2023 OSU TURF FIELD DAY
Lewis Brown Horticulture Farm
Corvallis, OR
33329 Peoria Rd.
Corvallis, OR 97333
Thursday – Aug 31, 2023

Speakers:
Alec Kowalewski, PhD, Turfgrass Specialist, OSU
alec.kowalewski@oergonstate.edu

Brian McDonald, Senior Faculty Research Assistant, OSU
brian.mcdonald@oregonstate.edu

Emily Braithwaite, Graduate Assistant, OSU
emily.braithwaite@oregonstate.edu

Ruying "Wrennie" Wang, PhD, Research Associate, OSU
ruying.wang@oregonstate.edu

Chas Schmid, PhD, Research Associate, OSU
schmchar@oregonstate.edu

Cole Stover, Graduate Assistant, OSU
stoverco@oregonstate.edu

Zach Hamilton, Graduate Assistant, OSU
zachary.hamilton@oregonstate.edu

Shikhar Hatwal, Graduate Student, OSU
shikhar.hatwal@oregonstate.edu

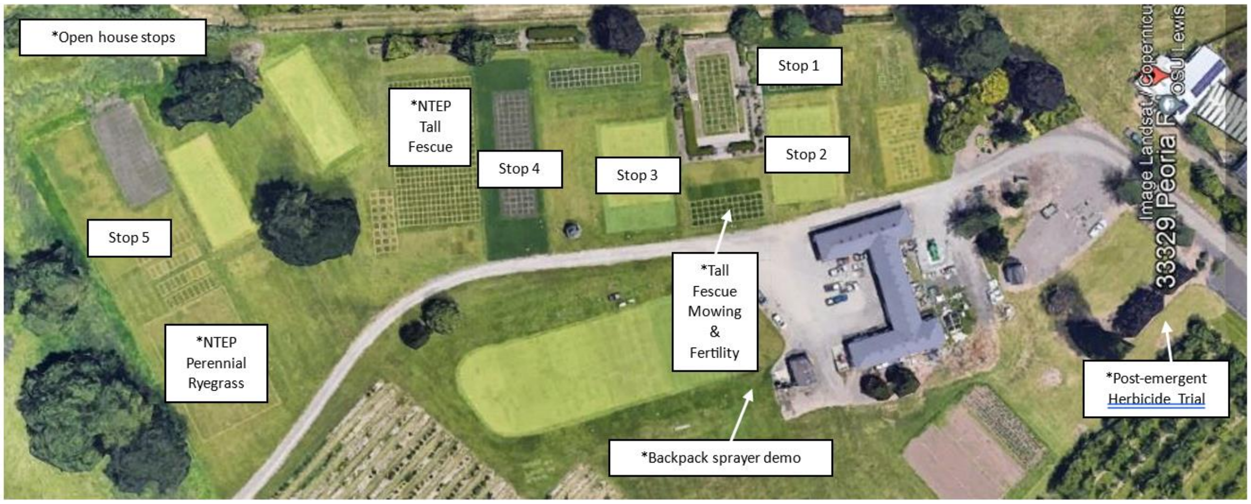
Robert Starchvick, Future Faculty Research Assistant, OSU
starchvr@oregonstate.edu

Hannah Rivedal, PhD, Research Plant Pathologist, USDA-ARS
hannah.rivedal@usda.gov

Field Day Map – Page 3
Research PowerPoint Presentations: 9:00 to 10:00
Presentation 1: Using remote sensing to predict turfgrass winter kill in central Oregon. Cole Stover (Pages 4 & 5).
Presentation 2: Destructive turfgrass insects of the Pacific Northwest. Zach Hamilton (Page 6)
Presentation 3: Long term effects of cultivation and topdressing on an annual bluegrass putting green. Chas Schmid, PhD (Pages 7 & 8)
Presentation 4: Turfgrass diagnostics laboratory update (disease trends of 2023). Emily Braithwaite (Page 9)
Presentation 5: Summer patch of fine fescue first report. Robert Starchvick (Page 10)
Presentation 6: Nematode inventory, action thresholds and best management practices for Washington and Oregon. Hannah Rivedal, PhD (Page 11)
Formal Field Tour: 10:00 to 11:00 am
Stop 1: Effects of tall fescue irrigation rates and frequency on carbon sequestration, surface temperature and turf quality. Wrennie Wang, PhD, and Alec Kowalewski, PhD (Pages 12 & 13)
Stop 2: Growing degree day models for reapplication of plant growth regulators on annual bluegrass. Chas Schmid, PhD (Pages 14 & 15)
Stop 3: Fungicides for anthracnose management on annual bluegrass putting greens. Brian McDonald and Emily Braithwaite (Pages 16 – 18)
Stop 4: A-LIST fine fescue trial: effects of fine fescue genus, species, cultivar and endophyte presence on drought tolerance. Alec Kowalewski, PhD, and Hannah Rivedal, PhD (Pages 19&20)
Stop 5: Comparing classic and contemporary turf type tall fescue cultivars (from seed production to lawns). Shikhar Hatwal (Page 21)
Open House: 11:00 to 11:30 am
• Tall fescue National Turfgrass Evaluation Program Trial (Pages 22 & 23) • Perennial ryegrass National Turfgrass Evaluation Program Trial (Pages 24 & 25) • Post emergence herbicides for broadleaf weed control (Pages 26 & 27) • Backpack sprayer demonstration (28 & 29) • Tall fescue mowing height and fertility trial (Page 30)
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
2022/2023 Research Supporters: Page 31-34
2022/2023 Scholarships and Awards: Page 35

2023 Oregon State University Turf Field Day

Map of the Lewis Brown Farm



Presentation 1: Using remote sensing to predict turfgrass winter kill in central Oregon (page 1 of 2).

Cole Stover

Winterkill is a serious issue on golf courses in areas like central Oregon where weather conditions can vary greatly from November through April. There are a variety of causes of damage that all fall under the label of winterkill. Those causes include desiccation, disease, direct low temperature kill, saturation, and ice encasement. Often winterkill is observed in localized areas of individual golf courses that struggle to maintain healthy turf year to year. Some of the contributing factors that lead to winterkill are shade from trees or homes, northern facing slopes, poor surface drainage, exposed areas, extreme temperature swings, and weather that promotes a cycle of freezing and thawing of snow. This study is part of a larger project in cooperation with many universities in the United States as well as Scandinavian turfgrass researchers. At OSU we are looking at better identifying damaged turfgrass using drone imagery to quantify the amount and severity of damage at a variety of sites in central Oregon. We will then associate damage with weather data gathered on site using nodes placed in high-risk greens to be able to better predict when and where damage will occur using predictive models, site information, and weather forecasts. Currently we are looking at early detection of damage and grading the severity of it to help turfgrass managers predict how much damage they can expect, what can recover on its own, and what will need to be replaced with seed or sod.

Fig 1 above: Severely damaged area observed on hole 12 of the Big Meadows golf course at Black Butte Ranch on April 24th, 2023. Damage can be attributed to an area shaded through the winter months that had lasting snow cover and an ice layer. Compare to Fig 2 showing the front half of the same green.

Presentation 1: Using remote sensing to predict turfgrass winter kill in central Oregon

(page 2 of 2).

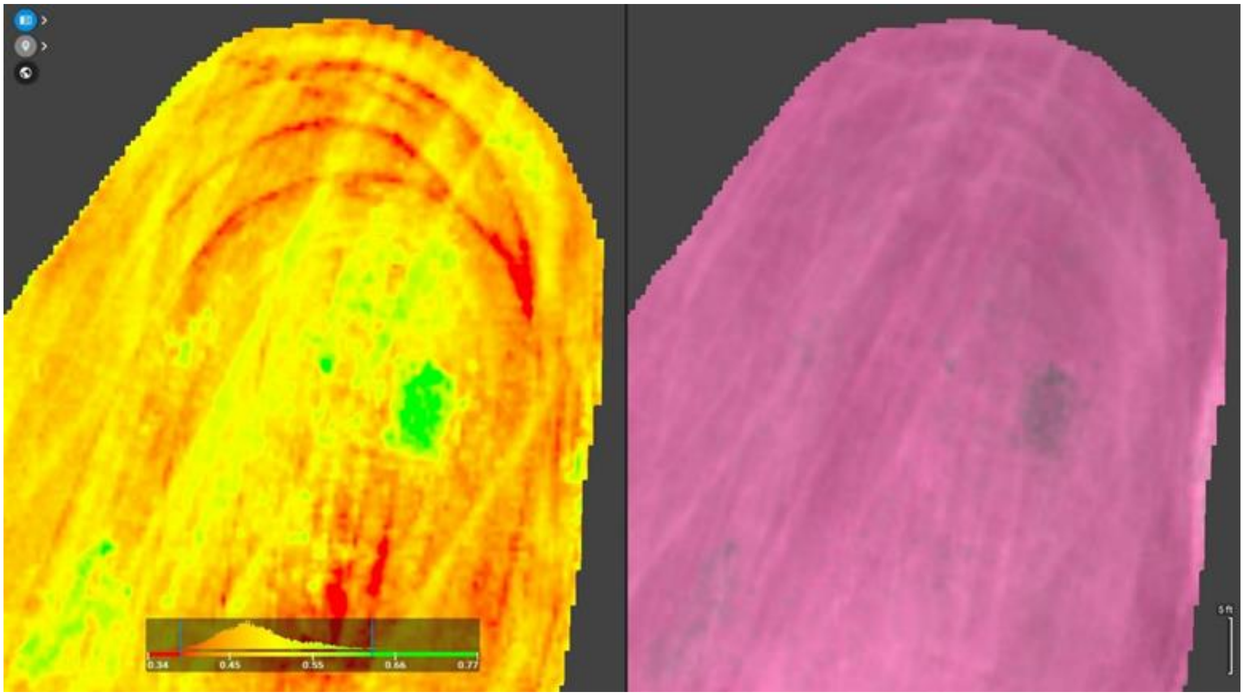


Figure 2 above: Shows the damaged area of hole 12 as observed by the drone. The left half of the image shows NDVI (normalized difference vegetative index) vs the radiometrically corrected image on the right. Red indicates areas of lower NDVI while green represents healthier areas.

