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This publication includes lecture notes of papers presented at the 2018 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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SUPPRESSING SUMMER PATCH WITH SELECTED FUNGIDES AND BIOCONTROL PRODUCTS ON KENTUCKY BLUEGRASS, 2018

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Fungicides were evaluated in 2018 for their ability to control summer patch (caused by *Magnaporthiopsis poae*) on Kentucky bluegrass (*Poa pratensis* cv. Baron) at the Rutgers Horticultural Research Farm II in North Brunswick, NJ. Turf was established in September 2002 on a Norton loam soil with a pH of 6.6. Mowing was performed three 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. Turf was inoculated on 15 May 2004 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 feet apart) were made per plot. Plots were 3 x 9 ft and treatments were arranged in a randomized complete block with four replications.

Fertilizer was applied as 19-0-9 (0.75 lb nitrogen (N) per 1000 ft^2) on 10 April, 13 June, and 13 August. Dimension 2EW (0.367 fl oz per 1000 ft^2) was sprayed on 13 April and 21 July for pre-emergence weed control. Broadleaf weeds were controlled with a tank mixture of Speed Zone 2.2EC (1.8 fl oz per 1000 ft^2) and Lontrel 3EC (0.12 fl oz per 1000 ft^2) on 27 April. Yellow nutsedge (*Cyperus esculentus*) was eliminated from the site on 20 July with Prosedge 75WG (0.3 oz per 1000 ft^2). Insect pests were suppressed with Acelepryn 1.67SC (0.18 oz per 1000 ft^2) on 9 May. Daconil Ultrex 82.5WG (4.0 fl oz per 1000 ft^2) was applied on 4 May, 19 June, 27 July, and 29 August to control dollar spot (caused by *Clarireedia jacksonii*), leaf spot (incited by *Drechslera poae*), and brown patch (caused by *Rhizoctonia solani*). Previous research conducted by the authors has shown that this product did not suppress summer patch development at the rates used in this trial. The plant growth regulator Primo MAXX 1ME (0.25 fl oz per 1000 ft^2) was sprayed on 8 May to suppress growth prior to initiation of the study.

Fungicides were applied in water equivalent to 4 gal per 1000 ft^2 with a CO_2 powered sprayer at 30 psi using Tee Jet Air Induction AI8002 nozzles. Treatments (trt) were initiated on 29 May when the maximum soil temperature at a 2-inch depth exceeded 65°F for five consecutive days. Fungicides were reapplied at the predetermined intervals as indicated in Tables 1A, 1B, and 1C. Turf area exhibiting foliar symptoms of summer patch was assessed as a disease severity index (DSI) on 12 and 22 July, 1, 11, 21, and 31 August, 10, 20, and 30 September, and 10 October. The DSI was calculated by multiplying the patch diameter of each infection center by the disease intensity of the 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 within each patch. Patch diameter was recorded as the mean of two perpendicular measurements per infection center. Disease severity values were averaged for the three lesion centers per plot. Turf quality was rated on 26 June, 24 July, and 21 August using a 1 to 9 scale, where 9 = best turf quality and 5 = acceptable quality. Color of foliage was visually estimated on 26 June, 24 July, and 21 August using a 1 to 10 scale, where 5 = color of healthy untreated turf,

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less than 5 = progressively more chlorotic or necrotic turf, and greater than 5 = progressively darker green turf. 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 8 July and became uniformly distributed throughout the study area on 12 July (Table 1A). The epidemic peaked at a DSI of 146 for untreated turf (trt 55) on 30 September, which was extremely severe and the most destructive summer patch infestation observed on this site since the turf was inoculated in 2004. A DSI of less than 20 was considered an acceptable level of disease control. Only nine of the 54 treatments in this study [Briskway 2.7SC + Primo MAXX 1.0ME (trt 18), Heritage Action 51.2WG + Primo MAXX 1.0ME (trt 19), 2018 Summer Patch Program #2 (trt 21), A22070C SE (trt 22), Headway 1.39EC (trts 23 and 44), Velista 50WG + Heritage Action 51.2WG (trt 25), Navicon Intrinsic 3.34SC @ 0.85 fl oz (trt 43), and RU-2125-18D SC @ 1.5 fl oz (trt 52)] provided acceptable, season-long control (29 May to 10 October) of summer patch. Of these nine treatments, all of the non-experimental products contained either a DMI and/or a QoI fungicide. Another 16 treatments [Insignia Intrinsic 2.1SC (trt 4), RU-21196-18H SC (trt 5), Banner MAXX II 1.3EC @ 2.0 fl oz every 42 days (trt 12), Armada 50WG (trt 15), Heritage 0.31G (trt 16), 2018 Summer Patch Program #1 (trt 20), CrossOver Turf 100SGN + Heritage TL 0.8ME (trt 31), Tekken 1.8SC (trt 33), EXP WW002 SC (trt 35), Maxtima 3.33SC @ 0.8 fl oz (trt 41), Navicon Intrinsic 3.34SC @ 0.7 fl oz (trt 42), Banner 1.3ME @ 4.0 fl oz (trt 46), Briskway 2.7SC (trt 47), and RU-2125-18H SC (trts 48 to 50)] afforded good to excellent disease control throughout the application period (30 May to 7 August; see 11 August evaluation date, Table 1A).

Turf quality evaluated on 26 June, 24 July, and 21 August was closely associated with the severity of summer patch; treatments affording good protection from this disease had good turf quality (Tables 1C). Turf quality was acceptable (greater or equal to 5.0) for all of the entries in June, but quickly declined for most treatments as the disease outbreak intensified in July and August (Table 1C). Even so, all treatments provided acceptable turf quality in July and August that was significantly better than the untreated control (trt 55) except for Varnimo WP (trt 6), Varnimo WP + KaPre Embella LC (trt 7), Varnimo WP + KaPre EmbellaPLUS LC (trt 8), RU-2125-18F SC (trts 9, 10), Banner MAXX II 1.3EC @ 1.0 fl oz (trt 11), Fame 0.25G (trt 17), A19649B SC + A22063A SC (trt 24), A19649B SC (trt 26), Fame 3.98SC (trt 28), Xzemplar 2.5SC (trt 29), CrossOver Turf 100SGN (trt 30), 2018 Summer Patch Program #3 (trt 37), 2018 Summer Patch Program #4 (trt 38), and 2018 Summer Patch Program #5 (trt 39).

