

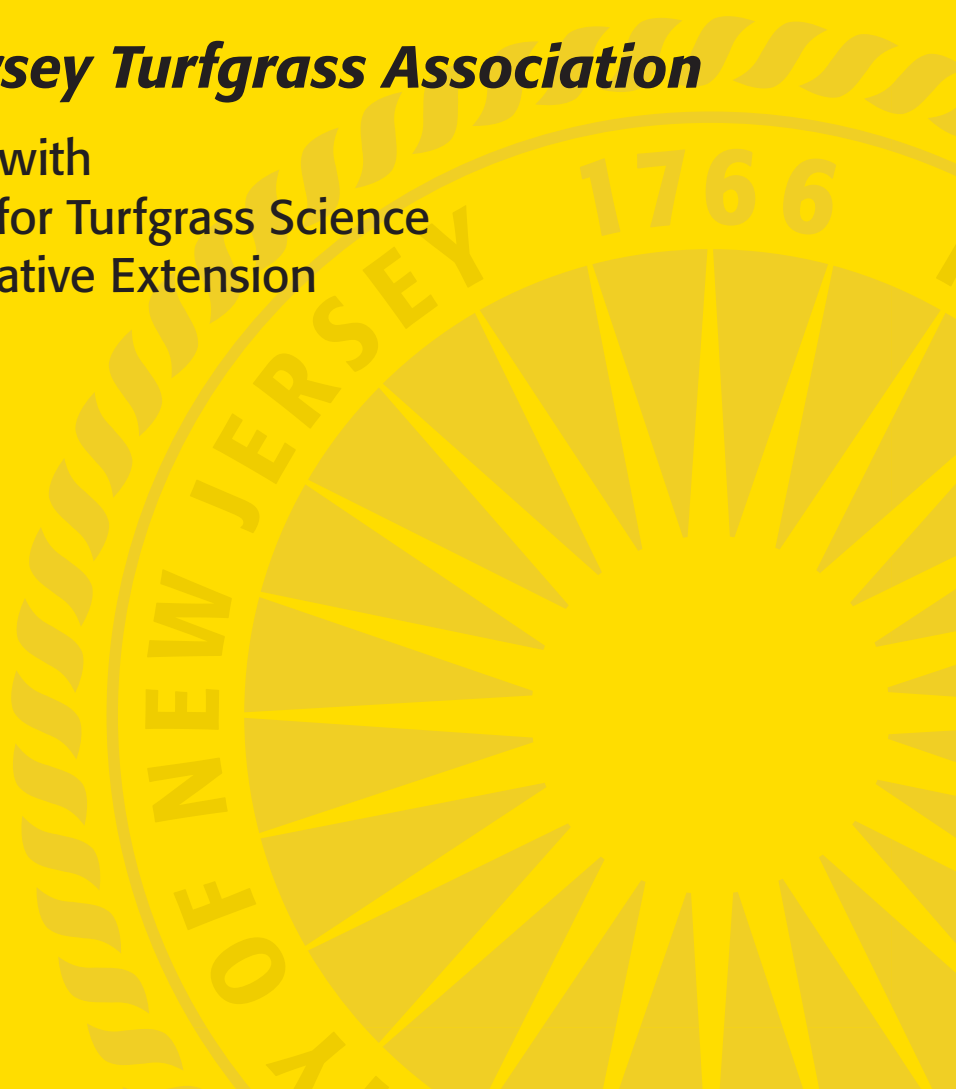
RUTGERS

New Jersey Agricultural
Experiment Station

2006 Turfgrass Proceedings

The New Jersey Turfgrass Association

In Cooperation with
Rutgers Center for Turfgrass Science
Rutgers Cooperative Extension



2006 RUTGERS TURFGRASS PROCEEDINGS

of the

New Jersey Turfgrass Expo December 5-7, 2006 Trump Taj Mahal 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 2006 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.

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 and Marlene Karasik for administrative and secretarial support.

