**2018 OSU Turf Field Day**

**Lewis Brown Horticulture Farm**

**Corvallis, OR**

**33329 Peoria Rd.**

**Corvallis, OR 97333**

**Wednesday –August 1, 2018**



**Field Day Sponsor: Turfgrass Water Conservation Alliance**



**Speakers:**

Alec Kowalewski, Turfgrass Specialist

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Brian McDonald, Senior Faculty Research Assistant

[brian.mcdonald@oregonstate.edu](mailto:brian.mcdonald@oregonstate.edu)

Clint Mattox, Graduate Assistant

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Emily Braithwaite, Faculty Research Assistant

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**Guest Speaker:**

Tyler Carr, Graduate Assistant, University of Arkansas

[tqcarr@uark.edu](%20tqcarr@uark.edu)

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| **Research PowerPoint Presentations: 9:00 to 10:00** |
| OSU Education and Extension Update.  Speaker – Alec Kowalewski, Oregon State University |
| Effect of Nitrogen, Phosphorus and Potassium Rates on Annual Bluegrass Disease Activity.  Speaker – Brian McDonald, Oregon State University (Page 3) |
| Fungicide Alternatives for Microdochium Patch Management.  Speaker – Clint Mattox, Oregon State University (Page 4) |
| Determining Water Requirements and Use Rates of KBG as Affected By Cultivar and Irrigation Volume and Frequency.  Speaker – Tyler Carr, University of Arkansas (Page 5) |
| **Formal Field Tour: 10:00 to 11:00 am** |
| **Stop 1:** Effects of Mowing Height and Frequency on Weed Populations.  Speaker – Emily Braithwaite, Oregon State University (Page 6) |
| **Stop 2:**  Effects of Fertilization on Weed Populations.  Speaker – Emily Braithwaite, Oregon State University (Page 7) |
| **Stop 3:**  Effects of Cultural Practices on Drought Tolerance.  Speaker – Clint Mattox, Oregon State University (Page 8) |
| **Stop 4:**  Moss Control on Putting Greens.  Speaker – Clint Mattox, Oregon State University (Page 9) |
| **Stop 5:** Effects of DMI Fungicides and Primo on Annual Bluegrass Health.  Speaker – Brian McDonald, Oregon State University (Page 10) |
| **Stop 6:**  National Turfgrass Evaluation Project Perennial Ryegrass.  Speaker – Alec Kowalewski (Page 11 and 12) |
| **Open House: 11:00 to 11:30 am** |
| **Featured Projects:**   * National Turfgrass Evaluation Project Fine Fescue Wear Tolerance. (Page 13 and 14) * Effects of Irrigation Rates and Frequency on Weed Populations. (Page 15 and 16) * Effects of Fungicides on Anthracnose – Trial 1. (Page 17 and 18) * Effects of Fungicides on Anthracnose – Trial 2. (Page 19 and 20) |
| **Lunch: 11:30 to 12:30 pm at Lewis Brown Farm** |
| **Jason Oliver Memorial Golf Tournament and Dinner**  **1:00 to 6:00 pm at Trysting Tree Golf Course** |
| **Exhibitor List and Golf Outing Sponsors: Page 21** |
| **2017/2018 Research Supporters: Page 22** |
| **2018 Scholarships and Awards: Page 23** |

**Effect of Nitrogen, Phosphorus and Potassium Rates on Annual Bluegrass Disease Activity.**

**Brian McDonald, Oregon State University**

**9:15 to 9:30 am**

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**Introduction:**

Research on primary nutrient nitrogen (N), phosphorus (P) and potassium (K) ratios have suggested that maintaining the proper balance of those nutrients is critical to disease mitigation2. However, research on N, P, and K ratios relevant to annual bluegrass and Microdochium patch is not available. Contrary to traditional recommendations, recent research has suggested that winter applications of N can improve annual bluegrass playing conditions and disease resistance, however, if N rates get too high, Microdochium patch will increase3. The objective of this research is to evaluate the effects of winter applied N, P and K rates on Microdochium patch development within an annual bluegrass putting green in the absence of traditional fungicides.

