	27
		28	34	35	27	34

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

⁴ Phytotoxicity on a 1 to 5 scale where 1 = no discoloration, 2 = slight foliar chlorosis or necrosis, 3 = moderate chlorosis or necrosis, 4 = severe chlorosis or necrosis, and 5 = all turf dead.

(Continued)

Table 1C (continued).

⁵ Fungicides were applied on 24 May (all treatments), 31 May (7-day treatment), 7 June (7- and 14-day treatments), 14 June (7- and 21-day treatments), 21 June (7-, 14-, and 28-day treatments), 28 June (7-day treatment), 5 July (7-, 14-, and 21-day treatments), 12 July (7-day treatment), 19 July (7-, 14-, and 28-day treatments), 26 July (7- and 21-day treatments), 2 August (7- and 14-day treatments), and 9 August (7-day treatment).

⁶ Treatment 88 (EcoGuard Program #1) consisted of EcoGuard L (20.0 fl oz) + Bio B Plus (1.5 fl oz) + NoburN (3.0 fl oz).

⁷ Variable spray program, where treatment 97 (Rutgers Program #1) consisted of Emerald 70WG (0.13 oz) on 24 May, Banner MAXX 1.3 ME (1.0 fl oz) on 7 June, Daconil Ultrex 82.5WDG (2.75 oz) on 21 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 19 July, Banol 6SC (1.1 fl oz) + Insignia 20WG (0.9 oz) on 2 August, and Eagle 20EW (1.2 fl oz) on 16 August.

⁸ Spray intervals in days.

⁹ 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.