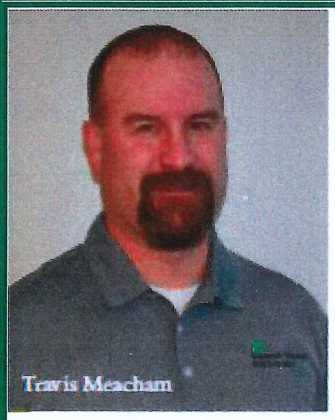
Washington Turfgrass Seed Commission

2018-2019
Annual Report & Research Reports

Washington Turfgrass Seed Commission

2018-2019 Annual Report and Research Book

In This Issue


Travis Meacham

The Washington State Turfgrass Seed Commission has been working hard this past year to create a meaningful return on the assessments that the growers pay. We have been actively creating opportunities to help educate the people of our state about the Turfgrass Seed industry.

We are going out into the public and letting them know what the value of grass is in our community. The commission has been partnering with a couple of marketing firms to determine the best way to reach and educate the people about our product. We are sponsoring social events throughout the state at golf courses and other high turfgrass use areas. These events create a great chance for the public to get together with growers and industry experts to help better understand the quality of product we grow in this state.

Giving tools to our growers to grow a better crop is still our number one priority. Just like we have for the past 20 years we will continue to fund research projects that help solve challenges for the growers of this state. We are always looking for the most up to date concerns that the growers have and will continue to seek out people to help us solve them. If you have any issues that we can help with please let us know.

The commission is going to continue to move forward with helping the growers of this state. We are always open to ideas and comments.

Thanks ~ Travis Meacham, Chair, WA Turfgrass Seed Commission

Washington State Department of Ag
SEED CORNER

We are pleased to announce that after a competitive recruitment process, Paula Moore has accepted the role as Seed Program Manager, effective August 1st. Paula has a Master of Science in Agriculture degree from Washington State University and has been acting Seed Program Manager since August 2018. Paula started with WSDA in 2014 as the Field Certification Supervisor. Prior to her roles at WSDA, Paula worked in various roles at WSU with a majority of her time being at the USDA –ARS Western Regional Plant Introduction Station in Pullman where she gained Lab Analyst experience as a Germination Technician.

Over the last year the Seed Program has had several personnel changes and the length of time without a permanent Program Manager may have caused industry to have concerns on the direction of the Seed Program. However, we are confident that Paula will be dedicated and diligent as the program moves forward in a positive, customer service driven manner. Over the next several months Paula will be focusing on proactive customer communication that includes reestablishing the Seed Advisory Board, sending out regular program newsletters, and one-on-one customer meetings to ensure the program is meeting industry needs and expectations. Additionally, Paula will be focusing on succession planning within the seed laboratory and identifying training and development needs of staff to ensure timely and consistent service. Congratulations Paula!

Washington Turfgrass Seed Assessment

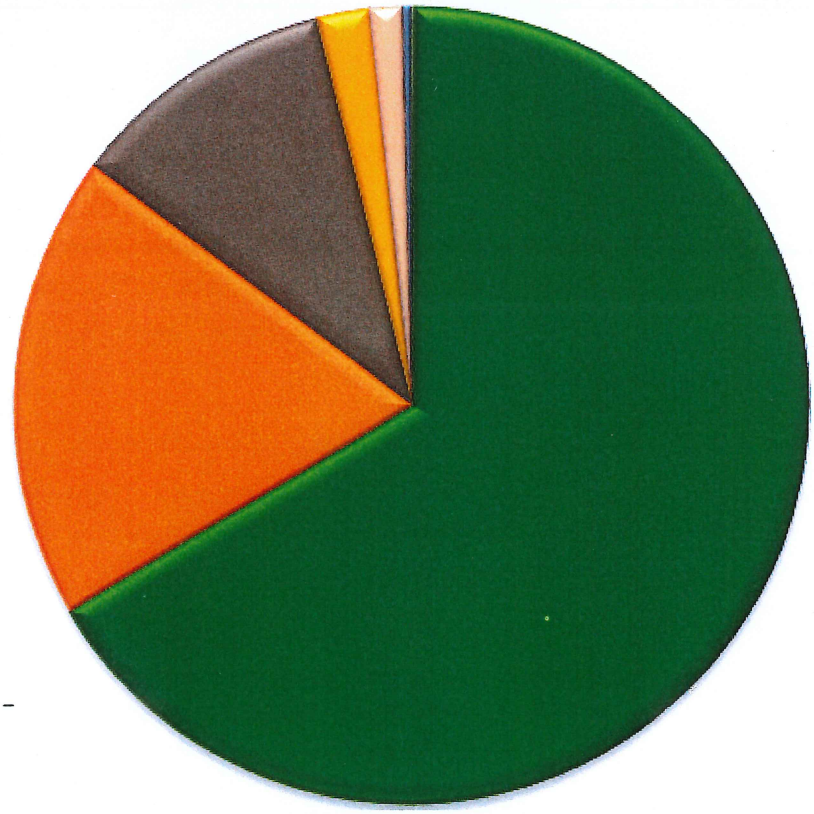
The Washington Turfgrass Seed Commission collects 0.3% (three tenths of one percent) on the net receipts on all Kentucky Bluegrass, perennial ryegrass, tall fescue, hard fescue, slender fescue and creeping red fescue from production areas east of the summit of the Cascade Mountains in Washington state. The money is collected at the first point of sale and is deducted from the price paid to the grower. The person or company collecting the assessment on behalf of the grower submits the assessment to the WTSC.

