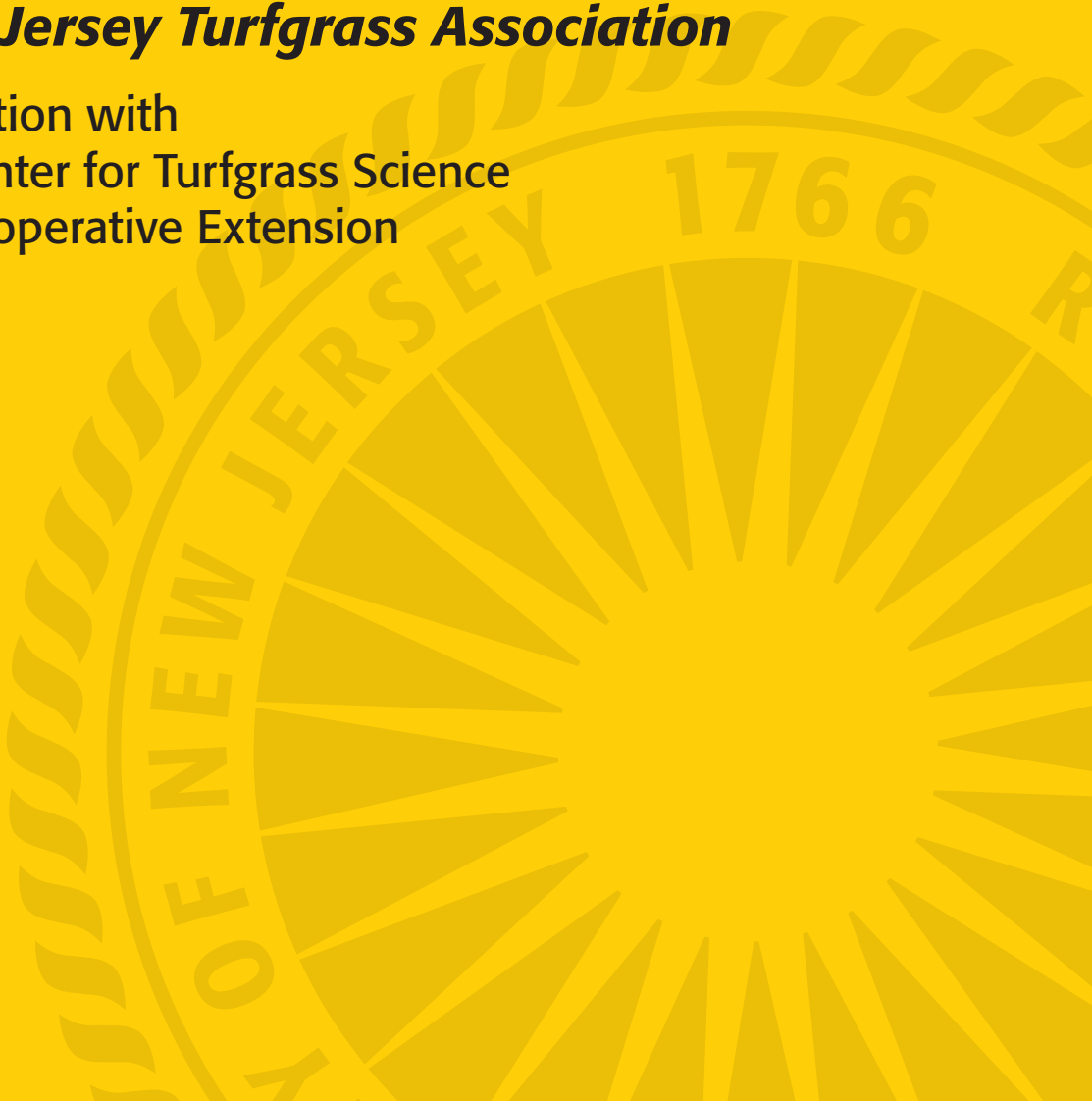
RUTGERS
New Jersey Agricultural
Experiment Station

2015
Turfgrass Proceedings

The New Jersey Turfgrass Association

In Cooperation with
Rutgers Center for Turfgrass Science
Rutgers Cooperative Extension



2015 RUTGERS TURFGRASS PROCEEDINGS

of the

GREEN EXPO Turf and Landscape Conference
December 8-10, 2015
Borgata Hotel
Atlantic City, New Jersey

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

This publication includes lecture notes of papers presented at the 2015 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.