Presentation 2: Destructive turfgrass insects of the Pacific Northwest.

Zach Hamilton

Introduction

The changing environmental conditions in more recent years has impacted the historically minimal insect pressure in the Pacific Northwest. As a result, increased insect populations have threatened the sustainability of turfgrass in Oregon and Washington regions. The objective of this project is to access the diversity, flight duration, and distribution of destructive turfgrass insects across Oregon and Washington.

Materials and Methods

Data were collected from Spring through Fall 2021 and 2022 at golf courses in Portland, Oregon and the following Washington cities: Everett, Seattle, Tacoma, Olympia, and Vancouver. The experiment will be repeated in 2023 during the same period. Insects were collected from blacklight traps at each location every three days. Soil samples and playing surface scouting was also done to collect soil larvae and adults, respectively.

Preliminary Results

Findings have shown that there are a variety of different destructive turfgrass pests were found in Oregon and Washington. Examples included, cutworms, Noctuidae family, found in Oregon and Washington. Winter cutworm, *Noctua pronuba*, and black cutworm, *Agrotis ipsilon,* were frequently found in Washington and Oregon. European chafer, *Rhizotrogus majalis***,** was found in only Washington, specifically the Tacoma and Seattle locations. Denver billbugs, *Sphenophorus cicastristriatus*, and Kentucky bluegrass billbug, *Sphenophorus parvulus*, were found in Washington and Oregon. As a result of this work, we are encouraging superintendents to scout for cutworm and billbugs because it appears to be more problematic than previously anticipated. We are also encouraging superintendents to continue scouting for European chafer because we anticipate an increasing distribution pattern across Washington and Oregon.

Presentation 3: Long term effects of cultivation and topdressing on an annual bluegrass putting green (page 1 of 2).

Chas Schmid, PhD

Introduction

Hollow tine aerification and sand topdressing have been used on golf course putting greens for decades to manage organic matter accumulation, improve infiltration, and maintain firm playing conditions. In more recent years, superintendents and researchers have been exploring solid tine aerification, and topdressing without aerification. Despite recent trends, aerification and topdressing research on annual bluegrass putting greens in the Pacific Northwest, where 12 months of growth can be expected, is minimal.

Materials and Methods

A long-term field trial was initiated in May 2020. Experimental design for the trial is a randomized complete block design with four replications. Treatments are arranged in a 2 x 2 x 3 factorial, with two sand topdressing rates (50 and 100 lbs/1000ft^2), two tine types (hollow and solid tine), and three cultivation timings (spring, fall, and both spring and fall). A non-treated control (no cultivation, no sand topdressing) and two non-cultivated plots that received either 50 or 100 lb/1,000 ft^2 sand topdressing were also included in the analysis.

Preliminary Results

During 2022, the accumulation of more than two years of cultivation and topdressing treatments resulted in differences in soil physical properties and surface characteristics. Putting green surface firmness, measured with a Trufirm, was influenced by topdressing rate and cultivation timing during 2022. Sand topdressing at 100 lbs/1,000 ft^2 resulted in a firmer surface compared to 50 lbs/1,000 ft^2 on 4 out of 5 ratings. Additionally, the combination of spring and fall topdressing resulted in a firmer putting green surface compared to spring or fall only cultivation on 4 and 3 out of the 5 ratings, respectively. On one rating in 2022, hollow tine cultivation produced a firmer surface compared to solid tine cultivation.

Statistical differences in soil infiltration rate were detected between treatments in 2022 (Fig. 1). The non-treated control and topdressing alone (both rates) resulted in significantly lower soil infiltration rates compared to all combinations of cultivation and topdressing. Visual observation of soil sample cores indicates a significant thatch layer has developed in non-treated control plots (Image 1), which is likely reducing infiltration rate. Similarly, soil cores from topdressing only treatments show layering because of topdressing treatments, which is also likely to reduce infiltration rates. The treatment that produced the highest infiltration rate was the combination of hollow tine cultivation in spring and fall, and sand topdressing at 100 lb/1,000 ft^2., which was also the only treatment that maintained an average infiltration rate above 6 in/hr (which is the USGA recommendation for infiltration rate for new greens construction). Cultivation timing also influenced infiltration rate in 2022, with fall only cultivation resulting in lower infiltration rates compared to spring alone and the combination of spring and fall. Interestingly no statistical difference in infiltration rate was observed between hollow tine and solid tine treatments after almost three years. This result indicates that in the short-term, superintendents may implement solid tine cultivation to maintain infiltration rate, which reduces maintenance cost and recovery time compared to hollow tine cultivation.

Presentation 3: Long term effects of cultivation and topdressing on an annual bluegrass putting green (page 2 of 2).

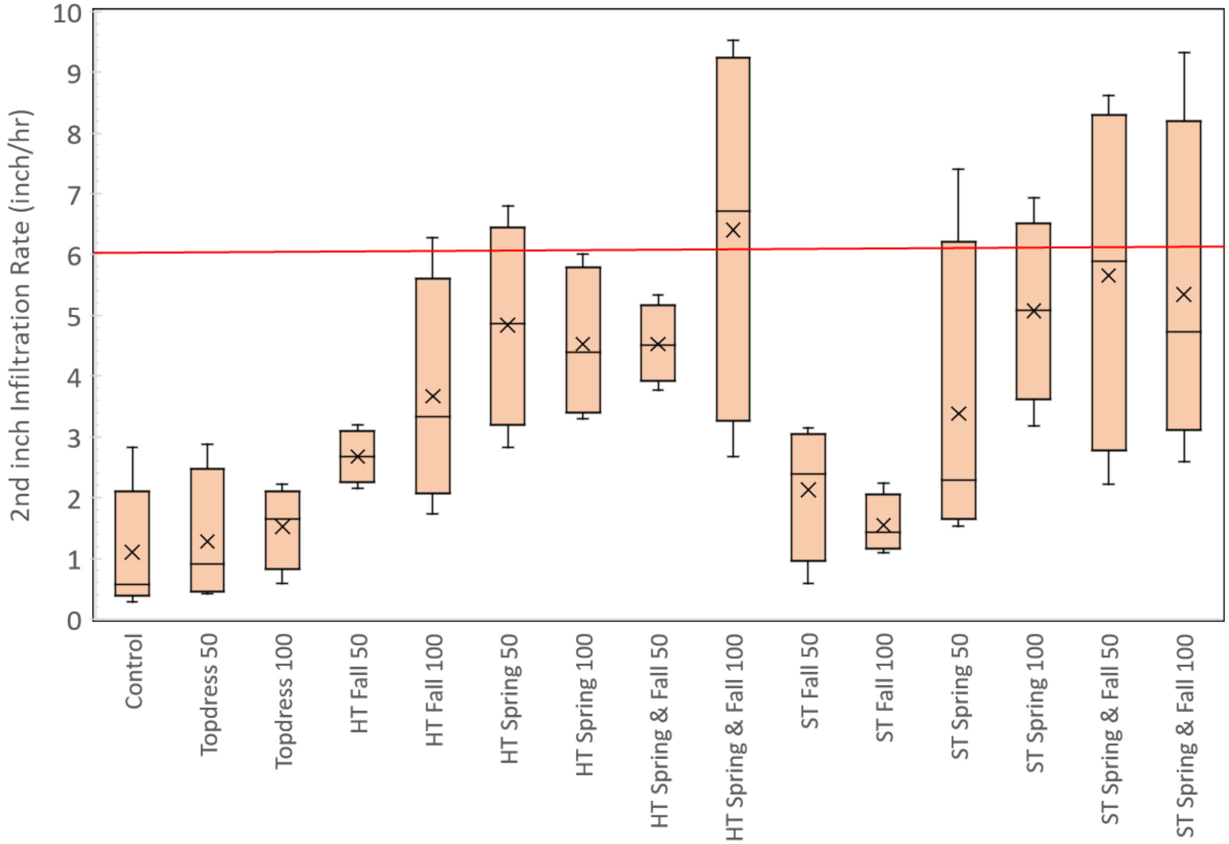


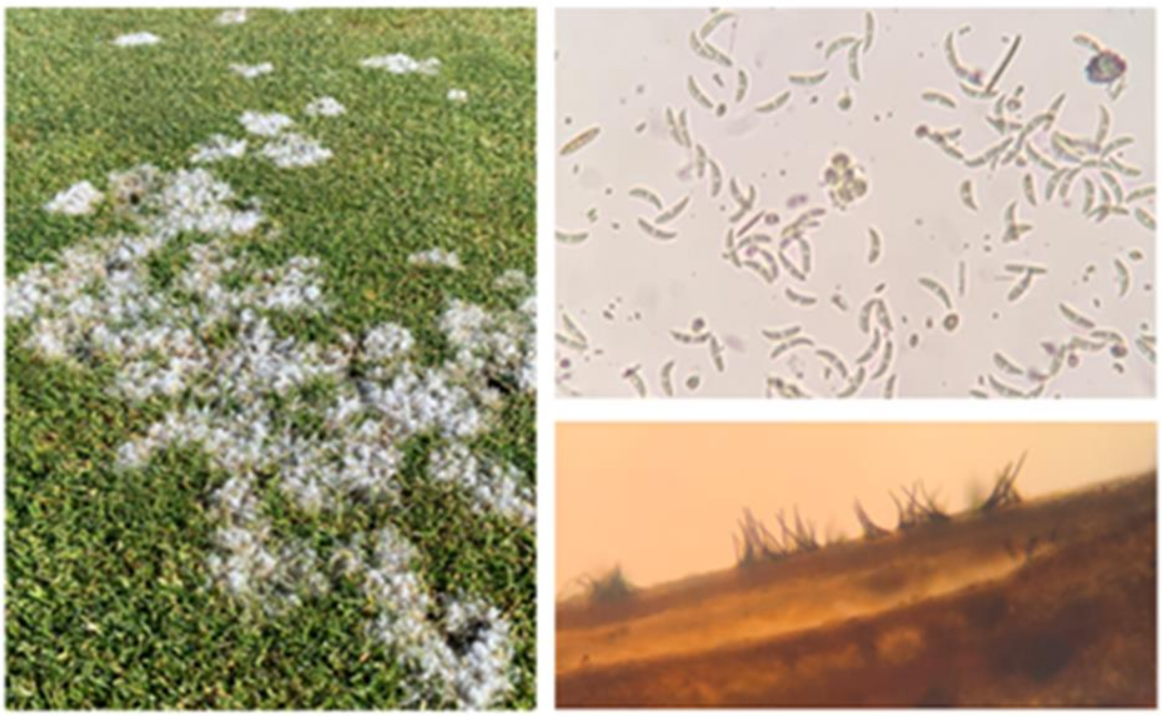
Figure 2. Box plot of cultivation and topdressing treatments effect on 2nd inch infiltration rate on an annual bluegrass putting green, collected 19 Aug 2022. HT= hollow tine, ST= solid tine; Spring and/or Fall refers to the timing of cultivation treatments; 50 or 100 at the end of treatment label refers to the summer topdressing rate in lbs /1,000 ft^2 applied every 14-d. Horizontal red line indicates the minimum infiltration rate (Ksat) for new putting green construction (6 in/hr; USGA staff 2018)

