

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

## EVALUATION OF CHEMICAL AND BIOLOGICAL FUNGICIDES FOR THE CONTROL OF BENTGRASS DEAD SPOT IN CREEPING BENTGRASS

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Fungicides were evaluated for their ability in 2000 to control bentgrass dead spot (caused by *Ophiosphaerella agrostis*) at the Charleston Springs Golf Course in Millstone, NJ on creeping bentgrass (*Agrostis palustris* 'L-93') maintained under golf course greens conditions. Turf was established 15 May 1998 on a sand green with a pH of 5.7. Mowing was performed daily at a height of 0.14 inch, clippings were collected, and the site was irrigated to prevent drought stress. The site was aerated with 0.25 inch hollow quad-tines on 4 April and topdressed at a rate of 0.2 cu yd/1000 ft<sup>2</sup> on 4 April, 28 April, and 28 August.

Granular fertilizer was applied as Sustain 5-2-4 + Fe on 3 January (0.33 lb nitrogen (N)/1000 ft<sup>2</sup>), as Scotts 20-0-10 + Mn on 4 April (0.29 lb N/1000 ft<sup>2</sup>), and as Sustain 5-2-4 + Fe on 23 June (0.28 lb N/1000 ft<sup>2</sup>). Liquid fertilizer was applied through the irrigation system as 13-0-37 on a weekly basis from 8 May to 9 September (0.025 lb N/1000 ft<sup>2</sup>) and as Plant Food 20-0-0 every week from 20 April to 9 September (0.082 lb N/1000 ft<sup>2</sup>). ProStar 70W was applied to the entire test on 16 June (1.5 oz/1000 ft<sup>2</sup>) and Bayleton 50W was applied 1 July (0.5 oz/1000 ft<sup>2</sup>) to prevent brown patch. Insect pests were suppressed with Merit (0.15 oz/1000 ft<sup>2</sup>) on 25 May and with Delta-Gard (0.4 oz/1000 ft<sup>2</sup>) on 20 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 2 gal per 1000 ft<sup>2</sup> with a CO<sub>2</sub> powered sprayer at 30 psi using TeeJet 8003VS flat fan nozzles.

Treatments (trt) were initiated on 10 July. Fungicides were reapplied at the appropriate intervals as indicated in Table 1. Percent turf area exhibiting symptoms of bentgrass dead spot was assessed on 28 July, 7 August, 21 August, 5 September, and 13 September. Turf quality was evaluated on 7 August using a 1 to 9 scale, where 9 = best turf quality. The percent turf area infested with algae (*Oscillatoria* spp.) was recorded on 13 September. Data were subjected to analysis of variance and means separation by Waller-Duncan *k*-ratio *t*-test (*k* = 100).

Bentgrass dead spot developed naturally and was first observed 26 July. Disease pressure was severe by September and disease activity peaked on 13 September. Banner MAXX 1.3MC (trt 1, 2), Banner MAXX 1.3MC + Daconil Ultrex 82.5SDG (trt 3), Fore Rainshield 80W (trt 5), AMS 21618 250SC (trt 6), Daconil Ultrex 82.5SDG (trt 8 to 10), Daconil 2787 Zn 4.17F (trt 11, 12), Cleary 3336 50W (trt 14, 15), WAC 74 + Cleary 3336 50W (trt 17), Spectro 90WDG (trt 18, 19), BAS 505 03F 50WG (trt 24), BAS 500 02F 20WG (trt 27), Chipco Aliette Signature 80WG + Daconil Ultrex 82.5SDG (trt 29), Chipco Aliette Signature 80WG + Fore Rainshield 80W (trt 30), Chipco Aliette Signature 80WG (trt 31), RU020119E (trt 32), Medallion 50WG (trt 33), Companion I + Cleary 3336 50W (trt 37), and Companion I + Daconil Ultrex 82.5SDG (trt 38) provided good to excellent bentgrass dead spot control throughout the study. Eagle 40W (trt 4), Heritage 50WG (trt 13), Compass 50WG + Banner MAXX 1.3MC (trt 22), Chipco 26GT 2SC (trt 25), and ProStar 70WG

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(trt 26) provided fair disease control. WAC 74 (trt 16), Compass 50WG (trt 21), F-155 20W (trt 28), Subdue MAXX 2MC (trt 34), and Companion I (trt 35, 36) did not provide acceptable control of the target disease. Bayleton 50W (trt 7) and BS-BMI-600 (trt 20) actually enhanced the severity of bentgrass dead spot in this study. Al-

gae were generally controlled by fungicides in the chlorothalonil (trt 3, 8 to 12, 18, 19, 38), thiophanate-methyl (trt 14, 15, 17, 37), strobilurin (trt 13, 24, 27), and fosetyl-Al (trt 29 to 31) chemical classes. Turf quality was closely associated with the incidence of bentgrass dead spot (7 August). No phytotoxicity was observed.

