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Research Day
January 8, 2019
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The First Time Ever

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

On October 1st, after a serious conversation with Harrison Beal, assistant superintendent at Kenosha Country Club, I made the tough decision to cancel the WTA Golf Outing. Kenosha Country Club received 2.4 inches of rain overnight. That combined with other recent rain events the course was soaked. This was a very difficult decision, but one I was comfortable making. Harrison was confident if they received no more rain, he could find a way to route the outing around the very wet areas. In the true spirit of all turfgrass managers, he was doing all he could to find a way for the event to go on as scheduled.

There were many things I took into consideration while I pondered the right decision to make. The short list: travel issues for the attendees, loss of income for the WTA, all the hard work by the Kenosha Country Club staff. While I contemplated these issues and more, I kept having a re-occurring thought in my mind of me, at an event somewhere, having a spirited conversation that went something like this: "Can you believe that those golfers would play in weather like this? I would not have allowed them to play but the club can use the revenue. My staff has worked so hard this year to get the course perfect. The damage the outing is doing will take time to repair, I hope the members understand. When will golfers ever understand how much damage they cause to the course when they play in these sloppy conditions? They pay me to work in this weather, I would not choose to be out here!"

Yes, we have all been part of this discussion as a golf course superintendent or a sports field manager. These thoughts, the forecast of heavy rains with storms at the end of the day when all the attendees would be traveling home, guided me to cancel the outing. How can a group of turfgrass professionals hold an event on a course when we all know there was a good chance we would be harming the course. We are better than that!

After I made my decision, I worried about what the decrease in income would mean to the WTA in the short term. The next day, I contacted all the players and industry partners that supported the event. This was a task I hoped I would never have to undertake, but it must be done. To my surprise, but what I hoped for, almost everyone made comments about the event being fun but the goal is to raise money for the WTA and the turf team. I heard comments like, "I have faith the money will be put to good use so please accept my registration as a donation to the WTA." This happened many many times and made me proud that I am associated with such a great industry. On behalf of the WTA Board, The UW Turf Team and myself we all want to say THANK YOU so very much!

I stand by my decision but it is an uneasy feeling knowing that canceling the golf outing could be a financial hardship on the WTA and its mission. The golf outing is a major source of income for the WTA. This single event will raise close to $10,000 which supports the research conducted by the UW-Madison Turf Team. On average, this one-day event will contribute 20-25% of the WTA annual income, second only to memberships. The other two events that the WTA hosts, Research Day and the Summer Field Day, are not large money making events. These two events were designed to disseminate the newest turfgrass research information and allow the WTA members to hear the newest research at a WTA event first before the rest of the industry. When the WTA was established, they felt it very important to create a vehicle to share the research done at the UW-Madison with the industry in a timely manner. These two events allow the turf team to share their latest work on many topics with the industry without writing a brief novel for everyone to read.

At times, we forget that the mission of the WTA is to be dedicated to better turf through research and education. The support comes in multiple forms; direct research support, graduate fellowships, upgrades to the O.J. Noer Research Facility, contact with the College of Agricultural and Life Science to promote on our behalf, and scholarships for students.

The WTA created four Graduate Fellowships before I started working at the UW. I took these Fellowships for granted. Over my years at the UW-Madison, I have had many conversations with personnel at other turfgrass universities and when the topic of graduate fellowships comes up a few universities have one or two but I have yet to have anyone tell me they have FOUR Fellowships as we do here at UW-Madison. The professors can use these fellowships when they are recruiting future graduate students. These fellowships demonstrate the level of commitment Wisconsin has to the Turfgrass Industry. This is something we can all be proud of!