**Materials and Methods:**

Field research was initiated in September 2017 on a sand-based putting green which was constructed in 2009 at the Lewis-Brown Horticulture Farm, Corvallis, OR. Experimental design is a 2 by 2 by 2 factorial randomized complete block design with four replications; factors include nitrogen rate, phosphorus rate, and potassium rate. All of these treatments receive monthly applications of phosphorous acid (Duraphite 12 applied at 3.7 kg H3PO3 ha-1) and sulfur (Sulfur DF applied at 12 kg S ha-1), fungicide alternatives that have shown promising results for control of Microdochium patch. Nitrogen, P and K rates were developed using N:P:K ratios that reflect tissue sampling data4, and standard extension recommendations for putting greens1. Traditional fungicides will not be applied to this experiment for the duration of the study, except for summer anthracnose control. Percent disease (0 to 100%) is collected every other week from September to May. Data were subjected to analysis of variance and mean separated using Fisher’s protected least significant difference (LSD) at a 0.05 level of probability.

**Results/Discussion:**

Regarding nitrogen, monthly applications during the winter at a high rate of 0.20 lbs. N/1,000 ft2 (9.8 kg N ha-1) resulted in the highest percent disease, while nitrogen applied at a low rate of 0.10 lbs. N/1,000 ft2 (4.9 kg N ha-1) resulted in the lowest percent disease. Potassium applied at a rate of 0.10 lbs. K/1,000 ft2 (4.9 kg K ha-1) reduced percent disease when compared to treatments that did not receive K. The main effect of P rate and the interactions between N, P and K were not significant. Findings suggest that winter applications of N and K at 0.10 lbs./1,000 ft2 (4.9 kg ha-1) each can mitigate Microdochium patch activity.

**Fungicide Alternatives for Microdochium Patch Management.**

**Clint Mattox, Oregon State University**

**9:30 to 9:45**

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**INTRODUCTION:**

Since 2013, more than a dozen field trials have focused on managing Microdochium patch in the absence of traditional fungicides. Trials have focused on using nitrogen, iron sulfate, sulfur, phosphorous acid, biological control products, horticulture oils, and cultural practices.

**Some highlights from previous trials include:**

* Microdochium patch incidence is not increased when applying 0.1#N/M every 2 weeks compared to applying no nitrogen from September through April. Urea rates of 0.2#N/M every two weeks increases the incidence of disease compared to rates of 0.1#N/M or no nitrogen.
* Iron sulfate applications of 1.0 and 2.0#/M every 2 weeks suppress Microdochium patch, although turfgrass density is reduced. Higher water carrier volume (7.5 or 10 gal/M compared to 2.5 or 5.0 gal/M) improves turfgrass quality and continues to suppress disease, but thinning still occurs.
* Sulfur applications of 0.25#/M every 2 weeks reduce the incidence of Microdochium patch although there is evidence to suggest that sulfur may lead to more summer incidence of anthracnose.
* Phosphorous acid applications of 0.075# H3PO3/M every 2 weeks reduces the incidence of Microdochium patch although suppression is enhanced when applied in combination with Civitas Defense or sulfur.
* Civitas Defense applications of 8.5 oz./M every 2 weeks suppress Microdochium patch, although turfgrass thinning is observed in the coldest periods of winter when traffic is applied.
* A rotation of phosphorous acid applied in combination with sulfur in a two week rotation with phosphorous acid in combination with Civitas Defense provided acceptable disease suppression and turfgrass quality.

**2016-2018 Trial Highlights:**

* Applying sulfur and phosphorous acid in the coldest periods of the winter (Dec, Jan, & Feb) and using Civitas Defense in combination with phosphorous acid in other months (Sep, Oct, Nov, Mar, & Apr) suppresses Microdochium patch without causing abiotic damage.
* Phosphorous acid applied in combination with iron sulfate will provide disease control at a reduced rate of iron sulfate.

