

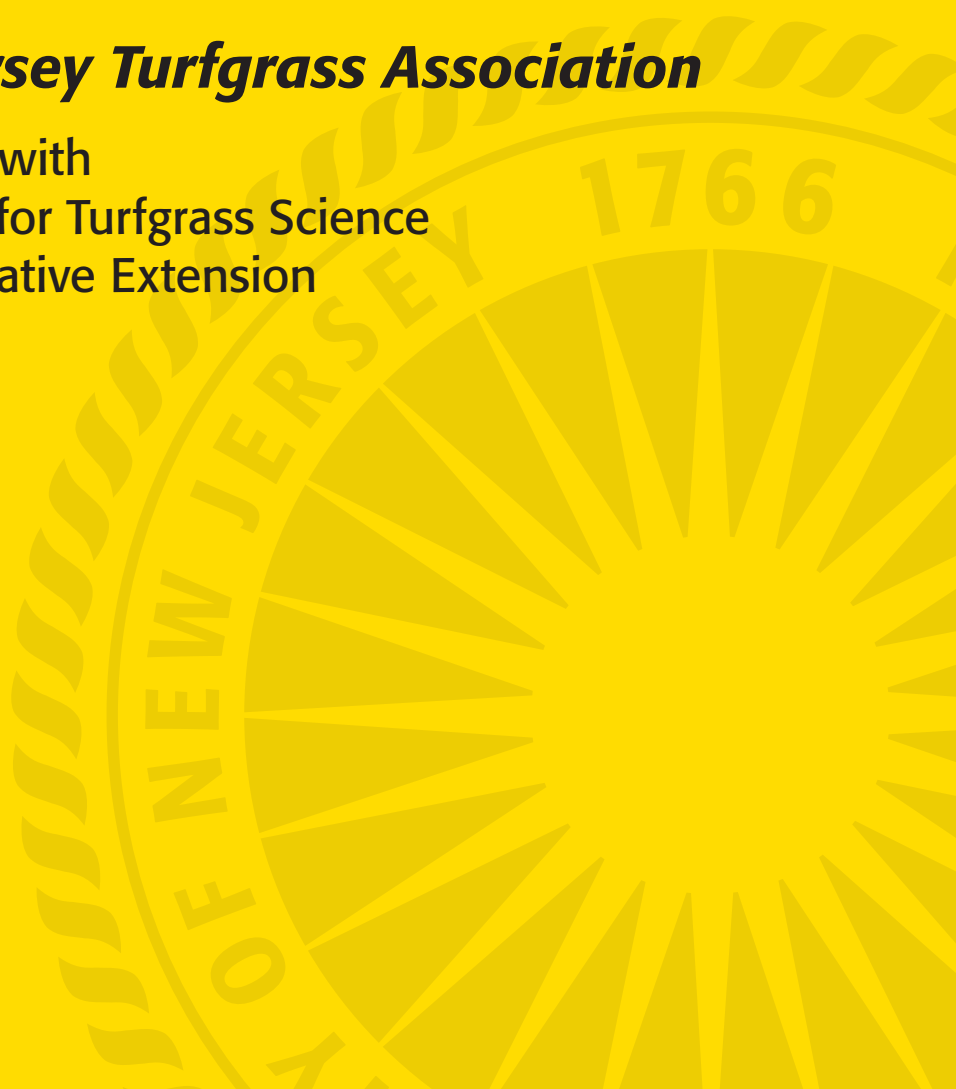
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Rutgers Center for Turfgrass Science
Rutgers Cooperative Extension



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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 2008 New Jersey Turfgrass Expo. Publication of these lectures provides a readily avail-

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

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

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

PREVENTIVE CONTROL OF ANTHRACNOSE WITH SELECTED FUNGICIDES AND BIORATIONAL PRODUCTS ON AN ANNUAL BLUEGRASS PUTTING GREEN, 2008

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Fungicides were evaluated in 2008 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 6.2 by killing the existing stand of creeping bentgrass (*Agrostis stolonifera*) and annual bluegrass with Roundup Pro 3LC (3 qt/A) and then core aerifying the site in two directions to bring dormant annual bluegrass seed to the soil surface. Mowing was performed daily at a height of 0.125-inch with clippings collected. The site was irrigated as needed to prevent drought stress.

Fertilizer was applied as 34-0-0 (0.5 lb nitrogen (N)/1000 ft²) on 4 April, 21-0-0 (0.2 lb N/1000 ft²) on 8 and 28 May, and 34-0-0 (0.2 lb N/1000 ft²) on 21 June and 4 July. Dimension 0.15G (28 oz/A) was applied on 12 May for pre-emergence weed control and Fusilade 2L (0.28 fl oz/1000 ft²) was sprayed on 28 August to eliminate creeping bentgrass from the site.

Diseases other than anthracnose (e.g., dollar spot [caused by *Sclerotinia homoeocarpa*] and brown patch [incited by *Rhizoctonia solani*]) were suppressed in the test area with Emerald 70WG (0.18 oz/1000 ft²) + ProStar 70W (3.0 oz/1000 ft²) on 25 May, 22 June, and 18 July; Curalan 50EG (1.0 oz/1000 ft²) + ProStar 70W (3.0 oz/1000 ft²) on 7 June, 4 July, and 1 August; and Emerald 70WG (0.18 oz/1000 ft²) on 15 August. Previous research by the authors has shown that Curalan 50EG, ProStar 70W, and Emerald 70WG did not affect anthracnose development on the site at the rates used in this study. The growth regulator Primo MAXX 1ME (0.125 fl oz/1000 ft²) was applied to the trial every 14 days from 7 May to 29 August,

but seedhead suppressants were not used. Insect pests were controlled with Telstar GC 0.67F (0.44 oz/1000 ft²) on 24 April. Turf was topdressed with a sand root zone mix on 1 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 Tee Jet 8003E nozzles. Treatments (trt) were initiated on 16 May, prior to the development of anthracnose. Fungicides were reapplied at the appropriate intervals until 15 August as indicated in Tables 1A and 1B. Turf was visually evaluated for percent turf area infested with anthracnose on 15 and 25 July, 1, 15, and 22 August, and 1 and 22 September. Phytotoxicity was assessed on 4 and 19 June 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. Turf quality was evaluated on 1 August using a 1 to 9 scale, where 9 = best turf quality and 5 = acceptable quality. Data were subjected to analysis of variance and means were separated by Waller-Duncan *k*-ratio *t*-test (*k* = 100).

Anthracnose developed on 9 July as a natural infection and became uniformly distributed throughout the green by 15 July. Disease severity peaked on 12 September (95% turfgrass area infested on non-fungicide treated turf). Due to the extreme severity of this natural epidemic, only a few treatments provided season-long control of anthracnose (i.e., less than 10% turf area infested from 15 May through 12 September) including RU192514A-08 F @ 3.6 fl oz (trt 24), RU192514F-08 SC @ 3.6 fl oz (trt 26), RU192514G-08 SC @ 3.6 fl oz (trt 28), Legacy B

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3.1SC @ 1.1 fl oz (trt 65), Legacy C 4.8SC (trts 67 to 69), products containing phosphonates fungicides alone or in combination with other compounds [i.e., Chipco Signature 80WG + Daconil Ultrex 82.5WDG + Cal Force + Base K + ENFOS (trt 15), Legacy B 3.1SC + Chipco Signature 80WG alternated with Chipco Signature 80WG + Daconil Ultrex 82.5WDG (trt 66), Legacy C 4.8SC + Chipco Signature 80WG (trt 72), Endorse 2.5W + Alude 46L (trt 76), Spectro 90WDG + Alude 46L (trt 77), Autograph 70WDG + Kestrel 1.3ME (trt 95), Autograph 70WDG + Pegasus HPX 6F (trt 97), Autograph 70WDG + PEX 6015 82.5DF (trt 99), Autograph 70WDG + Kestrel 1.3ME alternated with Autograph 70WDG + Pegasus HPX 6F (trt 100), Chipco Signature 80WG + Banner MAXX 1.3 (trt 101), Chipco Signature 80WG + Daconil Weatherstik 6F (trt 102), Chipco Signature 80WG + Daconil Ultrex 82.5WDG (trt 103), Chipco Signature 80WG + Banner MAXX 1.3ME alternated with Chipco Signature 80WG + Daconil Weatherstik 6F (trt 104)], or fungicides containing chlorothalonil alone or in combination with other products [i.e., Daconil Ultrex 82.5WDG @ 3.2 oz + Cal Force + Base K + ENFOS (trt 19), Concert 4.3EC (trt 73), Banner MAXX 1.3ME + Daconil Ultrex 82.5WDG (trt 74), Syngenta Program #1 with Primo MAXX 1MEC (trt 105), and RU Anth 08 Program #1 (trt 111)]. Daconil Ultrex 82.5WDG @ 1.8 oz + Cal Force + Base K + ENFOS (trt 16) also adequately suppressed this disease through 12 September with only slight reductions in control on 25 July and 15 August.

