

Results of Fungicide Evaluation for 2003-04 Snow Mold Control in Wisconsin and Minnesota

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Snow molds, including Typhula blight (*Typhula ishikariensis* and *T. incarnata*) and pink snow mold (*Microdochium nivale*), are the most difficult and economically important diseases on golf courses in the Great Lakes region. This is due to disease damage which directly correlates with decreased playability and the expensive preventive fungicide applications that are required regardless of the environmental conditions of the upcoming winter. It is very clear that environmental factors such as snow cover days and cold temperatures, affect the degree of pathogenicity of the pathogens as well as plant physiological conditions and defense mechanisms. Furthermore, based on our previous research results, each of the snow mold species maintains its environmental and geographical niche where they can survive better than in other areas. In order to provide superintendents the most effective chemicals, we carry out field trials to evaluate commercial and experimental fungicides for the control of snow molds at several golf courses with diverse environmental conditions each year. Trial results on efficacy of fungicides for snow mold control at Gateway GC, WI and Giants Ridge Resort, MN are discussed and presented.

EXPERIMENTAL METHODS

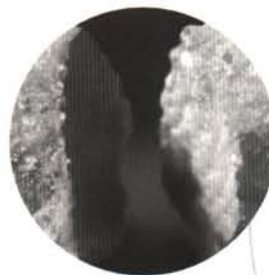
This past year's fungicide evaluation for the snow mold control was conducted at Gateway Golf Club (GWGC) in Land O' Lakes, WI on annual bluegrass and at Giants Ridge Golf Resort (GRGR) in Biwabik, MN on creeping bentgrass maintained under golf course fairway management conditions. Two additional sites were at O. J. Noer Turfgrass Research and Education Facility, Verona, WI and at Sentryworld GC, Stevens Point, WI where results of data are not presented due to a lack of disease pressure.

Individual 3 ft x 10 ft plots (a total of 71 treatments listed in table) were arranged in a randomized complete block design with three replications. The experimental area was not inoculated and all disease development was of natural occurrence. Treatments were applied with a CO₂-powered boom sprayer, using XR TeeJet 8005 VS nozzles, at 30 psi, in water carrier volume of 2 gal/1000ft². Granular applications were applied using a shaker jar. Early applications were made on October 22 (GWGC) and 23 (GRGR), mid-applications on November 8 (both), and late applications on November 12 (GWGC) and 16 (GRGR) in 2003. Percent snow mold, speckled snow mold (*T. ishikariensis*) and pink snow mold ratings were taken on April 15, 2004 at both

sites. Data obtained were subjected to analysis of variance and LSD was used to determine significant differences between treatment means.

RESULTS and DISCUSSION

Interesting observations were made this year. Each site had only one fungal species causing the most damage. The predominant disease active this year at Gateway GC was pink snow mold, which might be due to the relatively mild winter (less days of snow cover). No single or combination of chemicals provided 100% control of pink snow mold. This could be due to a slight onset of pink snow mold disease symptoms prior to the late fungicide application (Nov. 12, 03). Overall, the disease pressure was relatively low. On the other hand, only *T. ishikariensis* was active



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at Giants Ridge. A very small number of sporadic patches were found to be pink snow mold and *Myriosclerotinia borealis*, one of cold loving fungi. Currently, I haven't seen any damage caused by *M. borealis* in Wisconsin. Disease pressure was considerably high compared to other testing sites, with the untreated control averaging 51.7% damage. Five treatments provide 100% control (treatment numbers 6, 20, 22, 42, and 46) in table. Interestingly, treatment #2, a combo of Chipco 26 GT (4 oz), Daconil WeatherStik (5.5 oz), and Turfcide 400 (6

oz), which has worked well in Wisconsin testing sites over past years did not have a complete control (average 0.33% damage) at this MN site. Trt#20 (a combo of 5.5 oz Daconil WeatherStik and 0.5 oz Medallion) has a complete control over *T. ishikariensis* in MN. More tests are required to be tested in WI plots. In Minnesota, another combo (4.5 oz Prostar and 6 oz Turfcide 400) gave an excellent control. Treatment # 6, a mixture of Chipco 26 GT (4 oz), Bayleton (1 oz), and Turfcide 400 (6 oz), also offered a complete control in MN.

