

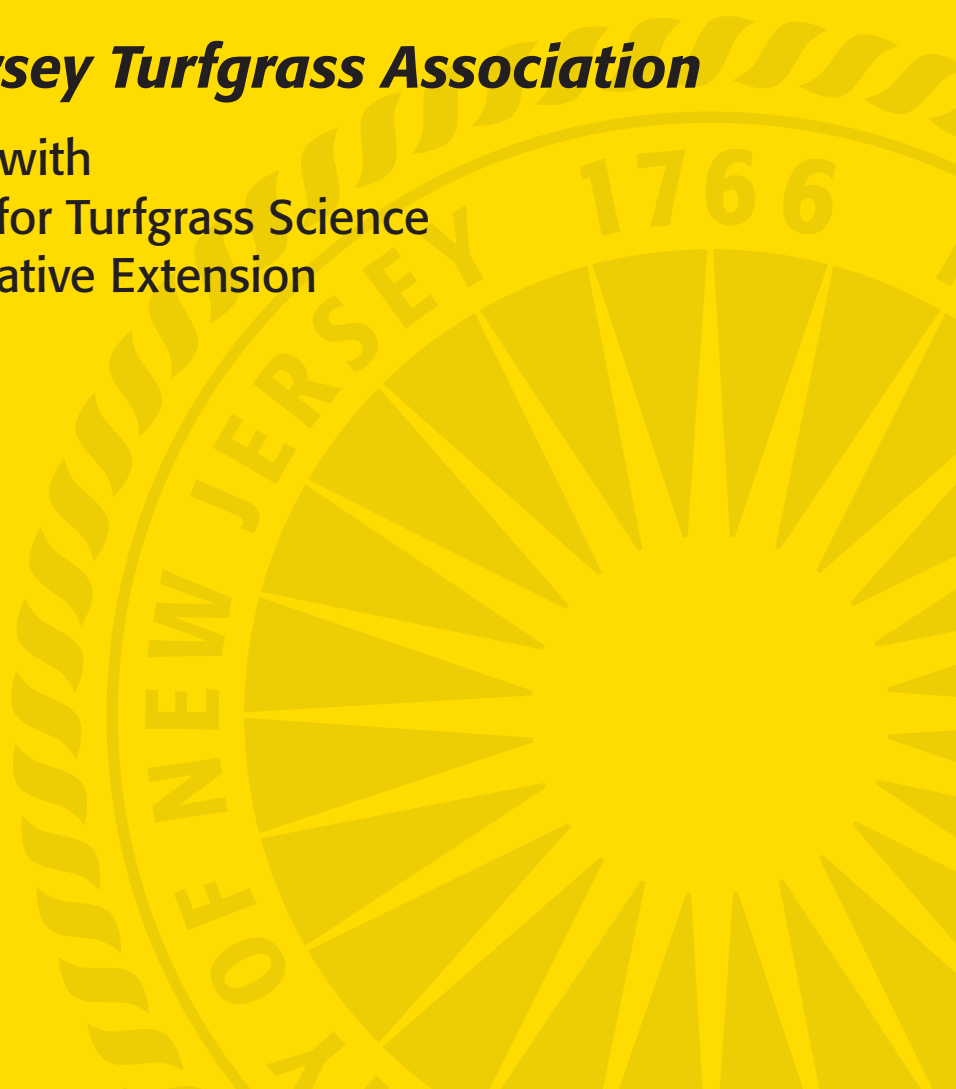
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The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State 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 2010 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

CONTROL OF SUMMER PATCH WITH SELECTED FUNGICIDES AND BIORATIONAL COMPOUNDS ON KENTUCKY BLUEGRASS TURF, 2009

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Fungicides were evaluated in 2009 for their ability to control summer patch (caused by *Magnaporthe poae*) on Kentucky bluegrass (*Poa pratensis* cv. Baron) at the Rutgers Turf Research Farm in North Brunswick, NJ. Turf was established in September 2002 on a Norton loam soil with a pH of 6.7. Mowing was performed two times weekly at a height of 1.5 inches with clippings returned. The site was irrigated as needed to prevent drought stress and to encourage disease.

Fertilizer was applied as 16-4-8 on 2 and 26 June (0.70 lb nitrogen (N)/1000 ft²) and on 28 September (0.50 lb N/1000 ft²). Dimension 2EW (12 fl oz/A) was sprayed on 30 April and 15 June for pre-emergence weed control. Broadleaf weeds were controlled with Trimec Classic 1.3L (1.5 fl oz/1000 ft²) and Drive 75DF (1 lb/A) on 17 June. Insect pests were suppressed with Merit 75WSP (0.16 oz/1000 ft²) on 7 July. Yellow nutsedge was controlled with Manage 75WG (1.0 oz/A) on 11 July. Emerald 70WG (0.18 oz/1000 ft²) was applied to the entire test area on 12 August to control dollar spot (caused by *Sclerotinia homoeocarpa*). Plots were 3 x 9 ft and treatments were arranged in a randomized complete block with four replications. Turf on the site was inoculated on 1 June 2005 by removing 3-inch diameter x 3-inch deep circular sod cores with a cup cutter, placing 25 cc of oat grains infested with *M. poae* isolate OAK A-5 into each hole, replacing the cores, and irrigating the site to encourage rooting. Three inoculations (1.5 ft apart) were made per plot.

Fungicides were applied in water equivalent to 4 gal/1000 ft² with a CO₂ powered sprayer at 30 psi using TeeJet 8003VS flat fan nozzles. Treatments (trt) were initiated on 26 May when the maximum soil

temperature at a 2-inch depth exceeded 65°F for five consecutive days. Fungicides were reapplied at the appropriate intervals as indicated in Tables 1A and 1B.