**Future Field Trials:**

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

**Findings for Microdochium patch research are highlighted at our**

**annual Microdochium patch field day.**

**Determining Water Requirements and Use Rates of KBG as Affected By Cultivar and Irrigation Volume and Frequency.**

**Tyler Carr, University of Arkansas**

**9:45 to 10:00**

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**Background**

Turfgrasses provide an aesthetically-pleasing benefit, but many users perceive these systems as only a visual benefit that requires significant water inputs. These concerns have made it to policy makers who have created incentives that encourage homeowners to replace their turfgrass with other landscapes utilizing “water efficient” plants and/or hardscapes. However, it is well documented that water availability in the United States has decreased, therefore, instead of eliminating turfgrass as a whole, there is a need for researchers to identify turfgrass species and cultivars with low water use rates.

**Objective**

Differences in drought tolerance have been observed both among and within turfgrass species. Irrigation practices such as deficit irrigation have provided reductions in water use, but irrigation requirements may vary by soil texture or irrigation frequency. The objective of this study is to evaluate the effects of cultivar selection, soil texture, irrigation frequency and volume on drought tolerance of Kentucky bluegrass (KBG) (*Poa pratensis)*.

**Materials and Methods**

The study is conducted under a rainout structure to ensure consistent drought conditions. Two KBG cultivars are compared in this experiment, Mallard (drought-tolerant) and Geronimo (drought-susceptible). Two different soil textures are compared by filling half of the lysimeters with native soil at the site (Captina silt loam, *Typic Fragiudult*) and the other half of the lysimeters with a loamy sand that was created by mixing a medium-coarse sand that meets USGA particle size specifications for putting green construction and a locally-available sandy loam soil.

Each combination of KBG cultivar and soil texture is irrigated either 1x or 3x/week at 40 or 80% reference evapotranspiration. The lysimeters are weighed prior to irrigation, and actual evapotranspiration is calculated between successive lysimeter weights.

**Stop 1: Effects of Mowing Height and Frequency on Weed Populations.**

**Emily Braithwaite, Oregon State University**

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**Introduction**

Oregon’s school Integrated Pest Management (IPM) law requires that K-12 school districts implement an IPM plan, and designate an IPM coordinator. The goal of the school IPM program is for a healthier school community via a reduction in pests, pesticide uses, and pest management costs. Part of OSU’s commitment to the law, is training IPM coordinators, including teaching them the principles of mowing, fertilizing, and irrigating turfgrasses. The purpose of this trial was to simulate existing mowing practices in schools and grounds and look for ways to optimize those practices in order to reduce the number of weeds occurring without relying on traditional pesticides to manage turfgrass weeds.

**Materials and Methods**

Field research was initiated in November 2017 on a mixed stand of turfgrass (consisting primarily of tall fescue and perennial ryegrass) at the Lewis-Brown Horticulture Farm, Corvallis, OR. Six weeks prior to the initiation of the trial, two herbicide applications of Speedzone (*Carfentrazone-ethyl, 2,4-D, 2-ethylhexyl ester, Mecoprop-p acid, and Dicamba acid*) were made (1.8 fl. oz/1000ft2) with a four week interval between the sprays to allow the trial to begin with no weeds. Perennial ryegrass was then seeded over the trial (9 lbs/1000ft2) to fill in voids left by weeds.

Experimental design is a 2 by 3 factorial randomized complete block design with four replications; factors include mowing height, and mowing frequency. Mowing heights of 2” and 4” were selected based on current mowing heights IPM coordinators use in Oregon. Mowing frequencies included once, twice, and four times per month, again based on practices observed of IPM coordinators. With the exception of the initial applications, traditional herbicides will not be applied to the trial area. Fertilizer applications will occur four times per year at a rate of 1.0 lbs Nitrogen/1000ft2 per application, two in the spring, and two in the fall.