In conclusion, environment factors (especially snow cover day, frequency of melting during the winter) play important roles in fungicide efficacy for snow mold control. Combinations (two or three chemicals) which gave excellent control of snow molds in MN in 2003-04 should be confirmed in WI. ♣

Table. Percent snow mold ratings from plot at Gateway Golf Course (mainly pink snow mold), Land O' Lakes, WI and Giants Ridge Golf Resort (mainly Typhula blight, especially *T. ishikariensis*), Biwabik, MN taken April 15, 2004

No.	Treatment		Appl. Timing	% of Snow Mold	
	Name	Form Rate (/1000 FT ²)		Gateway GC, WI	Biwabik, MN
1	Untreated Control			7	51.67
2	Chipco 26 GT	2 SC 4 FL OZ	Late	3.67	0.33
3	Daconil WeatherStik	6 F 5.5 FL OZ	Late		
4	Turfcide 400	40 F 6 FL OZ	Late	0.67	3.67
5	Compass	50 WG 0.25 OZ	Late		
6	Daconil WeatherStik	6 F 5.5 FL OZ	Late	1.17	5
7	Turfcide 400	40 F 6 FL OZ	Late	1.17	7.5
8	Chipco 26 GT	2 SC 4 FL OZ	Late	2.83	0
9	Bayleton	50 WG 1 OZ	Late		
10	Turfcide 400	40 F 6 FL OZ	Late	4.17	0.33
11	Bayleton	50 WG 1 OZ	Late	4.17	4.50
12	Daconil WeatherStik	6 F 5.5 FL OZ	Late	4.17	4.50
13	Signature	80 WG 4 OZ	Late	3.33	0.83
14	Chipco 26 GT	2 SC 4 FL OZ	Late		
15	Daconil WeatherStik	6 F 5.5 FL OZ	Late		
16	Insignia	20 WG 0.9 OZ	Both	4.5	15.83
17	Insignia	20 WG 0.9 OZ	Both	2.33	1.17
18	Iprodione Pro	2 SE 4 FL OZ	Both		
19	Banner MAXX	1.3 ME 2 OZ	Late	12	10
20	Medallion	50 WP 0.33 OZ	Late	15.3	11.67
21	Medallion	50 WP 0.5 OZ	Late	8.67	7
22	Medallion	50 WP 0.5 OZ	Late	7.33	11.17
23	Turfcide 400	40 F 6 FL OZ	Late	15	31.67
24	Heritage	50 WG 0.4 OZ	Late	10	35
25	Banner MAXX	1.3 ME 2 OZ	Late	3.67	3.33
26	Medallion	50 WP 0.5 OZ	Late	1.17	0.33
27	Banner MAXX	1.3 ME 2 OZ	Both	2.33	0
28	Daconil WeatherStik	6 F 5.5 OZ	Late	2.33	0
29	Medallion	50 WP 0.8 OZ	Late		
30	AND3118 (chlorothalonil)	5 G 15.1 LB	Early	1	7
31	AND3224 (PCNB)	15.4 G 6.36 LB	Late		
32	AND3238 (iprodione)	1.3 G 7.21 LB	Early	2.33	0
33	AND3118 (chlorothalonil)	5 G 15.1 LB	Three		
34	AND3237 (triazimefen)	1 G 12.8 LB	Three		
35	AND3238 (iprodione)	1.3 G 7.21 LB	Three		
36	AND3131 (chloroneb)	6.26 G 5.95 LB	Late	1.17	6.17
37	AND3224 (PCNB)	15.4 G 6.36 LB	Mid		
38	AND3131 (chloroneb)	6.26 G 5.95 LB	Late	2	13.33
39	AND3226 (PCNB)	15 G 6.36 LB	Mid		
40	AND3099 topsin/chloroneb	4.9 G 5.76 LB	Early	1	8.67
41	AND3118 (chlorothalonil)	5 G 15.1 LB	Early		
42	AND3224 (PCNB)	15.4 G 6.36 LB	Late		
43	Chipco 26 GT	2 SC 4 FL OZ	Late	5.33	20.33
44	Daconil WeatherStik	6 F 5.5 FL OZ	Late	2.5	18.33
45	Turfcide 400	40 F 6 FL OZ	Late	4	8.67
46	Compass	50 WG 0.25 OZ	Late	2.5	20.83
47	Bayleton	50 WG 1 OZ	Late	4.5	18.33
48	Signature	80 WG 4 OZ	Late	8.33	43.33
49	Iprodione Pro	2 SE 4 FL OZ	Late	5	18.33
50	Banner MAXX	1.3 ME 2 OZ	Late	15	13.33
51	Banner MAXX	1.3 ME 2 OZ	Late	4.5	4.50
52	AND3118 (chlorothalonil)	5 G 15.1 LB	Early	4.17	20
53	AND3099 (PCNB)	15.4 G 6.36 LB	Late	8.67	14.17
54	AND3224 (PCNB)	15.4 G 6.36 LB	Late	7.5	20
55	AND3226 (PCNB)	15 G 6.36 LB	Mid	2.83	36.67
56	AND3238 (iprodione)	1.3 G 7.21 LB	Early	2.33	26.67
57	AND3131 (chloroneb)	6.26 G 5.95 LB	Late	2.33	13.33
58	AND3099 topsin/chloroneb	4.9 G 5.76 LB	Early	0.33	25
59	AND3237 (triazimefen)	1 G 12.8 LB	Three	6.17	0
60	Fore	80 WP 8 OZ	Late	5	12
61	Heritage	50 WG 0.7 OZ	Late	5	12.50
62	Prostar	70 WP 4.5 OZ	Late	2.5	3.33
63	Prostar	70 WP 4.5 OZ	Late	2.33	0
64	Turfcide 400	40 F 6 FL OZ	Late	7.5	1.50
65	Prostar	70 WP 4.5 OZ	Late		
66	Banner MAXX	1.3 ME 2 OZ	Late	2.33	8.33
67	Fore	80 WP 8 OZ	Late		
68	Turfcide 400	40 F 6 FL OZ	Late	2	1
69	Heritage	50 WG 0.7 OZ	Late		
70	Banner MAXX	1.3 ME 2 OZ	Late	2.83	7.5
71	Chipco 26 GT	2 SC 4 FL OZ	Late		
72	Banner MAXX	1.3 ME 2 OZ	Late		
73	Daconil WeatherStik	6 F 5.5 OZ	Late	4.5	8.67
74	Banner MAXX	1.3 ME 2 OZ	Late		
75	Bayleton	50 WG 1 OZ	Late		