Assessment dollars are used in the following three ways:

1	2	3
Provide for RESEARCH in the production, processing, irrigation, transportation, handling and distributing of turfgrass seed.	Provide for COLLECTION & DISSEMINATION OF INFORMATION pertaining to turfgrass seed and turfgrass seed by-products, including programs to market and promote turfgrass seed production in Washington.	Establish and conduct PROGRAMS to develop markets for turfgrass seed by-products.

2018-2019 FY Financials

- Research ($100,815.00 - 66.39%)
- Education & Outreach / Marketing ($28,622.18 - 18.85%)
- Administration ($16,249.92 - 10.75%)
- Total State of Washington ($3,289.44 - 2.17%)
- Meeting & Travel ($2,065.11 - 1.36%)



Total assessment collected in 2018-2019 $149,777.25

WASHINGTON TURGRASS SEED COMMISSION

PROGRESS REPORT

Project No.: 3390

Title: Integrating New Tools for Grass Weed Control in Kentucky Bluegrass and Perennial Ryegrass.

Personnel: Raul Arryo, Graduate Research Assistant

Accomplishments:

- Both indaziflam and pyroxasulfone are effective herbicides for managing the most common problematic grass weeds in turfgrass seed production.
- Revised trials were initiated to determine the feasibility of using pyroxasulfone and indaziflam for weed management in turgrass for seed.
- Revised trials were also initiated to study the effect of GA on turfgrass stand establishment and seedbank management.
- A laboratory assay was developed to study turfgrass cultivar sensitivity to indaziflam.

Results:

In August and September of 2017, multiple field trials were established to examine the effects of field applications of GA on grass weed seed germination and seedbank depletion during establishment and to identify herbicide systems combining pyroxasulfone (Zidua) or indaziflam (Alion) with mesotrione (Callisto) to provide an integrated management plan leveraging our understanding of seed dormancy and seedbank management with herbicide physiology and targeted herbicide use, rather than relying on herbicides alone. Our first year results suggest: 1) that PRE applications of pyroxasulfone or indaziflam in combination with mesotrione provide complete control of downy brome, rattail fescue, alkali grass, and annual bluegrass eight weeks after treatment. However, both Kentucky bluegrass and perennial ryegrass germination and stand establishment are also inhibited, 2) while turfgrass emergence was impacted by PREs, both varieties of perennial ryegrass appeared to have some natural tolerance to both pyroxasulfone and indaziflam, and 3) all grass species tested responded to GA applications.

A revised set of trial were initiated in September 2018 to correct the doses used in September 2017, and to revise our approach understanding how to use GA in turfgrass for seed. Those trials were not sufficiently established to determine if our new strategies were appropriate – seedling establishment was slower than anticipated. Early ratings indicate that carbon seeding appears to be an effective strategy to achieve selectivity with pyroxasulfone and indaziflam. GA treatments also appear to have stimulated germination of the turfgrass species. When stands have matured, we'll have a better sense of how would modify our approach. We plan on initiating trials in the spring to speed the learning cycle.

Publications:

Arryo, R., K. Sanguinet, T. Lehman, and I. C. Burke. 2019. A root growth assay to determine dose-response of weeds and crops to indaziflam. In *Proceedings of the Western Society of Weed Science*.

