

## 2018-2019 Snow Mold Control Evaluation: Marquette Golf Club – Marquette, MI



Kurt Hockemeyer and Paul Koch, Ph.D.  
Department of Plant Pathology  
University of Wisconsin-Madison

### OBJECTIVE

To evaluate fungicides for the control of Typhula blight (caused by *Typhula incarnata*) and Microdochium patch (caused by *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 p.s.i using a CO<sub>2</sub>-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 ft<sup>2</sup>. Granular applications were made by evenly spreading a pre-weighed amount of product over the designated plots. Early applications were made on 4 Oct 2018 and late applications were made on 1 Nov 2018. The experimental plot area was not inoculated. Snow cover was present from mid-November through mid-April, a total of approximately 150 days. Disease severity, turf quality, and turf color were measured on 17 Apr 2019. 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

Nontreated controls averaged 81% disease, indicating high disease pressure. On average about 90% of the disease present was caused by *M. nivale* and 10% was caused by *T. ishikariensis*. Any treatment providing greater than 95% control under these circumstances performed exceptionally well, and 45 treatments met that standard. Of those, 34 treatments provided greater than 99% snow mold control. Turf quality and turf color mostly reflected disease severity. Phytotoxicity was not observed with any treatment.

**Table 1: Mean snow mold severity, turf quality, and turf color were assessed on April 17, 2019 at Marquette Golf Club in Marquette, MI.**

	Treatment	Rate	Application Timing <sup>a</sup>	Disease Severity <sup>b</sup>	Turf Quality <sup>c</sup>	Turf Color <sup>d</sup>
1	Non-treated control			81.3a	2.3n	121.5v
2	Premion	8.0 fl oz/1000 ft <sup>2</sup>	Late	0.0o	7.5abc	250.3d-r
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
	Previa	4.0 fl oz/1000 ft <sup>2</sup>				
3	Premion	10.0 fl oz/1000 ft <sup>2</sup>	Late	0.0o	7.3a-d	246.0f-s
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
	Previa	4.0 fl oz/1000 ft <sup>2</sup>				
4	Premion	10.0 fl oz/1000 ft <sup>2</sup>	Late	0.0o	7.8ab	249.0e-r
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
	Previa	5.5 fl oz/1000 ft <sup>2</sup>				
5	Premion	10.0 fl oz/1000 ft <sup>2</sup>	Late	0.0o	7.8ab	263.8a-r
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
	Secure	0.5 fl oz/1000 ft <sup>2</sup>				
6	Concert II	5.5 fl oz/1000 ft <sup>2</sup>	Late	0.0o	7.8ab	275.3a-h
	Turfcide	8.0 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
7	Concert II	8.3 fl oz/1000 ft <sup>2</sup>	Late	0.5o	7.5abc	297.8a
	Turfcide	8.0 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
8	Previa	5.5 fl oz/1000 ft <sup>2</sup>	Late	3.0mno	7.0b-e	265.3a-r
	Turfcide	8.0 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
9	Previa	4.0 fl oz/1000 ft <sup>2</sup>	Late	8.0i-o	6.0f-i	269.3a-o
	Turfcide	6.0 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
10	Previa	2.67 fl oz/1000 ft <sup>2</sup>	Late	8.0i-o	6.0f-i	241.5h-t
	Turfcide	4.0 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
11	Previa	1.33 fl oz/1000 ft <sup>2</sup>	Late	31.3cd	4.5klm	236.8m-t
	Turfcide	2.0 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
12	AND18131 4-way	6.6 lb/1000 ft <sup>2</sup>	Late	10.5h-m	5.8g-j	249.8e-r
13	AND18148 3-way	6.6 lb/1000 ft <sup>2</sup>	Late	17.5fgh	5.0jkl	251.3c-r
14	Prophecy	2.5 lb/1000 ft <sup>2</sup>	Early	3.0mno	6.5d-g	231.3rst
	AND18131 4-way	6.6 lb/1000 ft <sup>2</sup>	Late			
15	AND12147	6.67 lb/1000 ft <sup>2</sup>	Late	12.5g-l	5.8g-j	235.0o-t
16	A13705V	4.5 fl oz/1000 ft <sup>2</sup>	Late	0.0o	8.0a	279.5a-g
	A19188B	1.0 fl oz/1000 ft <sup>2</sup>				
	Par	0.37 fl oz/1000 ft <sup>2</sup>				
17	A13705V	2.6 fl oz/1000 ft <sup>2</sup>	Late	0.0o	8.0a	249.5e-r
	A19188B	1.0 fl oz/1000 ft <sup>2</sup>				
	Turfcide	6.0 fl oz/1000 ft <sup>2</sup>				
	Par	0.37 fl oz/1000 ft <sup>2</sup>				