As one of the older timers, I can always rely on "I remember when." As memberships stay stagnant and costs increase, the WTA

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PRESIDENT'S MESSAGE

Weather is an Important Player in the Game of Turf

By Paul Huggett, Paul's Turf & Tree

Weather is always on our minds in the turf industry. I will tell a vendor a good time to stop for a visit is when it is raining out and my help has left for the day. That also applies to meeting dates. If only we could predict the bad weather day for working outside, so we can focus on what needs to be accomplished at our meeting. Weather was the sole reason for cancelling the WTA golf outing for the first time. Bruce contacted those who signed up for the WTA golf outing and many of you have donated the fee for the outing or sponsorship to the WTA. We appreciate such generosity! The outing is one of our primary fundraisers.

Weather has affected the O.J. Noer Research Facility that Bruce, Kurt, Audra and others have so diligently worked to put back together. Our double-digit rain falls this summer caused damage to the grounds and building. I drove by the Noer Facility and road construction today and positive progress is happening. Hopefully, when the road is completed, the box culverts will alleviate some of the water issues.

Weather has affected our sod and tree business in positive and taxing ways. Our nursery trees put on phenomenal growth this summer due to the wet conditions. All our newly planted trees took off well also with very little loss. This fall, seeding has been a struggle with multiple seeding attempts that are finally starting to shape up. Water is at the perfect level and indicates to us the areas that need drainage work.

Weather is part of everyone's lives everyday but more so for turf managers. Adapting to the weather keeps us quick on our feet. I hope we all have the patience to weather the storm. This too shall pass.

I hope and pray everyone has a successful fall / winter. We look forward to seeing you at our winter Research day January 8th, 2019.

The First Time Ever - *continued*

is always in need of finding more ways to raise funds, dues increases are short-lived and not always the best option. There was a time in the way back machine when Superintendents like Mark Kienert (formerly at Bull's Eye CC) and Jeff Bottensek (formerly at Stevens Point CC) Jerry Kershasky (formerly at Westmoor CC) went to their membership committee and explained the WTA's role in driving the standards of the green industry. Each club would put a checkbox on the year's dues statement allowing the members to add $5-10.00 to their annual dues, which was donated directly to the WTA in the name of the club. There were others and this simple gesture raises a significant amount of money. A few vendors also would run annual promotions where a bounty was put on a product or product line and a percentage would be donated to charity. Reinders' had the longest running program where it donated $5.00 per case for every case of Daconil to the WTA. Then the onset of generics and other issues and this and other programs fell by to the wayside. I do not have the figure but every year at Research Day there was a line of people that showed their support to the WTA. We could use that support now. As individual members, maybe we could all adopt a New Year's resolution for each member to try to recruit one new member. If your friends are already members, then maybe talk with a landscaper or sports turf manager in your area. There is still a great need for more research and funding allows the professors to accomplish that research. Just think every new dollar the WTA takes in can go 100% to research since annual costs are being covered by your continued support.

I hope your season ended quietly and take some time to re-charge this winter because before you know it Spring will be here!

Water and Highway Construction Equals a Big Mess

By Bruce Schweiger, Manager, O.J. Noer Turfgrass Facility

Discussions with turfgrass professionals this year have been consistent; this has been a challenging and bizarre summer. I could recap the weather but we have all lived through the past few months. One thing that has made this summer a long one at the O.J. Noer Facility has been the rains and some very heavy ones. Add these rains to the massive road construction project along County Highway M in front of the O.J. Noer Facility it makes for a noteworthy combination.

When I assumed this position from Tom Schwab after his 22-year career at the helm, he stated I should expect the facility to flood on average once per year. Beginning January 1st, 2017, the Noer Facility has flooded once in winter making it a complete ice-skating rink. The growing season would not be outdone. The Noer Facility flooded three times in 2017 and another three times this year, so far. At times I think Tom knew more than he was telling me. After the last flood, I texted him a few pictures asking if he wanted his old job back, no response!

You may not have heard or seen but the morning of August 21st, the Noer Facility flooded the worst it has ever. With rain falling hard for hours and hours I planned to leave for work around 5:30am to survey the damage. To my surprise, in Cross Plains we received more than 15 inches of rain and there were no open roads out of town. Around 6:45am, I was outside surveying my house and yard when the local police chief drove by. I flagged him down and he said one road was being opened at that time. I was off to see what the Noer Facility looked like. Arriving at the Noer the water level was as high as I had ever seen. I walked around the grounds taking pictures. When my employee Larry arrived, we could not believe our eyes. As we looked out on the property, it was quite apparent this was going to be bad as all four of my Toro irrigation controllers were under water as was my pump station.