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

PREVENTIVE CONTROL OF BROWN PATCH ON TALL FESCUE WITH GRANULAR- AND FOLIAR-APPLIED FUNGICIDES

Bruce B. Clarke, Pradip R. Majumdar, Amy Matlack, Mark Peacos, Annmarie Scholz, Dennis Fitzgerald, and Lindsay Jepsen¹

Fungicides were evaluated in 2006 for their ability to control brown patch (caused by *Rhizoctonia solani*) on tall fescue (*Festuca arundinacea* cv. Coronado) at the Plant Science Research and Extension Farm in Adelphia, NJ. The study was established in September 2003 on a Freehold sandy loam with a pH of 6.4. Turf was mowed twice a week at a height of 2.0 inches and clippings were returned. The site was irrigated as needed to prevent drought stress and encourage disease. Fertilizer was applied as 10-10-10 (0.75 lb nitrogen (N)/1000 ft²) on 3 April and 16-4-8 (0.75 lb N/1000 ft²) on 13 June and 9 September. Dimension 1E (1.1 fl oz/1000 ft²) was applied for pre-emergence weed control on 12 April. The site was inoculated with three isolates of *R. solani* (i.e., COGGBP1, COGGBP2, and Rh76) on 2 July using 2.5 g/m² of oat-infested inoculum from each isolate. Banol 6S (3.5 fl oz/1000 ft²) was applied to the entire test area on 19 July to control Pythium blight (caused by *Pythium aphanidermatum*). Plots were 3 x 9 ft and were arranged in a randomized complete block with four replications.

Fungicides were applied in water equivalent to 1.9 gal/1000 ft² with a CO₂ powered sprayer at 30 psi using TeeJet 8003VS flat fan nozzles. Treatments (trt) were initiated on 13 June when environmental conditions were conducive to brown patch development. Fungicides were reapplied at the appropriate intervals as indicated in Table 1. Turf was visually evaluated for percent turf area infested with brown patch on 9 and 20 July, and 3, 15, and 24 August. Turf quality was rated on 24 August using a 1 to 9 scale, where 9 = best turf quality and 6 = acceptable quality. Phytotoxicity was evaluated on 3 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 necro-

sis, and 5 = all turf dead. Data were subjected to analysis of variance and means were separated using the Waller-Duncan *k*-ratio *t*-test (*k* = 100).

Brown patch was first observed on 6 July and became uniform throughout the study by 9 July (Table 1). Disease severity ranged from 31 to 73% turf area infested with *R. solani* on untreated turf, which was considered a moderate to severe level of brown patch infestation, respectively. Less than 10% turf area infested per plot represented an acceptable level of disease control. Approximately a third of the treatments in this study provided excellent control of brown patch throughout the evaluation period (9 July to 24 August). In particular, RU 2125-06E + RU 2125-06K (trt 6), Armada 50W (trt 11), Heritage 50WG (trt 15), A14912 C 0.31G (trts 26 and 27), A12705 A SC (trts 28 to 31), Headway 1.39EC (trt 37), Heritage TL 0.8ME (trts 38 to 40), RU42116D (trts 60 and 61), ProStar 70W (trt 63), Endorse 2.5W (trt 64), Medalion 50W (trt 65), Insignia 20WG (trts 66 and 68), and Insignia 20WG + Urea (46-0-0) (trts 67 and 69) afforded excellent disease control.

For RU 2125-06 products I and J (trts 2 to 5), efficacy was independent of whether treatments were applied to dry or wet foliage. Early season application of Armada 50W (trts 11 to 13), 7 to 21 days before the study was initiated on 13 June, did not affect disease control, except on 3 and 24 August when the Armada 50W treatment initiated on 23 May (trt 11) was more effective than the Armada 50W entry initiated with the majority of the other treatments on 13 June (trt 14).

All treatments exhibited acceptable turf quality on 24 August, except Immunox Lawn Disease 0.39G (trts 53 and 54), which had a quality rating equiva-

¹Extension Specialist in Turfgrass Pathology, Senior Laboratory Technician, Research Assistant, Senior Greenhouse and Field Technician, Research Assistant, Research Assistant, and Research 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.

lent to the untreated checks (trts 7, 8, 17, 18, and 70). Moderate foliar chlorosis was noted on 3 August for turf treated with Bayleton 3.62%SC (trt 47) and a slight foliar chlorosis was observed on turf that had been sprayed with Bayleton 3.62%SC (trt 46) or RU42116D (trt 61). No other phytotoxicity was observed.