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

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

CONTROL OF GRAY LEAF SPOT WITH SELECTED FUNGICIDES ON PERENNIAL RYEGRASS, 2014

Bruce B. Clarke, Pradip R. Majumdar, Mark Peacos, Samantha Flatley, Michael Mus, Gerard Rappa, Glen Groben, Susan Butterworth, Joseph B. Clark, and Charles J. Schmid[1]

Fungicides were evaluated in 2014 for their ability to control gray leaf spot (GLS; caused by *Pyricularia grisea*) at the Rutgers Turf Research Farm in North Brunswick, NJ on perennial ryegrass (*Lolium perenne* cv. Evening Shade). Turf was established 19 July 2014 with 6.0 lb seed per 1000 ft^2 on a Norton loam with a pH of 6.2. Mowing was performed weekly at a height of 3 inches with clippings returned. The site was irrigated as needed to prevent drought stress and to encourage disease.

Scotts Turf Builder Starter Fertilizer (21-22-04) containing the pre-emergence herbicide mesotrione (0.15 lb a.i. per acre) was applied at establishment on 19 July (0.9 lb N per 1000 ft^2). Subdue G (1.5 lb per 1000 ft^2) was also applied at seeding to control pre-emergence damping-off (caused by *Pythium aphanidermatum*). ProStar 70WGD (3 oz per 1000 ft^2) was applied on 4 August to suppress brown patch (caused by *Rhizoctonia solani*) and Banol 6L (4 fl oz per 1000 ft^2) was applied on 13 August to control Pythium blight (caused by *P. aphanidermatum*). Plots were 3 x 5 ft and were arranged in a randomized complete block with four replications.

Fungicides were applied in water equivalent to 1.89 gal per 1000 ft^2 with a CO_2 powered sprayer at 30 psi using 85025 air induction nozzles. Treatments (trt) were initiated on 7 August when environmental conditions were conducive to gray leaf spot development. Fungicides were reapplied until 18 September as indicated in Tables 1A to 1C. Turf was visually evaluated for percent turf area infested with *P. grisea* on 29 August, 5, 15, and 25 September, and 5 and 15 October. Percent turf area infested by crown rust (caused by *Puccinia coronata*) was evaluated on 2 October. Less than 10% turf area infested per plot represented an acceptable level of disease control.

Turf quality was rated on 4 September and 2 and 20 October using a 1 to 9 scale, where 9 = best turf quality and 5 = acceptable quality. Color of foliage was evaluated on 4 September and 2 and 20 October on a scale of 1 to 10, where 5 = color of healthy untreated turf, less than 5 = progressively more chlorotic or necrotic turf, and greater than 5 = progressively darker green turf. Phytotoxicity was assessed on 4 September 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 necrotic or dead turf. Data were subjected to analysis of variance and means were separated using the Waller-Duncan *k*–ratio *t*–test (*k* = 100).

A natural infestation of GLS developed on 21 August and became uniformly distributed throughout the study by 29 August. Disease severity increased quickly in the test and peaked on 15 September (93% turf area infested with *P. grisea* on untreated control) (Tables 1A and 1B). Due to the rapid development and extreme severity of the disease epidemic, only 44% of the treatments provided season-long control (less than 10% turf area infested from 7 August through 15 October) (Tables 1A and 1B). These treatments included the following materials: 3336 4F @ 4 fl oz applied every 14 days (trt 4), Isofetamid 3.3SC @ 0.3 fl oz + IB10354 6SC @ 3.2 fl oz (trt 7), Isofetamid 3.3SC @ 0.4 fl oz + IB10354 6SC @ 3.2 fl oz (trt 8), Daconil Ultrex 82.5WG (trt 10),