Several additional products and product combinations applied at 14-day intervals including A7402 2.1EC (trt 4), RU192514H-08 WG @ 3.2 oz (trt 30), Insignia 20WG @ 0.7 oz + Trinity 1.67SC @ 1.0 fl oz (trt 53), RU42116-08E WG @ 0.4 oz (trt 60) and 0.5 oz (trt 61), Chipco Signature 80WG + Tartan 2.4SC (trt 75), P-K Plus 3-7-18 + Daconil Ultrex 82.5WDG (trt 84), SAETA DF + Kestrel 1.3ME (trt 96), Syngenta Program #2 without Primo MAXX 1MEC (trt 106), Medallion 50W + Daconil Ultrex 82.5WDG + Primo MAXX 1MEC (trt 107), Tourney 50WDG (trt 108), Daconil Ultrex 82.5WDG @ 3.2 oz (trt 109), and Chipco Signature 80WG (trt 110) also provided good residual control by 1 September (24 days after the last fungicide application). A16841 1.3ME @ 1.5

fl oz (trt10), CX-3205EC + Endorse 2.5W (trt 36), Trinity 1.67SC @ 1.5 fl oz (trt 56), RU42116-08E WG @ 0.3 oz (trt 59), Daconil Ultrex 82.5WDG @ 2.4 oz (trt 70), Chipco 26GT 2SC (trt 71), and Magnet-B F + Pegasus HPX 6F (trt 98) afforded adequate control of anthracnose during the treatment period (16 May to 15 August).

It is interesting to note that fungicides in the QoI, benzimidazole, and DMI [except for Tourney 50WDG (trt 108) and Trinity 1.67SC @ 1.5 fl oz (trt 56)], an antibiotic [e.g., Endorse 2.5W (trt 46)], and phenylpyrrole [e.g., Medallion 50W (trt 33)] groups did not adequately control anthracnose during the severe epidemic in 2008, even though they typically provided acceptable levels of protection on this site prior to 2006. As in past anthracnose efficacy studies at Rutgers University, tank mixtures often controlled the disease better than the individual components used alone [e.g., Insignia 20WG @ 0.7 oz + Trinity 1.67SC @ 1 fl oz (trt 53) was more efficacious than the individual components Insignia 20WG (trt 52) or Trinity 1.67SC (trt 5) alone, and P-K Plus 3-7-18 6 fl oz + Daconil Ultrex 82.5WDG 1.8 oz (trt 84) controlled anthracnose better than P-K Plus 3-7-18 (trt 83) or Daconil Ultrex 82.5WDG (trt 85) when used alone at the same rates.]

Moderate to severe foliar chlorosis was noted on 4 June for turf treated with Syngenta Program #1 with Primo 1MC (trt 105) or Medallion 50W + Daconil Ultrex 82.5WDG + Primo MAXX 1MEC (trt 107) every 14 days, but the injury was only temporary and turf quickly recovered within 14 days. Slight to moderate foliar chlorosis was noted on 19 June for turf sprayed with Trinity 1.67SC @ 1 fl oz (trt 5), GF-1948 1.25EW @ 2.0 fl oz (trt 32), RU21196A-08 SC @ 0.21 fl oz + RU21196C-08 SC @ 1.0 fl oz (trt 44), Insignia 20WG @ 0.7 oz + Trinity 1.67SC @ 1.0 fl oz (trt 53), Trinity 1.67SC @ 1.5 fl oz (trt 56), or Tourney 50WDG @ 0.28 oz (trt 108) every 14 days. Phytotoxicity was not significant for any other treatment. Turf quality evaluated on 1 August was closely associated with anthracnose control, except for Trinity 1.67SC @ 1.5 fl oz (trt 56) which afforded good disease protection during the treatment period but caused moderate foliar chlorosis.

Table 1A. Preventive control of anthracnose with selected fungicides and biorational products on an annual bluegrass putting green: Rutgers University, 2008.

Treatment	Rate per 1000 sq ft	Application Schedule (days) ²	Turf Area Infested (%) per Plot ¹				
			15 July	25 July	1 Aug.	15 Aug.	22 Aug.
1 Banner MAXX 1.3ME.....	1.0 fl oz	14	5.8 o-y	16.8 s-x	19.0 o-u	33.8 t-x	27.0 w-z'c'
2 Banner MAXX 1.3ME.....	1.5 fl oz	14	2.5 t-y	8.3 z-z'h'	13.8 t-z'd'	31.0 v-y	24.8 y-z'e'
3 A7402 2.1EC.....	0.625 fl oz	14	1.5 v-y	4.3 z'e'-j'	8.5 y-z'm'	19.8 z'a'-g'	16.0 z'd'-i'
4 A7402 2.1EC.....	0.94 fl oz	14	1.3 w-y	1.8 z'g'-j'	4.5 z'f'-n'	5.3 z'n'-s'	3.5 z'k'-n'
5 Trinity 1.67SC	1.0 fl oz	14	2.3 u-y	11.0 w-z'e'	15.0 r-z'a'	35.3 t-x	31.8 u-z
6 Bayleton 50WP	0.5 oz	14	16.8 kl	36.5 k-m	57.5 fg	93.8 ab	78.5 e-g
7 A6780 1.3ME	1.0 fl oz	14	3.8 r-y	10.8 x-z'e'	15.5 r-y	33.3 u-x	29.8 v-z'b'
8 A6780 1.3ME	1.5 fl oz	14	1.8 v-y	6.5 z'a'-j'	13.3 t-z'e'	31.8 v-x	29.0 v-z'b'
9 A16841 1.3ME	1.0 fl oz	14	1.5 v-y	2.5 z'g'-j'	10.5 v-z'j'	18.0 z'c'-i'	20.3 z'b'-g'
10 A16841 1.3ME	1.5 fl oz	14	1.3 w-y	0.8 z'ij'	2.8 z'j'-n'	8.0 z'k'-s'	6.5 z'i'-n'
11 Granular Fertility Program	—	14 ³	30.8 e-h	37.5 k-m	61.5 ef	56.5 m-o	44.3 p-t
12 Cal Force	6.0 fl oz						
+ Base K	3.0 fl oz						
+ ENFos.....	5.12 oz	14 ³	27.8 g-i	37.0 k-m	31.0 kl	38.3 r-v	28.5 v-z'b'
13 Banner MAXX 1.3ME.....	1.0 fl oz	21	9.3 m-r	15.0 s-z	25.8 k-o	35.5 t-x	42.3 p-t
14 Banner MAXX 1.3ME.....	1.5 fl oz	21	3.3 s-y	5.5 z'c'-j'	15.3 r-z	28.0 x-z	38.3 r-v
15 Chipco Signature 80WG	4.0 oz						
+ Daconil Ultrex 82.5WDG.....	3.2 oz						
+ Cal Force	6.0 fl oz						
+ Base K	3.0 fl oz						
+ ENFos.....	2.56 oz	14 ³	8.3 m-t	10.5 x-z'f'	3.5 z'h'-n'	4.0 z'o'-s'	2.5 z'm'n'
16 + Daconil Ultrex 82.5WDG.....	1.8 oz						
+ Cal Force	6.0 fl oz						
+ Base K	3.0 fl oz						
+ ENFos.....	5.12 oz	14 ³	10.0 m-q	13.3 t-z'b'	4.3 z'g'-n'	14.0 z'd'-l'	2.5 z'm'n'
17 A6780 1.3ME	1.0 fl oz	21	9.0 m-s	15.5 s-y	33.0 jk	51.5 n-p	47.5 n-r
18 A6780 1.3ME	1.5 fl oz	21	10.0 m-q	11.5 v-z'd'	23.3 l-r	48.8 o-q	45.5 o-s