Table 1. Preventive control of brown patch on tall fescue with granular- and foliar-applied fungicides: New Brunswick, NJ, 2006.

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ⁴	Turf area infested (%) per Plot ¹				Phytotoxicity ² 3 Aug.	Turf Quality ³ 24 Aug.	
			9 July	20 July	3 Aug.	15 Aug.			24 Aug.
1 RU 2125-06E	1.6 fl oz	28	1.3 ab	9.3 c-h	15.3 c-i	5.0 a-e	15.0 c-l	1.0 a	7.3 a-c
2 RU 2125-06I	96.0 oz	28 ⁵	7.5 b-f	6.3 a-f	20.5 g-k	3.8 a-d	15.0 c-l	1.0 a	7.8 c
3 RU 2125-06L	96.0 oz	28 ⁶	6.3 a-e	8.8 b-h	21.5 g-k	1.8 ab	12.5 a-j	1.0 a	6.8 a-c
4 RU 2125-06J	96.0 oz	28 ⁵	2.5 a-c	3.8 a-d	20.0 g-k	5.0 a-e	3.8 a-d	1.0 a	7.0 a-c
5 RU 2125-06J	96.0 oz	28 ⁶	7.5 b-f	5.0 a-e	20.5 g-k	4.5 a-e	11.3 a-i	1.0 a	6.5 a-c
6 RU 2125-06E	1.6 fl oz								
+ RU 2125-06K	0.2 oz	28	1.3 ab	2.5 a-c	4.8 ab	3.8 a-d	2.5 a-c	1.0 a	7.5 bc
7 Untreated Check	—	— ⁵	23.8 lm	22.5 m-o	65.0 tu	28.8 j	26.3 k-n	1.0 a	6.3 a-c
8 Untreated Check	—	— ⁶	26.3 m	30.0 o	66.8 u	27.5 j	27.5 l-n	1.0 a	6.5 a-c
9 Compass 50WG	0.2 oz	28	3.8 a-d	0.0 a	43.0 o-q	2.5 a-c	2.5 a-c	1.0 a	7.5 bc
10 Heritage 50WG	0.3 oz	Cur							
		/Once ⁷	27.5 m	12.5 e-k	19.0 g-k	8.8 a-g	6.3 a-f	1.0 a	7.0 a-c
11 Armada 50W	1.2 oz	Pre/28 ⁸	0.0 a	1.3 ab	2.0 a	7.5 a-g	10.0 a-h	1.0 a	6.8 a-c
12 Armada 50W	1.2 oz	Pre/28 ⁸	0.0 a	1.3 ab	5.3 ab	2.5 a-c	12.5 a-j	1.0 a	6.8 a-c
13 Armada 50W	1.2 oz	Pre/28 ⁸	0.0 a	0.0 a	6.5 a-c	1.3 ab	20.0 g-n	1.0 a	6.5 a-c
14 Armada 50W	1.2 oz	28	0.0 a	2.5 a-c	12.5 b-g	3.8 a-d	21.3 h-n	1.0 a	6.8 a-c
15 Heritage 50WG	0.3 oz	28	0.0 a	0.0 a	5.0 ab	0.0 a	1.3 ab	1.0 a	7.8 c
16 Armada 50W	1.2 oz	Cur							
		/Once ⁷	23.8 lm	16.3 h-m	21.0 g-k	7.5 a-g	23.8 i-n	1.0 a	6.8 a-c
17 Untreated Check	—	—	22.5 k-m	30.0 o	69.3 u	26.3 ij	30.0 mn	1.0 a	6.5 a-c
18 Untreated Check	—	—	17.5 i-l	25.0 no	65.5 tu	26.3 ij	25.0 j-n	1.0 a	6.3 a-c
19 Foliar Phosphate 0-29-26	3.0 fl oz	14	16.3 h-k	20.0 k-n	57.3 st	15.0 e-h	23.8 i-n	1.0 a	6.5 a-c
20 A14912 A 0.31G	32.3 oz	28 ⁹	5.0 a-e	7.5 a-g	23.8 l-l	3.8 a-d	20.0 g-n	1.0 a	7.5 bc
21 A14912 A 0.31G	32.3 oz	35 ⁹	3.8 a-d	21.3 l-n	32.5 l-n	11.3 b-h	18.8 f-m	1.0 a	7.8 c
22 A14912 C 0.31G	32.3 oz	28 ⁹	1.3 ab	2.5 a-c	15.0 c-i	2.5 a-c	8.8 a-h	1.0 a	7.5 bc
23 A14912 C 0.31G	32.3 oz	35 ⁹	5.0 a-e	7.5 a-g	22.0 h-k	6.3 a-f	15.5 c-l	1.0 a	6.8 a-c
24 A14912 A 0.31G	64.6 oz	28 ⁹	0.0 a	3.8 a-d	8.8 a-f	1.3 ab	16.3 d-l	1.0 a	7.8 c
25 A14912 A 0.31G	64.6 oz	35 ⁹	1.3 ab	5.0 a-e	6.5 a-c	10.0 a-g	18.8 f-m	1.0 a	7.3 a-c
26 A14912 C 0.31G	64.6 oz	28 ⁹	1.3 ab	1.3 ab	7.0 a-d	3.8 a-d	8.8 a-h	1.0 a	7.3 a-c
27 A14912 C 0.31G	64.6 oz	35 ⁹	5.5 a-e	6.3 a-f	6.5 a-c	3.8 a-d	11.3 a-i	1.0 a	7.3 a-c

