



2020-2021 Snow Mold Control Evaluation: Marquette Golf Club – Marquette, MI

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OBJECTIVE

To evaluate fungicides for the control of gray snow mold (caused by *Typhula incarnata*), speckled snow mold (*T. ishikariensis*), and Microdochium patch (*Microdochium nivale*) on golf course turfgrass.

MATERIALS AND METHODS

This evaluation was conducted at Marquette Golf Club in Marquette, MI on a creeping bentgrass (*Agrostis stolonifera*) and annual bluegrass (*Poa annua*) golf course fairway maintained at a height of 0.5 inches. Individual plots measured 3 ft x 10 ft and were arranged in a randomized complete block design with four replications. Individual treatments were applied at a nozzle pressure of 40 psi using a CO₂-pressurized boom sprayer equipped with two XR Teejet AI8004 VS nozzles. All fungicides were agitated by hand and applied in the equivalent of 1.5 gallons of water per 1000 ft². Early applications were made on 6 Oct 2020 and late applications were made on 5 Nov 2020. The experimental plot area was not inoculated. Snow cover was present from mid-December through mid-March, a total of approximately 90 days. Disease severity, turf quality, and turf color were measured on 18 Mar 2021. Disease severity was visually rated as percent area affected, turfgrass quality was visually rated on a 1-9 scale with 6 being acceptable, and chlorophyll content (turfgrass color) was rated using a FieldScout CM 1000 Chlorophyll Meter from Spectrum Technologies, Inc. (Aurora, IL). Treatment means were analyzed using Fisher's LSD method and are presented in Table 1.

RESULTS AND DISCUSSION

Despite lower than average snowfall for Marquette, disease pressure was still high with non-treated controls averaging 72.5% disease. On average about 50% of the disease present was caused by *M. nivale*, 25% was caused by *T. ishikariensis*, and 25% was caused by *T. incarnata*. All fungicide treatments significantly reduced disease severity relative to the non-treated control, and most treatments performed exceptionally well. Only 3 of the 70 treatments tested failed to provide 90% disease control, and only 14 treatments failed to provide 95% disease control. Successful treatments typically contained a mixture of 3 or 4 active ingredients from multiple chemical classes. Turf quality and turf color mostly reflected disease severity, and there were only 2 treatments that averaged a turf quality rating less than 6. Phytotoxicity was not observed with any treatment.

Table 1: Mean snow mold severity, turf quality, and turf color were assessed on March 18, 2021 at Marquette Golf Club in Marquette, MI.