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(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) ²	Turf Area Infested (%) per Plot ¹					
			15 July	25 July	1 Aug.	15 Aug.	22 Aug.	
19 Daconil Ultrex 82.5WDG.....	3.2 oz							
+ Cal Force	6.0 fl oz							
+ Base K	3.0 fl oz							
+ ENFos	5.12 oz	14 ³	3.5 r-y	5.5 z'c'-j'	3.0 z'i'-n'	2.5 z'p'-s'	1.3 z'n'	
20 Untreated check.....	—	—	60.5 a	72.8 bc	80.5 a-c	81.8 f-h	83.8 b-f	
21 A7402 2.1EC.....	0.625 fl oz	21	2.3 u-y	5.0 z'd'-j'	18.0 o-v	28.5 w-z	37.3 s-v	
22 A7402 2.1EC.....	0.94 fl oz	21	1.5 v-y	2.0 z'g'-j'	11.8 u-z'h'	16.5 z'c'-j'	34.5 t-y	
23 RU192514A-08 F	2.0 fl oz	14	6.0 o-x	7.8 z'a'-i'	14.3 s-z'b'	18.3 z'c'-h'	23.0 z-z'f'	
24 RU192514A-08 F	3.6 fl oz	14	1.3 w-y	2.5 z'g'-j'	8.3 y-z'n'	1.8 z'q'-s'	7.5 z'h'-n'	
25 RU192514F-08 SC	2.0 fl oz	14	3.3 s-y	4.0 z'e'-j'	17.3 q-w	7.3 z'k'-s'	8.8 z'h'-n'	
26 RU192514F-08 SC	3.6 fl oz	14	1.0 w-y	2.8 z'g'-j'	5.0 z'e'-n'	3.5 z'o'-s'	3.5 z'k'-n'	
27 RU192514G-08 SC.....	2.0 fl oz	14	0.0 y	0.8 z'i'j'	2.0 z'k'-n'	1.3 z'q'-s'	2.3 z'm'n'	
28 RU192514G-08 SC.....	3.6 fl oz	14	0.0 y	0.0 z'j'	2.0 z'k'-n'	0.0 z's'	0.3 z'n'	
29 RU192514H-08 WG.....	1.8 oz	14	2.3 u-y	3.5 z'f'-j'	13.3 t-z'e'	22.0 z-z'd'	28.5 v-z'b'	
30 RU192514H-08 WG.....	3.2 oz	14	1.8 v-y	1.5 z'h'-j'	5.8 z'c'-n'	8.8 z'j'-q'	12.0 z'g'-m'	
31 GF-1948 1.25EW	1.0 fl oz	14	10.0 m-q	25.8 p-r	29.8 k-m	44.5 p-s	60.8 i-l	
32 GF-1948 1.25EW	2.0 fl oz	14	2.0 u-y	6.3 z'b'-j'	11.3 u-z'i'	18.8 z'c'-h'	31.5 u-z	
33 Medallion 50W	0.33 oz	14	11.0 l-p	20.0 r-t	29.5 k-n	36.3 t-w	41.0 q-u	
34 Banner MAXX 1.3ME.....	2.0 fl oz	14	2.8 t-y	5.8 z'c'-j'	7.0 z-z'n'	11.5 z'h'-o'	13.0 z'f'-l'	
35 Eagle 1.67EW	1.2 fl oz	14	30.5 e-h	48.8 g-i	60.3 f	77.0 g-i	84.5 a-f	
36 CX-3205EC.....	2.57 fl oz							
+ Endorse 2.5W	2.0 oz	7	1.0 w-y	4.3 z'e'-j'	5.5 z'd'-n'	14.0 z'd'-l'	6.8 z'i'-n'	
37 RU21196A-08 SC	0.21 fl oz	14	60.0 a	82.0 a	84.5 ab	90.3 a-e	90.0 a-c	
38 RU21196A-08 SC	0.315 fl oz	14	56.0 a	84.5 a	87.0 a	92.3 a-c	91.0 a-c	
39 RU21196A-08 SC	0.21 fl oz							
+ RU21196B-08 SC	0.252 fl oz	14	29.5 e-i	54.5 e-g	60.8 f	65.5 kl	61.5 h-k	
40 RU21196A-08 SC	0.262 fl oz							
+ RU21196B-08 SC	0.315 fl oz	14	26.5 g-i	43.0 i-k	48.5 h	63.0 k-m	55.3 k-o	
41 RU21196A-08 SC	0.157 fl oz							
+ RU21196B-08 SC	0.377 fl oz	14	25.5 hi	34.8 l-o	39.8 ij	54.0 no	56.5 k-n	

(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) ²	Turf Area Infested (%) per Plot ¹					
			15 July	25 July	1 Aug.	15 Aug.	22 Aug.	
42 RU21196A-08 SC0.21 fl oz								
+ RU21196B-08 SC0.503 fl oz		14	18.0 jk	35.3 l-n	46.5 hi	67.0 k	71.0 gh	
43 RU21196A-08 SC0.21 fl oz								
+ RU21196C-08 SC0.5 fl oz		14	27.5 g-i	40.0 j-l	50.3 gh	76.3 h-j	78.8 e-g	
44 RU21196A-08 SC0.21 fl oz								
+ RU21196C-08 SC1.0 fl oz		14	11.3 l-o	28.5 n-p	28.3 k-n	51.0 n-p	51.0 l-q	
45 Sync 100XL.....0.32 fl oz		14	46.3 b	59.8 d-f	75.5 cd	93.5 ab	87.5 a-e	
46 Endorse 2.5W 4.0 oz		14	4.3 q-y	17.0 s-x	17.3 q-w	36.5 s-w	41.0 q-u	
47 Endorse 2.5W 4.0 oz								
+ Sync 100XL.....0.32 fl oz		14	8.3 m-t	12.5 u-z'c'	7.0 z-z'n'	21.5 z-z'e'	25.8 x-z'd'	
48 SARS-351 20SC0.25 fl oz		14	41.5 bc	55.5 d-g	75.8 cd	86.0 b-f	89.0 a-d	
49 SARS-351 20SC0.5 fl oz		14	31.5 e-g	55.0 e-g	77.3 b-d	90.0 a-e	92.0 ab	
50 SARS-351 20SC0.5 fl oz		21	34.8 de	61.3 de	82.0 a-c	95.5 a	92.0 ab	
51 SARS-351 20SC0.5 fl oz		28	37.5 cd	62.5 d	80.8 a-c	89.3 a-f	84.5 a-f	
52 Insignia 20WG 0.9 oz		14	23.8 ij	40.0 j-l	57.8 fg	70.0 i-k	69.8 g-j	
53 Insignia 20WG 0.7 oz								
+ Trinity 1.67SC1.0 fl oz		14	1.0 w-y	4.0 z'e'-j'	3.0 z'i'-n'	7.0 z'k'-s'	7.8 z'h'-n'	
54 Insignia 20WG 0.9 oz		14 ⁴						
/ Trinity 1.67SC1.5 fl oz		14 ⁴	7.3 n-v	20.8 q-s	22.3 m-s	40.0 r-u	51.3 l-p	
55 Curalan 50EG 1.0 oz		14	38.5 cd	46.0 h-j	59.3 f	87.5 a-f	87.3 a-e	
56 Trinity 1.67SC1.5 fl oz		14	2.8 t-y	7.8 z'a'-i'	8.8 x-z'l'	14.5 z'd'-k'	9.3 z'h'-n'	
57 RU42116-08D WG 0.2 oz		14	6.3 n-w	18.5 s-v	14.0 s-z'c'	33.0 u-x	31.0 u-z'a'	
58 RU42116-08E WG 0.2 oz		14	0.8 w-y	3.3 z'g'-j'	12.8 u-z'f'	13.8 z'e'-l'	13.3 z'f'-k'	
59 RU42116-08E WG 0.3 oz		14	0.5 w-y	2.3 z'g'-j'	9.0 w-z'k'	13.0 z'g'-n'	9.0 z'h'-n'	
60 RU42116-08E WG 0.4 oz		14	0.3 xy	1.5 z'h'-j'	8.3 y-z'n'	7.5 z'k'-s'	6.5 z'i'-n'	
61 RU42116-08E WG 0.5 oz		14	0.5 w-y	1.3 z'h'-j'	6.8 z'a'-n'	7.0 z'k'-s'	6.5 z'i'-n'	
62 Legacy B 3.1SC0.4 fl oz		14	13.3 k-m	19.0 r-u	28.0 k-n	41.5 q-t	49.5 m-q	
63 Legacy B 3.1SC0.55 fl oz		14	3.5 r-y	15.5 s-y	17.0 r-x	21.3 z-z'f'	21.8 z-z'g'	
64 Legacy B 3.1SC0.75 fl oz		14	2.3 u-y	6.8 z'a'-j'	11.3 u-z'i'	13.3 z'f'-n'	17.3 z'c'-h'	
65 Legacy B 3.1SC1.1 fl oz		14	0.5 w-y	1.0 z'i'j'	3.0 z'i'-n'	5.5 z'm'-s'	2.0 z'm'-n'	