(Continued)

Table 1 (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ⁴	Turf area infested (%) per Plot ¹				Phytotoxicity ² 3 Aug.	Turf Quality ³ 24 Aug.	
			9 July	20 July	3 Aug.	15 Aug.			24 Aug.
28 A12705 A SC	0.38 fl oz	28	0.0 a	0.0 a	2.5 a	3.8 a-d	8.8 a-h	1.0 a	7.5 bc
29 A12705 A SC	0.38 fl oz	35	0.0 a	0.0 a	2.5 a	0.0 a	5.0 a-e	1.0 a	7.3 a-c
30 A12705 A SC	0.77 fl oz	28	0.0 a	0.0 a	1.0 a	1.3 ab	2.5 a-c	1.0 a	6.8 a-c
31 A12705 A SC	0.77 fl oz	35	0.0 a	1.3 ab	1.3 a	0.0 a	6.3 a-f	1.0 a	6.8 a-c
32 EXC 418 1G	23.9 oz	28 ^g	7.5 b-f	13.8 f-l	36.3 no	7.5 a-g	15.0 c-l	1.0 a	6.0 ab
33 EXC 457 0.39G	63.9 oz	28 ^g	5.0 a-e	16.3 h-m	26.0 k-m	11.3 b-h	12.5 a-j	1.0 a	6.5 a-c
34 EXC 477 2.3G	43.3 oz	28 ^g	23.0 lm	20.0 k-n	47.3 p-r	13.8 d-h	12.5 a-j	1.0 a	6.8 a-c
35 Headway 1.39EC	0.75 fl oz	28	0.0 a	2.5 a-c	4.5 ab	5.0 a-e	13.8 b-k	1.0 a	6.3 a-c
36 Headway 1.39EC	1.5 fl oz	28	0.0 a	0.0 a	3.0 a	1.3 ab	12.5 a-j	1.0 a	6.3 a-c
37 Headway 1.39EC	3.0 fl oz	28	0.0 a	2.5 a-c	1.5 a	5.0 a-e	6.3 a-f	1.0 a	7.3 a-c
38 Heritage TL 0.8ME	0.5 fl oz	28	0.0 a	0.0 a	9.5 a-f	5.0 a-e	10.0 a-h	1.0 a	7.0 a-c
39 Heritage TL 0.8ME	1.0 fl oz	28	0.0 a	0.0 a	4.5 ab	3.8 a-d	6.3 a-f	1.0 a	7.8 c
40 Heritage TL 0.8ME	2.0 fl oz	28	0.0 a	0.0 a	2.3 a	2.5 a-c	5.0 a-e	1.0 a	7.5 bc
41 Banner MAXX 1.3ME	1.0 fl oz	28	10.0 d-h	18.8 j-n	52.8 rs	15.0 e-h	8.8 a-h	1.0 a	6.3 a-c
42 Banner MAXX 1.3ME	2.0 fl oz	28	1.3 ab	10.0 c-i	25.0 j-m	5.0 a-e	11.3 a-i	1.0 a	6.8 a-c