No.	Treatment		Appl. Timing	% of Snow Mold	
	Name	Form Rate (/1000 FT ²)		Gateway GC, WI	Biwabik, MN
53	Banner MAXX	1.3 ME 2 OZ	Late	9.17	6.67
54	Curalan	50 HG 1 OZ	Late		
55	Emerald	70 WG 0.18 OZ	Late	6.67	36.67
56	Emerald	70 WG 0.18 OZ	Late	9.17	31.67
57	Emerald	70 WG 0.18 OZ	Late	6.67	8.67
58	Turfcide 400	40 F 6 FL OZ	Late		
59	Turfcide 400	40 F 6 FL OZ	Late	3.67	14.17
60	Iprodione Pro	2 SE 4 FL OZ	Late		
61	Daconil WeatherStik	6 F 5.5 FL OZ	Late	6.67	28.33
62	Emerald	70 WG 0.18 OZ	Late		
63	Insignia	20 WG 0.9 OZ	Late		
64	Spectro	90 WG 4 OZ	Both	0.33	20
65	Endorse	2.5 WP 4 OZ	Late		
66	Spectro	90 WG 4 OZ	Early	0.67	11.67
67	Endorse	2.5 WP 4 OZ	Late		
68	Spectro	90 WG 5.75 OZ	Both		
69	Spectro	90 WG 4 OZ	Both	0.33	3.33
70	Emberse	2.5 WP 4 OZ	Late		
71	Aimile	48 E 5.5 FL OZ	Late		
72	Endorse	2.5 WP 4 OZ	Late	1.5	9.17
73	Spectro	90 WG 4 OZ	Late		
74	Endorse	2.5 WP 4 OZ	Late	3.33	9.50
75	Spectro	90 WG 5.75 OZ	Late		
76	Endorse	2.5 WP 4 OZ	Late	2.33	6.67
77	Spotrete	75 WG 8 OZ	Late		
78	Endorse	2.5 WP 6 OZ	Late	2.83	10.83
79	Spotrete	75 WG 8 OZ	Late		
80	PCNB12.5+Novex 9-0-19	12.5 G 96 OZ	Late	3.33	20.33
81	Revere	10 G 120 OZ	Late	3.5	48.67
82	Lesco 18 Plus	2 SC 4 FL OZ	Late	1	0.33
83	Lesco Manganese Ultrex	82.5 WG 5 OZ	Late		
84	Lesco Revere 4000	4 SC 8 FL OZ	Late		
85	Lesco 18 Plus	2 SC 4 FL OZ	Late	4.17	11.67
86	Lesco Manganese Ultrex	82.5 WG 5 OZ	Late		
87	Chipco 26 GT	2 SC 2 FL OZ	Late	5.83	2.83
88	Daconil Weatherstik	6 F 2.75 FL OZ	Late		
89	Turfcide 400	4 F 4 FL OZ	Late		
90	Catbacter	90 WP 3 OZ	Late	3.33	1.67
91	LSD (P=0.95)			7.91	16.95
92	Standard Deviation			4.89	10.48
93	CV			113	88.11

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