	Treatment	Rate	Application Timing ^a	Disease Severity ^b	Turf Quality ^c	Turf Color ^d
1	Non-treated control			72.5a	2.8i	103.0t
2	Turficide	6.0 fl oz/1000 ft ²	Late	3.0g-k	6.8b-f	199.3e-s
	Banner Maxx Foursome	2.0 fl oz/1000 ft ² 0.5 fl oz/1000 ft ²				
3	Turficide	8.0 fl oz/1000 ft ²	Late	0.0k	7.8ab	199.5e-s
	Banner Maxx Foursome	2.0 fl oz/1000 ft ² 0.5 fl oz/1000 ft ²				
4	Turficide	6.0 fl oz/1000 ft ²	Late	5.5f-k	6.5c-g	196.0g-s
	Torque Foursome	1.1 fl oz/1000 ft ² 0.5 fl oz/1000 ft ²				
5	Turficide	8.0 fl oz/1000 ft ²	Late	1.0jk	7.3a-d	195.0h-s
	Torque Foursome	1.1 fl oz/1000 ft ² 0.5 fl oz/1000 ft ²				
6	Turficide	6.0 fl oz/1000 ft ²	Late	2.5g-k	6.8b-f	205.5c-r
	Mirage Foursome	2.0 fl oz/1000 ft ² 0.5 fl oz/1000 ft ²				
7	Turficide	8.0 fl oz/1000 ft ²	Late	5.5f-k	6.5c-g	209.8b-q
	Mirage Foursome	2.0 fl oz/1000 ft ² 0.5 fl oz/1000 ft ²				
8	Premion	10.0 fl oz/1000 ft ²	Late	0.0k	7.8ab	172.0rs
	Previa Foursome	4.0 fl oz/1000 ft ² 0.5 fl oz/1000 ft ²				
9	Premion	10.0 fl oz/1000 ft ²	Late	1.8ijk	7.3a-d	214.5a-p
	Secure Foursome	0.5 fl oz/1000 ft ² 0.5 fl oz/1000 ft ²				
10	Concert II	5.5 fl oz/1000 ft ²	Late	3.8g-k	7.0a-e	206.5c-q
	Turficide Foursome	6.0 fl oz/1000 ft ² 0.5 fl oz/1000 ft ²				
11	Concert II	5.5 fl oz/1000 ft ²	Late	7.5d-k	6.3d-h	205.0c-r
	Turficide Foursome	8.0 fl oz/1000 ft ² 0.5 fl oz/1000 ft ²				
12	Concert II	8.3 fl oz/1000 ft ²	Late	0.0k	8.0a	227.0a-j
	Turficide Foursome	8.0 fl oz/1000 ft ² 0.5 fl oz/1000 ft ²				
13	Turficide	8.0 fl oz/1000 ft ²	Late	7.5d-k	6.3d-h	211.8b-p
	Previa Foursome	5.5 fl oz/1000 ft ² 0.5 fl oz/1000 ft ²				
14	Turficide	3.33 fl oz/1000 ft ²	Late	7.5d-k	6.3d-h	209.0b-q
	Previa Mirage	1.825 fl oz/1000 ft ² 0.67 fl oz/1000 ft ²				
15	Turficide	6.66 fl oz/1000 ft ²	Late	3.0g-k	7.3a-d	189.0m-s
	Previa Mirage	3.65 fl oz/1000 ft ² 1.33 fl oz/1000 ft ²				
16	Turficide	8.0 fl oz/1000 ft ²	Late	0.5k	7.5abc	220.3a-n
	Previa Mirage	4.4 fl oz/1000 ft ² 1.6 fl oz/1000 ft ²				
LSD P=.05				8.24	1.2	33.98

^aEarly treatments applied on Oct 6, 2020 and late treatments applied on Nov 5, 2020.

^bMean percent diseased area assessed on Mar 18, 2021.

^cQuality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.

^dColor was assessed using a FieldScout CM1000 Chlorophyll Meter from Spectrum Technologies, Inc.

Table 1(cont): Mean snow mold severity, turf quality, and turf color were assessed on March 18, 2021 at Marquette Golf Club in Marquette, MI.

