



Oregon State
University

Thursday – 27th of February 2020

**5TH ANNUAL
MICRODOCHIUM PATCH FIELD DAY**

**Lewis Brown Horticulture Farm
Corvallis, OR
33329 Peoria Rd
Corvallis, OR 97333**

Speakers:

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Quantifying the long-term effects of alternative Microdochium patch management techniques on sand-based annual bluegrass putting green performance over multiple seasons.

Presenter: Clint Mattox

In addition to quantifying Microdochium patch suppression and winter turfgrass quality, this experiment aims to provide information about the long-term impacts that repeated phosphorous acid, mineral oil, sulfur, and/or iron sulfate heptahydrate applications have on soil fertility, summer anthracnose, and summer putting green performance. Data collection includes annual soil fertility levels, summer putting green speed, summer water infiltration, summer volumetric water content %, summer NDVI, monthly disease incidence (primarily Microdochium patch and anthracnose), and monthly turfgrass quality. A beneficial outcome of this research will be to provide answers to golf course superintendents regarding the long-term use of alternative techniques to manage Microdochium patch on annual bluegrass putting greens. A summary of the first-year observations are included on the following page (Page 3).

Trt # 1	Elemental Sulfur	0.25 #/M
	Duraphite 12	3.2 oz./M
Trt # 2a	Civitas One	8.5 oz./M
(Sep, Oct, Nov, Apr)	Duraphite 12	3.2 oz./M
Trt # 2b	Elemental Sulfur	0.25 #/M
(Dec, Jan, Feb, Mar)	Duraphite 12	3.2 oz./M
Trt # 3a	Civitas One	8.5 oz./M
	Duraphite 12	3.2 oz./M
Trt # 3b	Elemental Sulfur	0.25 #/M
(in 4-wk rotation)	Duraphite 12	3.2 oz./M
Trt # 4a	Civitas One	8.5 oz./M
Trt # 4b	Elemental Sulfur	0.25 #/M
(in 4-wk rotation)	Duraphite 12	3.2 oz./M
Trt # 5	0.50 # FeSO ₄ /M	0.5 #/M
	Duraphite 12	3.2 oz./M
Trt # 6	1.0 # FeSO ₄ /M	1.0 #/M
	Duraphite 12	3.2 oz./M
Trt # 7	Elemental Sulfur	0.25 #/M
Trt # 8	Duraphite 12	3.2 oz./M
Trt # 9	Fungicide Control	Every 4 wks
Trt # 10	Not Treated Control	



Treatment #	Treatment Description	< ---- 24th of January 2019 ---- >		< ---- 19th of September 2019 ---- >	
		% Microdochium patch	Turf Quality	% Anthracnose	Turf Quality
1	0.25 # S / M + 0.075 lbs. H ₃ PO ₃ / M	2.0% ab [†]	5.0 ab [†]	8.0% ab [†]	5.8 a [†]
2a	8.5 oz. Civitas Turf Defense + (Sep, Oct, Nov, Apr)	0.3% b	6.8 a	1.4% ab	6.3 a
2b	0.25 # S / M + (Dec - Mar)				
3a	8.5 oz. Civitas Turf Defense + (in 4-wk rotation)	0.3% b	6.8 a	0.3% ab	6.8 a
3b	0.25 # S / M + (in 4-wk rotation)				
4a (in 4-wk rotation)	8.5 oz. Civitas Turf Defense	0.9% ab	5.4 ab	1.9% ab	5.3 a
4b	0.25 # S / M + (in 4-wk rotation)				
5	0.5 lbs. FeSO ₄ / M + 0.075 lbs. H ₃ PO ₃ / M	0.6% ab	5.0 ab	10.0% a	4.8 a
6	1.0 lbs. FeSO ₄ / M + 0.075 lbs. H ₃ PO ₃ / M	0.5% ab	5.0 ab	2.6% ab	6.0 a
7	0.25 # S / M	4.3% ab	5.0 ab	0.3% ab	6.8 a
8	0.075 lbs. H ₃ PO ₃ / M	3.8% ab	5.0 ab	5.3% ab	5.0 a
9	Fungicide Control	0.3% b	6.3 a	0.0% b	7.3 a
10	Non-treated Control	40.0% a	3.0 b	0.3% ab	6.0 a

Treatment effects on % Microdochium patch, % anthracnose, and turfgrass quality. [†] Mean differences in the same column followed by the same letter are not significantly different (Dunn's test : $\alpha \leq 0.05$).

