

## A Recap of Research Day 2018

By Bruce Schweiger, Manager, O.J. Noer Turfgrass Research and Education Facility

The mission of the WTA is to support and promote the research done at the UW-Madison. Turf Research Day is one way they accomplish this mission. This year was no exception to years past.

This was the first time that the WTA board created a committee that took on the role of organizing the entire program. In the winter of 2017 the WTA Board formed a committee of three members to plan the 2018 Turf Day. Josh LePine (Maple Bluff Country Club), Neal Radatz (Hawks Landing Golf Club) and Grayson Harms (Reliable Golf) volunteered and jointly ran this committee. Knowing how much busier their schedules would be during the growing season they set to work lining up speakers very early. By mid-March they had the speakers confirmed. As the year went on they checked in with me to make sure I was doing my tasks by working with the professors for topics and titles for their portion.

Dr. Soldat was again our moderator. He began the day with a very well deserved tribute and moment of silence for the late Dr. Wayne Kussow. Doug then had the pleasure of presenting the 2018 scholarship winners:

- WGCSA James R. Love Scholarship (\$1500.00)-Isaac Zimmerman - Senior Soil Science
- Charles O. Newlin Scholarship (\$1500.00) - Michael Bekken-Ph.D. Soil Science
- WTA James W. Huggett Scholarship (\$1000.00) - Emma Buczkowski, M.S. Plant Pathology
- WTA Scholarship (\$500.00) - Michael Bekken, Ph.D. Soil Science

- WTA Scholarship (\$500.00) - Lily Gonzalez Vazques-Ph.D. Plant Pathology

Congratulations to all of our Scholarship winners!

Of course, there are always a few hiccups. Early in the day, there was an issue getting Dr. Williamson's presentation to load properly for the webinar participants. The amazing part was the presentation was loaded and work perfectly just a minute before, computers. The rumor was that Dr. Williamson had a "bug" in his presentation. He outlined his pollinator project where he and Dr. David Hogg (Professor of Entomology, emeritus) started beehives on multiple courses in southern Wisconsin. This year they educated the courses with bee maintenance and set the groundwork for future research. One interesting note was the amount of honey they harvested from each hive. There was a distinct difference from hives in a more urban area vs more rural hives. We all look forward to some interesting findings from this project.

Dr. Williamson has long talked about what effect herbicide, fungicides, and plant growth regulators might have of the pollinator population. This past year Audrey Simard joined Dr. Williamson's lab as a Masters student. She began her research into what plant protectant products are found in guttation water. How might the product found in the guttation water effect pollinators? She will be looking at other ways our plant protectants might be affecting pollinators. I look forward to a possible presentation of her findings at WTA Summer Field Day and

next year's Turf Research Day.

Our second speaker was Carmen Magro from POGO. He spent time talking about new sensor technologies and the uses in modern-day turfgrass care. As turfgrass managers, the facilities that we maintain have varied microclimates. Changes in our properties can be from one side of the property to the other side or from the front of a green to the back of a green. In the past, we looked at weather data or very location specific data and made some very crucial decisions. With some of the new sensor technologies, there is portability and the possibility to be very location specific. The information gathered allows us to make very specific decisions on turf maintenance practices. The information gathered can be used in a wide variety of ways. Here is a short list.

- Reduce irrigation applications
- Reduce hand watering
- Monitor site-specific nutrient use
- Very accurate reading and repeatable over time
- Track stresses to the turfgrass system in an attempt to remedy before issues happen
- GPS map data collection points and infrastructure
- Allow for more efficient use of GPS sprayer and other new technologies

One issue most managers have is all the information we record, has to be digested and used over time. Another issue is the time needed for interpreting this information. With GPS, Wi-Fi and computer technology all the information gathered can be immediately

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# PRESIDENT'S MESSAGE

## End of a Great Season

By Paul Huggett, Paul's Turf & Tree



Hi WTA members! With the snow on the ground, it's hard to believe that the grass will soon be green. Transitioning from winter to summer seems to be a more common occurrence. Spring is a quick season that is getting shorter and shorter. I was looking forward to a normal start after last years wet spring. The 2018 growing season has allowed us to work ground and get a spring seeding in on March 27 as well as getting a few tree liners planted. Hopefully, our recent freezing weather won't do any harm to our early start.

The slow start to spring has been enjoyable from a personal level. I enjoy reading a little every night. This time of year, I can read a little more since the bedside alarm is not going off at 4 am. I am currently reading *The Oregon Trail A New American Journey* by Rinker Buck. The book is a modern-day story of two brothers with opposing personalities heading west on the Oregon "Trail" in a covered wagon pulled by three mules. The writings cover their relationships, politics of settling the west and finding out the best planning doesn't always work. The constant is having to adapt to equipment, mule, neighbor, food, water, weather and health changes throughout the trip. Searching the multitude of routes for the old parallel wheel tracks long covered up by time. I can't help but ponder their adaptability to the trials we face as turf growers. Our scenery doesn't change as much as theirs but having to be quick on your feet with whatever is thrown at you is very similar.