(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) ²	Turf Area Infested (%) per Plot ¹					
			15 July	25 July	1 Aug.	15 Aug.	22 Aug.	
66 Legacy B 3.1SC.....0.4 fl oz								
+ Chipco Signature 80WG..... 4.0 oz		14 ⁵						
/ Chipco Signature 80WG..... 4.0 oz								
+ Daconil Ultrex 82.5WG..... 3.2 oz		14 ⁵	0.5 w-y	0.8 z'ij'	0.5 z'l'-n'	0.3 z's'	0.8 z'n'	
67 Legacy C 4.8SC.....3.6 fl oz		14	0.3 xy	0.3 z'j'	0.3 z'm'n'	1.0 z'q'-s'	1.0 z'n'	
68 Legacy C 4.8SC.....4.5 fl oz		14	0.0 y	0.0 z'j'	0.5 z'l'-n'	0.3 z's'	0.0 z'n'	
69 Legacy C 4.8SC.....5.4 fl oz		14	0.0 y	0.0 z'j'	0.0 z'n'	0.5 z'r's'	0.3 z'n'	
70 Daconil Ultrex 82.5WG..... 2.4 oz		14	0.8 w-y	2.8 z'g'-j'	12.3 u-z'g'	7.8 z'k'-s'	7.5 z'h'-n'	
71 Chipco 26GT 2SC.....4.0 fl oz		14	5.5 o-y	5.8 z'c'-j'	10.5 v-z'j'	10.0 z'i'-p'	9.3 z'h'-n'	
72 Legacy C 4.8SC.....3.6 fl oz								
+ Chipco Signature 80WG..... 4.0 oz		14	0.0 y	0.0 z'j'	0.0 z'n'	0.0 z's'	0.0 z'n'	
73 Concert 4.3EC.....5.0 fl oz		14	0.0 y	0.3 z'j'	1.0 z'k'-n'	1.8 z'q'-s'	0.8 z'n'	
74 Banner MAXX 1.3ME..... 1.0 oz								
+ Daconil Ultrex 82.5 WDG..... 3.2 oz		14	0.8 w-y	0.5 z'j'	0.3 z'm'n'	4.5 z'o'-s'	0.3 z'n'	
75 Chipco Signature 80WG..... 4.0 oz								
+ Tartan 2.4SC.....1.5 fl oz		14	0.0 y	0.5 z'j'	0.0 z'n'	2.0 z'p'-s'	2.3 z'm'n'	
76 Endorse 2.5W..... 4.0 oz								
+ Alude 46L.....6.0 fl oz		14	0.8 w-y	2.0 z'g'-j'	3.0 z'i'-n'	3.8 z'o'-s'	3.3 z'k'-n'	
77 Spectro 90WDG..... 4.0 oz								
+ Alude 46L.....6.0 fl oz		14	0.5 w-y	0.8 z'ij'	2.5 z'j'-n'	1.3 z'q'-s'	15.0 z'e'-j'	
78 3336 4F.....3.0 fl oz								
+ CX-15 40WP..... 0.5 oz		14	1.5 v-y	6.5 z'a'-j'	6.5 z'b'-n'	19.5 z'b'-h'	23.0 z-z'f'	
79 3336 4F.....3.0 fl oz								
+ CX-08 50WP..... 1.5 oz		14	34.3 d-f	42.8 i-k	54.0 f-h	83.8 d-h	79.0 d-g	
80 AGSCI-BLX.....1.0 fl oz								
+ AGSCI-IB.....4.0 fl oz		14	5.5 o-y	13.5 t-z'a'	17.8 o-v	27.8 x-z'a'	31.0 u-z'a'	
81 Gary's Green Ultra 13-2-3.....9.0 fl oz								
+ P-K Plus 3-7-18.....6.0 fl oz		14	5.0 q-y	17.5 s-x	14.0 s-z'c'	27.5 x-z'b'	26.0 x-z'd'	
82 Gary's Green Ultra 13-2-3.....15.0 fl oz								
+ P-K Plus 3-7-18.....6.0 fl oz		14	5.3 p-y	27.8 o-q	24.5 l-q	27.5 x-z'b'	35.0 t-x	

(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) ²	Turf Area Infested (%) per Plot ¹				
			15 July	25 July	1 Aug.	15 Aug.	22 Aug.
83 P-K Plus 3-7-18.....	6.0 fl oz	14	7.8 m-u	28.5 n-p	21.3 n-t	57.5 l-n	57.0 k-n
84 P-K Plus 3-7-18.....	6.0 fl oz						
+ Daconil Ultrex 82.5WDG.....	1.8 oz	14	2.5 t-y	6.0 z'c'-j'	5.8 z'c'-n'	8.8 z'j'-q'	8.8 z'h'-n'
85 Daconil Ultrex 82.5WDG.....	1.8 oz	14	5.0 q-y	8.8 y-z'g'	18.8 o-v	13.5 z'e'-m'	15.0 z'e'-j'
86 Disarm 480SC.....	0.27 fl oz	14	42.0 bc	71.0 c	77.3 b-d	93.0 a-c	93.3 ab
87 Disarm C SC.....	4.32 fl oz	14	0.3 xy	1.5 z'h'-j'	3.5 z'h'-n'	8.5 z'j'-r'	15.0 z'e'-j'
88 Disarm 480SC.....	0.27 fl oz						
+ Endorse 2.5W.....	2.0 oz	14	5.0 q-y	18.8 r-u	17.8 o-v	33.0 u-x	36.3 s-w
89 Endorse 2.5W.....	2.0 oz	14	12.0 l-n	30.8 m-p	25.5 k-p	57.3 mn	59.8 j-l
90 V10190 2.5SC.....	1.04 fl oz	14	46.5 b	45.3 ij	70.3 d	83.5 e-h	81.8 c-f
91 V10190 2.5SC.....	2.08 fl oz	14	28.8 f-i	43.0 i-k	69.8 de	85.0 c-g	75.3 fg
92 Legacy F 1.67FS.....	1.0 fl oz	14	2.3 u-y	10.5 x-z'f'	13.3 t-z'e'	23.3 y-z'c'	21.0 z'a'-g'
93 3336 4F.....	3.0 fl oz	14	27.0 g-i	52.8 f-h	58.5 fg	70.5 i-k	70.0 g-i
94 Banner MAXX 1.3ME.....	0.8 fl oz	21	16.8 kl	18.0 s-w	27.8 k-n	68.8 jk	71.3 gh
95 Autograph 70WDG.....	4.57 oz						
+ Kestrel 1.3ME.....	2.0 fl oz	14	0.0 y	0.3 z'j'	0.5 z'l'-n'	2.0 z'p'-s'	1.3 z'n'
96 SAETA DF.....	4.0 oz						
+ Kestrel 1.3ME.....	2.0 fl oz	14	0.3 xy	0.8 z'i'j'	2.3 z'j'-n'	3.8 z'o'-s'	7.3 z'h'-n'
97 Autograph 70WDG.....	4.57 oz						
+ Pegasus HPX 6F.....	3.6 fl oz	14	0.0 y	0.3 z'j'	0.0 z'n'	0.0 z's'	0.0 z'n'
98 Magnet-B F.....	6.0 fl oz						
+ Pegasus HPX 6F.....	3.6 fl oz	14	1.5 v-y	2.5 z'g'-j'	2.3 z'j'-n'	8.8 z'j'-q'	8.3 z'h'-n'
99 Autograph 70WDG.....	4.57 oz						
+ PEX 6015 82.5DF.....	3.25 oz	14	0.8 w-y	0.3 z'j'	0.3 z'm'n'	0.8 z'q'-s'	0.3 z'n'
100 Autograph 70WDG.....	4.57 oz						
+ Kestrel 1.3ME.....	2.0 fl oz	14 ⁶					
/ Autograph 70WDG.....	4.57 oz						
+ Pegasus HPX 6F.....	3.6 fl oz	14 ⁶	0.0 y	0.0 z'j'	0.3 z'm'n'	0.3 z's'	0.8 z'n'
101 Chipco Signature 80WG.....	4.0 oz						
+ Banner MAXX 1.3ME.....	2.0 fl oz	14	0.0 y	0.5 z'j'	0.0 z'n'	0.3 z's'	1.5 z'n'

