2020 OGCSA Pest Management Webinar Series

Thank you for joining us.

We will begin at the top of the hour.

Presented By

Simplot
PARTNERS

Microdochium patch!

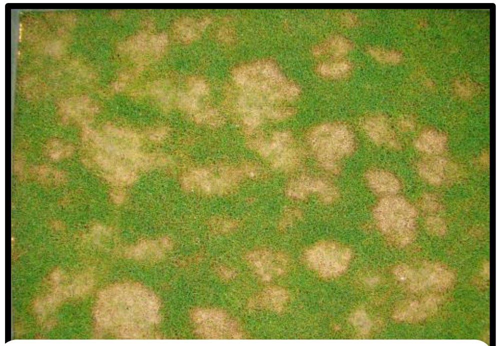
Clint Mattox Ph.D.
Research Associate (Post-Doc)
Oregon State University

Oregon State University

Trial Background

Managing Microdochium patch on annual bluegrass with non-traditional fungicides

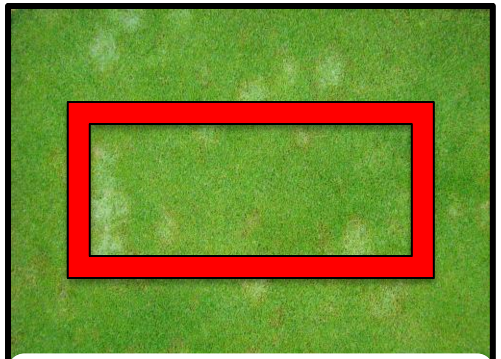
Rolling 5 days wk



Trichoderma sp.

H_3PO_3

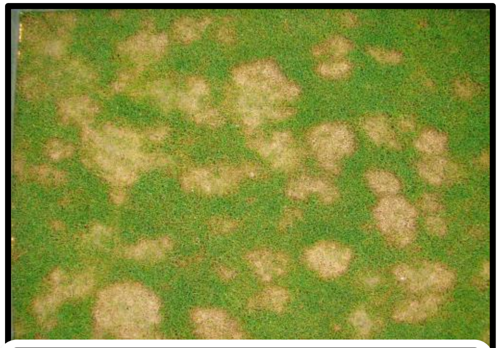
Sulfur



Civitas Defense

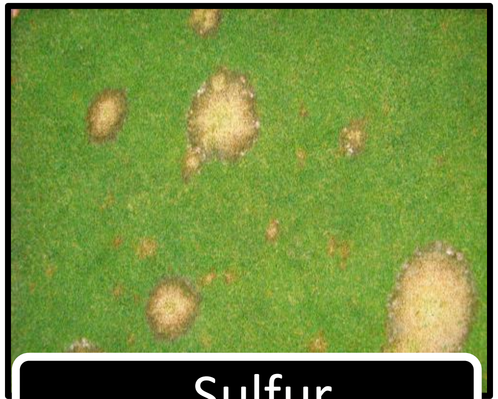
Managing Microdochium patch on annual bluegrass with non-traditional fungicides

Rolling 5 days wk



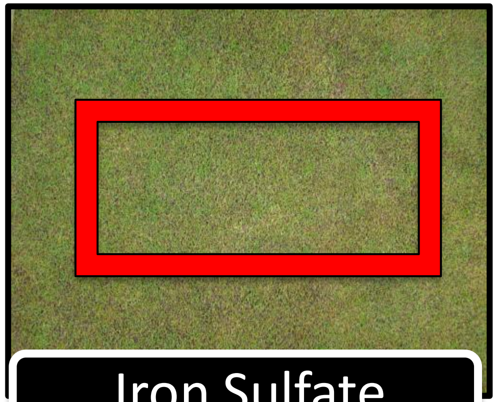
Trichoderma sp.

H_3PO_3

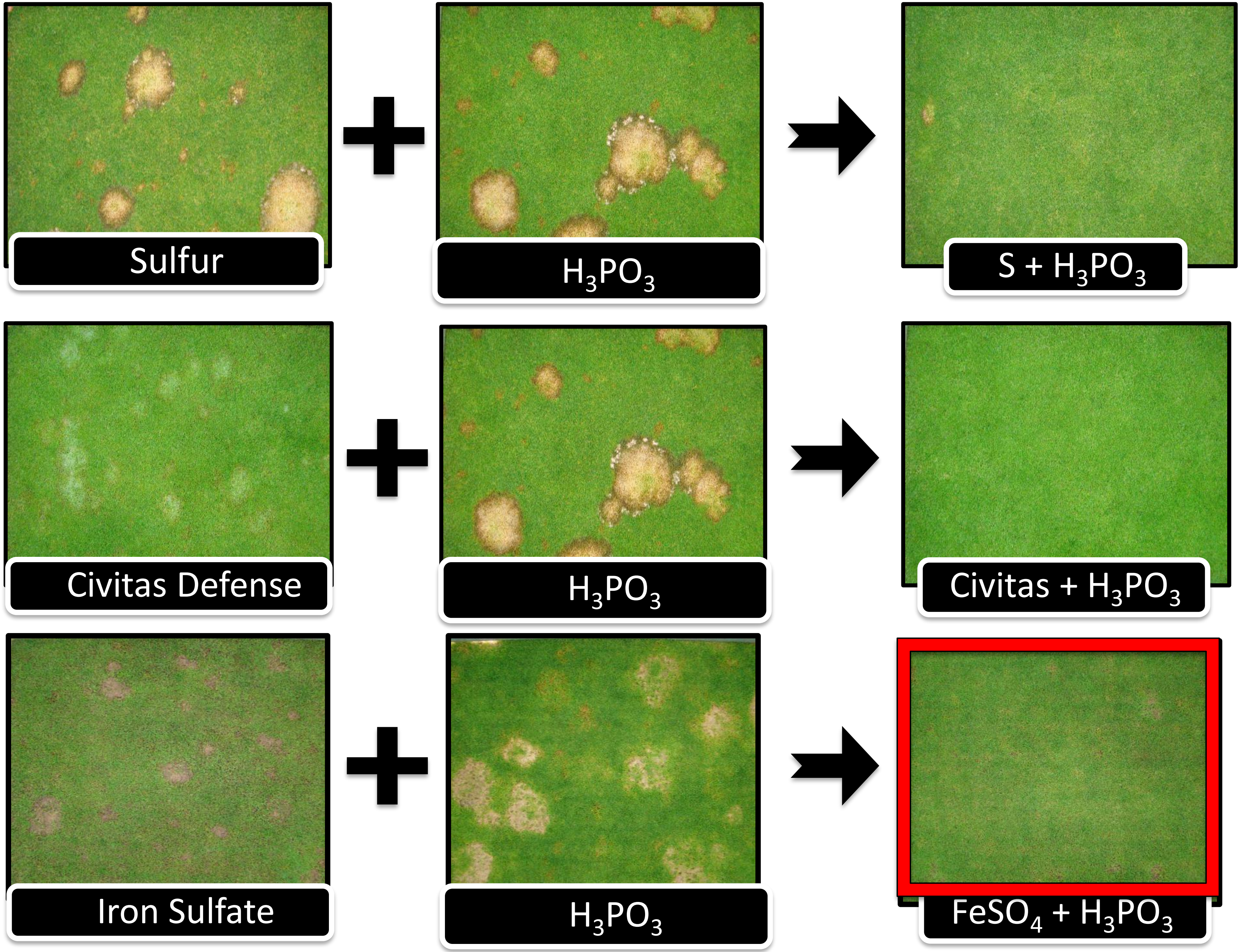


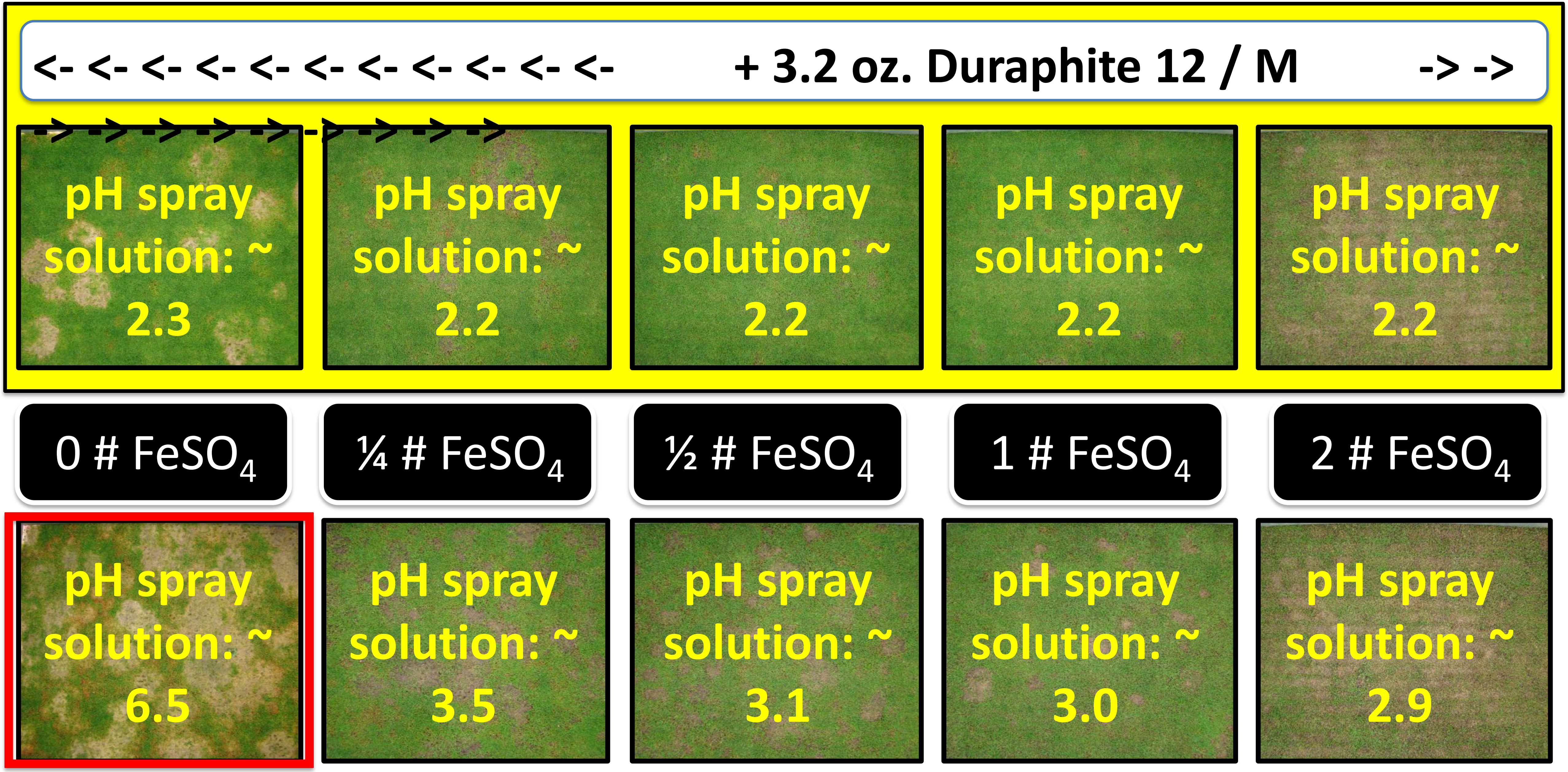
Sulfur

Civitas Defense



Iron Sulfate


Sulfur
H_3PO_3
$S + H_3PO_3$
Civitas Defense
H_3PO_3
Civitas + H_3PO_3
Iron Sulfate
H_3PO_3
$FeSO_4 + H_3PO_3$



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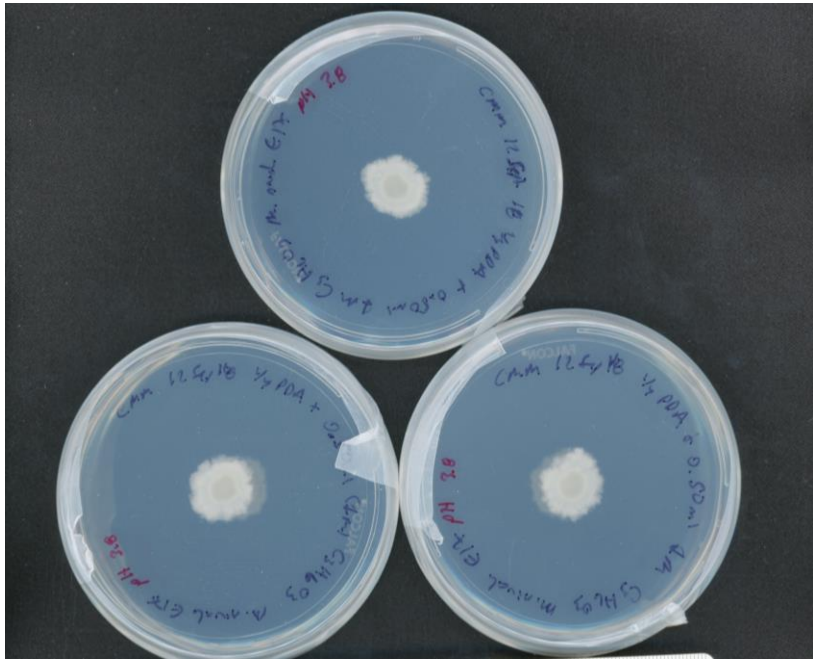
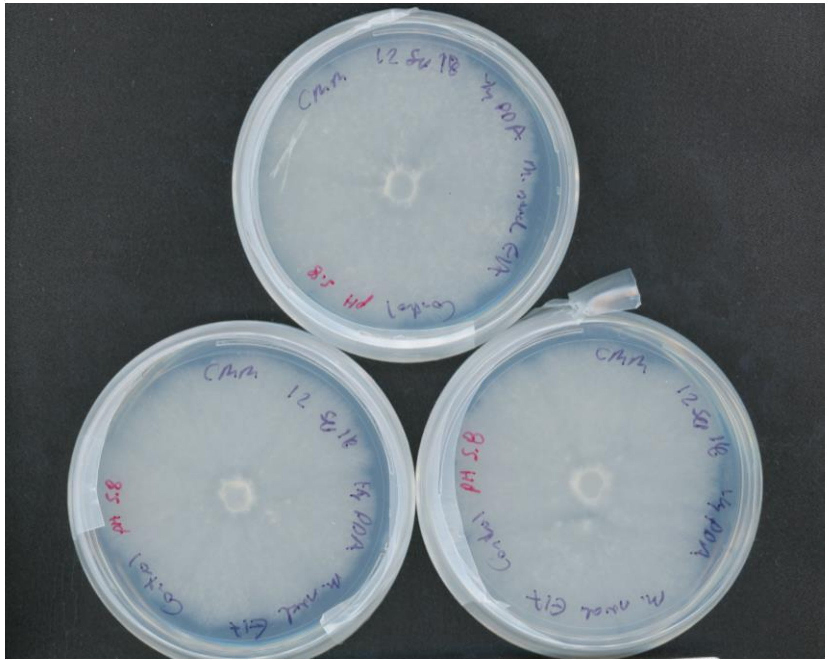
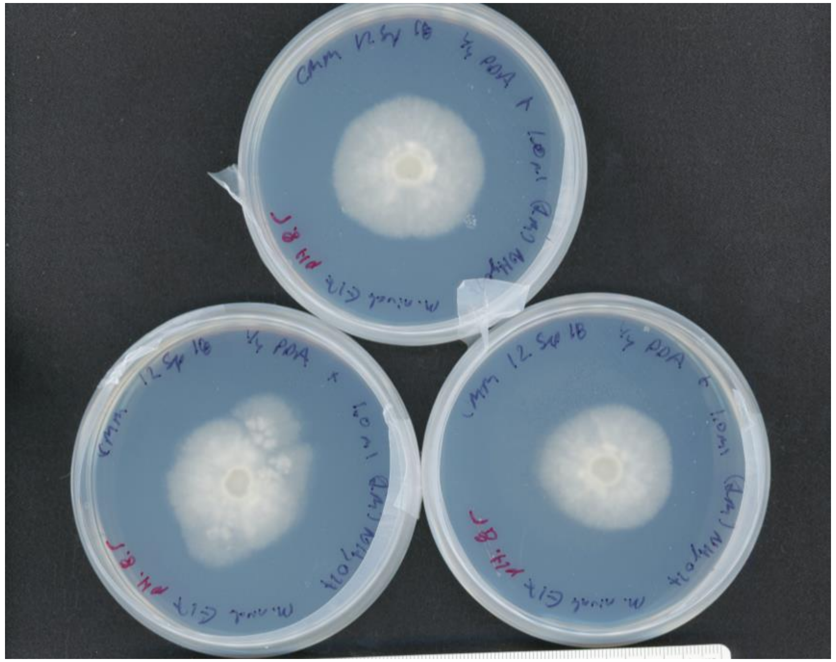
Microdochium nivale pH sensitivity



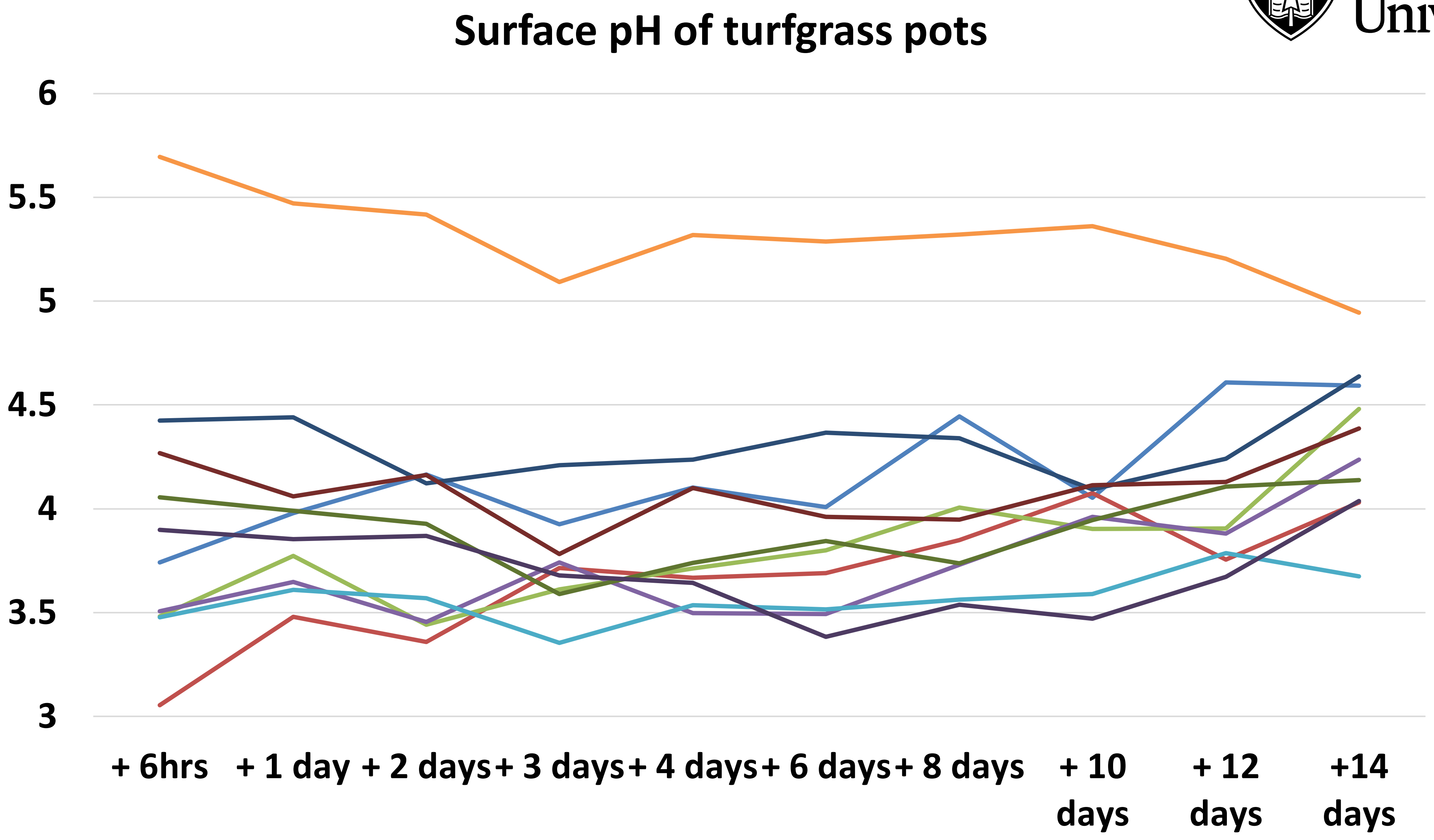
pH 3.8



pH 5.6



pH 8.5



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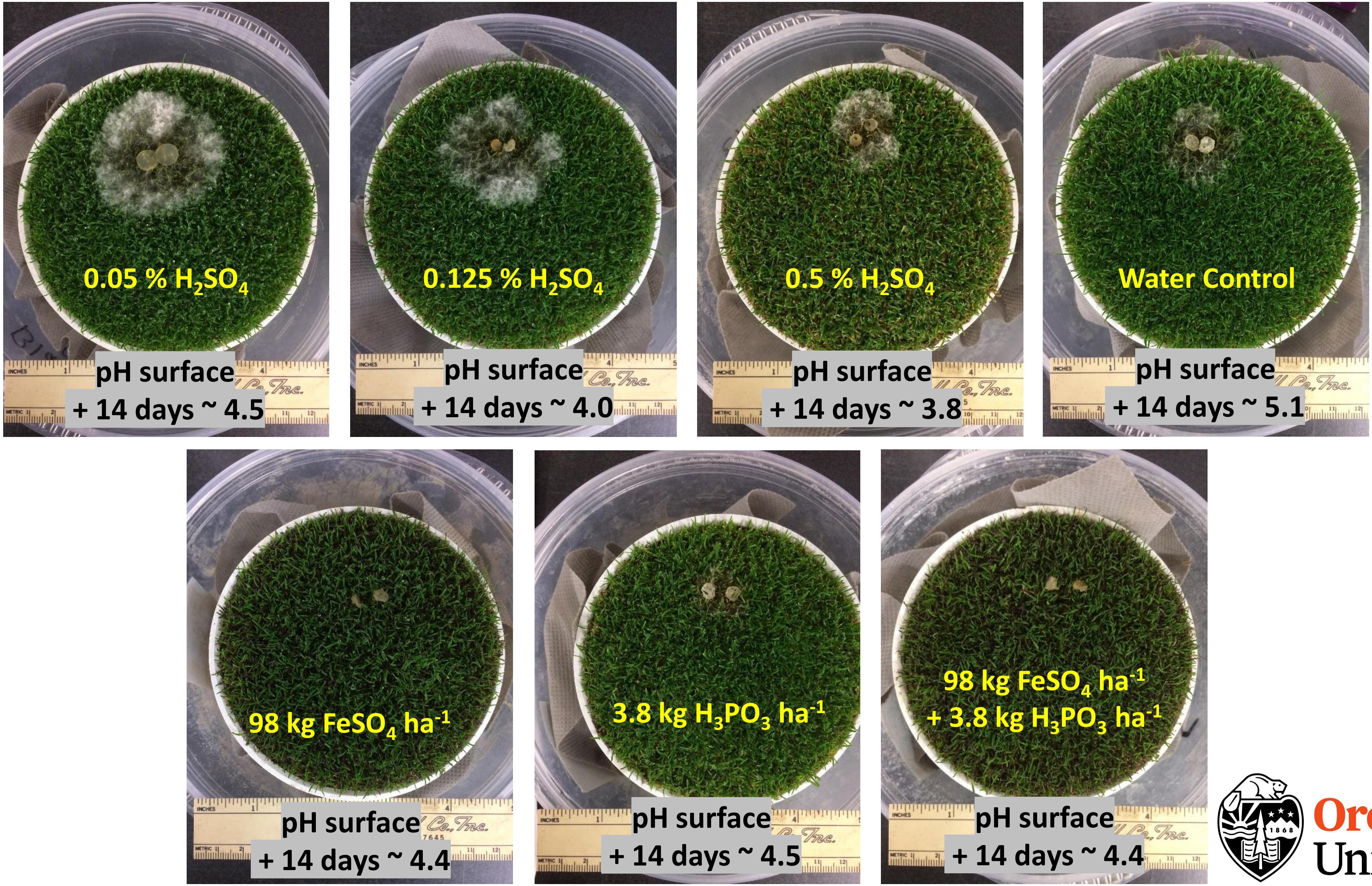