43 Armada 50W	0.6 oz	28	1.3 ab	6.3 a-f	21.0 g-k	7.5 a-g	15.0 c-l	1.0 a	7.3 a-c
44 Fungus Ctrl For Lawn 1G	24.0 oz	28 ^g	6.3 a-e	15.0 g-m	37.5 no	12.5 c-h	10.0 a-h	1.0 a	6.5 a-c
45 Fungus Ctrl For Lawn 1G	48.0 oz	28 ^g	3.8 a-d	13.8 f-l	26.3 k-m	8.8 a-g	7.5 a-g	1.0 a	6.3 a-c
46 Bayleton 3.62%SC	6.4 fl oz	28	15.0 g-j	17.5 i-n	20.3 g-k	6.3 a-f	17.5 e-l	1.3 a	6.5 a-c
47 Bayleton 3.62%SC	12.8 fl oz	28	5.0 a-e	17.5 i-n	16.0 d-j	2.5 a-c	16.3 d-l	3.0 b	7.5 bc
48 Disease Ctrl Conc 2.9%EW	8.0 fl oz	28	10.0 d-h	7.5 a-g	12.8 b-h	12.5 c-h	12.5 a-j	1.0 a	6.5 a-c
49 Disease Ctrl Conc 2.9%EW	16.0 fl oz	28	1.3 ab	7.5 a-g	17.3 f-k	10.0 a-g	7.5 a-g	1.0 a	6.0 ab
50 AE F069623 00 1G A1	24.0 oz	28 ^g	13.8 f-j	16.3 h-m	40.8 n-p	15.0 e-h	10.0 a-h	1.0 a	6.0 ab
51 AE F069623 00 1G A1	48.0 oz	28 ^g	11.3 e-i	15.0 g-m	34.3 m-o	6.3 a-f	6.3 a-f	1.0 a	6.8 a-c
52 Lawn Fungus Ctrl 2.3G	22.0 oz	28 ^g	13.8 f-j	10.0 c-i	51.3 q-s	8.8 a-g	7.5 a-g	1.0 a	6.5 a-c
53 Immunox Lawn Disease 0.39G	64.0 oz	28 ^g	7.5 b-f	11.3 d-j	33.5 mn	17.5 g-i	10.0 a-h	1.0 a	5.8 a
54 Immunox Lawn Disease 0.39G	96.0 oz	28 ^g	6.3 a-e	5.0 a-e	39.8 n-p	16.3 f-h	10.0 a-h	1.0 a	5.8 a
55 Immunox Lawn Disease 2SC	10.7 fl oz	28	2.5 a-c	6.3 a-f	36.0 no	13.8 d-h	1.3 ab	1.0 a	7.0 a-c
56 Lynx 2SC	3.2 fl oz	28	0.0 a	6.3 a-f	2.8 a	7.5 a-g	13.8 b-k	1.0 a	6.8 a-c
57 3336 4F	1.0 fl oz	28	18.8 j-l	22.5 m-o	74.0 u	20.0 h-j	13.8 b-k	1.0 a	7.0 a-c
58 Headway 1.39EC	1.125 fl oz	28	0.0 a	2.5 a-c	3.5 ab	1.3 ab	12.5 a-j	1.0 a	7.0 a-c

(Continued)

Table 1 (continued).

