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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, Cook College, 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 2001 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 SELECTED FUNGICIDES FOR THE CONTROL OF DOLLAR SPOT AND BROWN PATCH IN CREEPING BENTGRASS

Gabriel W. Towers, Bruce B. Clarke, Pradip, R. Majumdar, Jennifer N. Vaiciunas, Mark Peacos, and Eric N. Weibel¹

Fungicides were evaluated in 2001 primarily for their ability to control dollar spot (caused by *Sclerotinia homoeocarpa*) at the Rutgers Turf Research Farm in North Brunswick, NJ on creeping bentgrass (*Agrostis stolonifera* 'Crenshaw') maintained under golf course greens conditions. The efficacy of these products for the control of brown patch (caused by *Rhizoctonia solani*) was also assessed. Turf was established September 1996 on a Norton loam with a pH of 6.5. Mowing was performed three times weekly at a height of 0.152 inch with clippings collected. The site was irrigated as needed to prevent drought stress.

Fertilizer was applied as 16-4-8 on 20 April (0.5 lb nitrogen (N)/1000 ft²), 6 June (0.3 lb N/1000 ft²), and 10 July (0.4 lb N/1000 ft²). Localized dry spots were controlled with Primer wetting agent (4.0 fl oz/1000 ft²) on 7 May. Daconil Ultrex 82.5SDG (5.6 oz/1000 ft²) was applied to the entire test area on 30 May to suppress dollar spot and brown patch prior to the current study. Insect pests were controlled with Dursban Pro 2E (2.0 oz/1000 ft²) on 24 July. 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 per 1000 ft² with a CO₂ powered sprayer at 30 psi using TeeJet 8003VS flat fan nozzles. Treatments (trt) were initiated on 19 June when environmental conditions were conducive to disease development. Fungicides were reapplied at the appropriate intervals as indicated in Table 1. Turf was visually evaluated for number of dollar spot infection centers per plot on 29 June, 11 July, 23 July, 7 August, 15 August, and 25 August. The percent turf area infested with *R. solani* was also assessed on 20 August. Data were subjected to analysis of variance and means separation by Waller-Duncan *k*-ratio *t*-test (*k*=100).

Dollar spot was first observed in mid-June and was evenly distributed over the study area by 29 June. Dollar spot pressure was moderate throughout the summer, while brown patch developed late in the season (i.e., 2 August) and reached peak activity in mid-August. Most treatments provided good to excellent control of both dollar spot and brown patch during the study period. Although the experimental fungicide BAS 510 02F 70WG (trt 33, 34) proved effective against dollar spot, it was ineffective in controlling brown patch. Conversely, several products that effectively controlled brown patch but did not afford satisfactory control of dollar spot included: Endorse 2.5W (trt 12, 13), TD 2389-02 (trt 14, 15), TD 2390-03 (trt 16, 17), and Heritage 50WG (trt 56).

Both of the rotational programs designed to reduce the potential for fungicide resistance (trt 42, 43) provided good to excellent control of both target diseases. While all of the reduced rate tank-mixture combinations (trt 46 to 49) resulted in excellent disease control of both dollar spot and brown patch, the efficacy of the individual products at the corresponding rates was variable. For example, the reduced rate of Banner MAXX 1.3MC (trt 50) provided excellent dollar spot suppression but only fair control of brown patch; Chipco 26GT 2SC at 1.5 fl oz (trt 52) afforded good protection from brown patch but failed to control dollar spot late in the season; the low label rates of Bayleton 50W (trt 51) and Vorlan 50EG (trt 54) controlled dollar spot but did not adequately suppress brown patch; and Daconil Weather Stik 6F at 2 fl oz (trt 53) failed to control either dollar spot or brown patch late in the season. Cupri-Zin 22 4LC (trt 36, 37), Eco-Dyne 3.5LC (trt 38, 39), and Cupri-Zin 22 4LC + Eco-Dyne 3.5LC (trt 40, 41) did not control either dollar spot or brown patch in this study. No phytotoxicity was observed.

¹Graduate Assistant, Extension Specialist in Turfgrass Plant Pathology, Senior Laboratory Technician, Graduate Assistant, Senior Greenhouse and Field Technician, and Graduate Assistant, respectively, Department of Plant Biology and Pathology, Cook College, Rutgers, The State University of New Jersey, 59 Dudley Rd., New Brunswick, NJ 08901-8520.

Table 1. Impact of selected fungicides on the incidence of dollar spot and brown patch in creeping bentgrass in North Brunswick, NJ: 2001.

