

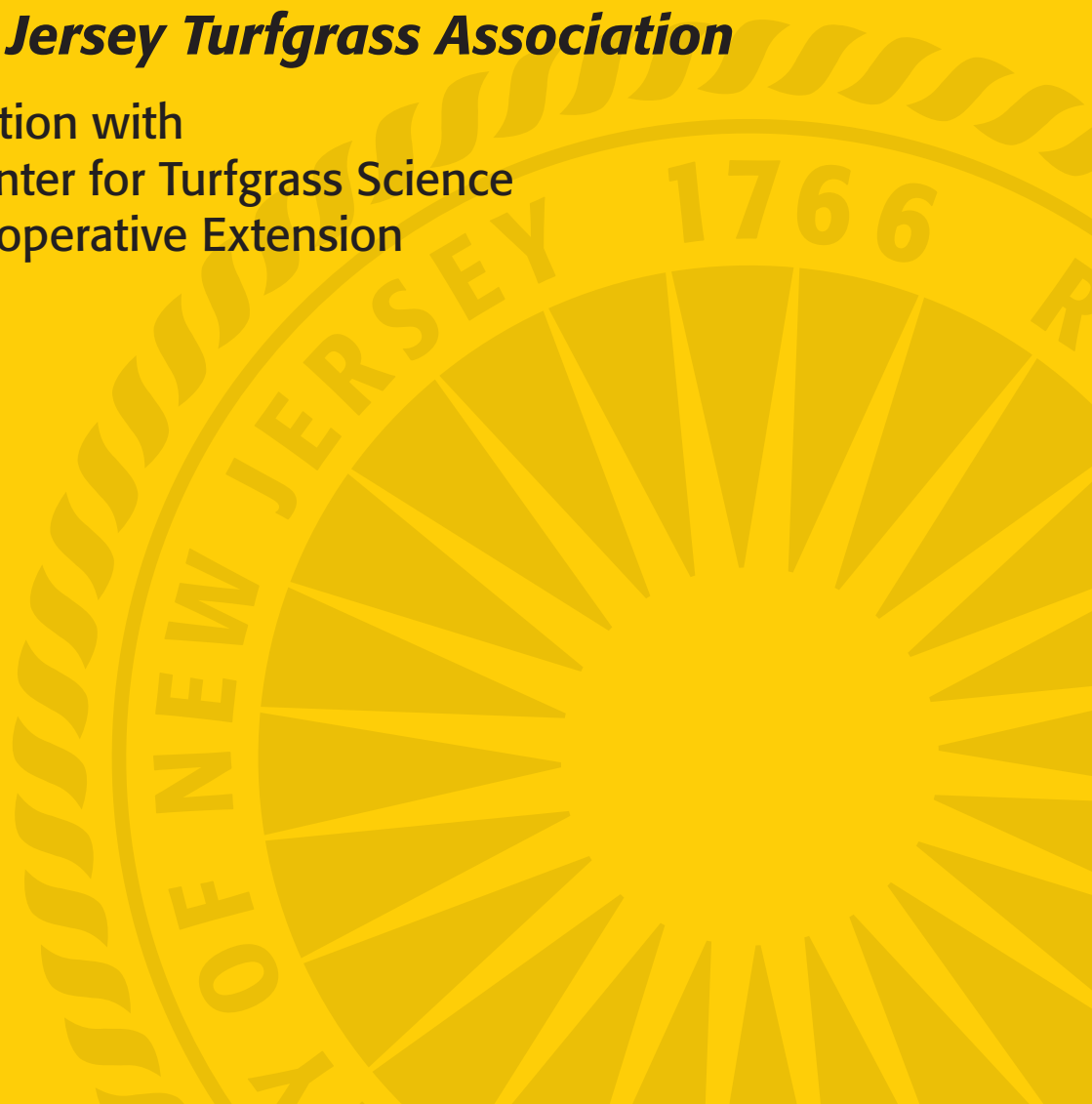
# RUTGERS

New Jersey Agricultural  
Experiment Station

## **2014 Turfgrass Proceedings**

***The New Jersey Turfgrass Association***

In Cooperation with  
Rutgers Center for Turfgrass Science  
Rutgers Cooperative Extension



# **2014 RUTGERS TURFGRASS PROCEEDINGS**

of the

## **GREEN EXPO Turf and Landscape Conference**

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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 2014 GREEN EXPO Turf and Landscape Conference. Publication of these lectures provides a readily available 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

## ANTHRACNOSE CONTROL WITH FUNGICIDES AND BIORATIONAL PRODUCTS ON ANNUAL BLUEGRASS PUTTING GREEN TURF, 2014

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Fungicides were evaluated in 2014 for their ability to control anthracnose basal rot (caused by *Colletotrichum cereale*) on an annual bluegrass (*Poa annua*) putting green at the Rutgers Turf Research Farm in North Brunswick, NJ. The green was established October 2004 on a Nixon loam with a pH of 6.3 by killing the existing stand of creeping bentgrass (*Agrostis stolonifera*) and annual bluegrass with Roundup Pro 3LC (3 qt per acre) and then core aerifying the site in two directions to bring dormant annual bluegrass seed to the soil surface. The site was inoculated with *C. cereale* isolate ValP-04 on 17 July 2005 using a 2 gal per 1,000 ft<sup>2</sup> water spore suspension (4 x 10<sup>5</sup> conidia per ml); the disease developed naturally on the site each year thereafter. Plots were 3 x 5 ft and were arranged in a randomized complete block with four replications. Mowing was performed daily at a height of 0.110 inches with clippings collected. The site was irrigated as needed to prevent drought stress.

Fertilizer was applied as 30-0-0 (0.2 lb nitrogen (N) per 1000 ft<sup>2</sup>) on 27 March; 46-0-0 (0.2 lb N per 1000 ft<sup>2</sup>) on 27 March, 14 and 21 April, 6 and 19 May, 2, 16, and 30 June, 14 and 27 July, and 11 and 25 August; Magnesium 4% (3 fl oz per 1000 ft<sup>2</sup>) and Harrell's MAX Minors (4 fl oz per 1000 ft<sup>2</sup>) on 2 and 21 April, 20 May, 17 June, and 16 July; 0-30-0 (0.025 lb phosphorous (P) per 1000 ft<sup>2</sup>) on 27 March, 23 May, 11 and 21 June, 7, 21, and 26 July, and 16 and 25 August; 0-0-62 (0.05 lb potassium (K) per 1000 ft<sup>2</sup>) on 22 April, 12 and 31 May, 17 and 29 June, 11 July, 1, 6, and 23 August, and 3 September; and Sugar Cal 10% (4 fl oz per 1000 ft<sup>2</sup>) on 25 April, 12 May, 14 June, 8 July, and 6 August. The growth regulators

Primo MAXX 1ME (0.125 fl oz per 1000 ft<sup>2</sup>) + Proxy 2SL (5.0 fl oz per 1000 ft<sup>2</sup>) were sprayed over the trial on 1 and 21 April and 6 May to suppress seed heads, and sprays of Primo MAXX 1ME (0.125 fl oz per 1000 ft<sup>2</sup>) were continued every 7 days from 14 May to 12 November.

Dollar spot (caused by *Sclerotinia homoeocarpa*) was suppressed with Emerald 70WG (0.18 oz per 1000 ft<sup>2</sup>) on 25 April, 12 June, 9 July, and 7 August, and Curalan 50EG (1.0 oz per 1000 ft<sup>2</sup>) on 28 May, 24 June, 26 July, and 23 August. Brown ring patch (*Rhizoctonia circinata*) was controlled with ProStar 70W (3.0 oz per 1000 ft<sup>2</sup>) on 1 and 22 April and 6 May. Brown patch (*Rhizoctonia solani*) was prevented with ProStar 70W (3.0 oz per 1000 ft<sup>2</sup>) on 24 June and 26 July, and summer patch (*Magnaporthe poae*) was controlled with Heritage TL 0.8ME (2.0 fl oz per 1000 ft<sup>2</sup>) on 14 May. Brown patch and summer patch were also suppressed with Disarm 480 SC (0.36 fl oz per 1000 ft<sup>2</sup>) on 11 June, 8 July, and 9 August. Previous research by the authors has shown that Curalan 50EG, Heritage TL 0.8ME, ProStar 70W, Disarm 480 SC, and Emerald 70WG did not affect anthracnose development on the study site at the rates used in this study. Annual bluegrass weevil was controlled with Acelepryn 1.67SC (0.276 fl oz per 1000 ft<sup>2</sup>) on 14 May. Algae in turf was controlled with WingMan 4L (10 fl oz per 1000 ft<sup>2</sup>) on 16 July. Turf was aerified on 4 April and topdressed with sand (size 310 sand; 0.5 lb per 1000 ft<sup>2</sup>) on 26 April, 13 and 27 May, 25 June, 9 and 19 July, and 2 and 18 August.

Fungicides were applied in water equivalent to 1.9 gal per 1000 ft<sup>2</sup> with a CO<sub>2</sub> powered sprayer at

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30 psi using Tee Jet 8003E nozzles. Treatments (trt) were initiated on 21 May, prior to the development of anthracnose. Fungicides were reapplied at the appropriate intervals until 20 August as indicated in Tables 1A to 1D. Turf was visually evaluated for percent turf area infested with anthracnose on 27 June, 7, 17, and 27 July, 6, 16, and 26 August, and 5 September. Turf quality was evaluated on 18 June, 16 July, and 13 August using a 1 to 9 scale, where 9 = best turf quality and 5 = acceptable quality. Color of foliage was visually estimated on 18 June, 16 July, and 13 August using a 1 to 5 scale, where 1 = very chlorotic turf, 2 = slight reduction in green color, 3 = normal color of untreated turf, 4 = slight increase in dark green color, and 5 = very dark green color. Phytotoxicity was determined on 2 and 28 June, 28 July, and 25 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. Data were subjected to analysis of variance and means were separated by Waller-Duncan *k*-ratio *t*-test (*k* = 100).