Turf area exhibiting foliar symptoms of summer patch was assessed as a disease severity index (DSI) on 13, 21, and 31 August and 9, 18, and 28 September. The DSI was calculated by multiplying the patch diameter of each infection center by the disease intensity of that patch. Disease intensity was assessed on a 0 to 3 scale, where 0 = no visual foliar necrosis, 1 = 1 to 33% necrotic foliage, 2 = 34 to 66% necrotic foliage, and 3 = 67 to 100% necrotic foliage. Patch diameter was recorded as the mean of two perpendicular measurements per infection center. Disease severity values were averaged for each plot. Turf was also visually evaluated for the number of lesion centers infested by *Sclerotinia homoeocarpa*, the causal agent of dollar spot, on 11 August. Turf quality was rated on 18 June, 30 July, 11 August, and 28 September 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).

Summer patch symptoms were first noticed on 29 July but did not become uniformly distributed throughout the study area until 13 August (Table 1A). The epidemic peaked at a DSI of 70 for untreated turf (trt 70) on 9 September, which was considered a severe summer patch infestation. A DSI of less than 15 was considered an acceptable level of disease control. All products in this study provided good to excellent disease control throughout the evaluation period (26 May to 28 September) except for Compass G 0.16G (trt 4), Disarm G 0.25G (trts 5 and 11), Re-

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serve 4.8SC @ 3.2 and 3.6 fl oz every 28 days (trts 19 and 20), Tartan 2.4SC (applied twice at 28-day intervals, trt 23), DPX-LEM17-50 50WDG (now called Velista 50WDG) + Daconil Ultrex 82.5WDG (trt 30), Rhapsody AS (trt 56), Disarm 480SC @ 0.18 fl oz + ARY 0916-000 LC @ 2.0 fl oz (trt 61), Disarm 480SC @ 0.18 fl oz + ARY 0916-000 LC @ 4.0 fl oz (trt 62), Disarm 480SC @ 0.27 fl oz + ARY 0916-000 LC @ 2.0 fl oz (trt 64), Disarm 480SC @ 0.27 fl oz + ARY 0916-000 LC @ 6.0 fl oz (trt 66), and 3336 Plus 19.4F (trt 69).

It is interesting to note that the lowest (2.8 fl oz, trt 18) and highest (4.5 fl oz, trt 21) rates of Reserve 4.8SC provided season-long control of summer patch, whereas the two middle rates (3.2 and 3.6 fl oz, trts 19 and 29, respectively) did not provide adequate disease protection after the first evaluation date (13 August). Previous research at Rutgers and elsewhere (e.g., the University of Maryland) has shown that chlorothalonil does not control, and in some cases may increase, summer patch on *Poa* and *Festuca* spp. compared to untreated turf. Since Reserve is a mixture of chlorothalonil and triticonazole (a DMI fungicide known to suppress summer patch), it is possible that increasing rates of this product actually reduced summer patch control as the chlorothalonil concentration increased until the highest rate (4.5 fl oz, trt 21), when the concentration of triticonazole was high enough to counteract the enhancing effect

of chlorothalonil. Although effective summer patch fungicides typically require at least three to four applications at 21- or 28-day intervals to adequately control this disease during hot summers in New Jersey based on previous efficacy research studies at Rutgers, many entries in the current trial provided excellent season-long disease control (from 26 May to 28 September) when applied only twice at 21-day (A17629 1.16G [trts 6, 7], A17630 0.96G [trts 8, 9], Headway 1.39EC [trt 10], and Tartan 2.4SC [trt 12]) or 28-day (Disarm 480SC [trts 59, 60], Disarm 480SC @ 0.18 fl oz + ARY 0916-000 LC @ 6.0 fl oz [trt 63], Disarm 480SC @ 0.27 fl oz + ARY 0916-000 LC @ 4.0 fl oz [trt 65], and Disarm M 3.82 SC [trts 67, 68]) intervals.

Turf quality was acceptable (greater or equal to 5.0) for all entries in this study, except for A14912 0.31G @ 3.0 lb (trt 2), Disarm G 0.25G (trt 5), A17629 1.16G @ 3.0 lb (trt 6), Rhapsody AS (trt 56), and Disarm 480SC @ 0.18 fl oz (trt 59) on 30 July (Table 1B). All treatments reduced dollar spot to acceptable levels (< 10 lesions centers per plot) except for A14912 0.31G (trts 1 to 3), Compass G 0.16G (trt 4), all products containing Disarm (trts 5, 11, 59 to 67) with the exception of Disarm M 3.82 SC @ 1.0 fl oz (trt 68), Heritage TL 0.8ME (trts 54, 58), Heritage G (trt 55), and Rhapsody AS (trt 56). No phytotoxicity was observed for any of the products evaluated.

Table 1A. Control of summer patch with selected fungicides and biorational products on Kentucky bluegrass turf: Rutgers University, 2009.

