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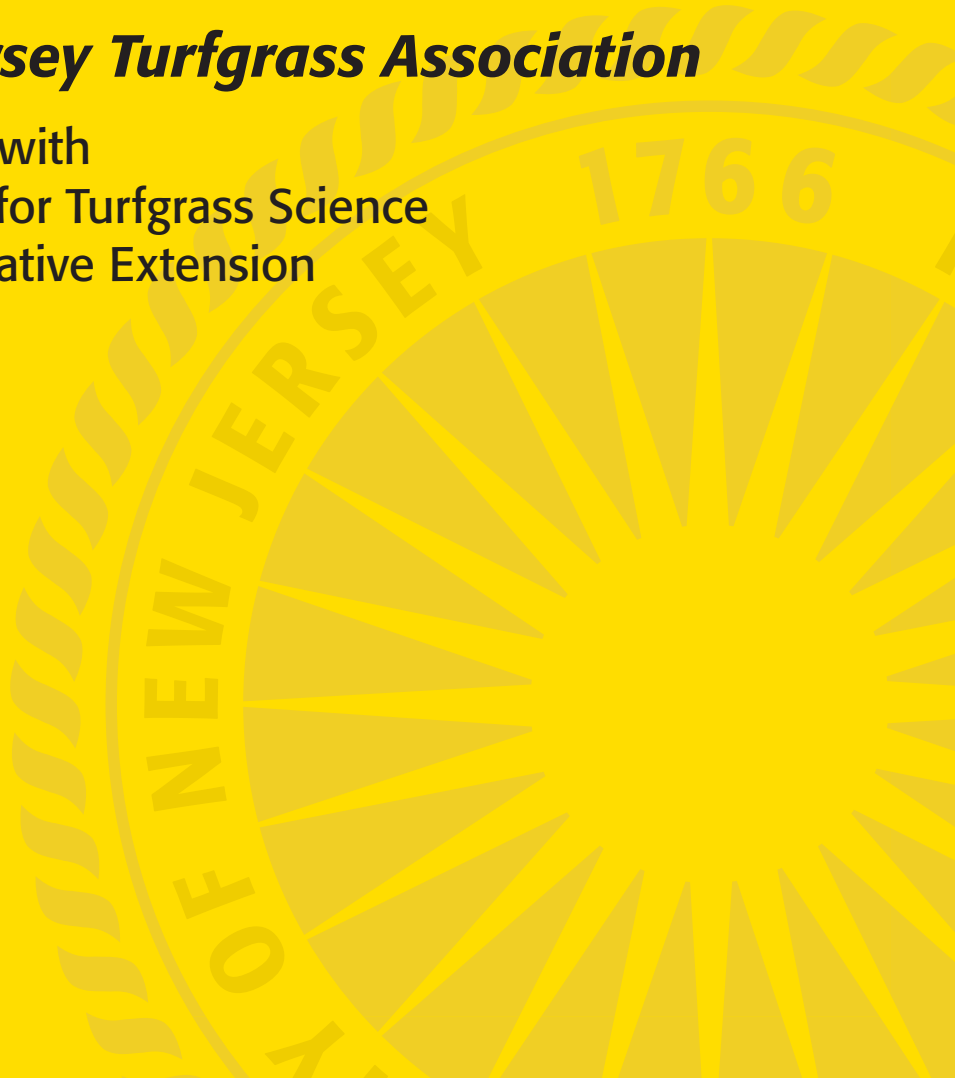

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The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State 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 2006 New Jersey Turfgrass Expo. 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

