

2000 RUTGERS Turfgrass Proceedings



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This publication includes lecture notes of papers presented at the 2000 New Jersey Turfgrass Expo. Publication of these lectures pro-

vides 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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EVALUATION OF FUNGICIDES FOR THE CONTROL OF DOLLAR SPOT IN CREEPING BENTGRASS

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Fungicides were evaluated in 2000 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 palustris* 'Crenshaw') maintained under golf course greens conditions. 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 7 April (0.63 lb nitrogen (N)/1000 ft²), 18-4-10 on 18 May (1.0 lb N/1000 ft²), and 16-4-8 on 11 June (0.51 lb N/1000 ft²). Localized dry spots were controlled with Primer wetting agent (4.0 fl oz/1000 ft²) on 20 June. Betasan 4E (6.8 fl oz/1000 ft²) was applied for preemergence weed control on 28 April. On 24 April, turf was aerified with 0.5 inch hollow tines on 4 inch centers. Daconil Ultrex 82.5 WDG (3.8 oz/1000 ft²) was applied to the entire test area on 20 May to suppress dollar spot and brown patch prior to the current study. Insect pests were controlled with Turcam 76W (1 oz/1000 ft²) on 22 June. 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 8003E nozzles. Treatments (trt) were initiated on 2 June when environmental conditions were conducive to dollar spot development. Fungicides were re-

applied at the appropriate intervals as indicated in Table 1. Turf was visually evaluated for number of dollar spot infection centers per plot on 3 July (data not shown), 12 July (data not shown), 21 July, 2 August (data not shown), 12 August, 22 August (data not shown), 1 September, 11 September, 20 September, and 2 October (data not shown). Turf quality was assessed on 1 September using a 1 to 9 scale, where 9 = best quality. Percent turf area infested with algae (*Oscillatoria* spp.) was assessed on 2 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 early July, but did not become evenly distributed throughout the test until late August. Disease pressure was low to moderate throughout the study, with disease activity peaking in late September. All treatments provided acceptable control of dollar spot through 1 September except: Fore Rainshield 80W (trt 8, 9), Fore 80W (trt 10), Pentathlon 75DF (trt 15, 16), Heritage 50WG (trt 64, 70), Compass 50WG (trt 32, 71 to 73), S7511 G at the 32 oz rate (trt 41), AND 713-00 G (trt 56), RU041523A at the 0.24 fl oz rate + Genapol 26-L-50 at the 35 day spray interval (trt 59), the curative applications of RU041523A + Genapol 26-L-50 (trt 65, 66, 68), and Heritage 50WG (trt 64, 70). Good residual control (42 to 56 days post-treatment) was observed on 20 September for plots treated with Daconil Ultrex 82.5SDG (trt 5), Bayleton 50W (trt 11), Lynx 45W + Daconil Ultrex 82.5SDG (trt 14), Concorde SST 82.5DF

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(trt 18), Banner Maxx 1.3 MC (trt 24, 33), RU141522A at the 14 day interval (trt 25), BAS 505 03F 50WG (trt 35), the high rate of S7511 G (trt 43), S3026 G (trt 45, 46), S7221 W (trt 48, 49), the high rate of S9427 W (trt 52), AND 711-00 G (trt 54), AND 712-00 G (trt 55), AND 714-00 G (trt 57), and AND 715-00 G (trt 58).

The highest percentage of algae (which was generally associated with thinned turf) was ob-

served on plots treated with Banner Maxx 1.3 MC (trt 24, 34), Compass 50WG + Banner Maxx 1.3MC (trt 27), F-155 20W (trt 30, 31), TM-41702 40W (trt 39), S3026 G (trt 44), AND 711-00 G (trt 54), AND 712-00 G (trt 55), AND 714-00 G (trt 57), and AND715-00 G (trt 58). At the end of the study, turf quality was found to be closely associated with the prior incidence of dollar spot. No phytotoxicity was observed.

Table 1. Impact of fungicides on the incidence of dollar spot in creeping bentgrass in North Brunswick, NJ: 2000.