WASHINGTON TURFGRASS SEED COMMISSION

PROGRESS REPORT FORMAT FOR 2018 PROJECTS

Project No.: WSU ACCOUNT# 13C-3019-6780

Title: Characterization of vernalization genes and flowering in Kentucky Bluegrass

Personnel: Michael M. Neff Ph.D. (PI), Gaganjot Sidhu (Postdoc) and Xin Xin (Graduate Student)

Reporting Period: 7/16/18 – present (4.0 months)

Accomplishments: In the first year of this project, John Hadish, a rotating Molecular Plant Sciences (MPS) graduate student cloned fragments of two flowering time genes, *VRN1* and *VRN3*, from the KBG genome. A new postdoc, Dr. Gaganjot Sidhu, and a MPS graduate student, Xin Xin joined the Neff lab in July and August 2018, respectively and began working on this project. Xin is supported by a scholarship from the China Scholarship Council, requiring only $2500/semester plus summer salary coming from this project. As a result, this project can now support two scientists, working as a team. In the past three months, Gaganjot has identified nine publicly available KBG transcriptomic/genomic studies. With this resource, Gaganjot has performed *in-silico* studies to identify *VRN* genes from KBG using wheat *VRN1*, *2* and *3* coding sequence as a reference. Gaganjot, Xin, and Evan Stowe (an undergraduate student working in the Neff lab) have identified a total of eight copies of *VRN1*, three copies of *VRN2*, and two copies of *VRN3* genes in KBG. Gaganjot and Xin have also designed primers to perform wet lab experiments to validate the *in-silico* studies. They have also started both growth chamber and vernalization chamber/greenhouse experiments to examine the expression of these flowering genes as outlined in this proposal.

Results: Using the transcriptomic reads ranging from 41 to 555 million in individual studies, eight structural copies of *VRN1* were identified. Unlike *VRN1*, only three copies of *VRN2* and two copies of *VRN3* were identified, most probably due to reduced number of reads available for these genes. These results also suggest that *VRN1* has a higher expression level compared to the other two genes. Gaganjot and Xin are using *in-silico* and wet lab experiments to validate the sequence and copy numbers of these genes. This will also facilitate in creating an expression atlas of *VRN* genes in KBG for different developmental stages and biotic as well as abiotic stress treatments. In addition, Gaganjot and Xin will continue to clone these and other known flowering related genes from varieties Jumpstart and Barsweet as well as the wild Alaskan accession described in our proposal in order to compare their sequences with the identified sequences from other KBG accessions. The *in-silico* and cloned sequences share high degrees of similarity with orthologous gene sequences previously characterized from *Hordeum vulgare* and several *Triticum* species. This is in accordance with past research that indicates there is a high degree of conservation in VRN1 (Shinozuka et al. (2013). A growth chamber study consisting of Jumpstart, Barsweet and an Alaskan accession was also initiated along with control accessions Aspen, Midnight, Park, and Trenton. After giving a start chamber treatment of 6 and 8 weeks, the plants are now in the vernalization chamber and the data and tissue collection is in progress.

Publications: None at this time.

WASHINGTON TURFGRASS SEED COMMISSION
PROGRESS REPORT FOR 2018 PROJECTS

Project No.:

Title: Integrated Disease Management of Ergot in Kentucky Bluegrass

Personnel: Jeremiah Dung, Oregon State University (OSU), Madras, OR; Kenneth Frost, OSU, Hermiston, OR; Qunkang Cheng, OSU, Madras, OR; and Darrin Walenta, OSU, La Grande, OR.

Cooperators: Jory Iverson, Paul Hedgepeth, Scott Davis, Mike Hawman

Reporting Period: July 2018-November 2018

Accomplishments:

Fungicide treatments reduced ergot incidence by 28 to 76% and ergot severity by 45 to 84% compared to the non-treated control. Inquiries have been made with product representatives regarding potential labeling of ergot and results will be submitted to Plant Disease Management Reports for publication. Effects of treatment with plant growth regulators on ergot severity was variable and depended on the cultivar. Significant differences between treated- and non-treated plots were only observed for three cultivars. Additional data would be required to determine if these observations are consistent over several cropping seasons. Compared to last year, spore production occurred much earlier in 2018 and inoculum was detected at all sites by late April. This year, the predictive degree-day period occurred between May 13 and May 31 as compared to May 22 and June 13 in 2017. The model only accounted for 52% of the total spores captured at HAREC and 26% of spores at a commercial field in the Columbia Basin. Fourteen Ergot Alerts were distributed in a mobile-friendly blog format between April 25 and June 25, 2018. Ergot incidence was low at HAREC field plots, preventing the evaluation of the fungicide application programs. Together, this research contributes towards the development of comprehensive integrated disease management strategies for ergot in grass seed crops of the Pacific Northwest.