Several treatments resulted in visually darker green foliage (statistically greater than the untreated controls; trt 55) on at least two evaluation dates [i.e., Briskway 2.7SC + Primo MAXX 1.0ME (trt 18), Heritage Action 51.2WG + Primo MAXX 1.0ME (trt 19), 2018 Summer Patch Program #1 (trt 20), 2018 Summer Patch Program #2 (trt 21), A22070C SE (trt 22), and RU-2125-18D SC @ 1.5 fl oz (trt 52) and 2.0 fl oz (trt 53); Table 1C]. No phytotoxicity was observed in this study.

Table 1A. Suppressing summer patch with selected fungicides on Kentucky bluegrass: Rutgers University, 2018.

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[3]	Disease Severity Index (%)[1,2] 12 July	22 July	1 Aug.	11 Aug.	21 Aug.
1	RU-21196-18G SC	0.786 fl oz	28	3.5 c	3.5 c-e	10.1 g-l	17.8 h-n	29.5 i-m
2	RU-21196-18G SC	1.18 fl oz	28	3.7 c	5.3 c-e	12.0 g-l	16.0 h-n	23.8 j-r
3	RU-21196-18G SC	1.57 fl oz	28	0.0 c	3.5 c-e	2.3 kl	14.0 j-n	21.5 k-s
4	Insignia Intrinsic 2.1SC	0.7 fl oz	28	0.7 c	0.0 e	0.0 l	9.0 l-n	9.5 l-s
5	RU-21196-18H SC	2.62 fl oz	28	0.0 c	0.0 e	3.0 kl	9.8 l-n	12.5 l-s
6	Varnimo WP	0.74 oz	VAR[4]	11.5 a-c	18.0 b-e	36.5 c-f	51.5 b-d	62.0 c-f
7	Varnimo WP	0.74 oz	–					
	+ KaPre Embella LC	0.28 fl oz	VAR[4]	20.5 a-c	27.8 ab	37.3 c-e	67.3 ab	73.3 b-e
8	Varnimo WP	0.74 oz	–					
	+ KaPre EmbellaPLUS LC	0.28 fl oz	VAR[4]	15.5 a-c	27.3 ab	30.2 c-i	67.3 ab	83.0 a-c
9	RU-2125-18F SC	0.2 fl oz	42[5]	16.8 a-c	19.3 b-e	27.6 c-j	48.8 b-f	59.3 d-f
10	RU-2125-18F SC	0.3 fl oz	42[5]	15.5 a-c	20.8 b-d	21.0 d-l	46.5 b-f	57.8 d-g
11	Banner MAXX II 1.3EC	1.0 fl oz	42[5]	23.1 a-c	19.0 b-e	30.5 c-h	35.3 d-j	52.5 e-h
12	Banner MAXX II 1.3EC	2.0 fl oz	42[5]	7.5 bc	6.0 c-e	5.5 j-l	4.8 mn	18.5 k-s
13	RU-2125-18F SC	0.2 fl oz	–					
	+ RU- 2125-18B EC	1.0 fl oz	42[5]	6.6 bc	4.3 c-e	3.6 kl	20.0 g-n	30.5 h-l
14	RU-2125-18F SC	0.2 fl oz	–					
	+ RU-2125-18B EC	2.0 fl oz	42[5]	5.0 c	3.5 c-e	0.0 l	11.0 k-n	21.5 k-s
15	Armada 50WG	1.5 oz	42[5]	0.0 c	0.0 e	0.0 l	5.3 mn	14.5 l-s
16	Heritage 0.31G	64.0 oz	42[6]	21.0 a-c	16.5 b-e	13.5 f-l	5.8 mn	0.0 s
17	Fame 0.25G	73.6 oz	42[6]	10.3 bc	13.1 b-e	23.0 d-l	43.3 b-g	49.8 f-i
18	Briskway 2.7SC	0.5 fl oz	–					
	+ Primo MAXX 1.0ME	0.25 fl oz	21[7]	23.0 a-c	0.0 e	0.0 l	6.0 mn	0.0 s
19	Heritage Action 51.2WG	0.4 oz	–					
	+ Primo MAXX 1.0ME	0.25 fl oz	21[7]	1.8 c	0.0 e	0.0 l	0.0 n	0.0 s
20	2018 SP Program #1	–	14[8]	0.0 c	0.0 e	0.0 l	8.8 l-n	4.0 p-s
21	2018 SP Program #2	–	21[9]	5.8 bc	0.0 e	0.0 l	0.0 n	0.0 s
22	A22070C SE	3.0 fl oz	21[7]	5.8 bc	6.8 c-e	6.8 j-l	9.3 l-n	8.0 m-s
23	Headway 1.39EC	3.0 fl oz	21[7]	6.0 bc	3.5 c-e	5.0 j-l	0.0 n	0.0 s

(Continued)

Table 1A. Summer patch control on Kentucky bluegrass: Rutgers University, 2018.