	Treatment	Rate	Application Timing ^a	Disease Severity ^b	Turf Quality ^c	Turf Color ^d
17	Turfcide	10.0 fl oz/1000 ft ²	Late	0.5k	7.3a-d	191.5l-s
	Previa	5.5 fl oz/1000 ft ²				
	Mirage	2.0 fl oz/1000 ft ²				
18	Turfcide	3.0 fl oz/1000 ft ²	Late	1.3ijk	7.0a-e	203.5d-s
	26GT	2.0 fl oz/1000 ft ²				
	3336F	1.0 fl oz/1000 ft ²				
19	Mirage	0.6 fl oz/1000 ft ²	Late	0.0k	7.5abc	200.0e-s
	Turfcide	6.0 fl oz/1000 ft ²				
	26GT	4.0 fl oz/1000 ft ²				
20	3336F	2.0 fl oz/1000 ft ²	Late	0.0k	7.3a-d	193.8i-s
	Mirage	1.2 fl oz/1000 ft ²				
	Turfcide	8.0 fl oz/1000 ft ²				
21	26GT	5.33 fl oz/1000 ft ²	Late	0.0k	7.5abc	182.5p-s
	3336F	2.67 fl oz/1000 ft ²				
	Mirage	1.6 fl oz/1000 ft ²				
22	Turfcide	9.0 fl oz/1000 ft ²	Late	3.8g-k	6.5c-g	199.5e-s
	26GT	1.0 fl oz/1000 ft ²				
	Torque	0.3 fl oz/1000 ft ²				
23	Banner Maxx	0.5 fl oz/1000 ft ²	Late	0.0k	7.0a-e	207.5b-q
	Turfcide	6.0 fl oz/1000 ft ²				
	26GT	2.0 fl oz/1000 ft ²				
24	Torque	0.6 fl oz/1000 ft ²	Late	0.0k	7.0a-e	171.0s
	Banner Maxx	1.0 fl oz/1000 ft ²				
	Turfcide	9.0 fl oz/1000 ft ²				
25	26GT	3.0 fl oz/1000 ft ²	Late	5.0f-k	6.5c-g	182.5p-s
	Torque	0.9 fl oz/1000 ft ²				
	Banner Maxx	1.5 fl oz/1000 ft ²				
26	Turfcide	8.0 fl oz/1000 ft ²	Late	0.0k	7.0a-e	188.0n-s
	26GT	2.0 fl oz/1000 ft ²				
	Torque	0.6 fl oz/1000 ft ²				
27	Banner Maxx	1.0 fl oz/1000 ft ²	Late	2.5g-k	6.8b-f	195.8g-s
	Enclave	8.0 fl oz/1000 ft ²				
	Turfcide	8.0 fl oz/1000 ft ²				
28	Posterity XT	3.0 fl oz/1000 ft ²	Early	0.0k	8.0a	241.0ab
	Ascernity	1.0 fl oz/1000 ft ²	Late			
	Par	0.37 fl oz/1000 ft ²	Late			
LSD P=.05				8.24	1.2	33.98

^aEarly treatments applied on Oct 6, 2020 and late treatments applied on Nov 5, 2020.

^bMean percent diseased area assessed on Mar 18, 2021.

^cQuality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.

^dColor was assessed using a FieldScout CM1000 Chlorophyll Meter from Spectrum Technologies, Inc.

