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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 University 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. Articles appearing in these proceedings are divided into two sections.

The first section includes lecture notes of papers presented at the 1999 New Jersey Turfgrass Expo. Publication of the New Jersey Turfgrass Expo Notes provides a readily available

source of information covering a wide range of topics. The Expo Notes include technical and popular presentations of importance to the turfgrass industry.

The second section includes research papers containing original research findings and reviews covering selected subjects in turfgrass science. The primary objective of this section is to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

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Dr. Ann B. Gould, Editor
Dr. Bruce B. Clarke, Coordinator

EVALUATION OF FUNGICIDES FOR THE CONTROL OF DOLLAR SPOT ON CREEPING BENTGRASS

J. N. DiMarco, P. R. Majumdar, G. W. Towers, E. N. Weibel,
M. Peacos, and B. B. Clarke¹

Fungicides were evaluated in 1999 for their ability to control dollar spot (caused by *Sclerotinia homoeocarpa*) at the Rutgers Turf Research Farm in North Brunswick, New Jersey on creeping bentgrass (*Agrostis palustris* 'Crenshaw') maintained under golf course greens conditions. Turf was established in September 1996 on a Norton loam with a pH of 6.5. Mowing was performed three times weekly at a height of 0.152 inches with clippings collected. The site was irrigated as needed to prevent drought stress.

Pelletized lime (20 lb/1000 ft²) was applied on 14 April. Fertilizer was applied as 16-4-8 on 2 April (1.1 lb N/1000 ft²), 18-4-10 on 13 May (0.7 lb N/1000 ft²), 16-4-8 on 15 June (0.46 lb N/1000 ft²), and 16-4-8 on 10 August (0.75 lb N/1000 ft²). Localized dry spots were controlled with Aqueduct wetting agent (6.0 fl oz/1000 ft²) on 28 May. Betasan 4E (7 fl oz/1000 ft²) was applied for preemergence weed control on 14 April. On 22 April, turf was aerified with 0.375 inch hollow tines on 4 inch centers. The field was topdressed with 0.125 inches of sand on 26 April. Chipco 26GT 2SC (3 fl oz/1000 ft²) was applied to the entire study on 27 May and 15 June to suppress dollar spot and brown patch. Insect pests were controlled with Turcam 76W (1 oz/1000 ft²) on 7 June, Dursban Pro 2E (1.5 oz/1000 ft²) on 10 August, and Turcam 1.5G (3 lb/1000 ft²) on 14 September. Plots were 3 ft x 9 ft and were arranged in a randomized complete block with four replications.

Fungicides were applied in water equivalent to 1.9 gal/1000 ft² with a CO₂ powered sprayer

at 30 psi using TeeJet 8003E nozzles. Treatments (trt) were initiated on 18 June when environmental conditions were conducive to dollar spot 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 9 July, 19 July, 29 July (data not shown), 10 August, 20 August, 30 August (data not shown), 10 September, 22 September (data not shown), and 5 October. 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 May, but did not become evenly distributed throughout the test until 1 July. Disease pressure was moderate to severe throughout the study, with disease activity peaking in mid-August and early September. All treatments provided acceptable control of dollar spot through 10 September except the low rate of Daconil Ultrex 82.5 WDG (trt 14), Cleary 3336 4.5F (trt 20), WAC 74 (trt 21), WAC 79 (trt 23), Prograss 1.5E (trt 32,33), Prograss 1.5E + Sprint + Urea 38-0-0 (trt 34), UBI 4087 75WG (trt 36, 37), and the low rate of TM - 41702 40W (trt 42). Good to excellent residual control (36 to 53 days post-treatment) was observed on 5 October for plots treated with DAS 0076 50W (trt 1), DAS 0076 250SC (trt 2, 3), DAS 0076 250E (trt 4), Lynx 45W (trt 5, 6), Lynx 45W + Daconil Ultrex 82.5WDG (trt 7), Bayleton 50DF (trt 9) and 50W (trt 10), Bayleton 50W + Daconil Ultrex 82.5WDG (trt 12), Daconil WeatherStik 6F (trt 16), Chipco Triton 1.67SC (trt 17, 18), Eagle 40W (trt 25 to 27), Banner

¹ Graduate Research Assistant, Senior Laboratory Technician, Graduate Research Assistant, Graduate Research Assistant, Senior Greenhouse and Field Technician, and Extension Specialist in Turfgrass Pathology, respectively. New Jersey Agricultural Experiment Station, Cook College, Rutgers, The State University of New Jersey, New Brunswick, NJ 08901-8520.