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[3]	Disease Severity Index (%)[1,2] 12 July	22 July	1 Aug.	11 Aug.	21 Aug.
24	A19649B SC	0.157 fl oz	–					
	+ A22063A SC	0.5 fl oz	21[7]	13.6 a-c	17.3 b-e	31.8 c-g	65.5 ab	72.3 b-e
25	Velista 50WG	0.5 oz	–					
	+ Heritage Action 51.2WG	0.4 oz	21[7]	3.5 c	0.0 e	0.0 l	3.3 mn	1.8 rs
26	A19649B	0.157 fl oz	21[7]	8.8 bc	23.0 bc	46.5 bc	49.3 b-f	76.8 a-d
27	A20581A SC	0.47 fl oz	21[7]	8.3 bc	11.2 b-e	18.5 e-l	34.0 d-k	26.8 j-o
28	Fame 3.98SC	0.36 fl oz	21	6.4 bc	5.2 c-e	9.3 g-l	26.0 f-m	44.8 f-j
29	Xzemplar 2.5SC	0.26 fl oz	28	2.5 c	10.0 b-e	21.0 d-l	38.3 c-i	53.0 e-g
30	CrossOver Turf 100SGN	15.0 lb	14[10]	10.8 a-c	16.1 b-e	30.3 c-h	50.3 b-e	75.3 a-d
31	CrossOver Turf 100SGN	15.0 lb	–					
	+ Heritage TL 0.8ME	1.5 fl oz	VAR[11]	3.5 c	6.0 c-e	4.8 j-l	19.3 g-n	17.0 k-s
32	Heritage TL 0.8ME	1.5 fl oz	28[12]	13.0 a-c	8.8 b-e	6.8 j-l	26.5 e-m	21.5 k-s
33	Tekken 1.8SC	3.0 fl oz	28	9.3 bc	6.5 c-e	6.8 j-l	10.8 k-n	7.0 o-s
34	Insignia 2.1SC	0.4 fl oz	21	2.3 c	4.3 c-e	3.8 j-l	20.5 g-n	29.3 i-n
35	EXP WW002 SC	0.4 fl oz	21[13]	3.5 c	6.3 c-e	4.5 j-l	15.5 h-n	18.5 k-s
36	EXP WW002 SC	0.4 fl oz	–					
	+ RightLine PD-N LC	1.1 fl oz	21[13]	4.3 c	5.5 c-e	8.8 g-l	16.8 h-n	27.0 j-o
37	2018 SP Prog #3	–	14[14]	0.0 c	6.8 c-e	7.8 h-l	38.5 c-h	60.3 d-f
38	2018 SP Prog #4	–	14[15]	32.0 ab	45.0 a	62.3 ab	79.0 a	83.0 a-c
39	2018 SP Prog #5	–	14[16]	12.6 a-c	20.7 b-d	43.8 b-d	59.5 a-c	96.0 a
40	Maxtima 3.33SC	0.4 fl oz	28	10.6 a-c	11.8 b-e	10.0 g-l	20.0 g-n	24.8 j-q
41	Maxtima 3.33SC	0.8 fl oz	28	6.8 bc	5.3 c-e	7.3 i-l	13.5 j-n	18.0 k-s
42	Navicon Intrinsic 3.34SC	0.7 fl oz	28	2.3 c	0.0 e	0.0 l	8.8 l-n	13.3 l-s
43	Navicon Intrinsic 3.34SC	0.85 fl oz	28	0.0 c	0.0 e	0.0 l	4.8 mn	7.5 n-s
44	Headway 1.39ME	3.0 fl oz	28	6.8 bc	10.0 b-e	16.0 e-l	15.0 h-n	15.5 k-s
45	Banner 1.3ME	2.0 fl oz	14	3.8 c	16.0 b-e	24.8 c-k	30.3 d-l	37.0 g-k
46	Banner 1.3ME	4.0 fl oz	28	1.8 c	12.5 b-e	9.8 g-l	14.3 i-n	11.3 l-s
47	Briskway 2.7SC	0.5 fl oz	21	0.0 c	0.0 e	0.0 l	5.5 mn	2.8 q-s
48	RU-2125-18H SC	1.0 fl oz	14[17]	1.8 c	2.8 c-e	8.3 h-l	7.3 l-n	11.5 l-s
49	RU-2125-18H SC	1.5 fl oz	21[18]	0.0 c	0.0 e	9.0 g-l	7.5 l-n	12.8 l-s

(Continued)

Table 1A. Summer patch control on Kentucky bluegrass: Rutgers University, 2018.

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[3]	Disease Severity Index (%)[1,2] 12 July	22 July	1 Aug.	11 Aug.	21 Aug.
50	RU-2125-18H SC	2.0 fl oz	28[19]	6.3 bc	1.8 de	0.0 l	8.5 l-n	3.8 p-s
51	RU-2125-18D SC	1.0 fl oz	14[17]	3.8 c	11.9 b-e	12.5 g-l	20.0 g-n	25.8 j-p
52	RU-2125-18D SC	1.5 fl oz	21[18]	6.2 bc	11.7 b-e	6.7 j-l	6.5 l-n	3.0 q-s
53	RU-2125-18D SC	2.0 fl oz	28[19]	10.8 a-c	8.5 b-e	10.3 g-l	12.1 j-n	21.0 k-s
54	RU-2125-18G SC	0.47 fl oz	28[19]	15.4 a-c	12.3 b-e	17.3 e-l	33.8 d-k	30.0 i-m
55	Untreated check	–	–	37.1 a	44.3 a	69.8 a	75.8 a	91.3 ab
			INT[20]	DAT[21]	DAT	DAT	DAT	DAT
			14	2	12	8	4	14
			21	2	12	1	11	21
			28	16	26	8	18	28
			42	2	12	22	32	42

[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). No phytotoxicity was observed in this study.

[2] 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 *Magnaporthiopsis poae* isolate OAK A-5 on 15 May 2004. Disease severity values were averaged for each plot.

[3] Fungicides were applied on 29 May (all treatments except 35, 36, and 48 to 54), 5 June (7-day treatment), 12 June (7- and 14-day treatments, initiated treatments 35, 36, and 48 to 54), 19 June (21-day treatment), 26 June (14- and 28-day treatments, and treatments 48 and 51), 3 July (treatments 35, 36, 49, and 52), 10 July (14-, 21-, and 42-day treatments, and treatments 48, 50, 51, 53, and 54), 24 July (14- and 28-day treatments, and treatments 35, 36, 48, 49, 51, and 52), 31 July (21-day treatment), 7 August (14-day treatment, and treatments 48, 50, 51, 53, and 54), 14 August (treatments 35 and 36), and 21 August (treatments 9 to 17 and 21). Treatments were applied at 4.0 gal per 1000 sq ft unless noted otherwise.

[4] VAR = Variable spray schedule where treatments 6 to 8 were applied on a 7-day interval 29 May, 5 June, and 12 June, and then on a 14-day interval beginning 26 June. All plots were irrigated in with 0.5 gal of H_2O.

[5] Treatments 9 to 15 were applied at 2.0 gal per 1000 sq ft on a 42-day interval 29 May and 10 July only.

(Continued)

Table 1A. Summer patch control on Kentucky bluegrass: Rutgers University, 2018.

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[6] Treatments 16 and 17 were applied on a 42-day interval on 29 May and 10 July only, and irrigated with 0.5 gal of H_2O per plot.

[7] Treatments 18, 19, and 22 to 27 were applied on a 21-day interval and irrigated with 0.5 gal of H_2O per plot.

[8] Treatment 20 (2018 SP Prog #1) consisted of Heritage Action 51.2WG (0.2 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 29 May, Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 12 June, Heritage Action 51.2WG (0.2 oz) + Primo MAXX 1.0ME (0.25fl oz) applied 26 June, Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 10 July, Heritage Action 51.2WG (0.2 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 24 July, and Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 7 August. All treatments were watered in with 0.5 gal of H_2O after application.

[9] Treatment 21 (2018 SP Prog #2) consisted of Heritage Action 51.2WG (0.3 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 29 May, Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 19 June, Heritage Action 51.2WG (0.3 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 10 July, Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 31 July, and Heritage Action 51.2WG (0.3 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 21 August.

[10] Treatment 30 was applied on a 14-day interval 29 May, 12 June, and 26 June, and irrigated in with 1.0 gal of H_2O per plot.

[11] VAR = Variable spray schedule where treatment 31 consisted of CrossOver Turf 100SGN (15.0 lb) applied 29 May, 12 June, and 26 June and irrigated with 1.0 gal of H_2O per plot, and Heritage TL 0.8ME (1.5 fl oz) applied 29 May, 26 June, and 24 July with no irrigation.