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

2014 GLS Program #1 (trt 11), Heritage TL 0.8ME + Daconil Ultrex 82.5WG (trt 12), Heritage TL 0.8ME (trt 13), Mirage 2SC (trt 16), RU-22112-14F SC (trts 17, 19), and Velista 50WG + Heritage 50WG + Banner Maxx 1.3ME (trt 23). Interestingly, the QoI fungicide Heritage TL 0.8ME (trt 13) provided excellent control of GLS throughout the study in 2014. In previous years at this location, QoI fungicides have often provided poor control due to the presence of resistant isolates of the pathogen. Thus, it would appear that the pathogen may not overwinter at this location, and that the level of control afforded by QoI fungicides each year is dependent upon the presence or absence of QoI sensitive or insensitive isolates that happen to blow into the site by the prevailing winds. The experimental materials RU-22112-14G SC (trt 18) and RU-22112-14A EC (trt 20) provided an unacceptable level of GLS control on the first rating date (29 August), but with subsequent applications afforded excellent disease suppression for the rest of the study. Isofetamid 3.3SC @ 0.2 fl oz + IB10354 6SC @ 3.2 fl oz (trt 6) also provided good protection from GLS, except on 25 August and 5 October when disease was very severe (90 to 92%) (Table 1A).

A natural infestation of crown rust developed late in the season and became uniformly distributed throughout the study by 2 October. Rust severity increased to moderate levels on 2 October (38% turf area infested with *P. coronata* on untreated control) (Table 1B). In general, treatments that were effective at controlling GLS were also effective at suppressing crown rust, with the exception of RU-22112-14F SC (trts 17, 19). Additionally, several treatments [e.g., Banner Maxx 1.3ME (trt 5), Companion LC + TKO Phosphite (0-29-26) DF (trt 9), Mirage 2SC (trt 15), Velista 50 WG + Secure 4.17SC + Banner Maxx 1.3ME (trt 24), Velista 50 WG + Secure 4.17SC (trt 25), and Velista 50 WG + Daconil Action 6.1SC (trt 26)] provided acceptable control of crown rust but were ineffective at preventing GLS (Tables 1A and 1B).

Turf quality evaluated on 4 September and 2 and 20 October (Table 1C) was acceptable (> 5.0) for most entries in this study. In general, turf treated with products that provided poor GLS control exhibited unacceptable quality on at least two-thirds of the evaluation dates. Turf color was also evaluated on 4 September and 2 and 20 October (Table 1C). Most treatments had color ratings that were not significantly different than 5.0 (the color of healthy untreated turf) with the exception of Banner Maxx 1.3ME (trt 5), 2014 GLS Program #1 (trt 11), Heritage TL 0.8ME + Daconil Ultrex 82.5WG (trt 12), RU-22112-14G SC (trt 18), Velista 50WG + Heritage 50WG + Banner Maxx 1.3ME (trt 23), and Velista 50 WG + Secure 4.17SC + Banner Maxx 1.3ME (trt 24), which had noticeably darker green color on at least one rating date. No phytotoxicity was observed in this study.

Table 1A. Control of gray leaf spot with selected fungicides on perennial ryegrass: Rutgers University, 2014.