Treatment	Rate per 1000 sq ft	Spray Interval (days) ³	Pre-treatment ¹ Fall 2008	Disease Severity Index ²					
				13 Aug.	21 Aug.	31 Aug.	9 Sept.	18 Sept.	28 Sept.
1 A14912 0.31G.....	2.0 lb	21 ⁴	5.0 a	3.8 de	11.3 c-k	13.8 d-l	10.4 e-q	5.5 c-f	2.2 d-f
2 A14912 0.31G.....	3.0 lb	21 ⁴	5.3 a	3.3 de	8.0 e-l	9.5 f-m	5.9 i-q	3.8 ef	1.7 ef
3 A14912 0.31G.....	4.0 lb	21 ⁴	5.3 a	2.2 e	9.0 e-l	7.9 g-m	6.1 i-q	2.5 ef	1.0 ef
4 Compass G 0.16G.....	4.0 lb	21 ⁴	5.0 a	8.3 b-d	16.1 b-f	25.2 cd	29.8 c	19.8 bc	10.8 c-f
5 Disarm G 0.25G.....	2.3 lb	21 ⁴	5.0 a	10.7 bc	19.7 b-d	18.0 c-i	20.6 c-g	8.2 c-f	7.9 c-f
6 A17629 1.16G.....	3.0 lb	21 ⁴	5.3 a	2.4 de	4.7 h-l	2.4 lm	3.3 l-q	1.3 ef	0.0 f
7 A17629 1.16G.....	4.0 lb	21 ⁴	5.3 a	1.3 e	1.3 kl	0.0 m	3.3 l-q	1.2 ef	0.0 f
8 A17630 0.96G.....	3.0 lb	21 ⁴	5.3 a	0.0 e	0.0 l	4.3 k-m	4.7 k-q	1.8 ef	0.0 f
9 A17630 0.96G.....	4.0 lb	21 ⁴	5.5 a	0.0 e	0.0 l	0.0 m	1.8 n-q	0.0 f	0.0 f
10 Headway 1.39EC.....	3.0 fl oz	21 ⁵	5.0 a	3.0 de	4.0 i-l	4.5 j-m	6.9 h-q	0.0 f	0.0 f
11 Disarm G 0.25G.....	2.3 lb	21 ⁴	5.3 a	8.2 b-d	21.3 bc	18.3 c-h	18.0 c-i	10.3 c-f	8.4 c-f
12 Tartan 2.4SC.....	2.0 fl oz	21 ⁵	5.3 a	1.0 e	2.2 kl	3.7 k-m	9.1 f-q	7.7 c-f	4.5 d-f
13 RU 21196-09A.....	0.34 fl oz	14	5.8 a	0.0 e	0.0 l	0.0 m	2.7 l-q	3.9 ef	0.0 f
14 RU 21196-09A.....	0.34 fl oz	21	5.3 a	0.0 e	3.0 j-l	3.3 k-m	13.3 d-p	3.5 ef	1.6 ef
15 RU 21196-09A.....	0.46 fl oz	14	5.8 a	0.5 e	1.3 kl	3.0 k-m	9.8 e-q	2.1 ef	0.0 f
16 RU 21196-09A.....	0.46 fl oz	21	5.3 a	0.4 e	1.8 kl	2.3 lm	8.7 g-q	0.8 ef	1.1 ef
17 RU 21196-09B.....	0.288 fl oz								
+ RU 21196-09C.....	0.7 fl oz	14	5.5 a	0.0 e	1.0 kl	0.0 m	0.9 o-q	0.0 f	0.0 f
18 Reserve 4.8SC.....	2.8 fl oz	28	5.8 a	0.9 e	1.3 kl	3.1 k-m	7.8 h-q	7.8 c-f	7.4 c-f
19 Reserve 4.8SC.....	3.2 fl oz	28	5.0 a	3.7 de	15.4 b-g	21.3 c-f	28.0 c	18.8 b-d	16.2 b-d
20 Reserve 4.8SC.....	3.6 fl oz	28	5.8 a	2.8 de	16.8 b-e	28.9 c	29.7 c	24.7 b	21.8 bc
21 Reserve 4.8SC.....	4.5 fl oz	28	5.3 a	0.0 e	6.4 e-l	7.6 h-m	8.8 f-q	5.3 d-f	4.2 d-f
22 Concert 4.3SE.....	5.0 fl oz	28	5.8 a	2.5 de	5.8 fl	7.4 h-m	13.3 d-p	7.8 c-f	8.9 c-f
23 Tartan 2.4SC.....	2.0 fl oz	Var ⁶	5.8 a	2.8 de	6.3 e-l	13.5 d-l	21.3 c-f	12.9 b-f	9.4 c-f
24 Triton 3SC.....	1.0 fl oz	28	5.8 a	0.4 e	1.6 kl	5.3 j-m	15.2 d-m	7.2 c-f	4.8 d-f
25 Triton 3SC.....	1.0 fl oz	Var ⁶	5.3 a	0.5 e	3.8 j-l	5.7 i-m	11.3 e-q	8.8 c-f	4.5 d-f
26 Legacy F 1.7SC.....	0.5 fl oz	28	5.5 a	0.0 e	8.0 e-l	10.3 e-m	13.0 d-p	9.6 c-f	8.8 c-f
27 Legacy F 1.7SC.....	0.75 fl oz	28	5.8 a	0.0 e	2.4 j-l	6.5 h-m	11.3 e-q	8.1 c-f	7.5 c-f
28 Legacy F 1.7SC.....	1.0 fl oz	28	5.8 a	0.0 e	2.1 kl	2.0 lm	2.4 n-q	5.7 c-f	4.6 d-f