Treatment and rate/1000 sq ft	Spray interval (days) ⁴	Number of dollar spot lesion centers per plot ¹					Algae (%) ²	Turf Quality ³
		21 July	12 Aug.	1 Sept.	11 Sept.	20 Sept.		
1. Daconil Ultrex 82.5SDG 1.8 oz	7	0.3 a	0.0 a	0.0 a	14.3 a-m	28.5 c-m	0.0 a	6.8 b-f
2. Daconil Ultrex 82.5SDG 1.8 oz	14	0.0 a	0.3 a	1.5 ab	20.3 c-n	45.0 j-s	0.0 a	6.0 d-i
3. Daconil Ultrex 82.5SDG 2.8 oz	14	0.0 a	0.0 a	0.5 ab	11.3 a-m	37.5 f-q	0.0 a	6.5 b-g
4. Daconil Ultrex 82.5SDG 3.2 oz	14	0.0 a	0.0 a	0.0 a	13.8 a-m	37.3 f-q	0.0 a	6.5 b-g
5. Daconil Ultrex 82.5SDG 5.0 oz	14	0.0 a	0.0 a	0.0 a	3.3 a-d	18.5 a-i	0.0 a	6.5 b-g
6. Eagle 40W 0.6 oz	14	0.0 a	0.0 a	1.8 ab	13.0 a-m	30.8 e-n	6.8 h-p	6.8 b-f
7. Eagle 40W 1.2 oz	28	0.0 a	0.0 a	3.8 ab	21.8 f-o	30.8 e-n	4.3 b-l	6.0 d-i
8. Fore Rainshield 80W 6.0 oz	14	2.5 a-c	15.5 cd	78.3 k	97.8 y	147.5 z ₄	0.0 a	4.5 jk
9. Fore Rainshield 80W 8.0 oz	14	1.0 ab	8.5 a-d	62.8 j	100.5 y	146.3 z ₄	0.0 a	4.3 k
10. Fore 80W 8.0 oz	14	0.8 ab	10.8 a-d	42.8 i	59.8 t-v	86.0 x-z ₁	0.0 a	4.5 jk
11. Bayleton 50W 1.0 oz	14	0.0 a	0.0 a	0.0 a	0.8 a	3.5 a	2.3 a-f	7.3 a-d
12. Lynx 45W 0.28 oz	14	0.0 a	0.0 a	6.0 ab	33.8 n-q	70.8 u-x	3.5 a-j	5.3 g-k
13. Lynx 45W 0.56 oz	14	0.0 a	0.0 a	0.5 ab	11.8 a-m	34.8 f-o	3.0 a-i	6.8 b-f
14. Lynx 45W 0.28 oz + Daconil Ultrex 82.5SDG 1.8 oz	14	0.0 a	0.0 a	0.0 a	7.8 a-j	23.5 a-j	0.0 a	7.0 a-e
15. Pentathlon 75DF 3.0 oz	7	5.5 c	16.8 d	92.5 l	137.5 z ₂	138.8 z ₃ z ₄	0.0 a	5.0 h-k
16. Pentathlon 75DF 4.0 oz	7	0.8 ab	2.3 a-c	43.3 i	61.5 u-w	90.0 x-z ₁	0.0 a	5.3 g-k
17. Concorde SST 82.5DF 1.8 oz	7	0.0 a	0.0 a	0.0 a	10.0 a-l	40.5 i-r	0.0 a	6.0 d-i
18. Concorde SST 82.5DF 3.2 oz	7	0.0 a	0.0 a	0.0 a	4.8 a-f	19.3 a-i	0.0 a	6.5 b-g
19. Chipco Triton 1.7SC 0.5 fl oz	14	0.3 a	0.5 a	11.3 a-d	33.3 n-q	56.5 o-w	4.5 b-l	5.0 h-k
20. Chipco Triton 1.7SC 1.0 fl oz	14	0.0 a	0.0 a	6.5 ab	29.0 m-q	58.3 p-w	3.5 a-j	5.5 f-k
21. TADS 12529 70W 0.15 oz	14	0.0 a	0.0 a	6.3 ab	27.0 k-q	45.0 j-s	2.3 a-f	5.8 e-j
22. TADS 12529 70W 0.3 oz	14	0.0 a	0.0 a	10.0 a-c	24.0 i-o	69.3 t-x	6.0 e-p	5.3 g-k
23. Rubigan 1SC 2.0 fl oz	14	0.0 a	0.0 a	4.0 ab	22.0 f-o	47.0 k-t	6.0 e-p	5.8 e-j
24. Banner MAXX 1.3MC 2.0 fl oz	14	0.0 a	0.0 a	0.0 a	2.0 ab	8.5 a-e	7.8 k-p	8.0 a
25. RU141522A 2.0 fl oz	14	0.0 a	0.0 a	0.0 a	7.0 a-i	19.0 a-i	2.8 a-h	7.5 a-c