Visual quality (1-9 scale where 5=acceptable) will be assessed on a biweekly basis. Weed counts will be made with a 20”x40” transect with 36 intersects four times per year. An initial count with the intersect showed the trial beginning with no weeds.



**Stop 2: Effects of Fertilization on Weed Populations.**

**Emily Braithwaite, Oregon State University**

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**Introduction**

Oregon’s school Integrated Pest Management (IPM) law requires that K-12 school districts implement an IPM plan, and designate an IPM coordinator. The goal of the school IPM program is for a healthier school community via a reduction in pests, pesticide uses, and pest management costs. Part of OSU’s commitment to the law, is training IPM coordinators, including teaching them the principles of mowing, fertilizing, and irrigating turfgrasses. The purpose of this trial was to simulate existing fertilizer practices in schools and grounds and look for ways to optimize those practices in order to reduce the number of weeds occurring without relying on traditional pesticides to manage turfgrass weeds.

**Materials and Methods**

Field research was initiated in November 2017 on a mixed stand of turfgrass (consisting primarily of tall fescue and perennial ryegrass) at the Lewis-Brown Horticulture Farm, Corvallis, OR. Six weeks prior to the initiation of the trial, two herbicide applications of Speedzone (*Carfentrazone-ethyl, 2,4-D, 2-ethylhexyl ester, Mecoprop-p acid, and Dicamba acid*) were made (1.8 fl. oz/1000ft2) with a four week interval between the sprays to allow the trial to begin with no weeds. Perennial ryegrass was then seeded over the trial (9 lbs/1000ft2) to fill in voids left by weeds.

Experimental design is a randomized complete block design with four replications; fertilizer rates within this study were 0, 2 and 4 lbs N/1,000 ft2 annually. Fertilizer applications will occur either two or four times per year at a rate of 1.0 lbs Nitrogen/1000ft2 per application. With the exception of the initial applications, traditional herbicides will not be applied to the trial area.

Visual quality (1-9 scale where 5=acceptable) will be assessed on a biweekly basis. Weed counts will be made with a 20”x40” transect with 36 intersects four times per year. An initial count with the intersect showed the trial beginning with no weeds. Mowing heights are checked twice per week, and when plots reach 3.5” in height, they will be mowed to 2.5” and the mowing event will be recorded.

|  |  |
| --- | --- |
| **Trt** | **Annual Fertilizer Rate** |
| **1** | None |
| **2** | 2.0 lbs N/1000ft2 |
| **3** | 4.0 lbs N/1000ft2 |



**Stop 3:** **Effects of Cultural Practices on Drought Tolerance.**

**Clint Mattox, Oregon State University**

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| --- | --- | --- | --- |
| Trts | Products | Rate per 1,000 sq ft | units |
| Applied 6/11, 6/25, and 7/9; Primo only 6/11 and 7/9 |
| 1 | Untreated | na | na |
| 2 | Primo Maxx | 0.75 | fl. oz. |
| 3 | Calciphite 0 - 0 - 9Ɏ | 0.75 | fl. oz. |
| 4 | Kelp Grow 0.1 - 0.5 - 1.0 | 0.74 | fl oz |
| 5 | Armor Tech 28 + Si (1%)¥ | 4.00 | fl oz |
| 6 | Foltec Fortify 6 - 0 - 0 | 6.00 | fl oz |
| ɎContains potassium Phosphite + 9% Calcium and organic acids | | | |
| ¥Includes Potassium phosphite (99%) | | |  |