(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft	Spray Interval (days) ³	Pre- treatment ¹ Fall 2008	Disease Severity Index ²					
				13 Aug.	21 Aug.	31 Aug.	9 Sept.	18 Sept.	28 Sept.
29 Banner MAXX 1.3ME.....	3.24 fl oz	28	5.8 a	0.5 e	1.3 kl	2.1 lm	5.6 i-q	3.3 ef	1.7 ef
30 DPX-LEM17-50 50WDG.....	0.3 oz	14	5.0 a	4.8 c-e	23.7 b	48.4 b	50.8 b	45.5 a	41.0 a
31 DPX-LEM17-50 50WDG.....	0.3 oz	14	5.0 a	2.0 e	3.0 j-l	4.5 j-m	11.0 e-q	10.4 b-f	9.6 c-f
+ Banner MAXX 1.3ME.....	1.0 fl oz	14	5.5 a	2.1 e	6.7 e-l	9.1 f-m	12.6 d-p	14.7 b-e	9.6 c-f
32 DPX-LEM17-50 50WDG.....	0.3 oz	14	5.8 a	0.0 e	1.5 kl	5.1 j-m	7.8 h-q	13.4 b-f	7.7 c-f
33 DPX-LEM17-50 50WDG.....	0.5 oz	28	5.5 a	1.0 e	1.2 kl	0.0 m	4.0 l-q	0.0 f	0.0 f
34 Honor 28 WG.....	1.1 oz	28	5.8 a	0.0 e	0.8 kl	4.3 k-m	15.3 d-l	7.7 c-f	3.2 d-f
35 Insignia 20WG.....	0.5 oz	28	5.8 a	0.0 e	0.7 kl	0.0 m	0.8 pq	0.0 f	0.6 ef
+ Trinity 1.67SC.....	1.0 fl oz	14 ⁷	5.8 a	0.0 e	0.0 l	2.9 k-m	11.3 e-q	6.1 c-f	4.0 d-f
36 Insignia 20WG.....	0.9 oz	14 ⁷	5.5 a	0.0 e	1.4 kl	3.1 k-m	3.8 l-q	3.3 ef	3.2 d-f
+ Trinity 1.67SC.....	1.0 fl oz	14 ⁷	5.5 a	0.0 e	0.0 l	1.0 m	4.8 k-q	0.0 f	0.0 f
37 Rubigan 1AS.....	2.0 fl oz	28 ⁷	5.5 a	0.8 e	1.3 kl	1.5 lm	0.8 pq	0.0 f	0.0 f
38 Rubigan 1AS.....	2.0 fl oz	28 ⁷	5.3 a	2.1 e	5.3 g-l	10.8 e-m	9.5 e-q	8.2 c-f	6.5 d-f
+ GWN-9812 LC.....	0.74 fl oz	28 ⁷	5.3 a	0.5 e	1.8 kl	2.8 k-m	4.3 l-q	1.2 ef	0.6 ef
39 Banner MAXX 1.3ME.....	2.0 fl oz	14	5.3 a	0.6 e	1.7 kl	2.8 k-m	5.2 j-q	5.4 d-f	4.3 d-f
40 Rubigan 1AS.....	4.0 fl oz	14	5.3 a	0.0 e	1.5 kl	2.7 k-m	5.5 i-q	3.8 ef	3.8 d-f
41 Rubigan 1AS.....	4.0 fl oz	14	5.5 a	0.0 e	1.9 kl	0.0 m	5.1 j-q	0.0 f	0.0 f
+ GWN-9812 LC.....	0.74 fl oz	14	5.5 a	0.8 e	0.6 l	0.8 m	0.0 q	0.0 f	0.0 f
42 Banner MAXX 1.3ME.....	4.0 fl oz	14	5.3 a	0.0 e	0.0 l	0.0 m	0.0 q	0.0 f	0.0 f
43 SP2169 1.04SC.....	0.71 fl oz	14	5.5 a	0.0 e	0.0 l	0.0 m	0.0 q	0.0 f	0.0 f
44 SP2169 1.04SC.....	1.41 fl oz	14	5.5 a	0.0 e	0.0 l	0.0 m	0.0 q	0.0 f	0.0 f
45 SP2169 1.04SC.....	2.83 fl oz	14	5.5 a	0.0 e	0.0 l	0.0 m	2.5 m-q	0.0 f	0.8 ef
46 A12910 2.3SC.....	0.48 fl oz	14	5.3 a	0.0 e	0.0 l	0.0 m	1.5 o-q	0.0 f	0.0 f
47 A13703 2.7SC.....	0.32 fl oz	14	5.3 a	0.0 e	0.0 l	0.0 m	2.4 n-q	1.7 ef	1.1 ef
48 A13703 2.7SC.....	0.49 fl oz	14	5.5 a	0.0 e	0.0 l	0.0 m			
49 A12910 2.3SC.....	0.48 fl oz	28	5.3 a	0.0 e	0.0 l	0.0 m			
50 A12910 2.3SC.....	0.76 fl oz	28	5.3 a	0.0 e	0.0 l	0.0 m			
51 A13703 2.7SC.....	0.32 fl oz	28	5.3 a	0.0 e	0.0 l	0.0 m			