Presentation 4: Turfgrass diagnostics laboratory update (disease trends of 2023).

Emily Braithwaite

Oregon State University

Turfgrass Diagnostic Lab



Located at Lewis-Brown Farm, the OSU Turfgrass Diagnostic Lab provides quick and accurate diagnostic information and management recommendations for turfgrass problems.

Visit our website below or follow QR code for details on submission costs, sampling and shipping methods, or email us for more information.

Lewis-Brown Farm:
33329 Peoria Rd, Corvallis, OR 97333
https://horticulture.oregonstate.edu/beaverturf/diagnostic-lab

Presentation 5: Summer patch of fine fescue first report.

Robert Starchvick

The OSU Turfgrass Diagnostic Laboratory has been receiving an increase in samples from homeowners in central Oregon with symptoms presenting as summer patch disease. While *Magnaporthiopsis poae* has been found on *Poa, Agrostis, and Festuca* only the hard fescue in the submitted samples has been affected. This leads us to believe we are seeing the *meyeri festucae* species of *Magnaporthiopsis* which currently has only been characterized in New Jersey. We seek to identify and confirm the presence of *M. meyeri festucae* and will work to develop and improve molecular diagnostic methods for faster and earlier detection.

Presentation 6: Nematode inventory, action thresholds and best management practices for Washington and Oregon.

Hannah Rivedal, PhD

Plant-parasitic nematodes (PPN) are important pests affecting golf course turfgrass health and recently, they have become a topic of interest for golf courses in the Pacific Northwest (PNW). The distribution and species of PPN in Oregon, Washington, the north coast and Bay Area of California, and British Columbia, has not been extensively surveyed, but recent reports indicate that PPN are causing damage to cool-season putting greens in all locations. In addition, multiple putting green samples submitted to the Oregon State University Turfgrass Disease Diagnostic Clinic in 2022 had PPN-associated damage. PPN of multiple species were recovered, with some at rates over 1,000 nematodes/100 cc of soil. These population numbers, and the actual presence of previously unreported turf-associated nematodes, are indicative of a need for research into the diversity of PPN affecting cool-season golf course greens in the PNW.

To date, there have been no extensive surveys of Oregon and Washington golf courses to determine the range of PPN species found in putting greens, and their relative distribution. There are also no established nematode threshold levels specific to the PNW or coastal northern California. Recommendations and action thresholds vary by geographical region, between turfgrass species, and depend heavily on additional factors like biotic and abiotic stress. To provide more specific recommendations for superintendents in the PNW, we first need to understand the scope of PPN species present and their distribution throughout the region.

Objectives

Our goal is to better understand the PPN associated with putting greens to improve identification methods and develop action thresholds for coastal PNW golf courses. This work will help west coast superintendents to better identify and understand the risk of PPN to course quality and reduce over- or under-management of greens for these pathogens. To meet this goal, we are utilizing the following objectives:

1. Determine PPN genus/species presence across 60 coastal PNW golf courses (20 per state) using both traditional morphological examination and molecular approaches;
2. Evaluate survey timing (spring, summer, fall) and collection method (soil, thatch, tillers) for the most accurate detection of PPN associated with cool-season putting greens in the PNW;
3. Develop action thresholds and integrated pest management programs for PNW PPN of putting greens and deploy via publication and extension efforts.

Interest in participating?

Emily Braithwaite is leading survey efforts for her master's thesis. If you would like to participate in next year's survey, be sure to contact her (Emily.braithwaite@oregonstate.edu) or Hannah (Hannah.rivedal@usda.gov) to be included.

Acknowledgement

Thank you to the United States Golf Association, Northwest Turfgrass Association, and the USDA-ARS National Plant Disease Recovery System for their generous funding support of this project. Thank you to all the superintendents who have allowed us to sample thus far.

Stop 1: Effects of tall fescue irrigation rates and frequency on carbon sequestration, surface temperature and turf quality (page 1 of 2).

Wrennie Wang, PhD, and Alec Kowalewski, PhD

Irrigation Treatments Initiated: June 15, 2023

	S ----->				
	trt				
block 1	3	2	4	1	C
block 2	C	1	3	4	2
block 3	1	C	2	3	4
block 4	2	4	1	C	3

Trt 1 = 45% 1x/week
Trt 2 = 80% 1x week
Trt 3 = 45% 4 x week
Trt 4 = 80% x 4 week
C = control, no irrigation

Effects of Irrigation Rate and Frequency on Turf Health and Temperature:

Contrasts comparing the control (no irrigation) to reference evapotranspiration (ETref) replacement rates, and irrigation frequency, data collected in Corvallis, OR and pooled across Aug 14, 16 and 18, 2023 (average atmospheric temperature at the time of data collection 97°F, and no turf 126°F).

	(NDVI)	Turf quality (1-9, 6 or greater acceptable)	Volumetric water content (%)	Temperature (°F)
No irrigation	40.5	3.0	3.3	114.5
ETref replacement				
45%	73.9***	5.6***	17.2***	102.5***
80%	86.8***	7.8***	30.3***	93.3***
Frequency				
once per week	79.1***	6.6***	22.1***	96.4***
4 times per week	81.5***	6.8***	25.3***	99.4***

***significant at a 0.01 level of probability.

Stop 1: Effects of tall fescue irrigation rates and frequency on carbon sequestration, surface temperature and turf quality (page 2 of 2).

Effects of Irrigation Rate and Frequency on Carbon Sequestration:

Criticisms of the environmental impacts of lawns, including a high climate footprint and high irrigation requirement, pose challenges to the market acceptance of natural turfgrass. There are limited assessments of how irrigation rate and frequency affect turfgrass carbon sequestration potential and compare irrigation treatments to non-irrigated turf and bare soil. The goal of this study is to identify the minimum irrigation required to maintain turfgrass for the benefit of sequestering atmospheric CO_2. Factors in this experiment included two irrigation frequencies (once or 4 times a week) and two reference evapotranspiration (ET) replacement rates (45% and 80%) compared to non-irrigated with and without turf. CO_2 fluxes are measured every two weeks with a potable clear chamber connecting to a CO_2 gas analyzer (PP systems).

	1-Jun-23	14-Jun-23	29-Jun-23	12-Jul-23	26-Jul-23	9-Aug-23
Rate	NS	NS	NS	**	***	NS
Frequency	NS	NS	NS	NS	*	NS
Rate x frequency	NS	NS	NS	NS	NS	NS
Irrigated vs non-irrigated turf	NS	NS	*	***	***	***
Turf vs no turf	***	***	**	***	***	***
	---------------------- CO_2 flux ($\mu mol\ m^{-2}s^{-1}$)[a] ----------------------					
45% ET	8.1	0.9	1.0	2.0	2.3	5.1
80% ET	8.9	1.7	2.4	6.8	7.5	6.8
1X/week	8.7	2.2	0.4	4.4	6.2	6.6
4X/week	8.3	0.4	3.0	4.4	3.6	5.3
Non-irrigated turf	9.2	2.8	-2.1	-2.4	-2.9	-2.1
Non-irrigated no turf	-4.2	-6.7	-4.3	-4.0	-2.1	-3.9

[a] Positive numbers indicate the assimilation of atmospheric CO_2, negative numbers indicate the release of CO_2 into the atmosphere.

Irrigating tall fescue turf at 80% ET generally produced higher CO_2 assimilation rate compared to 45% ET, such effect was only statistically significant on 12 and 26 July. Irrigation applied once a week produced higher CO_2 assimilation rate compared to irrigation applied four times a week only on 26 July. Tall fescue without irrigation produced similar CO_2 assimilation rate only for the first two dates, and contributed to the release of CO_2 to the atmosphere for rest of the dates, whereas tall fescue plots subjected to irrigation treatments were shown to assimilate atmospheric CO_2. As expected, tall fescue turf has been shown to have carbon sequestration benefits. In contrast, soil without turfgrass was demonstrated to constantly release significant amount of CO_2 into the atmosphere.

Stop 2: Growing degree day models for reapplication of plant growth regulators on annual bluegrass (page 1 of 2).

Chas Schmid, PhD

Introduction

Plant growth regulators (PGRs) are an effective tool turfgrass managers can use to reduce vertical shoot growth, increase shoot density, and improve putting green playability. Traditionally, PGRs have been applied on a calendar-based schedule, but growing degree-day (GDD) models for reapplication intervals have been developed recently for trinexapac-ethyl (TE), paclobutrazol, and prohexadione-Ca (PH) on creeping bentgrass and ultradwarf bermudagrass putting greens. There is, however, a lack of data available to develop similar GDD reapplication interval models for annual bluegrass putting greens. Moreover, it is unclear what effect nitrogen rate will have on GDD models for PGR reapplication interval.