I took a westward journey as well this winter and headed down to Tucson, AZ for the Turfgrass Producers International Conference. Over

600 attended with growers coming from all over the world. We toured R&R Products; which many of you know as a supplier of mower parts, sod knives and many other industry needed items. A very welcoming "small" family business that values its employees. It was fascinating to see part of their sprawling set of buildings and the modern technology they are using. It's interesting to see the manufacturing process. Some things are highly automated, but things you think would be automated are done by hand.

The field day was hosted by Evergreen Turf, Inc. The outing was like the one we hosted here at the O.J. Noer Facility in Wisconsin. The field day highlight was a Firefly prototype mower that was fully autonomous, no operator needed. Mowing 22 feet wide and using GPS, sensors and programming it operated with out a hitch. A majority of the sod harvesting equipment is designed and produced by sod growers. Confirming the proverb "Necessity is the mother of invention!" as it applies to our labor challenges.

I hope your spring starts of well. ■

### WISCONSIN TURFGRASS ASSOCIATION 2018 OFFICERS

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Paul Huggett '21  
Pauls Turf & Tree Nursery  
5146 Ridge Rd  
Marshall WI 53559  
608-655-3600  
paul@paulsturfandtree.com

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Neil Radatz '21  
Hawks Landing Golf Course  
1602 Waterbend Dr  
Verona WI 53593  
608-206-3991  
nsuperhawks@gmail.com

**Secretary**  
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Reliable Property Services  
5440 Willow Rd # 122  
Waunakee WI 53597  
608-709-5546  
graysonh@rpswi.com

**Treasurer**  
Mark Kienert '19  
Retired  
521 19th Street S  
Wisconsin Rapids WI 54494  
715-697-8067  
tomanpak@wctc.net

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WeedMan  
2211 Eagle Dr  
Middleton WI 53562  
608-824-0043  
brad.debels@weedmanusa.com

**Josh LePine '19**  
Maple Bluff Country Club  
500 Kensington Dr  
Madison WI 53704  
608-249-3468  
joshi@mbcc1899.com

**Aaron Goninen '20**  
Reinders  
4397 Cradle Hill Dr  
DeForest WI 53532  
414-313-5244  
agoninen@reinders.com

**Jake Schneider '20**  
Bruce Company  
PO Box 620330  
Middleton WI 53562  
608-410-2237  
jschneider@brucecompany.com

**Ron Novinska '21**  
Oregon School District  
456 N. Perry Pkwy  
Oregon WI 53575  
608-835-4048  
rjn@oregonsd.org

**Honorary Member**  
Terry Kurth  
Midwest Lawn Care  
2211 Eagle Dr  
Middleton WI 53562  
608-798-1490  
takurth@gmail.com

**Honorary Member**  
Monroe Miller  
Retired  
5524 Sandhill Ct  
Middleton WI 53562  
608-445-4982  
groots@charter.net

Year behind board member name, is the expiration of their current term. January is the month the term is up.

stored and processed. This information is then an instant tool for you and your staff to utilize. This portable technology allows you to take more measurements efficiently and have much more information at your fingertips. As we move to the future plant protectant application is striving for pinpoint use of plant protectants, highly efficient use of water and other resources this new technology is the new super highway to get to where we need to be as soon as possible. Much of this technology can be integrated into everyday practices and might lay the groundwork for an environmentally efficient spray program. Technology is here to stay; the key is how we use it. I believe the way we use this new technology is just scratching the surface. The previous statement is being made by the guy with the eight-track player in his office (don't know what that is, google it).

After a brief break, Dr. Koch updated us on precision dollar spot control. Over the past few years his work with the Smith-Kerns Dollar Spot model has been demonstrating that we can use this model to see actual decreases in dollar spot control applications. In conjunction with Spectrum Technology, multiple weather stations have been installed at the O.J. Noer Facility and University Ridge Golf Course. In time, he will be able to monitor the climatic conditions in various locations around the O.J. Noer and University Ridge Golf Course. Hopefully, when this data is entered into the Smith-Kerns Dollar Spot model he will successfully be able to predict plant protectant needs more accurately. In the early stages of this work, he is observing the most benefits from the spring and fall season on dollar spot control. As this research continues this may change. You can access the Smith-Kerns Model calculator available at [tdl.wisc.edu/dollar-spot-model](http://tdl.wisc.edu/dollar-spot-model) to track the threshold at your property.

After a 22 year break from speaking at the Turf Research Day, Dr. Frank Rossi from Cornell joined us through a distance learning link (more technology). Dr. Rossi updated us on many of his newest and greatest research projects. One topic that golf industry attendees found very interesting was his work on golf shoe spikes and design. With a few slips on the PGA tour and clubs banning some types of spikes and shoes, this is very relevant. He has a graduate student developing a method to create accurate wear patterns on bentgrass areas to very closely mimic the wear and tear on a typical putting surface. His testing for shoe wear are chosen for shoe size, weight, and height. This allows for a good cross-section of the golfing public. He said his results are interesting but do not always make the shoe manufacturers happy.