Anthracnose developed on 17 June as a natural infection and became uniformly distributed throughout the green by 27 June. Disease severity peaked on 5 September (74% turfgrass area infested on non-fungicide treated turf). Due to the severity of this natural epidemic, only 40% of the treatments provided season-long control of anthracnose (i.e., less than 10% turf area infested from 21 May through 5 September; Tables 1A and 1B). These treatments included the following programs: 2014 Anth Program #21 (trt 2), 2014 Anth Program #22 (trt 6), 2014 Anth Program #24 (trt 15), 2014 Anth Program #25 (trt 16), 2014 Anth Program #27A + Daconil Ultrex 82.5WG alternated with 2014 Anth Program #27B + Daconil Ultrex 82.5WG (trt 35), 2014 Anth Program #28A + Daconil Ultrex 82.5WG alternated with 2014 Anth Program #28B (trt 36), 2014 Anth Program #29A + Banner MAXX 1.3ME alternated with 2014 Anth Program #29B + Banner MAXX 1.3ME (trt 37), 2014 Anth Program #30 (trt 42), 2014 Anth Program #31

(trt 45), as well as QP Strobe 50WG + Daconil Ultrex 82.5WG + Foursome 100SL (trt 17), Heritage 50WG + Daconil Ultrex 82.5WG + Foursome 100SL (trt 18), QP Fosetyl-AI 80WG + QP Chlorothalonil 82.5DF + Foursome 100SL (trt 19), Chipco Signature 80WG + Daconil Ultrex 82.5WG (trt 20), QP Enclave 5.3F + Foursome 100SL (trt 21), Daconil Ultrex 82.5WG (trts 25 and 26), Banner MAXX 1.3ME (trt 33), Disarm C 4.25 SC (trt 40), and Velista 50WG (trt 47).

Several other products and product combinations adequately suppressed anthracnose throughout the treatment period (21 May to 20 August; see 26 August evaluation date, Tables 1A and 1B) [i.e., 2014 Anth Program #20 (trt 1), 2014 Anth Program #23 (trt 14), Daconil Ultrex 82.5WG (trts 22 to 24, 41), SR-9059 SC @ 0.5 fl oz (trt 31), and Medallion 1.04SC (trt 32)]. Additionally, the following product combinations reduced dew formation throughout the treatment period, although neither adequately suppressed anthracnose: Civitas One LC 12.5 fl oz + Allude 46L 10.0 fl oz, and Civitas One LC 17.0 fl oz + Allude 46L 10.0 fl oz applied every 14 days (trts 10, 11 respectively).

Turf quality was evaluated on 18 June, 16 July, and 13 August (Table 1C) and was acceptable (greater or equal to 5.0) for most entries in this study. In general, turf treated with products that provided poor anthracnose control exhibited unacceptable quality on at least half of the evaluation dates. Turf color was evaluated on 18 June, 16 July, and 13 August (Table 1C). During the study, 41% of the treatments had color ratings below 5 (where 5 was considered the color of normal, healthy untreated turf) on at least one evaluation date, but were not significantly different than the untreated control (trt 49). Phytotoxicity was evaluated on 2 and 28 June, 28 July, and 25 August (Table 1D); all but two treatments [2014 Anth Program #24 (trt 15) and 2014 Anth Program #25 (trt 16)] showed no or only slight (acceptable) foliar chlorosis or necrosis during the evaluation period.

Table 1A. Anthracnose control with fungicides and biorational products on annual bluegrass putting green turf: Rutgers University, 2014.

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>2</sup>	Turf Area Infested per Plot (%) <sup>1</sup>				
			27 June	7 July	17 July	27 July	6 Aug.
1 2014 Anth Program #20	UPI	ALT-14 <sup>3</sup>	5.8 bc	5.5 d-g	1.3 ij	3.3 j-n	2.0 p-r
2 2014 Anth Program #21	UPI	ALT-14 <sup>4</sup>	1.3 f-i	2.3 f-l	1.3 ij	3.0 j-n	4.5 n-r
3 PK Plus 3-17-18 LC	6.0 fl oz	-	1.8 d-i	10.3 c	24.0 b	32.0 b	32.3 bc
+ Keplex LC	3.0 fl oz	14					
4 Gary's Green Ultra (13-2-3) LC	12.0 fl oz	-	3.0 c-i	3.8 d-k	9.5 d-f	13.8 e-h	15.3 f-i
+ PK Plus 3-17-18 LC	6.0 fl oz	14					
5 Gary's Green Ultra (13-2-3) LC	12.0 fl oz	-	3.3 c-i	5.0 d-h	2.0 h-j	10.8 e-i	16.8 e-g
+ PK Plus 3-17-18 LC	6.0 fl oz	14					
+ Keplex LC	3.0 fl oz	14	1.3 f-i	1.3 i-l	0.0 i	1.5 l-n	3.0 o-r
6 2014 Anth Program #22	Griggs	14 <sup>5</sup>	1.0 g-i	2.0 g-l	0.8 ij	2.3 k-n	4.3 n-r
7 Daconil Action 6.1SC	3.0 fl oz	14	2.0 d-i	1.8 h-l	10.0 de	16.0 c-f	13.5 g-k
8 Gary's Green Ultra (13-2-3) LC	12.0 fl oz	14	4.8 c-f	5.8 d-f	9.0 d-g	13.8 e-h	14.8 g-j
+ Civitas One LC	8.5 fl oz	-					
+ Allude 46L	10.0 fl oz	14	2.5 c-i	3.8 d-k	4.0 e-j	7.5 h-m	11.8 h-m
9 Civitas One LC	12.5 fl oz	-					
+ Allude 46L	10.0 fl oz	14	2.3 c-i	4.5 d-i	4.0 e-j	3.5 j-n	12.3 h-k
10 Civitas One LC	17.0 fl oz	-					
+ Allude 46L	10.0 fl oz	14	0.5 hi	2.8 d-l	2.3 h-j	8.5 g-k	4.5 n-r
11 Allude 46L	10.0 fl oz	21	1.3 f-i	2.8 d-l	8.3 e-h	20.8 cd	24.0 d
12 Allude 46L	10.0 fl oz	14	1.5 e-i	1.5 h-l	0.8 i	0.5 n	1.0 qr
13 2014 Anth Program #23	Nufarm	ALT-14 <sup>6</sup>	0.0 i	0.0 i	1.3 ij	0.8 mn	1.5 p-r
14 2014 Anth Program #24	Nufarm	ALT-14 <sup>7</sup>	0.0 i	0.5 kl	0.8 i	1.0 mn	2.8 o-r
15 2014 Anth Program #25	Nufarm	ALT-14 <sup>8</sup>					
16 QP Strobe 50WG	0.2 oz	-					
+ Daconil Ultrex 82.5WG	3.25 oz	-	2.3 c-i	2.0 g-l	0.3 i	1.0 mn	2.5 o-r
17 Foursome 100SL	0.4 fl oz	14					
18 Heritage 50WG	0.2 oz	-					
+ Daconil Ultrex 82.5WG	3.25 oz	-	5.3 cd	4.3 d-j	6.3 e-j	4.3 i-n	1.3 p-r
+ Foursome 100SL	0.4 fl oz	14					

(Continued)

Table 1A. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>2</sup>	Turf Area Infested per Plot (%) <sup>1</sup>					
			27 June	7 July	17 July	27 July	6 Aug.	
19 QP Fosetyl-Al 80WG.....	4.0 oz	-						
+ QP Chlorothalonil 82.5DF .....	3.23 oz	-						
+ Foursome 100SL .....	0.4 fl oz	14	1.3 f-i	1.5 h-i	2.8 g-j	3.5 j-n	5.3 m-r	
20 Chipco Signature 80WG .....	4.0 oz	-						
+ Daconil Ultrex 82.5WG .....	3.23 oz	14	1.3 f-i	2.0 g-i	3.8 e-j	3.3 j-n	5.5 l-r	
21 QP Enclave 5.3F.....	3.0 fl oz	-						
+ Foursome 100SL .....	0.4 fl oz	14	0.0 i	0.0 l	0.3 i	1.0 mn	1.8 p-r	
22 Daconil Ultrex 82.5WG .....	3.2 oz	14	1.0 g-i	2.8 d-i	1.0 ij	4.0 i-n	2.0 p-r	
23 Daconil Ultrex 82.5WG .....	3.2 oz	14	1.3 f-i	1.8 h-i	1.8 h-j	1.8 k-n	2.8 o-r	
24 Daconil Ultrex 82.5WG .....	3.2 oz	14	1.5 e-i	2.0 g-i	1.5 ij	3.3 j-n	2.3 p-r	
25 Daconil Ultrex 82.5WG .....	3.2 oz	14	1.3 f-i	3.3 d-i	2.8 g-j	4.5 i-n	3.8 n-r	
26 Daconil Ultrex 82.5WG .....	3.2 oz	14	1.5 e-i	3.0 d-i	1.8 h-j	5.0 i-n	3.3 o-r	
27 Varnimo WP .....	0.735 oz	-						
+ KaPre Remede8 LC .....	3.0 fl oz	VAR <sup>9</sup>	4.5 c-g	2.0 g-i	5.0 e-j	16.8 c-e	23.5 de	
28 Varnimo WP .....	0.735 oz	-						
+ KaPre Remede8 LC .....	3.0 fl oz	-						
+ Pennamin Driver-P DF .....	1.5 oz	VAR <sup>9</sup>	3.0 c-i	2.8 d-i	9.0 d-g	14.8 d-g	22.0 d-f	
29 SR-9059 SC .....	0.3 fl oz	14	3.5 c-i	3.0 d-i	5.3 e-j	9.3 f-j	10.3 h-n	
30 SR-9059 SC .....	0.4 fl oz	14	0.8 hi	1.8 h-i	1.8 h-j	2.8 j-n	3.5 n-r	
31 SR-9059 SC .....	0.5 fl oz	14	0.8 hi	1.8 h-i	0.8 i	2.3 k-n	2.5 o-r	
32 Medallion 1.04SC.....	2.0 fl oz	14	1.5 e-i	2.3 f-i	2.5 g-j	2.0 k-n	1.3 p-r	
33 Banner MAXX 1.3ME.....	1.5 fl oz	14	1.5 e-i	2.5 e-i	2.3 h-j	1.0 mn	2.5 o-r	
34 2014 Anth Program #26A.....	Plant-food	-						
/ 2014 Anth Program #26B.....		7 <sup>10</sup>	2.5 c-i	4.0 d-k	3.3 f-j	15.0 d-g	8.0 j-p	
35 2014 Anth Program #27A.....	Plant-food	-						
+ Daconil Ultrex 82.5WG .....	0.9 oz	-						
/ 2014 Anth Program #27B.....		-						
+ Daconil Ultrex 82.5WG .....	0.9 oz	7 <sup>11</sup>	3.0 c-i	2.5 e-i	1.0 ij	6.3 i-n	4.0 n-r	