[12] Treatment 32 was applied on a 28-day interval with no irrigation after application.

[13] Treatments 35 and 36 were applied on a 21-day interval on 12 June, 3 July, 24 July, and 14 August only.

[14] Treatment 37 (2018 SP Prog #3) consisted of 29-0-0 LC (4.0 fl oz) + 7-0-0 LC (6.0 fl oz) + Adams Earth LC (3.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Flo Thru A+ LC (0.7 fl oz) applied on a 14-day interval.

[15] Treatment 38 (2018 SP Prog #4) consisted of 7-0-0 LC (6.0 fl oz) + pHMn 7% LC (6.0 fl oz) + Flo Thru A+ LC (1.5 fl oz) + Omega LC (0.7 fl oz) applied on a 14-day interval.

[16] Treatment 39 (2018 SP Prog #5) consisted of Hydration A+ LC (1.5 fl oz) + Flo Thru A+ LC (1.5 fl oz) + pHMn 7% LC (6.0 fl oz) + RMM LC (1.5 fl oz) + Zinc 7% LC (1.5 fl oz) + Healthy Start LC (6.0 fl oz) + 16-2-7 LC (6.0 fl oz) + 0-0-25 LC (3.0 fl oz) applied on a 14-day interval.

[17] Treatments 48 and 51 were applied on a 14-day interval 12 June, 26 June, 10 July, 24 July, and 7 August at 2.0 gal per 1000 sq ft.

[18] Treatments 49 and 52 were applied on a 21-day interval 12 June, 3 July, and 24 July at 2.0 gal per 1000 sq ft.

[19] Treatments 50, 53, and 54 were applied on a 28-day interval 12 June, 10 July, and 7 August at 2.0 gal per 1000 sq ft.

[20] INT = Spray interval in days.

[21] DAT = Days after last treatment.

Table 1B. Suppressing summer patch with selected fungicides on Kentucky bluegrass: Rutgers University, 2018.

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[3]	Disease Severity Index (%)[1,2] 31 Aug.	10 Sept.	20 Sept.	30 Sept.	10 Oct.
1	RU-21196-18G SC	0.786 fl oz	28	66.0 f-l	63.8 f-j	70.0 h-j	51.0 kl	48.8 ij
2	RU-21196-18G SC	1.18 fl oz	28	51.0 j-p	58.8 g-k	69.3 i-j	44.8 lm	32.8 k-m
3	RU-21196-18G SC	1.57 fl oz	28	41.8 m-s	39.5 j-p	54.5 k-n	43.0 l-n	27.0 l-n
4	Insignia Intrinsic 2.1SC	0.7 fl oz	28	40.8 m-t	30.8 k-s	35.8 q-u	26.5 q-u	14.8 o-r
5	RU-21196-18H SC	2.62 fl oz	28	31.8 o-v	23.8 m-t	23.3 u-y	17.5 t-w	10.0 o-s
6	Varnimo WP	0.74 oz	VAR[4]	79.3 d-h	70.3 e-i	72.8 g-i	63.3 ij	65.0 e-h
7	Varnimo WP	0.74 oz	–					
	+ KaPre Embella LC	0.28 fl oz	VAR[4]	110.5 a-c	81.8 c-g	92.8 e-f	64.3 hi	65.8 e-h
8	Varnimo WP	0.74 oz	–					
	+ KaPre EmbellaPLUS LC	0.28 fl oz	VAR[4]	96.8 b-e	109.3 bc	98.0 d-e	90.8 c-e	75.3 de
9	RU-2125-18F SC	0.2 fl oz	42[5]	82.8 d-g	82.8 c-g	83.3 f-g	75.8 f-h	54.0 hi
10	RU-2125-18F SC	0.3 fl oz	42[5]	75.5 e-i	83.0 c-g	91.8 e-f	96.3 cd	82.5 cd
11	Banner MAXX II 1.3EC	1.0 fl oz	42[5]	66.8 f-k	65.0 f-j	84.5 f-g	70.3 g-i	48.5 ij
12	Banner MAXX II 1.3EC	2.0 fl oz	42[5]	43.0 l-r	38.0 j-q	49.5 m-p	40.5 l-p	40.5 jk
13	RU-2125-18F SC	0.2 fl oz	–					
	+ RU- 2125-18B EC	1.0 fl oz	42[5]	73.8 e-j	64.0 f-j	65.0 i-k	62.8 i-k	48.3 ij
14	RU-2125-18F SC	0.2 fl oz	–					
	+ RU-2125-18B EC	2.0 fl oz	42[5]	53.0 i-o	49.0 h-m	59.0 j-m	41.0 l-o	34.0 kl
15	Armada 50WG	1.5 oz	42[5]	15.8 u-z	29.5 k-t	45.0 n-r	19.0 s-v	8.3 p-s
16	Heritage 0.31G	64.0 oz	42[6]	30.3 o-w	22.0 m-t	31.5 s-w	23.0 r-u	0.0 s
17	Fame 0.25G	73.6 oz	42[6]	85.3 d-f	80.0 c-g	82.5 f-h	72.5 g-i	59.5 f-i
18	Briskway 2.7SC	0.5 fl oz	–					
	+ Primo MAXX 1.0ME	0.25 fl oz	21[7]	0.0 z	0.0 t	0.0 b’	0.0 y	0.0 s
19	Heritage Action 51.2WG	0.4 oz	–					
	+ Primo MAXX 1.0ME	0.25 fl oz	21[7]	0.0 z	0.0 t	0.0 b’	0.0 y	0.0 s
20	2018 SP Program #1	–	14[8]	23.5 r-y	0.0 t	14.8 y-a’	0.0 y	0.0 s
21	2018 SP Program #2	–	21[9]	5.0 x-z	0.0 t	0.0 b’	0.0 y	0.0 s
22	A22070C SE	3.0 fl oz	21[7]	12.0 v-z	0.0 t	4.5 z-b’	0.0 y	0.0 s
23	Headway 1.39EC	3.0 fl oz	21[7]	8.5 w-z	0.0 t	3.0 a’-b’	0.0 y	0.0 s

(Continued)

Table 1B. Summer patch control on Kentucky bluegrass: Rutgers University, 2018.