On non-golf issues Dr. Rossi in doing work with fraze mowing and weed control. The hypothesis is that the seed bank is not throughout the entire root zone. At what depth would you greatly decrease the weed seed population? They have been doing fraze mowing at different depths and following the recovery time and weed re-infestation. These are only a few of the topics Dr. Rossi covered.

After lunch, Kurt Hockemeyer kept everyone awake as he gave the 2017 Turfgrass Diagnostic Lab update. He went through a very nice presentation showing the most often encountered issues, combined with a good discussion of why they exist and how to prevent or control them. The TDL is not just a disease diagnostics lab for professional turfgrass managers. Kurt showed how many of these samples were not disease-related and who submits many of the samples. The number of grass identification samples Kurt examines in a year seemed to amaze a few people. Kurt does a good job of making sure his message is delivered to those involved in a way they understand.

His discussion with a homeowner is much different than with lawn care professionals and golf course managers. Kurt has done a fine job in his first year.

Leslie Ptak from OSHA had plenty of information for the Green Industry. She began with a few slides showing the number of deaths in Wisconsin from mower accidents, it was eye opening for me. Leslie spent her time on a wide variety of subject:

- Lawn mower safety and the standard
- Electronic reports (Form 300A) a business required form not departmental
- The new silica standards
- Fall protection which encompassed more than you think

She provided links to many standards:

Flammable liquids [www.osha.gov/SLTC/firesafety/standards.html](http://www.osha.gov/SLTC/firesafety/standards.html)  
Small Entity Compliance Guide [www.osha.gov/publications/OSHA3911.pdf](http://www.osha.gov/publications/OSHA3911.pdf)

The topic generating the most discussion is the new silica standards. Topdressing and bunker raking are areas where silica exposure would be most often observed. Does topdressing or bunker raking expose staff to silica levels that would exceed the permissible exposure limits? Leslie explained the only way to know is to do silica monitoring. This may not be something that an individual would normally undertake. There is a service in Wisconsin that will do this monitoring for free. The WTA has reached out to the agency and is currently developing a monitoring program. Once the protocols have been established, the agency, with the WTA's assistance, will do some monitoring this summer. Once the data has been collected and interpreted it will be made available to everyone. WisCon and the WTA developed this plan so every course in Wisconsin does not have to undergo monitoring. With the assistance of OSHA, this information can be used by all courses to evaluate their need for respiratory protection and complying with the silica standard.

As the day headed for a close Dr. Soldat gave a brief overview of the work his lab has been conducting this year. Some of this work was conclusions of past work he has reported on at previous Turf Research Days:

- PGR use on sports turf
- Phosphorous research on bentgrass putting greens
- Wetting agent application, new ways to apply wetting agents or are they new

A few of his projects are ongoing and he updated us on the progress:

- Sodium Equation, what was and what is changing
- Herbicide trials

Of all this work the fun one was the Phosphorous "P" trials. Dr. Soldat has presented this for a number of years but this past year the testing recognized that the soil test extraction of "P" does not seem to be declining at a predictable level. With clipping removal, it would appear the "P" levels in the tests should be dropping faster. He discovered that the feldspars in the sands are "P" rich and the plants appear to be extracting the "P" from the rock. The soil test that we typically run for "P" does not detect this "P" source but the turfgrass plants appear to be "mining" out of feldspar or any other rock source with "P". His continued examination of this phenomenon will be very interesting. ■



# White Grubs in 2018: What to Expect?

Dr. R. Chris Williamson, Department of Entomology, University of Wisconsin-Madison

Last year (2017) was an outstanding and ideal (optimal) year for white grubs, likely due to the adequate and conducive moisture levels in the fall of 2016. Most areas in Wisconsin experienced a relatively cool and moist spring, followed by consistent rainfall events throughout the summer. The fall of 2017 was also comparable. These environmental conditions are ideal for the development and survival of several white grub species. Therefore, it is anticipated that white grub populations in 2018 will also be much like that of 2017. In terms of turf damage that may (or may not) occur is contingent on several factors including soil moisture content (influenced by irrigation or rainfall), ambient and soil temperatures, vertebrate foraging activity and insecticide treatment regime.

Preventative applications of insecticides are an excellent means to mitigate white grub damage to turf. Unfortunately, curative (corrective or rescue) control of white grubs is more difficult to achieve compared to preventative treatments as older, larger grubs (2nd and 3rd instars) are less susceptible to insecticide treatments. In the event that turf areas had not been treated preventatively the previous growing season (2017), grub populations may be present in the spring of 2018. Thus, a corrective insecticide treatment may be necessary once soil temperatures reach 50°F in the spring.