Treatment #	Treatment Description	< ---- 19th of September 2019 ---- >				< ----- Mehlich III (ppm) ----- >					
		H ₂ O Infiltration [†]	Greenspeed [‡]	NDVI [§]	pH	Cu	Fe	K	Mn	P	S
1	0.25 # S / M + 0.075 lbs. H ₃ PO ₃ / M	6.5 a [¶]	9.3 a [¶]	44.0 a ^{¶¶}	6.42 b ^{¶¶}	1.3 a ^{¶¶}	157.3 a ^{¶¶}	26.8 a ^{¶¶}	27.6 a ^{¶¶}	13.1 ab ^{¶¶}	11.6 ab ^{¶¶}
2a	8.5 oz. Civitas Turf Defense + (Sep, Oct, Nov, Apr)	8.0 a	8.9 a	43.7 a	6.50 ab	1.3 a	168.7 a	25.3 a	26.6 ab	12.5 ab	7.6 bcd
2b	0.25 # S / M + (Dec - Mar)										
3a	8.5 oz. Civitas Turf Defense + (in 4-wk rotation)	5.5 a	9.3 a	44.5 a	6.55 ab	1.4 a	171.6 a	29.1 a	24.3 abc	14.9 ab	8.9 abc
3b	0.25 # S / M + (in 4-wk rotation)										
4a (in 4-wk rotation)	8.5 oz. Civitas Turf Defense	10.8 a	9.5 a	41.5 a	6.48 ab	1.4 a	196.0 a	30.2 a	23.2 abcd	15.4 a	9.7 abc
4b	0.25 # S / M + (in 4-wk rotation)										
5	0.5 lbs. FeSO ₄ / M + 0.075 lbs. H ₃ PO ₃ / M	19.5 a	9.6 a	41.2 a	6.61 ab	1.2 a	169.3 a	24.3 a	22.8 abcd	14.8 ab	5.2 cd
6	1.0 lbs. FeSO ₄ / M + 0.075 lbs. H ₃ PO ₃ / M	8.0 a	9.2 a	40.0 a	6.69 ab	1.0 a	117.0 a	24.3 a	18.2 d	9.5 b	5.6 cd
7	0.25 # S / M	16.8 a	9.8 a	42.4 a	6.50 ab	1.3 a	168.5 a	28.7 a	27.5 a	11.4 ab	13.4 a
8	0.075 lbs. H ₃ PO ₃ / M	3.3 a	9.2 a	43.8 a	6.62 ab	1.2 a	142.8 a	23.1 a	21.8 bcd	12.4 ab	3.2 d
9	Fungicide Rotation	4.3 a	8.9 a	43.2 a	6.56 ab	1.2 a	152.3 a	23.2 a	21.7 bcd	9.9 b	3.1 d
10	Non-treated Control	8.8 a	9.2 a	41.2 a	6.73 a	1.1 a	160.9 a	27.2 a	20.9 cd	13.8 ab	3.1 d

Treatment effects on putting green characteristics and soil fertility. [†] H₂O infiltration recorded with a Turf-Tec Infiltrometer (5 min). [‡] Greenspeed = mean of 3 ball roll distances in 2 directions using the 2X notch on the USGA Stimpmeter. [§] Means of 5 FieldScout CM 1000 NDVI Meter readings. [¶] Mean differences in the same column followed by the same letter are not significantly different (Dunn's test : $\alpha \leq 0.05$).

Comparing iron sulfate versus chelated iron for the suppression of Microdochium patch on annual bluegrass putting greens in the absence and presence of phosphorous acid.

Presenter: Clint Mattox

This field study compares the effects of chelated iron versus iron sulfate with or without the addition of phosphorous acid on the severity of Microdochium patch and turfgrass quality on an annual bluegrass putting green.

< ----- 24th of January 2019 ----- >			
	% Microdochium patch [†]	Percent Green Cover [‡]	Turf Quality [§]
0.1 # Fe/M as FeSO ₄	20.0% b [¶]	81.8% cd [¶]	5.00 abc [#]
0.1 # Fe/M as FeSO ₄ 0.075 lbs. H ₃ PO ₃ / M	0.4% c	94.6% ab	5.00 abc
0.2 # Fe/M as FeSO ₄	1.8% c	87.6% bc	5.00 abc
0.2 # Fe/M as FeSO ₄ 0.075 lbs. H ₃ PO ₃ / M	0.0% c	91.6% ab	5.75 ab
0.1 # Fe / M as DTPA	32.5% ab	71.3% e	4.00 bc
0.1 # Fe/M as DTPA 0.075 lbs. H ₃ PO ₃ / M	0.7% c	95.0% ab	5.00 abc
0.2 # Fe/M as DTPA	25.0% b	77.4% de	4.00 bc
0.2 # Fe/M as DTPA 0.075 lbs. H ₃ PO ₃ / M	0.1% c	94.8% ab	5.25 abc
0.075 lbs. H ₃ PO ₃ / M	3.3% c	93.6% ab	5.00 abc
Fungicide Control	0.0% c	97.8% a	7.25 a
Not-treated Control	45.0% a	43.7% f	3.25 c