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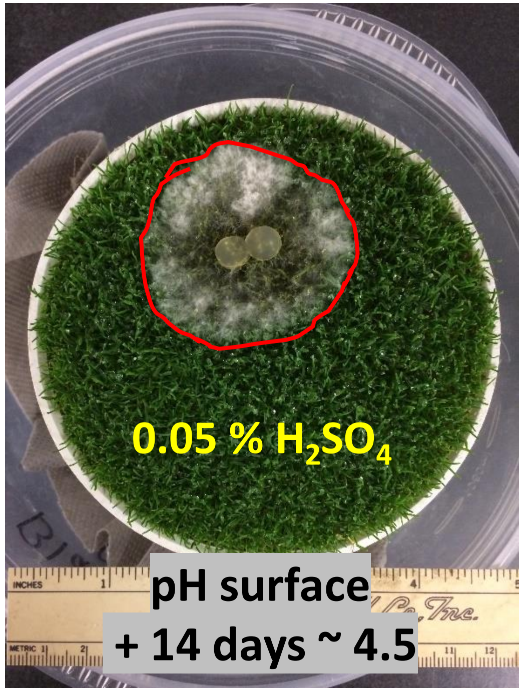

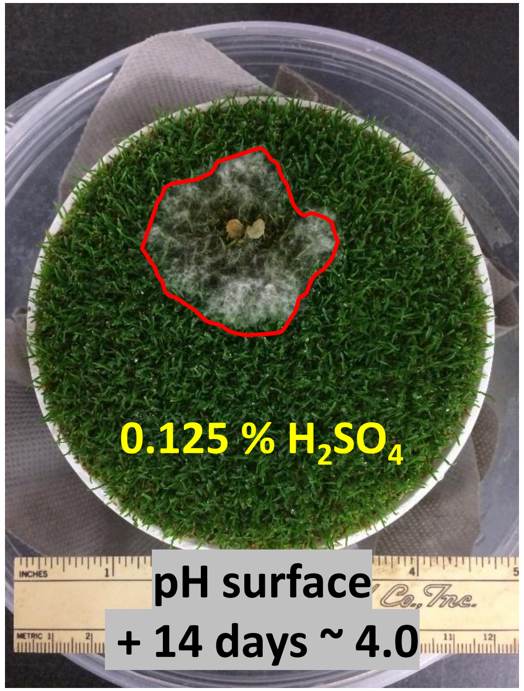

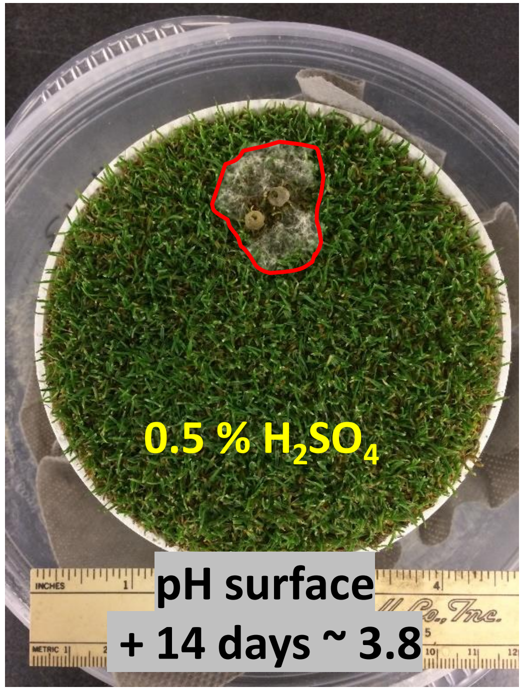

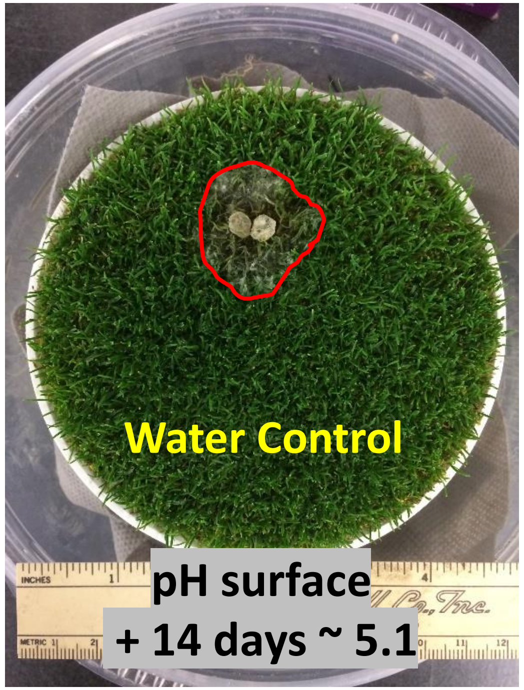

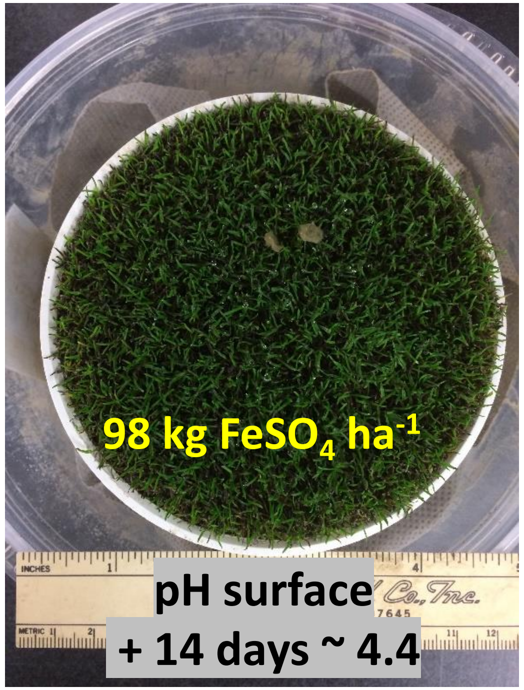

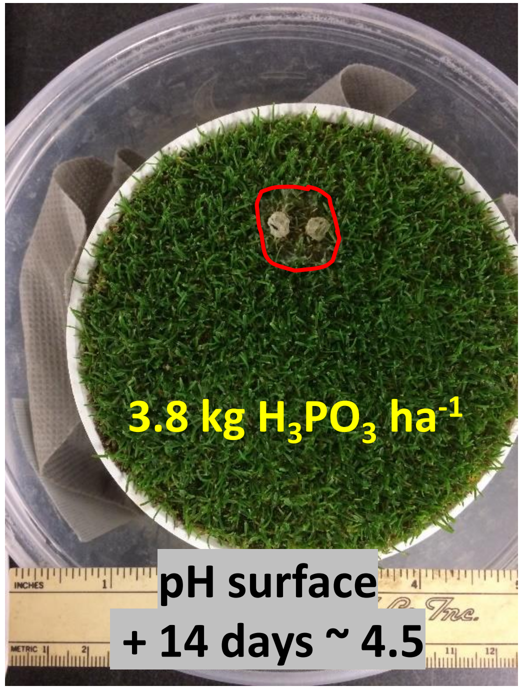

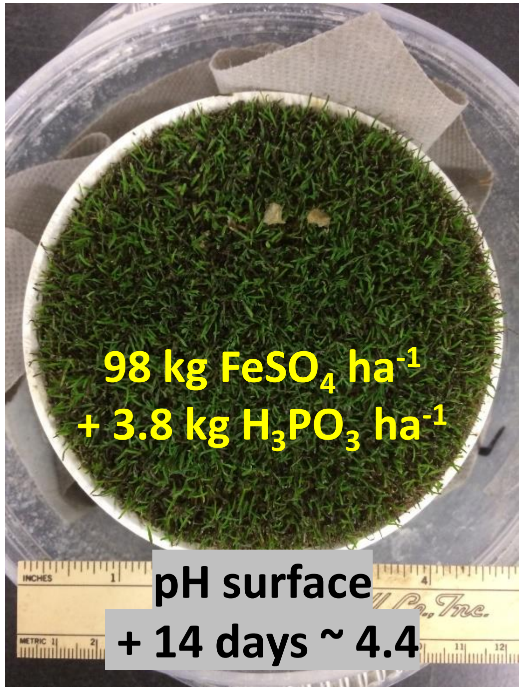

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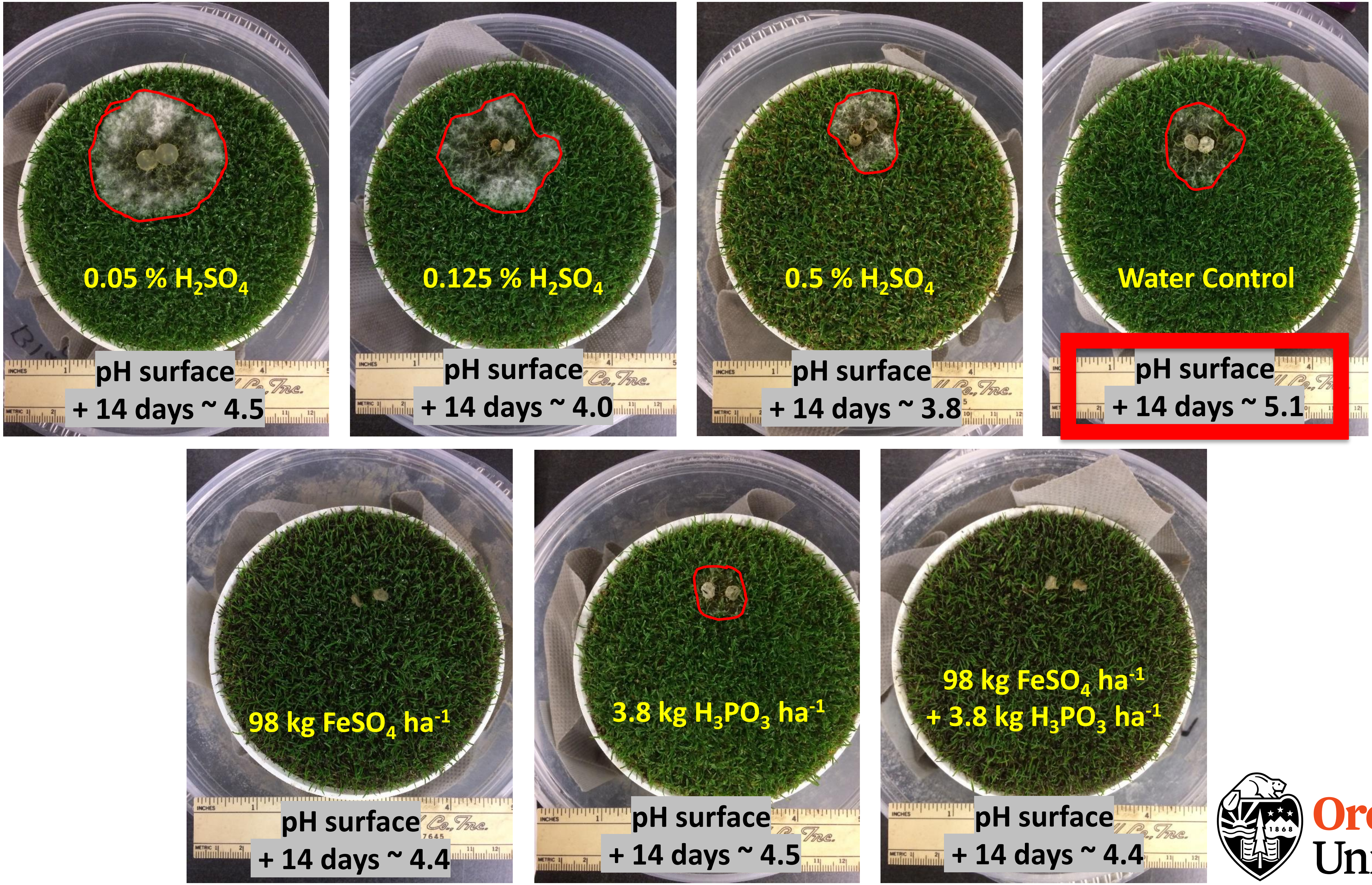

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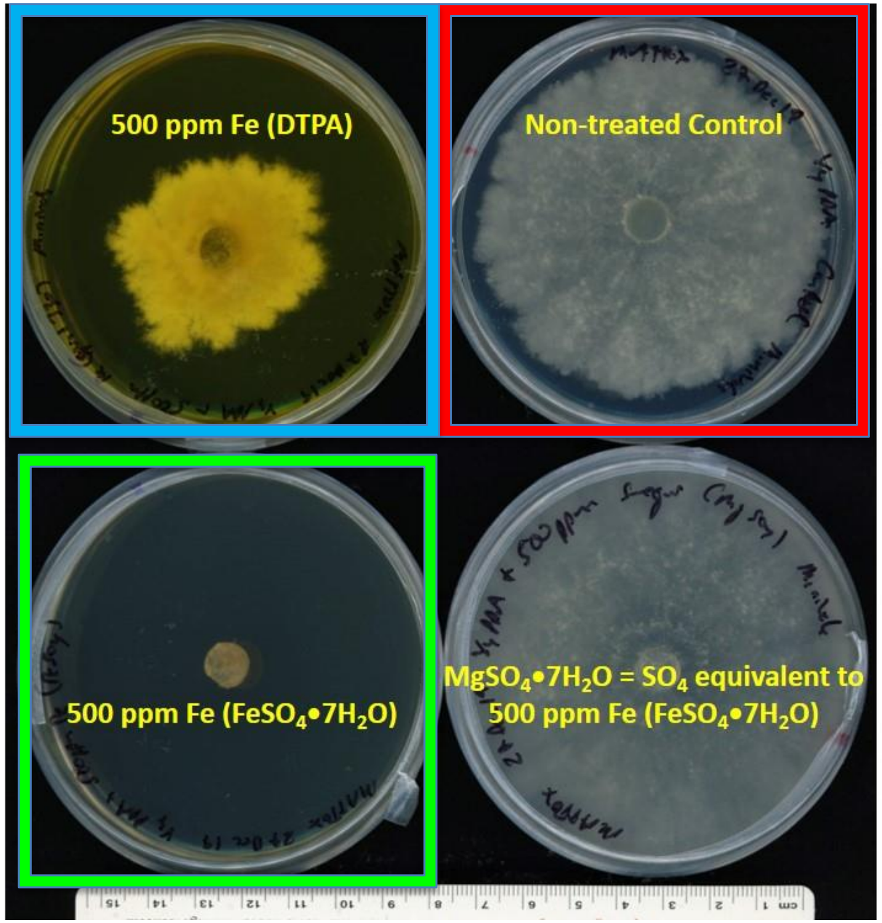
Results

Treatment	media pH Run 1 Start	*M. nivale* (mm^2)	media pH + 14 days
	- - - - - - - - - - - - Run 1 - - - - - - - - - - - -		
10 ppm Fe ($FeSO_4$)	3.99	4363 bc†	4.03
10 ppm Fe (DTPA)	3.93	5205 ab	4.06
SO_4 equivalent to 10 ppm Fe ($FeSO_4$)	3.88	4671 b	3.99
100 ppm Fe ($FeSO_4$)	3.94	603 d	3.59
100 ppm Fe (DTPA)	3.94	3608 c	4.02
SO_4 equivalent to 100 ppm Fe ($FeSO_4$)	3.91	5323 ab	3.99
500 ppm Fe ($FeSO_4$)	3.92	0 d	3.44
500 ppm Fe (DTPA)	3.96	999 d	3.99
SO_4 equivalent to 500 ppm Fe ($FeSO_4$)	3.92	5938 a	4.02
non-treated control	3.94	4592 bc	3.95



The effects of iron sulfate heptahydrate, chelated iron, and magnesium sulfate heptahydrate on Microdochium nivale in vitro. † Means in the same column followed by the same letter are not statically significant according to Tukey's Test at $P \leq 0.05$. ‡ DTPA = ferrous chelate.

Current Trials :

- Comparing iron sulfate versus chelated iron.
  - in the absence and presence of phosphorous acid.

- Quantifying the long-term effects of alternative products.

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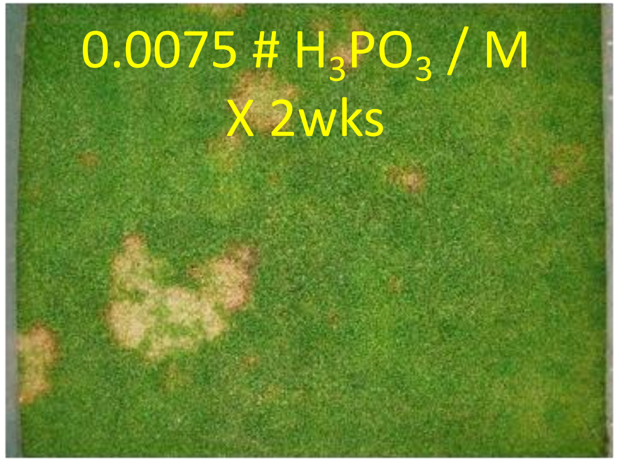
DTPA Fe vs. $FeSO_4$
Jan. 2019
Corvallis, OR



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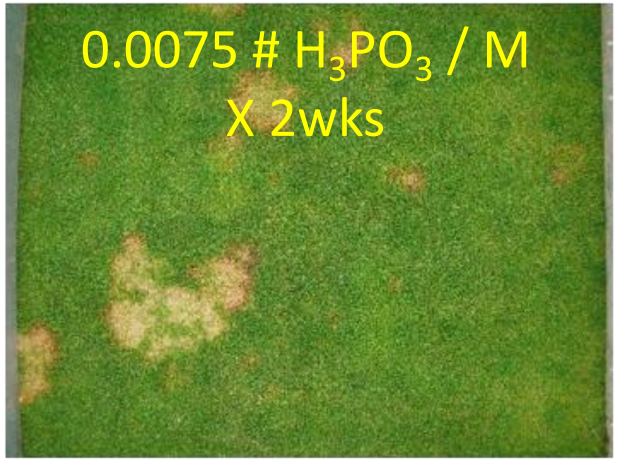

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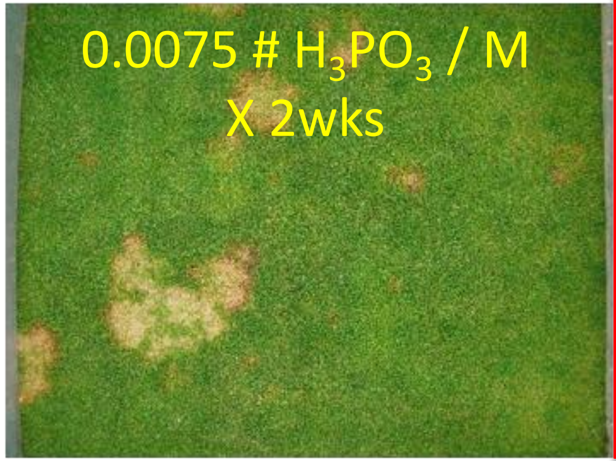

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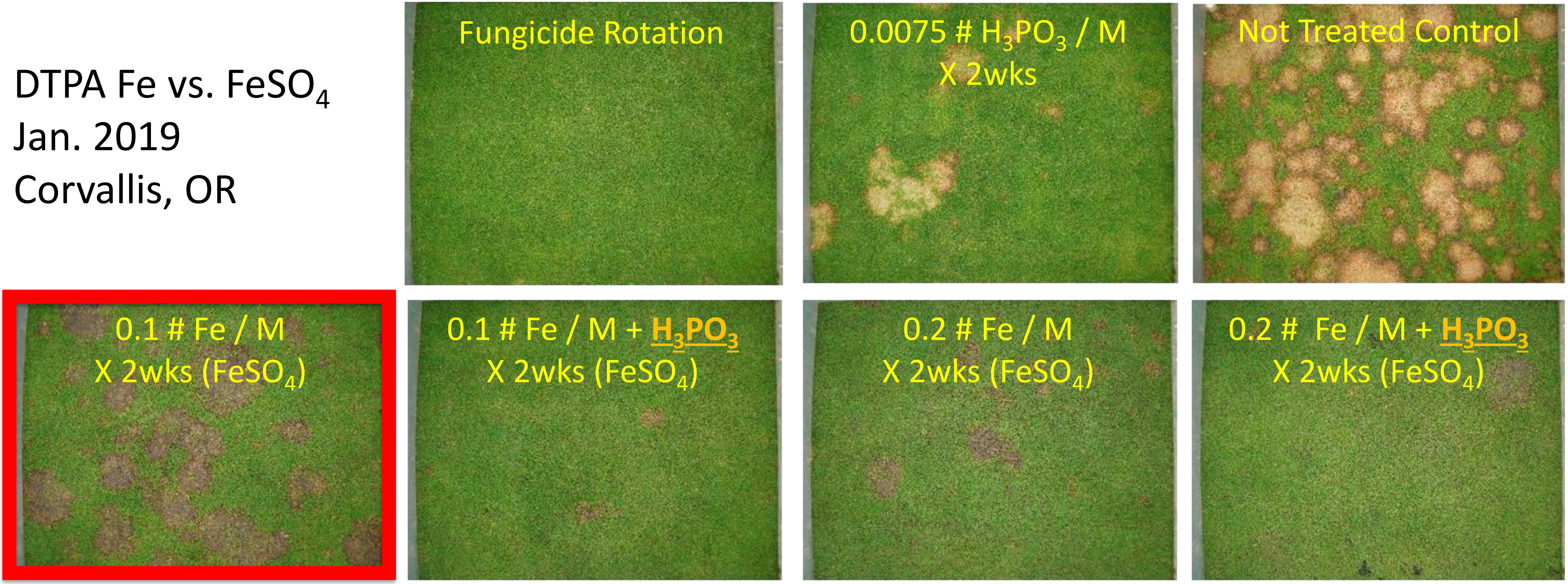

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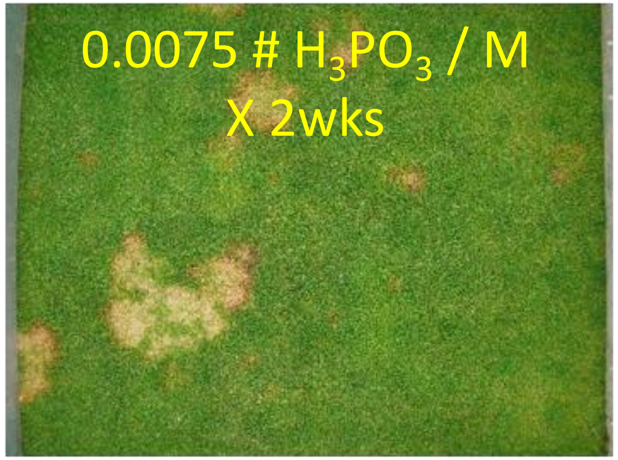