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[3]	Disease Severity Index (%)[1,2] 31 Aug.	10 Sept.	20 Sept.	30 Sept.	10 Oct.
24	A19649B SC	0.157 fl oz	–					
	+ A22063A SC	0.5 fl oz	21[7]	100.3 a-d	103.5 b-d	118.3 b-c	108.3 ab	100.8 b
25	Velista 50WG	0.5 oz	–					
	+ Heritage Action 51.2WG	0.4 oz	21[7]	3.8 yz	7.0 st	0.0 b’	0.0 y	0.0 s
26	A19649B	0.157 fl oz	21[7]	98.8 b-d	104.8 bc	104.0 d-e	100.3 bc	91.5 bc
27	A20581A SC	0.47 fl oz	21[7]	52.5 i-o	37.5 j-r	39.8 o-t	31.8 n-r	18.0 n-q
28	Fame 3.98SC	0.36 fl oz	21	73.5 f-j	65.3 f-j	72.3 g-i	64.3 hi	62.5 f-h
29	Xzemplar 2.5SC	0.26 fl oz	28	82.3 d-g	74.3 d-h	91.5 e-f	79.5 e-g	57.5 g-i
30	CrossOver Turf 100SGN	15.0 lb	14[10]	99.5 b-d	92.0 b-f	109.0 c-d	87.5 d-f	70.5 d-f
31	CrossOver Turf 100SGN	15.0 lb	–					
	+ Heritage TL 0.8ME	1.5 fl oz	VAR[11]	40.5 m-t	27.0 l-t	33.8 r-w	7.5 v-y	0.0 s
32	Heritage TL 0.8ME	1.5 fl oz	28[12]	52.0 j-o	36.0 j-s	49.3 m-p	30.5 o-s	16.0 n-r
33	Tekken 1.8SC	3.0 fl oz	28	18.3 t-z	7.3 st	21.0 w-y	6.3 w-y	0.0 s
34	Insignia 2.1SC	0.4 fl oz	21	60.5 g-m	48.3 h-n	50.3 l-o	45.0 lm	35.0 kl
35	EXP WW002 SC	0.4 fl oz	21[13]	62.0 g-m	43.5 i-o	42.8 n-s	28.8 p-t	14.8 o-r
36	EXP WW002 SC	0.4 fl oz	–					
	+ RightLine PD-N LC	1.1 fl oz	21[13]	50.8 j-p	33.0 k-s	39.0 o-t	23.5 q-u	19.8 n-p
37	2018 SP Prog #3	–	14[14]	80.8 d-g	83.0 c-g	94.5 e-f	73.3 g-i	68.3 e-g
38	2018 SP Prog #4	–	14[15]	88.0 c-f	98.0 b-e	101.8 d-e	91.8 cd	77.0 de
39	2018 SP Prog #5	–	14[16]	114.3 ab	119.3 ab	130.5 b	116.8 a	101.3 b
40	Maxtima 3.33SC	0.4 fl oz	28	57.5 h-n	54.5 g-l	62.8 i-l	52.0 j-l	33.3 k-m
41	Maxtima 3.33SC	0.8 fl oz	28	27.3 q-x	19.0 n-t	22.5 v-y	19.3 s-v	11.8 o-s
42	Navicon Intrinsic 3.34SC	0.7 fl oz	28	30.8 o-w	26.3 l-t	28.0 t-x	23.3 q-u	7.5 q-s
43	Navicon Intrinsic 3.34SC	0.85 fl oz	28	16.5 u-z	8.8 q-t	11.5 y-b’	8.8 v-y	7.0 q-s
44	Headway 1.39ME	3.0 fl oz	28	19.3 s-z	8.0 r-t	10.5 y-b’	2.3 y	0.0 s
45	Banner 1.3ME	2.0 fl oz	14	49.8 k-q	38.8 j-p	40.3 o-t	33.3 m-r	11.5 o-s
46	Banner 1.3ME	4.0 fl oz	28	30.3 o-w	10.3 p-t	18.5 x-y	14.8 u-x	4.8 rs
47	Briskway 2.7SC	0.5 fl oz	21	26.0 r-y	0.0 t	0.0 b’	3.5 xy	0.0 s
48	RU-2125-18H SC	1.0 fl oz	14[17]	22.3 r-z	22.3 m-t	34.0 r-v	15.0 u-x	12.8 o-r
49	RU-2125-18H SC	1.5 fl oz	21[18]	36.5 n-u	34.0 k-s	32.8 r-w	29.5 o-s	21.8 m-o

(Continued)

Table 1B. Summer patch control on Kentucky bluegrass: Rutgers University, 2018.

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[3]	Disease Severity Index (%)[1,2] 31 Aug.	10 Sept.	20 Sept.	30 Sept.	10 Oct.
50	RU-2125-18H SC	2.0 fl oz	28[19]	20.3 r-z	6.8 st	15.5 x-a'	2.8 y	0.0 s
51	RU-2125-18D SC	1.0 fl oz	14[17]	28.0 p-x	25.8 l-t	37.3 p-t	30.3 o-s	16.5 n-r
52	RU-2125-18D SC	1.5 fl oz	21[18]	20.0 r-z	17.5 o-t	16.8 x-z	15.0 u-x	8.3 p-s
53	RU-2125-18D SC	2.0 fl oz	28[19]	26.8 q-y	12.8 p-t	16.8 x-z	9.5 v-y	8.0 p-s
54	RU-2125-18G SC	0.47 fl oz	28[19]	60.8 g-m	48.5 h-n	47.5 m-q	35.0 m-q	27.3 l-n
55	Untreated check	–	–	122.8 a	143.0 a	146.5 a	117.5 a	119.0 a
			INT[20]	DAT[21]	DAT	DAT	DAT	DAT
			14	24	34	44	54	64
			21	31	41	51	61	71
			28	38	48	58	68	78
			42	52	62	72	82	92

[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). No phytotoxicity was observed in this study.

[2] 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 *Magnaporthiopsis poae* isolate OAK A-5 on 15 May 2004. Disease severity values were averaged for each plot.

[3] Fungicides were applied on 29 May (all treatments except 35, 36, and 48 to 54), 5 June (7-day treatment), 12 June (7- and 14-day treatments, initiated treatments 35, 36, and 48 to 54), 19 June (21-day treatment), 26 June (14- and 28-day treatments, and treatments 48 and 51), 3 July (treatments 35, 36, 49, and 52), 10 July (14-, 21-, and 42-day treatments, and treatments 48, 50, 51, 53, and 54), 24 July (14- and 28-day treatments, and treatments 35, 36, 48, 49, 51, and 52), 31 July (21-day treatment), 7 August (14-day treatment, and treatments 48, 50, 51, 53, and 54), 14 August (treatments 35 and 36), and 21 August (treatments 9 to 17 and 21). Treatments were applied at 4.0 gal per 1000 sq ft unless noted otherwise.

[4] VAR = Variable spray schedule where treatments 6 to 8 were applied on a 7-day interval 29 May, 5 June, and 12 June, and then on a 14-day interval beginning 26 June. All plots were irrigated in with 0.5 gal of H_2O.