Treatment effects on % Microdochium patch, % green cover, and turfgrass quality. [†] % Microdochium patch assessed through visual ratings from 0 to 100% [‡] % green cover assessed using the TurfAnalyzer program. [§] Turf quality assessed using the NTEP scale from 1 to 9 with a rating of 6 or greater considered acceptable. [¶] Means in the same column followed by the same letter are not significantly different (Tukey's HSD: alpha ≤ 0.05). [#] Means in the same column followed by the same letter are not significantly different (Dunn's test : alpha ≤ 0.05).

Trt # 1	0.1 # Fe/M (Iron Sulfate)	0.5 # FeSO ₄ /M
Trt # 2	0.1 # Fe/M (Iron Sulfate) Duraphite 12	0.5 # FeSO ₄ /M 3.2 oz./M
Trt # 3	0.2 # Fe/M (Iron Sulfate)	1.0 # FeSO ₄ /M
Trt # 4	0.2 # Fe/M (Iron Sulfate) Duraphite 12	1.0 # FeSO ₄ /M 3.2 oz./M
Trt # 5	0.1 # Fe/M (DTPA)	0.9 #/M
Trt # 6	0.1 # Fe/M (DTPA) Duraphite 12	0.9 #/M 3.2 oz./M
Trt # 7	0.2 # Fe/M (DTPA)	1.8 #/M
Trt # 8	0.2 # Fe/M (DTPA) Duraphite 12	1.8 #/M 3.2 oz./M
Trt # 9	Duraphite 12	3.2 oz./M
Trt # 10	Fungicide Control	Every 4 weeks
Trt # 11	Not Treated Control	

East -- >>

10	3	6	5
9	1	7	6
4	10	5	4
1	11	8	1
8	7	2	10
3	2	3	2
11	6	9	11
2	8	11	3
6	5	1	8
7	4	10	7
5	9	4	9

Road

2019-2020 Quali-Pro *Microdochium* Patch Trial

Presenter: Brian McDonald

The goal of this trial was to evaluate various rates of Enclave fungicide (tebuconazole, iprodione, thiophanate methyl, and chlorothalonil) as well as test some experimental fungicides on suppression of *Microdochium* patch on an annual bluegrass putting green. Preliminary results suggest that the higher rates of Enclave (8.0 fl. oz.) + Foursome (0.4 fl. oz.) provided better disease suppression than lower rates.

Percent Disease				
Trt		Rate/M	Interval	Average 02/12/20
1	Non-treated Control	-	-	23.3
2	Enclave + Foursome	8.0 fl. oz. 0.4 fl. oz.	28 day	0.2
3	Enclave + Foursome	6.0 fl. oz. 0.4 fl. oz.	28 day	0.9
4	Enclave + Foursome	3.0 fl. oz. 0.4 fl. oz.	28 day	3.0
5	CSI19-304	1.3 fl. oz.	28 day	1.0
6	CSI19-318	2.0 fl. oz.	28 day	1.5

2019 Belchim Quali-Pro *Microdochium* Patch Trial

Oregon State University

Initiated:10/07/19

Location: North Green - South Half

E--->

5	6	2	13	8	7	4		10		11	5	7	4	9	2
	10	4		12	5	9	6	12		8	2	10	3	1	
12	8	9	3		1	13		4		13	7	6		13	8
7	1	11		2	3	10	11	3	6	1	9	5	11		12

Oregon State University					
Initiated: 10/01/19					
Area: 20' x 21.5'					
Plot size 4' wide X 4' long					
	Rep 4 4'	Rep 3	Rep 2	Rep 1	S----->
1' 4'					Trt # Programs
					1 Nontreated
					2 70% Action Threshold
					3 80% Action Threshold
					4 90% Action Threshold
					5 Calendar Based Program

2019-2020 Bayer, BASF, AMVAC Fungicide Efficacy Trial

Presenter: Brian McDonald

2019 Bayer BASF AMVAC M. Patch

Oregon State University

E ---->

Initiated: 10/15/19

1	6"	1	6"	2	6"	2		3	6"	3	6"	4	6"	4
20		22		6		7		3		20		16		19
19		10		18		14		9		7		3		8
17		15		3		17		8		19		22		11
2		6		11		13		15		22		1		18
1		13		19		5		17		5		4		13
11		7		21		20		18		4		2		15
4		3		12		1		14		2		7		21
8		5		16		9		6		16		14		17
9		18		15		10		21		11		20		12
14		12		8		22		1		12		6		10
21		16		2		4		13		10		5		9