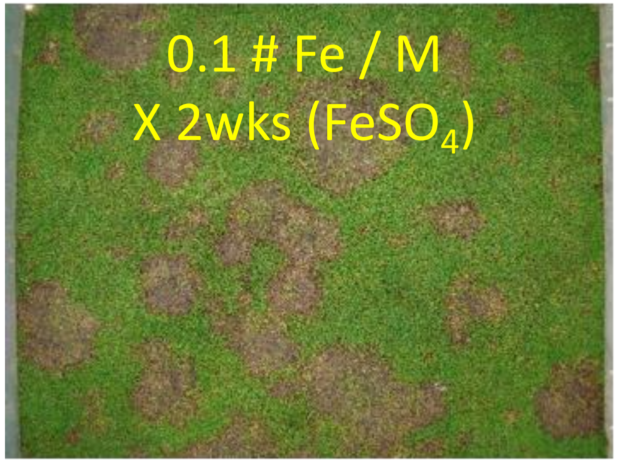

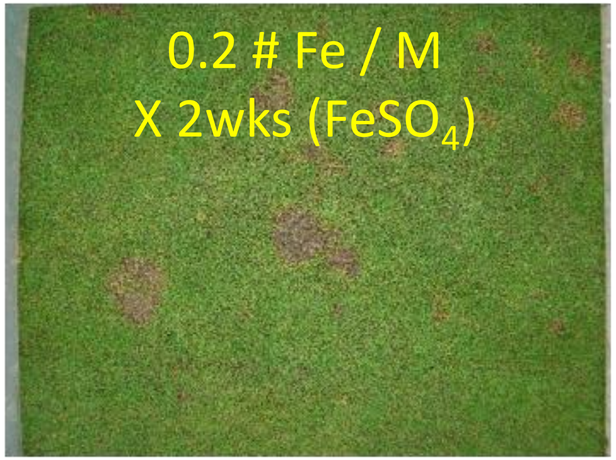

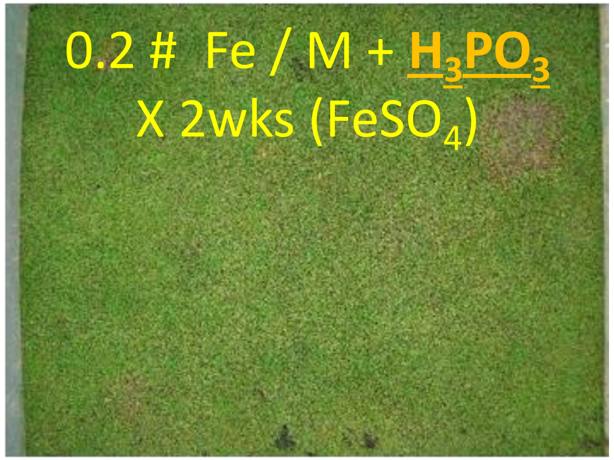

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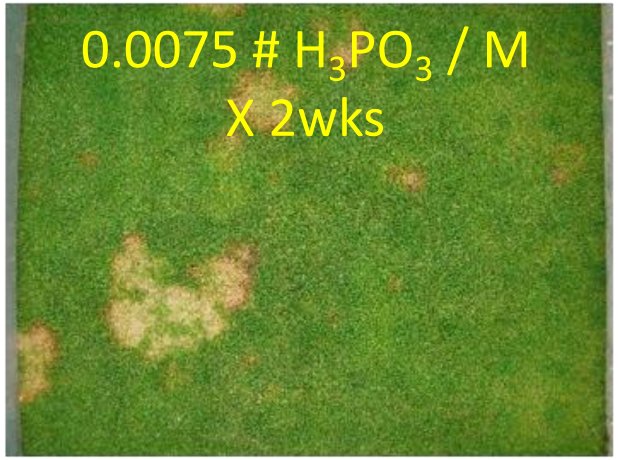

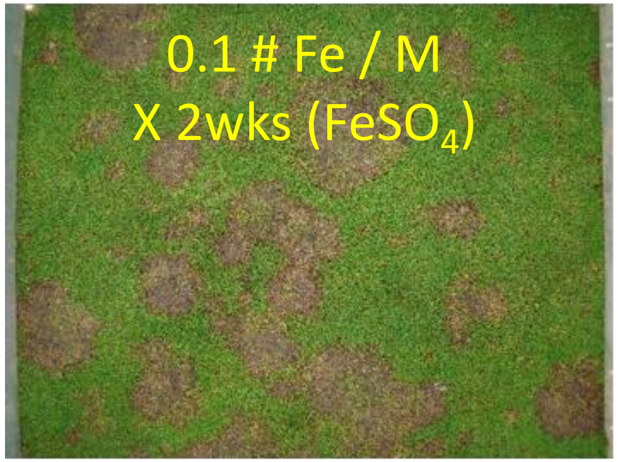

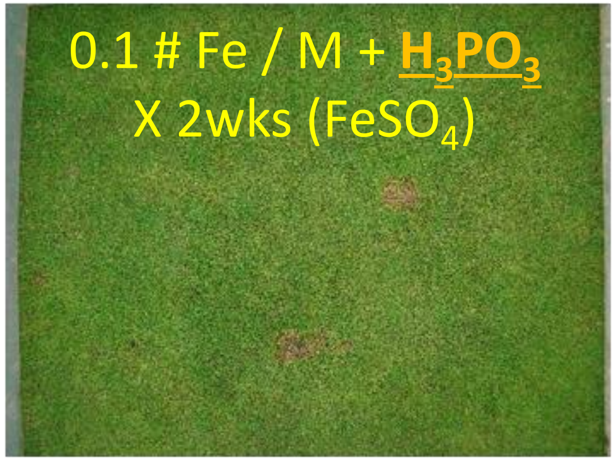

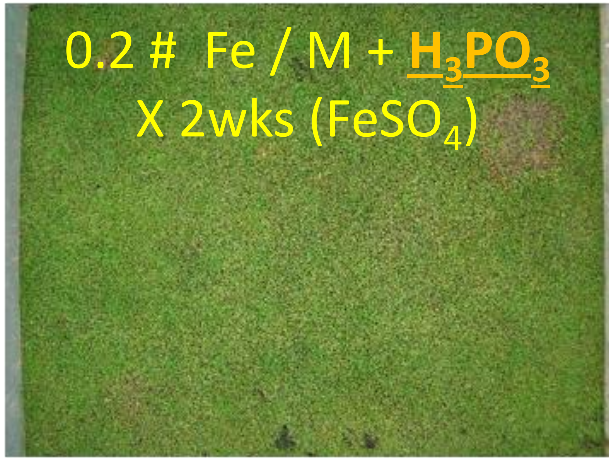

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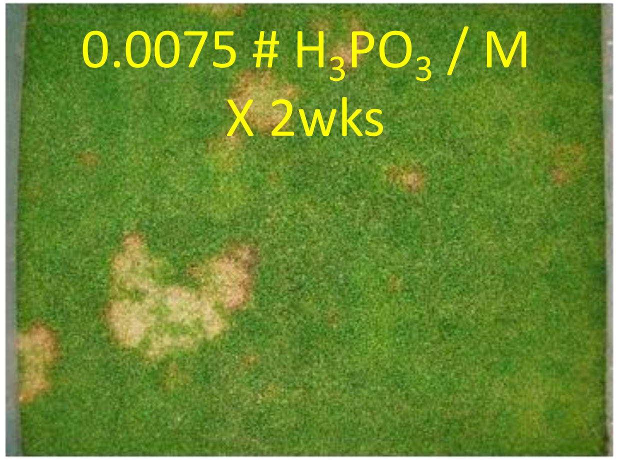

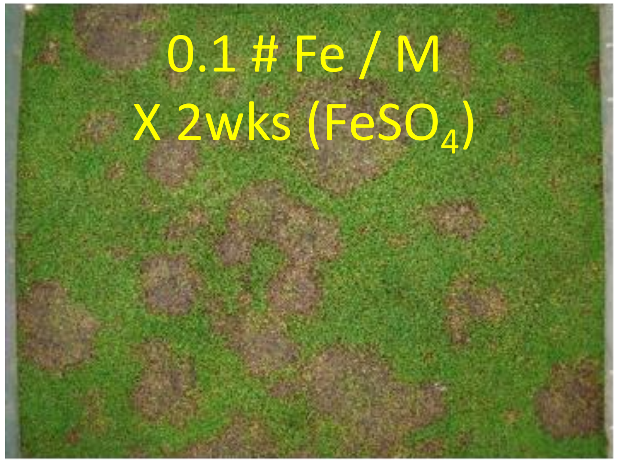

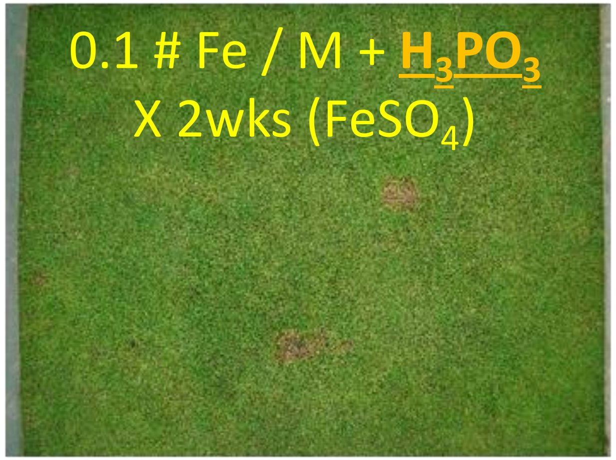

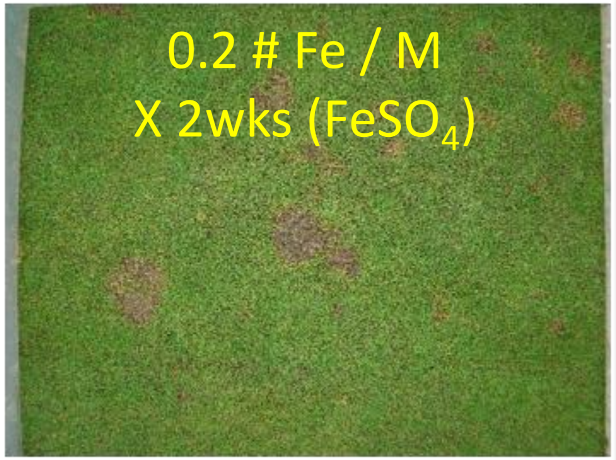

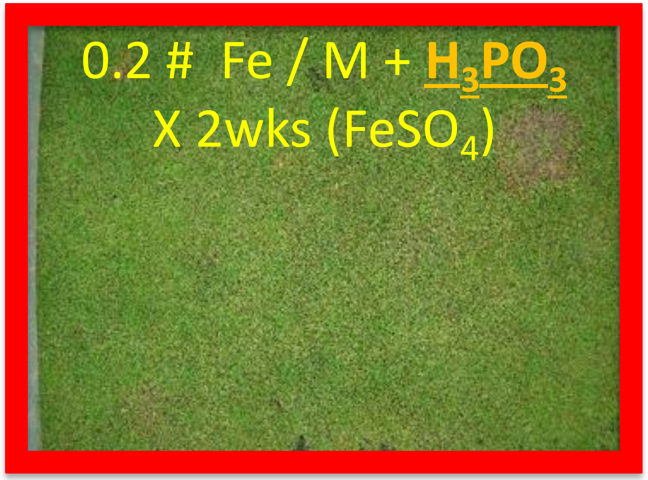

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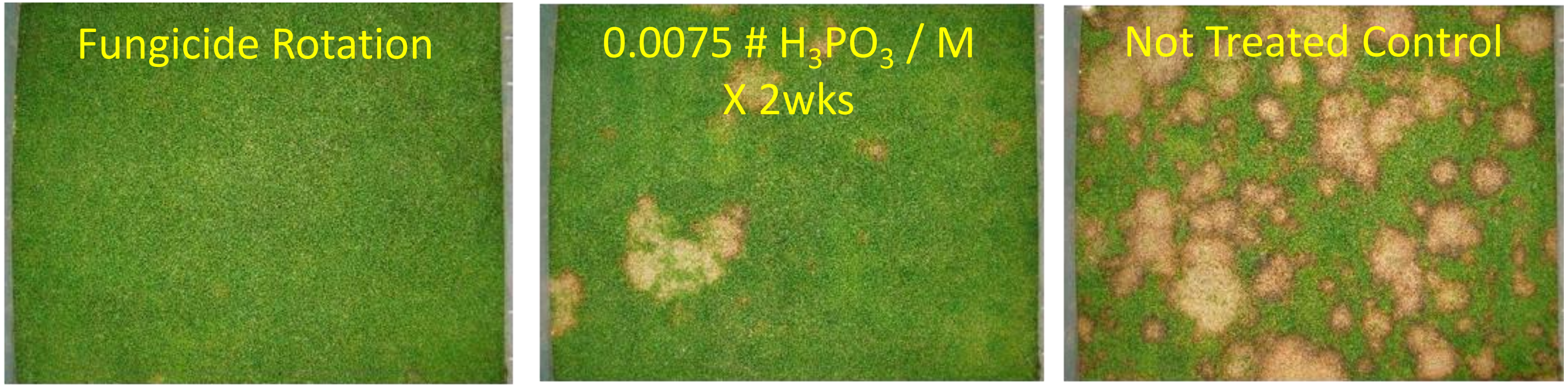
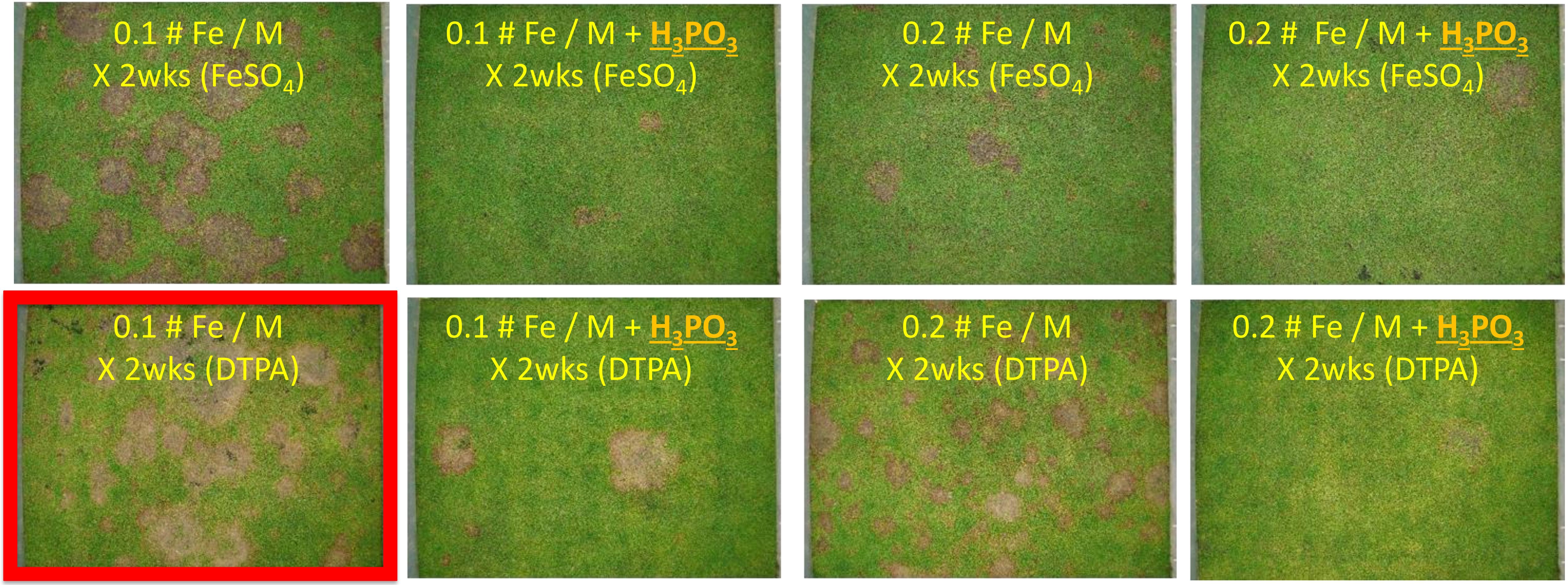
Corvallis, OR





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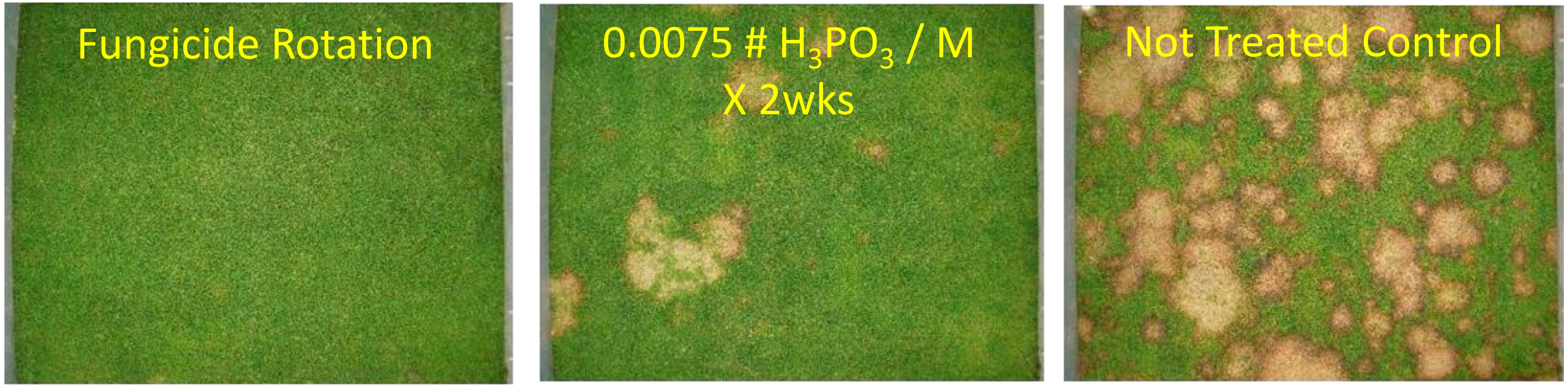

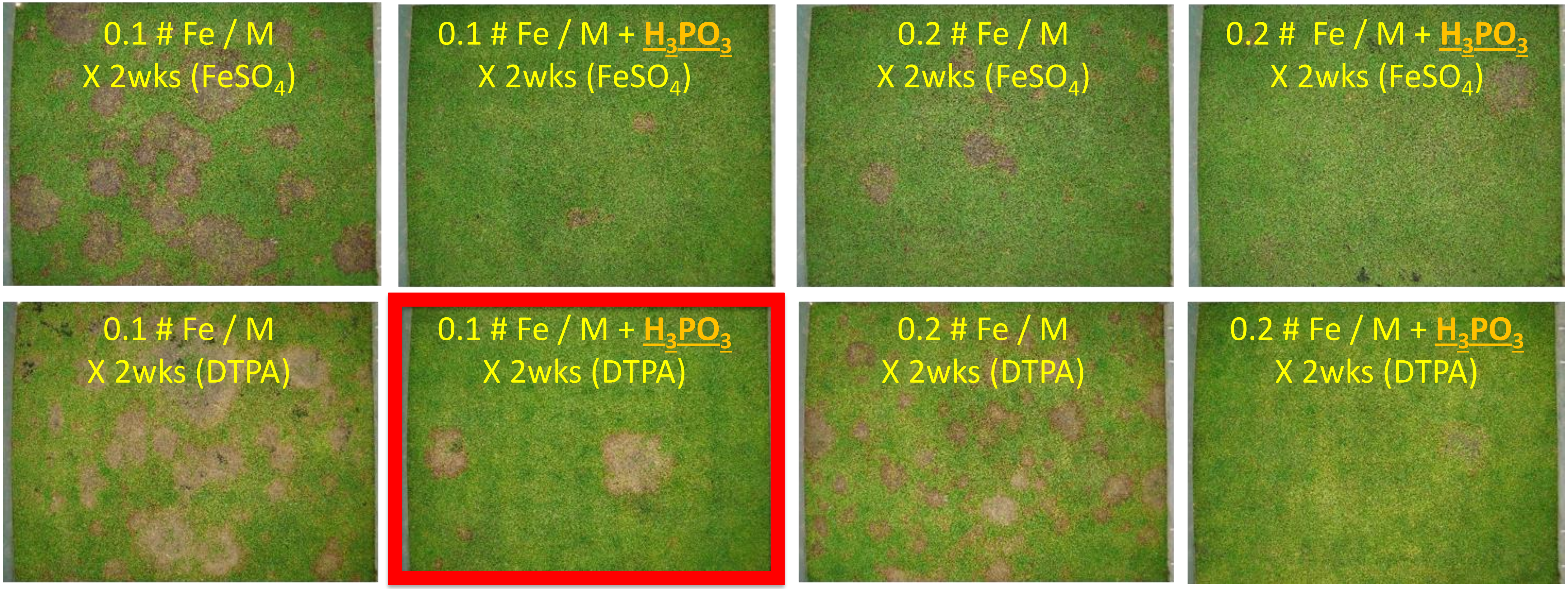

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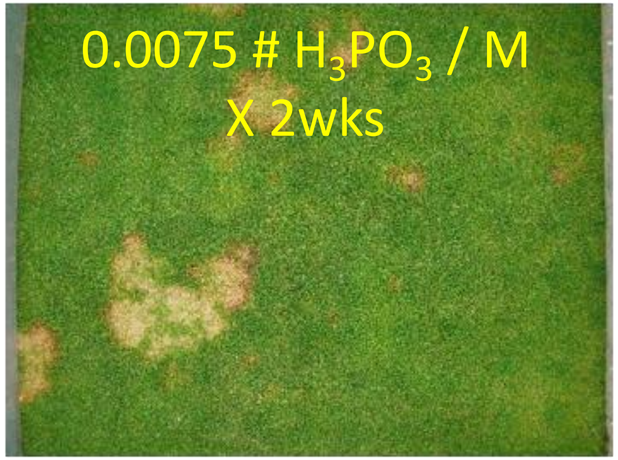
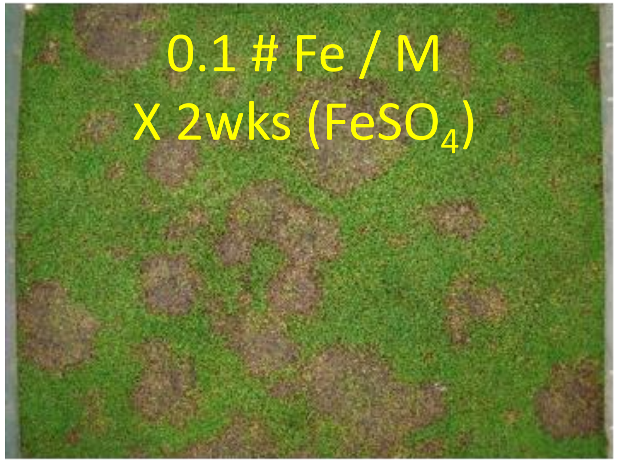
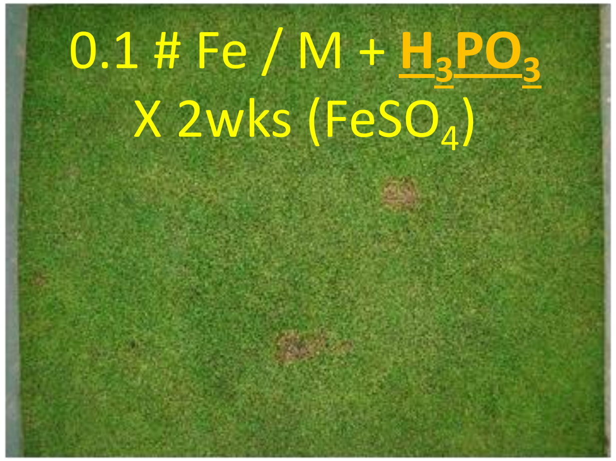
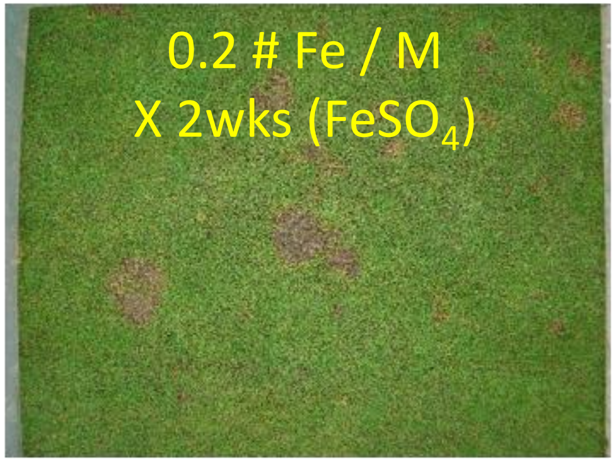
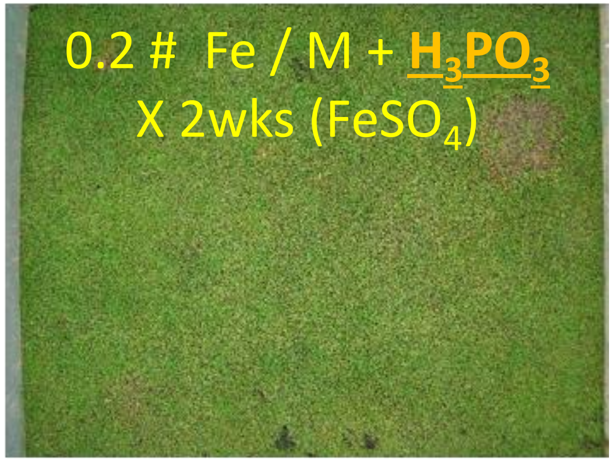
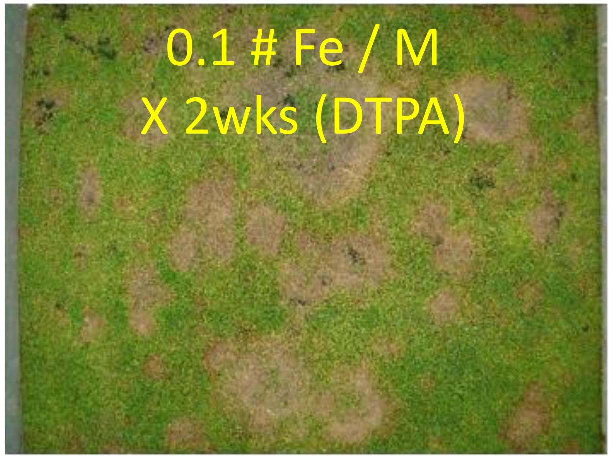