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[2]	Turf Area Infested per Plot (%)[1]				
				29 Aug.	5 Sept.	15 Sept.	25 Sept.	5 Oct.
1	SR-9059 SC	0.125 fl oz	14	31.3 b	19.5 ef	47.8 e	44.3 de	44.8 de
2	SR-9059 SC	0.25 fl oz	14	17.5 c-e	11.0 gh	42.3 ef	45.5 de	44.5 de
3	SR-9059 SC	0.5 fl oz	14	15.0 c-f	4.8 h-j	33.5 f	43.3 de	40.0 e
4	3336 4F	4.0 fl oz	14	3.0 h-j	0.0 j	3.5 g	8.0 hi	3.8 gh
5	Banner MAXX 1.3ME	1.5 fl oz	14	13.8 d-g	13.3 fg	58.8 c	33.5 fg	28.5 f
6	Isofetamid 3.3SC	0.2 fl oz	–					
	+IB10354 6SC	3.2 fl oz	14	6.3 f-j	3.8 ij	8.3 g	12.5 h	10.5 f
7	Isofetamid 3.3SC	0.3 fl oz	–					
	+IB10354 6SC	3.2 fl oz	14	5.5 g-j	2.3 ij	5.8 g	7.3 hi	4.5 gh
8	Isofetamid 3.3SC	0.4 fl oz	–					
	+IB10354 6SC	3.2 fl oz	14	1.3 j	0.3 j	5.3 g	8.5 hi	3.3 gh
9	Companion LC	6.0 fl oz	–-					
	+ TKO Phosphite (0-29-26) DF	5.0 oz	28	23.8 bc	72.5 a	92.8 a	86.3 a	76.8 b
10	Daconil Ultrex 82.5WG	3.2 oz	14	2.5 ij	0.3 j	4.8 g	5.5 hi	5.8 gh
11	2014 GLS Program #1	Rutgers	14[3]	1.3 j	0.8 j	0.0 g	0.3 i	0.3 h
12	Heritage TL 0.8ME	1.0 fl oz	–					
	+Daconil Ultrex 82.5WG	3.2 oz	14	2.5 ij	0.0 j	0.3 g	1.5 i	0.8 h
13	Heritage TL 0.8ME	2.0 fl oz	14	8.8 e-j	2.0 ij	3.0 g	4.0 hi	3.5 gh
14	Varnimo WP	0.735 oz	–					
	+KaPre RemeD8 LC	3.0 fl oz	VAR[4]	22.5 b-d	52.5 c	94.3 a	92.5 a	88.8 a
15	Mirage 2SC	1.0 fl oz	21	13.8 d-g	21.0 e	49.5 de	26.3 g	23.3 f
16	Mirage 2SC	2.0 fl oz	21	1.3 j	3.5 ij	8.5 g	6.8 hi	1.5 h
17	RU-22112-14F SC	0.94 fl oz	14	3.8 h-j	0.5 j	4.0 g	2.5 i	2.0 h
18	RU-22112-14G SC	0.94 fl oz	14	11.3 e-i	0.5 j	0.5 g	1.0 i	0.8 h
19	RU-22112-14F SC	0.71 fl oz	14	6.3 f-j	0.8 j	5.8 g	4.8 hi	1.8 h
20	RU-22112-14A EC	2.36 fl oz	14	17.5 c-e	1.3 j	7.3 g	3.8 hi	1.5 h
21	3336 4F	5.0 fl oz	21	11.8 e-h	6.0 h-j	36.0 f	38.5 ef	28.3 f
22	Untreated Check	–	–	58.8 a	60.0 b	93.0 a	92.0 a	90.3 a

(Continued)

Table 1A. Gray leaf spot control on perennial ryegrass, 2014 (continued).

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[2]	Turf Area Infested per Plot (%)[1] 29 Aug.	5 Sept.	15 Sept.	25 Sept.	5 Oct.
23	Velista 50WG	0.3 oz	–					
	+Heritage 50WG	0.2 oz	–					
	+Banner Maxx 1.3ME	1.0 fl oz	14[2]	4.3 h-j	5.5 h-j	7.0 g	5.8 hi	4.0 gh
24	Velista 50WG	0.3 oz	–					
	+Secure 4.17SC	0.5 fl oz	–					
	+Banner Maxx 1.3ME	1.0 fl oz	14[2]	7.5 f-j	22.8 e	57.8 cd	61.0 c	50.0 d
25	Velista 50WG	0.5 oz	–					
	+Secure 4.17SC	0.5 fl oz	14[2]	5.0 g-j	35.8 d	74.0 b	70.5 b	61.3 c
26	Velista 50WG	0.5 oz	–					
	+ Daconil Action 6.1SC	3.2 fl oz	14[2]	6.8 f-j	9.0 g-i	33.8 f	51.3 d	37.3 e
			INT[5]	DAT[6]	DAT	DAT	DAT	DAT
			14	8	1	11	7	17
			21	1	8	18	7	17
			28	22	1	11	21	31

[1] Values are means of four replicates. Means followed by the same letter are not significantly different according to Waller-Duncan *k*-ratio *t*-test (*k*=100).

[2] Fungicides were applied on 7 August (all treatments, except treatments 23 to 26), 14 Aug (treatment 14), 21 August (14-day treatment and treatment 14; treatments 23 to 26 initiated), 28 August (21-day treatment), 4 September (14- and 28-day treatments), and 18 September (14- and 21-day treatments).

[3] Treatment 11 (2014 Rutgers GLS Program #1) consisted of Insignia Intrinsic 2.1SC (0.7 fl oz) on 7 August, 3336 4F (4.0 fl oz) on 21 August, Disarm 480SC (0.18 fl oz) + Daconil Ultrex 82.5WG (2.5 oz) on 4 September, and 3336 4F (3.0 fl oz) + Daconil Ultrex 82.5WG (2.5 oz) on 18 September.

[4] VAR = Variable spray schedule where treatment 14 consisted of Varnimo WP (0.735 oz) + KaPre RemeD8 LC (3.0 fl oz) applied on 7, 14, and 21 August and then repeated every 14 days thereafter. The plots were immediately irrigated with 0.5 gal of H_2O per plot.