<sup>a</sup>Early treatments applied on Oct 4, 2018 and late treatments applied on Nov 1, 2018

<sup>b</sup>Mean percent diseased area assessed on Apr 17, 2019.

<sup>c</sup>Quality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.

<sup>d</sup>Color 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 April 17, 2019 at Marquette Golf Club in Marquette, MI.**

	Treatment	Rate	Applicatio Timing <sup>a</sup>	Disease Severity <sup>b</sup>	Turf Quality <sup>c</sup>	Turf Color <sup>d</sup>
18	A15457K	0.24 fl oz/1000 ft <sup>2</sup>	Late	0.5o	7.5abc	274.0a-i
	A17856B	1.88 fl oz/1000 ft <sup>2</sup>				
	Turfside	6.0 fl oz/1000 ft <sup>2</sup>				
	Par	0.37 fl oz/1000 ft <sup>2</sup>				
19	A15457K	0.24 fl oz/1000 ft <sup>2</sup>	Late	0.5o	7.8ab	288.8ab
	A17856B	1.88 fl oz/1000 ft <sup>2</sup>				
	Daconil Wthrstk	5.5 fl oz/1000 ft <sup>2</sup>				
	Par	0.37 fl oz/1000 ft <sup>2</sup>				
20	A15457K	0.24 fl oz/1000 ft <sup>2</sup>	Late	2.5mno	7.3a-d	257.0b-r
	A17856B	1.88 fl oz/1000 ft <sup>2</sup>				
	Secure	0.5 fl oz/1000 ft <sup>2</sup>				
	Par	0.37 fl oz/1000 ft <sup>2</sup>				
21	A15457K	0.24 fl oz/1000 ft <sup>2</sup>	Late	0.0o	7.8ab	263.0b-r
	A17856B	1.88 fl oz/1000 ft <sup>2</sup>				
	Banner Maxx	2.0 fl oz/1000 ft <sup>2</sup>				
	Par	0.37 fl oz/1000 ft <sup>2</sup>				
22	A15457K	0.24 fl oz/1000 ft <sup>2</sup>	Late	0.0o	8.0a	251.8c-r
	A17856B	1.88 fl oz/1000 ft <sup>2</sup>				
	A13705V	2.6 fl oz/1000 ft <sup>2</sup>				
	Par	0.37 fl oz/1000 ft <sup>2</sup>				
23	A22835A	2.87 fl oz/1000 ft <sup>2</sup>	Late	5.0k-o	6.8c-f	264.3a-r
	Par	0.37 fl oz/1000 ft <sup>2</sup>				
24	A22835B	2.87 fl oz/1000 ft <sup>2</sup>	Late	6.3j-o	6.8c-f	262.8b-r
	Par	0.37 fl oz/1000 ft <sup>2</sup>				
25	A22835C	2.87 fl oz/1000 ft <sup>2</sup>	Late	3.0mno	7.3a-d	271.3a-l
	Par	0.37 fl oz/1000 ft <sup>2</sup>				
26	A22835D	2.87 fl oz/1000 ft <sup>2</sup>	Late	0.5o	7.8ab	271.0a-m
	Par	0.37 fl oz/1000 ft <sup>2</sup>				
27	A15457K	0.236 fl oz/1000 ft <sup>2</sup>	Late	20.0efg	5.3ijk	233.5q-t
	A17856B	1.88 fl oz/1000 ft <sup>2</sup>				
	Par	0.37 fl oz/1000 ft <sup>2</sup>				
28	A19188B	1.0 fl oz/1000 ft <sup>2</sup>	Late	0.5o	7.5abc	280.3a-f
	A17856B	2.61 fl oz/1000 ft <sup>2</sup>				
	Par	0.37 fl oz/1000 ft <sup>2</sup>				
29	Traction	1.3 fl oz/1000 ft <sup>2</sup>	Late	0.0o	7.0b-e	248.0e-s
	26/36	4.0 fl oz/1000 ft <sup>2</sup>				
30	Traction	1.3 fl oz/1000 ft <sup>2</sup>	Late	0.0o	7.0b-e	264.8a-r
	26/36	8.0 fl oz/1000 ft <sup>2</sup>				
31	Pinpoint	0.31 fl oz/1000 ft <sup>2</sup>	Late	0.0o	7.0b-e	256.5b-r
	Tourney	0.44 fl oz/1000 ft <sup>2</sup>				
	Rotator	0.5 fl oz/1000 ft <sup>2</sup>				
32	Fludi 50	0.495 oz/1000 ft <sup>2</sup>	Late	13.0g-k	5.8g-j	239.5j-t
33	QP Ppz	6.5 fl oz/1000 ft <sup>2</sup>	Late	3.8l-o	6.5d-g	240.8i-t