(Continued)

Table 1A. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>2</sup>	Turf Area Infested per Plot (%) <sup>1</sup>					
			27 June	7 July	17 July	27 July	6 Aug.	
36 2014 Anth Program #28A..... Plant-food + Daconil Ultrex 82.5WG .....	0.9 oz	-						
/ 2014 Anth Program #28B.....	-	7 <sup>12</sup>	4.8 c-f	6.3 d	6.8 e-i	8.3 g-l	7.8 k-q	
37 2014 Anth Program #29A..... Plant-food + Banner MAXX 1.3ME.....	0.5 fl oz	-						
/ 2014 Anth Program #29B.....	-	7 <sup>13</sup>	1.3 f-i	1.8 h-i	1.3 ij	5.5 i-n	0.8 r	
+ Banner MAXX 1.3ME.....	0.5 fl oz	14	1.0 g-i	1.3 i-l	5.0 e-j	4.8 i-n	7.0 k-r	
38 ARY-0534-002 SC.....	0.33 fl oz	14	0.3 i	0.8 j-l	1.8 h-j	2.0 k-n	7.8 k-q	
39 Disarm T SC.....	0.66 fl oz	14	5.0 de	3.0 d-i	2.5 g-j	1.3 mn	1.5 p-r	
40 Disarm C 4.25 SC.....	6.0 fl oz	14	1.5 e-i	3.0 d-i	3.3 f-j	5.0 i-n	5.0 m-r	
41 Daconil Ultrex 82.5WG .....	3.2 oz	14 <sup>14</sup>	1.5 e-i	2.5 e-l	3.0 f-j	4.0 i-n	2.3 p-r	
42 2014 Anth Program #30 .....	Rutgers	14	1.8 d-i	6.0 de	6.8 e-i	17.5 c-e	9.3 i-o	
43 Affirm 11.3WG.....	0.88 oz	14	9.3 b	17.5 b	19.5 bc	22.5 c	19.8 d-g	
44 Secure 4.2SC.....	0.5 fl oz	14	0.8 hi	1.3 i-l	5.3 e-j	5.5 i-n	5.5 l-r	
45 2014 Anth Program #31 .....	Humate Intl	VAR <sup>15</sup>						
46 Companion LC.....	6.0 fl oz	-	4.0 c-h	6.0 de	15.5 cd	20.8 cd	26.5 cd	
+ Recover Rx 3-18-18 DF .....	5 oz	14	1.3 f-i	2.3 f-l	2.5 g-j	2.5 j-n	1.3 p-r	
47 Velista 50WG .....	0.5 oz	14	2.3 c-i	3.8 d-k	21.8 bc	37.8 b	37.8 b	
48 Xzemplar 2.5SC.....	0.21 fl oz	14	17.0 a	25.0 a	62.0 a	56.8 a	66.0 a	
49 Untreated Check.....	-	-						
		INT <sup>16</sup>	DAT <sup>17</sup>	DAT	DAT	DAT	DAT	DAT
		7	7	5	1	4	7	7
		14	9	5	1	9	7	7
		21	16	5	15	4	14	14

<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).

(Continued)

Table 1A. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

- <sup>2</sup> Fungicides were applied on 21 May (all treatments except treatments 34 to 37), 28 May (7-day treatments 34 to 37), 2 June (treatment 45 only), 4 June (7- and 14-day treatments), 11 June (7- and 21-day treatments), 18 June (7- and 14-day treatments), 25 June (7-day treatment), 2 July (7-, 14-, and 21-day treatments), 6 July (treatment 45 only), 9 July (7-day treatment), 16 July (7- and 14-day treatments), 23 July (7- and 21-day treatments), 30 July (7- and 14-day treatments), 6 August (7-day treatment), 13 August (7-, 14-, and 21-day treatments), and 20 August (7-day treatment).
- <sup>3</sup> ALT = Alteration treatment, where treatment 1 (2014 UPI Anth Program #20) consisted of Pegasus HPX 6SC (3.6 fl oz) + Skylark 3.6LC (0.6 fl oz) applied on 21 May and 16 July, Viceroy 70DF (4.6 oz) + Raven 2LC (4.0 fl oz) on 4 June and 30 July, Pegasus HPX 6SC (3.6 fl oz) + Raven 2LC (4.0 fl oz) on 18 June and 13 August, and Viceroy 70DF (4.6 oz) + Skylark 3.6LC (0.6 fl oz) on 2 July.
- <sup>4</sup> ALT = Alteration treatment, where treatment 2 (2014 UPI Anth Program #21) consisted of Pegasus HPX 6SC (3.6 fl oz) + Viceroy 70DF (4.6 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Skylark 3.6LC (0.6 fl oz) + Raven 2LC (4.0 fl oz) on 4 June, and 2 and 30 July.
- <sup>5</sup> Treatment 6 (2014 Griggs Anth Program #22) consisted of Gary's Green Ultra (13-2-3) LC (12.0 fl oz) + PK Plus 3-17-18 LC (6.0 fl oz) + Keplex LC (3.0 fl oz) + Daconil Action 6.1SC (3.0 fl oz) applied every 14 days starting on 21 May.
- <sup>6</sup> ALT = Alteration treatment, where treatment 14 (2014 Nufarm Anth Program #23) consisted of Torque 3.6F (0.75 fl oz) + Spectro 90WG (3.6 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Affirm 11.3WG (0.9 oz) + Spectro 90WG (3.6 oz) on 4 June, and 2 and 30 July.
- <sup>7</sup> ALT = Alteration treatment, where treatment 15 (2014 Nufarm Anth Program #24) consisted of Torque 3.6F (0.75 fl oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.092 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Affirm 11.3WG (0.9 oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.092 oz) on 4 June, and 2 and 30 July.
- <sup>8</sup> ALT = Alteration treatment, where treatment 16 (2014 Nufarm Anth Program #25) consisted of Torque 3.6F (0.75 fl oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.183 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Affirm 11.3WG (0.9 oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.183 oz) on 4 June, and 2 and 30 July.
- <sup>9</sup> Treatments 27 and 28 were applied on 21 and 28 May and 4 June and then every 14 days thereafter. The plots were irrigated with 0.5 gal of H<sub>2</sub>O per plot immediately after application.
- <sup>10</sup> Treatment 34 (2014 Plant Food Anth Program #26) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse GT LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.
- <sup>11</sup> Treatment 35 (2014 Plant Food Anth Program #27) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Daconil Ultrex 82.5 WG (0.9 oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) + Daconil Ultrex 82.5 WG (0.9 oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.



Table 1A. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

- <sup>12</sup> Treatment 36 (2014 Plant Food Anth Program #28) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Daconil Ultrex 82.5 WG (0.9 oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse GT LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.
- <sup>13</sup> Treatment 37 (2014 Plant Food Anth Program #29) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Banner Maxx 1.3ME (0.5 fl oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse GT LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) + Banner MAXX 1.3ME (0.5 fl oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.
- <sup>14</sup> Treatment 42 (2014 Rutgers Anth Program #30) consisted of Banner Maxx 1.3ME (1.0 fl oz) applied on 21 May, Daconil Ultrex 82.5WG (3.2 oz) on 4 June, Chipco Signature 80WG (4.0 oz) + Insignia Intrinsic 2.1SC (0.7 fl oz) on 18 June, Affirm 11.3WG (0.9 oz) + Daconil Ultrex 82.5WG (3.2 oz) on 2 July, Chipco Signature 80WG (4.0 oz) + Chipco 26GT 2SC (4.0 fl oz) on 16 July, 3336 Plus 19.4F (3.0 fl oz) + Daconil Ultrex 82.5WG (3.2 oz) on 30 July, and Chipco Signature 80WG (4.0 oz) + Medallion 1.04SC (1.5 fl oz) on 13 August.
- <sup>15</sup> VAR = variable spray schedule, where treatment 45 (2014 Humate Intl. Anth Program #31) consisted of Chipco 26GT 2SC (4.0 fl oz) applied on 21 May, Humate Rejuvenator G (12.5 lb) on 2 June and 9 July and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application, Humate Microfeed (6.0 fl oz) on 4, 11, 18, and 25 June and immediately irrigated with 0.5 gal of H<sub>2</sub>O per plot after application, Humate Microfeed (3.0 fl oz) on 2 July and applied every 7 days thereafter; immediately irrigated with 0.5 gal of H<sub>2</sub>O per plot after application, Biosyst Annual Plus (1.1 oz) on 6 June and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application, Biosyst Monthly-MS (0.4 oz) on 11 June, 9 July, and 6 August and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application, and Humate Ag1635 G (5.0 lb) applied on 25 June and 23 July and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application.
- <sup>16</sup> INT = Spray interval in days.
- <sup>17</sup> DAT = Days after the last treatment.