**🡨 North**

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| --- | --- | --- | --- | --- |
| **No Core Cultivation** | |  | **Core Cultivation (5/29)** | |
| **4** | 4 | **4** | 4 |
| **3** | 3 | **3** | 3 |
| **5** | 5 | **5** | 5 |
| **2** | 2 | **2** | 2 |
| **1** | 1 | **1** | 1 |
| **6** | 6 | **6** | 6 |
| **2** | 2 | **2** | 2 |
| **6** | 6 | **6** | 6 |
| **4** | 4 | **4** | 4 |
| **1** | 1 | **1** | 1 |
| **3** | 3 | **3** | 3 |
| **5** | 5 | **5** | 5 |
| No Fertilizer | Fertilizer\* | No Fertilizer | Fertilizer\* |
|  | | | | |
| \*25-3-10 + 5% iron applied at 1 lb N per 1,000 sq ft on 6/5 and 6/25 for a total of 2 lbs N per 1,000 sq ft | | | | |

**Irrigation Discontinued – 7/11/2018**

**Stop 4: Moss Control on Putting Greens.**

**Clint Mattox, Oregon State University**

**Trial Initiated 6/19/2018**

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**Stop 5: Effects of DMI Fungicides and Primo on Annual Bluegrass Health**

**Brian McDonald, Oregon State University**

**Trial initiated 6/25/2018**

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**🡨 North**



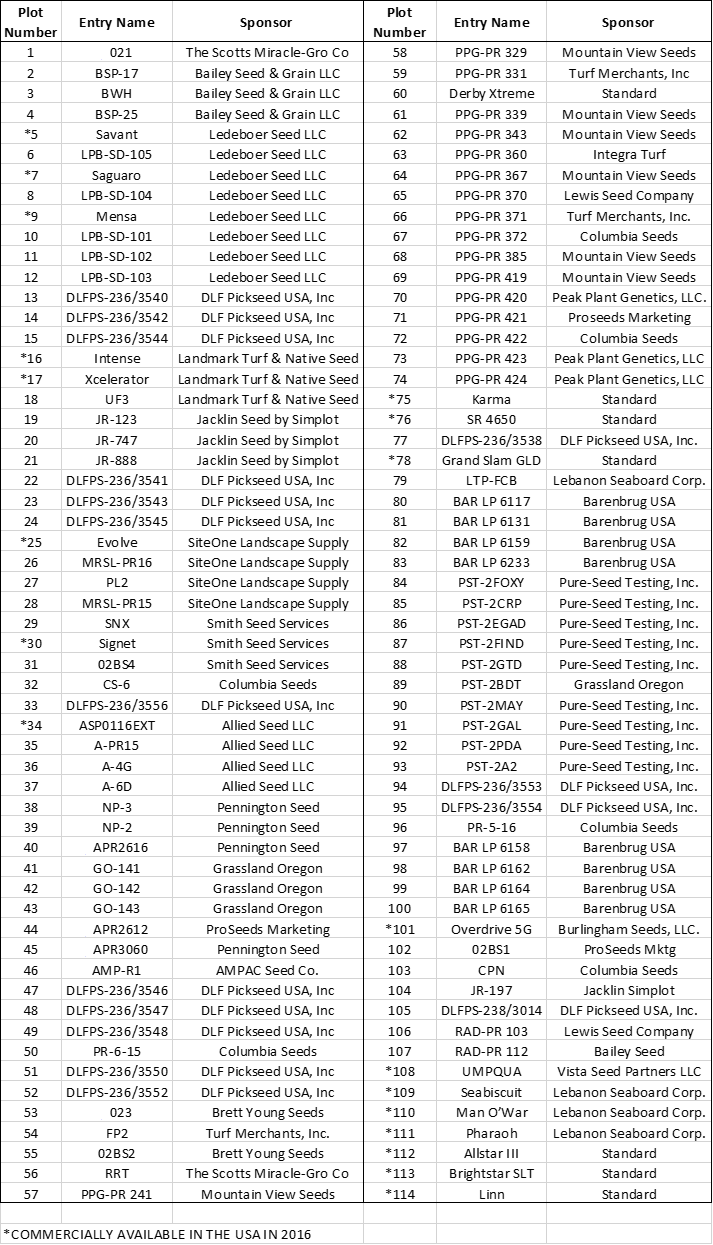
**Stop 6: National Turfgrass Evaluation Project Perennial Ryegrass.**