Treatment	Rate per 1000 sq ft)	Spray Interval (days) ⁴	Turf area infested (%) per Plot ¹			Phytotoxicity ² 3 Aug.	Turf Quality ³ 24 Aug.		
			9 July	20 July	3 Aug.			15 Aug.	24 Aug.
59 RU42116D	0.28 fl oz	14	0.0 a	1.3 ab	16.5 e-j	1.3 ab	8.8 a-h	1.0 a	6.8 a-c
60 RU42116D	0.425 fl oz	14	0.0 a	2.5 a-c	5.5 ab	1.3 ab	5.0 a-e	1.0 a	7.5 bc
61 RU42116D	0.638 fl oz	14	0.0 a	2.5 a-c	4.0 ab	6.3 a-f	0.0 a	1.5 a	7.5 bc
62 Banner MAXX 1.3ME	1.0 fl oz	14	0.0 a	5.0 a-e	7.8 a-e	2.5 a-c	13.8 b-k	1.0 a	6.8 a-c
63 Prostar 70W	3.0 oz	14	0.0 a	3.8 a-d	2.5 a	6.3 a-f	8.8 a-h	1.0 a	7.8 c
64 Endorse 2.5W	4.0 oz	14	0.0 a	2.5 a-c	1.8 a	2.5 a-c	8.8 a-h	1.0 a	6.8 a-c
65 Medallion 50W	0.5 oz	14	0.0 a	5.0 a-e	7.3 a-e	6.3 a-f	5.0 a-e	1.0 a	7.3 a-c
66 Insignia 20WG	0.9 oz	28	0.0 a	0.0 a	3.5 ab	3.8 a-d	8.0 a-h	1.0 a	6.5 a-c
67 Insignia 20WG	0.9 oz								
+ Urea 46-0-0	4.0 oz N	28	0.0 a	0.0 a	1.5 a	10.0 a-g	3.8 a-d	1.0 a	7.0 a-c
68 Insignia 20WG	0.9 oz	Cur/28 ¹⁰	2.5 a-c	1.3 ab	7.8 a-e	3.8 a-d	7.5 a-g	1.0 a	6.5 a-c
69 Insignia 20WG	0.9 oz								
+ Urea 46-0-0	4.0 oz N	Cur/28 ¹⁰	8.8 c-g	3.8 a-d	5.5 ab	6.3 a-f	3.8 a-d	1.0 a	6.8 a-c
70 Untreated Check	—	—	40.0 n	48.8 p	73.0 u	38.8 k	31.3 n	1.0 a	6.0 ab

Treatment	INT ¹¹ Once/Cur ⁷	DAT ¹²	DAT		DAT		DAT	
			9	9	14	14	45	45
14	12	—	9	9	14	36	14	45
28	26	26	9	9	9	7	9	2
35	26	26	9	2	23	7	23	16
			2	2	16	28	16	37

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 1 to 9 scale, where 9 = best turf quality and 6 = commercially acceptable.

⁴ Fungicides were applied on 13 June (all treatments, except treatments 10, 16, 68, and 69), 27 June (14-day treatment, treatments 68 to 69 initiated), 30 June (treatments 68 and 69), 11 July (14- and 28-day treatments, and treatments 10 and 16), 18 July (35-day treatment), 25 July

(Continued)

Table 1 (continued).

day treatment), 8 August (14- and 28-day treatments except treatments 20, 22, 24, 26, 28, 30, 32 to 34, and 44 to 57), and 22 August (14-day treatment, except treatments 21, 23, 25, 27, 29, and 31).

⁵ Treatments 2 and 4 were applied to dry foliage and then irrigated with 0.67 gal of water/plot 24 hrs post application. Treatment 7 was irrigated with 0.67 gal of water/plot 24 hrs post application.

⁶ Treatment 3 and 5 were applied to wet foliage (0.1 gal water/plot) and then were irrigated with 0.67 gal of water/plot 24 hrs post application. Foliage of treatment 8 was moistened with 0.1 gal of water/plot and then was irrigated with 0.67 gal of water/plot 24 hrs post application.

⁷ Treatments 10 and 16 were applied once on a curative (Cur) basis on 11 July.

⁸ Treatment 11 was applied on 23 May (21 days before the study started on 13 June) and then was reapplied every 28 days from 13 June to 8 August.

Treatment 12 was applied on 30 May (14 days before the study started on 13 June) and then was reapplied every 28 days from 13 June to 8 August. Treatment 13 was applied on 6 June (7 days before the study started on 13 June) and then was reapplied every 28 days from 13 June to 8 August.

⁹ Treatments 20 to 27, 32 to 34, 44, 45, and 50 to 54 were irrigated immediately with 0.5 gal of water/plot.

¹⁰ Treatments 68 and 69 were applied on a curative basis on 30 June and then were reapplied on a 28-day schedule.

¹¹ Spray interval in days.

¹² 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.