[5] INT = Spray interval in days.

[6] DAT = Days after the last treatment.

Table 1B. Control of gray leaf spot with selected fungicides on perennial ryegrass: Rutgers University, 2014.

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[4]	GLS (%)[1] 15 Oct.	Phytotoxicity[2] 4 Sept.	Rust (%)[3] 2 Oct.
1	SR-9059 SC	0.125 fl oz	14	49.5 c	1.0 a	47.5 ab
2	SR-9059 SC	0.25 fl oz	14	46.3 c	1.0 a	44.0 b
3	SR-9059 SC	0.5 fl oz	14	43.8 cd	1.0 a	46.3 b
4	3336 4F	4.0 fl oz	14	8.8 fg	1.0 a	12.3 d
5	Banner MAXX 1.3ME	1.5 fl oz	14	12.3 f	1.0 a	1.5 d
6	Isofetamid 3.3SC	0.2 fl oz	–			
	+IB10354 6SC	3.2 fl oz	14	2.5 gh	1.0 a	1.5 d
7	Isofetamid 3.3SC	0.3 fl oz	–			
	+IB10354 6SC	3.2 fl oz	14	2.3 gh	1.0 a	1.0 d
8	Isofetamid 3.3SC	0.4 fl oz	–			
	+IB10354 6SC	3.2 fl oz	14	1.5 gh	1.0 a	0.3 d
9	Companion LC	6.0 fl oz	–			
	+ TKO Phosphite (0-29-26) DF	5.0 oz	28	60.0 b	1.0 a	7.0 d
10	Daconil Ultrex 82.5WG	3.2 oz	14	2.3 gh	1.0 a	6.0 d
11	2014 GLS Program #1	Rutgers	14[5]	0.0 h	1.0 a	0.3 d
12	Heritage TL 0.8ME	1.0 fl oz	–			
	+Daconil Ultrex 82.5WG	3.2 oz	14	0.0 h	1.0 a	0.0 d
13	Heritage TL 0.8ME	2.0 fl oz	14	2.3 gh	1.0 a	1.3 d
14	Varnimo WP	0.735 oz	–			
	+KaPre RemeD8 LC	3.0 fl oz	VAR[6]	63.8 b	1.0 a	28.0 c
15	Mirage 2SC	1.0 fl oz	21	6.3 f-h	1.0 a	0.3 d
16	Mirage 2SC	2.0 fl oz	21	0.5 h	1.0 a	2.3 d
17	RU-22112-14F SC	0.94 fl oz	14	2.8 gh	1.0 a	38.8 bc
18	RU-22112-14G SC	0.94 fl oz	14	0.0 h	1.0 a	7.0 d
19	RU-22112-14F SC	0.71 fl oz	14	2.8 gh	1.0 a	59.8 a
20	RU-22112-14A EC	2.36 fl oz	14	0.5 h	1.0 a	10.0 d
21	3336 4F	5.0 fl oz	21	42.0 cd	1.0 a	43.0 b
22	Untreated Check	–	–	74.3 a	1.0 a	37.5 bc

(Continued)

Table 1B. Gray leaf spot control on perennial ryegrass, 2014 (continued).

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[4]	GLS (%)[1] 15 Oct.	Phytotoxicity[2] 4 Sept.	Rust (%)[3] 2 Oct.
23	Velista 50WG	0.3 oz	–			
	+Heritage 50WG	0.2 oz	–			
	+Banner Maxx 1.3ME	1.0 fl oz	14[4]	1.0 h	1.0 a	1.0 d
24	Velista 50WG	0.3 oz	–			
	+Secure 4.17SC	0.5 fl oz	–			
	+Banner Maxx 1.3ME	1.0 fl oz	14[4]	28.3 e	1.0 a	0.0 d
25	Velista 50WG	0.5 oz	–			
	+Secure 4.17SC	0.5 fl oz	14[4]	45.0 c	1.0 a	0.0 d
26	Velista 50WG	0.5 oz	–			
	+ Daconil Action 6.1SC	3.2 fl oz	14[4]	36.3 d	1.0 a	0.0 d
			INT[7]	DAT[8]	DAT	DAT
			14	27	14	14
			21	27	7	14
			28	41	28	28

[1] Values are means of four replicates. Means followed by the same letter are not significantly different according to Waller-Duncan *k*-ratio *t*-test (*k*=100).