As we entered the building, the carpets and floors were all soaked, the building had flooded. Larry and I started moving things to higher ground and cleaning up water. I had never seen anyone use a greens squeegee to move water out of carpet. We started running a carpet cleaner to remove more water and dumped 125 gallons of water. Calls began to ServPro, my boss, and the UW to begin the insurance claim process.

By the end of the day ServPro was here working their magic and due to the hard work of Larry (79 years old), we were able to have all standing water removed. Boy did we pump water! The squeegees seemed to conform to our hands. That was a long day proven by the fact that my Iphone battery normally has a charge for days but on my way home that night the battery died. Thank you to all those that reached out and offered to assist and words of wisdom that this too shall pass.

Then came Wednesday and the real cleanup began. The entire property was covered in silt and there was debris everywhere. Thanks to Phil Davison from University Ridge for the use of his greens sweep and Toro Turf Vac. The irrigation system will be down until mid-October. This did not allow us to wash the silt off greens, so the next best option was drag, brush and blow. By end of the day Wednesday, Kurt Hockemeyer and one of his staff were blowing all bentgrass areas after I dragged and swept them. The general grounds were also covered in silt. I wish I had a picture of the silt flying when I dragged, Kurt and his staff were blowing and Larry was mowing general turf areas, dust bowl is the picture. At days end things looked better but we were a long way from done.

Thursday everyone waited until the turf dried and we attempted to mow. The mowing went well and the property started to look respectable. Around noon I was told the water pressure inside the building was low. I had a few hoses running off the building and thought I was just demanding too much water. Alas, I was mistaken and the building well pump had died. I had not thought about that pump but when the well repairman arrived, it was agreed the wellhead had gone underwater and things were damaged. A few hours later and the well was repaired.

By now it was Friday and ServPro had been there running many fans and dehumidifiers for four days. The sound in the building was deafening and the heat from the equipment was unbelievable. The air conditioning could not keep up and was turned off late Tuesday. The next week when ServPro was done I turned the air conditioning back on and it did cool things off but something was wrong. One more call the HVAC contractor. After inspection, the air conditioning units have been damaged and their demise is in the foreseeable future.

As I submit this article, the O.J. Noer Facility went through countless days without irrigation. Hot, dry and sunny makes my sand based surfaces anything but happy. I brought out two one-thousand gallon water tanks and water the turf as best we can. Yes, the surfaces showed sign of stress then came the million dollars rains followed the next day by some of the "best" dollar spot this old guy has ever seen.

Well, let's hope that 2019 is dry or at least floodless!!!!!!

Turfgrass Entomology 2018 Overview

By Audrey Simard, University of Wisconsin - Madison, Entomology Department

Pollinator health has been listed as a conservational priority covering both rural and urban landscapes. Insecticide usage among large scale agriculture and their potentially devastating effects on pollinators has been well documented and researched over the years. Within the field of turfgrass entomology, there remains a knowledge gap on how management practices, specifically fungicide usages may impact both native pollinators and European honey bees (*Apis mellifera*). Therefore, the objective of my work is to determine the bioactivity of commonly applied Demethylation Inhibitors (DMI) and Strobilurin fungicides. Additionally, DMI plant growth regulators (PGRs) in turfgrass guttation fluid and identify the potential hazards they may pose to pollinators (i.e., honey bees) and other beneficial insects. Over the course of the 2018 summer I was able to collect guttation fluid from fungicide treated turf (Creeping bentgrass and Kentucky bluegrass) at 1,3,7,14-day post application. Unfortunately, with heavy rains through-out the collection intervals along with a detrimental flood at the O.J. Noer Turfgrass Research Facility overall guttation fluid yield was lower than expected. However, enough samples were collected to commence analysis, which we hope to conclude by the years end.