Table 1. Impact of chemical and biological fungicides on the incidence of bentgrass dead spot in creeping bentgrass in North Brunswick, NJ: 2000.

Treatment and rate/1000 sq ft	Spray interval (days) <sup>4</sup>	Turf area infected (%) per plot <sup>1</sup>				Algae <sup>2</sup> (%)	Turf Quality <sup>3</sup>	
		28 July	7 Aug.	21 Aug.	5 Sept.			
1. Banner MAXX 1.3MC 1.0 fl oz	14	0.5 a	3.8 a-d	2.2 ab	3.3 ab	5.2 a	20.2 d-h	7.2 a-d
2. Banner MAXX 1.3MC 2.0 fl oz	14	0.2 a	0.5 ab	0.0 a	0.0 a	0.5 a	52.5 j	7.0 a-c
3. Banner MAXX 1.3MC 1.0 fl oz								
+Daconil Ultrex 82.5SDG 3.2 oz	14	2.8 a-d	3.5 a-d	1.8 ab	2.8 ab	4.0 a	0.0 a	8.2 c-e
4. Eagle 40W 0.6 oz	14	2.2 a-c	9.5 d-f	20.2 f	17.5 c	30.8 d	18.8 c-g	8.0 b-e
5. Fore Rainshield 80W 8.0 oz	14	0.8 a	2.0 a-c	5.8 a-c	2.2 ab	6.8 ab	0.0 a	8.2 c-e
6. AMS 21618 250SC 0.38 fl oz	14	1.8 ab	3.0 a-c	3.0 ab	2.0 a	3.0 a	14.0 b-e	7.0 a-c
7. Bayleton 50W 2.0 oz	14	6.3 c-f	25.8 h	48.8 k	54.0 g	62.5 i	16.8 c-f	6.5 a
8. Daconil Ultrex 82.5SDG 3.2 oz	7	1.2 a	1.5 a-c	1.8 ab	1.0 a	1.5 a	0.0 a	8.5 de
9. Daconil Ultrex 82.5SDG 3.2 oz	14	3.8 a-e	3.5 a-d	3.8 ab	4.0 ab	4.0 a	0.2 a	8.0 b-e
10. Daconil Ultrex 82.5SDG 5.0 oz	14	3.0 a-d	3.0 a-c	2.5 ab	2.2 ab	3.0 a	0.0 a	8.0 b-e
11. Daconil 2787 Zn 4.17F 5.0 fl oz	7	1.0 a	1.8 a-c	0.2 a	1.2 a	0.8 a	0.0 a	7.8 a-e
12. Daconil 2787 Zn 4.17F 8.0 fl oz	14	4.0 a-e	7.2 c-e	8.2 b-d	6.8 ab	5.5 a	0.0 a	7.2 a-d
13. Heritage 50WG 0.2 oz	14	0.0 a	6.8 b-d	16.8 ef	15.2 c	18.8 c	12.2 b-d	7.8 a-e
14. Cleary 3336 50W 4.0 oz	14	0.5 a	2.0 a-c	2.2 ab	3.5 ab	1.8 a	18.2 c-f	7.8 a-e
15. Cleary 3336 50W 8.0 oz	14	0.0 a	0.5 ab	0.5 a	2.0 a	5.5 a	6.2 ab	8.5 de
16. WAC 74 2.0 oz	14	8.5 fg	25.2 h	41.2 ij	47.0 fg	53.2 f-h	20.0 d-g	7.0 a-c
17. WAC 74 2.0oz								
+Cleary 3336 50W 4.0 oz	14	2.5 a-d	3.2 a-c	3.0 ab	6.8 ab	7.8 ab	11.5 b-d	7.8 a-e
18. Spectro 90WDG 4.0 oz	14	3.2 a-d	3.2 a-c	3.8 ab	4.2 ab	2.2 a	0.0 a	8.2 c-e
19. Spectro 90WDG 7.6 oz	14	1.0 a	0.8 ab	0.0 a	1.0 a	0.0 a	0.2 a	8.5 de
20. BS-BMI-600 4.0 fl oz	14	8.5 fg	32.3 i	47.3 jk	51.0 fg	59.2 hi	23.2 f-i	6.5 a
21. Compass 50WG 0.15 oz	14	9.2 fg	28.0 hi	39.2 hi	43.2 f	51.8 e-h	15.0 c-f	7.2 a-d
22. Compass 50WG 0.15 oz								
+Banner MAXX 1.3MC 1.0 fl oz	14	2.8 a-d	5.0 b-d	12.3 de	10.5 bc	14.2 bc	16.8 c-f	7.2 a-d
23. TM-41702 40W 0.7 oz	14	7.8 e-g	14.0 fg	29.5 g	29.2 de	33.2 d	29.8 i	7.2 a-d

Table 1 (continued).