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29	Banner Maxx	2.0 fl oz/1000 ft ²	Early	3.8g-k	7.0a-e	216.5a-o
	Ascernity	1.0 fl oz/1000 ft ²	Late			
	Daconil Weatherstik	2.6 fl oz/1000 ft ²	Late			
	Par	0.37 fl oz/1000 ft ²	Late			
30	Banner Maxx	2.0 fl oz/1000 ft ²	Early	0.5k	7.8ab	219.3a-o
	Contend A	1.0 fl oz/1000 ft ²	Late			
	Contend B	2.6 fl oz/1000 ft ²	Late			
	Par	0.37 fl oz/1000 ft ²	Late			
31	Banner Maxx	2.0 fl oz/1000 ft ²	Early	0.0k	8.0a	234.5a-d
	Contend A	1.0 fl oz/1000 ft ²	Late			
	Contend B	2.6 fl oz/1000 ft ²	Late			
	Daconil Weatherstik	5.5 fl oz/1000 ft ²	Late			
	Par	0.37 fl oz/1000 ft ²	Late			
32	Banner Maxx	2.0 fl oz/1000 ft ²	Early	3.8g-k	7.0a-e	220.3a-n
	Posterity XT	3.0 fl oz/1000 ft ²	Late			
	Daconil Weatherstik	5.5 fl oz/1000 ft ²	Late			
	Par	0.37 fl oz/1000 ft ²	Late			
33	Banner Maxx	2.0 fl oz/1000 ft ²	Early	10.0c-h	6.5c-g	227.5a-i
	Daconil Weatherstik	5.5 fl oz/1000 ft ²	Late			
	Secure Action	0.5 fl oz/1000 ft ²	Late			
	Par	0.37 fl oz/1000 ft ²	Late			
34	Mirage	1.5 fl oz/1000 ft ²	Late	0.5k	7.8ab	227.5a-i
	Interface	5.0 fl oz/1000 ft ²				
35	Mirage	1.5 fl oz/1000 ft ²	Late	0.0k	8.0a	237.8abc
	Interface	5.0 fl oz/1000 ft ²				
	Daconil Weatherstik	5.5 fl oz/1000 ft ²				
36	Mirage	1.5 fl oz/1000 ft ²	Late	1.3ijk	7.5abc	213.3b-p
	Interface	5.0 fl oz/1000 ft ²				
	Secure Action	0.5 fl oz/1000 ft ²				
37	Mirage	2.0 fl oz/1000 ft ²	Late	0.0k	8.0a	232.5a-e
	Interface	6.0 fl oz/1000 ft ²				
38	Mirage	2.0 fl oz/1000 ft ²	Late	1.8ijk	7.3a-d	247.8a
	Interface	6.0 fl oz/1000 ft ²				
	Daconil Weatherstik	5.5 fl oz/1000 ft ²				
39	Mirage	2.0 fl oz/1000 ft ²	Late	1.3ijk	7.5abc	232.0a-f
	Interface	6.0 fl oz/1000 ft ²				
	Secure Action	0.5 fl oz/1000 ft ²				
40	Densicor	0.196 fl oz/1000 ft ²	Early	0.0k	8.0a	221.5a-n
	Interface	5.0 fl oz/1000 ft ²	Late			
	Mirage	1.5 fl oz/1000 ft ²	Late			
41	Dedicate	1.0 fl oz/1000 ft ²	Late	7.5d-k	6.0e-h	195.8g-s
42	Dedicate	2.0 fl oz/1000 ft ²	Late	1.3ijk	7.3a-d	217.0a-o
43	Dedicate	2.0 fl oz/1000 ft ²	Late	0.0k	7.3a-d	208.5b-q
	Medallion	1.0 fl oz/1000 ft ²				
44	Pedigree	4.4 fl oz/1000 ft ²	Late	10.5c-g	6.0e-h	202.3d-s
	Tekken	3.0 fl oz/1000 ft ²				
LSD P=.05				8.24	1.2	33.98

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^bMean percent diseased area assessed on Mar 18, 2021.