Before choosing to make a curative insecticide application, it is important to sample and begin monitoring for white grubs by simply pulling-back the turf and look for grubs where you suspect they may be. If present, a pest management decision must be made as to if

a curative (corrective) insecticide application is necessary. Keep in mind, white grubs are more difficult to control when they are larger (older). Unfortunately, grubs are largest in the late-fall and spring. There are fewer insecticide options for treating white grubs curatively, they are limited to the following: 1) clothianidin (Arena); 2) clothianidin + bifenthrin (Aloft); 3) carbaryl (Sevin); 4) carbaryl + bifenthrin (Duocide) or 5) trichlorfon (Dylox). Even under the "best or optimal" conditions, these aforementioned insecticides will likely provide up to about 75% control.

A more effective management approach would be the application of a preventative insecticide application between late-May to late-July/early-August for the next generation of white grubs (next year), especially if you have a history of white grub problems. Preventative insecticides typically provide measurably higher control (> 90%) compared to curative or rescue insecticide treatments previously mentioned. Several preventative insecticides are available, they include: 1) chlorantraniliprole (Aceylepryn); 2) cyantraniliprole (Ferenze); 3) clothianidin (Arena); clothianidin + bifenthrin (Aloft); 4) dinotefuran (Safari or Zylam); 5) imidacloprid (Merit and various other post-patent products); and 6) thiamethoxam (Meridian). Regardless of the product, formulation, timing or approach (curative or preventative), ALL white grub control products (insecticides) MUST be watered or irrigated-in with an appropriate amount (about 0.15 – 0.25 inches) of post-treatment irrigation in order for the insecticide to reach the target and provide maximum efficacy (control). ■



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# Meet the Graduate Student

By Michael Bekken, Soils Department, University of Wisconsin - Madison

I arrived in Madison this past September to start graduate work with Dr. Doug Soldat here in the Soil Science Department at UW-Madison. I was able to attend the WGCSA annual meeting earlier this spring and enjoyed getting to know the organization and its members a bit. I am very happy to be part of the Best Management Practices (BMP) committee that Josh LePine is leading and think that project will be able to yield great results.

I grew up most passionate about the outdoors, the natural world, and golf. I decided when I was relatively young that I wanted to try and combine these passions into a career. I'm from Virginia and attended William and Mary where I studied Biology and Geology and played on the golf team. After finishing my NCAA eligibility, I spent a year as an exchange student at University of St. Andrews in Scotland. Living in the historic village, learning about Scottish culture, meeting people from all over the world, was an experience of a lifetime for me. I was able to play on the St. Andrews golf team and enjoyed playing the Old Course many times that year.

The following summer I interned at the R&A in St. Andrews, working for their sustainability department. I helped the R&A undertake initial research for an urban golfpark concept, and also helped with their sustainability initiative for the Open Championship, which just happened to be in St. Andrews that summer (2015). My most memorable experience at the R&A came on a rainy morning the day before the Open was set to start. My boss was hosting a meeting across town and as it turned out, our taxi didn't show. As we were leaving our offices, I just so happened to pick up an especially heavy and seemingly indestructible case that was amongst other various boxes and presentation materials that we needed to take with us. We ended up scrambling across town getting soaked in the rain, each of us awkwardly carrying as much as we could. The large black case that I picked up was so heavy that I had to put it down several times and switch the arm I was carrying it with. When we finally reached our conference room my boss opened the case. My heart skipped a beat when I first caught a glimpse of what was inside. I had carried the Claret Jug across town.

Shortly after finishing at the R&A I accepted a position at the Golf Environment Organization (GEO), a non-profit that is also based in Scotland. While at GEO I helped with their *OnCourse* platform, which is an online software that helps golf managers communicate their environmental and social value to both their local community and the world. The platform can also be used to apply for *GEO Certified*, a program that helps golf courses continuously achieve greater sustainability in the areas of Nature, Resources, and Community. *GEO Certified* is an ecolabel much like Fairtrade or Rainforest Alliance are ecolabels for the sustainable production of items that you might see in the grocery (e.g. coffee, chocolate etc.). If you're interested in the *OnCourse* platform or *GEO Certified*, the web links are ([www.getoncourse.golf](http://www.getoncourse.golf)) and (<http://www.golfenvironment.org/vision/action>) respectively.



While I very much enjoyed my work at GEO, I wanted to return to doing active scientific research as I had so much enjoyed during my undergraduate degree. I was thrilled to accept a position in Dr. Soldat's lab early in 2017 and started formally in September. Attending UW-Madison also has special meaning for me personally; both of my maternal grandparents received their graduate degrees here in the 1950s. After graduating from Madison my grandfather accepted a position as a Zoology professor at UW-Eau Claire. My grandparents raised their children (my mom and aunt) in Eau Claire. My aunt still lives in Wisconsin, and I have enjoyed seeing her more now that I am here.

In the turfgrass program here at UW-Madison, I am studying resource (water, energy, fertilizer, pesticide) use efficiency on golf courses. I am trying to quantitatively understand what makes a sustainable golf course, in light of the management practices that are being employed

and the playing quality expectations of golfers. Given the large variation of climate, soil type, size, management style, and playing quality expectations on golf courses around the world, developing a better understanding of resource use sustainability is a significant challenge! My goal is to determine if one can effectively account for all of these differences amongst golf courses. If successful, my hope is to develop tools that assist everyone from individual golf course managers to national golf federations better understand and work toward greater resource use sustainability.