[2] 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. No phytotoxicity was observed on 2 October.

[3] Percent turf area affected by crown rust (*Puccinia coronata*).

[4] Fungicides were applied on 7 August (all treatments, except treatments 23 to 26), 14 Aug (treatment 14), 21 August (14-day treatment and treatment 14; treatments 23 to 26 initiated), 28 August (21-day treatment), 4 September (14- and 28-day treatments), and 18 September (14- and 21-day treatments).

[5] Treatment 11 (2014 Rutgers GLS Program #1) consisted of Insignia Intrinsic 2.1SC (0.7 fl oz) on 7 August, 3336 4F (4.0 fl oz) on 21 August, Disarm 480SC (0.18 fl oz) + Daconil Ultrex 82.5WG (2.5 oz) on 4 September, and 3336 4F (3.0 fl oz) + Daconil Ultrex 82.5WG (2.5 oz) on 18 September.

[6] VAR = Variable spray schedule where treatment 14 consisted of Varnimo WP (0.735 oz) + KaPre RemeD8 LC (3.0 fl oz) applied on 7, 14, and 21 August and then repeated every 14 days thereafter. The plots were immediately irrigated with 0.5 gal of H_2O per plot.

(Continued)

Table 1B. Gray leaf spot control on perennial ryegrass, 2014 (continued).

---

[7] INT = Spray interval in days.
[8] DAT = Days after the last treatment.

Table 1C. Control of gray leaf spot with selected fungicides on perennial ryegrass: Rutgers University, 2014.

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[4]	Turf Quality[1,2]			Color[3]		
				4 Sept.	2 Oct.	20 Oct.	4 Sept.	2 Oct.	20 Oct.
1	SR-9059 SC	0.125 fl oz	14	5.2 ij	4.3 gh	4.2 i-l	4.8 cd	4.3 g	4.7 fg
2	SR-9059 SC	0.25 fl oz	14	6.1 g-i	4.4 gh	4.3 i-l	4.9 cd	4.4 g	4.5 g
3	SR-9059 SC	0.5 fl oz	14	6.3 gh	4.6 gh	4.4 i-k	4.9 b-d	4.5 fg	4.7 fg
4	3336 4F	4.0 fl oz	14	7.9 a-e	6.7 de	5.6 f-h	4.9 cd	5.4 b-d	5.0 d-g
5	Banner MAXX 1.3ME	1.5 fl oz	14	5.7 h-j	4.7 gh	6.3 ef	5.0 b-d	5.4 b-d	6.0 ab
6	Isofetamid 3.3SC	0.2 fl oz	–						
	+IB10354 6SC	3.2 fl oz	14	7.5 c-f	7.2 cd	7.3 b-d	5.1 a-c	5.5 bc	5.3 d-f
7	Isofetamid 3.3SC	0.3 fl oz	–						
	+IB10354 6SC	3.2 fl oz	14	8.2 a-d	7.3 cd	7.9 ab	5.4 ab	5.4 b-d	5.5 b-d
8	Isofetamid 3.3SC	0.4 fl oz	–						
	+IB10354 6SC	3.2 fl oz	14	8.8 a	7.1 cd	7.9 ab	5.4 ab	5.4 b-d	5.2 d-f
9	Companion LC	6.0 fl oz	–						
	+ TKO Phosphite (0-29-26) DF	5.0 oz	28	2.8 k	2.5 i	3.5 kl	3.8 f	5.0 c-e	4.9 e-g
10	Daconil Ultrex 82.5WG	3.2 oz	14	8.4 a-c	7.6 b-d	7.3 b-d	5.4 ab	5.3 b-d	5.1 d-f
11	2014 GLS Program #1	Rutgers	14[5]	8.7 ab	8.4 ab	8.4 a	5.1 a-c	5.6 b	6.0 ab
12	Heritage TL 0.8ME	1.0 fl oz	–						
	+Daconil Ultrex 82.5WG	3.2 oz	14	8.1 a-e	8.6 a	8.2 a	5.1 a-c	5.7 b	5.4 c-e
13	Heritage TL 0.8ME	2.0 fl oz	14	8.3 a-c	7.3 cd	6.9 c-e	5.0 b-d	5.3 b-d	5.4 c-e
14	Varnimo WP	0.735 oz	–						
	+KaPre RemeD8 LC	3.0 fl oz	VAR[6]	3.3 k	2.5 i	3.5 l	4.1 f	5.0 c-e	5.0 d-g
15	Mirage 2SC	1.0 fl oz	21	7.2 d-g	5.2 fg	6.8 de	4.8 cd	5.0 c-e	5.3 d-f
16	Mirage 2SC	2.0 fl oz	21	8.2 a-d	7.8 a-c	7.8 a-c	5.1 a-c	5.4 b-d	5.5 b-d
17	RU-22112-14F SC	0.94 fl oz	14	8.8 a	6.1 ef	5.8 fg	5.1 a-c	5.0 d-f	4.9 e-g
18	RU-22112-14G SC	0.94 fl oz	14	8.6 ab	7.9 a-c	8.3 a	5.0 bc	5.6 b	5.1 d-f
19	RU-22112-14F SC	0.71 fl oz	14	8.6 ab	5.1 g	4.8 h-j	5.0 b-d	5.1 c-e	4.8 fg
20	RU-22112-14A EC	2.36 fl oz	14	8.0 a-e	6.9 de	7.2 b-d	4.9 cd	5.2 b-d	5.3 d-f
21	3336 4F	5.0 fl oz	21	6.8 fg	4.7 gh	4.0 j-l	5.0 b-d	4.6 e-g	4.5 g
22	Untreated Check	–	–	3.0 k	2.8 i	3.5 kl	4.1 ef	5.0 c-e	5.0 d-g