Table 1 (continued).

Treatment and rate/1000 sq ft	Spray interval (days) ⁴	Number of dollar spot lesion centers per plot ¹					Algae (%) ²	Turf Quality ³
		21 July	12 Aug.	1 Sept.	11 Sept.	20 Sept.		
26. RU141522A 2.0 fl oz	21	0.0 a	0.0 a	4.5 ab	27.3 k-q	53.5 n-v	4.0 a-k	6.3 c-h
27. Compass 50WG 0.15 oz + Banner MAXX 1.3 MC 1.0 fl oz	14	0.0 a	0.0 a	1.0 ab	9.5 a-k	30.3 d-n	8.3 l-p	6.8 b-f
28. Compass 50WG 0.15 oz + Banner MAXX 1.3 MC 1.0 fl oz	21	0.0 a	0.0 a	2.3 ab	12.8 a-m	36.0 f-p	2.0 a-e	6.5 b-g
29. F155 20W 0.4 oz	21	0.3 a	0.3 a	6.2 ab	29.0 m-q	50.3 m-u	2.8 a-h	5.8 e-j
30. F155 20W 0.8 oz	21	0.3 a	0.3 a	3.0 ab	26.3 k-p	48.3 l-u	7.0 i-p	6.0 d-i
31. F155 20W 1.2 oz	21	0.0 a	0.0 a	2.0 ab	14.5 a-m	40.8 i-r	7.0 i-p	6.3 c-h
32. Compass 50WG 0.15 oz	14	0.5 ab	2.0 a-c	20.5 c-g	58.8 s-v	86.3 x-z ¹	3.8 a-k	5.3 g-k
33. Banner MAXX 1.3MC 1.0 fl oz	14	0.0 a	0.0 a	0.0 a	6.5 a-i	15.3 a-g	5.8 d-p	6.5 b-g
34. Banner MAXX 1.3MC 1.0 fl oz	21	0.8 ab	0.0 a	4.8 ab	27.3 k-q	63.8 s-w	9.3 op	5.8 e-j
35. BAS 505 03F 50WG 0.2 oz	14	0.0 a	0.0 a	0.0 a	2.5 a-c	5.5 ab	2.8 a-h	6.8 b-f
36. BAS 505 03F 50WG 0.2 oz	28	0.0 a	0.0 a	8.0 ab	43.3 p-s	57.8 o-w	4.3 b-l	6.0 d-i
37. TM-41702 40W 0.1 oz	14	0.0 a	0.0 a	2.3 ab	20.8 d-o	39.8 h-r	3.3 a-i	5.8 e-j
38. TM-41702 40W 0.25 oz	14	0.0 a	0.0 a	2.3 ab	21.3 e-o	38.3 g-q	3.3 a-i	6.0 d-i
39. TM-41702 40W 0.5 oz	14	0.0 a	0.0 a	1.3 ab	19.3 b-n	36.8 f-g	8.8 m-p	5.8 e-j
40. TM-41702 40W 0.7 oz	14	0.0 a	0.0 a	0.5 ab	12.3 a-m	37.5 f-q	5.5 c-o	5.8 e-j
41. S7511 G 32.0 oz	14 ⁵	1.0 ab	2.8 a-c	13.0 b-f	27.8 l-q	60.0 q-w	5.0 b-n	5.8 e-j
42. S7511 G 64.1 oz	14 ⁵	1.0 ab	2.0 a-c	5.3 ab	18.3 a-n	26.5 b-l	6.0 e-p	6.0 d-i
43. S7511 G 128.2 oz	14 ⁵	0.0 a	0.0 a	1.3 ab	3.8 a-b	7.5 a-d	4.5 b-l	7.0 a-e
44. S3026 G 21.1 oz	14 ⁵	0.5 ab	2.5 a-c	10.8 a-d	24.5 j-o	43.0 j-s	7.5 j-p	6.0 d-i
45. S3026 G 42.3 oz	14 ⁵	0.0 a	0.0 a	3.8 ab	13.8 a-m	25.5 a-l	3.0 a-i	6.0 d-i
46. S3026 G 84.7 oz	14 ⁵	0.0 a	0.0 a	0.5 ab	6.0 a-h	10.5 a-e	4.8 b-m	7.3 a-d
47. S7221 W 0.31 oz	14	0.5 ab	1.0 a	4.0 ab	23.3 h-o	39.8 h-r	5.5 c-o	6.3 c-h
48. S7221 W 0.62 oz	14	0.0 a	0.0 a	0.5 ab	7.8 a-j	16.8 a-h	2.5 a-g	7.3 a-d
49. S7221 W 1.25 oz	14	0.0 a	0.0 a	0.0 a	3.8 a-e	6.5 a-c	6.5 g-p	7.8 ab
50. S9427 W 0.25 oz	14	0.3 a	0.0 a	4.8 ab	21.3 e-o	40.5 i-r	5.8 d-p	5.8 e-j