While that is my specific research topic, I am interested in all of the environmental aspects of golf courses: natural capital, ecology, hydrology, microbiology, you name it. As one of the only sports that is played in a semi-natural environment, golf courses are fascinating to study from an environmental perspective. I hope to write about the scientific research that has been done on golf courses in these various fields over the coming years. I also hope to continue to get to know the many members of this organization, preferably on the links itself! Last but certainly not least, a sincere thank you to the WTA for your support of our research here at UW-Madison. ■

JW TURF JOHN DEERE GOLF

Matt Springer (920)204-1175  
Dave Kloss (920)979-9494  
Dennis Dary (608)609-5955

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# Growing Degree Day Tracking

Kurt Hockemeyer, TDL Manager, University of Wisconsin – Plant Pathology

Happy Spring 2018 to all! As we continue our steady march through early spring, I continually update and keep track of the growing degree days (GDDs) that we are accumulating here in Madison. Here is a quick refresher for anyone not exactly sure what GDDs are or how they work. GDDs are essentially a measurement of how much heat has accumulated so far throughout the growing season. This measurement is used to predict many different things such as crop development, crabgrass germination, and development of certain diseases. By predicting these things, we can then determine when is the best time to employ our management practices.

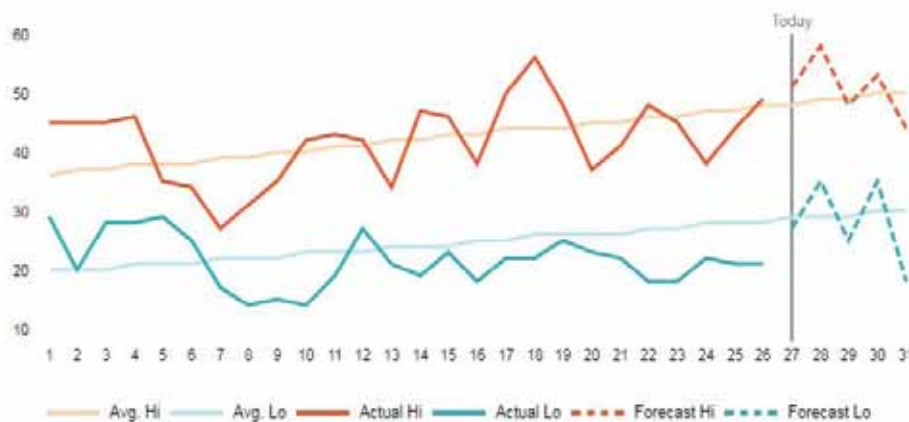
Here at the lab, I am mostly keeping track of GDDs so that I know when to apply fungicides for our early season dollar spot control trial. To do this, I enter the average temperature for each day into an excel file, and every degree above 50F counts as 1 GDD base 50. Every day the GDDs get added to the season's total. So if a day has an average temperature of 50 or lower, no GDDs accumulate for that day. But if a day has an average temperature of say 55F, then 5 GDDs accumulate for that day. And if the next day has an average temperature of 60F, then 10 GDDs accumulate for that day, and get added to the previous total, for a new total of 15 GDDs (base 50). The base can change depending on what you are tracking. But for determining early season dollar spot applications, base 50 is used. Once GDDs reach 140 to 170 for the season that is the optimal time for early season control of dollar spot, according to research coming out of Michigan State University.

I have looked up historical temperatures all the way back to 2011 for the city of Madison (Table 1). With the exception of 2012, all years have been very similar. The month of March from 2011-2017 (excluding 2012) accumulated an average of 6 GDDs. Not much, but definitely getting the ball rolling. March 2012 was extremely warm and accumulated 195 GDDs! This resulted in the optimal timing of fungicides to occur almost 2 months earlier than average (around March 21st). The month of April over that time averages about 59 GDDs, which gets us a little bit closer to the optimal timing. And then the month of May accumulates an average of over 300 GDDs, which puts us well over the top of our goal of 140-170 GDDs. So

**Table 1. Summary of GDD base 50 accumulations in Madison, WI since 2011.**

	March GDD	April GDD	May GDD	GDD=140	GDD=170
2011	2	39	243	19-May	21-May
2012	195	51	427	21-Mar	23-Mar
2013	0	52	318	14-May	16-May
2014	4	38	311	19-May	20-May
2015	7	61	337	7-May	8-May
2016	15	78	288	12-May	21-May
2017	6	94	221	13-May	15-May

**Temperature Graph March 2018**



**Figure 1. Average high and low temps for Madison, WI, charted against actual high and low temps for March 2018. Low temperatures have consistently been below average for the month. Graph credited to Accuweather.com.**

if we exclude 2012, which was abnormally warm, the average date when Madison hits 140-170 GDDs base 50, falls between May 14th and May 16th. This can vary from year to year, obviously, and should not be used as a hard rule.