(Continued)

Table 1C. Gray leaf spot control on perennial ryegrass, 2014 (continued).

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[4]	Turf Quality[1,2] 4 Sept.	Turf Quality[1,2] 2 Oct.	Turf Quality[1,2] 20 Oct.	Color[3] 4 Sept.	Color[3] 2 Oct.	Color[3] 20 Oct.
23	Velista 50WG	0.3 oz	–						
	+Heritage 50WG	0.2 oz	–						
	+Banner Maxx 1.3ME	1.0 fl oz	14[4]	7.6 b-f	8.1 a-c	7.6 a-d	5.5 a	6.2 a	6.3 a
24	Velista 50WG	0.3 oz	–						
	+Secure 4.17SC	0.5 fl oz	–						
	+Banner Maxx 1.3ME	1.0 fl oz	14[4]	5.4 h-j	4.3 gh	5.0 g-i	5.0 bc	5.3 b-d	5.9 a-c
25	Velista 50WG	0.5 oz	–						
	+Secure 4.17SC	0.5 fl oz	14[4]	4.7 j	3.9 h	4.5 ij	4.6 de	5.0 c-e	5.0 d-g
26	Velista 50WG	0.5 oz	–						
	+ Daconil Action 6.1SC	3.2 fl oz	14[4]	7.0 e-g	4.4 gh	4.8 h-j	5.1 a-c	5.1 c-e	5.1 d-f
			INT[7]	DAT[8]	DAT	DAT	DAT	DAT	DAT
			14	14	14	32	14	14	32
			21	7	14	32	7	14	32
			28	28	28	46	28	28	46

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

[3] 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.

[4] Fungicides were applied on 7 August (all treatments, except treatments 23 to 26), 14 Aug (treatment 14), 21 August (14-day treatment and treatment 14; treatments 23 to 26 initiated), 28 August (21-day treatment), 4 September (14- and 28-day treatments), and 18 September (14- and 21-day treatments).

[5] Treatment 11 (2014 Rutgers GLS Program #1) consisted of Insignia Intrinsic 2.1SC (0.7 fl oz) on 7 August, 3336 4F (4.0 fl oz) on 21 August, Disarm 480SC (0.18 fl oz) + Daconil Ultrex 82.5WG (2.5 oz) on 4 September, and 3336 4F (3.0 fl oz) + Daconil Ultrex 82.5WG (2.5 oz) on 18 September.

[6] VAR = Variable spray schedule where treatment 14 consisted of Varnimo WP (0.735 oz) + KaPre RemeD8 LC (3.0 fl oz) applied on 7, 14, and 21 August and then repeated every 14 days thereafter. The plots were immediately irrigated with 0.5 gal of H_2O per plot.

(Continued)

Table 1C. Gray leaf spot control on perennial ryegrass, 2014 (continued).

---

[7] INT = Spray interval in days.
[8] DAT = Days after the last treatment.