FUNGICIDE ALTERNATIVE MANAGEMENT PRACTICES FOR MICRODOCHIUM ON ANNUAL BLUEGRASS PUTTING GREENS

OVERVIEW:

Research at Oregon State University focusing on the management of Microdochium patch in the absence of fungicides on annual bluegrass in the Pacific Northwest was initiated in January 2013 and has made noteworthy strides in the past three years. Multiple field trials were completed in 2013, 2014 and 2015 with significant results observed. This early research has led to a better understanding of the options available to turfgrass managers regarding the use of alternative management techniques for Microdochium patch control. Even though these early research projects have provided useful IPM tools for the management of Microdochium patch, further research is required to manage Microdochium patch in the absence of chemical inputs.

Primarily, acceptable levels of Microdochium patch control was achieved using bi-weekly applications of iron sulfate rates although turfgrass density was compromised. Additional studies are ongoing to see if application frequencies or water carrier volumes can maintain disease control without compromising turf density.

Secondly, mineral oil (Civitas One) applications in combination with sulphur or phosphites were shown to suppress disease to acceptable levels although again turfgrass density was compromised as a result of abiotic damage. Additional studies looking at rotations, other mineral oils as well as different phosphite products are being explored.

Furthermore, in the quest to broaden the search for alternative products for Microdochium patch control, a new product containing essential oils, a surfactant, chitin and iron is being screened for Microdochium patch management in the Pacific Northwest.

Iron Sulfate Heptahydrate Water Carrier Volume Study

Objective: A trial comparing different water carrier volumes for iron sulfate heptahydrate applications in order to assess if a higher dilution will lead to less turfgrass thinning while at the same time continue to manage Microdochium patch on *Poa annua* putting greens.

The following treatments are being applied every other week from September 2015 to May 2016 and will be replicated again from September 2016 to May 2017.

Treatments: (M = 1 000ft^2)

1. 2.0 #/M Iron Sulfate Heptahydrate applied using a 2.5 gal/M spray volume every 2 wks
2. 2.0 #/M Iron Sulfate Heptahydrate applied using a 5.0 gal/M spray volume every 2 wks
3. 2.0 #/M Iron Sulfate Heptahydrate applied using a 7.5 gal/M spray volume every 2 wks
4. 2.0 #/M Iron Sulfate Heptahydrate applied using a 10.0 gal/M spray volume every 2 wks
5. Control (Not treated)

Civitas One / Sulfur / PK Plus Rates Trial

Objective: A trial with the goal of determining the most reliable and cost effective rate of the combination of the mineral oil Civitas One, sulfur DF and the potassium phosphite product PK Plus to control Microdochium patch on *Poa annua* putting greens, while assessing abiotic damage under replicated golfer traffic.

The following treatments are being applied every other week from September 2015 to May 2016 and will be replicated again from Sept. 2016 to May 2017.

Treatments:

1. 4.25 oz/M Civitas One + 0.125 lbs. S/M every two weeks (M = 1 000ft^2)
2. 4.25 oz/M Civitas One + 0.25 lbs. S/M every two weeks
3. 4.25 oz/M Civitas One + 3.0 oz/M PK Plus every two weeks
4. 4.25 oz/M Civitas One + 6.0 oz/M PK Plus every two weeks
5. 8.50 oz/M Civitas One + 0.125 lbs. S/M every two weeks
6. 8.50 oz/M Civitas One + 0.25 lbs. S/M every two weeks
7. 8.50 oz/M Civitas One + 3.0 oz/M PK Plus every two weeks
8. 8.50 oz/M Civitas One + 6.0 oz/M PK Plus every two weeks
9. Control (Not treated)

Civitas One / Sufur / PK Plus Rotation Study

Objective: A trial with the goal of determining if applications of the combinations of Civitas One and Sulfur DF or Civitas One and PK Plus in rotation with Sulfur DF and PK Plus will lead to acceptable control of Microdochium patch on *Poa annua* putting greens while lessening any effects of abiotic damage previously observed in bi-weekly combinations of the mineral oil Civitas One.

The following treatments are being applied every other week from September 2015 to May 2016 and will be replicated again from Sept. 2016 to May 2017.