Treatment and rate per 1000 sq ft	Spray Interval (days) ³	Number of Dollar Spot Lesion Centers per Plot ¹							Brown Patch ² (%) 20 Aug.
		29 June	11 July	23 July	7 Aug.	15 Aug.	25 Aug.		
1. V-10114 1.67FL0.88 fl oz + TADS 13093 0.25% v/v	7	23.3 b	5.5 a-d	0.0 a	0.0 a	0.0 a	0.0 a	3.8 ab	6.5 a-c
2. V-10114 1.67FL1.76 fl oz + TADS 13093 0.25% v/v	7	28.5 bc	5.0 a-d	0.0 a	0.0 a	0.0 a	0.0 a	2.0 ab	1.0 a
3. V-10114 1.67FL0.88 fl oz + TADS 13093 0.25% v/v	14	33.5 cd	4.8 a-d	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	1.5 a
4. V-10114 1.67FL1.76 fl oz + TADS 13093 0.25% v/v	14	37.3 cd	2.8 a-c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	1.5 a
5. Chipco Triton 1.67SC 0.75 fl oz	21	3.0 a	9.5 b-e	0.3 a	0.8 a	4.3 a-c	19.8 d-f	3.3 ab	3.3 ab
6. Chipco Triton 1.67SC 1.0 fl oz	21	1.0 a	8.5 a-e	1.0 a	0.5 a	1.3 a	9.3 bc	2.5 ab	2.5 ab
7. Chipco Triton 1.67SC 2.0 fl oz	21	0.5 a	4.8 a-d	0.0 a	0.0 a	0.0 a	4.8 ab	0.0 a	0.0 a
8. Banner MAXX 1.3MC 1 fl oz	21	2.5 a	1.0 a-c	0.0 a	0.0 a	0.0 a	0.8 a	10.0 b-d	10.0 b-d
9. Banner MAXX 1.3MC 2 fl oz	21	0.8 a	1.0 a-c	0.5 a	0.0 a	0.0 a	0.5 a	6.8 a-c	6.8 a-c
10. Spectro 90WDG 2 oz	14	1.0 a	0.5 ab	0.0 a	0.5 a	12.3 c-f	2.0 ab	0.0 a	0.0 a
11. Spectro 90WDG 4 oz	14	0.0 a	0.0 a	0.0 a	0.0 a	0.3 a	0.0 a	0.0 a	0.0 a
12. Endorse 2.5W 4 oz	14	111.3 k	56.8 n	39.8 f-h	53.3 d	178.8 k	120.5 j	3.8 ab	3.8 ab
13. Endorse 2.5W 6 oz	14	38.5 c-e	46.3 k-m	46.0 f-h	52.0 d	203.8 l	186.0 k	6.5 a-c	6.5 a-c
14. TD 2389-02 8 oz	14	42.8 de	37.5 h-j	35.5 ef	147.8 j	38.5 g	23.0 e-g	3.0 ab	3.0 ab
15. TD 2389-02 6 oz	14	47.8 e	36.0 hi	26.5 b-d	59.5 de	34.0 g	20.0 d-f	1.8 a	1.8 a
16. TD 2390-03 8 oz	14	32.3 bc	30.5 gh	28.5 c-e	88.3 i	49.5 h	14.8 cd	2.5 ab	2.5 ab
17. TD 2390-03 6 oz	14	31.8 bc	24.3 fg	19.8 b	81.3 hi	57.8 i	25.3 f-h	0.0 a	0.0 a
18. Eagle 40W 0.6 oz	14	3.5 a	2.8 a-c	0.0 a	0.3 a	0.0 a	0.0 a	1.3 a	1.3 a
19. Eagle 40W 1.2 oz	28	1.5 a	3.5 a-c	0.0 a	0.0 a	3.0 ab	0.0 a	10.0 b-d	10.0 b-d
20. Daconil Ultrex 82.5SDG 1.82 oz	14	4.3 a	0.8 ab	0.0 a	0.0 a	11.5 b-f	0.5 a	0.0 a	0.0 a
21. Bayleton 50W 0.5 oz	28	0.0 a	0.8 ab	0.0 a	0.5 a	7.3 a-e	0.5 a	4.5 ab	4.5 ab
22. Bayleton 50W 0.25 oz	14	5.5 a	3.0 a-c	0.0 a	1.3 a	0.0 a	0.0 a	6.8 a-c	6.8 a-c
23. Lynx 45W 0.278 oz	14	1.0 a	0.3 ab	0.0 a	0.0 a	2.0 a	0.0 a	0.0 a	0.0 a
24. Lynx 45W 0.556 oz	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
25. AMS-21616 200SC 0.239 fl oz	14	1.5 a	2.5 a-c	0.0 a	0.0 a	3.8 ab	0.8 a	0.0 a	0.0 a

Table 1 (continued).