Objectives:

1) develop a growing degree day model for PGR (trinexapac-ethyl and prohexadione-Ca) reapplication interval on annual bluegrass putting greens

2) determine if nitrogen rate has an influence on a growing degree day model for annual bluegrass putting greens.

Materials and Methods

The trial is a 2 by 2 factorial in a randomized complete block design with four replications. Factors include PGR type, either a single application of TE (PrimoMaxx, Syngenta) at 0.125 fl oz 1000 ft^{-2} or PH (Anuew, Nufarm) at 0.05 fl oz 1000 ft^{-2}; and N rate, either 0.075 or 0.15 lb N 1000 ft^{-2} every 7-d throughout the trial period (June through September). Multiple runs of the experiment will be conducted within each year, with applications starting on June 1, July 1, August 1, and September 1, where no previous PGR application had been made that season. Two sets of nontreated control plots will be included per replication.

Clippings are collected three times per week (Monday, Wednesday, and Friday) until ≈600 GDD; at which point, clippings will be collected once per week until the effects of PGRs are no longer detectable (≈1000 GDD). Clipping collection and general plot mowing will be done using a walk-behind greens mower (EFlex 2120, Toro Company), with bench height set at 0.110". The entire plot area will be mowed six days per week (except Saturday), after clippings have been harvested. An onsite weather station measuring daily air temperatures will be used to calculate cumulative GDD, with a base temperature of 0°C and the stipulation that if the daily mean temperature is less than the base temperature, then the GDD for that day is set to zero.

Preliminary Results

Data from the first run of the experiment in June 2023 indicated that relative clipping yield was highly correlated with cumulative GDD, regardless of PGR type or N rate (adjusted R^2= 0.575 to 0.741; Figure 1). The amplitude of the suppression phase was similar between TE treatments applied at the two rates of nitrogen (0.075 and 0.15 lb N 1000 ft^{-2}). However, the amplitude of the rebound phase was much greater for TE combined with the higher rate of N (0.15 lb N 1000 ft^{-2}) compared to the lower rate of N (0.075 lb N 1000 ft^{-2}). In contrast, the amplitude of the suppression phase was greater when PH was combined with the lower rate of N (0.075 lb N 1000 ft^{-2}); whereas the amplitude of the rebound phase was much greater when PH was combined with the higher rate of N (0.15 lb N 1000 ft^{-2}). Further data is needed to improve the robustness of these GDD models and determine the most appropriate GDD interval for reapplications of TE and PH.

Stop 2: Growing degree day models for reapplication of plant growth regulators on annual bluegrass (page 2 of 2).

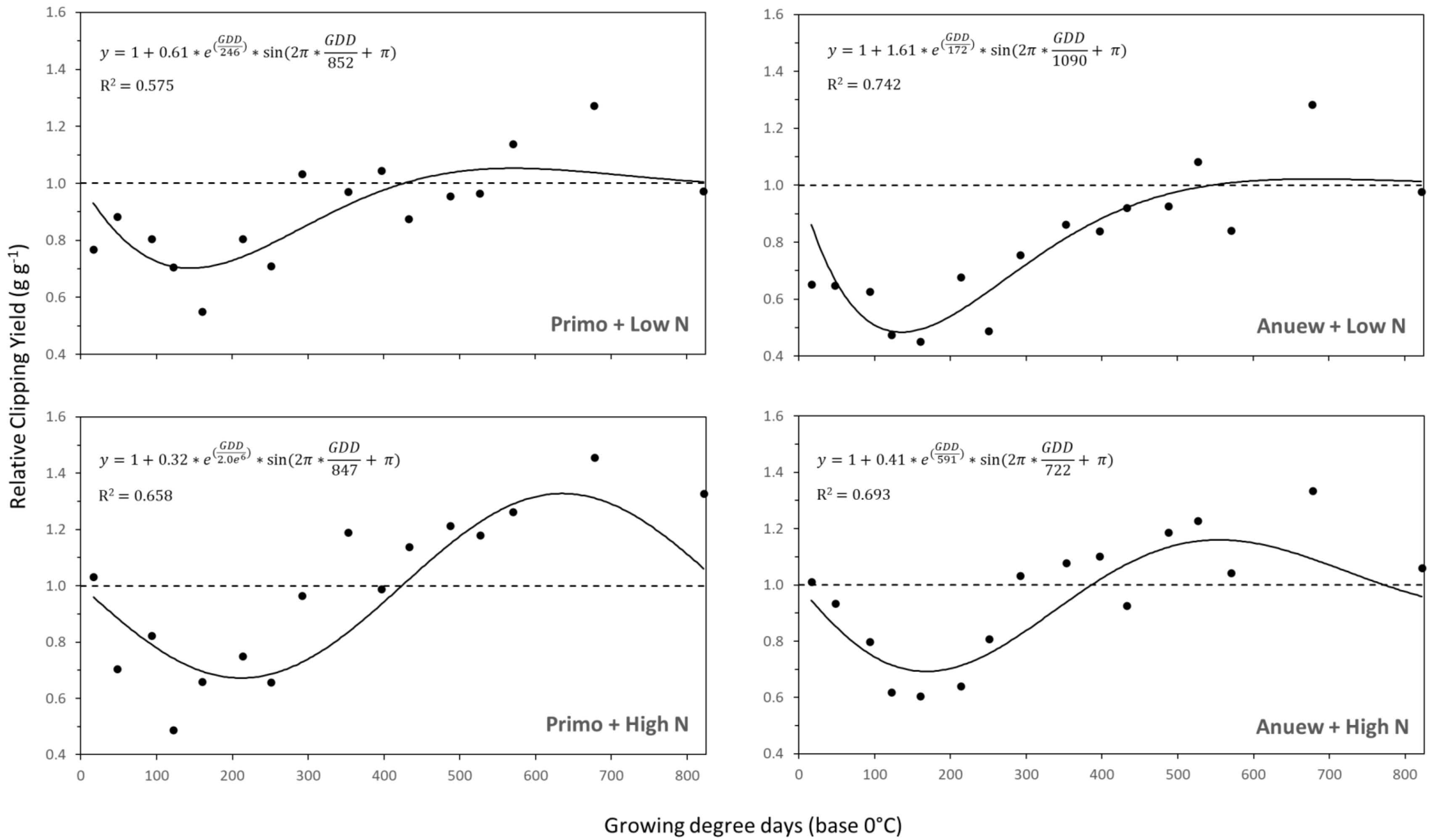


Figure 1. Growing degree-day models of Primo and Anuew combined with high or low rates of N (0.075 vs 0.15 lb N 1000 ft^{-2}every 7-d) on an annual bluegrass putting green maintained at 0.110". Plant growth regulator treatments were initiated on 13 June 2023.

Stop 3: Fungicides for anthracnose management on annual bluegrass putting greens. (page 1 of 3).

Brian McDonald & Emily Braithwaite

Anthracnose Trial # 1: Initiated June 16th, 2023

Trt #	Treatment	Rate(oz)/1,000 ft²	Interval
1	Untreated	-	-
2	BASF Rotation Program 1	See below	14 days
3	BASF Rotation Program 2	See below	14 days
8	Signature Xtra + Daconil Ultrex + Primo Maxx	4.0 + 3.2 + 0.125	14 days
9	Envu Rotation Program 1	See below	7 Days
10	Envu Rotation Program 2	See below	14 Days
11	Densicor + Primo Maxx	0.196 + 0.125	14 Days
13	Affirm	0.88	7 Days
15	Densicor + Rotator[1]	0.196 + 0.5	14 Days
16	Penthiopyrad + Spirato[2] + Rotator	0.5 + 0.5 + 0.5	14 Days

[1]Rotator's active ingredient is fluazinam.
[2]Spirato's active ingredient is fludioxinil.

BASF Rotation Program 1.

Date	Treatment	Rate(oz)/1,000 ft²
6/16	Maxtima	0.60
6/30	Encartis[1]	4.0
7/14	Maxtima + Affirm	0.60 + 0.88
7/28	Encartis	4.0
8/11	Maxtima + Affirm	0.60 + 0.88
8/25	Encartis	4.0

[1] Encartis is a mix of boscolid & chlorothalanil

BASF Rotation Program 2.

Date	Treatment	Rate(oz)/1,000 ft²
6/16	Navicon Intrinsic + Primo Maxx	0.70 + 0.10
6/30	Signature Xtra + Primo Maxx	5.3 + 0.10
7/14	Navicon Intrinsic + Secure + Primo Maxx	0.70 + 0.50 + 0.10
7/28	Signature Xtra + Primo Maxx	5.3 + 0.10
8/11	Navicon Intrinsic + Primo Maxx	0.70 + 0.10
8/25	Signature Xtra + Secure + Primo Maxx	5.3 + 0.50 + 0.10

Stop 3: Fungicides for anthracnose management on annual bluegrass putting greens. (page 2 of 3).