So far in 2018, we have not accumulated any GDDs for Madison in March, and it doesn't look like we will get any based on the forecast. This is not terribly far from average. In 2013, March had 0 GDDs as well. But that means March has been a little cooler than average (Figure 1). So, I will continue to track GDDs as I'm sure many of you will do as well. I'm hoping that warm weather gets here soon, but at the same time not too soon. Best of luck to all! ■



# Evaluation of Kentucky Bluegrass, Tall Fescue, and Fine Fescue under Traffic

By Doug Soldat, Ph.D., Nick Bero, M.S., Department of Soil Science, University of Wisconsin-Madison

Evaluating new turfgrass cultivars is a perennial task at the O.J. Noer Facility. While typically we evaluate grasses grown from seed, in 2016 we began a trial looking at sodded varieties. We were fortunate to have the sod donated to us by WTA president, Paul Huggett (Paul's Turf and Tree Nursery), and WTA member and recent Wisconsin Green Industry Hall of Fame inductee, Randy Japserson of Japserson Sod Farm – congratulations Randy!

Anyway, for this two year project, our objective was to evaluate the agronomic performance of several different grasses including a vegetatively propagated (no seed) variety of Kentucky bluegrass called 'Bella'. The full list of grasses included:

1. 'Bella' Kentucky bluegrass
2. 'Black Beauty' tall fescue
3. 'HGT' Kentucky bluegrass
4. Fine fescue blend (TBD)
5. Kentucky bluegrass blend (TBD)

The grasses were established in spring of 2016 on a silt loam soil. The plots measured 10 x 12 feet and were arrayed in a randomized complete block design with four replications. The grasses were mowed at a height of approximately 2.5 inches either once per week, twice a month, or monthly in strips four feet wide and 10 feet long. A sample of the grass clippings was collected and weighed at each mowing to estimate clipping production rates during the season. In addition, we measured the visual quality of each grass every other week using a 1-9 scale, with 9 representing the highest quality, 1 representing completely dead or brown turf, and 6 representing the minimally acceptable turfgrass quality. In 2016, we grew in the



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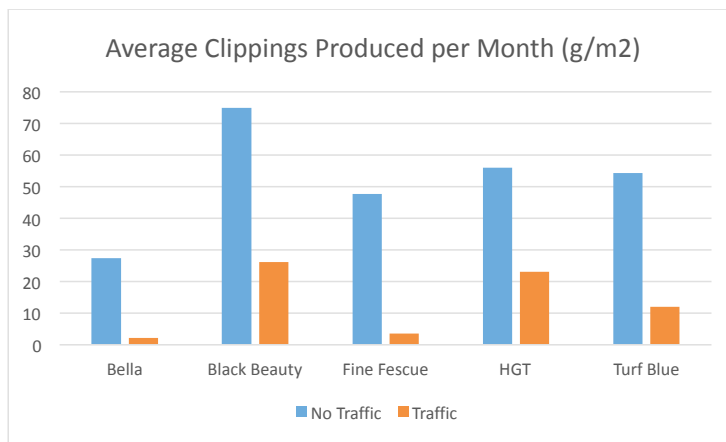
grasses and applied no fertilizer as soil test P was adequate and the residual fertility from the sod production was deemed adequate. In 2017, we fertilized the area with 3 lbs N/1000 square feet over three applications. Broadleaf weeds were controlled in spring. We made six passes per week using a Brinkman traffic simulator, which is similar to the amount of traffic produced by three NFL games between the hash marks.

We collected a ton of data from this trial, but for this article, we will just focus on the impact of the traffic. We were interested in this, because Bella is a grass with a very slow growth rate. While slow growth is great for people that hate mowing, we expected that a slow growing grass would have trouble tolerating traffic. Table 1 shows the visual turfgrass quality for the grasses with and without traffic. Bella had the highest quality with no traffic, and was the second highest with traffic – statistically similar to the best grass under traffic which happened to be HGT Kentucky bluegrass. However, Bella had the second highest drop in quality after traffic was applied. Fine fescue had the lowest traffic tolerance, and we actually saw increases in quality from HGT and Turf Blue (both Kentucky bluegrasses).

Aside from visual turfgrass quality, clipping production is an important indicator. In Figure 1 we see the average clippings per month of the five grasses as affected by traffic. Traffic greatly reduced the amount of clippings, but the difference was not consistent among the grasses. Bella and Fine Fescue experienced the greatest decline in growth as a result of traffic, while Black Beauty and HGT had the smallest drop in growth. These trends match up with the change in quality from Table 1. It appears that Bella is a great grass under no traffic, and that its high initial quality also helped it maintain acceptable quality under traffic, despite a large drop. However, I fear that under sustained (several years) traffic, it may not hold up. Tall fescue, and more traditional varieties of Kentucky bluegrass, on the other hand, may be a better choice for high traffic areas. ■

**Table 1.** The average visual turfgrass quality for the five grasses averaged over the three mowing frequencies with and without traffic. Different letters indicated statistically significant differences at the 0.05 level.