Treatments: (M = 1 000ft^2)

1. 8.5 oz/M Civitas One + 0.25 lbs. S/M, then 2 wks later, 0.25 lbs. S/M + 6.0 oz/M PK Plus "Rotation repeated every four weeks"
2. 8.5 oz/M Civitas One + 6.0 oz/M PK Plus, then 2 wks later, 0.25 lbs. S/M+6.0 oz/M PK Plus "Rotation repeated every four weeks"
3. 0.25 lbs. S/M + 6.0 oz/M PK Plus every two weeks
4. Control (Not treated)

Mineral Oil Screening

Objective: A trial with the goal of comparing three different mineral oils in combination with potassium phosphite in their ability to control Microdochium patch on *Poa annua* putting greens under replicated golfer traffic in order to determine if there are differences in abiotic damage observed and perhaps lead to more cost effective product choices.

The following treatments are being applied every other week from September 2015 to May 2016 and will be replicated again from Sept. 2016 to May 2017.

Treatments:

1. 8.50 oz/M Civitas One + 6.0 oz/M PK Plus every two weeks (M = 1 000ft^2)
2. 7.92 oz/M Superior Oil + 6.0 oz/M PK Plus + 0.37 oz/M of the pigment PAR every two weeks
3. 7.92 oz/M Superior Oil + 6.0 oz/M PK Plus every two weeks
4. 9.80 oz/M TriTek Oil + 6.0 oz/M PK Plus + 0.37 oz/M of the pigment PAR every two weeks
5. Control (Not treated)

Tour Turf FDC Screening

Objective: A trial quantifying the effects of an alternative management product consisting of iron, chitin, a surfactant and essential oils for the control of Microdochium patch on *Poa annua* putting greens.

Methods: The following treatments are being applied according to the schedule below from December 2015 to May 2016.

Treatments:

1. 12.5 oz/M of Tour Turf FDC applied every 4 weeks (M = 1 000ft^2)
2. Control (Not treated)

Iron Sulfate Heptahydrate Application Frequency Study

Objective: A trial comparing application timings of iron sulfate heptahydrate in order to quantify the minimum application intervals necessary for the control of Microdochium patch on *Poa annua* putting greens.

The following treatments are being applied every other week from October 2015 to May 2016 and will be replicated again from October 2016 to May 2017.

Treatments: (M = 1 000ft^2)

1. 2.0 #/M FeSO4 using a 5.0 gal/M spray volume every 2 wks
2. 2.0 #/M FeSO4 using a 5.0 gal/M spray volume every 4 wks
3. 2.0 #/M FeSO4 using a 5.0 gal/M spray volume every 6 wks
4. 2.0 #/M FeSO4 a 5.0 gal/M spray volume every 8 wks
5. Control (Not treated)

East ---->>>>

2	1	5	3	4
5	2	4	1	3

1	5	2	3	4
4	3	1	2	5

Phosphite + Sulfur Trial

Objective: A trial comparing two phosphite products alone and in combination with Sulfur DF in order to quantify their ability to control Microdochium patch on *Poa annua* putting greens.

The following treatments are being applied every other week from October 2015 to May 2016 and will be replicated again from October 2016 to May 2017.

East ---->>>>

Treatments:

1. 6.0 oz/M PK Plus every two weeks (M = 1 000ft^2)
2. 3.14 oz/M Duraphite 12 every2 wks
3. 6.0 oz/M PK Plus + 0.25 lbs. S/M every 2 wks
4. 3.14 oz/M Duraphite 12 + 0.25 lbs. S/M every 2 wks
5. 0.25 lbs. S/M every 2 wks
6. Control (Not treated)

1	2	6	5	4	3
6	3	4	1	2	5

2	5	1	3	4	6
3	4	5	6	2	1

2015 Oregon State University Microdochium Patch Field Day

North ----->>>>

Civitas One / Sulfur / PK Plus Rate Trial

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

Iron Sulfate Heptahydrate Water Carrier Volume Study

2	5
1	2
4	3
3	4
5	1

Mineral Oil Screening

Civitas One / Sulfur / PK Plus Rotation

1	3	2	5	4	3	1	2	4
5	4	1	2	3	2	4	3	1
4	3	2	5	1	1	3	4	2
5	2	3	1	4	4	2	3	1

4	5
2	3
5	1
1	4
3	2

Tour Turf DF Screening

2	1	1	2	2	1	2	1