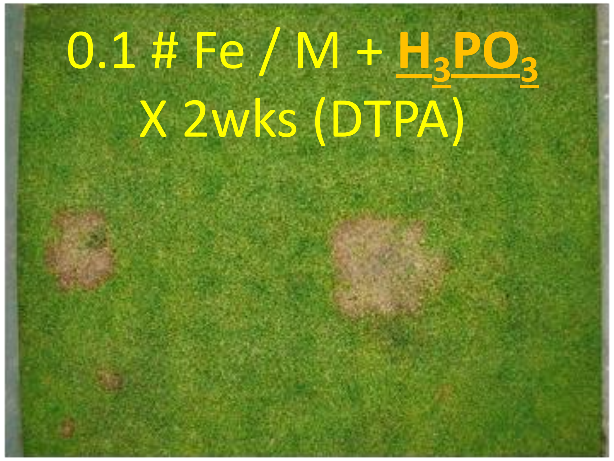


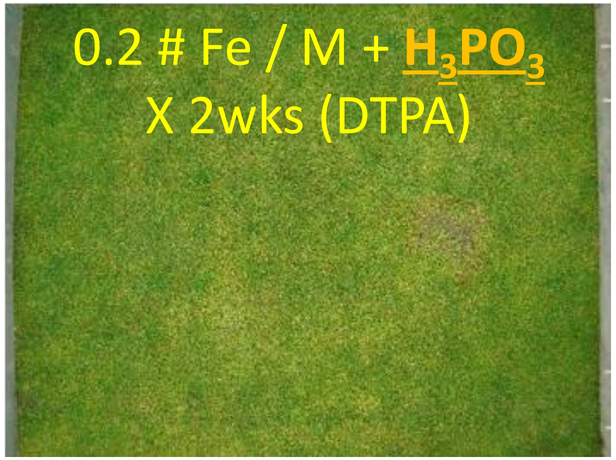




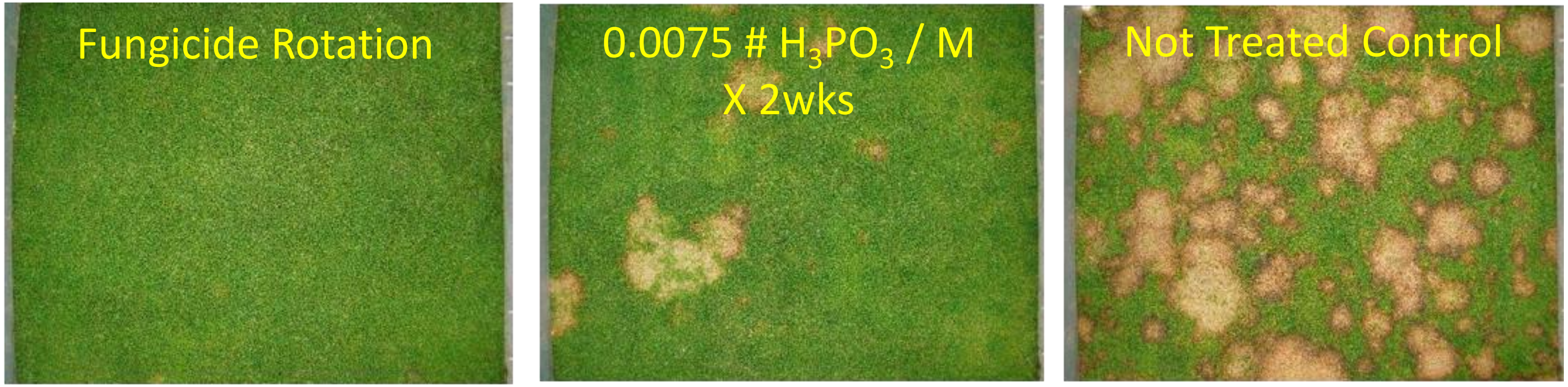


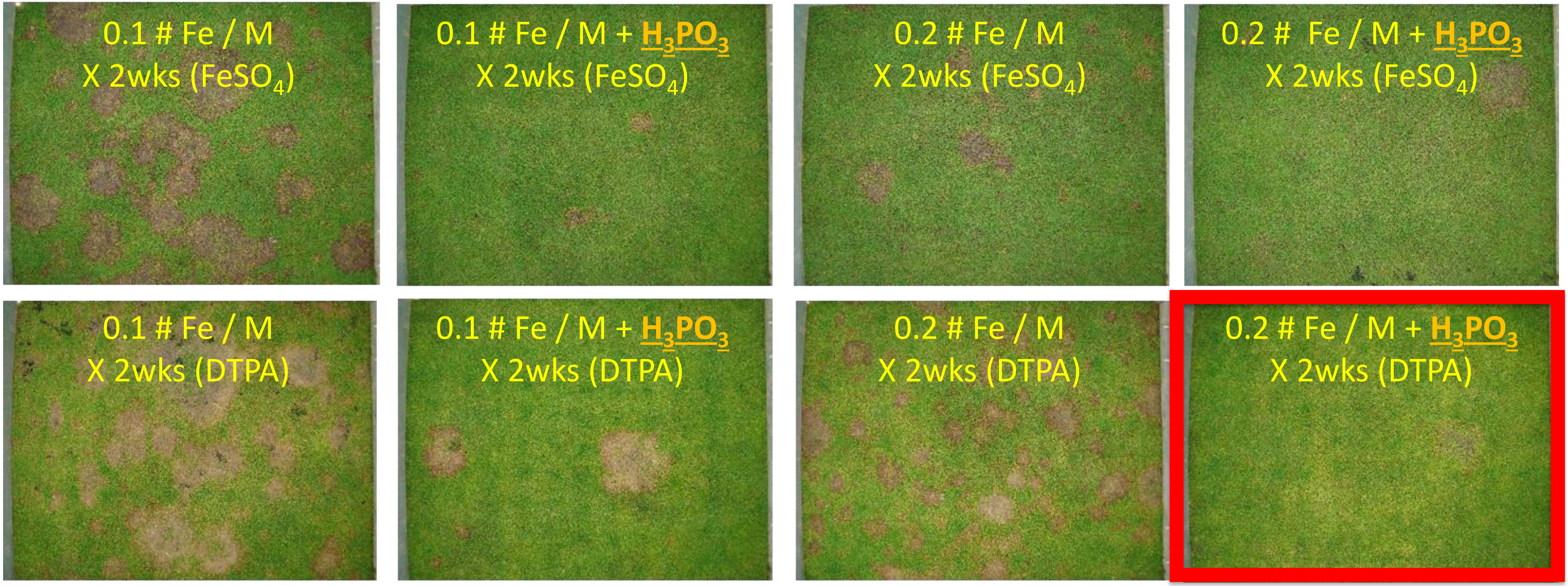


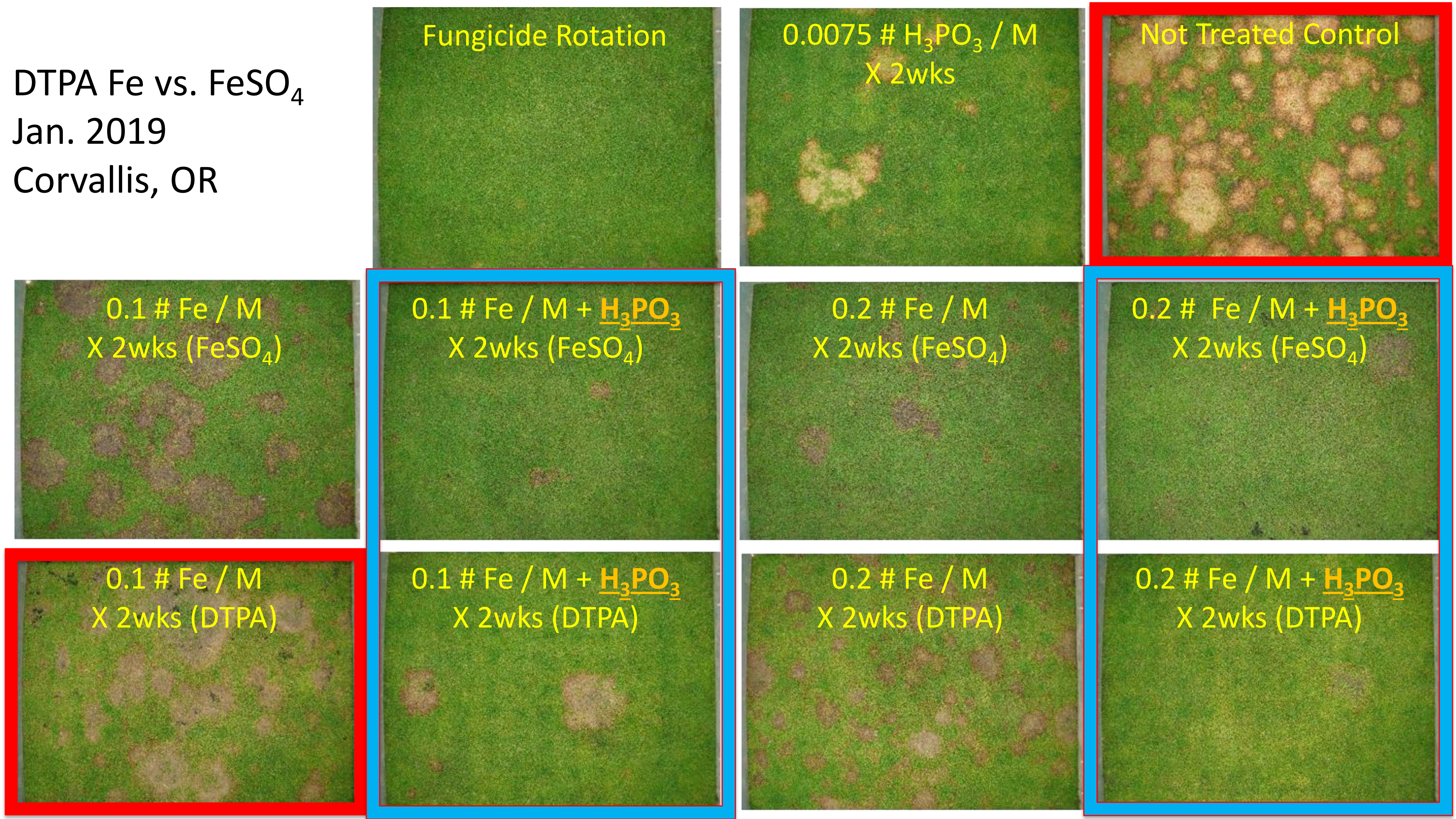




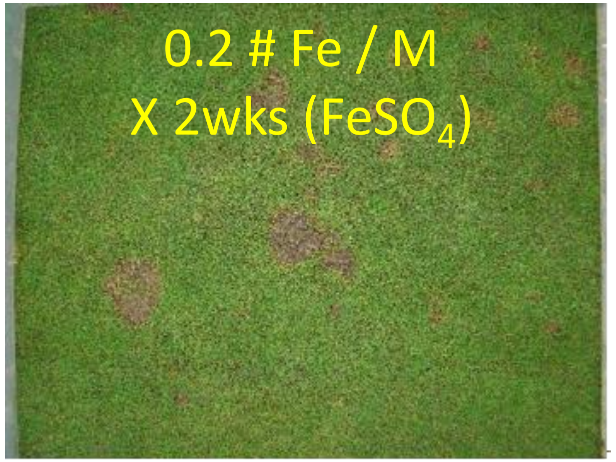
DTPA Fe vs. $FeSO_4$
Jan. 2019
Corvallis, OR

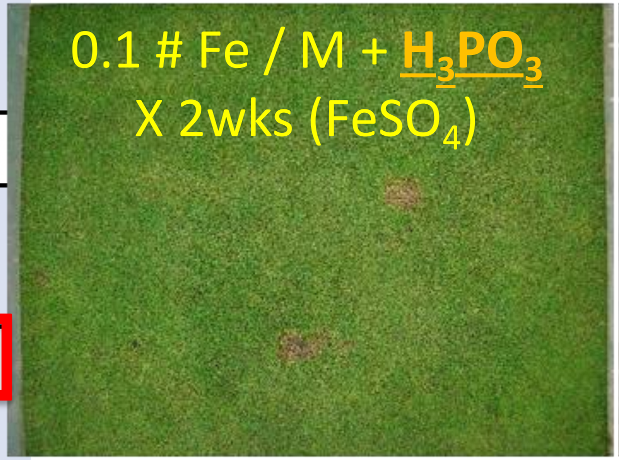


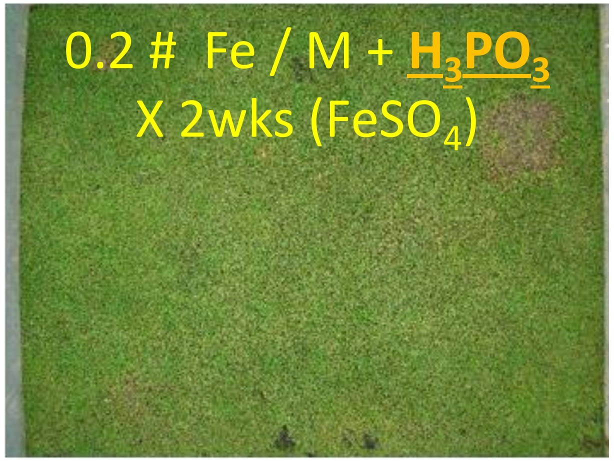


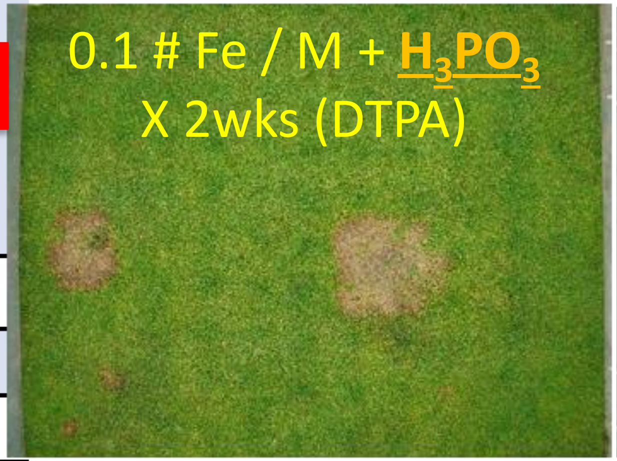

DTPA Fe vs. $FeSO_4$
Jan. 2019
Corvallis, OR
Fungicide Rotation
0.0075 # H_3PO_3 / M
X 2wks
Not Treated Control
0.1 # Fe / M
X 2wks ($FeSO_4$)
0.1 # Fe / M + H_3PO_3
X 2wks ($FeSO_4$)
0.2 # Fe / M
X 2wks ($FeSO_4$)
0.2 # Fe / M + H_3PO_3
X 2wks ($FeSO_4$)
0.1 # Fe / M
X 2wks (DTPA)
0.1 # Fe / M + H_3PO_3
X 2wks (DTPA)
0.2 # Fe / M
X 2wks (DTPA)
0.2 # Fe / M + H_3PO_3
X 2wks (DTPA)

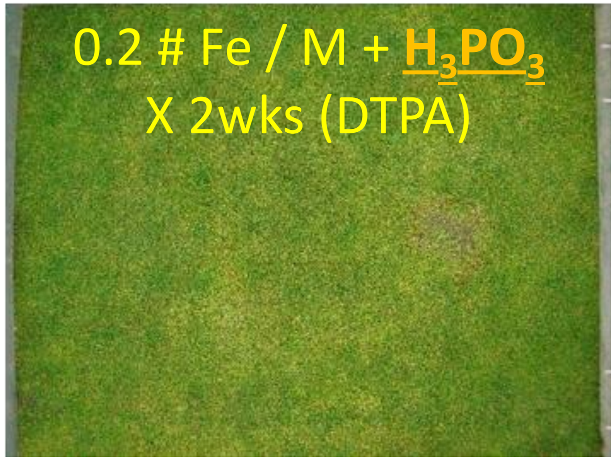
	% Microdochium patch 24 Jan. 19	% Microdochium patch 11 Feb. 20
0.1 # Fe/M as $FeSO_4$	20.0% b[z]	26.3% bc[z]
0.1 # Fe/M as $FeSO_4$ 0.075 lbs. H_3PO_3 / M	0.4% c	1.1% d
0.2 # Fe/M as $FeSO_4$	1.8% c	0.4% d
0.2 # Fe/M as $FeSO_4$ 0.075 lbs. H_3PO_3 / M	0.0% c	0.1% d
0.1 # Fe / M as DTPA	32.5% ab	42.5% ab
0.1 # Fe/M as DTPA 0.075 lbs. H_3PO_3 / M	0.7% c	1.1% d
0.2 # Fe/M as DTPA	25.0% b	35.0% ab
0.2 # Fe/M as DTPA 0.075 lbs. H_3PO_3 / M	0.1% c	0.3% d
0.075 lbs. H_3PO_3 / M	3.3% c	8.0% cd
Fungicide Control	0.0% c	0.0% d
Not-treated Control	45.0% a	50.0% a











Current Trials :

- Comparing iron sulfate versus chelated iron.
  - –in the absence and presence of phosphorous acid.
- Quantifying the long-term effects of alternative products.

Oregon State University

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- Comparing iron sulfate versus chelated iron.
  - in the absence and presence of phosphorous acid.

- Quantifying the long-term effects of alternative products.

Treatment		Microdochium patch
#	Description	Feb 2020
1	S[z] + PA[y]	0.1% c[x]
2	Sep, Oct, Nov, Apr = MO[v] + PA Dec, Jan, Feb, Mar = S + PA	0.5% c
3	MO + PA rotated with S + PA	0.1% c
4	MO rotated with S + PA	0.7% c
5	0.5 # $FeSO_4$ + PA	1.8% c
6	1.0 # $FeSO_4$ + PA	0.0% c
7	Sulfur (S)	0.7% c
8	Phosphorous Acid (PA)	11.8% b
9	Fungicide Control	0.0% c
10	Non-treated control	72.5% a

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Treatment #	Description	Summer Anthracnose Response Aug. 2020
1	S[z] + PA[y]	→ 35.8% a[w]
2	Sep, Oct, Nov, Apr = MO[v] + PA Dec, Jan, Feb, Mar = S + PA	→ 24.8% abc
3	MO + PA rotated with S + PA	→ 19.4% abcd
4	MO rotated with S + PA	→ 28.6% ab
5	0.5 # $FeSO_4$ + PA	9.2% cde
6	1.0 # $FeSO_4$ + PA	9.5% cde
7	Sulfur (S)	10.8% bcde
8	Phosphorous Acid (PA)	4.9% ef
9	Fungicide Control	7.8% de
10	Non-treated control	1.0% f

Oregon State University

Treatment		Summer Anthracnose Response	
#	Description	Aug. 2020	
1	S^z + PA^y	35.8% a[w]	4# S/M/YR
2	Sep, Oct, Nov, Apr = MO^v + PA Dec, Jan, Feb, Mar = S + PA	24.8% abc	2# S/M/YR
3	MO + PA rotated with S + PA	19.4% abcd	2# S/M/YR
4	MO rotated with S + PA	28.6% ab	2# S/M/YR
5	0.5 # $FeSO_4$ + PA	9.2% cde	0.9# S/M/YR
6	1.0 # $FeSO_4$ + PA	9.5% cde	1.8# S/M/YR
7	Sulfur (S)	10.8% bcde	4# S/M/YR
8	Phosphorous Acid (PA)	4.9% ef	
9	Fungicide Control	7.8% de	
10	Non-treated control	1.0% f	

Oregon State University

Treatment #	Description	Summer Anthracnose Response Aug. 2020	
1	S[z] + PA[y]	35.8% a[w]	4# S/M/YR
2	Sep, Oct, Nov, Apr = MO[v] + PA Dec, Jan, Feb, Mar = S + PA	24.8% abc	2# S/M/YR
3	MO + PA rotated with S + PA	19.4% abcd	2# S/M/YR
4	MO rotated with S + PA	28.6% ab	2# S/M/YR
5	0.5 # $FeSO_4$ + PA	9.2% cde	0.9# S/M/YR
6	1.0 # $FeSO_4$ + PA	9.5% cde	1.8# S/M/YR
7	Sulfur (S)	10.8% bcde	4# S/M/YR
8	Phosphorous Acid (PA)	4.9% ef	
9	Fungicide Control	7.8% de	
10	Non-treated control	1.0% f	

OSU Recommends to apply no more than

1.5 # S / M / YR

unless a soil test indicates otherwise.