Results:

Objective 1: Screening new fungicide chemistries for ergot control during anthesis.

Two fungicide trials were established at the Central Oregon Agricultural Research and Extension Center in Madras, OR. Five fungicide treatments and a non-treated control were compared in both trials; Quilt Xcel SE was used as an industry standard. A significant effect of fungicide treatment was observed for ergot incidence and severity in plots of Blue Ghost ($P = 0.0002$) and Shamrock ($P < 0.0001$). Trivapro SE®, Quilt Xcel SE®, Aproach 2.08 SC®, and A19649B significantly reduced ergot incidence and severity in Blue Ghost compared to the control, and none of the fungicides were significantly different from the industry standard Quilt Xcel SE. All of the fungicide products significantly reduced ergot incidence and severity in Shamrock compared to the non-treated control. Compared to the non-treated control, fungicide treatments reduced ergot incidence by 28 to 76% and ergot severity by 45 to 84% depending on the cultivar. Ergot was not detected in any fungicide plots located at the Hermiston, OR site, so product evaluations could not be performed. Powdery mildew and rust were only detected at trace levels in plots this year, preventing the evaluation of these products for mildew and rust control in grass grown for seed.

Objective 2: Effect of plant growth regulators on ergot. A field trial was established in second-year plots of Kentucky bluegrass. Sixteen cultivars were evaluated for ergot with and without the application of Palisade® (24 oz/A). A significant interaction ($P = 0.04$) was observed between cultivar and plant growth regulator treatment on ergot severity, suggesting that treatment with Palisade either increased or decreased ergot severity depending on the cultivar. Of the 16 cultivars, a significant difference in ergot severity between treated- and non-treated plots was only detected in three cultivars ('Geronimo', 'Jumpstart', and 'Right'), all of which had higher ergot levels in treated plots.

Objective 3: Developing and testing predictive models for improved ergot control

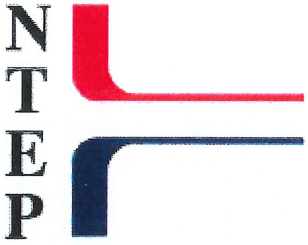
Regional model improvement and validation. A new site north of Pasco was added to the trap route in 2018, for a total of seven spore traps in central Oregon (1), the Columbia Basin of OR (2) and WA (2), and La Grande, OR (2). Spore production occurred much earlier in 2018 and inoculum was detected at all sites by late April. Between 993 and 9,253 spores were captured at naturally infested commercial fields between April 18 and June 14. The previously published predictive degree-day period occurred between May 13 and May 31 as compared to May 22 and June 13 in 2017. The model accounted for 52% of the total spores captured at HAREC and 26% of spores at a commercial field in the Columbia Basin.

In previous years, the Ergot Alert Newsletter was distributed as a .pdf via e-mail to growers and stakeholders to provide spore counts from statewide trapping efforts, prediction model updates, and regionally-focused disease management recommendations. In 2018, the Ergot Alert Newsletter was instead distributed in a blog via the OSU COAREC Ergot Alert Blog (http://blogs.oregonstate.edu/coarecplantpathology/?cat=1269982). The blog allowed for more frequent and timely updates to stakeholders in a mobile-friendly format. In all, fourteen Ergot Alerts were posted on the Ergot Alert Blog between April 25 and June 25, 2018. We also integrated our recently published quantitative PCR method to assess spore counts from field samples; the technique proved to be faster and more sensitive than the microscopic methods used in previous years.

Evaluation of a model-based fungicide program for ergot. Two trials consisting of replicated (4) plots of Kentucky bluegrass and perennial ryegrass were established at HAREC. Each trial consisted of four fungicide application programs: a predictive degree-day model program (applied May 11 to both trials); a calendar-based program following the average degree-day period from 2000-2017 (applied May 14 to both trials); a scouting-based program based flowering onset as observed in the field (applied May 7 to perennial ryegrass and May 17 to Kentucky bluegrass); and a non-treated control. Abound® was used for all fungicide programs. Unfortunately, ergot incidence was low overall and the disease only detected on one flower spike of perennial ryegrass, prohibiting the evaluation of the fungicide application programs on the two crops.

