



## **2019-2020 Snow Mold Control Evaluation: Marquette Golf Club – Marquette, MI**

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

### **OBJECTIVE**

To evaluate fungicides for the control of gray snow mold (*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 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>. Early applications were made on 2 Oct 2019 and late applications were made on 25 Oct 2019. The experimental plot area was not inoculated. Snow cover was present from early November through early April, a total of approximately 150 days. Disease severity, turf quality, and turf color were measured on 9 Apr 2020. 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**

Snow mold pressure was very high in Marquette during the winter of 2019-2020 as evidenced by the non-treated controls averaging 87.5% disease. On average about 30% of the disease present was caused by *M. nivale* and 70% was caused by *T. ishikariensis*, though pathogen breakdown within each treatment was not rated. There were 23 treatments that averaged less than 10% disease and 16 of those averaged less than 5% diseases, which is an exceptional performance given the high disease pressure. Turf quality and turf color mostly reflected disease severity and there were 23 treatments that had an average turf quality greater than 6. Phytotoxicity was not observed with any treatment.

**Table 1: Mean snow mold severity, turf quality, and turf color were assessed on April 9, 2020 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			87.5a	1.5rst	102.8u-A
2	Premion	6.0 fl oz/1000 ft <sup>2</sup>	Late	4.3w-z	6.8a-d	174.3b-n
	Previa	4.0 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
3	Premion	6.0 fl oz/1000 ft <sup>2</sup>	Late	17.5q-z	5.0f-j	178.0b-l
	Previa	5.5 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
4	Premion	8.0 fl oz/1000 ft <sup>2</sup>	Late	0.5yz	7.8ab	189.5a-h
	Previa	4.0 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
5	Premion	10.0 fl oz/1000 ft <sup>2</sup>	Late	1.3yz	7.5abc	204.0a-d
	Previa	4.0 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
6	Premion	10.0 fl oz/1000 ft <sup>2</sup>	Late	4.3w-z	7.0a-d	206.8a-d
	Previa	5.5 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
7	Premion	10.0 fl oz/1000 ft <sup>2</sup>	Late	0.5yz	7.5abc	171.8b-o
	Secure	0.5 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
8	Concert II	5.5 fl oz/1000 ft <sup>2</sup>	Late	1.8yz	7.0a-d	223.5a
	Turfcide	8.0 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
9	Concert II	8.3 fl oz/1000 ft <sup>2</sup>	Late	0.0z	7.8ab	204.3a-d
	Turfcide	8.0 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
10	Turfcide	6.0 fl oz/1000 ft <sup>2</sup>	Late	5.5v-z	6.3c-f	211.5ab
	Previa	4.0 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
11	Turfcide	8.0 fl oz/1000 ft <sup>2</sup>	Late	5.5v-z	6.3c-f	209.5abc
	Previa	5.5 fl oz/1000 ft <sup>2</sup>				
	Foursome	0.5 fl oz/1000 ft <sup>2</sup>				
12	Enclave	8.0 fl oz/1000 ft <sup>2</sup>	Late	28.8m-t	4.5h-l	180.5b-l
	Foursome	0.4 fl oz/1000 ft <sup>2</sup>				
13	Enclave	4.0 fl oz/1000 ft <sup>2</sup>	Early/Late	36.3i-r	4.3i-m	159.5f-q
	Foursome	0.4 fl oz/1000 ft <sup>2</sup>				
14	Zio	0.9 oz/1000 ft <sup>2</sup>	Late	91.3a	1.0t	96.3w-A
	Torque	0.6 fl oz/1000 ft <sup>2</sup>				
15	Torque	1.1 fl oz/1000 ft <sup>2</sup>	Late	95.0a	1.0t	93.5x-A
16	Traction	1.3 fl oz/1000 ft <sup>2</sup>	Late	26.3n-u	4.8g-k	173.8b-n
	26/36	4.0 fl oz/1000 ft <sup>2</sup>				
17	Traction	1.3 fl oz/1000 ft <sup>2</sup>	Late	34.3j-s	4.8g-k	166.8d-p
	26/36	8.0 fl oz/1000 ft <sup>2</sup>				
18	Affirm	0.9 oz/1000 ft <sup>2</sup>	Late	53.8e-j	3.5k-o	114.8s-A
	Civitas Pre-Mixed	17 fl oz/1000 ft <sup>2</sup>				

<sup>a</sup>Early treatments applied on Oct 2, 2019 and late treatments applied on Oct 25, 2019

<sup>b</sup>Mean percent diseased area assessed on Apr 9 2020.