EFFICACY OF FUNGICIDES AND BIORATIONAL PRODUCTS FOR THE CONTROL OF PYTHIUM BLIGHT ON PERENNIAL RYEGRASS

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Fungicides were evaluated in 2006 for their ability to control Pythium blight (caused by *Pythium aphanidermatum*) at the Rutgers Turf Research Farm in North Brunswick, NJ on perennial ryegrass (*Lolium perenne* cv. Paragon GLR). Turf was established 4 May 2006 with 9.8 lb seed/1000 ft^2 on a Norton Loam with a pH of 5.7. The pre-emergence herbicide Tupersan 4.7G (2.5 lb/1000 ft^2) was applied at seeding and on 17 May to suppress weed ingress. Mowing was performed weekly at a height of 2.5 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 (1.0 lb nitrogen (N)/1000 ft^2) at establishment on 4 May, 16-4-8 (0.7 lb N/1000 ft^2) on 17 May, 15.5-0-0 (0.7 lb N/1000 ft^2) on 31 May, and 16-4-8 (0.6 lb N/1000 ft^2) on 20 June. Dimension 1E (16 fl oz/A) was applied on 30 May for additional pre-emergence weed control. Crabgrass was eliminated with Acclaim Extra 0.57SC (20 oz/A) on 30 May and 14 July, yellow nutsedge was controlled with Manage 75WG (1.0 oz/A) on 14 June, and broadleaf weeds were controlled with Trimec Bentgrass 1.3L (1.5 fl oz/1000 ft^2) on 14 July. ProStar 70W (3.0 oz/1000 ft^2) was applied to the entire test area on 6 and 27 June, 13 July, and 11 August to suppress brown patch (caused by *Rhizoctonia solani*). Plots were 3 x 5 ft and were arranged in a randomized complete block with four replications.

Fungicides were applied in water equivalent to 3.8 gal/1000 ft^2 with a $C0_2$ powered sprayer at 30 psi using Tee jet 8003VS flat fan nozzles. Treatments (trt) were initiated on 1 June when environmental conditions were conducive to Pythium blight, except trt 27 and curative entries (trts 14 to 17 and 30) which were first applied on 15 and 26 June, respectively. Fungicides were reapplied as indicated in Table 1. Turf was visually evaluated for percent turf area infested with *P. aphanidermatum* on 26 and 29 June, 6 and 14 July, and 7 and 18 August. Turf quality was rated on 18 August using a 1 to 9 scale, where 9 = best turf quality and 6 = acceptable quality. Data were subjected to analysis of variance and means were separated using the Waller-Duncan *k*–ratio *t*–test (*k* = 100)

Pythium blight was first observed on 23 June and became uniform throughout the study by 26 June (Table 1). Disease severity ranged from 26 to 37% turfgrass area infested on untreated turf, which was considered a moderate level of *Pythium* infestation. Less than 10% turf area infested per plot represented an acceptable level of disease control. All fungicide entries in this study provided good to excellent control of Pythium blight throughout the study (1 June to 18 August), except for Foliar Phosphate Programs #1 (trt 6) and #2 (trt 7), V-10161 4FL (preventive trts 11 and 12, and curative trts 14 and 15), V-10162 5.73FL (curative trt 16), Banol 6L (curative trt 17), CL-EXP-1 30LC + Cleary 3336 4F (trt 26), CL-EXP-11 L + Cleary 3336 4F (trt 27), Cleary 3336 4F (trt 28), and Heritage 50WG @ 0.2 oz every 14 days (trt 33). Subdue MAXX 2MC @ 1.0 fl oz applied every 14 days after June 26 (trt 30) was the only curative treatment in the study that provided acceptable control of Pythium blight from 29 June to 18 August. Although the phosphites in the trial (trts 10 and 22) afforded excellent protection from this disease, the programs containing phosphates (trts 6 and 7) were ineffective. In fact, Foliar Phosphate Program #1 (trt 6) enhanced Pythium blight 29 to 37% from 29 June to 14 July, compared to untreated turf (trt 38), presumably due to the additional nitrogen that this product contained.

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Turf quality was closely associated with disease control. All products that provided excellent control of Pythium blight throughout the trial exhibited acceptable (> 6.0) turfgrass quality on 18 August except Disarm 480SC @ 0.37 fl oz every 14 days (trt 18). Tartan 2.4SC (trts 1 and 2), Alude 46L + Cleary 3336 4F (trt 23) and Chipco Signature 80WG (trt 36) enhanced quality compared to the untreated check (trt 38). No phytotoxicity was observed.

Table 1. Efficacy of selected fungicides and biorational products for the control of Pythium blight on perennial ryegrass: New Brunswick, NJ, 2006.