Sulfur and *Poa annua*


Photo: Corvallis, OR by Emily Braithwaite

Treatment		Summer Anthracnose Response	
#	Description	Aug. 2020	
1	S[z] + PA[y]	35.8% a[w]	4# S/M/YR
2	Sep, Oct, Nov, Apr = MO[v] + PA Dec, Jan, Feb, Mar = S + PA	24.8% abc	2# S/M/YR
3	MO + PA rotated with S + PA	19.4% abcd	2# S/M/YR
4	MO rotated with S + PA	28.6% ab	2# S/M/YR
5	0.5 # $FeSO_4$ + PA	9.2% cde	0.9# S/M/YR
6	1.0 # $FeSO_4$ + PA	9.5% cde	1.8# S/M/YR
7	Sulfur (S)	10.8% bcde	4# S/M/YR
8	Phosphorous Acid (PA)	4.9% ef	
9	Fungicide Control	7.8% de	
10	Non-treated control	1.0% f	

Sulfur and *Poa annua*

Treatment #	Description	Summary Anthracnose Response Aug. 2020	
1	S^z + PA^y	35.8% a[w]	4# S/M/YR
2	Sep, Oct, Nov, Apr = MO^v + PA Dec, Jan, Feb, Mar = S + PA	24.8% abc	2# S/M/YR
3	MO + PA rotated with S + PA	19.4% abcd	2# S/M/YR
4	MO rotated with S + PA	28.6% ab	2# S/M/YR
5	0.5 # $FeSO_4$ + PA	9.2% cde	0.9# S/M/YR
6	1.0 # $FeSO_4$ + PA	9.5% cde	1.8# S/M/YR
7	Sulfur (S)	10.8% bcde	4# S/M/YR
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9	Fungicide Control	7.8% de	
10	Non-treated control	1.0% f	

Sulfur and *Poa annua*

Treatment #	Description	Summary Anthracnose Response Aug. 2020	
1	S[z] + PA[y]	→ 35.8% a[w]	4# S/M/YR
2	Sep, Oct, Nov, Apr = MO[v] + PA Dec, Jan, Feb, Mar = S + PA	24.8% abc	2# S/M/YR
3	MO + PA rotated with S + PA	19.4% abcd	2# S/M/YR
4	MO rotated with S + PA	28.6% ab	2# S/M/YR
5	0.5 # $FeSO_4$ + PA	9.2% cde	0.9# S/M/YR
6	1.0 # $FeSO_4$ + PA	9.5% cde	1.8# S/M/YR
7	Sulfur (S)	→ 10.8% bcde	4# S/M/YR
8	Phosphorous Acid (PA)	4.9% ef	
9	Fungicide Control	7.8% de	
10	Non-treated control	1.0% f	

Sulfur and *Poa annua*

Treatment		Summer Anthracnose Response	
#	Description	Aug. 2020	
1	S[z] + PA[y]	→ 35.8% a[w]	4# S/M/YR
2	Sep, Oct, Nov, Apr = MO[v] + PA Dec, Jan, Feb, Mar = S + PA	24.8% abc	2# S/M/YR
3	MO + PA rotated with S + PA	19.4% abcd	2# S/M/YR
4	MO rotated with S + PA	28.6% ab	2# S/M/YR
5	0.5 # $FeSO_4$ + PA	9.2% cde	0.9# S/M/YR
6	1.0 # $FeSO_4$ + PA	9.5% cde	1.8# S/M/YR
7	Sulfur (S)	→ 10.8% bcde	4# S/M/YR
8	Phosphorous Acid (PA)	4.9% ef	
9	Fungicide Control	7.8% de	
10	Non-treated control	1.0% f	

Photo: Corvallis, OR by Emily Braithwaite

Photo: New Brunswick, NJ by Dr. Chas Schmid

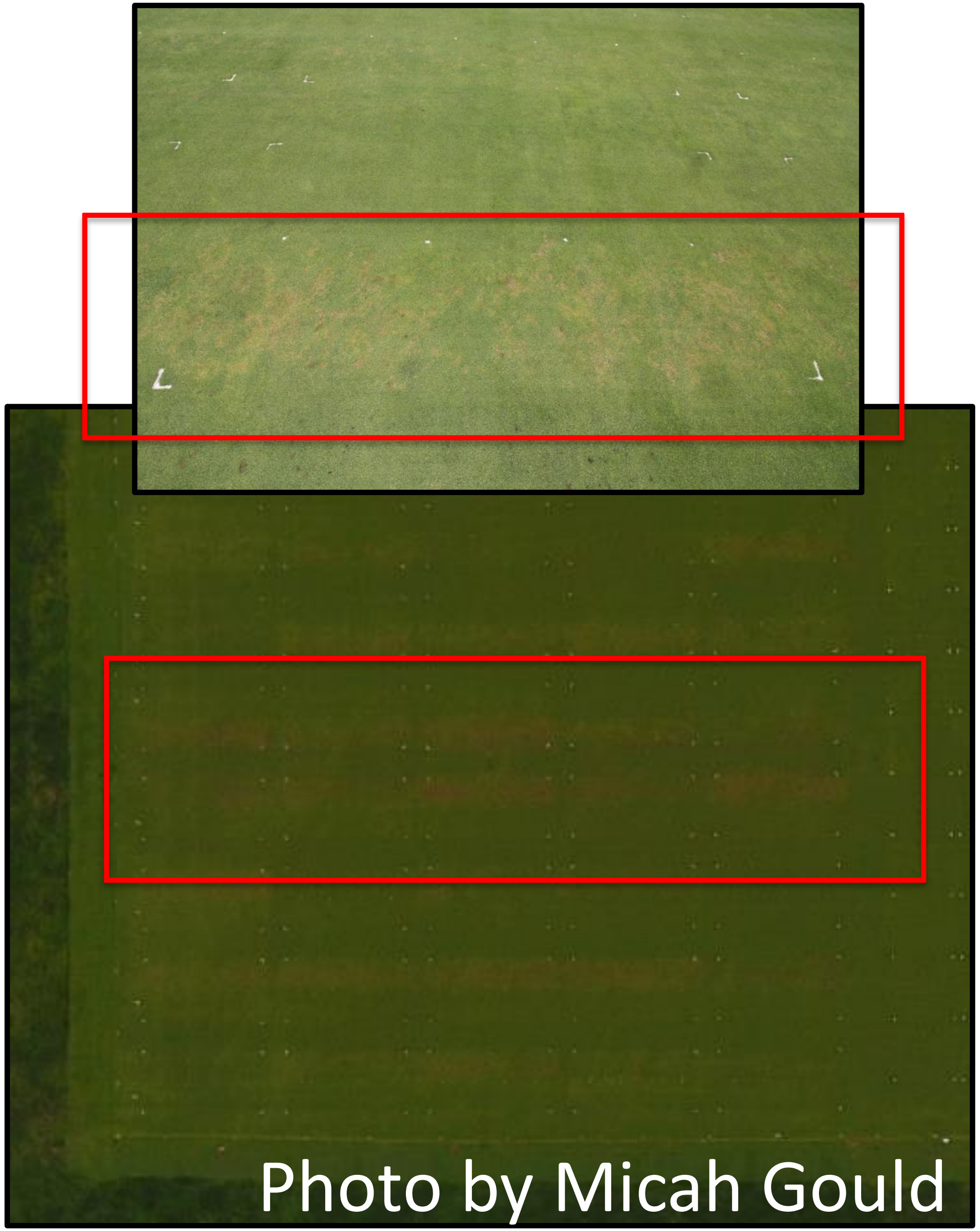


Photo by Micah Gould

Treatment	May 2019 pH	May 2020 pH	Change in pH	
S[z] + PA[y]	6.42	6.15	-0.27	ns[x]
Sep, Oct, Nov, Apr = MO[v] + PA Dec, Jan, Feb, Mar = S + PA	6.50	6.15	-0.35	ns
MO + PA rotated with S + PA	6.55	6.14	-0.42	ns
MO rotated with S + PA	6.48	6.10	-0.38	ns
0.5 # $FeSO_4$ + PA	6.61	6.36	-0.25	ns
1.0 # $FeSO_4$ + PA	6.69	6.29	-0.40	ns
Sulfur (S)	6.50	6.06	-0.44	ns
Phosphorous Acid (PA)	6.62	6.19	-0.43	ns
Fungicide Control	6.56	6.12	-0.44	ns
Non-treated control	6.73	6.26	-0.47	ns


Photo: Corvallis, OR by Emily Braithwaite

Results from 1" to 3" depth

<u>Still processing 0" to 1"</u>

Treatment	May 2019 pH	May 2020 pH	Change in pH	
S[z] + PA[y]	6.42	6.15	-0.27	ns[x]
Sep, Oct, Nov, Apr = MO[v] + PA Dec, Jan, Feb, Mar = S + PA	6.50	6.15	-0.35	ns
MO + PA rotated with S + PA	6.55	6.14	-0.42	ns
MO rotated with S + PA	6.48	6.10	-0.38	ns
0.5 # $FeSO_4$ + PA	6.61	6.36	-0.25	ns
1.0 # $FeSO_4$ + PA	6.69	6.29	-0.40	ns
Sulfur (S)	6.50	6.06	-0.44	ns
Phosphorous Acid (PA)	6.62	6.19	-0.43	ns
Fungicide Control	6.56	6.12	-0.44	ns
Non-treated control	6.73	6.26	-0.47	ns

Results from 1” to 3” depth

<u>Still processing 0” to 1”</u>

phorous acid and Phosphorus

Treatment	May 2019 Phosphorus	May 2020 Phosphorus	Change in Phosphorus	
S[z] + PA[y]	13.1	19.7	6.6	ab[w]
Sep, Oct, Nov, Apr = MO[v] + PA Dec, Jan, Feb, Mar = S + PA	12.5	19.2	6.7	ab
MO + PA rotated with S + PA	14.9	21.6	6.8	a
MO rotated with S + PA	15.4	15.8	0.4	d
0.5 # $FeSO_4$ + PA	14.8	17.6	2.9	cd
1.0 # $FeSO_4$ + PA	9.5	14.1	4.6	abc
Sulfur (S)	11.4	12.7	1.2	d
Phosphorous Acid (PA)	12.4	18.6	6.2	ab
Fungicide Control	9.9	13.4	3.5	bcd
Non-treated control	13.8	15.1	1.2	d

phorous acid and Phosphorus

Treatment	May 2019 Phosphorus	May 2020 Phosphorus	Change in Phosphorus	
S[z] + PA[y]	13.1	19.7	6.6	ab[w]
Sep, Oct, Nov, Apr = MO[v] + PA Dec, Jan, Feb, Mar = S + PA	12.5	19.2	6.7	ab
MO + PA rotated with S + PA	14.9	21.6	6.8	a
MO rotated with S + PA	15.4	15.8	0.4	d
0.5 # $FeSO_4$ + PA	14.8	17.6	2.9	cd
1.0 # $FeSO_4$ + PA	9.5	14.1	4.6	abc
Sulfur (S)	11.4	12.7	1.2	d
Phosphorous Acid (PA)	12.4	18.6	6.2	ab
Fungicide Control	9.9	13.4	3.5	bcd
Non-treated control	13.8	15.1	1.2	d

phorous acid and Phosphorus

Treatment		May 2019 Phosphorus	May 2020 Phosphorus	Change in Phosphorus	
S[z] + PA[y]	PA every 2 wks	13.1	19.7	6.6	ab[w]
Sep, Oct, Nov, Apr = MO[v] + PA Dec, Jan, Feb, Mar = S + PA	PA every 2 wks	12.5	19.2	6.7	ab
MO + PA rotated with S + PA	PA every 2 wks	14.9	21.6	6.8	a
MO rotated with S + PA	PA every 4 wks	15.4	15.8	0.4	d
0.5 # $FeSO_4$ + PA	PA every 2 wks	14.8	17.6	2.9	cd
1.0 # $FeSO_4$ + PA	PA every 2 wks	9.5	14.1	4.6	abc
Sulfur (S)		11.4	12.7	1.2	d
Phosphorous Acid (PA)	PA every 2 wks	12.4	18.6	6.2	ab
Fungicide Control		9.9	13.4	3.5	bcd
Non-treated control		13.8	15.1	1.2	d

phorous acid and Phosphorus

Treatment		May 2019 Phosphorus	May 2020 Phosphorus	Change in Phosphorus	
S[z] + PA[y]	PA every 2 wks	13.1	19.7	→ 6.6	ab[w]
Sep, Oct, Nov, Apr = MO[v] + PA Dec, Jan, Feb, Mar = S + PA	PA every 2 wks	12.5	19.2	→ 6.7	ab
MO + PA rotated with S + PA	PA every 2 wks	14.9	21.6	→ 6.8	a
MO rotated with S + PA	PA every 4 wks	15.4	15.8	0.4	d
0.5 # $FeSO_4$ + PA	PA every 2 wks	14.8	17.6	2.9	cd
1.0 # $FeSO_4$ + PA	PA every 2 wks	9.5	14.1	→ 4.6	abc
Sulfur (S)		11.4	12.7	1.2	d
Phosphorous Acid (PA)	PA every 2 wks	12.4	18.6	→ 6.2	ab
Fungicide Control		9.9	13.4	3.5	bcd
Non-treated control		13.8	15.1	1.2	d

phorous acid and Phosphorus

Treatment		May 2019 Phosphorus	May 2020 Phosphorus	Change in Phosphorus	
S[z] + PA[y]	PA every 2 wks	13.1	19.7	6.6	ab[w]
Sep, Oct, Nov, Apr = MO[v] + PA Dec, Jan, Feb, Mar = S + PA	PA every 2 wks	12.5	19.2	6.7	ab
MO + PA rotated with S + PA	PA every 2 wks	14.9	21.6	6.8	a
MO rotated with S + PA	PA every 4 wks	15.4	15.8	0.4	d
0.5 # $FeSO_4$ + PA	PA every 2 wks	14.8	17.6	2.9	cd
1.0 # $FeSO_4$ + PA	PA every 2 wks	9.5	14.1	4.6	abc
Sulfur (S)		11.4	12.7	1.2	d
Phosphorous Acid (PA)	PA every 2 wks	12.4	18.6	6.2	ab
Fungicide Control		9.9	13.4	3.5	bcd
Non-treated control		13.8	15.1	1.2	d

Treatment		Double Ring Infiltration (minutes at saturation)			Greenspeeds	
#	Description	May 2020	Aug. 2020	Oct. 2020	Jul. 2020	Oct. 2020
1	S^z + PA^y	20.2 ns^x	6.9 ns^x	9.3 ns^x	9.7 ns^x	11.1 ns^x
2	Sep, Oct, Nov, Apr = MO^v + PA Dec, Jan, Feb, Mar = S + PA	30.6 ns	8.1 ns	14.1 ns	10.1 ns	10.2 ns
3	MO + PA rotated with S + PA	35.7 ns	6.4 ns	16.1 ns	10.0 ns	10.8 ns
4	MO rotated with S + PA	37.9 ns	4.5 ns	17 ns	10.0 ns	10.8 ns
5	0.5 # $FeSO_4$ + PA	36 ns	7.3 ns	24.3 ns	9.9 ns	10.9 ns
6	1.0 # $FeSO_4$ + PA	31.9 ns	10.6 ns	18.9 ns	9.7 ns	11.1 ns
7	Sulfur (S)	37.8 ns	6.5 ns	14.4 ns	10.2 ns	11.3 ns
8	Phosphorous Acid (PA)	24.4 ns	7.5 ns	15.8 ns	9.9 ns	11.1 ns
9	Fungicide Control	46.6 ns	8.8 ns	23.2 ns	9.9 ns	10.8 ns
10	Non-treated control	49.5 ns	9 ns	22.4 ns	10.3 ns	10.8 ns

Current Trials :

- Comparing iron sulfate versus chelated iron.
  - in the absence and presence of phosphorous acid.

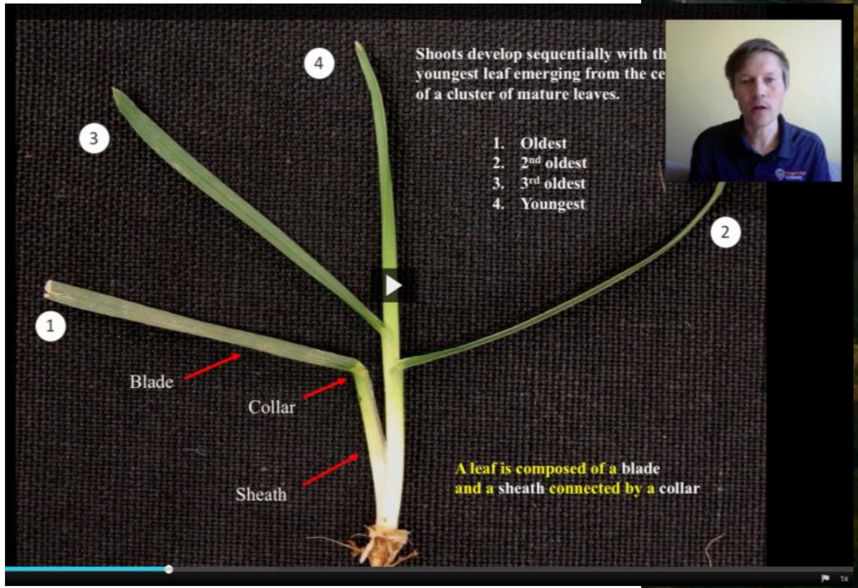
- Quantifying the long-term effects of alternative products.

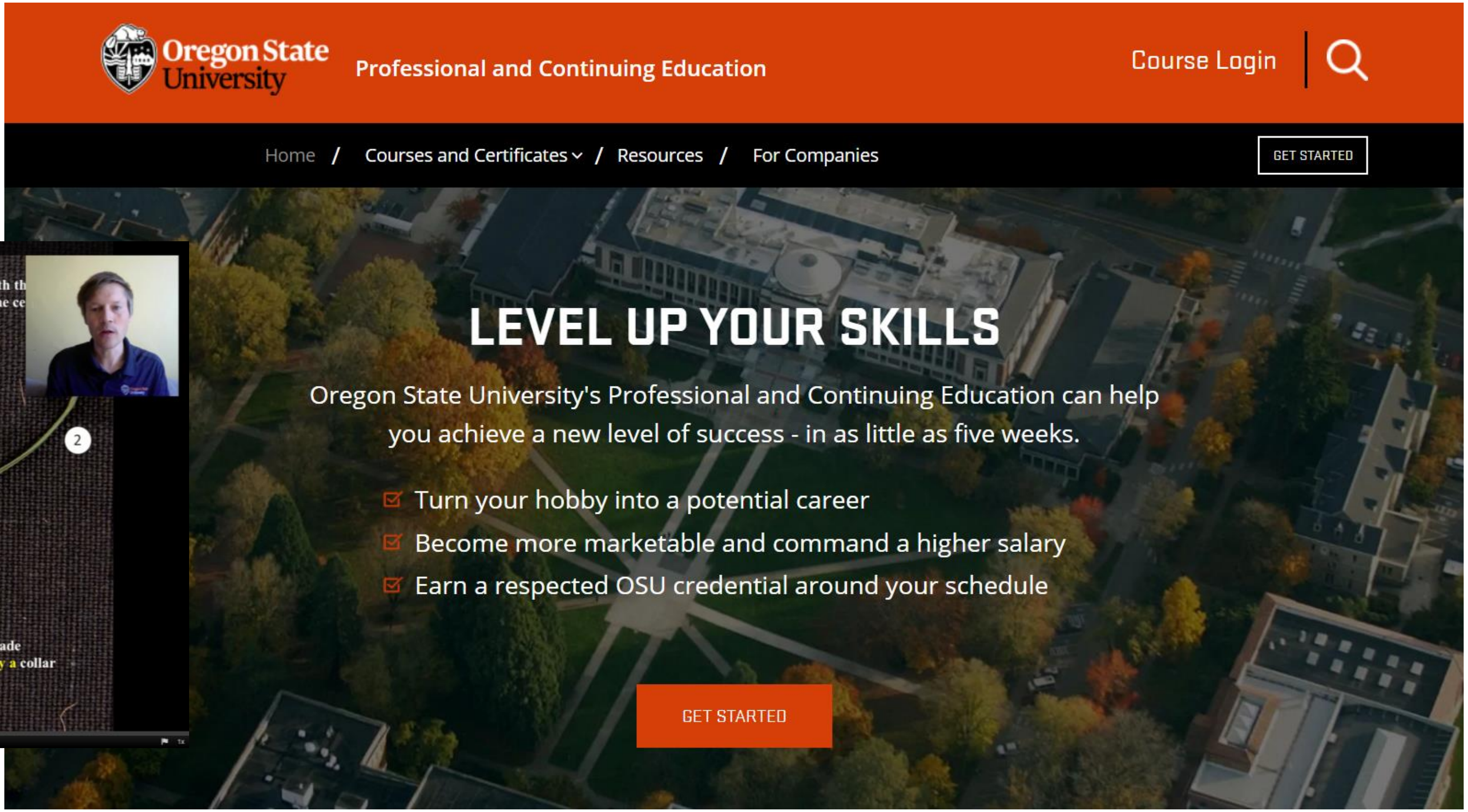
Polling Question

Thank You!

Oregon State University

- Clint.Mattox@oregonstate.edu
- Twitter @mattoxgolf
- OSU Turf Twitter: @osubeaverturf
- www.beaverturf.com





PACE Course Classes: links on www.beaverturf.com

General Turf Management : Next iteration: Nov 2021

Golf course Maintenance : Jan 4th 2021 – Feb 5th 2021

Oregon Pesticide Applicator License Training : Feb 8th 2021 – Mar 18th 2021

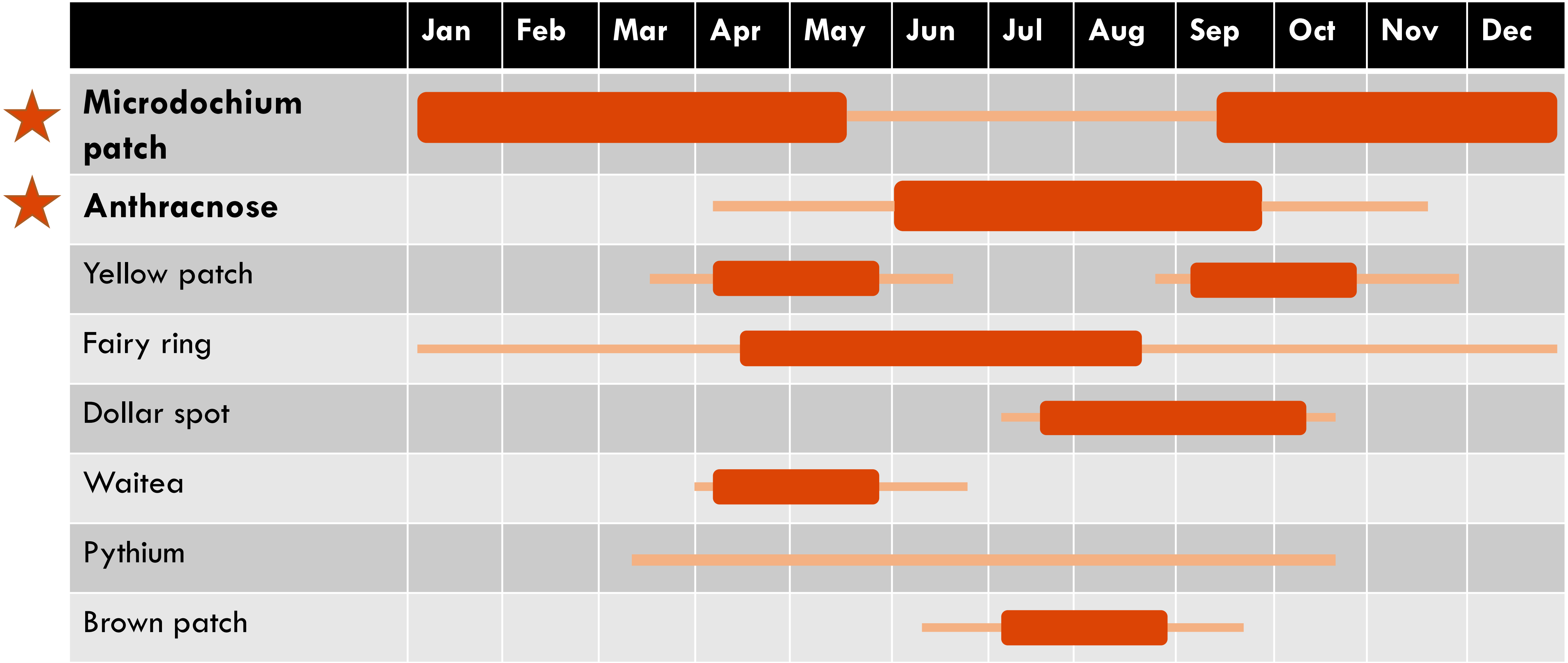
Management of Cool-Season Diseases with Fungicides

Emily Braithwaite

2020 Virtual OGCSA Pest Seminar

Oregon State University

Diseases on Annual Bluegrass in PNW



Anthracnose
(*Colletotrichum cereale*)

- Infects turf when it is weakened by physiological or mechanical stresses.
- Favored by conditions like: low fertility, high temperature, low mowing, poor drainage, compaction, high humidity, shade.