(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) ²	Turf Area Infested (%) per Plot ¹				
			15 July	25 July	1 Aug.	15 Aug.	22 Aug.
102 Chipco Signature 80WG 4.0 oz + Daconil Weatherstick 6F3.6 fl oz		14	0.3 xy	1.8 z'g'-j'	0.3 z'm'n'	1.5 z'q'-s'	0.8 z'n'
103 Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5WDG 3.2 oz		14	0.0 y	0.8 z'ij'	0.5 z'l'-n'	0.0 z's'	0.3 z'n'
104 Chipco Signature 80WG 4.0 oz + Banner MAXX 1.3ME2.0 fl oz / Chipco Signature 80WG 4.0 oz + Daconil Weatherstick 6F3.6 fl oz		14 ⁷	0.3 xy	0.0 z'j'	0.0 z'n'	0.0 z's'	0.5 z'n'
105 Syngenta Program #1—		VAR ⁸	0.3 xy	2.0 z'g'-j'	4.3 z'g'-n'	2.0 z'p'-s'	4.3 z'k'-n'
106 Syngenta Program #2—		VAR ⁹	0.0 y	1.8 z'g'-j'	9.0 w-z'k'	3.5 z'o'-s'	3.0 z'l'-n'
107 Medallion 50W 0.25 oz + Daconil Ultrex 82.5WDG 2.4 oz + Primo MAXX 1.0MEC0.15 fl oz		14	0.3 xy	1.0 z'ij'	6.8 z'a'-n'	3.3 z'p'-s'	2.0 z'm'n'
108 Tourney 50WDG 0.28 oz		14	1.0 w-y	1.8 z'g'-j'	5.5 z'd'-n'	11.5 z'h'-o'	3.5 z'k'-n'
109 Daconil Ultrex 82.5WDG 3.2 oz		14	0.8 w-y	1.5 z'h'-j'	5.0 z'e'-n'	3.8 z'o'-s'	5.5 z'j'-n'
110 Chipco Signature 80WG 4.0 oz		14	0.3 xy	2.5 z'g'-j'	1.8 z'k'-n'	6.0 z'l'-s'	3.0 z'l'-n'
111 RU Anth 08 Program #1—		VAR ¹⁰	1.5 v-y	1.8 z'g'-j'	5.3 z'e'-n'	2.3 z'p'-s'	1.0 z'n'
112 Prostar 70W 2.2 oz		14	59.5 a	72.3 bc	84.8 ab	93.3 ab	94.0 a
113 DewCure4.0 fl oz		14	4.8 q-y	10.8 x-z'e'	25.5 k-p	45.8 p-r	57.8 k-m
114 Untreated check—		—	61.5 a	78.5 ab	80.3 a-c	91.8 a-d	86.8 a-e
		INT ¹¹	DAT ¹²	DAT	DAT	DAT	DAT
		7	4	7	1	7	7
		14	4	14	7	7	14
		21	18	7	14	7	14
		28	4	14	21	7	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).

(Continued)

Table 1A (continued).

- ² Fungicides were applied on 16 May (all treatments except for treatments 11, 12, 15, 16, 19, and 96), 19 May (treatments 12, 15, 16, and 19 initiated), 23 May (7-day treatment and treatment 11 initiated), 30 May (7- and 14-day treatments and treatment 96 initiated), 6 June (7- and 21-day treatments), 13 June (7-, 14- and 28-day treatments), 20 June (7-day treatment), 27 June (7-, 14-, and 21-day treatments), 3 July (7-day treatment), 11 July (7-, 14- and 28-day treatments), 18 July (7- and 21-day treatments), 25 July (7- and 14-day treatments), 1 August (7-day treatment), 8 August (7-, 14-, 21-, and 28-day treatments). and 15 August (7-day treatment).
- ³ Treatments 11, 12, 15, 16, and 19 received Granular Tru-Prill 15-2-15 (3.5 lb/1,000 sq ft) + Granular Tru-Exchange 0-0-15 (5.0 lb/1,000 sq ft) fertilizers on 19 May, 1, 14, and 28 June, 12 and 26 July, and 9 and 23 August. The same treatments were sprayed with K-Force (6 fl oz/1,000 sq ft) + ENFos (5.12 fl oz/1,000 sq ft) on 16 May instead of CalForce, Base-K, ENFos. Except for 16 May, Cal Force, Base-K, ENFos were applied to these treatments at the specified rates on the same days as fungicides (i.e., 13 and 27 June, 11 and 25 July, and 8 and 22 August).
- ⁴ Alternation of fungicides on a 14-day schedule, where treatment 54 received Insignia 20WG on 16 May, 13 June, 11 July, and 8 August and Trinity 1.67SC on 30 May, 27 June, 25 July, and 22 August.
- ⁵ Alternation of fungicides on a 14-day schedule, where treatment 66 received Legacy B 3.1SC + Chipco Signature 80WG on 16 May, 13 June, 11 July, and 8 August and Chipco Signature 80WG + Daconil Ultrex 82.5WG on 30 May, 27 June, 25 July, and 22 August.
- ⁶ Alternation of fungicides on a 14-day schedule, where treatment 100 received Autograph 70WDG + Kestrel 1.3ME on 16 May, 13 June, 11 July, and 8 August and Autograph 70WDG + Pegasus HPX 6F on 30 May, 27 June, 25 July, and 22 August.
- ⁷ Alternation of fungicides on a 14-day schedule, where treatment 104 received Chipco Signature 80WG + Banner MAXX 1.3ME on 16 May, 13 June, 11 July, and 8 August and Chipco Signature 80WG + Daconil Weatherstick 6F on 30 May, 27 June, 25 July, and 22 August.
- ⁸ Variable spray schedule, where treatment 105 (Syngenta Program #1) consisted of Instrata 3.6SE (4.25 fl oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 16 May, Headway 1.39MEC (3.0 fl oz) + Daconil Ultrex 82.5WDG (3.2 oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 30 May, Concert 4.3SE (4.0 fl oz) + Medallion 50W (0.25 oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 13 June, Renown 4.84SE (4.5 fl oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 27 June, Concert 4.3SE (4.0 fl oz) + Medallion 50W (0.25 oz) + Subdue MAXX 2.0MEC (0.5 fl oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 11 July, Renown 4.84SE (4.5 fl oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 25 July, Concert 4.3SE (4.0 fl oz) + Medallion 50W (0.25 oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 8 August, and Medallion 50W (0.25 fl oz) + Daconil Ultrex 82.5WDG (3.2 oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 22 August.
- ⁹ Variable spray schedule, where treatment 106 (Syngenta Program #2) consisted of Instrata 3.6SE (4.25 fl oz) on 16 May, Headway 1.39MEC (3.0 fl oz) + Daconil Ultrex 82.5WDG (3.2 oz) on 30 May, Concert 4.3SE (4.0 fl oz) + Medallion 50W (0.25 oz) on 13 June, Renown 4.84SE (4.5 fl oz) on 27 June, Concert 4.3SE (4.0 fl oz) + Medallion 50W (0.25 oz) + Subdue MAXX 2.0MEC (0.5 fl oz) on 11 July, Renown 4.84SE (4.5 fl oz) on 25 July, and Concert 4.3SE (4.0 fl oz) + Medallion 50W (0.25 oz) on 8 August, Medallion 50W (0.25 fl oz) + Daconil Ultrex 82.5WDG (3.2 oz) on 22 August.
- ¹⁰ Variable spray schedule, where treatment 111 (RU Anth 08 Program #1) consisted of Tourney 50WDG (0.18 oz) on 16 May, Daconil Ultrex 82.5WDG (3.2 oz) on 30 May, Chipco Signature 80WG (4.0 oz) + Daconil Ultrex 82.5WDG (3.2 oz) on 13 June, Endorse 2.5W (4.0 oz) + Daconil Ultrex 82.5WDG (3.2 oz) on 27 June, Chipco Signature 80WG (4.0 oz) + Trinity 1.67SC (1.5 fl oz) on 11 July, Insignia 20WG (0.9 oz) + Daconil Ultrex 82.5WDG (3.2 oz) on 25 July, Chipco Signature 80WG (4.0 oz) + Medallion 50W (0.33 oz) on 8 August, and Chipco 26GT 2SC (4.0 fl oz) + Daconil Ultrex 82.5WDG (3.2 oz) on 22 August.
- ¹¹ Spray intervals in days.
- ¹² Days after the last treatment.

Table 1B. Preventive control of anthracnose with selected fungicides and biorational products on an annual bluegrass putting green: Rutgers University, 2008.