[5] Treatments 9 to 15 were applied at 2.0 gal per 1000 sq ft on a 42-day interval 29 May and 10 July only.

(Continued)

Table 1B. Summer patch control on Kentucky bluegrass: Rutgers University, 2018.

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[6] Treatments 16 and 17 were applied on a 42-day interval on 29 May and 10 July only, and irrigated with 0.5 gal of H_2O per plot.

[7] Treatments 18, 19, and 22 to 27 were applied on a 21-day interval and irrigated with 0.5 gal of H_2O per plot.

[8] Treatment 20 (2018 SP Prog #1) consisted of Heritage Action 51.2WG (0.2 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 29 May, Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 12 June, Heritage Action 51.2WG (0.2 oz) + Primo MAXX 1.0ME (0.25fl oz) applied 26 June, Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 10 July, Heritage Action 51.2WG (0.2 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 24 July, and Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 7 August. All treatments were watered in with 0.5 gal of H_2O after application.

[9] Treatment 21 (2018 SP Prog #2) consisted of Heritage Action 51.2WG (0.3 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 29 May, Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 19 June, Heritage Action 51.2WG (0.3 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 10 July, Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 31 July, and Heritage Action 51.2WG (0.3 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 21 August.

[10] Treatment 30 was applied on a 14-day interval 29 May, 12 June, and 26 June, and irrigated in with 1.0 gal of H_2O per plot.

[11] VAR = Variable spray schedule where treatment 31 consisted of CrossOver Turf 100SGN (15.0 lb) applied 29 May, 12 June, and 26 June and irrigated with 1.0 gal of H_2O per plot, and Heritage TL 0.8ME (1.5 fl oz) applied 29 May, 26 June, and 24 July with no irrigation.

[12] Treatment 32 was applied on a 28-day interval with no irrigation after application.

[13] Treatments 35 and 36 were applied on a 21-day interval on 12 June, 3 July, 24 July, and 14 August only.

[14] Treatment 37 (2018 SP Prog #3) consisted of 29-0-0 LC (4.0 fl oz) + 7-0-0 LC (6.0 fl oz) + Adams Earth LC (3.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Flo Thru A+ LC (0.7 fl oz) applied on a 14-day interval.

[15] Treatment 38 (2018 SP Prog #4) consisted of 7-0-0 LC (6.0 fl oz) + pHMn 7% LC (6.0 fl oz) + Flo Thru A+ LC (1.5 fl oz) + Omega LC (0.7 fl oz) applied on a 14-day interval.

[16] Treatment 39 (2018 SP Prog #5) consisted of Hydration A+ LC (1.5 fl oz) + Flo Thru A+ LC (1.5 fl oz) + pHMn 7% LC (6.0 fl oz) + RMM LC (1.5 fl oz) + Zinc 7% LC (1.5 fl oz) + Healthy Start LC (6.0 fl oz) + 16-2-7 LC (6.0 fl oz) + 0-0-25 LC (3.0 fl oz) applied on a 14-day interval.

[17] Treatments 48 and 51 were applied on a 14-day interval 12 June, 26 June, 10 July, 24 July, and 7 August at 2.0 gal per 1000 sq ft.

[18] Treatments 49 and 52 were applied on a 21-day interval 12 June, 3 July, and 24 July at 2.0 gal per 1000 sq ft.

[19] Treatments 50, 53, and 54 were applied on a 28-day interval 12 June, 10 July, and 7 August at 2.0 gal per 1000 sq ft.

[20] INT = Spray interval in days.

[21] DAT = Days after last treatment.

Table 1C. Suppressing summer patch with selected fungicides on Kentucky bluegrass: Rutgers University, 2018.

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[4]	Turf Quality[1,2]			Color[3]		
				26 June	24 July	21 Aug.	26 June	24 July	21 Aug.
1	RU-21196-18G SC	0.786 fl oz	28	7.3 a-g	7.6 a-j	5.5 lm	5.3 b-d	5.2 e	5.1 f-h
2	RU-21196-18G SC	1.18 fl oz	28	7.2 a-g	7.2 b-m	5.6 k-m	5.1 cd	5.0 e	5.5 c-g
3	RU-21196-18G SC	1.57 fl oz	28	7.8 a-g	7.7 a-i	5.7 kl	5.0 d	5.0 e	5.0 h
4	Insignia Intrinsic 2.1SC	0.7 fl oz	28	8.0 a-f	8.3 a-d	6.9 d-i	5.0 d	5.0 e	5.3 e-h
5	RU-21196-18H SC	2.62 fl oz	28	7.5 a-g	8.2 a-e	7.3 b-h	5.3 b-d	5.3 e	5.4 d-h
6	Varnimo WP	0.74 oz	VAR[5]	7.8 a-g	6.5 h-p	4.0 n-p	5.3 b-d	5.0 e	5.0 h
7	Varnimo WP	0.74 oz	–						
	+ KaPre Embella LC	0.28 fl oz	VAR[5]	7.6 a-g	5.8 n-r	3.2 p-r	5.3 b-d	5.0 e	5.0 h
8	Varnimo WP	0.74 oz	–						
	+ KaPre EmbellaPLUS LC	0.28 fl oz	VAR[5]	7.4 a-g	4.7 qr	2.1 r-t	5.1 cd	5.0 e	5.0 h
9	RU-2125-18F SC	0.2 fl oz	42[6]	7.5 a-g	6.0 m-q	3.5 o-q	5.1 cd	5.0 e	5.0 h
10	RU-2125-18F SC	0.3 fl oz	42[6]	8.0 a-f	6.6 g-o	3.5 o-q	5.3 b-d	5.0 e	5.1 f-h
11	Banner MAXX II 1.3EC	1.0 fl oz	42[6]	7.2 a-g	5.8 n-r	3.8 n-q	5.4 b-d	5.0 e	5.0 h
12	Banner MAXX II 1.3EC	2.0 fl oz	42[6]	8.0 a-f	7.5 a-k	6.3 h-l	5.0 d	5.1 e	5.0 h
13	RU-2125-18F SC	0.2 fl oz	–						
	+ RU- 2125-18B EC	1.0 fl oz	42[6]	7.8 a-g	6.6 g-o	5.6 k-m	5.3 b-d	5.0 e	5.0 h
14	RU-2125-18F SC	0.2 fl oz	–						
	+ RU-2125-18B EC	2.0 fl oz	42[6]	7.4 a-g	7.1 c-o	6.0 i-l	5.8 b-d	5.3 e	5.2 f-h
15	Armada 50WG	1.5 oz	42[6]	8.4 ab	7.7 a-i	6.9 d-i	5.4 b-d	5.0 e	5.1 f-h
16	Heritage 0.31G	64.0 oz	42[7]	6.5 e-g	6.6 g-o	7.6 a-g	5.1 cd	5.0 e	5.0 h
17	Fame 0.25G	73.6 oz	42[7]	7.2 a-g	5.3 p-r	3.7 n-q	5.5 b-d	5.0 e	5.0 h
18	Briskway 2.7SC	0.5 fl oz	–						
	+ Primo MAXX 1.0ME	0.25 fl oz	21[8]	7.1 a-g	7.8 a-h	8.5 a	5.7 b-d	6.4 bc	7.4 b
19	Heritage Action 51.2WG	0.4 oz	–						
	+ Primo MAXX 1.0ME	0.25 fl oz	21[8]	7.6 a-g	7.8 a-h	8.3 ab	5.1 cd	6.6 ab	7.4 b
20	2018 SP Program #1	–	14[9]	6.6 c-g	8.4 a-c	7.7 a-f	6.2 ab	6.9 ab	8.1 a
21	2018 SP Program #2	–	21[10]	7.2 a-g	7.7 a-i	7.5 a-g	5.4 b-d	7.1 a	7.4 b
22	A22070C SE	3.0 fl oz	21[8]	8.4 ab	8.2 a-e	7.5 a-g	6.0 a-c	5.9 cd	5.9 c
23	Headway 1.39EC	3.0 fl oz	21[8]	7.9 a-f	8.0 a-f	8.0 a-d	5.0 d	5.4 de	5.9 c