Brian McDonald & Emily Braithwaite

Envu Rotation Program 1: (7 day)

Date	Treatment	Rate (oz)/1,000 ft^2
6/16	Signature Xtra + **Daconil Ultrex** + Primo Maxx	2.0 + **3.2** + 0.125
6/23	Signature Xtra	2.0
6/30	Signature Xtra + **Mirage Stressgard** + Primo Maxx	2.0 + **1.0** + 0.125
7/7	Signature Xtra	2.0
7/14	Signature Xtra + **Densicor** + Primo Maxx	2.0 + **0.196** + 0.125
7/21	Signature Xtra	2.0
7/28	Signature Xtra + **Daconil Ultrex** + Primo Maxx	2.0 + **3.2** + 0.125
7/4	Signature Xtra	2.0
8/11	Signature Xtra + **Mirage Stressgard** + Primo Maxx	2.0 + **1.0** + 0.125
8/18	Signature Xtra	2.0
8/25	Signature Xtra + **Densicor** + Primo Maxx	2.0 + **0.196** + 0.125

Envu Rotation Program 2: (14 day)

Date	Treatment	Rate(oz)/1,000 ft^2
6/16	Signature Xtra + **Daconil Ultrex** + Primo Maxx	2.0 + **3.2** + 0.125
6/30	Densicor + Exteris Stressgard + Primo Maxx	0.196 + 2.0 + 0.125
7/14	Signature Xtra + **Daconil Ultrex** + Primo Maxx	2.0 + **3.2** + 0.125
7/28	Densicor + Exteris Stressgard + Primo Maxx	0.196 + 2.0 + 0.125
8/11	Signature Xtra + **Daconil Ultrex** + Primo Maxx	2.0 + **3.2** + 0.125
8/25	Densicor + Exteris Stressgard + Primo Maxx	0.196 + 2.0 + 0.125

Anthracnose Trial # 2: Initiated June 19th, 2023

Trt #	Treatment	Rate(oz)/1,000 ft^2	Interval
1	Untreated	-	-
2	Tuque exoGem + **Primo Maxx**	1.5 + 0.125	14 days
3	Tuque exoGem + Appear II + **Primo Maxx**	1.5 + 6.0 + 0.125	14 days
4	Tuque exoGem + Dac. Action + Appear II + **Primo Maxx**	1.5 + 3.5 + 6.0 + 0.125	14 days
5	Briskway + **Primo Maxx**	0.9 + 0.125	14 days

*Trts made 6/19, 7/3, 7/17, 7/31, 8/14, & 8/28

Stop 3: Fungicides for anthracnose management on annual bluegrass putting greens. (page 3 of 3).

Brian McDonald & Emily Braithwaite

S --->

Anthracnose suppression using fungicides - Trial # 2

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

Anthracnose suppression using fungicides - Trial # 1

22	16	1	13	11	20	12	4	14	6	2	3	**Rep 4**
17	18	24	7	10	19	9	23	15	5	21	8	
3	15	19	6	4	2	1	10	21	9	17	12	**Rep 3**
7	5	20	24	13	14	16	11	22	8	23	18	
22	2	6	10	23	17	4	12	18	21	5	16	**Rep 2**
14	20	24	9	7	13	15	8	11	19	3	1	
21	8	17	12	19	2	3	6	23	9	1	13	**Rep 1**
10	4	22	18	20	24	5	14	15	16	11	7	

Stop 4: A-LIST fine fescue trial: Effects of fine fescue genus, species, cultivar, and endophyte presence on drought tolerance (page 1 of 2).

Alec Kowalewski, PhD, and Hannah Rivedal, PhD

#	Entry	Species	Endophyte status
1	DLFPS-FRC-3105	Chewings Fescue	+
2	Leeward	Chewings Fescue	+
3	SR 5130	Chewings Fescue	-
4	Woodall	Chewings Fescue	+
5	Conductor	Chewings Fescue	+
6	Compass II	Chewings Fescue	+
7	PPG-FRC 127	Chewings Fescue	-
8	PPG-FRC 130	Chewings Fescue	+
9	DLFPS-FL-3104	Hard Fescue	-
10	Leonidas	Hard Fescue	-
11	Minimus	Hard Fescue	-
12	Clarinet	Hard Fescue	+
13	Jetty	Hard Fescue	+
14	PPG-FL 128	Hard Fescue	+
15	Quatro	Sheep Fescue	-
16	Blue Hornet	Sheep Fescue	-
17	Chantilly	Strong Creeping Red Fescue	-
18	DLFPS-FRR-3128	Strong Creeping Red Fescue	-
19	Ruddy	Strong Creeping Red Fescue	-
20	Marvel	Strong Creeping Red Fescue	-
21	Chorus	Strong Creeping Red Fescue	+
22	Cardinal II	Strong Creeping Red Fescue	-
23	PPG-FRR 127	Strong Creeping Red Fescue	-
24	PPG-FRR 132	Strong Creeping Red Fescue	+
25	PPG-FRR 134	Strong Creeping Red Fescue	+

Seeded: 9 June 2022

N

100 ft

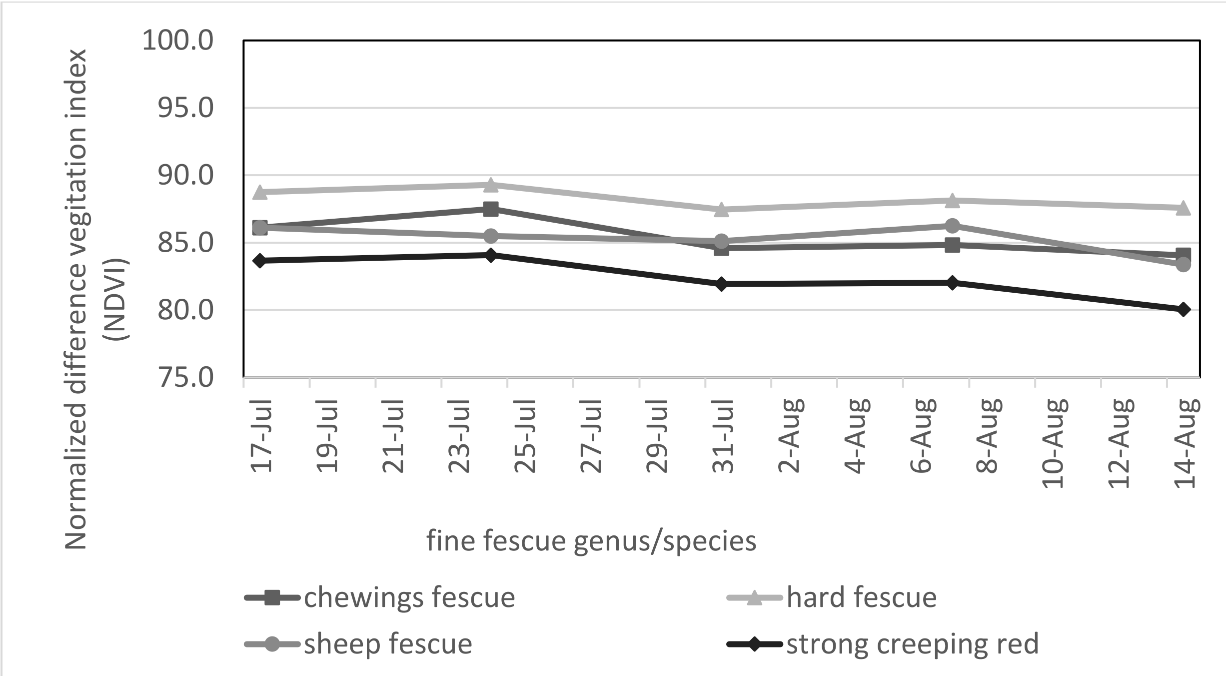
		Rep1					Rep2					Rep3					Rep4		
6	22	18	20	19	1	10	11	20	21	7	24	21	3	13	4	21	17	8	16
2	15	4	10	9	2	9	12	19	22	8	9	11	25	18	14	24	6	20	5
23	8	14	12	24	3	8	13	18	23	15	6	22	20	10	23	7	9	19	22
7	11	3	16	1	4	7	14	17	24	4	5	17	1	14	12	1	18	2	3
25	5	13	21	17	5	6	15	16	25	16	2	12	23	19	11	13	10	25	15

25 ft

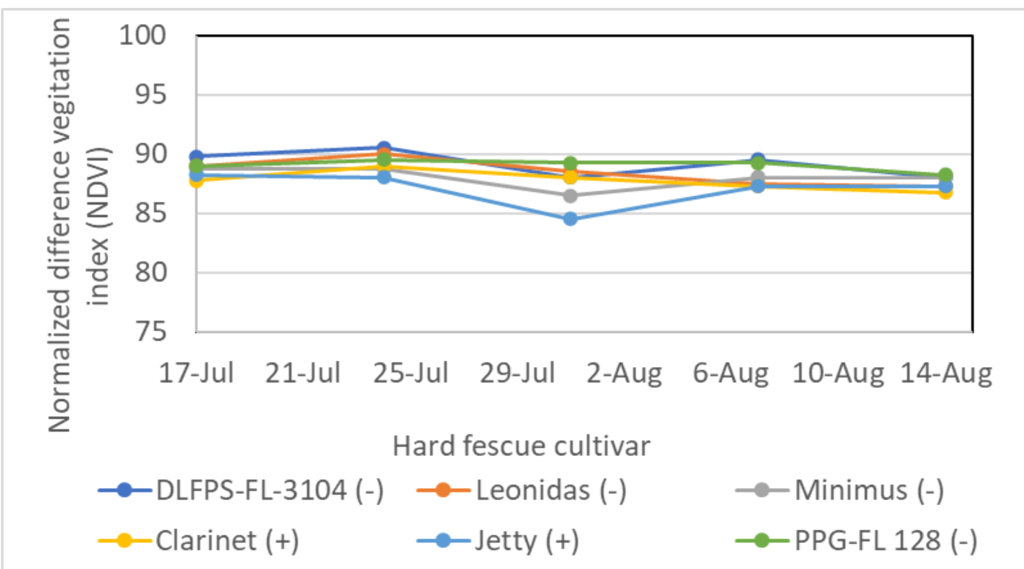
5 ft

5 ft

Stop 4: A-LIST fine fescue trial: Effects of fine fescue genus, species, cultivar, and endophyte presence on drought tolerance continued (page 2 of 2).



Normalized difference vegetation index values (100 represents the healthiest turf possible) for four different fine fescue genus and species (representing 25 cultivars total) when irrigated at 50% reference Evapotranspiration (ETref) Replacement in Corvallis, OR in 2023.