Table 1B. Anthracnose control with fungicides and biorational products on annual bluegrass putting green turf: Rutgers University, 2014.

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>3</sup>	Turf Area Infested per Plot (%) <sup>1</sup>			Dew <sup>2</sup> ----- 11 Aug.
			16 Aug.	26 Aug.	5 Sept.	
1 2014 Anth Program #20	UPI	ALT-14 <sup>4</sup>	5.0 l-q	7.3 k-p	14.0 h-m	1.0 b
2 2014 Anth Program #21	UPI	ALT-14 <sup>5</sup>	1.3 q	4.5 m-p	8.8 i-p	1.0 b
3 PK Plus 3-17-18 LC	6.0 fl oz	-	30.5 c	27.3 c	46.5 cd	1.0 b
+ Keplex LC	3.0 fl oz	14				
4 Gary's Green Ultra (13-2-3) LC	12.0 fl oz	-	18.5 e-i	6.8 k-p	10.3 h-o	1.0 b
+ PK Plus 3-17-18 LC	6.0 fl oz	14				
5 Gary's Green Ultra (13-2-3) LC	12.0 fl oz	-	11.8 i-m	4.0 m-p	1.8 op	1.0 b
+ PK Plus 3-17-18 LC	6.0 fl oz	14				
+ Keplex LC	3.0 fl oz	14				
6 2014 Anth Program #22	Griggs	14 <sup>6</sup>	1.8 q	1.3 op	1.8 op	1.0 b
7 Daconil Action 6.1SC	3.0 fl oz	14	12.3 h-l	9.5 h-o	15.3 h-k	1.0 b
8 Gary's Green Ultra (13-2-3) LC	12.0 fl oz	14	19.5 e-h	16.0 e-k	18.5 g-i	1.0 b
9 Civitas One LC	8.5 fl oz	-	28.8 cd	25.5 cd	47.8 bc	1.0 b
+ Allude 46L	10.0 fl oz	14				
10 Civitas One LC	12.5 fl oz	-	15.5 g-j	23.3 c-e	31.0 ef	1.9 a
+ Allude 46L	10.0 fl oz	14				
11 Civitas One LC	17.0 fl oz	-	17.8 f-i	19.3 c-g	30.5 ef	2.0 a
+ Allude 46L	10.0 fl oz	14				
12 Civitas One LC	17.0 fl oz	-	9.8 j-o	18.3 c-h	18.8 gh	1.0 b
+ Allude 46L	10.0 fl oz	21				
13 Allude 46L	10.0 fl oz	14	41.3 b	38.0 b	55.8 bc	1.0 b
14 2014 Anth Program #23	Nufarm	ALT-14 <sup>7</sup>	8.5 j-q	6.8 k-p	15.8 g-j	1.0 b
15 2014 Anth Program #24	Nufarm	ALT-14 <sup>8</sup>	2.3 pq	1.5 n-p	1.3 op	1.0 b
16 2014 Anth Program #25	Nufarm	ALT-14 <sup>9</sup>	1.5 q	1.5 n-p	2.5 op	1.0 b
17 QP Strobe 50WG	0.2 oz	-				
+ Daconil Ultrex 82.5WG	3.25 oz	-				
+ Foursome 100SL	0.4 fl oz	14	1.3 q	2.0 n-p	1.5 op	1.0 b
18 Heritage 50WG	0.2 oz	-				
+ Daconil Ultrex 82.5WG	3.25 oz	-				
+ Foursome 100SL	0.4 fl oz	14	1.3 q	0.0 p	2.0 op	1.0 b

(Continued)

Table 1B. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>3</sup>	Turf Area Infested per Plot (%) <sup>1</sup>			Dew <sup>2</sup> 11 Aug.
			16 Aug.	26 Aug.	5 Sept.	
19 QP Fosetyl-Al 80WG.....	4.0 oz	—				
+ QP Chlorothalonil 82.5DF .....	3.23 oz	—				
+ Foursome 100SL .....	0.4 fl oz	14	5.3 l-q	3.5 n-p	5.0 l-p	1.0 b
20 Chipco Signature 80WG .....	4.0 oz	—				
+ Daconil Ultrex 82.5WG .....	3.23 oz	14	9.3 j-p	8.8 i-p	9.3 h-p	1.0 b
21 QP Enclave 5.3F .....	3.0 fl oz	—				
+ Foursome 100SL .....	0.4 fl oz	14	1.8 q	4.5 m-p	9.5 h-p	1.0 b
22 Daconil Ultrex 82.5WG .....	3.2 oz	14	7.5 k-q	8.0 j-p	14.3 h-m	1.0 b
23 Daconil Ultrex 82.5WG .....	3.2 oz	14	5.5 l-q	8.8 i-p	17.0 g-j	1.0 b
24 Daconil Ultrex 82.5WG .....	3.2 oz	14	7.0 k-q	7.5 k-p	12.5 h-n	1.0 b
25 Daconil Ultrex 82.5WG .....	3.2 oz	14	7.8 k-q	6.8 k-p	9.3 h-p	1.0 b
26 Daconil Ultrex 82.5WG .....	3.2 oz	14	7.3 k-q	9.0 h-p	9.8 h-p	1.0 b
27 Varnimo WP .....	0.735 oz	—				
+ KaPre Remede8 LC .....	3.0 fl oz	VAR <sup>10</sup>	38.5 b	27.5 c	33.5 ef	1.0 b
28 Varnimo WP .....	0.735 oz	—				
+ KaPre Remede8 LC .....	3.0 fl oz	—				
+ Pennamin Driver-P DF .....	1.5 oz	VAR <sup>10</sup>	24.5 c-f	23.5 c-e	25.3 fg	1.0 b
29 SR-9059 SC .....	0.3 fl oz	14	21.8 d-f	20.8 c-f	30.8 ef	1.0 b
30 SR-9059 SC .....	0.4 fl oz	14	10.3 j-n	13.3 f-m	14.5 h-l	1.0 b
31 SR-9059 SC .....	0.5 fl oz	14	8.0 k-q	6.8 k-p	14.5 h-l	1.0 b
32 Medallion 1.04SC .....	2.0 fl oz	14	6.8 k-q	6.0 l-p	18.3 g-i	1.0 b
33 Banner MAXX 1.3ME .....	1.5 fl oz	14	2.0 pq	1.0 op	4.5 m-p	1.0 b
34 2014 Anth Program #26A.....	Plant-food	—				
/ 2014 Anth Program #26B.....	—	7 <sup>11</sup>	5.5 l-q	3.0 n-p	3.5 n-p	1.0 b
35 2014 Anth Program #27A.....	Plant-food	—				
+ Daconil Ultrex 82.5WG .....	0.9 oz	—				
/ 2014 Anth Program #27B .....	—	—				
+ Daconil Ultrex 82.5WG .....	0.9 oz	7 <sup>12</sup>	2.0 pq	1.5 n-p	2.0 op	1.0 b

(Continued)

Table 1B. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>3</sup>	Turf Area Infested per Plot (%) <sup>1</sup>			Dew <sup>2</sup>
			16 Aug.	26 Aug.	5 Sept.	
36 2014 Anth Program #28A..... Plant-food + Daconil Ultrex 82.5WG .....	0.9 oz	-				
/ 2014 Anth Program #28B.....	-	7 <sup>13</sup>	2.8 o-q	2.3 n-p	3.5 n-p	1.0 b
37 2014 Anth Program #29A..... Plant-food + Banner MAXX 1.3ME.....	0.5 fl oz	-				
/ 2014 Anth Program #29B.....	-	7 <sup>14</sup>	1.5 q	0.0 p	0.3 p	1.0 b
+ Banner MAXX 1.3ME.....	0.5 fl oz	14	13.3 h-k	17.0 d-j	37.5 de	1.0 b
38 ARY-0534-002 SC.....	0.33 fl oz	14	13.8 h-k	14.5 e-i	37.5 de	1.0 b
39 Disarm T SC.....	0.66 fl oz	14	2.0 pq	0.8 op	1.5 op	1.0 b
40 Disarm C 4.25 SC.....	6.0 fl oz	14	6.8 k-q	9.8 h-o	14.8 h-i	1.0 b
41 Daconil Ultrex 82.5WG .....	3.2 oz	14 <sup>15</sup>	3.0 n-q	2.5 n-p	4.0 n-p	1.0 b
42 2014 Anth Program #30 .....	Rutgers	14	13.3 h-k	10.8 g-n	16.0 g-j	1.0 b
43 Affirm 11.3WG.....	0.88 oz	14	25.8 c-e	17.8 d-i	25.3 fg	1.0 b
44 Secure 4.2SC.....	0.5 fl oz	VAR <sup>16</sup>	4.8 m-q	0.5 op	5.5 k-p	1.0 b
45 2014 Anth Program #31 .....	Humate Intl	-				
46 Companion LC.....	6.0 fl oz	-				
+ Recover Rx 3-18-18 DF .....	5 oz	14	38.3 b	15.5 e-k	18.8 gh	1.0 b
47 Velista 50WG .....	0.5 oz	14	1.8 q	3.8 n-p	7.3 j-p	1.0 b
48 Xzemplar 2.5SC.....	0.21 fl oz	14	39.3 b	40.0 b	57.3 b	1.0 b
49 Untreated Check.....	-	-	68.5 a	53.8 a	73.5 a	1.0 b
		INT <sup>17</sup>	DAT <sup>18</sup>	DAT	DAT	DAT
		7	3	6	16	5
		14	3	13	23	12
		21	3	13	23	19

<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).