Treatment and rate per 1000 sq ft	Spray Interval (days) ³	Number of Dollar Spot Lesion Centers per Plot ¹							Brown Patch ² (%) 20 Aug.
		29 June	11 July	23 July	7 Aug.	15 Aug.	25 Aug.	20 Aug.	
26. AMS-21616 200SC 0.358 fl oz	14	2.8 a	1.8 a-c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
27. AMS-21619 50W 0.1 oz	14	2.0 a	2.5 a-c	0.0 a	0.8 a	6.0 a-d	2.8 ab	1.3 a	1.3 a
28. AMS-21619 50W 0.2 oz	14	3.5 a	1.0 a-c	0.0 a	0.0 a	0.3 a	0.0 a	0.0 a	0.0 a
29. Lynx 45W 0.278 oz									
+Daconil Ultrex 82.5SDG 8.2 oz	14	0.5 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
30. BAS 505 03F 50WG 0.2 oz	14	0.8 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
31. BAS 505 03F 50WG 0.2 oz	28	0.5 a	3.0 a-c	1.5 a	0.0 a	5.3 a-d	0.0 a	0.5 a	0.5 a
32. BAS 505 03F 50WG 0.2 oz									
/ Daconil Ultrex 82.5SDG 3.2 oz ⁴	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
33. BAS 510 02F 70WG 0.13 oz	14	7.5 a	2.7 a-c	0.0 a	0.0 a	0.0 a	0.0 a	36.8 f	36.8 f
34. BAS 510 02F 70WG 0.18 oz	28	0.0 a	0.5 ab	0.5 a	0.3 a	18.5 f	0.0 a	40.0 f	40.0 f
35. Concorde SST 82.5DF 3.2 oz	14	0.8 a	0.0 a	0.0 a	0.0 a	7.5 a-e	2.3 ab	0.0 a	0.0 a
36. Cupri-Zin 22 4LC 1.0 fl oz	7	111.0 k	54.3 mn	46.8 h	62.8 ef	13.0 d-f	27.8 gh	39.0 f	39.0 f
37. Cupri-Zin 22 4LC 2.0 fl oz	7	70.5 hi	42.0 i-k	33.8 d-f	59.5 de	19.0 f	31.5 h	36.8 f	36.8 f
38. Eco-Dyne 3.5LC 0.5 fl oz	7	81.0 i	48.0 k-m	71.8 i	76.0 gh	15.3 ef	19.3 d-f	48.0 g	48.0 g
39. Eco-Dyne 3.5LC 1.0 fl oz	7	67.5 h	44.8 j-l	46.3 gh	44.3 c	8.5 a-e	16.3 c-e	43.5 fg	43.5 fg
40. Cupri-Zin 22 4LC 0.4 fl oz									
+ Eco-Dne 3.5LC 0.2 fl oz	7	100.0 j	46.8 k-m	39.0 fg	41.5 c	18.3 f	20.0 d-f	58.3 h	58.3 h
41. Cupri-Zin 22 4LC 0.8 fl oz									
+Eco-Dyne 3.5LC 0.4 fl oz	7	64.5 gh	38.3 ij	24.0 bc	26.3 b	8.8 a-e	24.5 f-h	15.0 de	15.0 de
42. Touche 50WDG 1 oz									
Daconil Weather Stik 6F 5 fl oz									
Pro Star 70W 1.5 oz									
+ Bayleton 50W 1 oz									
Daconil Weather Stik 6F 5 fl oz									
Compass 50WG 0.15 oz									
+ Banner MAXX 1.3MC 1 fl oz									
Chipco 26GT 2SC 3 fl oz	⁵	2.5 a	10.0 c-e	0.5 a	2.3 a	6.3 a-d	0.0 a	0.0 a	0.0 a

Table 1 (continued).