Acknowledgements and Other Funding:

Additional funding for this research was provided by the Oregon Seed Council, the Columbia Basin Grass Seed Association, and the Union County Grass Seed Growers. The researchers would like to thank the following companies for providing in-kind support: BASF, Bayer Crop Science, Central Oregon Seeds, Inc., Columbia River Seed, Syngenta, DuPont, and Riverview Seed. The technical support provided by Javier Almaguer, Hoyt Downing, Kelly Duggan, Travis Klopp, and Tim Weinke, was greatly appreciated.



NATIONAL EVALUATION OF COOL-SEASON TURFGRASS WATER USE AND DROUGHT RESISTANCE

Annual Progress Report – May 31, 2019
Washington Turfgrass Seed Commission

ABSTRACT

This is an exciting new project that evaluates, through a nationwide trial, Kentucky bluegrass and tall fescue for their water use and drought resistance. Data generated from this project will be used to identify, label and certify low-water using cool-season grass cultivars for use on lawns, parks, athletic fields and golf courses. We were awarded $35,000 per year for three years ($105,000 total) to help with the funding of this project.

Kevin Morris, NTEP and Dr. Michael Kenna, USGA

BACKGROUND AND UPDATE

As discussed at previous WTSC meetings, the United States Golf Association (USGA) budgeted considerable funding to conduct a national water use and drought tolerance trial, utilizing the National Turfgrass Evaluation Program (NTEP) as its evaluation organization. USGA funded the building of rainout shelters and irrigation infrastructure at several locations, and is working with NTEP in determining testing protocols, data collection methods, etc. Besides data collection on water use and drought resistance parameters, the goal of this effort is for the EPA Water Sense program to adopt these (or similar methods) and to agree to certify the first plant species with the Water Sense label. USGA has become a Water Sense partner and we have talked to the Water Sense staff about certifying grasses. EPA is very interested in the concept (they have never certified a plant or plants as water saving) as USGA Green Section Research Director Dr. Mike Kenna and I have met with them to discuss collaborative efforts. However, EPA needs to see more about the methods and tests, as well as we believe, some successful trials. Also, they will need our help in solving some legal requirements when certifying a product (could be unique for plants, however). Attachment A is our proposal that was submitted to WTSC and chosen for funding.

Because of space limitations (only around 30-35 entries can be accommodated), we limited the trial to only Kentucky bluegrass and tall fescue. We chose tall fescue over perennial ryegrass because of more interest from seed companies in submitting entries (than perennial ryegrass). Fortunately, when our deadline passed, we had received 32 entries (14 bluegrass, 18 tall fescue). We added three standards to the trial (one each of Ky. Bluegrass, tall fescue and perennial ryegrass). See Attachment C for the list of entries and sponsors.

Most locations planted the trial in fall 2016, while a few had to wait on infrastructure improvements (mostly irrigation), and therefore will plant in spring 2017. Planting plans were developed for both Approach 1 and 2 sites. Drought treatments were initiated in 2017 on those locations with mature plots.

Rainout shelters were ordered and delivered in spring 2017 to each of the five Approach 1 sites. Installation was performed by staff at each site. As a part of the grant agreement, NTEP returned a portion of the funding allocated for rainout shelter purchases back to each researcher to help with installation and other initial expenses. Approach 2 sites received

$15,000 initial set-up costs for irrigation installation and/or other expenses.

After the initial development of protocols, we have continued to meet with our cooperators to examine and tweak these protocols. This process is ongoing as we see what works, and what does not work, making additional changes to procedures, if necessary in the future.

The cost to run each trial location is high, and only a portion of that is covered by USGA's donation ($250,000). Therefore, we sincerely appreciate the support received from WTSC for the initiation of this trial. Without your support, this trial would not be conducted.

The first data from the cool-season trial was collected in 2017 at six of the ten locations.
Four Approach 1 (shelter) locations collected data during a 100-day induced drought period, and in some cases, large differences were noted in amount of water used by entries, however very little statistical differences were noted among entries. For 2018, we changed the re- watering procedures threshold to 65% green cover, as well as expanded our statistical analysis for all sites to include separate Kentucky bluegrass and tall fescue tables. In 2018, all ten sites collected data.

APPROACH 1

Rain exclusion shelters are used to simulate 100-day drought periods in higher rainfall regions. Under the rain exclusion shelters we measured the amount of water needed to maintain 65% green cover (changed from 50% in 2017), rate turfgrass quality as well as evaluate recovery from drought when irrigation is resumed.