(Continued)

Table 1B. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

- <sup>2</sup> Amount of dew formation, where 1= equivalent to untreated control, and 2 = significantly less dew compared to untreated turf.
- <sup>3</sup> Fungicides were applied on 21 May (all treatments except treatments 34 to 37), 28 May (7-day treatments 34 to 37), 2 June (treatment 45 only), 4 June (7- and 14-day treatments), 11 June (7- and 21-day treatments), 18 June (7- and 14-day treatments), 25 June (7-day treatment), 2 July (7-, 14-, and 21-day treatments), 6 July (treatment 45 only), 9 July (7-day treatment), 16 July (7- and 14-day treatments), 23 July (7- and 21-day treatments), 30 July (7- and 14-day treatments), 6 August (7-day treatment), 13 August (7-, 14-, and 21-day treatments), and 20 August (7-day treatment).
- <sup>4</sup> ALT = Alteration treatment, where treatment 1 (2014 UPI Anth Program #20) consisted of Pegasus HPX 6SC (3.6 fl oz) + Skylark 3.6LC (0.6 fl oz) applied on 21 May and 16 July, Viceroy 70DF (4.6 oz) + Raven 2LC (4.0 fl oz) on 4 June and 30 July, Pegasus HPX 6SC (3.6 fl oz) + Raven 2LC (4.0 fl oz) on 18 June and 13 August, and Viceroy 70DF (4.6 oz) + Skylark 3.6LC (0.6 fl oz) on 2 July.
- <sup>5</sup> ALT = Alteration treatment, where treatment 2 (2014 UPI Anth Program #21) consisted of Pegasus HPX 6SC (3.6 fl oz) + Viceroy 70DF (4.6 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Skylark 3.6LC (0.6 fl oz) + Raven 2LC (4.0 fl oz) on 4 June, and 2 and 30 July.
- <sup>6</sup> Treatment 6 (2014 Griggs Anth Program #22) consisted of Gary's Green Ultra (13-2-3) LC (12.0 fl oz) + PK Plus 3-17-18 LC (6.0 fl oz) + Keplex LC (3.0 fl oz) + Daconil Action 6.1SC (3.0 fl oz) applied every 14 days starting on 21 May.
- <sup>7</sup> ALT = Alteration treatment, where treatment 14 (2014 Nufarm Anth Program #23) consisted of Torque 3.6F (0.75 fl oz) + Spectro 90WG (3.6 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Affirm 11.3WG (0.9 oz) + Spectro 90WG (3.6 oz) on 4 June, and 2 and 30 July.
- <sup>8</sup> ALT = Alteration treatment, where treatment 15 (2014 Nufarm Anth Program #24) consisted of Torque 3.6F (0.75 fl oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.092 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Affirm 11.3WG (0.9 oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.092 oz) on 4 June, and 2 and 30 July.
- <sup>9</sup> ALT = Alteration treatment, where treatment 16 (2014 Nufarm Anth Program #25) consisted of Torque 3.6F (0.75 fl oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.183 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Affirm 11.3WG (0.9 oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.183 oz) on 4 June, and 2 and 30 July.
- <sup>10</sup> Treatments 27 and 28 were applied on 21 and 28 May and 4 June and then every 14 days thereafter. The plots were irrigated with 0.5 gal of H<sub>2</sub>O per plot immediately after application.
- <sup>11</sup> Treatment 34 (2014 Plant Food Anth Program #26) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse GT LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.
- <sup>12</sup> Treatment 35 (2014 Plant Food Anth Program #27) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Daconil Ultrex 82.5 WG (0.9 oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) + Daconil Ultrex 82.5 WG (0.9 oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.

Table 1B. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

- <sup>13</sup> Treatment 36 (2014 Plant Food Anth Program #28) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Daconil Ultrex 82.5 WG (0.9 oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse GT LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.
- <sup>14</sup> Treatment 37 (2014 Plant Food Anth Program #29) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Banner Maxx 1.3ME (0.5 fl oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse GT LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) + Banner MAXX 1.3ME (0.5 fl oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.
- <sup>15</sup> Treatment 42 (2014 Rutgers Anth Program #30) consisted of Banner Maxx 1.3ME (1.0 fl oz) applied on 21 May, Daconil Ultrex 82.5WG (3.2 oz) on 4 June, Chipco Signature 80WG (4.0 oz) + Insignia Intrinsic 2.1SC (0.7 fl oz) on 18 June, Affirm 11.3WG (0.9 oz) + Daconil Ultrex 82.5WG (3.2 oz) on 2 July, Chipco Signature 80WG (4.0 oz) + Chipco 26GT 2SC (4.0 fl oz) on 16 July, 3336 Plus 19.4F (3.0 fl oz) + Daconil Ultrex 82.5WG (3.2 oz) on 30 July, and Chipco Signature 80WG (4.0 oz) + Medallion 1.04SC (1.5 fl oz) on 13 August.
- <sup>16</sup> VAR = variable spray schedule, where treatment 45 (2014 Humate Intl. Anth Program #31) consisted of Chipco 26GT 2SC (4.0 fl oz) applied on 21 May, Humate Rejuvenator G (12.5 lb) on 2 June and 9 July and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application, Humate Microfeed (6.0 fl oz) on 4, 11, 18, and 25 June and immediately irrigated with 0.5 gal of H<sub>2</sub>O per plot after application, Humate Microfeed (3.0 fl oz) on 2 July and applied every 7 days thereafter; immediately irrigated with 0.5 gal of H<sub>2</sub>O per plot after application, Biosyst Annual Plus (1.1 oz) on 6 June and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application, Biosyst Monthly-MS (0.4 oz) on 11 June, 9 July, and 6 August and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application, and Humate Ag1635 G (5.0 lb) applied on 25 June and 23 July and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application.
- <sup>17</sup> INT = Spray interval in days.
- <sup>18</sup> DAT = Days after the last treatment.

Table 1C. Anthracnose control with fungicides and biorational products on annual bluegrass putting green turf: Rutgers University, 2014.

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>4</sup>	Turf Quality <sup>1,2</sup>			Color <sup>3</sup>		
			18 June	16 July	13 Aug.		18 June	16 July
1 2014 Anth Program #20..... UPI		ALT-14 <sup>5</sup>	8.2 a	7.9 a-f	7.5 c-l	5.1 kl	5.3 f-i	5.1 ij
2 2014 Anth Program #21..... UPI		ALT-14 <sup>6</sup>	8.1 a	6.8 c-k	7.4 d-l	5.6 ij	5.0 g-k	5.0 i-k
3 PK Plus 3-17-18 LC .....	6.0 fl oz	-	8.2 a	5.3 kl	4.8 st	5.8 hi	4.8 i-l	5.8 e-g
+ Keplex LC .....	3.0 fl oz	14						
4 Gary's Green Ultra (13-2-3) LC.....	12.0 fl oz	-	8.5 a	7.3 a-j	6.5 j-q	6.1 fg	5.3 f-i	5.5 gh
+ PK Plus 3-17-18 LC .....	6.0 fl oz	14						
5 Gary's Green Ultra (13-2-3) LC.....	12.0 fl oz	-	8.4 a	7.2 a-j	6.8 g-o	6.6 cd	5.4 e-h	6.1 cd
+ PK Plus 3-17-18 LC .....	6.0 fl oz	14						
+ Keplex LC .....	3.0 fl oz	14	8.4 a	7.2 a-j	6.8 g-o	6.6 cd	5.4 e-h	6.1 cd
6 2014 Anth Program #22..... Griggs		14 <sup>7</sup>	8.3 a	8.9 a	8.2 a-f	6.6 cd	6.0 cd	6.5 ab
7 Daconil Action 6.1SC .....	3.0 fl oz	14	8.2 a	8.2 a-c	7.0 f-n	5.0 l	5.1 f-i	5.0 i-k
8 Gary's Green Ultra (13-2-3) LC.....	12.0 fl oz	14	8.4 a	6.5 d-k	5.8 m-s	5.9 g-j	5.9 c-e	6.0 de
9 Civitas One LC.....	8.5 fl oz	-	7.6 a	6.7 c-k	5.9 m-s	5.0 l	5.0 g-k	5.0 i-k
+ Allude 46L .....	10.0 fl oz	14						
10 Civitas One LC.....	12.5 fl oz	-	7.7 a	6.1 g-l	6.2 l-s	5.1 kl	4.6 j-l	5.0 i-k
+ Allude 46L .....	10.0 fl oz	14						
11 Civitas One LC.....	17.0 fl oz	-	7.8 a	6.3 f-k	6.3 j-r	5.1 kl	4.5 kl	4.6 l
+ Allude 46L .....	10.0 fl oz	14						
12 Civitas One LC.....	17.0 fl oz	-	7.6 a	6.8 c-k	6.2 k-r	5.3 kl	4.9 h-l	4.9 j-l
+ Allude 46L .....	10.0 fl oz	21						
13 Allude 46L .....	10.0 fl oz	14	7.9 a	5.6 j-l	5.3 q-t	5.0 l	4.4 l	4.6 l
14 2014 Anth Program #23..... Nufarm		ALT-14 <sup>8</sup>	8.3 a	7.6 a-h	8.2 a-g	5.1 kl	5.9 c-e	6.1 cd
15 2014 Anth Program #24..... Nufarm		ALT-14 <sup>9</sup>	8.7 a	8.3 a-c	8.8 a-c	5.6 ij	6.8 ab	6.4 bc
16 2014 Anth Program #25..... Nufarm		ALT-14 <sup>10</sup>	8.5 a	8.1 a-e	8.1 a-g	5.9 g-j	7.0 a	6.8 a
17 QP Strobe 50WG .....	0.2 oz	-						
+ Daconil Ultrex 82.5WG .....	3.25 oz	-						
18 + Foursome 100SL .....	0.4 fl oz	14	8.3 a	8.0 a-f	7.8 a-i	6.8 cd	5.5 d-g	6.0 de
Heritage 50WG .....	0.2 oz	-						
+ Daconil Ultrex 82.5WG .....	3.25 oz	-						
+ Foursome 100SL .....	0.4 fl oz	14	7.4 a	7.3 a-j	8.4 a-e	6.5 de	5.5 d-g	5.9 d-f