<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 9, 2020 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>
19	Tourney Affirm	0.44 oz/1000 ft2 0.9 oz/1000 ft2	Late	63.8c-f	2.5o-s	127.3p-z
20	NUP-19022	9.28 fl oz/a	Late	91.3a	1.3st	97.8v-A
21	NUP-19022 Traction	9.28 fl oz/a 1.3 fl oz/1000 ft2	Late	90.0a	1.3st	91.8yzA
22	Insignia Trinity	0.7 fl oz/1000 ft2 1.0 fl oz/1000 ft2	Late	40.0h-p	3.8j-o	129.8p-y
23	Insignia Trinity 26/36	0.7 fl oz/1000 ft2 1.0 fl oz/1000 ft2 2.0 fl oz/1000 ft2	Late	16.8r-z	5.3e-i	177.3b-m
28	Bayleton Flo 26/36	1.9 fl oz/1000 ft2 4.0 fl oz/1000 ft2	Late	52.5e-k	3.3l-p	132.0o-x
29	C. rosea (88-710)	50.0 g/a	Early	92.5a	1.0t	89.8yzA
30	C. rosea (ACM 941)	50.0 g/a	Early	92.5a	1.3st	93.8x-A
31	Instrata	9.3 fl oz/1000 ft2	Late	18.8q-z	5.0f-j	150.0h-t
32	Turfcide	8.0 fl oz/1000 ft2	Late	42.5g-o	4.0i-n	163.3e-p
33	C. rosea (88-710) Instrata	50.0 g/a 9.3 fl oz/1000 ft2	Early Late	28.8m-t	5.0f-j	137.3m-v
34	C. rosea (ACM 941) Instrata	50.0 g/a 9.3 fl oz/1000 ft2	Early Late	16.0s-z	5.8d-h	178.8b-l
35	C. rosea (88-710) Turfcide	50.0 g/a 8.0 fl oz/1000 ft2	Early Late	23.8n-w	5.0f-j	140.5l-u
36	C. rosea (ACM 941) Turfcide	50.0 g/a 8.0 fl oz/1000 ft2	Early Late	31.3l-t	4.8g-k	152.3g-s
37	A13705V A19188B Turfcide Ambient Plus	2.6 fl oz/1000 ft2 1.0 fl oz/1000 ft2 6.0 fl oz/1000 ft2 0.37 fl oz/1000 ft2	Late	6.3u-z	6.8a-d	180.3b-l
38	Instrata Turfcide Ambient Plus	11.0 fl oz/1000 ft2 6.0 fl oz/1000 ft2 0.37 fl oz/1000 ft2	Late	0.0z	8.0a	195.3a-f
39	A15457R A17856B Turfcide Ambient Plus	0.24 fl oz/1000 ft2 1.88 fl oz/1000 ft2 6.0 fl oz/1000 ft2 0.37 fl oz/1000 ft2	Late	5.5v-z	7.0a-d	182.3b-k

<sup>a</sup>Early treatments applied on Oct 2, 2019 and late treatments applied on Oct 25, 2019

<sup>b</sup>Mean percent diseased area assessed on Apr 9 2020.