Irrigation amounts needed to maintain 65% green cover varied significantly among entries, and in some cases was more than double the best entry. However, the changes made to our re-watering threshold, as well as our statistical analysis resulted in virtually no statistical differences at Griffin, GA, Amherst, MA and Fayetteville, AR, even though in some instances large differences in amount of water used were evident (range = 4.3 to 72 mm). At College Park, MD statistical differences were noted, mainly among the Kentucky bluegrass entries, with 'BAR PP 110358', 'PST-KS-13-141', Blue Devil', 'NAI-13-14' and 'NAI-13-132' the top entries.
'BAR PP 110258' used less water than many of the tall fescue entries (169.3 mm). Tall fescues using the least water at College Park, MD (156.7 – 1.69.3 mm) include 'RS4', 'Catalyst', 'Monet', 'LTP-SYN-A3' and 'Titanium LS'.

The greatest entry separation in any Approach 1 (shelter) site was noted at West Lafayette, IN. Like most sites, the tall fescues, in general, needed less water to remain green than most bluegrasses. However, at West Lafayette there is a great range of performance, from 161 – 317.7 mm for tall entries, 216 – 313.7 mm for Kentucky bluegrass. Tall fescues with the least water required at this site in 2018 include 'DLFPS-321/3678' (161 mm), 'DLFPS- 321/3677' (173.7 mm) and 'RS4' (175.7 mm). For bluegrass at West Lafayette, 'Barrari' (216 mm), 'NAI-13-132' (216.3 mm) and 'NAI-13-14' (228.7 mm) used the least water in 2018.

APPROACH 2

The drier climate ETo-based sites evaluate performance at three deficit irrigation levels for 100-120 day periods. Data recorded includes percent green cover over time, turfgrass quality and recovery rate after sufficient irrigation is applied. The ETo-based locations allow us to determine the minimum level of deficit irrigation appropriate for, and thus the water savings from each entry. It was determined that 80, 60 and 40% ETo replacement levels would be utilized again in 2018, except for the St. Paul, MN site which would utilize 0, 25 and 75% ETo replacement (due to its far northern location).

In 2017, only Approach 2 sites at Riverside, CA and Las Cruces, NM collected data. In 2018, all five sites collected data, with four locations (Riverside, Las Cruces, Fort Collins, CO and Logan, UT) running irrigation at 40, 60 and 80% ETo replacement and St. Paul, MN using 0, 25 and 75% ETo replacement, while adjusting for any rainfall received during the 120 day drought period.

At Riverside, the 40% ETo irrigation regime was very harsh on all entries, with no entry delivering even acceptable lawn turf quality ratings (6.0+) throughout the drought period, or even minimally acceptable turf quality ratings (5.0) 60 days into the drought period. Turf quality ratings averaged over the entire season at 40% ETo replacement showed all entries with 5.0 score or higher. The 60% ETo replacement regime did not show a single entry with an acceptable mean turf quality rating (6.0) at end of the season, including recovery time. The 60% regimes did show some statistical significance among some Kentucky bluegrass entries, but not tall fescue. The 80% ETo regime, which is considered adequate replacement of ET lost for cool-season grasses, did some show entries with acceptable turf quality averages, but with no statistical difference among Kentucky bluegrass or tall fescue entries.

The Las Cruces, NM site, while being hot during summer, is not quite as harsh as Riverside (maybe due to some summer rains), which elevated some quality ratings to acceptable levels. Statistical significance was only noted between the top bluegrass entry ('PST- K11-118') and the lowest entry ('Midnight') at 40% ETo. No statistical significance was seen at the 60% level, while several entries performed statistically better at the least harsh, 80% ETo.Statistical significance among tall fescue was not seen at the 40% and 60% ET levels, but was noted at the 80% level. At the 80% ETo level, the top performing Kentucky bluegrasses were 'NAI-13-14', 'NAI-13-132', 'Blue Devil' and 'Midnight'; the top tall fescues were 'Thor', 'MRSL TF15', 'DLFPS-321/3678', 'RS4', 'Thunderstruck' and 'Titanium LS'.

Greater statistical significance was noted, among all ET levels at Logan, UT, however no Kentucky bluegrass performed at the acceptable lawn quality level for the season average, many falling below even the minimally acceptable quality score for low maintenance (5.0).

Overall, tall fescues performed better with 'Thunderstruck', 'DLFPS-321/3679', 'LTP-SYN-A3' and 'RS4' in the top turf quality statistical group under the 40% ETo replacement (turf quality scores of 5.7, 5.5, 5.3 and 5.2 respectively). Less, but still some statistical significance was noted at the 60% ETo regime with no statistical differences seen in tall fescue mean turf quality scores at 80% ETo.