(Continued)

Table 1C. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>4</sup>	Turf Quality <sup>1,2</sup>			Color <sup>3</sup>		
			18 June	16 July	13 Aug.	18 June	16 July	13 Aug.
19 QP Fosetyl-Al 80WG.....	4.0 oz	—						
+ QP Chlorothalonil 82.5DF .....	3.23 oz	—						
+ Foursome 100SL .....	0.4 fl oz	14	8.1 a	7.1 b-j	7.9 a-i	5.9 g-i	5.3 f-i	5.5 gh
20 Chipco Signature 80WG .....	4.0 oz	—						
+ Daconil Ultrex 82.5WG .....	3.23 oz	14	8.5 a	7.4 a-i	7.0 f-n	5.4 jk	5.4 e-h	5.3 hi
21 QP Enclave 5.3F.....	3.0 fl oz	—						
+ Foursome 100SL .....	0.4 fl oz	14	8.8 a	7.3 a-i	7.8 a-i	6.3 ef	6.0 cd	6.0 de
22 Daconil Ultrex 82.5WG .....	3.2 oz	14	8.4 a	7.5 a-i	7.8 a-i	5.0 l	5.0 g-k	5.0 i-k
23 Daconil Ultrex 82.5WG .....	3.2 oz	14	8.2 a	7.3 a-j	7.4 d-l	5.0 l	5.4 e-h	5.1 ij
24 Daconil Ultrex 82.5WG .....	3.2 oz	14	8.1 a	7.9 a-f	8.1 a-h	5.1 kl	5.6 d-f	5.3 hi
25 Daconil Ultrex 82.5WG .....	3.2 oz	14	8.3 a	7.7 a-h	6.9 f-o	5.0 l	5.4 e-h	5.1 ij
26 Daconil Ultrex 82.5WG .....	3.2 oz	14	8.3 a	7.7 a-h	7.6 b-k	5.0 l	5.0 g-k	5.1 ij
27 Varnimo WP .....	0.735 oz	—						
+ KaPre Remede8 LC .....	3.0 fl oz	VAR <sup>11</sup>	7.6 a	6.0 h-l	5.6 o-t	5.0 l	5.1 f-i	4.9 j-l
28 Varnimo WP .....	0.735 oz	—						
+ KaPre Remede8 LC .....	3.0 fl oz	—						
+ Pennamin Driver-P DF .....	1.5 oz	VAR <sup>11</sup>	8.3 a	6.2 g-k	5.9 m-s	5.0 l	4.9 h-l	5.0 i-k
29 SR-9059 SC.....	0.3 fl oz	14	8.1 a	7.0 c-j	6.6 j-q	5.0 l	4.9 h-l	4.9 j-l
30 SR-9059 SC.....	0.4 fl oz	14	8.2 a	6.9 c-k	7.6 b-k	5.0 l	4.8 i-l	4.9 j-l
31 SR-9059 SC.....	0.5 fl oz	14	8.5 a	7.6 a-h	6.9 f-o	5.0 l	4.9 h-l	4.9 j-l
32 Medallion 1.04SC.....	2.0 fl oz	14	7.6 a	6.4 f-k	7.0 f-n	5.0 l	4.8 i-l	4.8 kl
33 Banner MAXX 1.3ME.....	1.5 fl oz	14	7.8a	8.1 a-d	7.7 a-i	5.1 kl	4.8 i-l	5.3 hi
34 2014 Anth Program #26A.....	Plant-food	—						
/ 2014 Anth Program #26B.....	—	7 <sup>12</sup>	8.1 a	8.0 a-f	8.1 a-h	6.9 bc	6.0 cd	6.4 bc
35 2014 Anth Program #27A.....	Plant-food	—						
+ Daconil Ultrex 82.5WG .....	0.9 oz	—						
/ 2014 Anth Program #27B .....	—	7 <sup>13</sup>	8.4 a	8.8 ab	8.9 a	7.1 ab	6.4 bc	6.5 ab
+ Daconil Ultrex 82.5WG .....	0.9 oz	—						

(Continued)



Table 1C. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>4</sup>	Turf Quality <sup>1,2</sup>			Color <sup>3</sup>		
			18 June	16 July	13 Aug.	18 June	16 July	13 Aug.
36 2014 Anth Program #28A..... Plant-food + Daconil Ultrex 82.5WG .....	0.9 oz	-						
/ 2014 Anth Program #28B.....	-	7 <sup>14</sup>						
37 2014 Anth Program #29A..... Plant-food + Banner MAXX 1.3ME.....	0.5 fl oz	-	8.1 a	8.0 a-f	8.6 a-d	6.3 ef	5.9 c-e	6.4 bc
/ 2014 Anth Program #29B.....	-	-						
+ Banner MAXX 1.3ME.....	0.5 fl oz	7 <sup>15</sup>	8.6 a	7.5 a-i	8.9 ab	7.3 a	6.6 ab	6.8 a
38 ARY-0534-002 SC.....	0.33 fl oz	14	8.0 a	6.7 c-k	6.7 i-o	5.0 l	4.7 i-l	4.9 j-l
39 Disarm T SC.....	0.66 fl oz	14	8.5 a	6.7 c-k	6.7 j-p	5.0 l	5.0 g-k	4.9 j-l
40 Disarm C 4.25SC.....	6.0 fl oz	14	8.1 a	8.3 a-c	8.8 a-c	5.0 l	5.6 d-f	5.6 fg
41 Daconil Ultrex 82.5WG .....	3.2 oz	14	8.2 a	7.1 b-j	6.6 j-q	5.0 l	4.9 h-l	5.0 i-k
42 2014 Anth Program #30 .....	Rutgers	14 <sup>16</sup>	8.1 a	7.7 a-f	7.6 b-k	5.3 kl	5.0 g-k	5.0 i-k
43 Affirm 11.3WG.....	0.88 oz	14	7.3 a	6.4 e-k	6.8 h-o	5.0 l	4.6 j-l	4.6 l
44 Secure 4.2SC.....	0.5 fl oz	14	7.6 a	5.8 i-l	5.7 n-s	5.0 l	4.8 i-l	5.0 i-k
45 2014 Anth Program #31 .....	Humate Intl	VAR <sup>17</sup>	8.6 a	8.0 a-f	7.7 a-i	6.0 f-h	5.4 e-h	5.0 i-k
46 Companion LC.....	6.0 fl oz	-						
+ Recover Rx 3-18-18 DF .....	5 oz	14	8.1 a	6.1 g-l	5.3 p-t	5.0 l	4.7 i-l	4.9 j-l
47 Velista 50WG .....	0.5 oz	14	8.1 a	7.1 b-j	7.1 e-m	5.0 l	4.6 j-l	5.0 i-k
48 Xzemplar 2.5SC.....	0.21 fl oz	14	8.1 a	5.6 j-l	5.0 r-t	5.0 l	4.9 h-l	4.6 l
49 Untreated Check.....	-	-	8.6 a	4.4 l	4.3 t	5.0 l	5.0 g-k	4.6 l

<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).