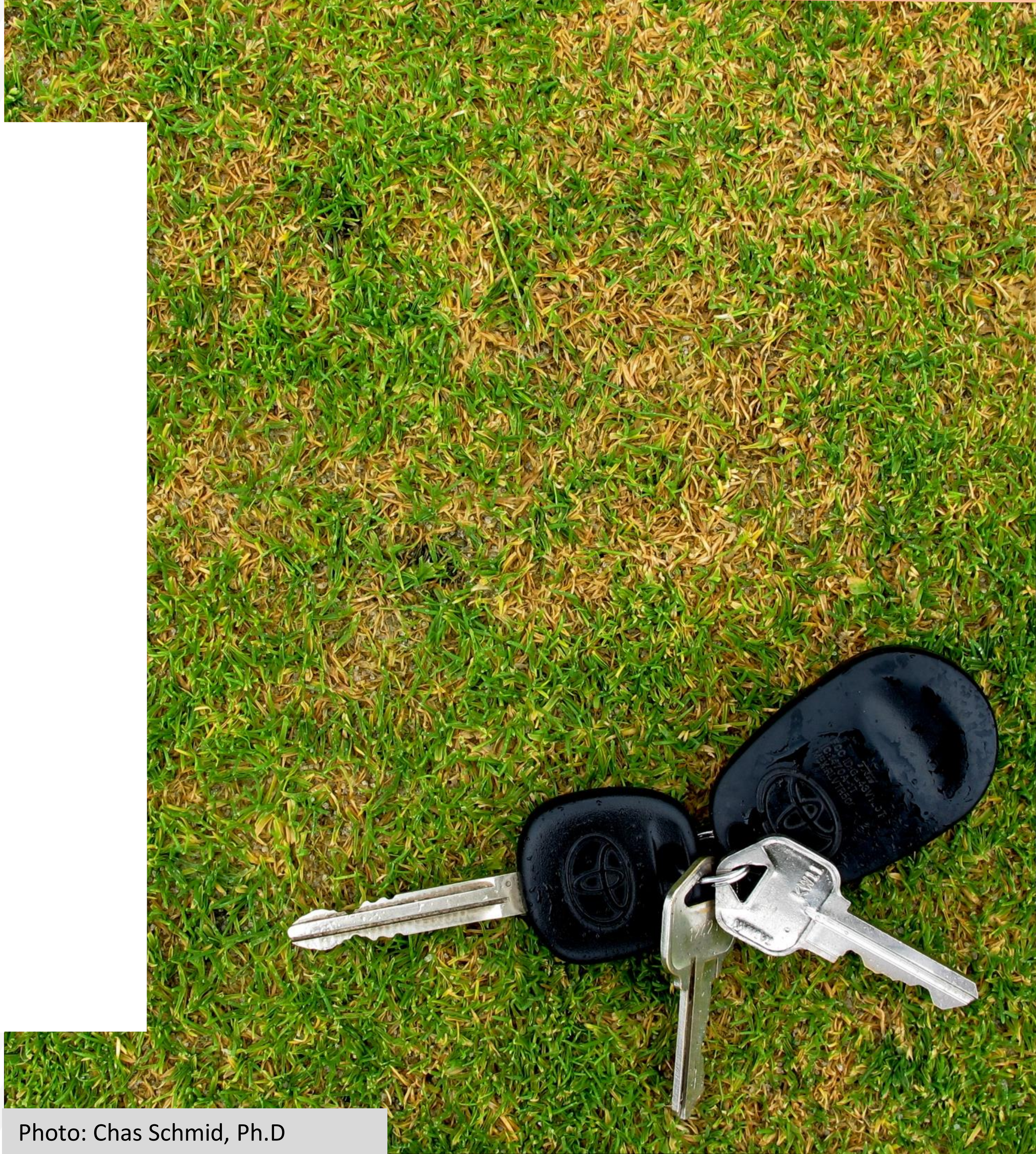


Photo: Chas Schmid, Ph.D

Anthracnose (*Colletotrichum cereale*)

- Develops over a range of temperatures
- Basal rot symptoms (60-78°F)
  - Can occur throughout the year
- Foliar symptoms (above 79°F)
  - Chlorosis at the tip of the leaves that moves down, eventually becoming necrotic

Photo: Chas Schmid, Ph.D

Components of a spray program

- The first application is the most important, before disease progresses
- If pressure is known to be a problem, get on a 14-day interval
- Contact fungicides give a shorter span of protection (7-10 days) compared to penetrants (14-28 days).
- A preventative program should include a rotation of modes of action, tank-mixing may increase efficacy.


American Phytopathological Society, 2006

June-August: 2020 OSU Anthracnose Program

It's important to start early! Aim for 3 weeks before you normally see symptoms

Date	Chemicals	Rate (oz/M)	Chemical Class
1st week June	Torque + Secure Action	0.6 + 0.5	DMI + 2,6-dinitroanilines
3rd week June	Heritage Action	0.4	QoI
1st week July	Velista + Duraphite	0.5 + 3.2	SDHI + Phosphite
3rd week July	Maxtima	0.6	DMI
1st week August	Medallion + Secure Action	1.0 + 0.5	Phenylpyrrole + 2,6-dinitroanilines
3rd week August	Heritage Action	0.4	QoI
1st week September	Banner Maxx	2.0	DMI (+ Fluazinam?)

★ Under high pressure years, adding Daconil Action (*chlorothalonil*) with applications can ★ improve disease suppression

Remember:

- First application is most important (3 weeks before symptoms usually are seen)
- 14 day intervals for high disease areas
- Add in Daconil to applications
- Rotate chemistries, and avoid DMIs in high heat (with the exception of new BASF products or Briskway)

Don't Forget:

- Anthracnose prefers weak/stressed turf
- Maintain Best Management Practices (BMPs)!

Best Management Practices for Anthracnose

Fertility
- Key is maintaining sufficient nitrogen in the plant through frequent, light rate applications of soluble N (0.1-0.2 lbs N/M per week)
- Granular applications (1-3 lbs N/M) should be emphasized in spring to reduce disease
- Maintain potassium at sufficient levels in the soil (≥ 98 ppm or 49mg/kg Mehlich 3) and tissue (≥ 2%)

Mowing
- Slight increases in mowing height can significantly reduce severity
- Roll and/or increase mowing frequency to maintain ball roll distances at higher mowing heights

Topdressing
- Frequent topdressing (100 lbs/M every 2 weeks) during the playing season will reduce anthracnose severity.
- Heavier topdressing in spring is also effective, and is critically important if a frequent summer topdressing program is not practiced.

20 July 2009

0.094 lb N per 1000 ft^2 per app

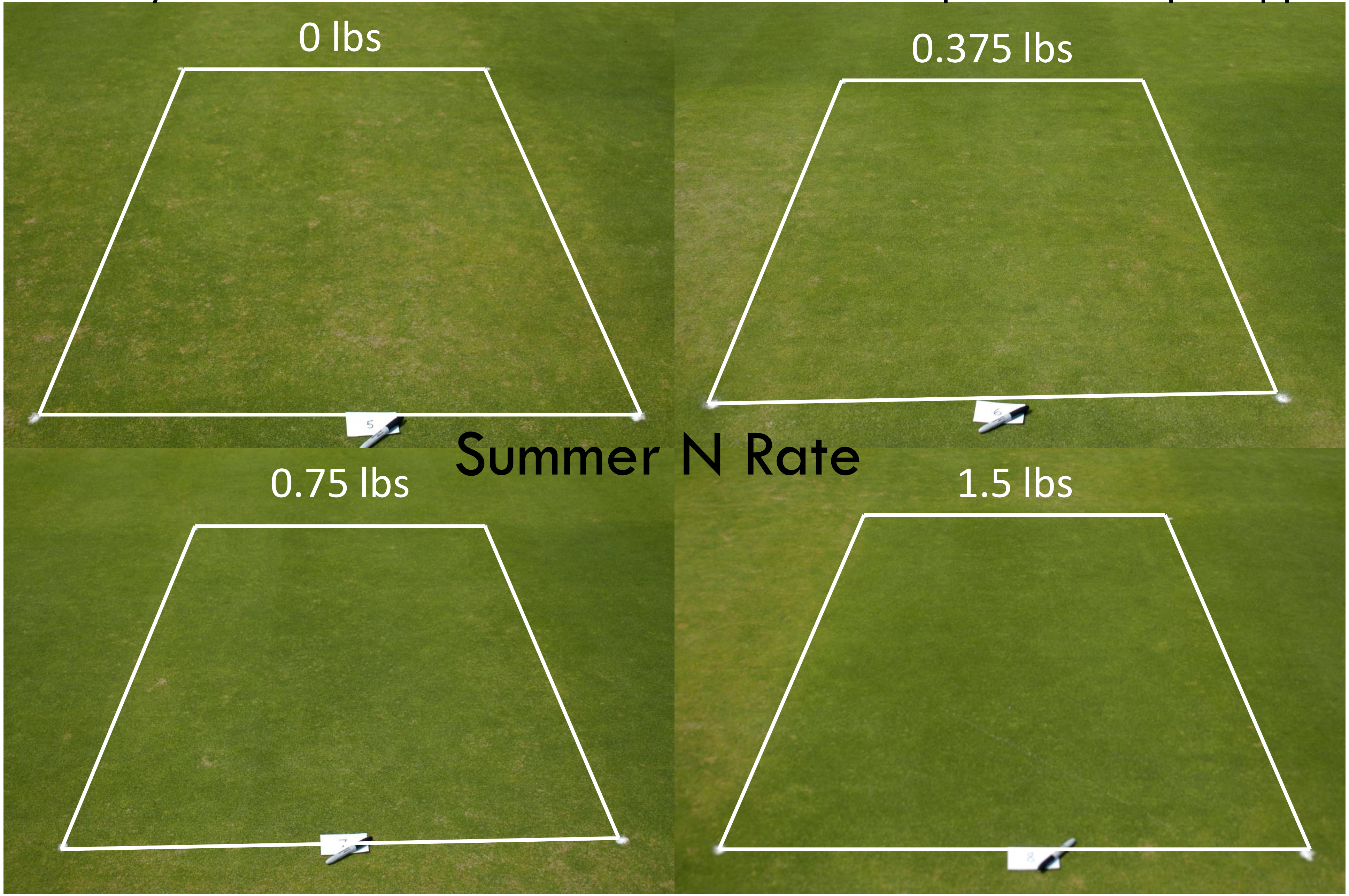


Photo: Chas Schmid, Ph.D

Best Management Practices for Anthracnose

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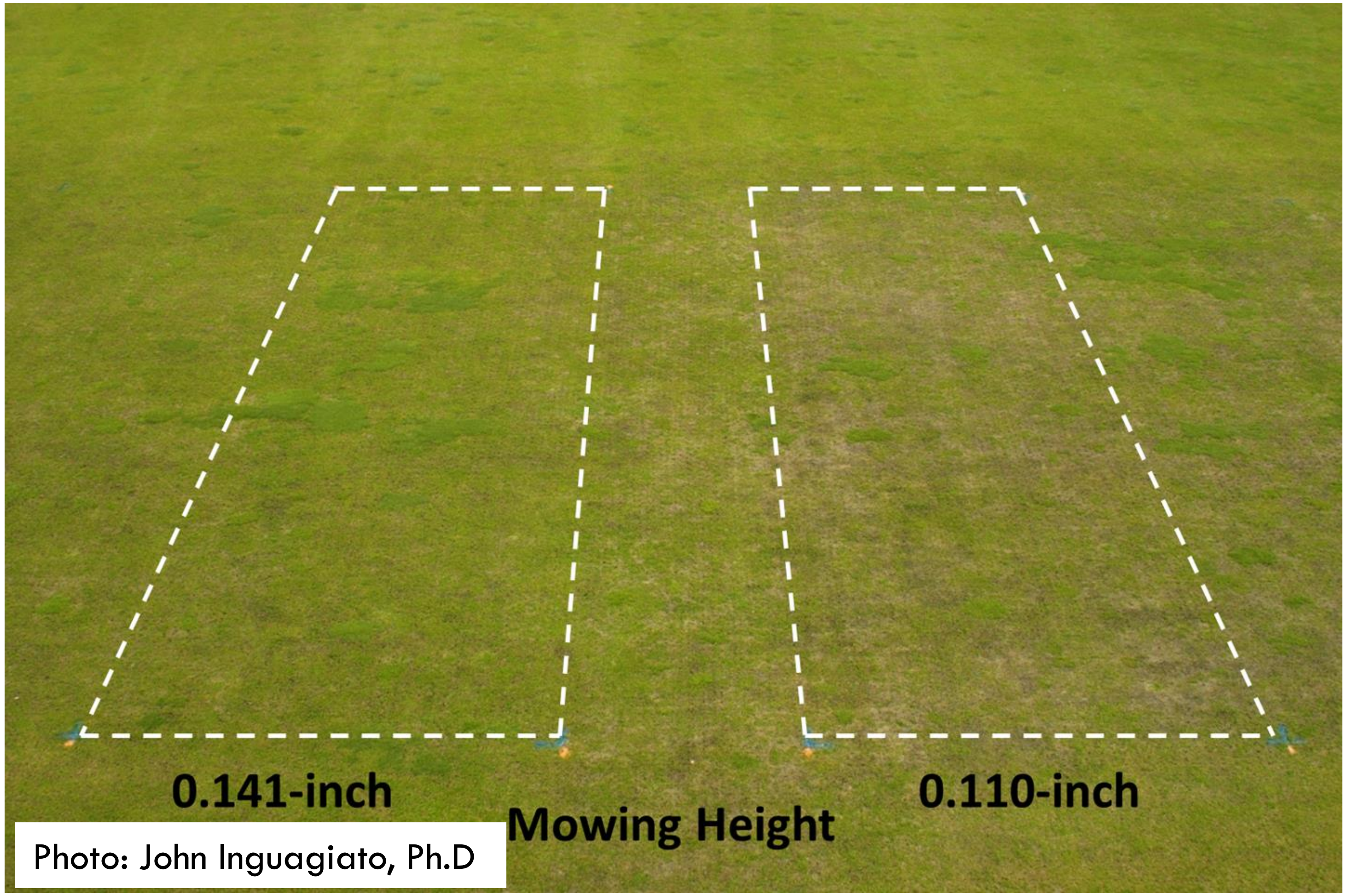
Best Management Practices for Anthracnose



Best Management Practices for Anthracnose

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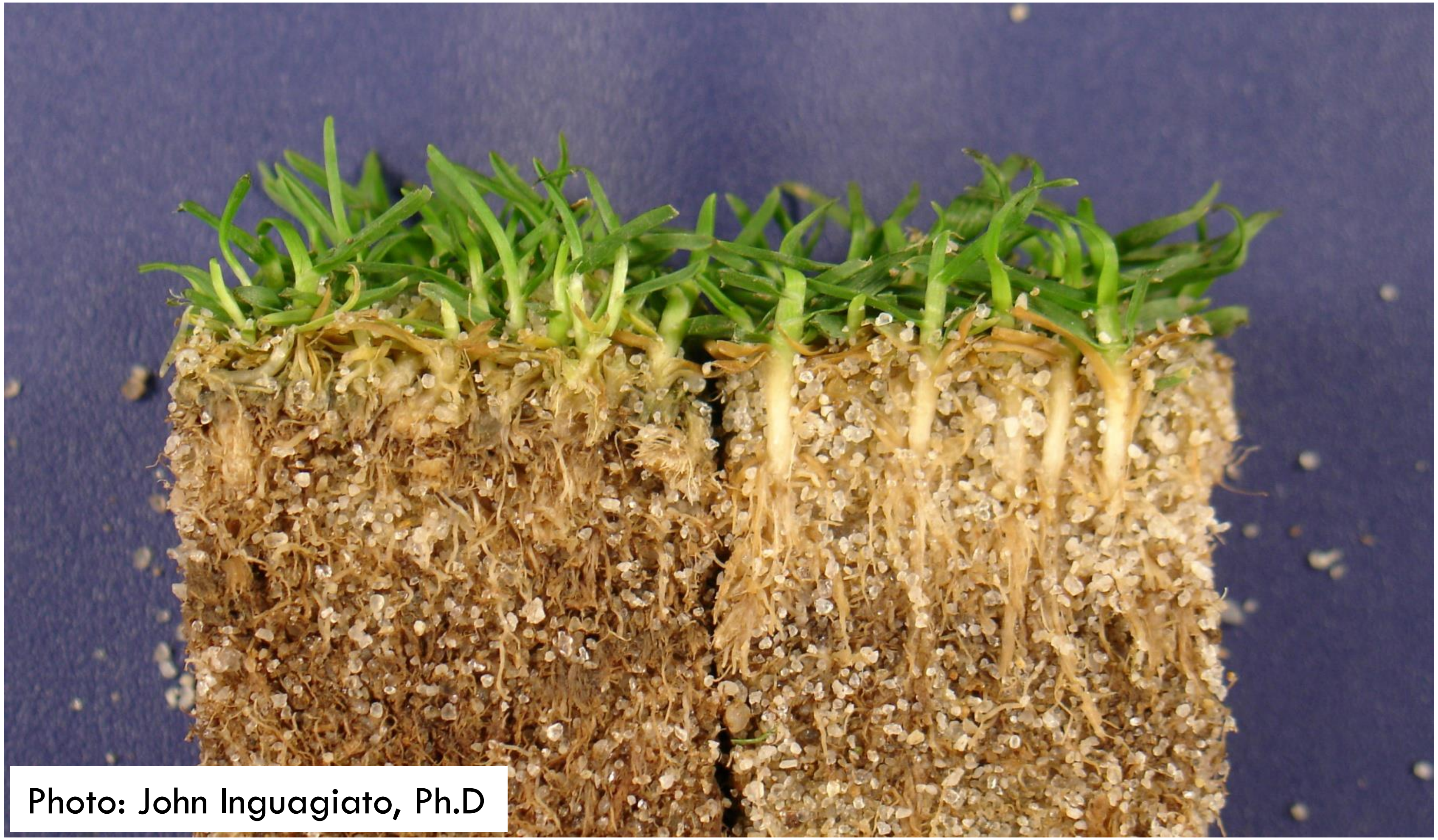
Best Management Practices for Anthracnose



Sand topdressing (right) enhances turf tolerance to low mowing by increasing the effective cutting height since the load of the mower (rollers) is better supported and less likely to settle into the turf canopy

Combining BMPs

- Disease response
  - N fertility produces the greatest reduction in disease severity
  - Mowing height and topdressing produce small to moderate reductions in disease severity
  - Low mowing height can be used to improve ball roll distance without increasing disease, as long as N rate and topdressing rate remain at BMP level

Microdochium patch (*Microdochium nivale*)

- Problematic west of the Cascades from fall through early spring, especially under cool, humid conditions
- Often exacerbated under higher fertility and shade

Sample Fungicide Rotation for M. Patch in Western Oregon

Date	Product	Rate (oz./M)	Active Ingredients	Group
Sep. 15	Headway	3.0	Propiconazole + Azoxystrobin	3,11
Oct. 15	Turfcide 400	8.0	PCNB	14
Nov. 15	Instrata	7.0	Chlorothalonil + Propiconazole + Fludioxonil	12,3,M
Dec. 15	Contend A	1.0	Benzovinduiflupyr (SDHI) + Difenoconazole	7,3
Jan. 15	Turfcide 400	8.0	PCNB	14
Feb. 15	Instrata	7.0	Chlorothalonil + Propiconazole + Fludioxonil	12,3,M
Mar. 15	Interface + FORE	5.0 + 8.0	Iprodione + Trifloxystrobin+ Mancozeb	2,11,M3
Apr. 15	Affirm + Secure	0.9 + 0.5	Polyoxin D + Fluazinam	19,29

What about fertility?

- When applying fertility fall through spring, do not apply urea alone
- Excessive N rates can increase disease pressure
- Add potassium by itself, or with phosphorus, to the urea
- Aim for an N-P-K ratio of approximately 8-1-4

Top: 0.1#N/M + K monthly
Bottom: 0.2#N/M monthly (no P or K)

New Fungicides

syngenta

BASF

- Posterity (*pydiflumetofen*) – dollar spot, fairy ring, Microdochium patch etc.
- Ascernity (*benzovindiflypyr + difenoconazole*) – anthracnose, yellow patch, snow mold, Microdochium patch etc.

- Maxtima (*mefentrifluconazole*) – anthracnose, dollar spot, fairy ring, summer patch etc.
- Navicon Intrinsic (*mefentrifluconazole + pyraclostrobin*) - anthracnose, dollar spot, fairy ring, summer patch etc.

Selecting Fungicides

Selecting fungicides

chemical control of turfgrass diseases 2020

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Scholarly articles for **chemical control of turfgrass diseases 2020**

Diagnosis of **turfgrass diseases** - Stowell - Cited by 25

… 6 fungicides against 3 pathogens of **turfgrass diseases** … - Wen - Cited by 4

… to suppress bentgrass **diseases** in Agrostis stolonifera - Coelho - Cited by 3

www.ca.uky.edu › agc › pubs › ppa › ppa1 › ppa1 PDF

PPA-1: Chemical Control of Turfgrass Diseases, 2020 - UK ...

PPFS-OR-T-11 describes **cultural** practices that usually can alleviate infectious **diseases** in home lawns without the use of fungicides. Consider these limitations before using commercial fungicides: • They are effective only against specific **turfgrass diseases**. They must be applied at the right time to be effective.

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entomology.ca.uky.edu › files › catmanualpdfs › ppa1 PDF

PPA-1: Chemical Control of Turfgrass Diseases 2017 - UK ...

This publication is intended for professional **turfgrass** man- agers who use fungicides as part of an overall **disease-control** program as described above.

You've visited this page 2 times. Last visit: 11/18/19

Selecting fungicides

PPA-1

Chemical Control of Turfgrass Diseases 2020

Bruce B. Clarke, Department of Plant Biology, Rutgers University; Paul Vincelli, Department of Plant Pathology, University of Kentucky; Paul Koch, Department of Plant Pathology, University of Wisconsin-Madison; Gregg Munshaw, Department of Plant and Soil Sciences, University of Kentucky

Turfgrasses under intensive management are often subject to outbreaks of infectious diseases. Diseases usually are most damaging when weather or cultural conditions favor the disease-causing agent but not plant growth and vigor. Cultural conditions that predispose turfgrass to diseases include close mowing, inadequate or excessive nitrogen fertility, light or frequent irrigation, excessive thatch, poor drainage, and shade.

Good turf management practices often greatly reduce the impact of disease by promoting healthy plants that are better able to resist infections. Even under good management, however, diseases sometimes cause excessive damage to highly managed turfgrasses. The proper use of fungicides in these instances, in conjunction with implementing best cultural management practices that promote quality turf, can be an important part of an overall disease-management program.