(Continued)

Table 1C. Suppressing summer patch with selected fungicides on Kentucky bluegrass: Rutgers University, 2018.

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[4]	Turf Quality[1,2]			Color[3]		
				26 June	24 July	21 Aug.	26 June	24 July	21 Aug.
24	A19649B SC	0.157 fl oz	–						
	+ A22063A SC	0.5 fl oz	21[8]	8.0 a-f	6.1 l-p	3.2 p-r	5.5 b-d	5.3 e	5.0 h
25	Velista 50WG	0.5 oz	–						
	+ Heritage Action 51.2WG	0.4 oz	21[8]	7.8 a-g	8.0 a-f	8.1 a-c	5.3 b-d	5.5 de	5.6 c-f
26	A19649B	0.157 fl oz	21[8]	8.1 a-f	5.9 n-r	2.9 q-t	5.6 b-d	5.0 e	5.0 h
27	A20581A SC	0.47 fl oz	21[8]	8.6 a	6.5 h-p	5.5 lm	5.0 d	5.0 e	5.0 h
28	Fame 3.98SC	0.36 fl oz	21	6.5 e-g	6.5 h-p	4.3 no	5.5 b-d	5.4 de	5.1 f-h
29	Xzemplar 2.5SC	0.26 fl oz	28	8.0 a-f	7.0 d-o	4.3 no	5.5 b-d	5.3 e	5.0 h
30	CrossOver Turf 100SGN	15.0 lb	14[11]	6.5 e-g	5.8 n-r	3.3 o-q	5.5 b-d	5.1 e	5.1 f-h
31	CrossOver Turf 100SGN	15.0 lb	–						
	+ Heritage TL 0.8ME	1.5 fl oz	VAR[12]	8.5 ab	7.1 c-o	6.6 g-k	5.8 b-d	5.0 e	5.0 h
32	Heritage TL 0.8ME	1.5 fl oz	28[13]	7.9 a-f	6.5 h-p	6.2 i-l	5.5 b-d	5.2 e	5.3 e-h
33	Tekken 1.8SC	3.0 fl oz	28	6.6 c-g	7.0 d-o	7.6 a-g	5.0 d	5.0 e	5.7 c-e
34	Insignia 2.1SC	0.4 fl oz	21	8.2 a-e	7.9 a-g	5.5 lm	5.8 b-d	5.5 de	5.2 f-h
35	EXP WW002 SC	0.4 fl oz	21[14]	8.4 ab	8.4 a-c	7.0 c-i	5.5 b-d	5.3 e	5.2 f-h
36	EXP WW002 SC	0.4 fl oz	–						
	+ RightLine PD-N LC	1.1 fl oz	21[14]	7.5 a-g	8.0 a-f	6.6 g-k	5.5 b-d	5.1 e	5.1 f-h
37	2018 SP Prog #3	–	14[15]	7.9 a-f	7.4 a-l	4.6 mn	5.3 b-d	5.4 de	5.0 h
38	2018 SP Prog #4	–	14[16]	6.4 fg	4.6 r	3.0 p-s	5.0 d	5.0 e	5.0 h
39	2018 SP Prog #5	–	14[17]	8.3 a-d	5.9 n-r	1.9 t	6.9 a	5.5 de	5.0 h
40	Maxtima 3.33SC	0.4 fl oz	28	7.9 a-f	6.2 l-p	6.0 i-l	5.4 b-d	5.0 e	5.3 e-h
41	Maxtima 3.33SC	0.8 fl oz	28	7.3 a-g	6.6 g-o	6.8 f-j	5.5 b-d	5.1 e	5.5 c-g
42	Navicon Intrinsic 3.34SC	0.7 fl oz	28	8.1 a-f	8.4 a-c	7.7 a-f	5.9 b-d	5.0 e	5.1 f-h
43	Navicon Intrinsic 3.34SC	0.85 fl oz	28	8.3 a-d	8.3 a-d	7.9 a-e	5.3 b-d	5.3 e	5.0 h
44	Headway 1.39ME	3.0 fl oz	28	7.9 a-f	7.3 b-l	7.4 a-g	5.4 b-d	5.5 de	5.1 f-h
45	Banner 1.3ME	2.0 fl oz	14	7.8 a-g	6.3 j-p	5.6 k-m	5.3 b-d	5.1 e	5.8 cd
46	Banner 1.3ME	4.0 fl oz	28	7.3 a-g	7.2 b-m	7.4 a-g	5.3 b-d	5.3 e	5.7 c-e
47	Briskway 2.7SC	0.5 fl oz	21	8.1 a-f	8.5 ab	7.8 a-f	5.6 b-d	5.3 e	5.1 f-h
48	RU-2125-18H SC	1.0 fl oz	14[18]	7.7 a-g	8.3 a-d	6.8 f-j	5.9 b-d	6.7 ab	5.1 f-h
49	RU-2125-18H SC	1.5 fl oz	21[19]	7.8 a-g	8.7 a	7.4 a-g	5.4 b-d	6.5 b	5.3 e-h

(Continued)

Table 1C. Suppressing summer patch with selected fungicides on Kentucky bluegrass: Rutgers University, 2018.