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45	Pedigree	4.4 fl oz/1000 ft ²	Late	9.3c-i	5.8fgh	209.0b-q
	Tekken	3.0 fl oz/1000 ft ²				
	Daconil Weatherstik	5.5 fl oz/1000 ft ²				
46	Pedigree	4.4 fl oz/1000 ft ²	Late	2.5g-k	6.8b-f	226.0a-k
	Azoxy 2SC	1.35 fl oz/1000 ft ²				
	Daconil Weatherstik	5.5 fl oz/1000 ft ²				
47	NB40293	4.0 gal/A	Late	9.3c-i	6.3d-h	200.5e-s
	Azoxy 2SC	0.77 fl oz/1000 ft ²				
48	NB40294	4.0 gal/A	Late	3.8g-k	6.8b-f	197.3g-s
	Azoxy 2SC	0.77 fl oz/1000 ft ²				
49	NB40293	4.0 gal/A	Late	0.0k	7.0a-e	198.5f-s
	Medallion	2.0 fl oz/1000 ft ²				
50	Insignia	0.65 fl oz/1000 ft ²	Late	6.3e-k	6.3d-h	198.0g-s
	Trinity	1.0 fl oz/1000 ft ²				
51	Insignia	0.65 fl oz/1000 ft ²	Late	4.3f-k	6.5c-g	193.3j-s
	Trinity	1.0 fl oz/1000 ft ²				
	26GT	4.0 fl oz/1000 ft ²				
52	Insignia	0.65 fl oz/1000 ft ²	Late	2.5g-k	6.8b-f	172.0rs
	Trinity	1.0 fl oz/1000 ft ²				
	Daconil Weatherstik	4.4 fl oz/1000 ft ²				
53	Insignia	0.65 fl oz/1000 ft ²	Late	3.0g-k	6.8b-f	198.0g-s
	Trinity	1.0 fl oz/1000 ft ²				
	Medallion	0.94 fl oz/1000 ft ²				
54	Enclave	8.0 fl oz/1000 ft ²	Late	0.5k	7.8ab	229.0a-g
	Foursome Plus	0.4 fl oz/1000 ft ²				
55	Intaglio	11.0 fl oz/1000 ft ²	Late	5.0f-k	6.8b-f	222.0a-m
	Foursome Plus	0.4 fl oz/1000 ft ²				
56	BCP1803	1.7 fl oz/1000 ft ²	Late	1.3ijk	6.8b-f	221.0a-n
	Fame	0.36 fl oz/1000 ft ²				
57	BCP1803	1.7 fl oz/1000 ft ²	Late	0.5k	7.0a-e	205.0c-r
	Fame	0.36 fl oz/1000 ft ²				
	3336F	5.75 fl oz/1000 ft ²				
58	BCP1803	1.7 fl oz/1000 ft ²	Late	5.0f-k	6.3d-h	196.0g-s
	Fame	0.36 fl oz/1000 ft ²				
	Daconil Weatherstik	4.0 fl oz/1000 ft ²				
59	Azoxy 2SC	1.35 fl oz/1000 ft ²	Late	0.0k	7.5abc	216.8a-o
	Tebuconazole 3.6F	0.6 fl oz/1000 ft ²				
	TM 4.5F	3.5 fl oz/1000 ft ²				
	Fluazinam 40SC	0.5 fl oz/1000 ft ²				
60	PS2	4.0 fl oz/1000 ft ²	Late	3.8g-k	6.8b-f	199.8e-s
61	Traction	1.3 fl oz/1000 ft ²	Late	0.5k	7.3a-d	193.0k-s
	26/36	6.0 fl oz/1000 ft ²				
62	Traction	1.3 fl oz/1000 ft ²	Late	3.0g-k	6.8b-f	228.3a-h
	26/36	6.0 fl oz/1000 ft ²				
	Mystic Verdant	16.0 fl oz/A				
63	NUP-19022	9.28 fl oz/A	Late	6.8e-k	6.3d-h	228.5a-h
	Spirato	0.5 fl oz/1000 ft ²				
	Rotator	0.5 fl oz/1000 ft ²				
LSD P=.05				8.24	1.2	33.98

^aEarly treatments applied on Oct 6, 2020 and late treatments applied on Nov 5, 2020.

^bMean percent diseased area assessed on Mar 18, 2021.

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64	NUP-19022 Traction	9.28 fl oz/A 1.3 fl oz/1000 ft ²	Late	13.8b-e	5.3h	190.3m-s
65	A22835A Par	2.87 fl oz/1000 ft ² 0.371 fl oz/1000 ft ²	Late	1.3ijk	7.5abc	203.0d-s
66	A23543A Par	2.98 fl oz/1000 ft ² 0.371 fl oz/1000 ft ²	Late	3.8g-k	7.3a-d	209.3b-q
67	A23543A Par Induce	2.98 fl oz/1000 ft ² 0.371 fl oz/1000 ft ² 0.25% v/v	Late	0.0k	8.0a	215.0a-p
68	A23543A Par Daconil Weatherstik	2.98 fl oz/1000 ft ² 0.371 fl oz/1000 ft ² 5.5 fl oz/1000 ft ²	Late	8.8c-j	6.8b-f	213.0b-p
69	A15457R A17856B Par	0.236 fl oz/1000 ft ² 1.88 fl oz/1000 ft ² 0.371 fl oz/1000 ft ²	Late	1.3ijk	7.5abc	217.0a-o
70	Instrata Par	11.0 fl oz/1000 ft ² 0.371 fl oz/1000 ft ²	Late	0.5k	7.8ab	224.5a-l
71	A21790A A21791A Daconil Weatherstik	6.0 fl oz/1000 ft ² 2.0 fl oz/1000 ft ² 5.5 fl oz/1000 ft ²	Late	0.0k	8.0a	229.0a-g
LSD P=.05				8.24	1.2	33.98

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