**Alec Kowalewski, Oregon State University**

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**Stop 6: National Turfgrass Evaluation Project Perennial Ryegrass Continued…**

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**National Turfgrass Evaluation Project Fine Fescue Wear Tolerance**

Alec Kowalewski

Oregon State University, Department of Horticulture

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| **2014 NTEP Fine Fescue** | | |  |  | 42 Entries | |  | Hard Fescue |
| Seeded 09/17/14; watered Friday 9/18 | | | | | 14 Entries per Row | | | Sheep Fescue |
| Plot Size 4' X 5' |  |  |  |  | 3 Rows per Rep | |  | Chewings |
| Area = 36' X 70' = 2,520 sq ft | | |  |  |  |  |  | Creeping Red |
|  | | |  |  |  |  |  |  |  |



**National Turfgrass Evaluation Project Fine Fescue Wear Tolerance Continued…**



**Effects of Irrigation Rates and Frequency on Weed Populations**

Emily Braithwaite

Department of Horticulture, Oregon State University

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**Introduction**

Oregon’s school Integrated Pest Management (IPM) law requires that K-12 school districts implement an IPM plan, and designate an IPM coordinator. The goal of the school IPM program is for a healthier school community via a reduction in pests, pesticide uses, and pest management costs. Part of OSU’s commitment to the law, is training IPM coordinators, including teaching them the principles of mowing, fertilizing, and irrigating turfgrasses. The purpose of this trial was to simulate existing irrigation practices in schools and grounds and look for ways to optimize those practices in order to reduce the number of weeds occurring without relying on traditional pesticides to manage turfgrass weeds.

**Materials and Method**

Field research was initiated in November 2017 on a mixed stand of turfgrass (consisting primarily of tall fescue and perennial ryegrass) at the Lewis-Brown Horticulture Farm, Corvallis, OR. Six weeks prior to the initiation of the trial, two herbicide applications of Speedzone (*Carfentrazone-ethyl, 2,4-D, 2-ethylhexyl ester, Mecoprop-p acid, and Dicamba acid*) were made (1.8 fl. oz/1000ft2) with a four week interval between the sprays to allow the trial to begin with no weeds. Perennial ryegrass was then seeded over the trial (9 lbs/1000ft2) to fill in voids left by weeds.

Experimental design is a randomized complete block design with four replications; factors include irrigation rate, and irrigation frequency. A non-irrigated control was included since there are several school districts that are unable to irrigate over the summer months. A rate of 0.25” applied four times per week reflected current recommendations made to IPM coordinators. Previous research conducted at OSU showed that 0.25” applied four times per week was not optimal in late July and August as temperatures increased, so treatment 3 rates were based on evapotranspiration (ET) rates from weather station data at the farm. The frequency remained the same, but rates were increased to 0.32” in July and August. Treatment 4 was designed as a method of infrequent irrigation (1” once a month) to maintain more turf density, without necessarily keeping the green color. The idea being, watering enough to avoid “clumping out” of the ryegrass which opens up voids for weeds to move in.

Fertilizer applications will occur either two or four times per year at a rate of 1.0 lbs Nitrogen/1000ft2 per application. With the exception of the initial applications, traditional herbicides will not be applied to the trial area.

Visual quality (1-9 scale where 5=acceptable) will be assessed on a biweekly basis. Weed counts will be made with a 20”x40” transect with 36 intersects four times per year. An initial count with the intersect showed the trial beginning with no weeds. Mowing heights are checked twice per week, and when plots reach 3.5” in height, they will be mowed to 2.5” and the mowing event will be recorded.

**Effects of Irrigation Rates and Frequency on Weed Populations Continued…**





**Effects of Fungicides on Anthracnose – Trial 1**

Brian McDonald

Department of Horticulture, Oregon State University

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Treatments were applied every 14 days; 6/15, 6-29, 7/15 and 7/28.