Treatment and rate/1000 sq ft	Spray interval (days) <sup>4</sup>	Turf area infected (%) per plot <sup>1</sup>					Algae <sup>2</sup> (%)	Turf Quality <sup>3</sup> 7 Aug.
		28 July	7 Aug.	21 Aug.	5 Sept.	13 Sept.		
24. BAS 505 03F 50WG 0.2 oz.....	14	0.8 a	0.2 a	0.8 a	0.8 a	0.2 a	11.0 bc	7.2 a-d
25. Chipco 26GT 2SC 4.0 fl oz .....	14	2.8 a-d	6.8 b-d	11.8 c-e	15.0 c	17.2 c	21.5 e-i	7.2 a-d
26. ProStar 70WG 2.2 oz .....	14	2.8 a-d	12.5 e-g	21.8 f	25.0 d	33.5 d	18.5 c-f	7.2 a-d
27. BAS 500 02F 20WG 0.5 oz .....	14	1.0 a	0.5 ab	0.8 a	1.3 a	0.8 a	12.8 b-e	7.8 a-e
28. F-155 20W 1.6 oz .....	14	4.2 a-e	15.8 g	30.2 g	35.5 e	49.0 e-g	14.0 b-e	7.0 a-c
29. Chipco Alette Signature 80WG 4.0 oz								
+Daconil Ultrex 82.5SDG 3.2 oz.....	14	1.0 a	1.8 a-c	0.2 a	0.5 a	0.8 a	0.0 a	8.8 e
30. Chipco Alette Signature 80WG 4.0 oz								
+Fore Rainshield 80W 8.0 oz.....	14	0.8 a	0.8 ab	0.0 a	0.2 a	0.2 a	0.0 a	8.2 c-e
31. Chipco Alette Signature 80WG 4.0 oz.....	14	0.2 a	4.2 a-d	5.0 ab	3.0 ab	4.8 a	0.2 a	8.8 e
32. RU02019E 0.2 oz.....	14	1.0 a	2.8 a-c	2.0 ab	1.5 a	0.5 a	15.2 c-f	7.8 a-e
33. Medallion 50WG 0.5 oz.....	14	1.0 a	0.5 ab	0.0 a	1.0 a	1.2 a	17.5 c-f	7.2 a-d
34. Subdue MAXX 2MC 1.0 fl oz. ....	14	6.8 d-f	28.2 hi	43.0 i-k	47.8 fg	57.2 g-i	28.5 hi	7.0 a-c
35. Companion I 4.0 fl oz .....	14	5.8 b-f	26.0 h	45.0 i-k	46.8 fg	47.2 ef	27.0 g-i	7.2 a-d
36. Companion I 8.0 fl oz .....	14	6.5 c-f	22.8 h	34.8 gh	35.8 e	43.8 e	28.5 hi	6.8 ab
37. Companion I 4.0 fl oz								
+Cleary 3336 50W 8.0 oz .....	14	0.8 a	1.5 a-c	2.2 ab	3.0 ab	3.2 a	10.0 bc	8.0 b-e
38. Companion I 4.0 fl oz								
+Daconil Ultrex 82.5SDG 3.2 oz .....	14	3.5 a-e	3.8 a-d	4.0 ab	3.5 ab	4.5 a	0.5 a	8.0 b-e
39. Untreated Check .....	—	11.2 g	26.0 h	40.2 hi	45.0 f	50.5 e-g	23.8 f-i	7.2 a-d

  

INT <sup>5</sup>	DAT <sup>6</sup>	DAT	DAT	DAT	DAT	DAT	DAT
7	4	7	7	7	2	2	7
14	4	14	14	14	8	8	14

Table 1 (continued).

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

<sup>2</sup>Turf area infested with algae (%) per plot.

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

<sup>4</sup>Fungicides were applied on 10 July (all treatments, except treatments 11 and 12, which were not applied for the first time until 24 July), 17 July (7 day treatment), 24 July (7 and 14 day treatments), 31 July (7 day treatment), 7 August (7 and 14 day treatments), 14 August (7 day treatment), 21 August (7 and 14 day treatments), 28 August (7 day treatment), 5 September (7 and 14 day treatments), and 11 September (7 day treatment).

<sup>5</sup>Spray interval in days.

<sup>6</sup>Days after treatment (DAT) for each spray interval.