Treatment	Rate per 1000 sq ft	Application Schedule (days) ⁴	Turf Area Infested (%) per Plot ¹		Phytotoxicity ²		Turf Quality ³
			1 Sept.	12 Sept.	4 June	19 June	1 Aug.
1 Banner MAXX 1.3ME	1.0 fl oz	14	33.0 w-z'b'	52.5 n-r	1.3 d-f	1.0 e	5.5 l-o
2 Banner MAXX 1.3ME	1.5 fl oz	14	31.5 x-z'c'	50.8 o-s	1.3 d-f	1.3 de	6.3 i-l
3 A7402 2.1EC	0.625 fl oz	14	20.5 z'd'-j'	25.5 z-z'f'	1.0 f	1.0 e	6.0 j-m
4 A7402 2.1EC	0.94 fl oz	14	6.5 z'l'-r'	13.0 z'g'-p'	1.0 f	1.0 e	7.3 e-h
5 Trinity 1.67SC	1.0 fl oz	14	35.0 v-z	39.8 t-x	1.5 b-d	2.0 c	5.5 l-o
6 Bayleton 50WP	0.5 oz	14	89.0 a-f	90.5 ab	1.4 c-e	1.0 e	2.8 u-x
7 A6780 1.3ME	1.0 fl oz	14	49.0 p-u	65.8 h-l	1.3 d-f	1.0 e	5.8 k-n
8 A6780 1.3ME	1.5 fl oz	14	39.8 u-x	56.0 l-p	1.8 b	1.5 d	5.8 k-n
9 A16841 1.3ME	1.0 fl oz	14	26.3 z-z'e'	34.5 v-z	1.0 f	1.0 e	5.8 k-n
10 A16841 1.3ME	1.5 fl oz	14	12.0 z'i'-o'	19.0 z'd'-l'	1.0 f	1.0 e	7.3 e-h
11 Granular Fertility Program	—	14 ⁵	31.8 x-z'c'	40.5 s-x	1.0 f	1.0 e	3.0 t-w
12 Cal Force	6.0 fl oz						
+ Base K	3.0 fl oz						
+ ENFos	5.12 oz	14 ⁵	22.3 z'c'-h'	30.0 x-z'c'	1.0 f	1.0 e	4.8 o-q
13 Banner MAXX 1.3ME	1.0 fl oz	21	53.8 o-r	69.5 g-k	1.3 d-f	1.0 e	4.8 o-q
14 Banner MAXX 1.3ME	1.5 fl oz	21	52.0 p-t	62.5 j-n	1.3 d-f	1.0 e	5.3 m-p
15 Chipco Signature 80WG	4.0 oz						
+ Daconil Ultrex 82.5WDG	3.2 oz						
+ Cal Force	6.0 fl oz						
+ Base K	3.0 fl oz						
+ ENFos	2.56 oz	14 ⁵	2.0 z'o'-r'	3.0 z'p'-r'	1.0 f	1.0 e	7.8 c-f
16 + Daconil Ultrex 82.5WDG	1.8 oz						
+ Cal Force	6.0 fl oz						
+ Base K	3.0 fl oz						
+ ENFos	5.12 oz	14 ⁵	2.8 z'n'-r'	5.3 z'n'-r'	1.0 f	1.0 e	6.8 g-j
17 A6780 1.3ME	1.0 fl oz	21	73.0 h-k	76.8 e-g	1.0 f	1.0 e	4.5 p-r
18 A6780 1.3ME	1.5 fl oz	21	70.8 i-l	74.3 f-i	1.0 f	1.0 e	4.8 o-q

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) ⁴	Turf Area Infested (%) per Plot ¹		Phytotoxicity ²		Turf Quality ³
			1 Sept.	12 Sept.	4 June	19 June	1 Aug.
19 Daconil Ultrex 82.5WDG.....	3.2 oz						
+ Cal Force	6.0 fl oz						
+ Base K	3.0 fl oz						
+ ENFos	5.12 oz	14 ⁵	1.3 z'q'r'	1.8 z'q'r'	1.0 f	1.0 e	8.3 a-d
20 Untreated check.....	—	—	89.3 a-f	89.0 a-d	1.0 f	1.0 e	2.3 wx
21 A7402 2.1EC.....	0.625 fl oz	21	53.3 o-s	76.5 e-h	1.0 f	1.0 e	5.3 m-p
22 A7402 2.1EC.....	0.94 fl oz	21	39.0 u-y	64.0 i-n	1.0 f	1.0 e	6.0 j-m
23 RU192514A-08 F	2.0 fl oz	14	43.3 s-v	37.3 u-y	1.0 f	1.0 e	5.5 l-o
24 RU192514A-08 F	3.6 fl oz	14	6.5 z'l'-r'	11.5 z'i'-q'	1.0 f	1.0 e	7.0 f-i
25 RU192514F-08 SC	2.0 fl oz	14	9.0 z'k'-r'	14.8 z'f'-o'	1.1 ef	1.0 e	6.8 g-j
26 RU192514F-08 SC	3.6 fl oz	14	4.5 z'm'-r'	11.8 z'h'-q'	1.0 f	1.0 e	6.8 g-j
27 RU192514G-08 SC.....	2.0 fl oz	14	6.3 z'l'-r'	13.3 z'g'-p'	1.0 f	1.0 e	8.3 a-d
28 RU192514G-08 SC.....	3.6 fl oz	14	0.0 z'r'	3.3 z'p'-r'	1.0 f	1.0 e	8.3 a-d
29 RU192514H-08 WG.....	1.8 oz	14	27.3 z-z'e'	40.5 s-x	1.0 f	1.0 e	6.0 j-m
30 RU192514H-08 WG.....	3.2 oz	14	9.3 z'k'-r'	15.8 z'f'-o'	1.0 f	1.0 e	7.3 e-h
31 GF-1948 1.25EW	1.0 fl oz	14	57.0 n-q	69.8 g-k	1.5 b-d	1.3 de	4.3 q-s
32 GF-1948 1.25EW	2.0 fl oz	14	25.5 z'a'-f'	41.8 r-w	1.6 bc	2.0 c	5.5 l-o
33 Medallion 50W	0.33 oz	14	39.3 u-y	50.8 o-s	1.0 f	1.0 e	4.5 p-r
34 Banner MAXX 1.3ME.....	2.0 fl oz	14	24.0 z'a'-g'	33.5 v-z'a'	1.3 d-f	1.0 e	6.3 i-l
35 Eagle 1.67EW	1.2 fl oz	14	82.8 c-h	86.8 a-e	1.3 d-f	1.0 e	3.3 t-v
36 CX-3205EC.....	2.57 fl oz						
+ Endorse 2.5W	2.0 oz	7	17.3 z'e'-k'	21.3 z'b'-j'	1.0 f	1.0 e	7.8 c-f
37 RU21196A-08 SC	0.21 fl oz	14	90.0 a-e	94.0 ab	1.0 f	1.0 e	2.3 wx
38 RU21196A-08 SC	0.315 fl oz	14	90.5 a-d	92.5 ab	1.0 f	1.0 e	2.3 wx
39 RU21196A-08 SC	0.21 fl oz						
+ RU21196B-08 SC	0.252 fl oz	14	65.8 k-n	77.5 e-g	1.0 f	1.0 e	3.3 t-v
40 RU21196A-08 SC	0.262 fl oz						
+ RU21196B-08 SC	0.315 fl oz	14	62.8 l-o	71.3 g-j	1.0 f	1.0 e	3.8 r-t

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) ⁴	Turf Area Infested (%) per Plot ¹		Phytotoxicity ²		Turf Quality ³
			1 Sept.	12 Sept.	4 June	19 June	1 Aug.
41 RU21196A-08 SC0.157 fl oz + RU21196B-08 SC0.377 fl oz		14	80.3 e-i	77.8 e-g	1.0 f	1.0 e	4.5 p-r
42 RU21196A-08 SC0.21 fl oz + RU21196B-08 SC0.503 fl oz		14	83.8 b-g	89.5 a-c	1.8 b	1.0 e	3.8 r-t
43 RU21196A-08 SC0.21 fl oz + RU21196C-08 SC0.5 fl oz		14	82.3 d-h	79.3 c-g	1.0 f	1.3 de	3.5 s-u
44 RU21196A-08 SC0.21 fl oz + RU21196C-08 SC1.0 fl oz		14	47.3 q-u	53.5 m-p	1.0 f	2.5 b	4.8 o-q
45 Sync 100XL.....0.32 fl oz		14	88.5 a-f	93.5 ab	1.0 f	1.0 e	2.3 wx
46 Endorse 2.5W 4.0 oz		14	42.3 t-w	55.3 l-p	1.0 f	1.0 e	5.0 n-q
47 Endorse 2.5W 4.0 oz + Sync 100XL.....0.32 fl oz		14	30.5 x-z'd'	39.5 t-x	1.0 f	1.0 e	6.5 h-k
48 SARS-351 20SC0.25 fl oz		14	89.8 a-f	91.0 ab	1.0 f	1.0 e	2.5 v-x
49 SARS-351 20SC0.5 fl oz		14	89.8 a-f	90.3 ab	1.0 f	1.0 e	2.5 v-x
50 SARS-351 20SC0.5 fl oz		21	95.8 a	95.5 a	1.0 f	1.0 e	2.3 wx
51 SARS-351 20SC0.5 fl oz		28	91.8 a-d	92.5 ab	1.0 f	1.0 e	2.3 wx
52 Insignia 20WG 0.9 oz		14	75.5 g-k	84.3 b-e	1.0 f	1.0 e	3.3 t-v
53 Insignia 20WG 0.7 oz + Trinity 1.67SC1.0 fl oz		14	9.8 z'k'-r'	23.3 z'a'-g'	1.0 f	2.0 c	7.0 f-i
54 Insignia 20WG 0.9 oz / Trinity 1.67SC1.5 fl oz		14 ⁶	51.0 p-t	48.5 p-t	1.0 f	1.5 d	4.5 p-r
55 Curalan 50EG 1.0 oz		14	89.3 a-f	90.8 ab	1.0 f	1.0 e	3.0 t-w
56 Trinity 1.67SC1.5 fl oz		14	15.8 z'f'-l'	21.5 z'b'-l'	1.3 d-f	3.0 a	5.8 k-n
57 RU42116-08D WG 0.2 oz		14	39.8 u-x	42.5 q-v	1.0 f	1.0 e	5.5 l-o
58 RU42116-08E WG 0.2 oz		14	26.0 z-z'e'	26.5 y-z'e'	1.0 f	1.0 e	5.5 l-o
59 RU42116-08E WG 0.3 oz		14	21.3 z'd'-i'	23.5 z'a'-g'	1.0 f	1.0 e	5.8 k-n
60 RU42116-08E WG 0.4 oz		14	5.0 z'm'-r'	22.8 z'a'-g'	1.0 f	1.0 e	6.5 h-k
61 RU42116-08E WG 0.5 oz		14	8.3 z'k'-r'	15.5 z'f'-n'	1.0 f	1.0 e	6.3 i-l
62 Legacy B 3.1SC0.4 fl oz		14	46.3 r-u	59.5 k-o	1.0 f	1.0 e	5.0 n-q