A major component of my research program is integrating European Honeybee hives within Wisconsin golf courses. A total of 13 hives were established. Each of the participating golf courses (University Ridge Golf Course, Bishops Bay CC, Blackhawk CC, Evansville CC, Janesville CC, West Bend CC) received 2 hives and 1 hive was added to the O.J. Noer Turfgrass Research Facility. Native pollinator "hotels" were added to attract and increase the diversity of pollinators and provide additional habitats native bees and wasp in urban landscapes. These beehives service a variety of research projects including a pollen diversity assays. This study is being conducted in collaboration with Purdue University. We will conduct a comparative analysis of European honeybees and native pollinators pollen sources and complete a biodiversity survey to identify native pollinators at the species level of each of the golf courses. In addition to research, the beehives provide outreach opportunities ranging from master garden seminars and honey extraction workshops.

In continuing our research partnership with Purdue University, this year the USDA funded our project to investigate the interactions between Japanese beetles (JB) and the soil environment. Working in correspondence with Doug S. Richmond Ph.D. and Francy Helena Arias Ph.D. of Purdue University, I have been coordinating with Wisconsin golf courses (Bishops Bay CC, Blackhawk CC and Janesville CC) to serve as field sites and identifying regions of JB infestations across the state of Wisconsin. The long-term goal of this research is to better understand interactions between invasive soil dwelling scarabs and their subterranean environment. Implementing a combination of natural and manipulative field experiments, we will quantify the impact of JB on soil CO2 and N2O flux and explore how JB influences the quantity and quality of soil organic matter. Using PLFA analysis and high throughput sequencing of microbial genes, we will characterize JB gut microbiota, quantify changes in soil microbial diversity associated with JB invasion and quantify feedback between soil and gut microbes.

Guttation fluid on Kentucky Bluegrass. Location: OJ Noer Turfgrass Research Facility
Photo credit: Audrey Simard

European Honeybee Hive at Evansville Country Club, Sept. 2018.
Photo Credit: Audrey Simard

TDL Contracts are the Foundation of the Lab

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

I hope that this article finds you in good spirits as (hopefully) most of the stresses of the growing season are behind you. Golf courses are probably thinking about what snow mold fungicides are going down, and lawn care companies may still be wrapping up fall fertilization and lawn aerification. Here at the TDL, we are in full swing with our snow mold research. But also, this is the time of year where I am getting ready to contact folks about renewing their TDL contracts with the lab. It is not a stretch to say that the TDL would not exist if it were not for our contract members. To my knowledge, no other plant disease diagnostic lab in the country runs like the Turfgrass Diagnostic Lab, with pre-paid contracts forming the foundation of our funding.

Most plant disease diagnostic labs are running as you would imagine. Sample submissions come in, and payment follows the diagnosis. This system is perfectly fine. As sample submissions increase, the revenue to the lab increases. But as you can imagine, there is always going to be a level of volatility to how many samples are submitted from year to year. Good weather patterns may result in better growing conditions one year, which directly translates to less dead plants and fewer sample submissions. Diagnostic labs associated with universities may also receive some type of baseline support to keep the lights on every year and to help offset some of that revenue volatility. But the TDL is unique. We rely on the contributions of our contract members as the main source of revenue from year to year. Also, our lab receives no money from the university. Our system is different, but I believe this results in less revenue volatility. Most folks are renewing their contracts year after year, giving us steady support throughout the years. Unfortunately, contract memberships are down from where they used to be 5-10 years ago, meaning overall funding into the lab is also down. That is why we are asking that more folks become contract members to help support the lab, so that we can continue to offer diagnostic services for years to come.