Maxx 1.3 MC (trt 28), F-155 20W (trt 29 to 31), and TM - 41702 (trt 39 to 41). The high rate of Daconil Ultrex 82.5WDG (trt 15), Spectro 90WDG (trt 19), GX-611 720F (trt 35), and Chipco 26GT 2SC (trt 38) also performed well throughout most of the study. The addition of Heritage 50WG to either Lynx 45W (trt 8), Bayleton 50W (trt 11), or Daconil Ultrex 82.5WDG (trt 13) did not enhance the incidence of dollar spot. It is also interesting to note that the combination of WAC 74 and Cleary 3336 4F (trt 22) provided excellent season-long disease

control, whereas the component products alone (trt 21 and 20, respectively) actually enhanced the incidence of dollar spot from 30 August (data not shown) to 5 October, compared to the untreated check (trt 43). Treatments 32 to 34 induced severe foliar necrosis from 19 July to 10 August, making disease evaluations difficult. No other phytotoxicity was observed. At the end of the study, turf quality was closely associated with the prior incidence of dollar spot (9 July to 10 September).

Table 1. Impact of fungicides on the incidence of dollar spot on creeping bentgrass in North Brunswick, NJ: 1999.

Treatment and rate/1000 sq ft	Spray interval (days) ³	Number of dollar spot lesion centers ¹						Turf Quality ²
		9 July	19 July	10 Aug.	20 Aug.	10 Sept.	5 Oct.	22 Sept.
1. DAS 0076 50W 0.1 oz.....	14	1.5 a	0.8 a	0.0 a	0.0 a	0.0 a	3.0 ab	8.0 ab
2. DAS 0076 250SC 0.19 fl oz	14	0.5 a	0.2 a	0.0 a	0.0 a	0.0 a	4.0 ab	7.5 a-d
3. DAS 0076 250SC 0.38 fl oz	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	1.0 a	7.8 a-c
4. DAS 0076 250E 0.19 fl oz	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	2.2 ab	7.5 a-d
5. Lynx 45W 0.28 oz.....	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	3.8 ab	7.3 a-e
6. Lynx 45W 0.56 oz.....	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	1.0 a	8.8 a
7. Lynx 45W 0.28 oz + Daconil Ultrex 82.5SDG 1.9 oz	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	1.2 a	8.3 ab
8. Lynx 45W 0.28 oz + Heritage 50WG 0.2 oz	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	3.8 ab	7.5 a-d
9. Bayleton 50DF 0.25oz.....	14	0.5 a	0.8 a	0.0 a	0.0 a	0.0 a	0.5 a	7.5 a-d
10. Bayleton 50W 0.5 oz	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	8.3 ab
11. Bayleton 50W 0.25 oz + Heritage 50WG 0.2 oz	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.5 a	7.8 a-c
12. Bayleton 50W 0.25 oz + Daconil Ultrex 82.5SDG 1.9 oz	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.2 a	7.3 a-e
13. Heritage 50WG 0.1 oz + Daconil Ultrex 82.5SDG 3.8 oz	14	0.5 a	0.8 a	0.2 a	0.0 a	3.5 a	47.5 g	6.3 c-e
14. Daconil Ultrex 82.5SDG 1.9 oz	14	20.5 d	48.2 d	29.5 b	5.8 a	8.2 a	46.8 g	4.3 gh
15. Daconil Ultrex 82.5SDG 3.8 oz	14	4.8 ab	2.0 a	0.0 a	0.0 a	0.0 a	24.2 ef	6.0 d-f
16. Daconil WeatherStik 6F 4.18 fl oz	14	0.2 a	0.0 a	0.0 a	0.0 a	0.0 a	4.5 ab	7.0 b-e
17. Chipco Triton 1.67SC 0.5 fl oz	14	2.5 a	2.8 ab	0.0 a	0.0 a	0.0 a	3.2 ab	6.8 b-e
18. Chipco Triton 1.67SC 1.0 fl oz	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.8 a	8.3 ab
19. Spectro 90WDG 4.0 oz	14	0.8 a	4.0 ab	0.0 a	0.0 a	0.0 a	18.2 c-f	5.8 ef
20. Cleary 3336 4.5F 4.0 fl oz	14	25.8 d-f	63.8 e	88.0 c	54.2 d	182.0 f	200.0 j	1.3 k

(continued)

Table 1 (continued).