Grass	Turfgrass Quality	Turfgrass Quality	Change in Quality from No Traffic to Traffic
	No Traffic	With Traffic	
	1-9, 9=best	1-9, 9=best	
Bella	7.2 a	6.6 ab	- 0.6
Black Beauty	6.1 b	6.1 b	0.0
Fine Fescue	5.2 c	3.6 c	- 1.6
HGT	6.0 b	6.7 a	+ 0.7
Turf Blue	6.0 b	6.4 ab	+ 0.4



**Figure 1.** Average amount of clippings collected in grams/square meter for the grasses as affected by mowing height.

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# Disease Profile: Necrotic Ring Spot

By Paul Koch, PhD and Kurt Hockemeyer, Department of Plant Pathology, University of Wisconsin - Madison

Necrotic ring spot, caused by the fungus *Ophiosphaerella korrae*, is an important root-infecting disease on cool-season turfgrass. In addition to being an important disease for Wisconsin turfgrass managers, the disease also has had a profound impact on the state's turf industry as a whole and is a major reason you're reading this newsletter today. The Wisconsin sod industry in the late 1970's and 1980's was having difficulty with a new disease of their sod, and when they approached UW for help in solving this problem they quickly realized little could be done without providing resources for research and extension. These sod and seed industry leaders combined with Monroe Miller and Tom Harrison from Blackhawk CC and Maple Bluff CC, respectively, and the Wisconsin Turfgrass Association was born in 1981 (Table 1). That disease the sod growers were struggling with would later come to be known as...you guessed it...necrotic ring spot.

The UW-Madison professor the WTA approached for help was Dr. Gayle Worf, former turf pathologist at UW-Madison. With the WTA's help in providing resources, Dr. Worf was one of the earliest pathologists to identify the causal agent of necrotic ring spot and distinguish it as a different disease from *Fusarium* blight, which was the commonly accepted belief at the time. This was an incredibly contentious topic in turf pathology at the time with professors engaged in shouting matches at academic meetings and threatening lawsuits...in retrospect it seems kind of sad to get so worked up over a turf fungus. It was Dr. Worf's work, among others, that slowly helped settle the argument and lead to the creation of the three independent root-infecting diseases we know today: necrotic ring spot, summer patch, and take-all patch.

## The Disease

Necrotic ring spot causes roughly circular patches of brown or tan turf 1 to 3 feet in diameter. Oftentimes grasses or weeds fill in the center of these patches, forming a ring or 'frog-eye' appearance (Figure 1). Patches most commonly appear between late May and early July, but this can vary significantly based upon the weather conditions. Infected roots appear darkened and when viewed under a microscope the necrotic ring spot fungus can be observed colonizing the root surface (Figure 2). Infected roots can no longer transport water and nutrients from the soil up to the plant, and symptoms appear shortly after that.

The fungus infects turfgrass roots in spring and fall when 2-inch soil temperatures are between 55 and 65°F, which typically falls in May and

*Continued on page 10*



Figure 1. Necrotic ring spot in a recently sodded lawn in northern Illinois.



Figure 2. The necrotic ring spot fungus causes disease by colonizing and infecting the turfgrass root.

Table 1. The founding Wisconsin Turfgrass Association Board of Directors. Most were from the state's sod industry and one of their major concerns was the disease that would later be known as necrotic ring spot. Information was taken from the Wisconsin Turfgrass Association website.

Dave Payne	Payne Sod Inc
Ed Devinger	Reinders Brothers
Egon Herrmann	Loft Seed
George P. Brandt	Brandt Sod Farms Inc
George R. Brandt	American Sod
James Huggett	Long Island Farms
Marshall Scheibe	Scheibe Landscape Contractors
Monroe Miller	Blackhawk CC
Thomas Harrison	Maple Bluff CC

October for much of Wisconsin. Once soil temperatures climb above 65°F in spring, the fungus goes dormant for the summer and no further root damage is done...but fungicides targeting necrotic ring spot will be ineffective during this time as well.

The disease is most severe on sodded Kentucky bluegrass within 2 to 6 years of installation, and oftentimes will lessen in severity in the years following. The reason for this isn't exactly clear, but it's believed that installing sod in a new and different environment can 'shock' the microbial community present on the roots and allow for the necrotic ring spot fungus to take hold. Over the following years the natural microbial community can build up on the roots, compete with necrotic ring spot, and gradually reduce the disease.

### Managing the Disease

Necrotic ring spot is one of the most frustrating disease Wisconsin turf managers can experience because once the symptoms become apparent there is very little the turf manager can do to quickly recover. However, there are some general principles to follow that can at least reduce disease severity.