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) ⁴	Turf Area Infested (%) per Plot ¹		Phytotoxicity ²		Turf Quality ³
			1 Sept.	12 Sept.	4 June	19 June	1 Aug.
63 Legacy B 3.1SC	0.55 fl oz	14	21.0 z'd'-i'	32.0 v-z'b'	1.0 f	1.0 e	5.8 k-n
64 Legacy B 3.1SC	0.75 fl oz	14	23.5 z'b'-g'	31.5 w-z'b'	1.0 f	1.0 e	6.0 j-m
65 Legacy B 3.1SC	1.1 fl oz	14	4.5 z'm'-r'	8.0 z'm'-r'	1.0 f	1.0 e	8.3 a-d
66 Legacy B 3.1SC	0.4 fl oz						
+ Chipco Signature 80WG	4.0 oz	14 ⁷					
/ Chipco Signature 80WG	4.0 oz						
+ Daconil Ultrex 82.5WG	3.2 oz	14 ⁷	0.3 z'r'	1.8 z'q'r'	1.0 f	1.0 e	8.8 ab
67 Legacy C 4.8SC	3.6 fl oz	14	1.3 z'q'r'	8.3 z'l'-r'	1.0 f	1.0 e	9.0 a
68 Legacy C 4.8SC	4.5 fl oz	14	0.3 z'r'	4.3 z'o'-r'	1.0 f	1.0 e	8.8 ab
69 Legacy C 4.8SC	5.4 fl oz	14	0.0 z'r'	2.5 z'p'-r'	1.0 f	1.0 e	8.8 ab
70 Daconil Ultrex 82.5WG	2.4 oz	14	11.5 z'i'-p'	15.5 z'f'-n'	1.0 f	1.0 e	6.0 j-m
71 Chipco 26GT 2SC	4.0 fl oz	14	14.3 z'g'-m'	31.5 w-z'b'	1.0 f	1.0 e	6.0 j-m
72 Legacy C 4.8SC	3.6 fl oz						
+ Chipco Signature 80WG	4.0 oz	14	0.0 z'r'	0.0 z'r'	1.0 f	1.0 e	9.0 a
73 Concert 4.3EC	5.0 fl oz	14	2.8 z'n'-r'	7.3 z'm'-r'	1.3 d-f	1.0 e	7.8 c-f
74 Banner MAXX 1.3ME	1.0 oz						
+ Daconil Ultrex 82.5 WDG	3.2 oz	14	1.5 z'p'-r'	2.0 z'q'r'	1.6 bc	1.5 d	8.0 b-e
75 Chipco Signature 80WG	4.0 oz						
+ Tartan 2.4SC	1.5 fl oz	14	3.0 z'n'-r'	11.5 z'l'-q'	1.0 f	1.0 e	9.0 a
76 Endorse 2.5W	4.0 oz						
+ Alude 46L	6.0 fl oz	14	4.5 z'm'-r'	10.5 z'j'-r'	1.0 f	1.0 e	8.0 b-e
77 Spectro 90WDG	4.0 oz						
+ Alude 46L	6.0 fl oz	14	4.8 z'm'-r'	7.3 z'm'-r'	1.0 f	1.0 e	7.8 c-f
78 3336 4F	3.0 fl oz						
+ CX-15 40WP	0.5 oz	14	29.5 y-z'd'	36.0 v-z	1.0 f	1.0 e	7.5 d-g
79 3336 4F	3.0 fl oz						
+ CX-08 50WP	1.5 oz	14	76.0 g-j	78.0 e-g	1.0 f	1.0 e	3.0 t-w
80 AGSCI-BLX	1.0 fl oz						
+ AGSCI-IB	4.0 fl oz	14	48.0 q-u	57.5 l-p	1.0 f	1.0 e	5.3 m-p

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) ⁴	Turf Area Infested (%) per Plot ¹		Phytotoxicity ²		Turf Quality ³
			1 Sept.	12 Sept.	4 June	19 June	1 Aug.
81 Gary's Green Ultra 13-2-3.....9.0 fl oz + P-K Plus 3-7-18.....6.0 fl oz		14	26.0 z-z'e'	34.5 v-z	1.0 f	1.0 e	6.0 j-m
82 Gary's Green Ultra 13-2-3.....15.0 fl oz + P-K Plus 3-7-18.....6.0 fl oz		14	33.8 v-z'a'	47.5 p-u	1.0 f	1.0 e	5.0 n-q
83 P-K Plus 3-7-18.....6.0 fl oz		14	68.5 j-m	78.5 d-g	1.0 f	1.0 e	4.8 o-q
84 P-K Plus 3-7-18.....6.0 fl oz + Daconil Ultrex 82.5WDG..... 1.8 oz		14	10.8 z'j'-q'	23.5 z'a'-g'	1.0 f	1.0 e	6.5 h-k
85 Daconil Ultrex 82.5WDG..... 1.8 oz		14	22.5 z'c'-h'	26.5 y-z'e'	1.0 f	1.0 e	5.5 l-o
86 Disarm 480SC.....0.27 fl oz		14	88.5 a-f	92.5 ab	1.0 f	1.0 e	2.8 u-x
87 Disarm C SC4.32 fl oz		14	14.5 z'g'-m'	31.8 w-z'b'	1.0 f	1.0 e	6.5 h-k
88 Disarm 480SC.....0.27 fl oz + Endorse 2.5W 2.0 oz		14	33.3 v-z'b'	52.8 n-q	1.0 f	1.0 e	5.3 m-p
89 Endorse 2.5W 2.0 oz		14	59.0 m-p	69.5 g-k	1.0 f	1.0 e	4.8 o-q
90 V10190 2.5SC.....1.04 fl oz		14	79.8 f-i	86.3 a-e	1.0 f	1.0 e	2.5 v-x
91 V10190 2.5SC.....2.08 fl oz		14	82.8 c-h	85.8 a-e	1.0 f	1.0 e	2.3 wx
92 Legacy F 1.67FS.....1.0 fl oz		14	31.5 x-z'c'	38.5 t-x	1.0 f	1.0 e	6.0 j-m
93 3336 4F.....3.0 fl oz		14	72.0 i-l	77.3 e-g	1.1 ef	1.0 e	3.0 t-w
94 Banner MAXX 1.3ME.....0.8 fl oz		21	85.3 b-g	85.8 a-e	1.3 d-f	1.0 e	4.5 p-r
95 Autograph 70WDG..... 4.57 oz + Kestrel 1.3ME2.0 fl oz		14	0.5 z'r'	3.3 z'p'-r'	1.0 f	1.0 e	8.8 ab
96 SAETA DF 4.0 oz + Kestrel 1.3ME2.0 fl oz		14	10.8 z'j'-q'	22.5 z'b'-h'	1.1 ef	1.0 e	7.8 c-f
97 Autograph 70WDG..... 4.57 oz + Pegasus HPX 6F3.6 fl oz		14	0.0 z'r'	1.3 z'q'r'	1.0 f	1.0 e	9.0 a
98 Magnet-B F6.0 fl oz + Pegasus HPX 6F3.6 fl oz		14	12.8 z'h'-n'	19.5 z'c'-k'	1.0 f	1.0 e	7.0 f-i
99 Autograph 70WDG..... 4.57 oz + PEX 6015 82.5DF 3.25 oz		14	1.0 z'q'r'	6.0 z'm'-r'	1.0 f	1.0 e	8.8 ab