Treatment and rate/1000 sq ft	Spray interval (days) ³	Number of dollar spot lesion centers ¹						Turf Quality ²
		9 July	19 July	10 Aug.	20 Aug.	10 Sept.	5 Oct.	22 Sept.
21. WAC 74 2.0 oz	14	44.5 h	75.2 e	135.8 d	61.5 d	174.8 f	94.0 i	1.8 jk
22. WAC 74 2.0 oz + Cleary 3336 4.5F 4.0 fl oz	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	1.5 a	7.3 a-e
23. WAC 79 5.0 fl oz	14	44.5 h	118.8 h	173.5 f	166.5 g	200.0 g	196.2 j	1.3 k
24. WAC 79 5.0 fl oz + Daconil Ultrex 82.5SDG 3.8 oz	14	3.2 a	2.5 ab	0.2 a	0.0 a	0.0 a	20.2 d-f	6.0 d-f
25. Eagle 40W 0.5 oz	14	1.5 a	0.5 a	0.0 a	0.0 a	0.0 a	0.8 a	7.3 a-e
26. Eagle 40W 0.6 oz	14	0.5 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	7.8 a-c
27. Eagle 40W 1.0 oz	28	0.8 a	3.8 ab	0.0 a	0.0 a	1.8 a	3.0 ab	5.8 ef
28. Banner Maxx 1.3MC 1.0 fl oz	14	0.0 a	0.0 a	0.2 a	0.0 a	0.0 a	0.0 a	7.8 a-c
29. F-155 20W 0.4 oz	14	0.5 a	0.2 a	0.0 a	0.0 a	0.0 a	2.5 ab	7.5 a-d
30. F-155 20W 0.8 oz	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.5 a	7.8 a-c
31. F-155 20W 1.2 oz	14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	7.5 a-d
32. Prograss 1.5E 1.5 oz	21 ⁴	29.0 f	109.0 gh	145.8 e	22.2 bc	57.0 c	7.8 a-c	3.8 g-i
33. Prograss 1.5E 3.0 oz	21 ⁴	22.8 de	92.2 f	189.8 g	5.5 a	38.0 b	8.8 a-d	1.3 k
34. Prograss 1.5E 1.5 oz + Sprint 330 10W 3.0 oz + Urea (38-0-0) 1.6 oz	21 ⁴	8.8 bc	34.0 c	27.5 b	27.2 c	146.5 e	74.5 h	1.8 jk
35. GX - 611 720F 4.18 fl oz	14	0.5 a	1.0 a	0.5 a	18.0 b	0.8 a	29.0 f	6.3 c-e
36. UBI 4087 75WG 3.0 oz	28 ⁵	37.0 g	91.2 f	195.0 gh	132.0 f	117.0 d	14.5 c-e	3.0 h-j
37. UBI 4087 75WG 3.0 oz	28 ⁵	28.0 ef	97.8 fg	186.2 g	102.0 e	126.0 d	9.5 b-d	2.3 jk
38. Chipco 26GT 2SC 2.0 fl oz	14	12.2 c	16.8 b	2.8 a	0.8 a	8.8 a	91.0 i	4.8 fg
39. TM - 41702 40W 0.46 oz	14	1.0 a	0.5 a	0.5 a	0.0 a	0.0 a	2.8 ab	6.0 d-f
40. TM - 41702 40W 0.69 oz	14	0.5 a	0.0 a	0.0 a	0.0 a	0.0 a	3.5 ab	6.8 b-e
41. TM - 41702 40W 0.92 oz	14	0.5 a	0.0 a	0.0 a	0.0 a	0.5 a	2.2 ab	6.3 c-e
42. TM - 41702 40W 0.69 oz	21	2.5 a	2.8 ab	0.5 a	0.0 a	54.2 c	97.8 i	2.7 ij

(continued)

Table 1 (continued).

Treatment and rate/1000 sq ft	Spray interval (days) ³	Number of dollar spot lesion centers ¹						Turf Quality ²
		9 July	19 July	10 Aug.	20 Aug.	10 Sept.	5 Oct.	22 Sept.
43. Untreated Check.	—	58.8 i	131.8 i	200.0 h	137.0 f	48.5 c	29.5 f	3.8 g-i
	INT ⁶	DAT ⁷	DAT	DAT	DAT	DAT	DAT	DAT
	14	7	3	11	7	11	36	23
	21	21	10	11	21	21	46	33
	28	21	3	25	7	28	53	40

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.

³ Fungicides were applied 18 June (all treatments), 2 July (14 day treatment), 9 July (21 day treatment), 16 July (14 and 28 day treatments), 30 July (14 and 21 day treatments), 13 August (14 and 28 day treatments), 20 August (21 day treatment), and 30 August (14 day).

⁴ Treatments 32 to 34 were applied 18 June, 9 July, and 30 July only.

⁵ Treatments 36 and 37 were applied on 18 June and 16 July only; treatment 36 was irrigated with 2 gal water/plot immediately following application, whereas treatment 37 was not irrigated after application.

⁶ Spray interval in days.

⁷ Days after treatment (DAT) for each spray interval.