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

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40	A15457R	0.24 fl oz/1000 ft <sup>2</sup>	Late	4.8w-z	6.8a-d	178.0b-l
	A17856B	1.88 fl oz/1000 ft <sup>2</sup>				
	Banner Maxx	1.0 fl oz/1000 ft <sup>2</sup>				
	Ambient Plus	0.37 fl oz/1000 ft <sup>2</sup>				
41	A15457R	0.24 fl oz/1000 ft <sup>2</sup>	Late	1.8yz	7.0a-d	160.5f-q
	A17856B	1.88 fl oz/1000 ft <sup>2</sup>				
	Banner Maxx	2.0 fl oz/1000 ft <sup>2</sup>				
	Ambient Plus	0.37 fl oz/1000 ft <sup>2</sup>				
42	A15457R	0.24 fl oz/1000 ft <sup>2</sup>	Late	13.8t-z	5.3e-i	192.5a-f
	A17856B	1.88 fl oz/1000 ft <sup>2</sup>				
	Banner Maxx	3.0 fl oz/1000 ft <sup>2</sup>				
	Ambient Plus	0.37 fl oz/1000 ft <sup>2</sup>				
43	Banner Maxx	2.0 fl oz/1000 ft <sup>2</sup>	Early	5.5v-z	6.8a-d	160.3f-q
	A15457R	0.24 fl oz/1000 ft <sup>2</sup>	Late			
	A17856B	1.88 fl oz/1000 ft <sup>2</sup>	Late			
	Ambient Plus	0.37 fl oz/1000 ft <sup>2</sup>	Late			
44	A22835C	2.87 fl oz/1000 ft <sup>2</sup>	Late	5.5v-z	6.8a-d	205.3a-d
	Ambient Plus	0.37 fl oz/1000 ft <sup>2</sup>				
45	A22835C	2.16 fl oz/1000 ft <sup>2</sup>	Late	35.0j-s	4.3i-m	132.0o-x
	Ambient Plus	0.37 fl oz/1000 ft <sup>2</sup>				
46	Banner Maxx	4.0 fl oz/1000 ft <sup>2</sup>	Early	3.5xyz	7.0a-d	152.0g-s
	A22835C	2.87 fl oz/1000 ft <sup>2</sup>	Late			
	Ambient Plus	0.37 fl oz/1000 ft <sup>2</sup>	Late			
	Banner Maxx	4.0 fl oz/1000 ft <sup>2</sup>	Late			
47	A22835C	2.87 fl oz/1000 ft <sup>2</sup>	Late	19.3q-z	5.3e-i	183.0b-j
	Ambient Plus	0.37 fl oz/1000 ft <sup>2</sup>				
48	A15457R	0.236 fl oz/1000 ft <sup>2</sup>	Late	5.0v-z	6.8a-d	182.8b-j
	A17856B	1.88 fl oz/1000 ft <sup>2</sup>				
	Ambient Plus	0.37 fl oz/1000 ft <sup>2</sup>				
49	A19188B	1.0 fl oz/1000 ft <sup>2</sup>	Late	48.8e-m	3.8j-o	163.3e-p
	A13705V	2.61 fl oz/1000 ft <sup>2</sup>				
	Ambient Plus	0.37 fl oz/1000 ft <sup>2</sup>				
50	Instrata	11.0 fl oz/1000 ft <sup>2</sup>	Late	5.3v-z	6.5b-e	186.3a-i
	Ambient Plus	0.37 fl oz/1000 ft <sup>2</sup>				
51	BCP1803	1.7 fl oz/1000 ft <sup>2</sup>	Late	3.5xyz	6.5b-e	179.3b-l
	Fame	0.36 fl oz/1000 ft <sup>2</sup>				
52	BCP1803	1.7 fl oz/1000 ft <sup>2</sup>	Late	25.0n-v	5.0f-j	211.0ab
	Fame	0.36 fl oz/1000 ft <sup>2</sup>				
	3336F	6.0 fl oz/1000 ft <sup>2</sup>				
53	BCP1803	1.7 fl oz/1000 ft <sup>2</sup>	Late	0.5yz	7.5abc	192.8a-f
	Fame	0.36 fl oz/1000 ft <sup>2</sup>				
	QP Chlorothalonil	5.25 fl oz/1000 ft <sup>2</sup>				
54	BCP1803	1.7 fl oz/1000 ft <sup>2</sup>	Late	42.5g-o	3.8j-o	121.5q-A
	3336F	6.0 fl oz/1000 ft <sup>2</sup>				

<sup>a</sup>Early treatments applied on Oct 2, 2019 and late treatments applied on Oct 25, 2019

<sup>b</sup>Mean percent diseased area assessed on Apr 9 2020.

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

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55	BCP1803	1.7 fl oz/1000 ft <sup>2</sup>	Late	56.3d-i	3.0m-q	110.0t-A
	3336F	8.0 fl oz/1000 ft <sup>2</sup>				
56	Interface	6.0 fl oz/1000 ft <sup>2</sup>	Late	65.0b-e	2.8n-r	134.8n-w
57	Daconil Wthrstk	5.5 fl oz/1000 ft <sup>2</sup>	Late	0.5yz	7.8ab	187.5a-i
	Interface	6.0 fl oz/1000 ft <sup>2</sup>				
	Mirage	2.0 fl oz/1000 ft <sup>2</sup>				
58	Interface	6.0 fl oz/1000 ft <sup>2</sup>	Late	0.0z	8.0a	192.0a-g
	Mirage	2.0 fl oz/1000 ft <sup>2</sup>				
	Turfcide	6.0 fl oz/1000 ft <sup>2</sup>				
61	Interface	6.0 fl oz/1000 ft <sup>2</sup>	Late	33.8j-t	4.5h-l	129.5p-y
	Mirage	2.0 fl oz/1000 ft <sup>2</sup>				
63	Instrata	11.0 fl oz/1000 ft <sup>2</sup>	Late	23.8n-w	4.8g-k	143.0j-t
LSD P=.05				20.16	1.46	40.12

<sup>a</sup>Early treatments applied on Oct 2, 2019 and late treatments applied on Oct 25, 2019

<sup>b</sup>Mean percent diseased area assessed on Apr 9 2020.

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