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) ⁴	Turf Area Infested (%) per Plot ¹		Phytotoxicity ²		Turf Quality ³
			1 Sept.	12 Sept.	4 June	19 June	1 Aug.
100	Autograph 70WDG..... 4.57 oz + Kestrel 1.3ME2.0 fl oz / Autograph 70WDG..... 4.57 oz + Pegasus HPX 6F3.6 fl oz	14 ⁸					
101	Chipco Signature 80WG 4.0 oz + Banner MAXX 1.3ME.....2.0 fl oz	14	0.3 z'r'	2.0 z'q'r'	1.0 f	1.0 e	8.8 ab
102	Chipco Signature 80WG 4.0 oz + Daconil Weatherstick 6F3.6 fl oz	14	0.8 z'q'r'	5.0 z'n'-r'	1.0 f	1.0 e	9.0 a
103	Chipco Signature 80WG 4.0 oz + Daconil Ultrex 82.5WDG..... 3.2 oz	14	2.0 z'o'-r'	4.5 z'o'-r'	1.0 f	1.0 e	8.3 a-d
104	Chipco Signature 80WG 4.0 oz + Banner MAXX 1.3ME.....2.0 fl oz / Chipco Signature 80WG 4.0 oz + Daconil Weatherstick 6F3.6 fl oz	14 ⁹	1.0 z'q'r'	3.8 z'p'-r'	1.0 f	1.0 e	8.5 a-c
105	Syngenta Program #1—	VAR ¹⁰	0.3 z'r'	2.0 z'q'r'	1.0 f	1.0 e	9.0 a
106	Syngenta Program #2—	VAR ¹¹	4.0 z'n'-r'	6.8 z'm'-r'	3.8 a	1.5 d	8.0 b-e
107	Medallion 50W 0.25 oz + Daconil Ultrex 82.5WDG..... 2.4 oz + Primo MAXX 1.0MEC0.15 fl oz	14	9.5 z'k'-r'	20.0 z'c'-k'	1.3 d-f	1.5 d	7.0 f-i
108	Tourney 50WDG 0.28 oz	14	7.3 z'k'-r'	11.0 z'l'-q'	4.0 a	1.0 e	6.8 g-j
109	Daconil Ultrex 82.5WDG..... 3.2 oz	14	9.0 z'k'-r'	27.3 y-z'd'	1.0 f	2.3 bc	6.8 g-j
110	Chipco Signature 80WG 4.0 oz	14	5.5 z'm'-r'	15.8 z'e'-n'	1.0 f	1.0 e	6.3 i-l
111	RU Anth 08 Program #1—	VAR ¹²	9.3 z'k'-r'	16.3 z'e'-m'	1.0 f	1.0 e	8.3 a-d
112	Prostar 70W 2.2 oz	14	1.8 z'p'-r'	5.3 z'n'-r'	1.1 ef	1.0 e	6.8 g-j
113	DewCure4.0 fl oz	14	92.5 a-c	95.3 a	1.0 f	1.0 e	2.0 x
114	Untreated check.....—	—	66.3 j-n	79.0 c-g	1.0 f	1.0 e	4.5 p-r
			93.8 ab	95.3 a	1.0 f	1.0 e	2.0 x

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) ⁴	Turf Area Infested (%) per Plot ¹		Phytotoxicity ²		Turf Quality ³
			1 Sept.	12 Sept.	4 June	19 June	1 Aug.
		INT ¹³	DAT ¹⁴	DAT	DAT	DAT	DAT
		7	17	28	5	6	7
		14	24	35	5	6	7
		21	24	35	19	13	14
		28	24	35	19	6	21

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 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.

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

⁴ Fungicides were applied on 16 May (all treatments except for treatments 11, 12, 15, 16, 19, and 96), 19 May (treatments 12, 15, 16, and 19 initiated), 23 May (7-day treatment and treatment 11 initiated), 30 May (7- and 14-day treatments and treatment 96 initiated), 6 June (7- and 21-day treatments), 13 June (7-, 14- and 28-day treatments), 20 June (7-day treatment), 27 June (7-, 14-, and 21-day treatments), 3 July (7-day treatment), 11 July (7-, 14- and 28-day treatments), 18 July (7- and 21-day treatments), 25 July (7- and 14-day treatments), 1 August (7-day treatment), 8 August (7-, 14-, 21-, and 28-day treatments). and 15 August (7-day treatment).

⁵ Treatments 11, 12, 15, 16, and 19 received Granular Tru-Prill 15-2-15 (3.5 lb/1,000 sq ft) + Granular Tru-Exchange 0-0-15 (5.0 lb/1,000 sq ft) fertilizers on 19 May, 1, 14, and 28 June, 12 and 26 July, and 9 and 23 August. The same treatments were sprayed with K-Force (6 fl oz/1,000 sq ft) + ENFos (5.12 fl oz/1,000 sq ft) on 16 May instead of CalForce, Base-K, ENFos. Except for 16 May, Cal Force, Base-K, ENFos were applied to these treatments at the specified rates on the same days as fungicides (i.e., 31 May, 13 and 27 June, 11 and 25 July, and 8 and 22 August).

⁶ Alternation of fungicides on a 14-day schedule, where treatment 54 received Insignia 20WG on 16 May, 13 June, 11 July, and 8 August and Trinity 1.67SC on 30 May, 27 June, 25 July, and 22 August.

⁷ Alternation of fungicides on a 14-day schedule, where treatment 66 received Legacy B 3.1SC + Chipco Signature 80WG on 16 May, 13 June, 11 July, and 8 August and Chipco Signature 80WG + Daconil Ultrex 82.5WG on 30 May, 27 June, 25 July, and 22 August.

⁸ Alternation of fungicides on a 14-day schedule, where treatment 100 received Autograph 70WDG + Kestrel 1.3ME on 16 May, 13 June, 11 July, and 8 August and Autograph 70WDG + Pegasus HPX 6F on 30 May, 27 June, 25 July, and 22 August.

⁹ Alternation of fungicides on a 14-day schedule, where treatment 104 received Chipco Signature 80WG + Banner MAXX 1.3ME on 16 May, 13 June, 11 July, and 8 August and Chipco Signature 80WG + Daconil Weatherstick 6F on 30 May, 27 June, 25 July, and 22 August.

(Continued)

Table 1B (continued).

- ¹⁰ Variable spray schedule, where treatment 105 (Syngenta Program #1) consisted of Instrata 3.6SE (4.25 fl oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 16 May, Headway 1.39MEC (3.0 fl oz) + Daconil Ultrex 82.5WDG (3.2 oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 30 May, Concert 4.3SE (4.0 fl oz) + Medallion 50W (0.25 oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 13 June, Renown 4.84SE (4.5 fl oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 27 June, Concert 4.3SE (4.0 fl oz) + Medallion 50W (0.25 oz) + Subdue MAXX 2.0MEC (0.5 fl oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 11 July, Renown 4.84SE (4.5 fl oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 25 July, Concert 4.3SE (4.0 fl oz) + Medallion 50W (0.25 oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 8 August, and Medallion 50W (0.25 fl oz) + Daconil Ultrex 82.5WDG (3.2 oz) + Primo MAXX 1.0MEC (0.15 fl oz) on 22 August.
- ¹¹ Variable spray schedule, where treatment 106 (Syngenta Program #2) consisted of Instrata 3.6SE (4.25 fl oz) on 16 May, Headway 1.39MEC (3.0 fl oz) + Daconil Ultrex 82.5WDG (3.2 oz) on 30 May, Concert 4.3SE (4.0 fl oz) + Medallion 50W (0.25 oz) on 13 June, Renown 4.84SE (4.5 fl oz) on 27 June, Concert 4.3SE (4.0 fl oz) + Medallion 50W (0.25 oz) + Subdue MAXX 2.0MEC (0.5 fl oz) on 11 July, Renown 4.84SE (4.5 fl oz) on 25 July, and Concert 4.3SE (4.0 fl oz) + Medallion 50W (0.25 oz) on 8 August, Medallion 50W (0.25 fl oz) + Daconil Ultrex 82.5WDG (3.2 oz) on 22 August.
- ¹² Variable spray schedule, where treatment 111 (RU Anth 08 Program #1) consisted of Tourney 50WDG (0.18 oz) on 16 May, Daconil Ultrex 82.5WDG (3.2 oz) on 30 May, Chipco Signature 80WG (4.0 oz) + Daconil Ultrex 82.5WDG (3.2 oz) on 13 June, Endorse 2.5W (4.0 oz) + Daconil Ultrex 82.5WDG (3.2 oz) on 27 June, Chipco Signature 80WG (4.0 oz) + Trinity 1.67SC (1.5 fl oz) on 11 July, Insignia 20WG (0.9 oz) + Daconil Ultrex 82.5WDG (3.2 oz) on 25 July, Chipco Signature 80WG (4.0 oz) + Medallion 50W (0.33 oz) on 8 August, and Chipco 26GT 2SC (4.0 fl oz) + Daconil Ultrex 82.5WDG (3.2 oz) on 22 August.
- ¹³ Spray intervals in days.
- ¹⁴ Days after the last treatment.



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