<sup>a</sup>Early treatments applied on Oct 4, 2018 and late treatments applied on Nov 1, 2018

<sup>b</sup>Mean percent diseased area assessed on Apr 17, 2019.

<sup>c</sup>Quality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.

<sup>d</sup>Color 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 April 17, 2019 at Marquette Golf Club in Marquette, MI.**

	Treatment	Rate	Application Timing <sup>a</sup>	Disease Severity <sup>b</sup>	Turf Quality <sup>c</sup>	Turf Color <sup>d</sup>
34	Chloro 720	5.5 fl oz/1000 ft2	Late	45.0b	3.8m	189.5u
35	Profile 200	6.3 fl oz/1000 ft2	Late	0.0o	7.0b-e	243.0h-t
36	Fludi 50	0.495 oz/1000 ft2	Late	0.0o	7.0b-e	245.8g-s
	QP Ppz	6.5 fl oz/1000 ft2				
37	Fludi 50	0.495 oz/1000ft	Late	2.5mno	7.0b-e	252.3c-r
	Chloro 720	5.5 fl oz/1000 ft2				
38	Chloro 720	5.5 fl oz/1000 ft2	Late	0.5o	7.0b-e	237.8k-t
	QP Ppz	6.5 fl oz/1000 ft2				
39	Chloro 720	5.5 fl oz/1000 ft2	Late	0.0o	7.3a-d	253.0c-r
	Fludi 50	0.495 oz/1000 ft2				
40	QP Ppz	6.5 fl oz/1000 ft2	Late	0.0o	7.0b-e	278.0a-g
	Instrata II A	1.92 fl oz/1000 ft2				
	Instrata II B	0.236 fl oz/1000 ft2				
41	Pedigree	5.5 fl oz/1000 ft2	Late	28.8cde	4.5klm	209.0tu
42	Pedigree	6.6 fl oz/1000 ft2	Late	35.0c	4.3lm	193.3u
43	Pedigree	4.4 fl oz/1000 ft2	Late	10.0h-n	6.0f-i	235.5n-t
	Banner Maxx	2.0 fl oz/1000 ft2				
44	Pedigree	5.5 fl oz/1000 ft2	Late	12.5g-l	5.5hij	252.8c-r
	Banner Maxx	2.0 fl oz/1000 ft2				
45	Pedigree	6.6 fl oz/1000 ft2	Late	13.8g-k	5.5hij	252.8c-r
	Banner Maxx	2.0 fl oz/1000 ft2				
46	Dexter Xcel	13.8 fl oz/1000 ft2	Late	1.3no	7.5abc	264.8a-r
	KFD-391-01	0.5 fl oz/1000 ft2				
47	Tebuzol	0.9 fl oz/1000 ft2	Late	0.0o	7.0b-e	263.8a-r
	KFD-112-02	1.35 fl oz/1000 ft2				
48	Pegasus DFX	3.25 oz/1000 ft2	Late	0.0o	7.0b-e	271.8a-k
	KFD-380	0.81 fl oz/1000 ft2				
49	KFD-112-02	1.35 fl oz/1000 ft2	Late	0.0o	7.0b-e	258.3b-r
	Pegasus DFX	3.25 oz/1000 ft2				
50	Insignia SC	0.7 fl oz/1000 ft2	Late	5.5k-o	6.3e-h	260.0b-r
	Trinity	1.0 fl oz/1000 ft2				
51	Turfcide	4.0 fl oz/1000 ft2	Late	1.3no	6.8c-f	264.5a-r
	Daconil Ultrex	3.2 oz/1000 ft2				
50	Insignia SC	0.7 fl oz/1000 ft2	Late	5.5k-o	6.3e-h	260.0b-r
	Trinity	2.0 fl oz/1000 ft2				
51	Insignia SC	0.7 fl oz/1000 ft2	Late	1.3no	6.8c-f	264.5a-r
	Trinity	1.0 fl oz/1000 ft2				
	Turfcide	4.0 fl oz/1000 ft2				