(Continued)

Table 1C. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

- <sup>2</sup> Turf quality on a scale of 1 to 9, where 9 = best turf quality and 5 = acceptable quality.
- <sup>3</sup> Color of foliage on a 1 to 10 scale, where 5 = color of healthy untreated turf, less than 5 = progressively more chlorotic or necrotic turf, and greater than 5 = progressively darker green turf.
- <sup>4</sup> Fungicides were applied on 21 May (all treatments except treatments 34 to 37), 28 May (7-day treatments 34 to 37), 2 June (treatment 45 only), 4 June (7- and 14-day treatments), 11 June (7- and 21-day treatments), 18 June (7- and 14-day treatments), 25 June (7-day treatment), 2 July (7-, 14-, and 21-day treatments), 6 July (treatment 45 only), 9 July (7-day treatment), 16 July (7- and 14-day treatments), 23 July (7- and 21-day treatments), 30 July (7- and 14-day treatments), 6 August (7-day treatment), 13 August (7-, 14-, and 21-day treatments), and 20 August (7-day treatment).
- <sup>5</sup> ALT = Alteration treatment, where treatment 1 (2014 UPI Anth Program #20) consisted of Pegasus HPX 6SC (3.6 fl oz) + Skylark 3.6LC (0.6 fl oz) applied on 21 May and 16 July, Viceroy 70DF (4.6 oz) + Raven 2LC (4.0 fl oz) on 4 June and 30 July, Pegasus HPX 6SC (3.6 fl oz) + Raven 2LC (4.0 fl oz) on 18 June and 13 August, and Viceroy 70DF (4.6 oz) + Skylark 3.6LC (0.6 fl oz) on 2 July.
- <sup>6</sup> ALT = Alteration treatment, where treatment 2 (2014 UPI Anth Program #21) consisted of Pegasus HPX 6SC (3.6 fl oz) + Viceroy 70DF (4.6 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Skylark 3.6LC (0.6 fl oz) + Raven 2LC (4.0 fl oz) on 4 June, and 2 and 30 July.
- <sup>7</sup> Treatment 6 (2014 Griggs Anth Program #22) consisted of Gary's Green Ultra (13-2-3) LC (12.0 fl oz) + PK Plus 3-17-18 LC (6.0 fl oz) + Keplex LC (3.0 fl oz) + Daconil Action 6.1SC (3.0 fl oz) applied every 14 days starting on 21 May.
- <sup>8</sup> ALT = Alteration treatment, where treatment 14 (2014 Nufarm Anth Program #23) consisted of Torque 3.6F (0.75 fl oz) + Spectro 90WG (3.6 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Affirm 11.3WG (0.9 oz) + Spectro 90WG (3.6 oz) on 4 June, and 2 and 30 July.
- <sup>9</sup> ALT = Alteration treatment, where treatment 15 (2014 Nufarm Anth Program #24) consisted of Torque 3.6F (0.75 fl oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.092 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Affirm 11.3WG (0.9 oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.092 oz) on 4 June, and 2 and 30 July.
- <sup>10</sup> ALT = Alteration treatment, where treatment 16 (2014 Nufarm Anth Program #25) consisted of Torque 3.6F (0.75 fl oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.183 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Affirm 11.3WG (0.9 oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.183 oz) on 4 June, and 2 and 30 July.
- <sup>11</sup> Treatments 27 and 28 were applied on 21 and 28 May and 4 June and then every 14 days thereafter. The plots were irrigated with 0.5 gal of H<sub>2</sub>O per plot immediately after application.
- <sup>12</sup> Treatment 34 (2014 Plant Food Anth Program #26) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse GT LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.
- <sup>13</sup> Treatment 35 (2014 Plant Food Anth Program #27) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Daconil Ultrex 82.5 WG (0.9 oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) + Daconil Ultrex 82.5 WG (0.9 oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.

(Continued)

Table 1C. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

- <sup>14</sup> Treatment 36 (2014 Plant Food Anth Program #28) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Daconil Ultrex 82.5 WG (0.9 oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse GT LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.
- <sup>15</sup> Treatment 37 (2014 Plant Food Anth Program #29) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Banner Maxx 1.3ME (0.5 fl oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse GT LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) + Banner MAXX 1.3ME (0.5 fl oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.
- <sup>16</sup> Treatment 42 (2014 Rutgers Anth Program #30) consisted of Banner Maxx 1.3ME (1.0 fl oz) applied on 21 May, Daconil Ultrex 82.5WG (3.2 oz) on 4 June, Chipco Signature 80WG (4.0 oz) + Insignia Intrinsic 2.1SC (0.7 fl oz) on 18 June, Affirm 11.3WG (0.9 oz) + Daconil Ultrex 82.5WG (3.2 oz) on 2 July, Chipco Signature 80WG (4.0 oz) + Chipco 26GT 2SC (4.0 fl oz) on 16 July, 3336 Plus 19.4F (3.0 fl oz) + Daconil Ultrex 82.5WG (3.2 oz) on 30 July, and Chipco Signature 80WG (4.0 oz) + Medallion 1.04SC (1.5 fl oz) on 13 August.
- <sup>17</sup> VAR = variable spray schedule, where treatment 45 (2014 Humate Intl. Anth Program #31) consisted of Chipco 26GT 2SC (4.0 fl oz) applied on 21 May, Humate Rejuvenator G (12.5 lb) on 2 June and 9 July and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application, Humate Microfeed (6.0 fl oz) on 4, 11, 18, and 25 June and immediately irrigated with 0.5 gal of H<sub>2</sub>O per plot after application, Humate Microfeed (3.0 fl oz) on 2 July and applied every 7 days thereafter; immediately irrigated with 0.5 gal of H<sub>2</sub>O per plot after application, Biosyst Annual Plus (1.1 oz) on 6 June and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application, Biosyst Monthly-MS (0.4 oz) on 11 June, 9 July, and 6 August and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application, and Humate Ag1635 G (5.0 lb) applied on 25 June and 23 July and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application.
- <sup>18</sup> INT = Spray interval in days.
- <sup>19</sup> DAT = Days after the last treatment.

Table 1D. Anthracnose control with fungicides and biorational products on annual bluegrass putting green turf: Rutgers University, 2014.

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>3</sup>	Phytotoxicity <sup>1,2</sup>			
			2 June	28 June	28 July	25 Aug.
1 2014 Anth Program #20.....	UPI	ALT-14 <sup>4</sup>	1.2 c	1.0 c	1.0 c	1.0 e
2 2014 Anth Program #21.....	UPI	ALT-14 <sup>5</sup>	1.0 c	1.0 c	1.0 c	1.1 d
3 PK Plus 3-17-18 LC .....	6.0 fl oz	-				
+ Keplex LC .....	3.0 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
4 Gary's Green Ultra (13-2-3) LC.....	12.0 fl oz	-				
+ PK Plus 3-17-18 LC .....	6.0 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
5 Gary's Green Ultra (13-2-3) LC.....	12.0 fl oz	-				
+ PK Plus 3-17-18 LC .....	6.0 fl oz	-				
+ Keplex LC .....	3.0 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
6 2014 Anth Program #22.....	Griggs	14 <sup>6</sup>	1.0 c	1.0 c	1.0 c	1.0 e
7 Daconil Action 6.1SC.....	3.0 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
8 Gary's Green Ultra (13-2-3) LC.....	12.0 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
9 Civitas One LC.....	8.5 fl oz	-				
+ Allude 46L.....	10.0 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
10 Civitas One LC.....	12.5 fl oz	-				
+ Allude 46L.....	10.0 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
11 Civitas One LC.....	17.0 fl oz	-				
+ Allude 46L.....	10.0 fl oz	14	1.0 c	1.7 a	1.7 a	1.4 c
12 Civitas One LC.....	17.0 fl oz	-				
+ Allude 46L.....	10.0 fl oz	21	1.0 c	1.0 c	1.0 c	1.0 e
13 Allude 46L.....	10.0 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
14 2014 Anth Program #23.....	Nufarm	ALT-14 <sup>7</sup>	1.0 c	1.0 c	1.0 c	1.0 e
15 2014 Anth Program #24.....	Nufarm	ALT-14 <sup>8</sup>	2.4 a	1.0 c	1.0 c	2.3 b
16 2014 Anth Program #25.....	Nufarm	ALT-14 <sup>9</sup>	2.2 b	1.4 b	1.4 b	3.0 a
17 QP Strobe 50WG.....	0.2 oz	-				
+ Daconil Ultrex 82.5WG .....	3.25 oz	-				
+ Foursome 100SL .....	0.4 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
18 Heritage 50WG.....	0.2 oz	-				
+ Daconil Ultrex 82.5WG .....	3.25 oz	-				
+ Foursome 100SL .....	0.4 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e

(Continued)

Table 1D. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>3</sup>	Phytotoxicity <sup>1,2</sup>			
			2 June	28 June	28 July	25 Aug.
19 QP Fosetyl-AI 80WG.....	4.0 oz	-				
+ QP Chlorothalonil 82.5DF .....	3.23 oz	-				
+ Foursome 100SL .....	0.4 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
20 Chipco Signature 80WG .....	4.0 oz	-				
+ Daconil Ultrex 82.5WG .....	3.23 oz	14	1.0 c	1.0 c	1.0 c	1.0 e
21 QP Enclave 5.3F.....	3.0 fl oz	-				
+ Foursome 100SL .....	0.4 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
22 Daconil Ultrex 82.5WG .....	3.2 oz	14	1.0 c	1.0 c	1.0 c	1.0 e
23 Daconil Ultrex 82.5WG .....	3.2 oz	14	1.0 c	1.0 c	1.0 c	1.0 e
24 Daconil Ultrex 82.5WG .....	3.2 oz	14	1.0 c	1.0 c	1.0 c	1.0 e
25 Daconil Ultrex 82.5WG .....	3.2 oz	14	1.0 c	1.0 c	1.0 c	1.0 e
26 Daconil Ultrex 82.5WG .....	3.2 oz	14	1.0 c	1.0 c	1.0 c	1.0 e
27 Varnimo WP .....	0.735 oz	-				
+ KaPre Remede8 LC .....	3.0 fl oz	VAR <sup>10</sup>	1.0 c	1.0 c	1.0 c	1.0 e
28 Varnimo WP .....	0.735 oz	-				
+ KaPre Remede8 LC .....	3.0 fl oz	-				
+ Pennamin Driver-P DF .....	1.5 oz	VAR <sup>10</sup>	1.0 c	1.0 c	1.0 c	1.0 e
29 SR-9059 SC.....	0.3 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
30 SR-9059 SC.....	0.4 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
31 SR-9059 SC.....	0.5 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
32 Medallion 1.04SC.....	2.0 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
33 Banner MAXX 1.3ME.....	1.5 fl oz	14	1.0 c	1.0 c	1.0 c	1.6 c
34 2014 Anth Program #26A.....	Plant-food	-				
/ 2014 Anth Program #26B.....		7 <sup>11</sup>	1.0 c	1.0 c	1.0 c	1.0 e
35 2014 Anth Program #27A.....	Plant-food	-				
+ Daconil Ultrex 82.5WG .....	0.9 oz	-				
/ 2014 Anth Program #27B .....		-				
+ Daconil Ultrex 82.5WG .....	0.9 oz	7 <sup>12</sup>	1.0 c	1.0 c	1.0 c	1.0 e