Normalized difference vegetation index values (100 represents the healthiest turf possible) for six different hard fescue genus and species [endophytes present (+) in seed at planting; endophytes absent (-) in seed] when irrigated at 50% reference Evapotranspiration (ETref) Replacement in Corvallis, OR in 2023.

Stop 5: Comparing classic and contemporary turf type tall fescue cultivars (from seed production to lawns).

Shikhar Hatwal

Objective:

Many traits have been selected for turf-type tall fescue (TTTF) varieties over the past 40 years. Prominent selections have been for dark foliage color and dwarf plants. These selections may have introduced shifts in traits like drought tolerance, overall turf quality and disease tolerance. The objectives of this research are to measure and explain any trends that have occurred between classic varieties versus contemporary varieties of TTTF, when comparing traits contributing to drought tolerance, overall agronomic quality and disease tolerance.

Map of Classic vs Contemporary Tall Fescue Turf Trait Trial

SETF120	Jaguar PI	23TFFS-6-2	GroPro	23TFFS-13-1	TFFC-4-22-BB	23TFFS-5-2	TFFC-5-22-8	23TFFS-8-2	Olympic PI	TFFC-5-22-10	Covenant II	23TFFS-4-2	Covenant II	Olympic PI	TF1895	23TFFS-17-2
SETF221	Olympic PI	Monet	TFFC-5-22-12	TFFC-5-22-10	TFFC-3-22-9	GroPro	Greenspan	Jaguar PI	SETF520	TFFC-3-22-9	Finelawn 5GL PI	Grand Prix	Finelawn 5GL PI	TFFC-5-22-10	23TFFS-8-2	23TFFS-18-2
SETF320	Rendition	23TFFS-8-2	TFFC-5-22-13	23TFFS-4-2	TFFC-6-22-3	23TFFS-3-2	SETF120	Fairfield	TFFC-6-22-3	23TFFS-7-1	TFFC-3-22-9	TFFC-5-22-5	SETF320	23TFFS-6-1	23TFFS-3-2	23TFFS-15-2
SETF222	23TFFS-19-1	23TFFS-3-2	Fairfield	TFFC-5-22-8	TFFC-5-22-3	TFFC-3-22-2	23TFFS-6-2	23TFFS-13-1	Rendition	23TFFS-4-2	SETF520	Honeymoon	Rebel	Greenspan	GroPro	SETF120
SETF520	23TFFS-6-1	Rebel	TFFC-5-22-11	TFFC-3-22-2	TF1895	23TFFS-6-1	23TFFS-17-2	SETF222	TF1895	Grand Prix	23TFFS-13-1	TFFC-5-22-3	TFFC-2-22-1	23TFFS-6-2	Jaguar PI	23TFFS-19-1
Covenant II	23TFFS-18-2	TF1883	TFFC-5-22-5	23TFFS-15-2	TFFC-5-22-11	TFFC-2-22-1	Monet	TFFC-5-22-4	TF1883	TFFC-5-22-3	TF1883	TFFC-5-22-12	TFFC-6-22-3	TFFC-5-22-8	TFFC-3-22-2	TFFC-5-22-13
Greenspan	23TFFS-7-1	TFFC-2-22-1	23TFFS-5-2	Grand Prix	23TFFS-18-2	23TFFS-15-2	TFFC-5-22-5	Honeymoon	TFFC-5-22-12	23TFFS-19-1	Fairfield	TFFC-5-22-4	SETF221	SETF222	Monet	TFFC-2-22-5
Honeymoon	Finelawn 5GL PI	TFFC-2-22-5	TFFC-5-22-4	23TFFS-17-2	TFFC-5-22-13	TFFC-2-22-5	Rebel	SETF320	TFFC-4-22-BB	SETF221	TFFC-4-22-BB	Rendition	23TFFS-7-1	23TFFS-5-2	TFFC-5-22-11	

Classic (< 2000)

Contemporary (> 2009)

Open House: Tall Fescue National Turfgrass Evaluation Program Entry Number, Name and Sponsor

(page 1 of 2)

Entry	Name	Sponsor	Entry	Name	Sponsor	Entry	Name	Sponsor
1	Naturally Green	Carlton Seed Co.	45	PST-5MINK	Pure Seed Testing	89	Spyder 2LS	Mountain View Seeds
2	Paramount	Standard	46	Moondance	Integrated Seed Growers	90	PPG-TF-231	Peak Plant Genetics LLC
3	DLFPS-321/3693	DLF USA	47	Monument	Site One Land. Supply	91	Rover	Landmark Turf & Native Seed
4	DLFPS-321/3694	DLF USA	48	PST-5DZM	Pure Seed Testing	92	PPG-TF-318	Peak Plant Genetics LLC
5	DLFPS-321/3695	DLF USA	49	GLX Revive	Pure Seed Testing	93	Bullseye	Standard
6	SR 8700	DLF USA	50	GLX ACED	Pure Seed (Rose Agri)	94	Firehawk SLT	Burlingham Seeds
7	ATF2116	Pennington Seed	51	PST-5DC24	Pure Seed (Rose Agri)	95	Hemi	Standard
8	NT-3	Pennington Seed	52	Tango	Site One Land. Supply	96	Bullseye LTZ	Burlingham Seeds
9	RS1	DLF USA	53	Endgame	Site One Land. Supply	97	Turbo SS	Burlingham Seeds
10	5LSS	Pure Seed Testing	54	Bandit	Site One Land. Supply	98	Dragster	Burlingham Seeds
11	TopShelf	Berger International	55	Copious TF	Site One Land. Supply	99	Providence	Grassland Oregon Seed
12	ATF 1768	Pennington Seed	56	Padre 2	Site One Land. Supply	100	Birmingham	Grassland Oregon Seed
13	Gallardo	DLF USA	57	Bravo 2	Site One Land. Supply	101	Lafayette	Grassland Oregon Seed
14	Essential 2	DLF USA	58	NAI-FQZ-17	Lakeside Ag. Ventures	102	Talladega II	The Scotts Company
15	DLFPS-TF/3553	DLF USA	59	Capitan	DLF USA	103	Battle Hawk	Landmark Turf & Native Seed
16	Bentley	DLF USA	60	DLFPS-321/3706	DLF USA	104	Tough	The Scotts Company
17	LBF	Tualatin Valley Seeds	61	DLFPS-321/3707	DLF USA	105	NAI-ST5	Landmark Turf & Native Seed
18	TD2	Pennington Seed	62	DLFPS-321/3708	DLF USA	106	Gro-Pro	Smith Seed Services, LLC
19	Raceway	DLF USA	63	Zion	Barenbrug USA	107	SE5STAR	Smith Seed Services, LLC
20	Rowdier	DLF USA	64	BAR-FA8230	Barenbrug USA	108	Galactic	Smith Seed Services, LLC
21	Grande 3	DLF USA	65	Clash	Landmark Turf & Native Seed	109	Fairfield	Smith Seed Services, LLC
22	Fayette	Standard	66	PPG-TF-249	Landmark Turf & Native Seed	110	SETFM2	Smith Seed Services, LLC
23	JT-517	Barenbrug USA	67	Expanse	Landmark Turf & Native Seed	111	SETFM3	Smith Seed Services, LLC
24	Bonfire	Barenbrug USA	68	PPG-TF-267	Landmark Turf & Native Seed	112	3B2	ProSeeds Marketing
25	RDC	DLF USA	69	Daybreak	Brett Young Seeds	113	RAD-TF105	Radix Research
26	BAR 9FE MAS	Barenbrug USA	70	K18-RS6	The Scotts Company	114	RAD-TF131	Radix Research
27	BAR FA 8228	Barenbrug USA	71	K18-WB1	The Scotts Company	115	RHL2	Semillas Fito
28	COL-TF-148	The Scotts Company	72	Falcon Supreme	ProSeeds Marketing Inc.	116	Raptor III	Standard
29	O'Keefe	Lebanon Seaboard Corp.	73	Finelawn Supreme	ProSeeds Marketing Inc.	117	RHF	Semillas Dalmau
30	Degas	Lebanon Seaboard Corp.	74	JT 233	Vista Seed Partners	118	Teacher	The Scotts Company
31	Kizzle	The Scotts Company	75	Xanadu	Barenbrug USA	119	Serenade	Integra Turf, Inc.
32	K18-NSE	The Scotts Company	76	Firenza II	Integra Turf, Inc.	120	Triad	The Scotts Company
33	Fastlane	Brett Young	77	Symphony	Integra Turf, Inc.	121	Tank	The Scotts Company
34	Bladerunner 3	DLF USA	78	PPG-TF 316	Lewis Seed Co.	122	Estrena	Semillas Fito
35	Houndog Nine	DLF USA	79	RC4	Semillas Fito	123	AST8118LM	Allied Seed LLC
36	DLFPS-321/3703	DLFUSA	80	Valsetz	Vista Seed Partners	124	AST8218LM	Allied Seed LLC
37	PST-5TRN	Pure Seed Testing	81	Stealth	Mountain View Seeds	125	A-TF31	Allied Seed LLC
38	PST-5GQ	Pure Seed Testing	82	Dynamite G-LS	Mountain View Seeds	126	Palomar	DLF USA
39	Extravaganza	Pure Seed Testing	83	Avenger III	Mountain View Seeds	127	Escalade	DLF USA
40	Pro Gold	Integrated Seed Growers	84	Titanium G-LS	Mountain View Seeds	128	OG-WALK	DLF USA
41	Hellcat GLR	Turf Merchants	85	PPG-TF-312	Mountain View Seeds	129	Titan GLX	Smith Seed Services
42	PST-5THM	Pure Seed Testing	86	Firecracker G-LS	Mountain View Seeds	130	Titan Max	Smith Seed Services
43	Oriole	Newsom Seed	87	Raptor LS	Mountain View Seeds	131	Grand Prix	Criadero El Concerro SA
44	Lifeguard	Pure Seed (Rose Agri)	88	PPG-TF-337	Mountain View Seeds	132	Kentucky-31	Standard