	Treatment	Rate per 1000 sq ft)	Spray Interval (days)[3]	Turf Area Infested (%) per Plot[1] 26 June	29 June	6 July	14 July	7 Aug.	18 Aug.	Turf Quality[2] 18 Aug.
1	Tartan 2.4SC	1.0 fl oz	21	0.8 a	3.0 a-f	5.5 a-f	4.3 a-c	2.5 ab	3.5 a	7.8 cd
2	Tartan 2.4SC	2.0 fl oz	21	1.3 ab	6.0 a-g	4.0 a-d	8.0 a-g	1.0 a	3.3 a	8.0 d
3	Tartan 2.4SC + Banol 6L	1.0 fl oz 1.3 fl oz	21	0.0 a	1.5 a-d	4.5 a-f	3.5 ab	2.5 ab	6.5 a-d	7.0 b-d
4	Tartan 2.4SC + Banol 6L	2.0 fl oz 1.3 fl oz	21	0.0 a	0.0 a	0.8 a	1.0 ab	0.0 a	3.5 a	7.3 b-d
5	Banol 6L	1.3 fl oz	21	1.0 a	0.0 a	0.8 a	0.0 a	0.8 a	3.8 a	6.0 a-c
6	Foliar Phosphate Program #1	—[4]	14	38.5 j	43.0 k	33.8 k	35.5 l	26.3 i	26.3 hi	5.8 ab
7	Foliar Phosphate Program #2	—[5]	14	36.0 j	20.3 hi	22.8 ij	14.0 e-i	19.0 g-i	26.3 hi	6.3 a-d
8	Insignia 20WG	0.9 oz	14	0.0 a	0.5 ab	0.5 a	1.5 ab	2.3 ab	6.3 a-d	6.0 a-c
9	Insignia 20WG + Alude 46L	0.9 oz 5.5 fl oz	14	0.8 a	0.0 a	0.8 a	1.0 ab	1.0 a	3.5 a	6.8 a-d
10	Alude 46L	5.5 fl oz	14	1.5 a-c	10.3 d-g	5.8 a-f	6.5 a-e	3.8 a-c	7.0 a-d	6.0 a-c
11	V-10161 4FL	0.2 fl oz	14	6.5 a-f	10.0 d-g	15.8 g-i	15.8 g-j	18.3 f-h	21.3 f-h	6.0 a-c
12	V-10161 4FL	0.3 fl oz	14	8.3 b-f	9.3 b-g	10.8 c-h	15.5 f-i	19.0 g-i	25.3 gh	5.0 a
13	V-10162 5.73FL	1.2 fl oz	14	1.0 a	0.8 ab	1.3 a	3.8 ab	5.3 a-d	8.3 a-e	6.3 a-d
14	V-10161 4FL	0.2 fl oz	Cur/14[6]	16.8 g-i	8.5 a-g	10.5 c-h	11.0 c-h	11.0 c-f	16.8 e-g	6.8 a-d
15	V-10161 4FL	0.3 fl oz	Cur/14[6]	18.8 hi	10.3 d-g	17.0 hi	18.0 h-j	14.8 e-h	22.0 f-h	5.8 ab
16	V-10162 5.73FL	1.2 fl oz	Cur/14[6]	17.5 hi	11.5 f-h	16.3 g-i	20.8 ij	15.3 e-h	14.8 c-f	6.8 a-d
17	Banol 6L	1.3 fl oz	Cur/14[6]	20.8 i	12.0 gh	12.0 f-h	13.0 d-i	21.5 hi	15.0 d-f	5.8 ab
18	Disarm 480SC	0.37 fl oz	14	0.0 a	0.0 a	1.3 a	0.8 ab	0.5 a	3.8 a	5.5 ab
19	Disarm 480SC + Subdue MAXX 2MC	0.18 fl oz 1.0 fl oz	14	0.8 a	0.0 a	2.0 ab	1.5 ab	2.0 ab	3.3 a	6.3 a-d
20	Disarm 480SC + TM-90109	0.18 fl oz 4.0 fl oz	14	0.5 a	1.0 a-c	4.3 a-e	2.5 ab	5.5 a-d	5.8 a-c	6.0 a-c
21	Disarm 480SC + Banner MAXX 1.3ME + TM-90109	0.18 fl oz 1.0 fl oz 4.0 fl oz	14	0.0 a	4.3 a-g	4.3 a-e	4.3 a-c	0.8 a	3.3 a	6.3 a-d
22	Vital Sign 4L	4.0 fl oz	14	2.3 a-d	1.8 a-e	6.5 a-f	4.3 a-c	1.5 ab	4.0 ab	6.5 a-d

(Continued)

Table 1 (continued).