(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft	Spray Interval (days) ³	Pre- treatment ¹ Fall 2008	Disease Severity Index ²					
				13 Aug.	21 Aug.	31 Aug.	9 Sept.	18 Sept.	28 Sept.
52 A13703 2.7SC.....	0.49 fl oz	28	5.0 a	0.0 e	0.0 l	0.0 m	2.6 m-q	0.0 f	0.0 f
53 Headway 1.39ME.....	3.0 fl oz	28	5.5 a	0.0 e	0.0 l	0.0 m	0.8 pq	0.0 f	0.0 f
54 Heritage TL 0.8ME.....	2.0 fl oz	28	5.0 a	0.0 e	4.1 i-l	0.0 m	4.2 l-q	0.0 f	0.0 f
55 Heritage G 0.31G.....	4.0 lb	28 ⁷	5.3 a	3.8 de	2.7 j-l	0.8 m	3.1 l-q	0.0 f	0.0 f
56 Rhapsody AS.....	10.0 fl oz	14	5.3 a	4.6 de	14.8 b-h	16.8 c-j	18.8 c-h	14.6 b-e	12.7 b-f
57 Rhapsody AS.....	5.0 fl oz	14	5.3 a	2.1 e	7.0 e-l	4.2 k-m	5.2 j-q	2.6 ef	2.2 d-f
+ Heritage TL 0.8ME.....	1.0 fl oz	14	5.8 a	0.5 e	0.6 l	0.0 m	2.3 n-q	0.0 f	0.0 f
58 Heritage TL 0.8ME.....	1.0 fl oz	28 ⁸	5.3 a	3.4 de	9.9 d-l	10.6 e-m	13.5 d-o	10.4 b-f	5.7 d-f
59 Disarm 480SC.....	0.18 fl oz	28 ⁸	5.3 a	2.5 de	6.1 fl	8.3 g-m	12.0 d-q	9.8 c-f	3.0 d-f
60 Disarm 480SC.....	0.36 fl oz	28 ⁸	5.3 a	12.3 b	24.3 b	25.1 cd	24.2 cd	18.3 b-d	14.6 b-e
61 Disarm 480SC.....	0.18 fl oz	28 ⁸	5.0 a	3.3 de	13.0 c-j	22.3 c-e	21.9 c-e	14.3 b-e	10.8 c-f
+ ARY 0916-000 LC.....	2.0 fl oz	28 ⁸	5.3 a	3.7 de	9.2 d-l	15.0 d-k	14.7 d-n	7.9 c-f	7.5 c-f
62 Disarm 480SC.....	0.18 fl oz	28 ⁸	5.0 a	4.3 de	10.3 d-l	10.4 e-m	17.2 c-k	8.7 c-f	8.5 c-f
+ ARY 0916-000 LC.....	4.0 fl oz	28 ⁸	5.3 a	1.7 e	5.6 fl	5.4 j-m	13.1 d-p	8.5 c-f	4.7 d-f
63 Disarm 480SC.....	0.18 fl oz	28 ⁸	5.5 a	1.8 e	5.1 g-l	8.8 g-m	17.7 c-j	15.0 b-e	8.0 c-f
+ ARY 0916-000 LC.....	6.0 fl oz	28 ⁸	5.5 a	1.8 e	4.6 h-l	7.5 h-m	8.5 h-q	3.0 ef	5.0 d-f
64 Disarm 480SC.....	0.27 fl oz	28 ⁸	5.5 a	0.0 e	0.7 kl	0.7 m	1.5 o-q	1.3 ef	0.4 ef
+ ARY 0916-000 LC.....	2.0 fl oz	28 ⁸	5.5 a	1.2 e	14.5 b-i	20.0 c-g	28.2 c	9.8 c-f	7.6 c-f
65 Disarm 480SC.....	0.27 fl oz	14	5.5 a	18.3 a	58.2 a	69.0 a	69.6 a	51.2 a	26.7 ab
+ ARY 0916-000 LC.....	4.0 fl oz	—	5.5 a	—	—	—	—	—	—
66 Disarm 480SC.....	0.27 fl oz	—	5.5 a	—	—	—	—	—	—
+ ARY 0916-000 LC.....	6.0 fl oz	—	5.5 a	—	—	—	—	—	—
67 Disarm M 3.82 SC.....	0.5 fl oz	28 ⁸	5.5 a	1.8 e	4.6 h-l	7.5 h-m	8.5 h-q	3.0 ef	5.0 d-f
68 Disarm M 3.82 SC.....	1.0 fl oz	28 ⁸	5.5 a	0.0 e	0.7 kl	0.7 m	1.5 o-q	1.3 ef	0.4 ef
69 3336 Plus 19.4F.....	6.0 fl oz	14	5.5 a	1.2 e	14.5 b-i	20.0 c-g	28.2 c	9.8 c-f	7.6 c-f
70 Untreated Check.....	—	—	5.5 a	18.3 a	58.2 a	69.0 a	69.6 a	51.2 a	26.7 ab

(Continued)

Table 1A (continued).

Treatment	Rate per 1000 sq ft	Spray Interval (days) ³	Pre-treatment ¹ Fall 2008	Disease Severity Index ²					
				13 Aug.	21 Aug.	31 Aug.	9 Sept.	18 Sept.	28 Sept.
		INT ⁹	DAT ¹⁰	DAT	DAT	DAT	DAT	DAT	DAT
		14	—	8	16	26	35	44	54
		21	—	15	23	33	42	51	61
		21 ⁴	—	36	44	54	63	72	82
		21 ⁵	—	57	65	75	84	93	103
		28	—	22	30	40	49	58	68
		VAR ⁶	—	36	44	54	63	72	82

¹ Pre-treatment rating taken on 17 September 2008, on a scale of 1 to 6, where 1 = no disease, 2 = slight disease, 3 = slight to moderate disease, 4 = moderate disease, 5 = moderate to severe disease, and 6 = severe disease. 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 Values are means of four replicates. Means followed by the same letter are not significantly different according to Waller-Duncan k-ratio t-test ($k=100$). All fungicides were applied in 4.0 gal H₂O per 1000 sq ft with a CO₂ compressed air sprayer, T-Jet nozzle 8003E, at 30 psi. Disease severity index = patch diameter x disease intensity. Disease intensity was rated on a 0 to 3 scale, where 0 = no visual foliar necrosis, 1 = 1 to 33% necrotic foliage, 2 = 34 to 66% necrotic foliage, and 3 = 67 to 100% necrotic foliage. Patch diameter was recorded as the mean of two perpendicular measurements per infection center. Three locations were inoculated per 3 x 9 ft replicate plot with *Magnaporthe poae* isolate OAK A-5 on 15 May 2004. Disease severity values were averaged for each plot. No phytotoxicity was observed.