Fungicides available for controlling turfgrass diseases in Kentucky, New Jersey, and many other states are listed in tables 1 and 2. Specific application rates, safety precautions, and other important information are provided on the labels of the formulated products. Read these labels completely and carefully before using any fungicide.

Diseases in Home Lawns

This publication is intended for professional turfgrass man-

If applying "granular" fungicides to home lawns, here are some guidelines to help improve results:

If disease is not yet evident, fungicides may be applied to foliage that is either wet or dry. In either case, wearing impermeable boots is recommended.

If disease is already active:

- For control of foliar diseases, apply the fungicide when foliage is wet so that it sticks to leaf blades when using a granular product.
- For control of root diseases, either apply it to dry foliage or apply it to wet foliage followed by immediate, light irrigation to wash the product into the topmost soil layer.

Contact and Systemic Fungicides

There are two general types of fungicides. Contact fungicides, sometimes called protectant fungicides, remain on plant surfaces after application and do not penetrate the plant tissue. Systemic or penetrant fungicides are those that are absorbed into

Selecting fungicides

2. Anthracnose

Pathogen: *Colletotrichum cereale (Colletotrichum graminicola)*

Pronunciation: [kahlay-**ta**trickum] [siri-**ah**-lay] [kahlay-**ta**trickum] [gramma-**nick**-ola]

Principal hosts: Annual bluegrass, creeping bentgrass

Season: June-September on creeping bentgrass, April-November in annual bluegrass

On creeping bentgrass, the disease anthracnose is associated with warm weather. On bentgrass sites with a history of the disease, begin fungicide applications in mid-May, continuing until the end of August. On greens with the basal rot phase of the disease, use walk-behind mowers and raise the height of cut. Irrigate greens as needed to avoid drought stress. If sowing new greens, consider adapted creeping bentgrass cultivars with moderate resistance to anthracnose (see http://www.ntep.org). Avoid the most susceptible cultivars, such as Providence, Pennlinks II, Penncross, Seaside II, and Brighton.

On annual bluegrass greens, basal anthracnose can develop under a wider range of temperatures than in creeping bentgrass. There are four peak periods of anthracnose development:

- During cool/moist periods in early spring and even through winter if conditions are mild and wet
- During periods of extended overcast conditions in late spring
- Following peak periods of flowering in early summer
- During periods of high temperature and humidity

It should also be noted that active anthracnose has been found occasionally under snow cover in late winter in Pennsylvania. During high-risk periods, minimize

2. Anthracnose

Fungicide: *Some Trade Names*	FRAC Code[a]	Efficacy*	Interval (days)
azoxystrobin: *Heritage*	11	1/3[b]	14-28
Bacillus licheniformis: *EcoGuard*	NC	1	3-14
Bacillus subtilis, strain QST 713: *Rhapsody*	NC	1.5	7-10
chlorothalonil: *Daconil Ultrex, Manicure, Concorde SST, Chlorostar, Echo, Pegasus L*	M5	3	7-14
fenarimol: *Rubigan*	3	2	30
fluazinam: *Secure, Rotator, Soteria*	29	1.5	14
fludioxonil: *Medallion*	12	3	14
fluoxastrobin: *Fame*	11	1/3[b]	14-28
fosetyl-Al: *Chipco Signature, Signature Xtra Stressgard*	33	NA[c]	14
hydrogen dioxide: *Zerotol*	NC	L	7
iprodione: *Chipco 26 GT*	2	NA[c]	Unspecified
mefentrifluconazole: *Maxtima*	3	4	14
metconazole: *Tourney*	3	3	14-21
mineral oil: *Civitas*	NC	3[d]	7-14
myclobutanil: *Eagle*	3	2	14-21
PCNB: *Autilus*	14	3[d]	7-10
penthiopyrad: *Velista*	7	3[e]	14
phosphite (salts of phosphorous acid): *Alude, Appear, Fiata Stressgard, Magellan, Biophos, Resyst, Vital Sign, PK-Plus*	33	2 to 3[f]	14
polyoxin D: *Affirm*	19	3	7-14
propiconazole: *Banner, Spectator, Savvi*	3	2.5	14-28
Pseudomonas chlororaphis, strain AFS009: *Zio*	BM02	L[g]	7-21
pyraclostrobin: *Insignia Intrinsic*	11	1/3[b]	14-28
Reynoutria sachalinensis: *Regalia PTO*	NC	1	7-14
tebuconazole: *Torque, Mirage Stressgard, Sipcam Clearscape ETQ, Offset, ArmorTech TEB360*	3	3	14-28
thiophanate-methyl: *3336 EG, Fungo, Systec 1998, Cavalier, T-Storm*	1	1/2[b]	10-14
triadimefon: *Bayleton, Andersons Fungicide VII*	3	1.5	14-45
trifloxystrobin: *Compass*	11	1/3[b]	14-21
triticonazole: *Trinity, Triton*	3	3	14-28

Selecting fungicides

Efficacy:

- 4 = consistently good to excellent control in published experiments
- 3 = good to excellent control in most experiments
- 2 = fair to good control in most experiments
- 1 = control is inconsistent between experiments
- N = no efficacy
- L = limited published data on efficacy

2. Anthracnose

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chlorothalonil: *Daconil Ultrex, Manicure, Concorde SST, Chlorostar, Echo, Pegasus L*	M5	3	7-14
fenarimol: *Rubigan*	3	2	30
fluazinam: *Secure, Rotator, Soteria*	29	1.5	14
fludioxonil: *Medallion*	12	3	14
fluoxastrobin: *Fame*	11	1/3[b]	14-28
fosetyl-Al: *Chipco Signature, Signature Xtra Stressgard*	33	NA[c]	14
hydrogen dioxide: *Zerotol*	NC	L	7
iprodione: *Chipco 26 GT*	2	NA[c]	Unspecified
mefentrifluconazole: *Maxtima*	3	4	14
metconazole: *Tourney*	3	3	14-21
mineral oil: *Civitas*	NC	3[d]	7-14
myclobutanil: *Eagle*	3	2	14-21
PCNB: *Autilus*	14	3[d]	7-10
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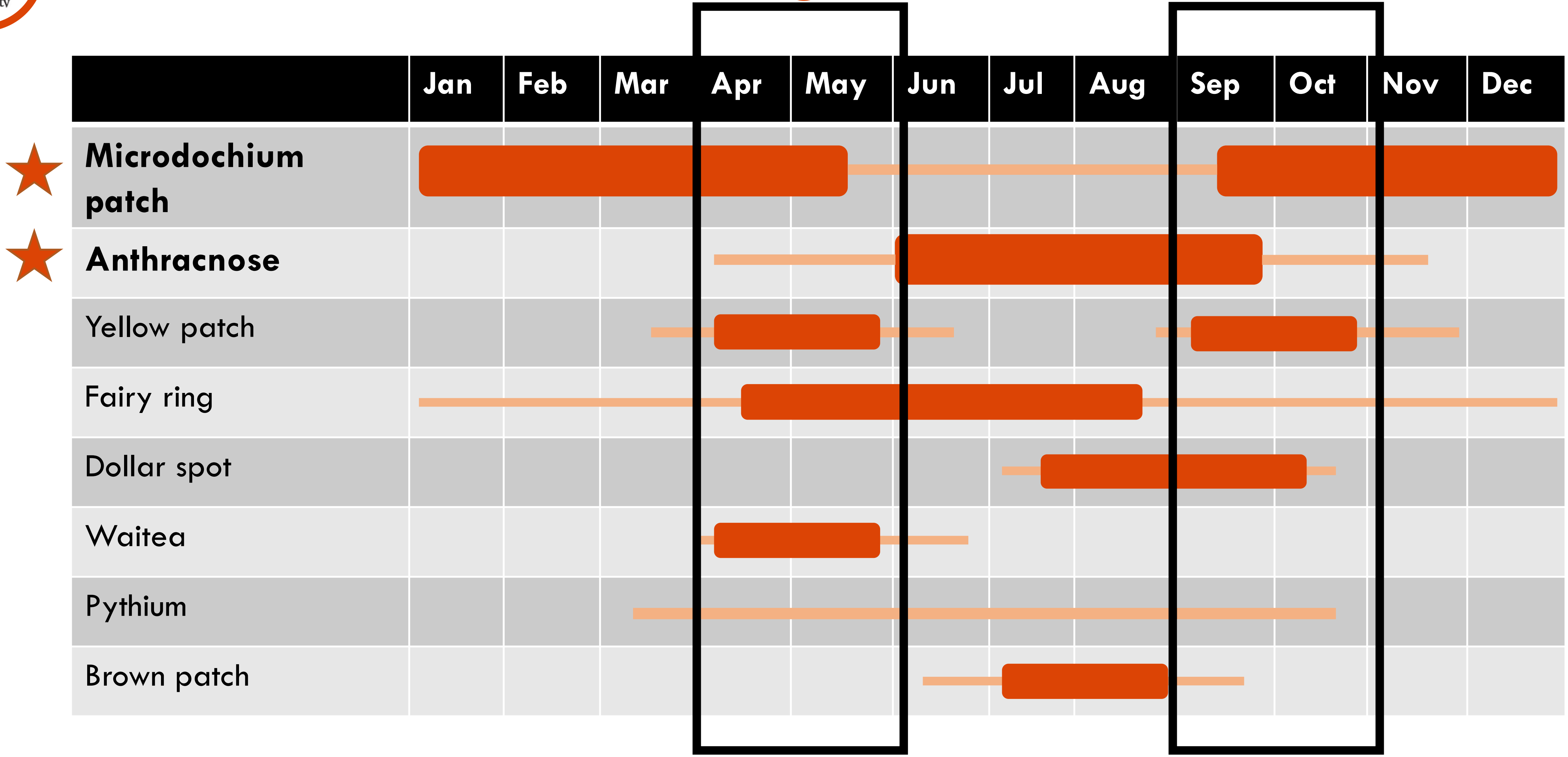
Pseudomonas chlororaphis, strain AFS009: *Zio*	BM02	L[g]	7-21
pyraclostrobin: *Insignia Intrinsic*	11	1/3[b]	14-28
Reynoutria sachalinensis: *Regalia PTO*	NC	1	7-14
tebuconazole: *Torque, Mirage Stressgard, Sipcam Clearscape ETQ, Offset, ArmorTech TEB360*	3	3	14-28
thiophanate-methyl: *3336 EG, Fungo, Systec 1998, Cavalier, T-Storm*	1	1/2[b]	10-14
triadimefon: *Bayleton, Andersons Fungicide VII*	3	1.5	14-45
trifloxystrobin: *Compass*	11	1/3[b]	14-21
triticonazole: *Trinity, Triton*	3	3	14-28

Diseases on Annual Bluegrass in PNW



Selecting fungicides

2. Anthracnose

Reynoutria sachalinensis: *Regalia PTO*	NC	1	7-14
tebuconazole: *Torque, Mirage Stressgard, Sipcam Clearscape ETQ, Offset, ArmorTech TEB360*	3	3	14-28
thiophanate-methyl: *3336 EG, Fungo, Systec 1998, Cavalier, T-Storm*	1	1/2[b]	10-14
triadimefon: *Bayleton, Andersons Fungicide VII*	3	1.5	14-45
trifloxystrobin: *Compass*	11	1/3[b]	14-21
triticonazole: *Trinity, Triton*	3	3	14-28
Combination Products			
azoxystrobin + acibenzolar-S-methyl: *Heritage Action*	11 + P1	L	14-28
azoxystrobin + chlorothalonil: *Renown*	11 + M5	2.5	7-21
azoxystrobin + difenoconazole: *Briskway*	11 + 3	L	14
azoxystrobin + propiconazole: *Headway, Goliath*	11 + 3	3	14-28
azoxystrobin + tebuconazole: *ArmorTech ZOXY-T, StrobeT, Oximus*	11 + 3	3.5	14-21
boscalid + pyraclostrobin: *Honor Intrinsic*	7 + 11	1/3[b]	14-28
chlorothalonil + acibenzolar-S-methyl: *Daconil Action*	M5 + P1	3	7-14
chlorothalonil + fludioxonil + propiconazole: *Instrata*	M5 + 12 + 3	L	14-28
chlorothalonil + iprodione: *E-Pro ETQ, Chipco 26GT + Daconil Ultrex*	M5 + 2	L	14
chlorothalonil + iprodione + thiophanate-methyl + tebuconazole: *Enclave*	M5 + 2 + 1 + 3	3.5	14-28
chlorothalonil + propiconazole: *Concert, Concert II*	M5 + 3	3	14-28
chlorothalonil + tebuconazole: *E-Scape ETQ*	M5 + 3	L	28
chlorothalonil + thiophanate-methyl: *ConSyst, Spectro, Broadcide, Peregrine, Tee-1-Up, TM/C*	M5 + 1	2.5	14
fosetyl-Al + chlorothalonil: *on-site tank-mix of labeled solo products.*	33 + M5	3.5	14
fluazinam + acibenzolar-S-methy: *Secure Action*	29 + P1	L	14
fluazinam + tebuconazole: *Traction*	29 + 3	3	14
fluopyram + trifloxystrobin: *Exteris Stressgard*	7+11	3	14-28

26. Yellow Patch (Low Temperature Brown Patch)

Fungicide: *Some Trade Names*	FRAC Code[a]	Efficacy*	Interval (days) or Applications (x)
azoxystrobin: *Heritage*	11	3	28
chlorothalonil: *Daconil Ultrex*	M5	2.5	7-14
fludioxonil: *Medallion*	12	2.5	1x
fluoxastrobin: *Fame*	11	L	28
flutolanil: *Prostar, Pedigree*	7	3	21-28
metconazole: *Tourney*	3	L	1-2x
polyoxin D: *Affirm*	19	L	7-14
propiconazole: *Banner Maxx, Spectator, Savvi*	3	2.5	1x
Reynoutria sachalinensis: *Regalia PTO*	NC	L	7-14
tebuconazole: *Torque, Mirage Stressgard, Sipcam Clearscape ETQ, Offset, ArmorTech TEB360*	3	L	1-2x @ 21-2
thiophanate-methyl: *3336 EG, Fungo, Systec 1998, Cavalier, T-Storm*	1	L	14
triticonazole: *Trinity, Triton*	3	L	21-28

continued

15. Pink Snow Mold/Microdochium Patch (= Fusarium Patch)

Combination Products			
azoxystrobin + acibenzolar-S-methyl: *Heritage Action*	11 + P1	L	10-28
azoxystrobin + chlorothalonil: *Renown*	11 + M5	L	14-21
azoxystrobin + difenoconazole: *Briskway*	11 + 3	L	14-28
azoxystrobin + propiconazole: *Headway, Goliath WP, Contend B*	11 + 3	3.5	14-28, Contend B once
azoxystrobin + tebuconazole: *ArmorTech ZOXY-T, StrobeT, Oximus*	11 + 3	L	14-21
benzovinduiflupyr + difenoconazole: Contend A	7 + 3	3	Once, late fall
boscalid + pyraclostrobin: *Honor Intrinsic*	7 + 11	2.5	14-28

continued

www.beaverturf.com

@osubeaverturf

braithwe@oregonstate.edu
brian.mcdonald@oregonstate.edu

Oregon State University

- BREAK –

We will reconvene at 11:00am

Support Turfgrass Research & Education at OSU

For Tickets: Scan QR code or visit: www.oregonturfgrassfoundation.org

OLCA
OREGON LANDSCAPE CONTRACTORS ASSOCIATION

OLCA
OREGON LANDSCAPE CONTRACTORS ASSOCIATION

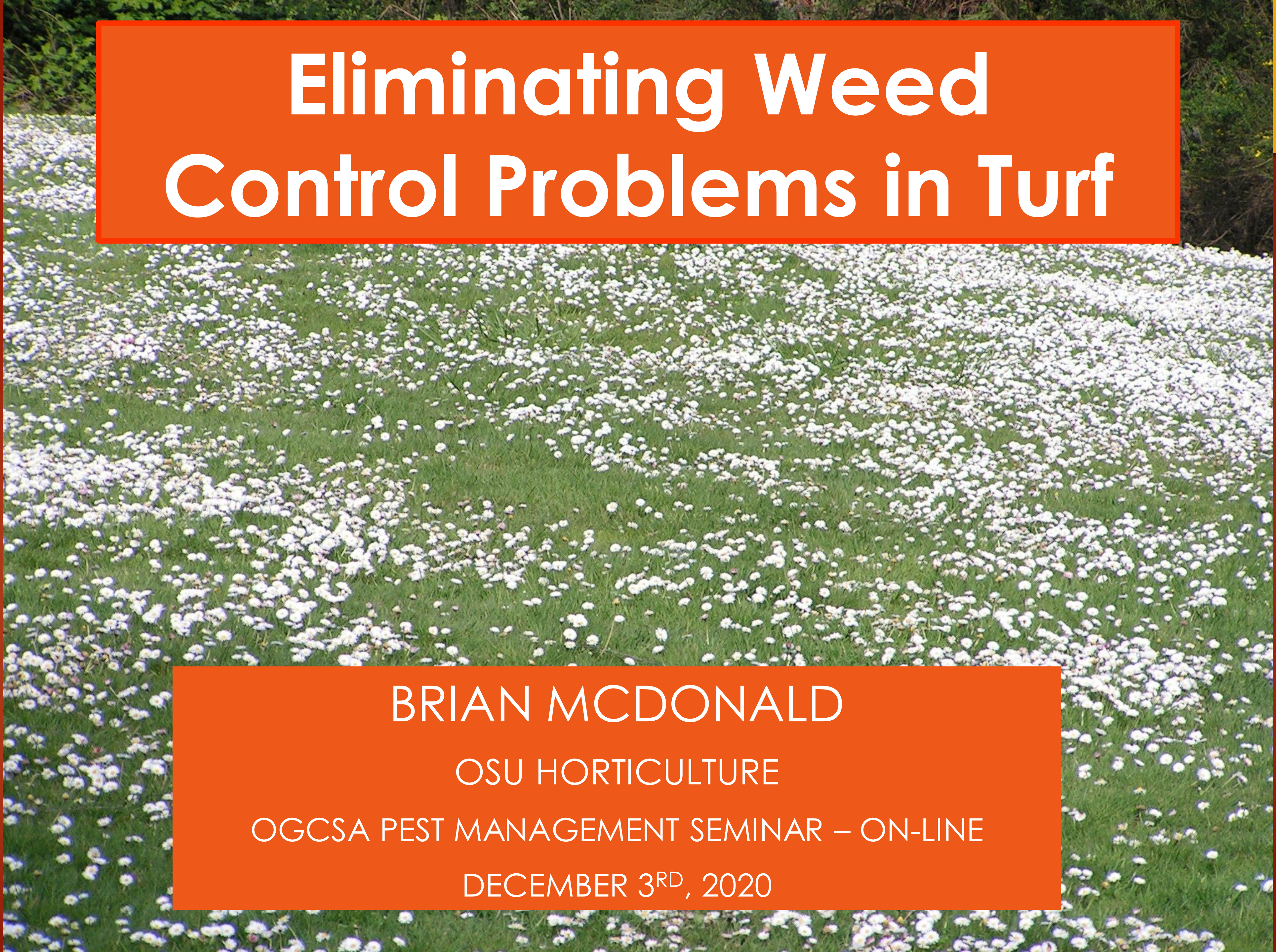
Break - We will reconvene at 11:00am

Simplot PARTNERS

WILBUR-ELLIS

RMT EQUIPMENT

Eliminating Weed Control Problems in Turf



BRIAN MCDONALD

OSU HORTICULTURE

OGCSA PEST MANAGEMENT SEMINAR – ON-LINE

DECEMBER 3RD, 2020

Two Main Problems

1. Poor weed control
2. Damage to turf, trees & Shrubs

Causes of Poor Post Emergent Weed Control

1. Wrong product used
2. Wrong formulation used
3. Rate too low or too few applications (need 2 apps)
4. Incorrect timing (time of year)
5. Weeds are not healthy
6. Irrigated or rain after application
7. Temp extremes and other stresses

Turf herbicide products are like cereals – way more choices than you need.

Very few ingredients – corn, wheat, oats, & rice - lots of products

Product Selection Process

1. Does a 3-way mix control your weeds?
    a) (2,4-D, MCPP, Dicamba)
        i. Common Dandelion
        ii. False Dandelion
        iii. Plantains
        iv. Spotted spurge
        v. Many others… over 90 weeds on label

Standard 3-Way Mixes

		lbs of ae per acre at 4 pts/Acre		
Product	Signal Word	2,4-D	MCPP	Dicamba
Mec Amine-D	Danger	1.22	0.33	0.11
Trimec 1000	Warning	1.19	0.33	0.11
Trimec 992	Danger	1.19	0.32	0.11
Triplet - Low Odor	Danger	1.19	0.32	0.11
Triplet - Selective	Danger	1.19	0.32	0.11
Triplet SF	Danger	1.19	0.32	0.11
Trimec Classic	Danger	0.99	0.27	0.11

Product Selection Process

2. If 3-way mix fails, add components
   a) (triclopyr, fluroxypyr, quinclorac, carfentrazone, etc.
      i. Clover, black medic
      ii. Oxallis
      iii. English Daisy

Add/Change Components

Speedzone

2,4-D**
MCPP***
Dicamba*****
Carfentrazone

Powerzone

MCPA**
MCPP***
Dicamba***
Carfentrazone

TZone

2,4-D*
Triclopyr**
Dicamba***
Sulfentrazone

Q4 Plus

2,4-D*
Quinclorac
Dicamba *
Sulfentrazone

Surge

2,4-D*
MCPP*
Dicamba *
Sulfentrazone

* Amine Salt
** Ester
*** Acid

Modified 3-way Mixtures

Escalade 2

2,4-D*
Fluroxypyr**
Dicamba***

Super Trimec (esters)

2,4-D**
Dichlorprop**
Dicamba*** (2x rate)

Tri-Power

MCPA*
MCPP*
Dicamba *

Cool Power

MCPA**
Triclopyr**
Dicamba***

* Amines
** Esters
*** Acid

Causes of Poor Weed Control

1. Wrong product used
2. **Wrong formulation used**
3. Rate too low
4. Too few applications (2 apps)
5. Incorrect timing (time of year)
6. Weeds are healthy
7. Irrigated or rain after application
8. Temp extremes and other stresses

Causes of Poor Weed Control

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Formulation Difference

1. Liquid vs. Granular
2. Ester vs. Amines and/or acids
   - Cold temps – esters
   - Warm temps – amines
   - Waxy leaves - esters
   - Ground water concerns – use esters.
   - Tree & Shrub damage in spring – use amines
   - Rain coming – use esters.
   - Safer on eyes – use esters.

Causes of Poor Weed Control

1. Wrong product used
2. Wrong formulation used
3. **Rate too low or too few applications (need 2 apps)**
4. **Incorrect timing (time of year)**
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6. Irrigated or rain after application
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Causes of Poor Weed Control

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2. Wrong formulation used
3. **Rate too low or too few applications (need 2 apps)**
4. **Incorrect timing (time of year)**
5. Weeds are healthy
6. Irrigated or rain after application
7. Temp extremes and other stresses

Recovery from Crowns

Best Time to Spray

1. Late summer thru Fall – best
2. Summer – during cooler spells, if turf is irrigated and healthy.
3. Spring
4. Winter

Causes of Poor Weed Control

1. Wrong product used
2. Wrong formulation used
3. Rate too low or too few applications (need 2 apps)
4. Incorrect timing (time of year)
5. **Weeds and lawn are not healthy**
6. Irrigated or rain after application
7. Temp extremes and other stresses

Lawn under drought stress and low fertility

What's the problem?

Irrigated but not fertilized

Turf and weeds under fertilized and under drought stress resulted in incomplete kill and then recovery.