To help incentivize the purchase of contracts, we offer several benefits to TDL contract members. **1) Accurate and timely diagnoses.** We know that your time as a turfgrass manager is limited. We also know that your budgets are also limited, and you cannot just go spray a fungicide or insecticide just because you think you may have a disease or insect problem. That is why I will strive to at least give contract members some type of preliminary diagnosis within 24 hours of receiving the sample, if not a definitive diagnosis. That way you can identify the problem quickly, and implement management practices that will start your turf on the road to recovery ASAP. **2) Written reports with up-to-date management recommendations.** Each pre-paid sample submission comes with a written report, complete with color microscope photos and the most up-to-date management recommendations based on university research. This way you have documentation that shows what was observed in your

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sample, and what you can do to rectify things. This documentation can be used to help communicate with golfers, greens committees, general managers, etc., who may not have the expertise in turf management like you do. These full reports cost $50 more per sample for non-contract members.

3) Stay up-to-date with disease trends being seen in the lab. This incentive is two-fold. Every two weeks during the summer, Dr. Paul Koch and myself alternate writing the fabled "TDL Update." We try to detail the disease trends seen in the lab so that our members can be made of aware of issues potentially popping up on their turf areas. Again, this update can be used to show to customers or golfers what may be going on in your turf. And then, as weather conditions permit, urgent "Disease Alert" emails go out when conditions are conducive for rapid development of certain diseases. This is usually for diseases like Pythium foliar blight that can develop rapidly and take out large swards of turf in a very short amount of time.

TDL contract membership is available in $100 intervals, and for every $100 you contribute to the TDL as a contract member you receive 1 sample diagnosis plus complimentary report (a $50 value). For example, if you contribute $500 to the TDL as a contract member for 2019, you are entitled to five sample submissions with five written reports with recommendations and pictures throughout the growing season. Most contract members contribute between $300 and $500, but even if you only contribute $100 you are still entitled to the biweekly updates, disease alert emails, and access to the most up-to-date UW-Madison research. In an era of tightening or flat budgets at many turf facilities, this fee system allows for you to contribute as much as you are able and still maximize your benefits.

If you are not already a contract member, please consider becoming one and help be the foundation that holds up the TDL. Again, without our contract members, the TDL would simply not exist. In addition to the benefits described above, all those who sign up for a 2019 contract membership will receive a complimentary copy of Dr. Aaron Patton's 'Weed Control for Professionals' and a TDL winter hat. Dr. Patton's book supplies up-to-date herbicide and plant growth regulator information that turfgrass managers can use to develop effective herbicide programs for golf courses, athletic fields, lawns, etc. The winter hat keeps your head warm in style. More information on becoming a TDL contract member can be found on the following webpage, by visiting the TDL's website (https://tdl.wisc.edu/contract-membership/). Please contact either myself (hockemeyer@wisc.edu) or Dr. Koch (plkoch@wisc.edu) if you have any interest in becoming a contract member. Or you can phone the lab at 608-845-2535. Thank you for your time and consideration.

Slowly Unravelling the Mysteries of Potassium

By Doug Soldat, Ph.D., University of Wisconsin – Madison, Soil Science Department

What started in 2008 as a simple project to identify the minimum level of Mehlich-3 soil potassium required to grow bentgrass has turned into to a decade long study with no end in sight that is changing the way we think about potassium fertility. Back in 2011, I wrote an article for this newsletter about how I would manage potassium given what we had learned to that point. The article highlighted that there was very limited evidence that potassium improved the cold tolerance of cool season grasses, but there was strong evidence from multiple locations that potassium fertilization increased the severity of snow mold diseases. The conclusion was that potassium fertilization should be targeted in spring and summer to help with drought tolerance, and that potassium fertilizer should only be applied if a soil test indicated a need. That much remains true, but in the seven years since that article was published we've raised some more questions about potassium fertilization.