<sup>a</sup>Early treatments applied on Oct 4, 2018 and late treatments applied on Nov 1, 2018

<sup>b</sup>Mean percent diseased area assessed on Apr 17, 2019.

<sup>c</sup>Quality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.

<sup>d</sup>Color 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 April 17, 2019 at Marquette Golf Club in Marquette, MI.**

	Treatment	Rate	Application Timing <sup>a</sup>	Disease Severity <sup>b</sup>	Turf Quality <sup>c</sup>	Turf Color <sup>d</sup>
52	Daconil Wthrstk	5.5 fl oz/1000 ft2	Late	0.0o	8.0a	284.3a-d
	Interface	6.0 fl oz/1000 ft2				
	Mirage	2.0 fl oz/1000 ft2				
53	Daconil Wthrstk	5.5 fl oz/1000 ft2	Late	1.8mno	7.3a-d	270.5a-m
	Interface	3.0 fl oz/1000 ft2				
	Tartan	1.0 fl oz/1000 ft2				
54	Interface	6.0 fl oz/1000 ft2	Late	0.0o	8.0a	266.5a-q
	Mirage	2.0 fl oz/1000 ft2				
	Turfcide	6.0 fl oz/1000 ft2				
55	Interface	3.0 fl oz/1000 ft2	Late	0.0o	7.8ab	267.0a-q
	Tartan	1.0 fl oz/1000 ft2				
	Turfcide	4.0 fl oz/1000 ft2				
56	Interface	4.0 fl oz/1000 ft2	Late	0.0o	8.0a	269.8a-n
	Mirage	1.5 fl oz/1000 ft2				
	Turfcide	4.0 fl oz/1000 ft2				
57	Instrata	11.0 fl oz/1000 ft2	Late	0.0o	7.0b-e	237.3l-t
58	Instrata	9.3 fl oz/1000 ft2	Late	0.0o	7.0b-e	240.8i-t
59	Instrata	7.0 fl oz/1000 ft2	Late	0.0o	7.0b-e	241.5h-t
	Turfcide	6.0 fl oz/1000 ft2				
60	Interface	6.0 fl oz/1000 ft2	Late	0.0o	8.0a	284.3a-d
	Mirage	2.0 fl oz/1000 ft2				
61	Interface	6.0 fl oz/1000 ft2	Late	2.3mno	7.0b-e	280.5a-e
	Daconil Wthrstk	5.5 fl oz/1000 ft2				
62	Interface	6.0 fl oz/1000 ft2	Late	0.0o	8.0a	285.3abc
	Secure	0.5 fl oz/1000 ft2				
LSD P=.05				8.8	0.88	34.29

<sup>a</sup>Early treatments applied on Oct 4, 2018 and late treatments applied on Nov 1, 2018

<sup>b</sup>Mean percent diseased area assessed on Apr 17, 2019.

<sup>c</sup>Quality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.

<sup>d</sup>Color was assessed using a FieldScout CM1000 Chlorophyll Meter from Spectrum Technologies, Inc.