= COMMERCIALLY AVAILABLE IN THE US OR ANY OTHER COUNTRY IN 2023

Open House: Tall Fescue National Turfgrass Evaluation Program Plot Map (page 2 of 2)

N

61	51	128	58	117	57	30	22	124	12	87	130	68	44	6	54	125	
13	15	26		19	11	129	66	78	25		20	46	84	40	72	106	
85	121	41	109	23	2	70	105	47	107	76	8	64	45	29	67	56	
94	114	100	80	126	3	93	120	50	38	59	82	17	101	71	99	113	Rep 3
116	90	86	73	33	49	131	31	81	62	43	10	119	110	102	122	16	
96	53	55	111	34	79	112	52	97	4	42	123	1	9	132	35	74	
77	69	63	75	28	108	7	115	48	27	83	88	103	118	60	127	92	
32	89	95		104	24	18	5	21	91		39	36	98	37	65	14	
		132	131	130	129	128	127	126	125	124	123	122	121	120	119	118	
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	
100	99	98	97	96	95	94	93	92	91	90	89	88	87	86	85	84	
67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	
66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	Rep 2
35	36	37		38	39	40	41	42	43	44		45	46	47	48	49	
34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
		3	44	109	131	48	50	122	49	77	106	70	72	115	75	104	
110	117	95	7	71	25	69	111	119	78	103	61	26	43	18	85	64	
84	12	114	116	24	5	8	34	65	14	101	68	132	62	74	4	92	
45	125	90		38	58	11	126	53	56	96		10	88	86	63	55	
39	99	15	66	80	23	31	6	1	102	27	107	16	81	105	59	129	Rep 1
57	32	37	21	83	98	82	73	112	30	108	52	127	9	113	13	94	
121	51	91	28	76	54	35	67	93	17	2	19	60	100	89	36	124	
33	20	87	41	46	118	40	128	97	79	42	29	22	47	120	130	123	

Open House: Perennial Ryegrass National Turfgrass Evaluation Program Entry Number, Name and Sponsor (page 1 of 2).

Entry	NAME	SPONSOR	Entry	NAME	SPONSOR
1	RC20-020	Criadero El Cencero S.A.	43	PPG-PR 668	Landmark Seed Company
2	LTP-RPP4	Lebanon Seaboard Corp.	44	PPG-PR 670	Semillas Fito
*3	Greenback	Carlton Seed, LLC	45	PPG-PR 671	Turf Merchants, Inc.
4	BY-PS2	BrettYoung	46	SGP4	Semillas Fito
5	LTP-NR	Lebanon Seaboard Corp.	*47	High Octane	Burlingham Seeds, LLC
6	PVF-RPP2	Pineview Farms, LLC	*48	Piston	Burlingham Seeds, LLC
*7	Stellar 4GL	Standard	49	MRSL-PR22	SiteOne Landscape Supply
*8	Homerun LS	Standard	50	PVF-SGS5	SiteOne Landscape Supply
*9	Siletz	Vista Seed Partners, LLC	51	20PR10	SiteOne Landscape Supply
10	GO-RUS20	GO Seed	52	PS4	SiteOne Landscape Supply
11	GO-RUS21	GO Seed	53	BAR LP 22191	Barenbrug USA
12	GO-RUS22	GO Seed	54	BAR LP 22256	Barenbrug USA
13	PST-2ADS	Pure-Seed Testing Inc.	55	BAR LP 22262	Barenbrug USA
14	PST-2BGL	Pure-Seed Testing Inc.	56	BAR LP 22263	Barenbrug USA
15	PST-2DRG	BrettYoung	57	BAR LP 22174	Barenbrug USA
16	PST-2EGY	Barenbrug	58	SE-DK	Smith Seed Services
17	PST-2GDS	Pure-Seed Testing Inc.	59	TSC-CR5	Columbia River Seed
18	PST-214	Pure Seed	60	PST-2MEG	Pure Seed
19	PST-2HAF20	Pure Seed	61	PST-2E6	Semillas Fito
20	PST-2HFM	Pure-Seed Testing Inc.	*62	Brightstar SLT	Standard
21	PST-2MES1	Pure-Seed Testing Inc.	63	CJP1R	ProSeeds Marketing, Inc.
22	PST-2SPF	Pure-Seed Testing Inc.	64	PR5	Columbia River Seed
23	PPG-PR 602	Mountain View Seeds	65	RPP3	Ampac Seed Company
24	PPG-PR 606	Integra Turf, Inc.	66	APS	Ampac Seed Company
25	PPG-PR 610	Smith Seed Services	67	SEPR-2013	Smith Seed Services
26	PPG-PR 611	The Scotts Company	68	BSG-PR22	Bailey Seed & Grain
27	PPG-PR 620	Peak Plant Genetics, LLC	*69	Dark Matter	Marion Ag Service, Inc.
28	PPG-PR 637	Mountain View Seeds	70	DLF-PR-3726	DLF USA
29	PPG-PR 639	Turf Merchants, Inc.	71	DLF-PR-3727	DLF USA
30	PPG-PR 642	Landmark Seed Company	72	DLF-PR-3728	DLF USA
31	PPG-PR 643	Landmark Seed Company	73	DLF-PR-3729	DLF USA
32	PPG-PR 644	Mountain View Seeds	74	DLF-PR-3730	DLF USA
33	PPG-PR 646	ProSeeds Marketing, Inc.	75	DLF-PR-3735	DLF USA
34	PPG-PR 647	BrettYoung	76	DLF-PR-3736	DLF USA
35	PPG-PR 658	Mountain View Seeds	77	DLF-PR-3737	DLF USA
36	PPG-PR 661	ProSeeds Marketing, Inc.	*78	Karma	Standard
37	PPG-PR 662	Peak Plant Genetics, LLC	*79	Alpha Centauri	Marion Ag Service, Inc.
38	PPG-PR 663	Mountain View Seeds	*80	Quasar	Marion Ag Service, Inc.
39	PPG-PR 664	Peak Plant Genetics, LLC	*81	Linn	Standard
40	PPG-PR 665	Landmark Seed Company	82	DLF-PR-3738	DLF USA
41	PPG-PR 666	Turf Merchants, Inc.	83	DLF-LGT-3066	DLF USA
42	PPG-PR 667	Smith Seed Services			

*Commercially available in 2022.

Open House: Perennial Ryegrass National Turfgrass Evaluation Program Plot Map

(page 2 of 2).

2022 NTEP Perennial Ryegrass Trial

Date Seeded: 10/7/22 | Seeding rate: 6 lbs/M | S ---->

Plot area 68' X 75' = 5,100 sq. ft.

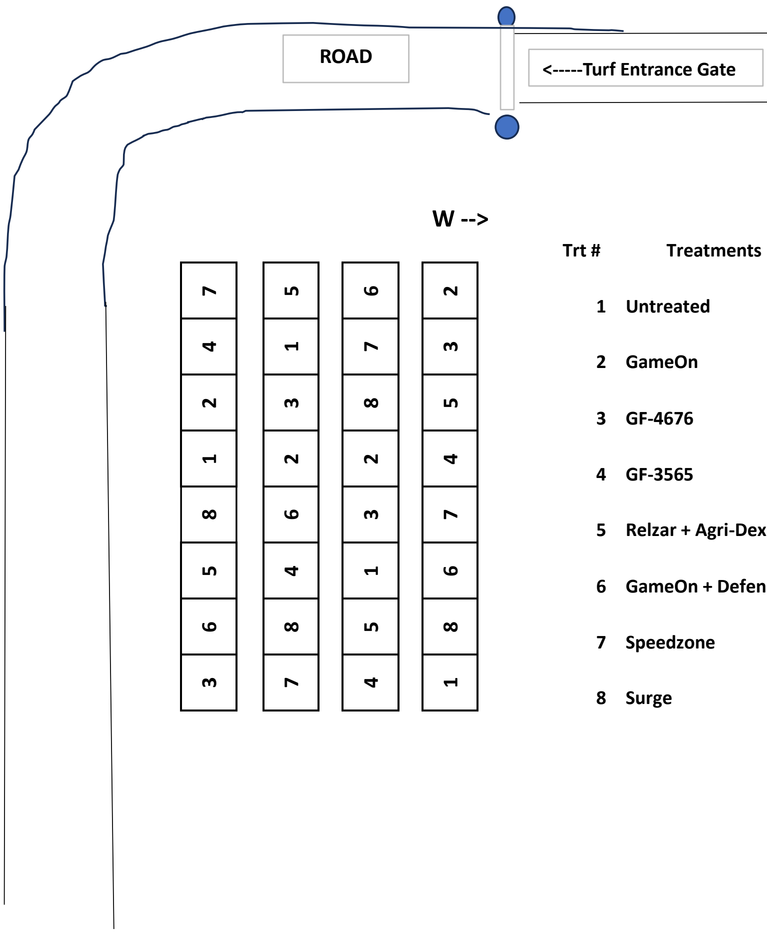
Note: two extra plots will go where the heads are in the middle

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Row
	4'																	
	61	19	20	58	35	62	26	38	65	59	36	40	75	63	43	66	13	5
	27	53	44	73	68	24	52	22	X	70	81	14	32	83	39	12	69	4
	76	6	71	1	79	5	29	54	X	48	9	74	72	67	51	7	56	3
	18	47	42	37	46	77	49	16	80	33	21	10	31	8	82	78	50	2
	55	60	3	4	11	15	57	17	45	30	64	28	2	25	34	23	41	1
	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	5
	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	4
	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	3
	32	31	30	29	28	27	26	25	X	24	23	22	21	20	19	18	17	2
	1	2	3	4	5	6	7	8	X	9	10	11	12	13	14	15	16	1
	20	79	46	73	40	19	47	33	16	70	80	58	68	32	82	X	X	5
	11	64	72	74	25	52	57	28	50	77	34	65	56	62	75	55	83	4
	67	71	14	44	13	61	7	59	76	18	38	21	53	1	42	5	37	3
	81	26	45	9	12	22	4	29	30	3	78	31	51	35	17	24	8	2
	39	69	41	2	49	27	66	43	10	36	48	54	63	6	15	60	23	1
	Start here																	