(Continued)

Table 1D. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) <sup>3</sup>	Phytotoxicity <sup>1,2</sup>			
			2 June	28 June	28 July	25 Aug.
36 2014 Anth Program #28A..... Plant-food + Daconil Ultrex 82.5WG .....	0.9 oz	-				
/ 2014 Anth Program #28B.....	-	7 <sup>13</sup>	1.0 c	1.0 c	1.0 c	1.0 e
37 2014 Anth Program #29A..... Plant-food + Banner MAXX 1.3ME.....	0.5 fl oz	-				
/ 2014 Anth Program #29B.....	-	7 <sup>14</sup>	1.0 c	1.0 c	1.0 c	1.0 e
+ Banner MAXX 1.3ME.....	0.5 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
38 ARY-0534-002 SC.....	0.33 fl oz	14	1.0 c	1.0 c	1.0 c	1.4 c
39 Disarm T SC.....	0.66 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
40 Disarm C 4.25SC.....	6.0 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
41 Daconil Ultrex 82.5WG .....	3.2 oz	14	1.0 c	1.0 c	1.0 c	1.0 e
42 2014 Anth Program #30 .....	Rutgers	14 <sup>15</sup>	1.0 c	1.0 c	1.0 c	1.0 e
43 Affirm 11.3WG.....	0.88 oz	14	1.0 c	1.0 c	1.0 c	1.0 e
44 Secure 4.2SC.....	0.5 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
45 2014 Anth Program #31 .....	Humate Intl	VAR <sup>16</sup>	1.0 c	1.0 c	1.0 c	1.0 e
46 Companion LC.....	6.0 fl oz	-				
+ Recover Rx 3-18-18 DF .....	5 oz	14	1.0 c	1.0 c	1.0 c	1.0 e
47 Velista 50WG .....	0.5 oz	14	1.0 c	1.0 c	1.0 c	1.0 e
48 Xzemplar 2.5SC.....	0.21 fl oz	14	1.0 c	1.0 c	1.0 c	1.0 e
49 UTC.....	-	-	1.0 c	1.0 c	1.0 c	1.0 e

	INT <sup>17</sup>	DAT <sup>18</sup>	DAT	DAT	DAT
	7	5	5	5	5
	14	13	12	12	12
	21	13	19	5	12

<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).

(Continued)

Table 1D. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

- <sup>2</sup> 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.
- <sup>3</sup> Fungicides were applied on 21 May (all treatments except treatments 34 to 37), 28 May (7-day treatments 34 to 37), 2 June (treatment 45 only), 4 June (7- and 14-day treatments), 11 June (7- and 21-day treatments), 18 June (7- and 14-day treatments), 25 June (7-day treatment), 2 July (7-, 14-, and 21-day treatments), 6 July (treatment 45 only), 9 July (7-day treatment), 16 July (7- and 14-day treatments), 23 July (7- and 21-day treatments), 30 July (7- and 14-day treatments), 6 August (7-day treatment), 13 August (7-, 14-, and 21-day treatments), and 20 August (7-day treatment).
- <sup>4</sup> ALT = Alteration treatment, where treatment 1 (2014 UPI Anth Program #20) consisted of Pegasus HPX 6SC (3.6 fl oz) + Skylark 3.6LC (0.6 fl oz) applied on 21 May and 16 July, Viceroy 70DF (4.6 oz) + Raven 2LC (4.0 fl oz) on 4 June and 30 July, Pegasus HPX 6SC (3.6 fl oz) + Raven 2LC (4.0 fl oz) on 18 June and 13 August, and Viceroy 70DF (4.6 oz) + Skylark 3.6LC (0.6 fl oz) on 2 July.
- <sup>5</sup> ALT = Alteration treatment, where treatment 2 (2014 UPI Anth Program #21) consisted of Pegasus HPX 6SC (3.6 fl oz) + Viceroy 70DF (4.6 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Skylark 3.6LC (0.6 fl oz) + Raven 2LC (4.0 fl oz) on 4 June, and 2 and 30 July.
- <sup>6</sup> Treatment 6 (2014 Griggs Anth Program #22) consisted of Gary's Green Ultra (13-2-3) LC (12.0 fl oz) + PK Plus 3-17-18 LC (6.0 fl oz) + Keplex LC (3.0 fl oz) + Daconil Action 6.1SC (3.0 fl oz) applied every 14 days starting on 21 May.
- <sup>7</sup> ALT = Alteration treatment, where treatment 14 (2014 Nufarm Anth Program #23) consisted of Torque 3.6F (0.75 fl oz) + Spectro 90WG (3.6 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Affirm 11.3WG (0.9 oz) + Spectro 90WG (3.6 oz) on 4 June, and 2 and 30 July.
- <sup>8</sup> ALT = Alteration treatment, where treatment 15 (2014 Nufarm Anth Program #24) consisted of Torque 3.6F (0.75 fl oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.092 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Affirm 11.3WG (0.9 oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.092 oz) on 4 June, and 2 and 30 July.
- <sup>9</sup> ALT = Alteration treatment, where treatment 16 (2014 Nufarm Anth Program #25) consisted of Torque 3.6F (0.75 fl oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.183 oz) applied on 21 May, 18 June, 16 July, and 13 August, and Affirm 11.3WG (0.9 oz) + Spectro 90WG (3.6 oz) + Anuew 27.5WG (0.183 oz) on 4 June, and 2 and 30 July.
- <sup>10</sup> Treatments 27 and 28 were applied on 21 and 28 May and 4 June and then every 14 days thereafter. The plots were irrigated with 0.5 gal of H<sub>2</sub>O per plot immediately after application.
- <sup>11</sup> Treatment 34 (2014 Plant Food Anth Program #26) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse GT LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.
- <sup>12</sup> Treatment 35 (2014 Plant Food Anth Program #27) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Daconil Ultrex 82.5 WG (0.9 oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) + Daconil Ultrex 82.5 WG (0.9 oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.

Table 1D. Anthracnose control on annual bluegrass putting green turf, 2014 (continued).

- <sup>13</sup> Treatment 36 (2014 Plant Food Anth Program #28) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Daconil Ultrex 82.5 WG (0.9 oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse GT LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.
- <sup>14</sup> Treatment 37 (2014 Plant Food Anth Program #29) consisted of Part A 16-2-7 25% SRN LC (6.0 fl oz) + Impulse GT LC (2.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Flo Thru 2403 LC (2.0 fl oz) + AdamsEarth LC (2.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Banner Maxx 1.3ME (0.5 fl oz) applied on 21 May, 4 June, 18 June, 2 July, 16 July, 30 July, and 13 August; Part B 0-0-29 LC (3.0 fl oz) + Sugar Cal LC (4.0 fl oz) + Cal Nitrate LC (6.0 fl oz) + Mn 5% LC (3.0 fl oz) + Mg Nitrate LC (3.0 fl oz) + Impulse GT LC (4.0 fl oz) + Omega LC (0.7 fl oz) + Flo Thru 2403 (2.0 fl oz) + Banner MAXX 1.3ME (0.5 fl oz) applied on 28 May, 11 June, 25 June, 9 July, 23 July, 6 August, and 20 August.
- <sup>15</sup> Treatment 42 (2014 Rutgers Anth Program #30) consisted of Banner Maxx 1.3ME (1.0 fl oz) applied on 21 May, Daconil Ultrex 82.5WG (3.2 oz) on 4 June, Chipco Signature 80WG (4.0 oz) + Insignia Intrinsic 2.1SC (0.7 fl oz) on 18 June, Affirm 11.3WG (0.9 oz) + Daconil Ultrex 82.5WG (3.2 oz) on 2 July, Chipco Signature 80WG (4.0 oz) + Chipco 26GT 2SC (4.0 fl oz) on 16 July, 3336 Plus 19.4F (3.0 fl oz) + Daconil Ultrex 82.5WG (3.2 oz) on 30 July, and Chipco Signature 80WG (4.0 oz) + Medallion 1.04SC (1.5 fl oz) on 13 August.
- <sup>16</sup> VAR = variable spray schedule, where treatment 45 (2014 Humate Intl. Anth Program #31) consisted of Chipco 26GT 2SC (4.0 fl oz) applied on 21 May, Humate Rejuvenator G (12.5 lb) on 2 June and 9 July and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application, Humate Microfeed (6.0 fl oz) on 4, 11, 18, and 25 June and immediately irrigated with 0.5 gal of H<sub>2</sub>O per plot after application, Humate Microfeed (3.0 fl oz) on 2 July and applied every 7 days thereafter; immediately irrigated with 0.5 gal of H<sub>2</sub>O per plot after application, Biosyst Annual Plus (1.1 oz) on 6 June and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application, Biosyst Monthly-MS (0.4 oz) on 11 June, 9 July, and 6 August and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application, and Humate Ag1635 G (5.0 lb) applied on 25 June and 23 July and immediately irrigated with 1 gal of H<sub>2</sub>O per plot after application.
- <sup>17</sup> INT = Spray interval in days.
- <sup>18</sup> DAT = Days after the last treatment.