**Effects of Fungicides on Anthracnose – Trial 1 Continued…**



**Effects of Fungicides on Anthracnose – Trial 2**

Brian McDonald

Department of Horticulture, Oregon State University

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Treatments initiated 6/22/2018



**Effects of Fungicides on Anthracnose – Trial 2 Continued…**



**…………………………………………..…………..…….Exhibitors…………………………….…………………………………**

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| --- | --- | --- |
| Organization | Name | Email |
| Aquatrols | Dan Macias | dmacias@aquatrols.com |
| Athletic Field Design | Mike Hebrard | hebrard@athleticfield.com |
| Barenbrug USA | Micah Gould | mgould@barusa.com |
| Columbia Seeds | Kristen Pick | kpick@columbiaseeds.com |
| Hydro Engineering, Inc. | AJ Brower | abrower@hydroblaster.com |
| Marion Ag Service, Inc. | Jeff Freeman | jefff@marionag.com |
| Nutrien Solutions | Sean Watts | sean.watts@nutrien.com |
| Oregon Golf Course Superintendents Association | Alexis Wenker | ogcsa@ogcsa.org |
| Oregon Turf Foundation | Sally Cheyne | otf@oregonturfgrassfoundation.org |
| Pure Seed | Nick Layton | nlayton@pureseed.com |
| Rain Bird Golf | Mark Willcut, CGIA | MWillcut@rainbird.com |
| Rocky Mountain Turf Equipment | Rich Schwabauer | rich@rmtequipment.com |
| SePRO Corporation | Travis Fuller | travisf@sepro.com |
| Target Specialty Products | Tony Lasher | tony.lasher@target-specialty.com |
| Target Specialty Products | Gary Willis | gary.willis@target-specialty.co |
| Trimax Mowing Systems | Raymond Prefume | (626)656-0397 |
| The Andersons, Inc. | Ed Price, CGCS | Ed\_Price@AndersonsInc.com |
| Winfield | Roger Henderson | RDHenderson@landolakes.com |

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| BASF |
| Brett Young |
| Columbia River Seed |
| Integra Turf, Inc. |
| Karlin Consulting |
| NexGen |
| Nufarm |
| Nutrien |
| Pennington |
| Pure Seed |
| Turf Merchants, Inc. |

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| Agricultural Research Foundation | Oregon Golf Course Superintendents Association |
| AMVAC Environmental Products | Oregon Seed Association |
| Andersons Inc. | Oregon Seed Council Research Committee |
| Aquatrols | Oregon Turf &Tree Farms |
| Athletic Field Design | Oregon Turf Foundation |
| Bandon Dunes Resort | Oregonians for Food and Shelter |
| Barenbrug USA | OSU Department of Athletics |
| BASF | PBI Gordon |
| Bayer Crop Science | Pure Seed |
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| Melgreen/Olmix NA, Inc. | United States Golf Association |
| Mountain View Seeds | USDA-NIFA |
| National Turfgrass Evaluation Program | Western Canada Turf Association |
| Northwest Turf Association | Western Equipment Distributors |
| NuFarm Americas Inc. | Wilbur-Ellis Company |
| Ontario Turfgrass Research Foundation | Winfield, Land O'Lakes |
| Oregon Golf Association | WISErg Corporation |

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| Randy Shults | OSU Turf Friends and Alumni |
| Ken Nice | OSU Turf Friends and Alumni |
| Clint Mattox | USGA Competitive Internship |
| Jeremy Lee | Jason Oliver Memorial Scholarship |
| Clint Mattox | OGCSA - Whitworth |
| Evan McFadden | OGCSA - Martin |
| Grant Roth | OGCSA Scholarship |
| Grant Roth | Tom Cook Legacy Scholarship |
| Evan McFadden | Bruce Faddis Memorial Scholarship |

**2017 Jason Oliver Memorial Golf Tournament Champions**

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| --- |
| Kurt Wright |
| Tyler Gabriel |
| Mike Turley |
| Corey Beelke |