In the first Fort Collins, CO data, an interesting and different effect from the ET regimes was noticed. The perennial ryegrass control entry that is included in the trial was one of the lowest, or the lowest performing entry at each site, with the exception being Fort Collins.

Under every ET regime, both for Kentucky bluegrass and tall fescue, the perennial ryegrass control entry was the top entry, in some cases statistically better than all entries. At the very least, the perennial ryegrass entry was statistically better than most tall fescue and bluegrass entries.

Besides the perennial ryegrass performance, 'PST-K13-141' and 'PST-K11-118' Kentucky bluegrass were consistently good at all three ET levels. For tall fescue, 'PST-5SDS' was the top entry under 40% ETo, while 'Catalyst', 'DLFPS-321/3678' and 'PST-R511' were also among the best performing entries under the three irrigation regimes.

The fifth reduced irrigation site, St. Paul, MN, utilized a modified ETo schedule of 0, 25 and 75% replacement. Moderate statistical significance was noted under the three irrigation regimes, with tall fescue scoring higher overall than Kentucky bluegrass. Under the 0% and 25% regimes, no bluegrass entry finished with an acceptable lawn turf quality rating (6.0).

Consistently rating near the top under all three levels include bluegrasses 'Blue Note', 'Blue Devil' and 'PST-K3-141". Conversely, almost every tall fescue entry finished with an acceptable turf quality rating under all regimes at St. Paul. Some of the best tall fescues under each ET level include 'Nonet', 'DLFPS-321/3678' and 'PST-5SDS'.

Data from 2017 can be found here: http://www.ntep.org/reports/cs16w/cs16w_18- 2.htm. As of this writing, data from 2018 will be available on the NTEP web site soon. 2019 data is being collected now and will be available in spring 2020.

SUMMARY AND CONCLUSIONS

In red are answers to the objectives and deliverables:

Objectives
The objectives of this trial are the following:

1.Determine the 100-day, summer water use of cool-season turfgrass species and cultivars. We have two years of data from six sites, and one year of data from four sites. We need three years of data to determine actual water use rates. We have however seen large differences among some entries, but not as much statistical significance as we would like to see thus far. We have adjusted our protocol slightly and it may need more tweaking. We are collecting data in 2019 and will again in 2020 for some sites.

2. Determine turfgrass recovery of grasses after 30 days and 60 days without water. Recovery has been measured but as stated in question 1 above, not as much statistical significance has been noted as we would like.

3. Determine the %ET replacement required by each entry to maintain a prescribed level of green or quality. Similar to question 1, we have only two years of data from two sites, and one year of data from four sites. We are continuing this project to obtain three years of data from all sites. One thing we can say is that all sites are not created equal, for example, the lowest (40%) and medium (60%) ET replacement did not deliver any acceptable entries at Riverside, CA, which means more breeding is needed for these grasses to be used with less water at an environment such as Riverside. At other sites, such as Las Cruces, NM, 60% ETo did show some entries with acceptable performance, probably because some summer rains occur there. Again, we do not have enough to data to answer this question definitively.

4. Develop requirements for water use and drought tolerance/recovery to be certified as a low-water use turfgrass. See answer to questions 1 and 3…we need three years of data to make determinations.\

5. Work with U.S. EPA WaterSense® or another organization to develop and apply a national water saving certification to qualified turfgrasses. We are in contact with the WaterSense office, but since EPA has been struggling with funding (Pres. Trump's first two budgets have proposed a 40% reduction in the overall EPA budget, including elimination of WaterSense), it has been impossible for WaterSense to move forward with turfgrass certification. However, we did help and support Congressional authoriza-

tion of WaterSense, which passed last year. Authorization helps protect the WaterSense program from elimination while also allowing EPA to request separate WaterSense funding in their budget requests (they have never had a separate budget line item for Water Sense, which has restricted the program's growth).

Deliverables

1. Data will be collected on the actual amount of water needed (inches) and ET replacement levels from multiple locations need to maintain turfgrass entries at a specified quality level or prescribed level of green cover. This data will be collected for three years (2017-2019) at multiple locations across the U.S. See answers above, but we are working on this and will have a better idea when three years of data is collected from all sites.

2. The data collected will be published each year on the NTEP web site (www.ntep.org) in the same manner as other NTEP data sets. Data from year 1 (2017) is on the NTEP web site and as of this writing, data from year two is almost complete (we have over 250 pages of data tables to edit and publish for just the 2018 data from this trial). 2018 data should be on the NTEP site soon. 2019 data (being collected now) will be available in spring 2020.