	Treatment	Rate per 1000 sq ft)	Spray Interval (days)[3]	Turf Area Infested (%) per Plot[1] 26 June	29 June	6 July	14 July	7 Aug.	18 Aug.	Turf Quality[2] 18 Aug.
23	Alude 46L	5.5 fl oz								
	+ Cleary 3336 4F	5.0 fl oz	14	8.5 c-f	5.5 a-g	6.0 a-f	7.8 a-g	9.0 b-e	7.3 a-d	7.8 cd
24	CL-EXP-1 30LC	24.0 fl oz								
	+ Cleary 3336 4F	5.0 fl oz	14	7.0 a-f	6.8 a-g	9.3 b-g	7.3 a-e	5.5 a-d	3.3 a	6.3 a-d
25	CL-EXP-1 30LC	16.0 fl oz								
	+ Cleary 3336 4F	5.0 fl oz	14	5.0 a-e	10.5 e-g	6.3 a-f	7.5 a-f	3.5 a-c	4.3 ab	6.3 a-d
26	CL-EXP-1 30LC	8.0 fl oz								
	+ Cleary 3336 4F	5.0 fl oz	14	12.5 f-h	8.0 a-g	11.3 d-h	14.0 e-i	7.5 a-e	13.0 b-f	7.0 b-d
27	CL-EXP-11 L	5.5 fl oz								
	+ Cleary 3336 4F	5.0 fl oz	14	9.3 d-f	9.8 c-g	11.8 e-h	12.8 d-i	12.0 d-g	9.8 a-e	6.8 a-d
28	Cleary 3336 4F	5.0 fl oz	14	36.8 j	26.3 ij	28.8 jk	31.8 kl	26.3 i	26.3 hi	6.3 a-d
29	Subdue MAXX 2MC	1.0 fl oz	14	1.8 a-e	0.0 a	1.0 a	3.5 ab	3.8 a-c	7.3 a-d	6.5 a-d
30	Subdue MAXX 2MC	1.0 fl oz	Cur/14[6]	20.0 i	7.8 a-g	7.0 a-f	7.5 a-f	4.8 a-d	7.5 a-d	6.5 a-d
31	Heritage 50WG	0.2 oz								
	+ Subdue MAXX 2MC	0.5 fl oz	14	3.3 a-e	7.0 a-g	7.8 a-f	8.8 b-g	5.0 a-d	3.3 a	6.8 a-d
32	Subdue MAXX 2MC	0.5 fl oz	14	1.3 ab	1.0 a-c	0.8 a	1.8 ab	1.8 ab	3.8 a	6.3 a-d
33	Heritage 50WG	0.2 oz	14	9.8 e-g	12.3 gh	9.5 b-h	12.8 d-i	12.5 d-g	5.3 ab	6.5 a-d
34	Heritage 50WG	0.4 oz	21	0.5 a	1.5 a-d	1.0 a	5.3 a-d	0.8 a	4.3 ab	6.8 a-d
35	Heritage TL 0.8ME	2.0 fl oz	21	1.3 ab	6.5 a-g	3.3 a-c	2.5 ab	1.5 ab	3.8 a	6.5 a-d
36	Chipco Signature 80WG	4.0 oz	14	0.3 a	5.0 a-g	4.3 a-e	6.3 a-e	3.0 ab	4.8 ab	7.8 cd
37	Banol 6L	1.3 fl oz	14	0.5 a	0.0 a	4.5 a-f	5.0 a-d	2.3 ab	8.8 a-e	6.5 a-d
38	Untreated Check	—	—	35.8 j	31.3 j	25.5 j	23.8 jk	36.8 j	35.0 i	5.8 ab

INT[7]	DAT[8]	DAT	DAT	DAT	DAT	DAT	DAT
14	11	14	7	1	11	4	4
21	4	7	14	1	4	15	15

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

(Continued)

Table 1 (continued).

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[2] Turf quality on a 1 to 9 scale, where 9 = best turf quality and 6 = commercially acceptable quality.
[3] Fungicides were applied on 1 June (all treatments, except treatment 27), 15 June (14-day treatment, treatment 27 initiated), 22 June (21-day treatment), 29 June (14-day treatment), 13 July (14- and 21-day treatments), 27 July (14-day treatment), 3 August (21-day treatment), and 10 August (14-day treatment).
[4] Treatment 6 (Foliar Phosphate Program #1) consisted of Foliar Phosphate 0-29-26 (3.0 fl oz) + Green T 12-3-12 50% SRN (6.0 fl oz) + Green T N 28-0-0 72% SRN (6.0 fl oz) + Sugar Cal 10% Ca (2.0 fl oz) + Primo MAXX 1MC (0.125 fl oz).
[5] Treatment 7 (Foliar Phosphate Program # 2) consisted of Foliar Phosphate 0-29-26 (3.0 fl oz) + Primo MAXX 1MC (0.125 fl oz).
[6] Curative application first applied on 26 June then repeated on a 14-day schedule.
[7] Spray interval in days.
[8] Days after the last treatment.

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