Table 1 (continued).

Treatment and rate/1000 sq ft	Spray interval (days) ⁴	Number of dollar spot lesion centers per plot ¹						Algae (%) ²	Turf Quality ³
		21 July	12 Aug.	1 Sept.	11 Sept.	20 Sept.	2 Aug.		
51. S9427 W 0.5 oz	14	0.0 a	0.0 a	1.0 ab	18.0 a-n	27.5 b-m	5.0 b-n	5.8 e-j	
52. S9427 W 1.0 oz	14	0.0 a	0.0 a	0.0 a	1.0 a	6.8 a-c	6.3 f-p	6.8 b-f	
53. AND 710-00 G 32.0 oz	14 ⁵	0.3 a	1.3 ab	10.0 a-c	35.3 n-q	46.3 j-s	3.8 a-k	5.5 f-k	
54. AND 711-00 G 64.1 oz	14 ⁵	0.0 a	0.3 a	1.5 ab	13.3 a-m	17.0 a-h	9.8 p	6.5 b-g	
55. AND 712-00 G 128.2 oz	14 ⁵	0.0 a	0.0 a	0.5 ab	5.0 a-f	9.0 a-e	9.8 p	7.5 a-c	
56. AND 713-00 G 21.1 oz	14 ⁵	1.8 ab	4.8 a-d	23.0 e-g	38.3 o-r	52.8 n-v	4.0 a-k	5.5 f-k	
57. AND 714-00 G 42.3 oz	14 ⁵	0.3 a	1.0 a	2.5 ab	17.5 a-n	24.5 a-k	9.0 n-p	6.3 c-h	
58. AND 715-00 G 84.7 oz	14 ⁵	0.0 a	0.0 a	0.0 a	5.5 a-g	14.5 a-f	7.5 j-p	6.5 b-g	
59. RU041523A 0.24 fl oz									
+ Genapol 26-L-50 0.1% v/v	35	0.5 ab	3.8 a-d	13.0 b-f	38.0 o-r	62.5 r-w	3.8 a-k	5.3 g-k	
60. RU041523A 0.47 fl oz									
+ Genapol 26-L-50 0.1% v/v	35	0.0 a	2.3 a-c	11.8 a-e	28.8 m-q	52.8 n-v	1.3 ab	5.3 g-k	
61. RU041523A 0.94 fl oz									
+ Genapol 26-L-50 0.1% v/v	35	0.3 a	0.8 a	4.8 ab	33.0 n-q	57.3 o-w	3.0 a-i	6.0 d-i	
62. RU041523A 1.89 fl oz									
+ Genapol 26-L-50 0.1% v/v	35	0.0 a	0.8 a	4.5 ab	23.8 h-o	40.3 i-r	1.3 ab	6.3 c-h	
63. RU041523A 2.8 fl oz									
+ Genapol 26-L-50 0.1% v/v	35	0.3 a	2.0 a-c	7.5 ab	34.0 n-q	52.8 n-v	2.5 a-g	6.0 d-i	
64. Heritage 50WG 0.4 oz									
65. RU041523A 0.24 fl oz	35	1.3 ab	5.5 a-d	28.0 gh	43.3 p-s	106.2 z ₁ z ₂	1.3 ab	4.8 i-k	
66. RU041523A 0.47 fl oz	35 ⁶	3.5 a-c	13.8 a-d	22.0 d-g	64.5 u-w	86.8 x-z ₁	4.0 a-k	5.8 e-j	
67. RU041523A 0.94 fl oz	35 ⁶	9.3 d	40.5 e	67.3 j	69.5 vw	73.0 v-y	3.3 a-i	4.3 k	
68. RU041523A 1.89 fl oz	35 ⁶	1.5 ab	8.0 a-d	6.8 ab	20.0 c-n	41.5 i-s	1.5 a-c	5.8 e-j	
+ Genapol 26-L-50 0.1% v/v	35 ⁶	13.5 e	0.5 a	24.0 f-h	56.8 s-v	118.8 z ₂ z ₃	6.3 f-p	3.3 g-k	