	Treatment	Rate per 1000 sq ft	Application Schedule (days)[4]	Turf Quality[1,2] 26 June	Turf Quality[1,2] 24 July	Turf Quality[1,2] 21 Aug.	Color[3] 26 June	Color[3] 24 July	Color[3] 21 Aug.
50	RU-2125-18H SC	2.0 fl oz	28[20]	7.4 a-g	7.5 a-k	7.0 c-i	5.4 b-d	5.5 de	5.3 e-h
51	RU-2125-18D SC	1.0 fl oz	14[18]	7.5 a-g	6.8 f-o	6.2 i-l	5.7 b-d	5.5 de	5.4 d-h
52	RU-2125-18D SC	1.5 fl oz	21[19]	7.8 a-g	7.3 b-l	7.7 a-f	6.1 ab	6.5 b	5.5 c-g
53	RU-2125-18D SC	2.0 fl oz	28[20]	7.5 a-g	6.3 j-p	6.0 i-l	6.0 a-c	5.9 cd	5.8 cd
54	RU-2125-18G SC	0.47 fl oz	28[20]	6.8 b-g	6.7 f-o	5.8 j-l	5.3 b-d	5.3 e	5.1 f-h
55	Untreated check	–	–	6.1 g	4.6 r	1.9 s-t	5.0 d	5.0 e	5.0 h
			INT[21]	DAT[22]	DAT	DAT	DAT	DAT	DAT
			14	14	14	14	14	14	14
			21	7	14	21	7	14	21
			28	28	28	28	28	28	28
			42	28	14	42	28	14	42

[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). No phytotoxicity was observed in this study.

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

[3] Color of foliage on a scale of 1 to 10, where 5 = color of healthy untreated turf, less than 5 = progressively more chlorotic/necrotic turf, and greater than 5 = progressively darker green turf.

[4] Fungicides were applied on 29 May (all treatments except 35, 36, and 48 to 54), 5 June (7-day treatment), 12 June (7- and 14-day treatments, initiated treatments 35, 36, and 48 to 54), 19 June (21-day treatment), 26 June (14- and 28-day treatments, and treatments 48 and 51), 3 July (treatments 35, 36, 49, and 52), 10 July (14-, 21-, and 42-day treatments, and treatments 48, 50, 51, 53, and 54), 24 July (14- and 28-day treatments, and treatments 35, 36, 48, 49, 51, and 52), 31 July (21-day treatment), 7 August (14-day treatment, and treatments 48, 50, 51, 53, and 54), 14 August (treatments 35 and 36), and 21 August (treatments 9 to 17 and 21). Treatments were applied at 4.0 gal per 1000 sq ft unless noted otherwise.

[5] VAR = Variable spray schedule where treatments 6 to 8 were applied on a 7-day interval 29 May, 5 June, and 12 June, and then on a 14-day interval beginning 26 June. All plots were irrigated in with 0.5 gal of H_2O.

[6] Treatments 9 to 15 were applied at 2.0 gal per 1000 sq ft on a 42-day interval 29 May and 10 July only.

[7] Treatments 16 and 17 were applied on a 42-day interval on 29 May and 10 July only, and irrigated with 0.5 gal of H_2O per plot.

[8] Treatments 18, 19, and 22 to 27 were applied on a 21-day interval and irrigated with 0.5 gal of H_2O per plot.

(Continued)

Table 1C. Summer patch control on Kentucky bluegrass: Rutgers University, 2018.

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[9] Treatment 20 (2018 SP Prog #1) consisted of Heritage Action 51.2WG (0.2 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 29 May, Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 12 June, Heritage Action 51.2WG (0.2 oz) + Primo MAXX 1.0ME (0.25fl oz) applied 26 June, Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 10 July, Heritage Action 51.2WG (0.2 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 24 July, and Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 7 August. All treatments were watered in with 0.5 gal of H_2O after application.

[10] Treatment 21 (2018 SP Prog #2) consisted of Heritage Action 51.2WG (0.3 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 29 May, Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 19 June, Heritage Action 51.2WG (0.3 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 10 July, Velista 50WG (0.5 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 31 July, and Heritage Action 51.2WG (0.3 oz) + Primo MAXX 1.0ME (0.25 fl oz) applied 21 August.

[11] Treatment 30 was applied on a 14-day interval 29 May, 12 June, and 26 June, and irrigated in with 1.0 gal of H_2O per plot.

[12] VAR = Variable spray schedule where treatment 31 consisted of CrossOver Turf 100SGN (15.0 lb) applied 29 May, 12 June, and 26 June and irrigated with 1.0 gal of H_2O per plot, and Heritage TL 0.8ME (1.5 fl oz) applied 29 May, 26 June, and 24 July with no irrigation.

[13] Treatment 32 was applied on a 28-day interval with no irrigation after application.

[14] Treatments 35 and 36 were applied on a 21-day interval on 12 June, 3 July, 24 July, and 14 August only.

[15] Treatment 37 (2018 SP Prog #3) consisted of 29-0-0 LC (4.0 fl oz) + 7-0-0 LC (6.0 fl oz) + Adams Earth LC (3.0 fl oz) + Phosphite 30 LC (3.0 fl oz) + Flo Thru A+ LC (0.7 fl oz) applied on a 14-day interval.

[16] Treatment 38 (2018 SP Prog #4) consisted of 7-0-0 LC (6.0 fl oz) + pHMn 7% LC (6.0 fl oz) + Flo Thru A+ LC (1.5 fl oz) + Omega LC (0.7 fl oz) applied on a 14-day interval.

[17] Treatment 39 (2018 SP Prog #5) consisted of Hydration A+ LC (1.5 fl oz) + Flo Thru A+ LC (1.5 fl oz) + pHMn 7% LC (6.0 fl oz) + RMM LC (1.5 fl oz) + Zinc 7% LC (1.5 fl oz) + Healthy Start LC (6.0 fl oz) + 16-2-7 LC (6.0 fl oz) + 0-0-25 LC (3.0 fl oz) applied on a 14-day interval.

[18] Treatments 48 and 51 were applied on a 14-day interval 12 June, 26 June, 10 July, 24 July, and 7 August at 2.0 gal per 1000 sq ft.

[19] Treatments 49 and 52 were applied on a 21-day interval 12 June, 3 July, and 24 July at 2.0 gal per 1000 sq ft.

[20] Treatments 50, 53, and 54 were applied on a 28-day interval 12 June, 10 July, and 7 August at 2.0 gal per 1000 sq ft.

[21] INT = Spray interval in days.

[22] DAT = Days after last treatment.