3. We will work with EPA WaterSense® or another organization to develop a national certification/ labeling program for low-water using turfgrasses. This program will be used to certify/label those entries that meet the requirements prescribed in advance for qualification of the label. See answer to question 5 above.

4. The certification program will be promoted and encouraged for use by water utilities, municipalities, golf courses, athletic field complexes, grounds managers and homeowners. Again, this is dependent on getting EPA Water Sense in a position to certify turfgrass (question 5 above). Also, we need to make sure our technique is scientifically sound enough to be repeatable.

5. A yearly progress report will be provided to the WTSC from NTEP. This report should be delivered to the WTSC Administration via email, no later than December 15 of each year. We did not have any data analyzed by Dec. 15, but this is the progress report (or final report) considering the latest data we have (2018). We can provide progress reports in spring 2020 and 2021 (for 2019 and 2020 data).

DR. MICHELE DACOSTA, UNIV. MASSACHUSETTS IN THE APPROACH 1 PROJECT AT AMHERST, MA, JULY 2018

FT. COLLINS, CO - 80% ET LEVEL IN FRONT, NOTE 40% ET LEVEL IN

2019 - 2020 WA Turfgrass Seed Commission Funded Research

The Washington Turfgrass Seed Commission has funded the following projects for Fiscal Year 2019.

- Characterization of vernalization genes and flowering in Kentucky Bluegrass
  Michael M. Neff, WSU
- Integrating New Tools for Grass Weed Control in Kentucky Bluegrass and Perennial Ryegrass
  Ian Burke, WSU
- Integrated Disease Management of Ergot in Kentucky Bluegrass
  Jeremiah Dung, OSU
- The Effect of Manure Amendment on Soil pH and Soil Health in Grass Seed Fields
  Ruijun Qin, OSU

Research reports and proposals will be given at the WA Turfgrass Seed Commission's Annual Meeting.

If you have suggestions for future research projects please let one of the Commissioners know.

SAVE THE DATE
Washington Turfgrass Seed Commission Annual Meeting
February 6, 2020

The 2020 Annual Meeting of the Washington Turfgrass Seed Commission will be held on February 6, 2020 in conjunction with the Spokane Ag Expo.

Come hear research reports from those funded by the WA Turfgrass Seed Commission and proposals for 2020.

More Information to come.

www.waturfgrass.org

Grass is Good

Grass...

Is A Natural Filter

Run-off can be reduced by establishing new lawns. The biology of turfgrass makes grass an effective tool for the biodegradation of all sorts of environmental contamination. Turfgrass purifies the water as it moves through the root zone and down into our underground aquifers. Soil microbes help break down chemicals and naturally occurring contaminants. The root filtration system is so effective that rain water filtered through a healthy lawn can be as much as 10 times less acidic than water running off a hard surface.

Reduces Soil Erosion

A thick healthy lawn reduces runoff to nearly zero. Turfgrass is the most cost-effective method for controlling wind and water erosion. Turf roots work to bind the soil more effectively than any other plant because each grass plant has an extensive root system. (Up to 90% of the weight of a grass plant is in its roots.)

Produces Oxygen

Oxygen production is the name of the game for your lawn. Air is cleansed by plants through the process of photosynthesis. Green plants absorb carbon dioxide and water. They use the energy from sunlight in photosynthesis (the plant lives off of the carbohydrates produced by photosynthesis). In numbers, a 10,000 square foot lawn produces enough oxygen to meet the daily oxygen needs of 16 people.

Is Nature's Air Conditioner

On an average Spokane summer day (roughly 83° F), a natural grass lawn will be 30° cooler than asphalt, 40° cooler than an artificial sports turf field, and 14° cooler than bare soil. The lawn of a home has the cooling effect of about nine tons of air conditioning (the average home uses 2.5 tons per 1500 square feet). The cooling effect of irrigated turf reduces the amount of fossil fuels that must be burned to provide electricity which powers air conditioners.

Reduces Your Carbon Footprint

Responsibly managed lawns sequester, or store, significant amounts of carbon, capturing four times more carbon from the air than is produced by the engine of today's lawnmower. To maximize carbon intake benefits, lawns and other turfgrass areas must be actively managed by doing the following:

- Choosing quality turfgrass species right for your area
- Mowing your lawn high to develop deep roots
- Keeping your mower in good shape
- Leave your clippings on your lawn
- Watering responsibly

Sources: BlueGrass Enterprises, The Lawn Institute

Washington Turfgrass Seed Commission

2019 - 2020
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