³ Fungicides were applied on 26 May (all treatments except treatments 23 and 25), 10 June (14-day treatment and first application of treatments 23 and 25), 17 June (21-day treatment), 24 June (14- and 28-day treatments), 8 July (14- and 21-day treatments and second application of treatments 23 and 25), 22 July (14- and 28-day treatments), 29 July (21-day treatment), and 5 August (14-day treatment).

⁴ Treatments 1 to 5 were applied on 26 May, 17 June, and 8 July; treatments 6 to 9 and 11 were applied on 26 May and 17 June only and were irrigated immediately after application with 0.5 gal water per plot.

⁵ Treatments 10 and 12 were applied on 26 May and 17 June only and was not irrigated.

⁶ Variable spray schedule, where treatment 23, Tartan 2.4SC (2.0 fl oz), was applied on 10 June and 8 July, and treatment 25, Tartan 3SC (1 fl oz), was applied on 10 June and 8 July.

⁷ Treatments 37 to 42 and treatment 55 were irrigated immediately after application with 0.5 gal water per plot.

⁸ Treatments 59 to 68 were applied on 26 May and 24 June only and were irrigated immediately after application with 0.5 gal water per plot.

⁹ Spray intervals in days.

¹⁰ Days after treatment (DAT) for each spray interval.

Table 1B. Control of summer patch with selected fungicides and biorational products on Kentucky bluegrass turf: Rutgers University, 2009.

	Treatment	Rate per 1000 sq ft	Application Schedule (days) ³	Number of Dollar Spot Infection Centers per plot ¹		Turf Quality ^{1,2}		
				11 Aug.	18 June	30 July	11 Aug.	28 Sept.
1	A14912 0.31G	2.0 lb	21 ⁴	28.8 e-g	7.8 a-c	5.3 e-h	6.0 f-i	6.0 d-f
2	A14912 0.31G	3.0 lb	21 ⁴	46.8 d	7.3 b-e	4.5 h	5.3 ij	7.0 a-d
3	A14912 0.31G	4.0 lb	21 ⁴	58.0 c	7.0 c-f	5.0 f-h	5.5 h-j	7.5 ab
4	Compass G 0.16G	4.0 lb	21 ⁴	25.8 e-h	7.3 b-e	5.0 f-h	6.0 f-i	6.5 b-e
5	Disarm G 0.25G	2.3 lb	21 ⁴	34.3 e	7.0 c-f	4.5 h	5.5 h-j	5.8 ef
6	A17629 1.16G	3.0 lb	21 ⁴	7.5 j-l	7.3 b-e	4.5 h	7.0 b-e	5.3 fg
7	A17629 1.16G	4.0 lb	21 ⁴	0.0 l	7.5 a-d	6.0 b-g	6.8 c-f	6.5 b-e
8	A17630 0.96G	3.0 lb	21 ⁴	7.3 j-l	6.3 fg	5.5 d-h	6.3 e-h	7.0 a-d
9	A17630 0.96G	4.0 lb	21 ⁴	3.0 l	7.0 c-f	6.5 a-e	7.3 a-d	6.8 a-e
10	Headway 1.39EC	3.0 fl oz	21 ⁵	5.0 kl	8.0 ab	6.5 a-e	7.0 b-e	6.3 c-f
11	Disarm G 0.25G	2.3 lb	21 ⁴	18.8 hi	6.5 e-g	5.5 d-h	5.5 h-j	6.8 a-e
12	Tartan 2.4SC	2.0 fl oz	21 ⁵	0.0 l	8.0 ab	7.0 a-c	6.8 c-f	6.0 d-f
13	RU 21196-09A	0.34 fl oz	14	0.0 l	8.0 ab	6.0 b-g	7.8 ab	6.0 d-f
14	RU 21196-09A	0.34 fl oz	21	0.0 l	8.0 ab	7.3 ab	7.3 a-d	6.8 a-e
15	RU 21196-09A	0.46 fl oz	14	0.0 l	8.0 ab	7.0 a-c	7.3 a-d	6.5 b-e
16	RU 21196-09A	0.46 fl oz	21	0.5 l	8.0 ab	6.3 a-f	7.8 ab	7.0 a-d
17	RU 21196-09B	0.288 fl oz	14	0.0 l	7.8 a-c	6.8 a-d	8.0 a	7.3 a-c
18	Reserve 4.8SC	2.8 fl oz	28	0.0 l	8.0 ab	7.5 a	7.3 a-d	6.3 c-f
19	Reserve 4.8SC	3.2 fl oz	28	0.0 l	7.5 a-d	7.5 a	7.0 b-e	6.3 c-f
20	Reserve 4.8SC	3.6 fl oz	28	0.0 l	7.5 a-d	6.8 a-d	6.3 e-h	5.3 fg
21	Reserve 4.8SC	4.5 fl oz	28	0.0 l	8.3 a	7.5 a	6.5 d-g	6.3 c-f
22	Concert 4.3SE	5.0 fl oz	28	0.5 l	8.0 ab	7.3 ab	6.8 c-f	6.3 c-f
23	Tartan 2.4SC	2.0 fl oz	Var ⁶	0.0 l	7.0 c-f	7.0 a-c	7.5 a-c	5.8 ef
24	Triton 3SC	1.0 fl oz	28	0.0 l	8.0 ab	7.3 ab	7.8 ab	6.5 b-e
25	Triton 3SC	1.0 fl oz	Var ⁶	0.0 l	7.0 c-f	7.3 ab	7.5 a-c	6.5 b-e
26	Legacy F 1.7SC	0.5 fl oz	28	8.3 j-l	6.8 d-f	6.8 a-d	7.0 b-e	6.5 b-e
27	Legacy F 1.7SC	0.75 fl oz	28	0.0 l	6.8 d-f	6.8 a-d	8.0 a	6.3 c-f