2019-2020 Bayer, BASF, AMVAC Fungicide Efficacy Trial

	Trt	Rate/M	Interval	Percent Disease 2/19/20	Plot Quality 2/19/20
21	Instrata	9.4 fl. oz.	21 day	0.0	6.0
12	Turfcide 400 + 26GT	4.0 fl. oz. 4.0 fl. oz.	28 day	0.0	7.5
14	Interface + OSU-2019-EXPMP03	6.0 fl. oz. 0.2 fl. oz.	21 day	0.0	7.5
11	Premion	8.0 fl. oz.	28 day	0.1	7.4
9	Turfcide 400	8.0 fl. oz.	28 day	0.1	7.5
22	Strobe Pro rotated with Turfcide 400	3.0 fl. oz. 8.0 fl. oz.	28 day	0.1	7.1
16	Rotation	8.0 fl. oz.	28 day	0.2	7.3
19	Trilogy	5.6 fl. oz.	21 day	0.2	7.6
15	OSU-2019-EXPMP03	0.2 fl. oz.	21 day	0.3	7.0
8	Turfcide 400	4.0 fl. oz.	28 day	0.4	6.8
10	Premion	4.0 fl. oz.	28 day	0.9	5.9
13	Interface	6.0 fl. oz.	21 day	0.9	6.0
18	OSU-2019-EXPMP02	-	21 day	1.3	5.8
20	Dedicate Stressgard*	2.0 fl. oz.	21 day	1.4	5.8
5	Lexicon + Maxtima	0.47 fl. oz. 0.8 fl. oz.	28 day	2.0	5.3
7	Maxtima	0.8 fl. oz.	28 day	2.8	5.1
3	Navicon + Xzemplar	0.9 fl. oz. 0.26 fl. oz.	28 day	2.9	5.0
17	OSU-2019-EXPMP01	-	21 day	3.2	4.9
6	Xzemplar	0.26 fl. oz.	28 day	6.8	4.4
2	Navicon	0.9 fl. oz.	28 day	7.0	4.5
4	Lexicon	0.47 fl. oz.	28 day	8.8	4.5
1	Non-treated	-	-	34.5	2.6

* Dedicate Stressgard is tebuconazole + trifloxystrobin

2019-2020 Intelligro, Planet Turf, Rhizo Solutions, and Fungicide Standards *Microdochium* Patch Trial

Presenter: Emily Braithwaite

This trial evaluated some new experimental alternative products and existing rotations along with some fungicide standards on their effects on *Microdochium* patch. Entries from Intelligro (Duraphite 12 + Sulfur DF rotated with Duraphite 12 + Civitas Mineral Oil) have shown excellent suppression of *Microdochium* patch at 14 day intervals. In this trial they were evaluated at 28 day intervals, with the addition of Proxy applications in fall and spring. The fungicide standards in this trial (Secure Action and Daconil Action) were included to compare the efficacy of each contact on disease development.

2019 Intelligro, Planet Turf, Kostka Microdochium Patch Trials									
Oregon State University					E ---->				
Initiated: 10/15/19									
17.5'									

2019-2020 Intelligro, Planet Turf, Experimentals, and Fungicide Standards
***Microdochium* Patch Trial**

	Trt	Rate/M	Interval	Percent Disease 2/19/20	Plot Quality 2/19/20
10	Secure Action	0.5	14 day	0.0	7.8
11	Daconil Action	3.5	14 day	0.0	7.0
9	Rhizo Treatment 3	4.0	14 day	2.4	5.3
6	PT109 + Microthiol Disperse + Nutri-Phite Magnum + Optimizer Green Shade	1.47 3.67 2.0 0.37	14 day	2.8	5.9
2 ¹	Duraphite 12 + Civitas Rotated with Duraphite 12 + Sulfur DF	3.2 8.5 3.2 5.0	28 day ²	4.4	5.3
3	Duraphite 12 + Civitas Rotated with Duraphite 12 + Sulfur DF	3.2 8.5 3.2 5.0	28 day	5.3	4.8
7	Rhizo Treatment 1	2.0	14 day	10.5	4.1
8	Rhizo Treatment 2	4.0	14 day	13.9	4.0
4	PT109	0.73	14 day	18.3	3.4
5	PT109	1.47	14 day	18.6	3.5
1	Non-treated Control	-	14 day	22.0	3.0

¹ Proxy applied in late November and late March at 5.0 fl. oz./M

² Beginning 01/07/2020, treatments were applied on a 14 day interval