Table 1 (continued).

Treatment and rate/1000 sq ft	Spray interval (days) ⁴	Number of dollar spot lesion centers per plot ¹					Algae (%) ²	Turf Quality ³
		21 July	12 Aug.	1 Sept.	11 Sept.	20 Sept.		
69. RU041523A 2.8 fl oz + Genapol 26-L-50 0.1% v/v	35 ⁶	4.3 bc	10.3 a-d	5.8 ab	14.0 a-m	31.0 e-n	1.5 a-c	6.0 d-i
70. Heritage 50WG 0.4 oz	35 ⁶	3.5 a-c	15.0 b-d	44.8 i	119.5 z1	138.8 z ₃ z ₄	3.0 a-i	4.5 jk
71. Compass 50WG 0.25 oz	35 ⁶	3.0 a-c	14.5 a-d	40.0 i	44.3 qr	74.3 v-y	3.5 a-j	5.0 h-k
72. Compass 50WG 0.25 oz	35	2.8 a-c	13.8 a-d	66.0 j	86.3 xy	121.3 z ₂ z ₃	2.8 a-h	4.5 jk
73. Compass 50WG 0.15 oz	21	0.0 a	0.3 a	34.0 hi	52.3 r-u	76.0 w-y	1.8 a-d	5.5 f-k
74. Untreated Check		12.8 e	16.8 d	62.0 j	75.5 wx	95.0 yz ₁	3.3 a-i	5.3 g-k

INT ⁷	DAT ⁸	DAT	DAT	DAT	DAT	DAT	DAT
7	2	3	23	33	42	7	23
14	9	3	23	33	42	7	23
21	9	10	30	40	49	21	30
28	23	17	37	47	56	7	37
35	16	3	23	33	42	28	23

¹Values 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).

²Turf area infested per plot with algae.

³Turf quality on a scale of 1 to 9, where 9 = best turf quality. Values above 6.0 represent acceptable turf quality.

⁴Fungicides were applied 31 May (all treatments), 7 June (7 day treatment), 14 June (7 and 14 day treatments), 21 June (7 and 21 day treatments), 28 June (7, 14, and 28 day treatments), 5 July (7 and 35 day treatments), 12 July (7, 14, and 21 day treatments), 19 July (7 day treatment), 26 July (7, 14, and 28 day treatments), 2 August (7 and 21 day treatments), and 9 August (7, 14, and 35 day treatments).

⁵Treatments 41 to 46 and 53 to 58 were irrigated with 1 gal water per plot immediately following application.

Table 1 (continued).

⁶Treatments 65 to 71 were applied on a curative basis (when the mean number of lesion centers per plot exceeded 10) on 7 July (trt 66), 28 July (trt 68), 11 August (trt 66), 16 August (trt 65, 69, 70, and 71), and 21 August (trt 67).

⁷Spray interval in days.

⁸Days after treatment (DAT) for each spray interval.