Treatment and rate per 1000 sq ft	Spray Interval (days) ³	Number of Dollar Spot Lesion Centers per Plot ¹							Brown Patch ² (%) 20 Aug.
		29 June	11 July	23 July	7 Aug.	15 Aug.	25 Aug.	20 Aug.	
43. Banner MAXX 1.3MC 1.5 fl oz + Chipco 26GT 2SC 3 fl oz Daconil Ultrex 82.5SDG 3.67 oz Spectro 90W 4 oz Banner MAXX 1.3MC 1.5 fl oz + Daconil Ultrex 82.5SDG 3.67 oz..... ⁶		3.2 a	2.8 a-c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
44. Untreated Check.....		77.8 i	30.3 gh	36.0 ef	68.5 fg	15.3 ef	25.0 f-h	55.0 h	
45. Daconil Ultrex 82.5SDG 3.2 oz	14	1.3 a	1.0 a-c	0.0 a	0.0 a	1.5 a	0.0 a	0.0 a	
46. Banner MAXX 1.3MC 0.5 fl oz + Bayleton 50W 0.25 fl oz.....	21	0.5 a	3.5 a-c	0.0 a	0.0 a	0.0 a	0.5 a	0.0 a	
47. Banner MAXX 1.3MC 0.5 fl oz + Chipco 26GT 2SC 1.5 fl oz	21	0.0 a	1.3 a-c	0.0 a	0.0 a	0.0 a	4.3 ab	0.0 a	
48. Banner MAXX 1.3MC 0.5 fl oz + Daconil Weather Stik 6F 2.0 fl oz.....	21	0.5 a	2.3 a-c	0.0 a	0.0 a	0.0 a	1.3 ab	2.3 ab	
49. Banner MAXX 1.3MC 0.5 fl oz + Vorlan 50EG 1 oz	21	0.5 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	13.0 c-e	
50. Banner MAXX 1.3MC 0.5 fl oz	21	4.8 a	13.3 de	0.2 a	0.5 a	0.0 a	3.0 ab	13.3 c-e	
51. Bayleton 50W 0.25 oz	21	8.8 a	14.5 e	2.3 a	0.0 a	1.8 a	9.3 bc	19.5 e	
52. Chipco 26GT 2SC 1.5 fl oz	21	1.8 a	8.0 a-e	0.5 a	0.3 a	8.0 a-e	64.3 i	6.5 a-c	
53. Daconil Weather Stik 6F 2 fl oz	21	5.5 a	22.3 f	1.0 a	1.0 a	8.3 a-e	65.8 i	17.8 e	
54. Vorlan 50EG 1oz	21	0.5 a	2.3 a-c	0.0 a	0.0 a	0.0 a	1.0 a	56.8 h	
55. Daconil Ultrex 82.5SDG 2.75 oz	14	3.5 a	0.5 ab	0.0 a	0.0 a	3.0 ab	0.8 a	0.0 a	
56. Heritage 50WG 0.2 oz	14	57.0 f	51.8 l-n	29.2 c-e	161.3 k	213.8 l	123.3 j	13.8 c-e	
	INT ⁷	DAT ⁸	DAT	DAT	DAT	DAT	DAT	DAT	DAT
	7	3	1	0	1	6	6	4	
	14	10	8	7	1	6	7	14	
	21	10	1	7	15	13	21	4	
	28	10	22	21	1	6	7	14	

Table 1 (continued).

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- 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 Percent turf area infested with brown patch.
- ³ Fungicides were applied on 19 June (7, 14, 21, and 28 day treatments, except treatments (trt) 1 to 4), 26 June (7 day treatment, except trt 1 to 4), 3 July (7 and 14 day treatments, trt 1 to 4 initiated), 10 July (7 and 21 day treatments), 17 July (7, 14, 28 day treatments and BAS 505 03F 50WG from trt 32), 24 July (7 day treatment), 31 July (7, 14, and 21 day treatments), 7 August (7 day treatment), 14 August (7, 14, and 28 day treatments), 21 August (7 and 21 day treatments), 28 August (7 and 14 day treatments), and 4 September (7 day treatment).
- ⁴ For trt 32, BAS 505 03F 50WG was applied on 19 June, 17 July, and 14 August, whereas Daconil Ultrex 82.5SDG was applied on 3 July, 31 July, and 28 August.
- ⁵ Trt 42 was applied on 19 June (Touche 50WDG), 10 July (Daconil Weather Stik 6F), 24 July (ProStar 70W + Bayleton 50W), 14 August (Daconil Weather Stik 6F), 28 August (Compass 50WG + Banner MAXX 1.3MC), and 28 September (Chipco 26GT 2SC).
- ⁶ Trt 43 was applied on 19 June (Banner MAXX 1.3MC + Chipco 26GT 2SC), 10 July (Daconil Ultrex 82.5 SDG), 24 July (Spectro 90W), and 7 August (Banner MAXX 1.3MC + Daconil Ultrex 82.5SDG).
- ⁷ Spray interval in days.
- ⁸ Days after treatment (DAT) for each spray interval.