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) ³	Number of Dollar Spot Infection Centers per plot ¹	Turf Quality ^{1,2}			
				11 Aug.	18 June	30 July	11 Aug.
28 Legacy F 1.7SC	1.0 fl oz	28	0.0 I	7.0 c-f	7.5 a	7.8 ab	6.3 c-f
29 Banner MAXX 1.3ME	3.24 fl oz	28	0.0 I	7.3 b-e	7.0 a-c	8.0 a	6.0 d-f
30 DPX-LEM17-50 50WDG	0.3 oz	14	0.8 I	8.0 ab	7.0 a-c	5.5 h-j	5.3 fg
+ Daconil Ultrex 82.5WDG	3.25 oz						
31 DPX-LEM17-50 50WDG	0.3 oz	14	0.0 I	7.8 a-c	6.5 a-e	7.5 a-c	6.5 b-e
+ Banner MAXX 1.3ME	1.0 fl oz	14	0.0 I	7.0 c-f	6.8 a-d	8.0 a	7.0 a-d
32 DPX-LEM17-50 50WDG	0.3 oz	14	0.8 I	7.5 a-d	7.0 a-c	7.3 a-d	7.0 a-d
33 DPX-LEM17-50 50WDG	0.5 oz	28	0.0 I	7.5 a-d	6.8 a-d	7.5 a-c	7.5 ab
34 Honor 28WG	1.1 oz	28	3.0 I	7.5 a-d	7.3 ab	7.5 a-c	7.0 a-d
35 Insignia 20WG	0.5 oz	28	1.8 I	7.5 a-d	6.5 a-e	7.5 a-c	7.5 ab
+ Trinity 1.67SC	1.0 fl oz	14 ⁷	0.0 I	7.0 c-f	7.0 a-c	7.5 a-c	7.0 a-d
36 Insignia 20WG	0.9 oz	28	0.0 I	7.8 a-c	6.8 a-d	7.5 a-c	7.3 a-c
+ Trinity 1.67SC	1.0 fl oz	14 ⁷	0.0 I	7.3 b-e	6.0 b-g	8.0 a	7.3 a-c
37 Rubigan 1AS	2.0 fl oz	28 ⁷	0.0 I	7.8 a-c	6.8 a-d	7.5 a-c	7.0 a-d
38 Rubigan 1AS	2.0 fl oz	14 ⁷	0.0 I	7.0 c-f	6.8 a-d	7.5 a-c	7.3 a-c
+ GWN-9812 LC	0.74 fl oz	14 ⁷	0.0 I	7.8 a-c	6.8 a-d	7.5 a-c	7.0 a-d
39 Banner MAXX 1.3ME	2.0 fl oz	28 ⁷	0.0 I	7.8 a-c	5.8 c-h	7.3 a-d	6.3 c-f
40 Rubigan 1AS	4.0 fl oz	28 ⁷	0.0 I	7.5 a-d	6.3 a-f	7.5 a-c	6.8 a-e
41 Rubigan 1AS	4.0 fl oz	28 ⁷	0.0 I	7.8 a-c	6.3 a-f	7.3 a-d	7.0 a-d
+ GWN-9812 LC	0.74 fl oz	28 ⁷	0.0 I	7.5 a-d	6.5 a-e	7.3 a-d	6.8 a-e
42 Banner MAXX 1.3ME	4.0 fl oz	14	0.0 I	7.8 a-c	6.3 a-f	7.5 a-c	7.8 a
43 SP2169 1.04SC	0.71 fl oz	14	0.0 I	7.8 a-c	6.3 a-f	7.3 a-d	7.5 ab
44 SP2169 1.04SC	1.41 fl oz	14	0.0 I	7.5 a-d	6.5 a-e	7.3 a-d	7.3 a-c
45 SP2169 1.04SC	2.83 fl oz	14	0.0 I	7.8 a-c	6.3 a-f	7.5 a-c	7.8 a
46 A12910 2.3SC	0.48 fl oz	14	0.0 I	7.8 a-c	7.5 a	8.0 a	7.5 ab
47 A13703 2.7SC	0.32 fl oz	14	0.0 I	7.5 a-d	5.8 c-h	8.0 a	7.3 a-c
48 A13703 2.7SC	0.49 fl oz	14	0.0 I	8.0 ab	5.8 c-h	7.8 ab	7.5 ab
49 A12910 2.3SC	0.48 fl oz	28	0.0 I	7.0 c-f	6.8 a-d	7.5 a-c	7.5 ab
50 A12910 2.3SC	0.76 fl oz	28	0.0 I	7.3 b-e	7.0 a-c	8.0 a	7.3 a-c