1. Maintain optimal root health. This may seem obvious, but the more healthy roots there are on a plant, the more the plant can tolerate to lose some to necrotic ring spot infection. These conditions include proper mowing height, drainage, irrigation and management of traffic and soil compaction... among other things.
2. Manage thatch. The thatch layer in turf is loaded with organic matter and has less microbial competition relative to the soil... and it's an area that root diseases like necrotic ring spot and summer patch thrive in. If thatch thickness is greater than 1/4 - 1/2 of an inch, an aerification program should be implemented to reduce thatch thickness. Recently installed sod often has

a thick thatch layer, and an aggressive aerification program should be implemented on these sites to lessen the thatch layer, alleviate soil compaction, and encourage rooting penetration into the underlying soil.

3. Choose a resistant cultivar? Clear differences in bluegrass resistance to necrotic ring spot have been observed in the field (Figure 3), unfortunately with so many bluegrass cultivars on the market there has been only minimal testing. For this reason, cultivar blends can be an effective way to at least lessen necrotic ring spot severity since it's likely that at least one of the cultivars will have some level of resistance.
4. Fungicides? Fungicides are not normally a very good option for controlling necrotic ring spot. First, the timing of the application can be difficult since it needs to be during that window of activity (soil temps of 55 - 65°F). Second, the fungicide needs to be watered down to the roots. Unless the customer has an in-ground irrigation system that can provide consistent irrigation over a large area, this is normally very difficult.

### Recovering from the Disease

Necrotic ring spot causes symptoms by rotting away the root system of the plant, which makes rapid recovery very difficult. The first thing you can do is to increase the frequency of irrigation to make up for the lack of water being absorbed by the plant. Note that this will not help severely infected root systems. Light applications of fast-release nitrogen fertilizer can help promote recovery and encroachment from surrounding plants, but this will take time. Affected patches can also be roughed up and reseeded with bluegrass, which will also take significant amounts of time, water, and labor until full recovery is reached. ■



Figure 3. Differences in necrotic ring spot resistance between Kentucky bluegrass cultivars near Madison, WI. The bottom half of the picture shows a highly susceptible cultivar riddled with disease from the previous summer while the back half shows more resistant cultivars



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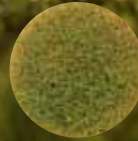
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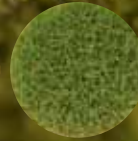
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@ToddFregien\_ATS  
tfregien@advancedturf.com



Rusty Stachlewitz  
630.779.0761  
@RustyStack  
rstachlewitz@advancedturf.com

1556 Advance Road, Unit C  
Madison, WI 53718  
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John "JT" Turner  
Territory Manager,  
Aquatrols

1-630-215-6110  
1-630-443-7807  
jturner@aquatrols.com

40W665 Campton Woods Drive  
Elburn, IL 60119



Carl McPherson  
Store Manager

cmcpherson@SiteOne.com | www.SiteOne.com  
8520 Fairway Place | Middleton, WI 53562  
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# CALENDAR OF EVENTS

## 2018

May 14th	WGCSA meeting - Racine Country Club.....	Racine, WI
June 18th	WGCSA meeting - Wild Rock Golf Club.....	Wisconsin Dells, WI
June 18 – 24th	AmFam Championship – University Ridge Golf Course.....	Verona, WI
<b>July 24th</b>	<b>WTA Summer Field Day – note date change</b> .....	<b>Verona, WI</b>
August 13th	WGCSA & NGLCSAA meeting – Horseshoe Bay G C.....	Egg Harbor, WI
Sept. 17th	WeeOne – Pine Hills Country Club.....	Sheboygan, WI
<b>October 1st</b>	<b>WTA Golf Outing – Kenosha Country Club</b> .....	<b>Kenosha, WI</b>

**WTA Members -- If you have an important date you'd like to share with other members, Call 608-845-6536 or email [audra.anderson@wisc.edu](mailto:audra.anderson@wisc.edu) to include it in the next calendar.**

## Contact Telephone Numbers

GCSAA	Golf Course Superintendents Association.....	800-472-7878
Great Lakes	Great Lakes School of Turfgrass Science Online.....	763-767-3518
NGLGCSA	Northern Great Lakes Golf Course Superintendents Assoc.....	906-424-4176
Northern	Northern Green .....	651-633-4987
iLandscape	The Illinois + Wisconsin Landscape Show .....	630-472-2851
PAT	Pesticide Applicator Training (Turf and Landscape 3.0).....	608-262-7588
STMA	Sports Turf Managers Association Conference .....	800-323-3875
TPI	Turf Producers International .....	800-405-8873
WDATCP	Pesticide Certification & Licensing.....	608-224-4548
Wee One	Wee One Foundation Golf Outing .....	630-457-7276
WGCSA	Wisconsin Golf Course Superintendents Association .....	920-643-4888
WGIF	Wisconsin Green Industry Federation .....	414-529-4705
WPT	WPT Garden Expo.....	608-262-5256
WSPA	Wisconsin Sod Producers Association .....	262-895-6820
WSTMA	Wisconsin Sports Turf Managers Association .....	608-792-9264
<b>WTA</b>	<b>Wisconsin Turfgrass Association</b> .....	<b>608-845-6536</b>