Causes of Poor Weed Control

1. Wrong product used
2. Wrong formulation used
3. Rate too low or too few applications (need 2 apps)
4. Incorrect timing (time of year)
5. Weeds are healthy
6. **Irrigated or rain after application**
7. Temp extremes and other stresses

Wait 24 hours after post emergent herbicide application to irrigate

Rain or Irrigation after herbicide application

- Post emergent herbicides are all foliar absorbed (some also are root absorbed (dicamba, quinclorac). Rain or irrigation washes the herbicide off the plant.
- The general recommended amount of time is 24 hours but some labels give lower values.
  - Amines: 8 hours (Trimec Classic)
  - Ester formulation: – 3 hours (Speed Zone)
  - Drive XLR8 (Quinclorac) < 1 hour.

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Causes of Poor Weed Control

1. Wrong product used
2. Wrong formulation used
3. Rate too low or too few applications (need 2 apps)
4. Incorrect timing (time of year)
5. Weeds are healthy
6. Irrigated or rain after application
7. **Extreme temps and other stresses**

Herbicide Selectivity

1. Herbicide placement
   a) Soil vs. leaves
   b) Beds vs. lawns
   c) Spot treat weeds
   d) Banding (e.g. along fence lines)

2. Plant Biological Effects
   a) Uptake; leaf surface [waxy or hairy] and shape [upright vs. prostrate or narrow vs. wide leaf])
   b) Translocation (slower vs. faster)
   c) Metabolism – breaks down herbicide

3. Effective rate of the herbicide is changed by temperatures effect on items in # 2 above.

Injury to Grass

- Mowing earlier than 2 days before and 2 days after.
- Applying in extreme temperatures
- Rate too high (selective, broad leaf herbicides)
- Adding a surfactant when not on label.
- Wrong Products.
  - 2,4-D Products (except Bentgrass Formula Trimec)
    - Bentgrass
  - Quinclorac (Drive & Q4 Plus)
    - Creeping and Colonial bentgrass, fine fescue
  - Dimension (pre-emergent)
    - Colonial bentgrass
    - Annual bluegrass?

List of Sensitive Grasses

1. Bentgrasses (2,4-D) - use bentgrass formula Trimec
2. Colonial bentgrass (Dimension pre-emergent)
3. Rough bluegrass (Poa trivialis). Most sensitive grass.
4. Fine fescues (Drive/Quinclorac, Q4 Plus, others)
5. Tall fescue & Perennial Ryegrass (Sapphire/penoxulam)

Bentgrass Formula Trimec vs. Standard 3-way mix

	Bentgrass Formula		Standard 3 – way Mix
2,4-D	0.44 lbs./gal	2,4-D	2.44 lbs./gal
MCPP	0.71 lbs./gal	MCPP	0.65 lbs./gal
Dicamba	0.18 lbs./gal	Dicamba	0.22 lbs./gal

Rate: 4 pints/Acre

Rate: 4 pints/Acre

Common Dandelion

Good Control with 3-way mix

False Dandelion aka "catsear"

Broadleaf Plantain

Good Control with 3-way mix


Mousear Chickweed
Use standard 3-way mix,
May need repeat application

White Clover

Fair control with 3- way mix; repeat applications needed

Black Medic, *Medicago Lupulina, summer annual*

Use product with triclopyr (Tzone, 4 speed XT, etc.)

Wood Sorrel (Oxalis)

Poor control with 3-way mix

Woodsorrel, *Oxalis corniculata*

Use product with triclopyr (OSU) or fluroxypyr (UC-IPM online)

English Daisy

Fair to poor control with 3-way mix, depending on the biotype


Common yarrow
Poor Control with 3-way mix

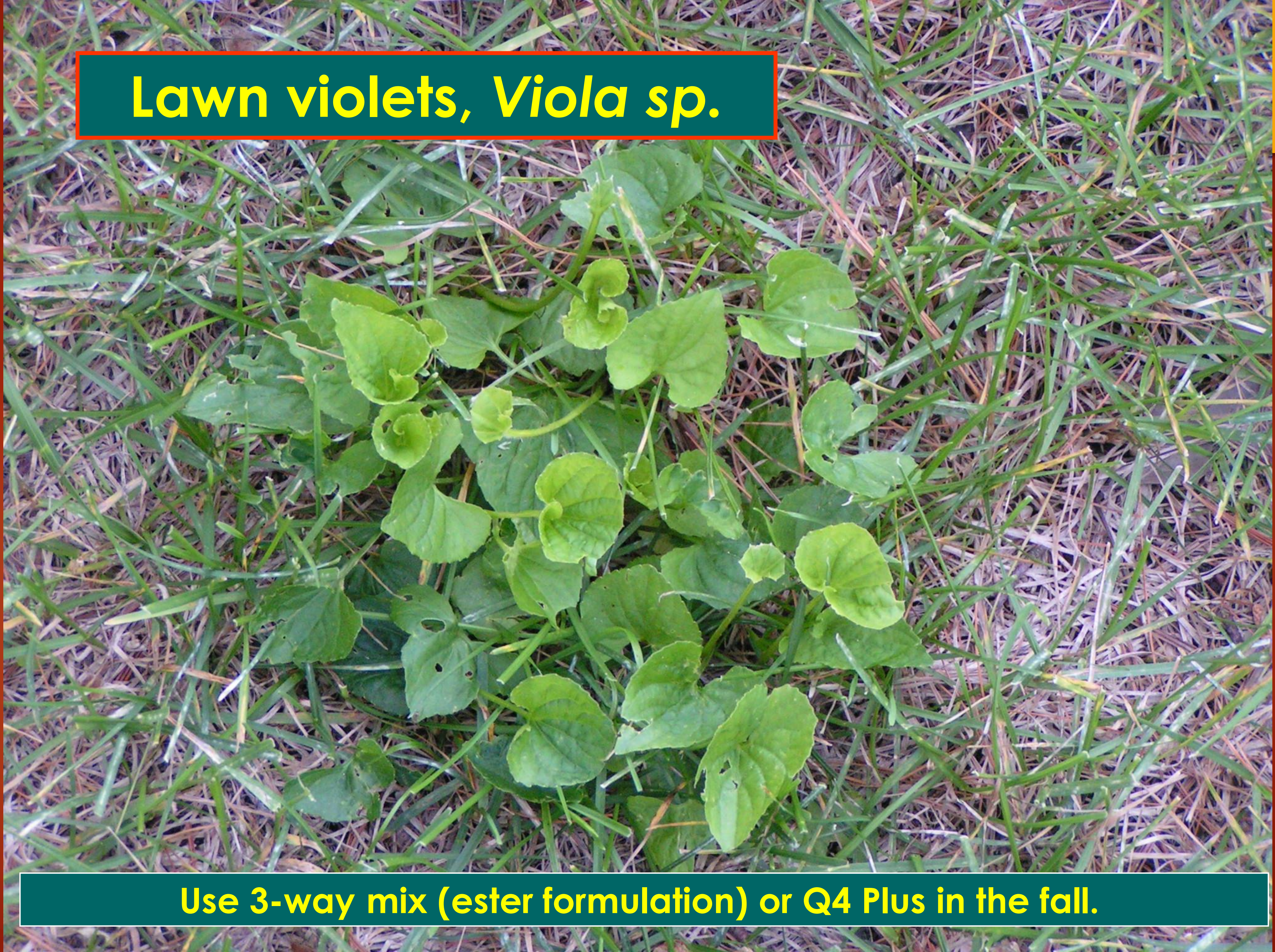
Veronica filiformis

Poor Control with 3-way mix, fluroxypyr or quinclorac

Spotted Spurge

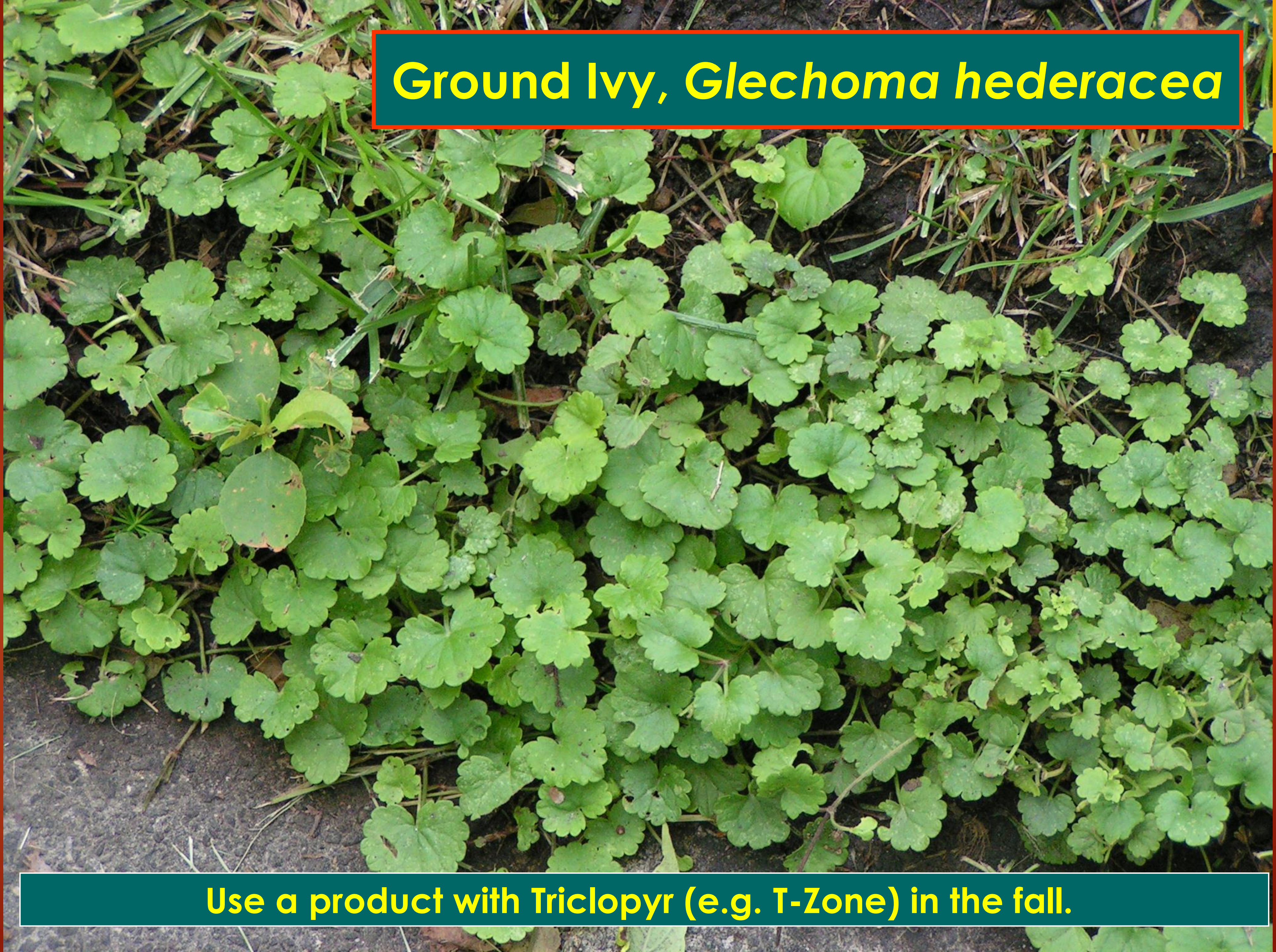
Summer annual:
Germinates @ 50 ° F
Grows thru summer and seeds
Dies from frost in fall

Lawn violets, *Viola sp.*



Use 3-way mix (ester formulation) or Q4 Plus in the fall.

Ground Ivy, *Glechoma hederacea*



Use a product with Triclopyr (e.g. T-Zone) in the fall.

TURFGRASS INSECTS

Alec Kowalewski, Turfgrass Specialist, Oregon State University
alec.kowalewski@oregonstate.edu

Turfgrass Insects


OREGON STATE UNIVERSITY EXTENSION SERVICE

Managing Crane Fly in Lawns

A. Kowalewski, B. Edmunds, B. McDonald and E. Braithwaite

Oregon State University

EM 9296
September 2020

European cranefly


GROWING KNOWLEDGE

Emerging lawn pest: European chafer

BY ALEC KOWALEWSKI, EMILY BRAITHWAITE AND CHAS SCHMID

European chafer

European cranefly

- **Life cycle**
- Scouting
- Action threshold
- Cultural practices
- Insecticides

September

Winter

Spring

summer

European cranefly

- Life cycle
- **Scouting**
- Action threshold
- Cultural practices
- Insecticides

- October to January

European cranefly

- Life cycle
- Scouting
- **Action threshold**
- Cultural practices
- Insecticides

- 25 larvae grubs per square foot in high maintenance turfgrass
- Cause the most damage in the spring (April and May)

European cranefly

- Record precipitation fall 2015 (12″ in October, and 8″ in November).
- Damage at OSU in April 2016

European cranefly

- Life cycle
- Scouting
- Action threshold
- **Cultural practices**
- Insecticides

- Irrigation
  - 4 times week at ¼" per app
  - Memorial Day to Labor Day
  - Adults lay eggs in wet soil in September
  - Discontinue or reduce irrigation around Labor Day

European cranefly

- Life cycle
- Scouting
- Action threshold
- Cultural practices
- **Insecticides**

- Preventative – low toxicity
  - Early instar (September and October)
    - Chlorantraniliprole – Acelepryn
    - Clothianidin – Arena
    - Imidacloprid – Merit

European cranefly

- Life cycle
- Scouting
- Action threshold
- Cultural practices
- **Insecticides**

- Curative – higher toxicity
  - Late instar (November, December and January)
    - Thiamethoxam – Meridian
    - Chlorpyrifos – Dursban
    - Carbaryl – Sevin

Spring applications will not prevent damage

Polling Slide

Turfgrass Insects

OREGON STATE UNIVERSITY EXTENSION SERVICE

Managing Crane Fly in Lawns

A. Kowalewski, B. Edmunds, B. McDonald and E. Braithwaite

Adult crane flies are a common sight in Pacific Northwest summers. You see them bouncing around walls and ceilings, or stuck in spiderwebs, long legs and wings tangled. The size and shape of these insects have earned them nicknames like "mosquito hawk" and "skeeter eater," but they do not consume mosquitoes. Their larvae, however, are known for eating the roots and shoots of your lawn. Learn how to identify crane flies and prevent damage — months before it shows up as bare patches in your yard.

There are several species of crane fly in the Pacific Northwest, but only the marsh crane fly (*Tipula oleracea*) and the common European crane fly (*Tipula paludosa*) damage turfgrass. Both these crane flies are invasive species, native to Europe and northern Africa, and now widespread across much of North America.

Photo: Alec Kowalewski, © Oregon State University

An adult crane fly emerges from the grass in late summer.

The common European crane fly was first detected in Western North America in 1965. The marsh crane fly was not found in the Pacific Northwest until more recently. The marsh crane fly has multiple generations a year, while the common European crane fly has only one generation a year. Both crane fly species are commonly referred to as European crane flies, due to their similarity in origin and appearance, and the damage they cause. These insects prefer regions that receive substantial precipitation. They can be found throughout British Columbia, Washington, Oregon and northern California. More recently, outbreaks have occurred in Bend and in Spokane, Washington.

The winter larval stage of these European crane flies can cause extensive damage to lawns because the insects feed on the turfgrass faster than it can grow.

European crane fly larvae feed on turfgrass shoots, crowns and roots, causing substantial damage in early spring. Proper turfgrass management can substantially reduce the damage caused by this insect. In cases of extreme infestations, scouting and properly timed insecticide applications can prevent turfgrass losses.

Alec Kowalewski, Extension turf specialist and associate professor; Brooke Edmunds, Extension community horticulturist and assistant professor; Brian McDonald, senior faculty research assistant; and Emily Braithwaite, faculty research assistant; all of the Department of Horticulture, Oregon State University.

Oregon State University

EM 9296
September 2020

European cranefly

GROWING KNOWLEDGE

Series content is coordinated by Dr. Jay Pscheidt, professor of botany and plant pathology at Oregon State University in Corvallis, Oregon.

Oregon State University USDA

An ongoing series provided by Oregon State University in collaboration with the United States Department of Agriculture and in partnership with the Oregon Association of Nurseries

Image 4 (above): Scout for European chafer grubs by digging a 1-foot long by 1-foot wide by 2-inch deep section of sod; the action threshold for high maintenance turf is 15-20 grubs per square foot.

Emerging lawn pest: European chafer

BY ALEC KOWALEWSKI, EMILY BRAITHWAITE AND CHAS SCHMID

THE EUROPEAN CHAFER (*Amphimallon majale*) is a beetle that feeds on turfgrass roots causing substantial damage. In more recent years, this invasive insect has been confirmed in the Pacific Northwest and British Columbia. Populations have been observed as early as 2015 in Portland, Oregon and Seattle and Tacoma Washington areas. Their numbers have been increasing ever since.

Identification and life cycle

The adult European chafers can be found above ground in late June and early July. This thick-bodied beetle is about ½-inch in length, larger than a Japanese beetle (*Popillia japonica*), but smaller than a green June beetle (*Cotinis nitida*). This beetle has a light-brown or tan colored head, thorax, abdomen and wing covers (Image 1). The insect's eyes are dark-brown to black, and the wing covers have grooves running the length of the insect. The abdomen protrudes slightly beyond the wing covers at the rear end.

Image 1: The adult European chafer is about ½-inch long and has a light-brown or tan colored body.

The adult stage of this insect is short-lived, at one to two weeks. During this time, the adults find partners, mate, and then lay eggs before dying. Each female European chafer will lay 20-40 eggs, one at a

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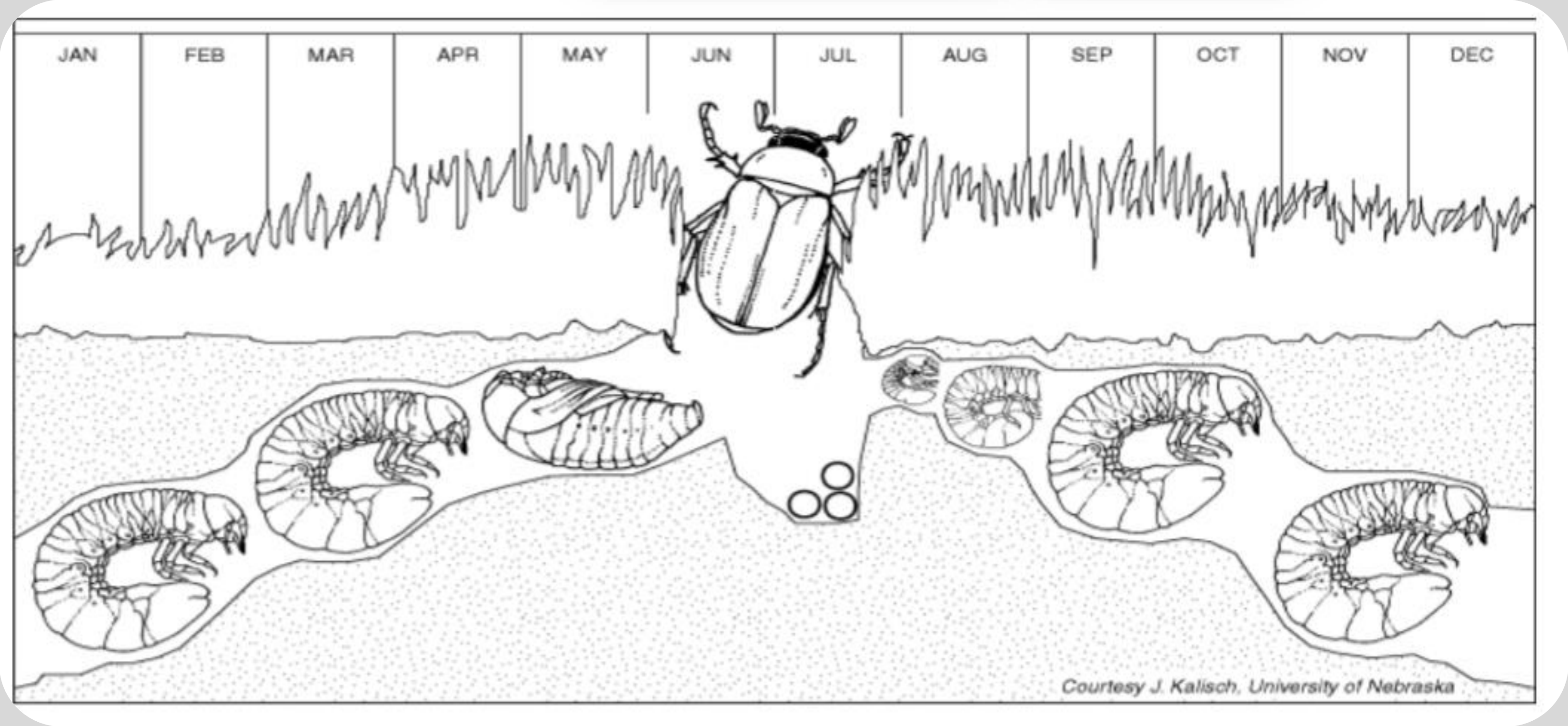
European chafer

European chafer

- **Life cycle**
- Scouting
- Action threshold
- Cultural practices
- Insecticides



European chafer

- Life cycle
- **Scouting**
- Action threshold
- Cultural practices
- Insecticides

- August, September and October

European chafer

- Life cycle
- Scouting
- **Action threshold**
- Cultural practices
- Insecticides

- 5 to 10 grubs per square foot for low maintenance turf
- 15 to 20 grubs per square foot in high maintenance turf

High maintenance turfgrass

- **Mowing**
  - Weekly
  - 2 to 3″
  - Return the clippings
- **Fertilization**
  - 4 to 6 times per year
  - 1 lb. N per 1,000 sq ft per application
- **Irrigation**
  - 4 times week at ¼″ per app
  - Memorial Day to Labor Day

European chafer

- Life cycle
- Scouting
- Action threshold
- **Cultural practices**
- Insecticides

- Insect associated with drought conditions…
  - Adults prefer to lay eggs in dry soil in late June/early July
  - **Summer irrigation**

European chafer

- Life cycle
- Scouting
- Action threshold
- Cultural practices
- **Insecticides**

- Preventative – low toxicity
  - Early instar (August)
    - Chlorantraniliprole – Acelepryn
    - Clothianidin – Arena
    - Imidacloprid – Merit

To protect pollinators avoid application to lawns with flowering weeds

European chafer

- Life cycle
- Scouting
- Action threshold
- Cultural practices
- **Insecticides**

- Curative – higher toxicity
  - Late instar (September and October)
    - Thiamethoxam – Meridian
    - Trichlorfon – Dylox
    - Carbaryl – Sevin

To protect pollinators avoid application to lawns with flowering weeds

Turfgrass Insects

OREGON STATE UNIVERSITY EXTENSION SERVICE

Managing Crane Fly in Lawns

A. Kowalewski, B. Edmunds, B. McDonald and E. Braithwaite

Adult crane flies are a common sight in Pacific Northwest summers. You see them bouncing around walls and ceilings, or stuck in spiderwebs, long legs and wings tangled. The size and shape of these insects have earned them nicknames like "mosquito hawk" and "skeeter eater," but they do not consume mosquitoes. Their larvae, however, are known for eating the roots and shoots of your lawn. Learn how to identify crane flies and prevent damage — months before it shows up as bare patches in your yard.

There are several species of crane fly in the Pacific Northwest, but only the marsh crane fly (*Tipula oleracea*) and the common European crane fly (*Tipula paludosa*) damage turfgrass. Both these crane flies are invasive species, native to Europe and northern Africa, and now widespread across much of North America.

Photo: Alec Kowalewski, © Oregon State University
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European chafer

Polling Slide

TURFGRASS INSECTS

Alec Kowalewski, Turfgrass Specialist, Oregon State University
alec.kowalewski@oregonstate.edu

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