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) ³	Number of Dollar Spot Infection Centers per plot ¹		Turf Quality ^{1,2}		
			11 Aug.	18 June	30 July	11 Aug.	28 Sept.
51 A13703 2.7SC.....	0.32 fl oz	28	0.0 l	7.8 a-c	6.5 a-e	7.5 a-c	7.8 a
52 A13703 2.7SC.....	0.49 fl oz	28	0.0 l	7.8 a-c	6.3 a-f	7.3 a-d	7.5 ab
53 Headway 1.39ME.....	3.0 fl oz	28	0.8 l	7.5 a-d	6.3 a-f	7.8 ab	7.8 a
54 Heritage TL 0.8ME.....	2.0 fl oz	28	14.3 i-k	7.8 a-c	6.0 b-g	6.8 c-f	7.5 ab
55 Heritage G 0.31G.....	4.0 lb	28 ⁷	68.3 b	6.5 e-g	5.0 f-h	5.0 j	7.8 a
56 Rhapsody AS.....	10.0 fl oz	14	46.3 d	5.3 h	4.5 h	5.8 g-j	5.3 fg
57 Rhapsody AS.....	5.0 fl oz	14	0.0 l	7.3 b-e	6.8 a-d	7.0 b-e	6.8 a-e
+ Heritage TL 0.8ME.....	1.0 fl oz	14	18.3 hi	7.0 c-f	5.8 c-h	6.5 d-g	7.3 a-c
58 Heritage TL 0.8ME.....	1.0 fl oz	28 ⁸	34.5 e	6.8 d-f	4.8 gh	6.0 f-i	6.0 d-f
59 Disarm 480SC.....	0.18 fl oz	28 ⁸	30.0 ef	7.0 c-f	5.3 e-h	5.5 h-j	6.5 b-e
60 Disarm 480SC.....	0.36 fl oz	28 ⁸	16.3h-j	7.3 b-e	5.8 c-h	5.3 ij	5.3 fg
61 Disarm 480SC.....	0.18 fl oz	28 ⁸	30.8 ef	7.3 b-e	5.0 f-h	5.3 ij	6.3 c-f
+ ARY 0916-000 LC.....	2.0 fl oz	28 ⁸	33.3 ef	7.3 b-e	5.5 d-h	5.8 g-j	6.0 d-f
62 Disarm 480SC.....	0.18 fl oz	28 ⁸	23.8 f-i	7.3 b-e	6.0 b-g	6.0 f-i	6.3 c-f
+ ARY 0916-000 LC.....	4.0 fl oz	28 ⁸	29.5 ef	7.5 a-d	5.8 c-h	5.5 h-j	6.5 b-e
63 Disarm 480SC.....	0.18 fl oz	28 ⁸	18.3 hi	8.0 ab	5.3 e-h	5.8 g-j	6.5 b-e
+ ARY 0916-000 LC.....	0.27 fl oz	28 ⁸	19.3 g-i	7.8 a-c	6.0 b-g	6.3 e-h	7.0 a-d
64 Disarm 480SC.....	0.27 fl oz	28 ⁸	3.0 l	7.5 a-d	6.3 a-f	7.5 a-c	7.3 a-c
+ ARY 0916-000 LC.....	4.0 fl oz	14	3.8 l	6.3 fg	6.8 a-d	6.0 f-i	6.7 a-e
65 Disarm 480SC.....	0.27 fl oz	—	83.5 a	5.8 gh	4.5 h	5.0 j	4.3 g
66 Disarm 480SC.....	0.27 fl oz	—	—	—	—	—	—
+ ARY 0916-000 LC.....	6.0 fl oz	28 ⁸	—	—	—	—	—
67 Disarm M 3.82 SC.....	0.5 fl oz	28 ⁸	—	—	—	—	—
68 Disarm M 3.82 SC.....	1.0 fl oz	28 ⁸	—	—	—	—	—
69 3336 Plus 19.4F.....	6.0 fl oz	14	—	—	—	—	—
70 Untreated Check.....	—	—	—	—	—	—	—

(Continued)

Table 1B (continued).

Treatment	Rate per 1000 sq ft	Application Schedule (days) ³	Number of Dollar Spot Infection Centers per plot ¹				Turf Quality ^{1,2}			
			11 Aug.	18 June	30 July	11 Aug.	11 Aug.	11 Aug.	11 Aug.	28 Sept.
		INT ⁹	DAT ¹⁰	DAT	DAT	DAT	DAT	DAT	DAT	
		14	—	8	8	8	6	54	54	
		21	—	8	1	13	13	61	61	
		21 ⁴	—	1	22	34	34	82	82	
		21 ⁵	—	1	43	55	55	103	103	
		28	—	8	8	20	20	68	68	
		VAR ⁷	—	17	8	34	34	82	82	

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 Fungicides were applied on 26 May (all treatments except treatments 23 and 25), 10 June (14-day treatment and first application of treatments 23 and 25), 17 June (21-day treatment), 24 June (14- and 28-day treatments), 8 July (14- and 21-day treatments and second application of treatments 23 and 25), 22 July (14- and 28-day treatments), 29 July (21-day treatment), and 5 August (14-day treatment). All fungicides were applied in 4.0 gal H₂O per 1000 sq. ft. with a CO₂ compressed air sprayer, T-Jet nozzle 8003E at 30 psi.

⁴ Treatments 1 to 5 were applied on 26 May, 17 June and 8 July; treatments 6 to 9 and 11 were applied on 26 May and 17 June only and were irrigated immediately after application with 0.5 gal water per plot.

⁵ Treatments 10 and 12 were applied on 26 May and 17 June only and was not irrigated.

⁶ Variable spray schedule, where treatment 23, Tartan 2.4SC (2.0 fl oz), was applied on 10 June and 8 July, and treatment 25, Tartan 3SC (1 fl oz), was applied on 10 June and 8 July.

⁷ Treatments 37 to 42 and treatment 55 were irrigated immediately after application with 0.5 gal water per plot.

⁸ Treatments 59 to 68 were applied on 6 May and 24 June only and were irrigated immediately after application with 0.5 gal water per plot.

⁹ Spray interval in days.

¹⁰ Days after the last treatment.