Road

Open House: Herbicides for post-emergence control of broadleaf weeds (page 1 of 2)

Post emergence herbicides for broadleaf weed control
Initiated: 7/28/23



Trt #	Treatments	pts/A	Apps	Interval
1	Untreated	-	-	-
2	GameOn	3.5	2	6 wks
3	GF-4676	3.0	2	6 wks
4	GF-3565	2.06	2	6 wks
5	Relzar + Agri-Dex	.72 oz. + .5% v/v	2	6 wks
6	GameOn + Defendor	3.0 pts + 3 fl. oz.	2	6 wks
7	Speedzone	4.0	2	6 wks
8	Surge	3.25	2	6 wks

Open House: Herbicides for post-emergence control of broadleaf weeds (page 2 of 2)

trt	Product	pts/A
1	Untreated	-
2	GameOn	3.5
3	GF-4676	3.0
4	GF-3565	2.06
5	Relzar + Agri-Dex	.72 oz. + .5% v/v
6	GameOn + Defendor	3.0 pts + 3 fl. oz.
7	Speedzone	4.0
8	Surge	3.25

2023 Corteva Weed Trial
Oregon State University
Initiated: 7/27/23

W -->

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

Open House: Backpack sprayer demonstration (page 1 of 2)

Chas Schmid, PhD

Calibration of backpack sprayers to determine sprayer output (in gal/1,000 ft^2) is controlled by three factors: walking speed, nozzle output, and spray width. The following steps will walk you through how to determine each of these factors and calculate your backpack sprayer output.

1. **Walking speed (MPH)** – Mark off two points 100 ft apart on the surface you will be spraying. Record in seconds how long to travel the distance. Repeat this step until you achieve a consistent travel speed. It is important to find a walking speed you can maintain throughout the spray; DO NOT walk too FAST! Then calculate walking speed in mph by dividing 68.18 by the time required to travel 100 ft (in sec). *Example 68.18 / 34 sec = 2.0 mph*

2. **Nozzle output (GPM)** – It is important to use a CF valve on backpack sprayers to maintain constant pressure which will make calibration much easier. The nozzle output in gallons per minute (GPM) can be determined by looking up the manufacturers GPM specifications (i.e. TeeJet Catalog) or can be measured directly with the following procedures:

   a) Fill sprayer half full of water.
   b) Pump the sprayer to pressurize the tank
   c) Pull the handle trigger, start timer for 60 seconds, and collect spray output in a measuring container.
   d) Determine volume collected and convert the flow rate to gallons per minute (128 fl oz = 1 gal)

3. **Spray width (W; inches)** – It is important to hold your spray boom at a constant height to ensure that you maintain a consistent spray width. To determine your spray width, find a comfortable boom height that you can maintain for an extended period (not too high or low). Find an area of dry concrete or gravel and spray a test strip using water (*make sure to maintain constant height). Measure the width (inches) of the spray pattern left on the concrete/gravel

Calculate Sprayer output using the following equation:

$$\boldsymbol{gal/1000\ sq\ ft = \frac{136 *\ GPM}{MPH * W}}$$

Parts List

Image	TeeJet Part #	Description
	11990-61	Female X hose shank (1/4" N.P.S. x 3/8 hose)
	4727	Sure Grip Handle - brass
	6466	Trigger Valve - brass
	6671-24	Spray gun extension - curved with fixed body, 24"
	-----	Constant Flow Valve (CF Valve) - G.A.T.E., Jacto, or Chapin; **Must be 11/16' thread**; yellow = 15 psi, Red = 21 psi and Blue = 29 psi
	QJT-NYB	Quick TeeJet - 11/16' thread
	CP25607-4-NY	Quick TeeJet caps - full circle, no alignment notch
	CP18999-EPR	Rubber seal gasket - notched; *order extra to replace worn gaskets
	8079-PP-50	TeeJet Strainer - Polypropylene, 50 mesh; *order extra to replace clogged screens
	See catalog	TeeJet spray tips - air induction XR Flat, air induction, extended range flat, twin flat, flood jet, or **Even** flat (spot treatment)
	----	Hose clamps; crimp type preferred
	----	Thread sealant tape

*Material adapted from https://sustainable-farming.rutgers.edu/backpack-sprayer-modification/

Open House: Tall fescue mowing height and fertility trial.

Trt #	Months Applied	N/app	Total lbs. of N
1	May, Jul, Sep, Nov, & Dec (Holiday)	0.4 lb.	2
2	May, Jul, Sep, Oct, & Nov	0.4 lb.	2
3	May, Sep, Oct, Nov, & Dec	0.4 lb.	2
4	Apr, May, July, Aug, & Sep	0.4 lb.	2
5	May, Jul, Sep, Nov, & Dec (Holiday)	0.8 lb.	4
6	May, Jul, Sep, Oct, & Nov	0.8 lb.	4
7	May, Sep, Oct, Nov, & Dec	0.8 lb.	4
8	Apr, May, July, Aug, & Sep	0.8 lb.	4
9	May, Jul, Sep, Nov, & Dec (Holiday)	1.2 lb.	6
10	May, Jul, Sep, Oct, & Nov	1.2 lb.	6
11	May, Sep, Oct, Nov, & Dec	1.2 lb.	6
12	Apr, May, July, Aug, & Sep	1.2 lb.	6

2020 Tall Fescue - Winter Fertility Trial

Oregon State University

Plot size 5' x 5'

Initiated: September 2020

W--->

	Rep 4		Rep 3		Rep 2		Rep 1	
	11		2		8		1	
	5		7		12		9	
	10		8		11		6	
	4		9		3		10	
	12		1		5		7	
	7		6		9		3	
	1		12		4		11	
	8		3		7		2	
	9		10		1		8	
	2		5		6		4	
	3		11		2		12	
	6		4		10		5	
Mowing	2"	3"	2"	3"	3"	2"	2"	3"

2022 and 2023 OSU Turf Research and Program Supports

Advanced Ag
Columbia Edgewater C.C.
Tokatee Golf Club
Agricultural Research Foundation
A-LIST
AMVAC Environmental Products
Andersons Plant Nutrient Group
AquaYield
Awbrey Glen Golf Club
Bandon Dunes Golf Resort
Barenbrug USA
BASF
Belchim Crop Protection
Bio Ag
Black Butte Ranch
Bob Sherman
Brim
British Columbia Golf Course Superintendents Association
Broken Top Golf Club
Burlingham Trust
Calpris
Canadian Turfgrass Research Foundation
Chambers Bay Golf Course
Columbia Seeds
Control Solutions Inc.
Corteva
Corteva Agriscience
Creekside C.C.,
Desantis Landscapes
DLF Pickseed
DLF Seed Research of Oregon
E Marker A/S
Emerald Valley
EnviroLogic Resources, Inc.
ENVU
Eugene Country Club
Everett Golf and Country Club
Evergreen Golf Course

FMC Corporation
Gearhart Golf
Giustina Family, Trysting Tree Foundation Board
Glen Acres Golf and Country Club
Go Seed
Golf Course Superintendents Association
Gresham Country Club
Gwen Stahnke
Harrell's LLC
Heritage PPG
Hunter Industries
Ilahee Hills Country Club
Kemper Sports
Koch Agronomic Services LLC
Land Mark Seed
Langdon Farms
Langdon Farms Golf Club
Lowell School District
Marion AG Services
Mattison Turf Works
Middlefield Golf Course
Milliken & Company
Mountain View Seed
National Turfgrass Evaluation Program
Northern California Superintendents Association
Northwest Turfgrass Association
NuFarm Americas Inc.
Ocean Organics
Ontario Turfgrass Research Foundation
Oregon Department of Agriculture
Oliver Family
Oregon Golf Club
Oregon Golf Course Superintendents Association
Oregon Metals Initiative
Oregon Seed Association
Oregon Tall Fescue Commission
Oregon Tool
Oregon Turf Foundation
OSU Ecampus

OSU Foundation
OSU Grounds Department
OSU School IPM Program
Oswego Lake Country Club
Pacific Golf and Turf
Pacific Landscape MGMT
Pacific Sports Turf
PBI Gordon
Petro Canada Lubricants
Planet Turf
Plant Peak Genetics
POGO, powered by Stevens
Portland Parks and Recreation
Prime Source
Pronghorn Resort
Pumpkin Ridge Golf Club
Pure Seed
Quail Run Golf Course
Rainbird
Royal Oaks Country Club
Salmon Run Golf
Santaluz Golf Club
Scott Larsen
SePro Corporation
Sharon Heights Country Club
Simplot
Smith Seed
Stewart Meadows Golf Course
SunRiver Resort
Syngenta Crop Protection, Inc.
Target
TeeJet
The Lawn Institute
Tigard and Tualatin School District
Tokatee Golf Club
Tom Cook
Trysting Tree Golf Course
Tualatin C.C.
Tumwater Valley Country Club

Turf Star Western and the Toro Company
United States Department of Agriculture – Specialty Crop Research Initiative
United States Golf Association
United States Department of Agriculture - Agricultural Research Service
Valent, Mycorrhizal Applications
Washington State Pesticide Registration
Waverley Country Club
Western Canada Turf Association
Widgi Creek Golf Club
Wilbur-Ellis Company

2022 and 2023 Awards and Scholarships

2022	Jason Oliver Golf Tournament Champions	Kurt Wright, Joseph Seevers, and Mike Turley
2023	Friends and Alumni Award	Barb Trammell, and Charles Wolsborn
2023	OTF - Whitworth Scholarship	Emily Braithwaite
2023	OTF - Martin Scholarship	Riley Edgar, Brayden Webb, Naia, Evans
2023	Jason Oliver Memorial Scholarship	Emily Braithwaite
2023	Bruce Faddis Scholarship	Naia Evans
2023	Tom Cook Legacy Scholarship	Brayden Webb