Our long-term potassium trial is on a bentgrass green growing on a sand root zone at the OJ Noer Facility. We remove the clippings every time we mow, which results in the removal of about 1 pound of K annually. The control plots have no potassium added to them (and there is a negligible amount in the irrigation and rainfall). At some point, we expected the soil to run out of K and the turf would start to decline. However, the control plots still look healthy as ever. The amount of potassium removed in the clippings should result in a 45 ppm decline in Mehlich-3 soil potassium. But the Mehlich-3 soil potassium is only 20 ppm to begin with and is only decreasing by only 1 or 2 ppm each year. This math doesn't add up. The only reasonable explanation is that the plant is getting its potassium from somewhere other than the Mehlich-3 potassium, which represents the potassium associated with soil cation exchange sites. Besides being associated with the cation exchange sites, potassium can be a part of the minerals in the sand grains. About 80% of our sand grains are made of quartz (silicon dioxide), but the other 20% is other minerals like potassium feldspar and amphibole, both which contain small amounts of potassium. Soil scientists call the potassium in the minerals "non-exchangeable" and generally agree that it not readily plant available. But, in our case, it appears that the non-exchangeable potassium is very available because the plant is getting the vast majority of its potassium from that location.

We aren't sure how the plant is able to extract the K from the sand grains, but one explanation might be that the roots excrete acids that dissolve the minerals and solubilize the potassium. Another might be that the plant is forming associations with mycorrhizal fungi which trade plant nutrients (like P and K) for the plant's sugar. If not mycorrhizal fungi, then maybe bacteria are helping. In addition to questions about how the grass is obtaining the potassium, we are interested in how grass would be able to extract potassium from a variety of different sands. To address these questions, we are working on several greenhouse projects and with collaborators from other Departments and other Universities.

Dr. Eric Melby is a Wisconsin native who earned his BS, MS, and PhD at UW-Madison. He worked for me at the O.J. Noer Turfgrass Research Facility as an Education major (he briefly taught High School Chemistry in Colorado between his MS and PhD degrees). Eric is now a Chemistry Professor at Columbia Basin College in Pasco, Washington. I have kept in touch with Eric over the years, and he recently expressed interest in helping us collect data on how bentgrass can extract non-exchangeable K. Eric and several of his students are growing bentgrass in a greenhouse using a sand that varies in non-exchangeable K content. He started with a relatively high K sand from Washington, and then diluted the sand with different amounts of pure quartz (containing no potassium). From that work we hope to identify the minimum amount of non-exchangeable potassium to maximize turfgrass growth and quality. We are repeating the study with two different sands in a greenhouse at UW-Madison.

In addition to my work with Dr. Melby, I am working with another Eric, Dr. Eric Roden in Geosciences at UW. Dr. Roden specializes in microbially-assisted mineral degradation. We have a few experiments in the works to assess how non-exchangeable potassium is made available by varying the microbes in the soil. In addition, I am exploring further collaborations with researchers at UW-Platteville who may also be able to contribute to our effort to better understand how grasses (specifically creeping bentgrass) can utilize a form of potassium traditionally considered not plant available.

Research can be a frustratingly slow process, but it is rewarding to see that we are continually moving our knowledge forward. After we complete the current series of experiments, we will likely start asking questions about how Kentucky bluegrass differs from creeping bentgrass, or wonder about the non-exchangeable potassium in silt loams instead of just sands. Obviously bentgrass on sand is just a small percentage of all the turf management systems in Wisconsin (albeit a very important one). Eventually, we hope a clear picture emerges which helps you to grow healthy turfgrass while utilizing fewer resources which will help to protect the environment and bolster your bottom line. The majority of this work would not be possible without the continued support of the Wisconsin Turfgrass Association, so thank you for sticking with me as we continue to unravel the mysteries of potassium.

Gray Leaf Spot's Northern Trek Not Only Bad for Golf Courses

By Paul Koch, PhD, University of Wisconsin – Plant Pathology

In the Sep/Oct 2018 issue of The Grass Roots, I discussed the impact that the warm and humid summer had on the northward creep of gray leaf spot for golf course turf. But this important disease isn't only a problem for golf courses, and in fact in Wisconsin it's probably MORE of a concern on home lawns, parks, and sports turf because it primarily impacts perennial ryegrass and tall fescue.

Figure 1. Lesions of gray leaf spot can start as small, water-soaked lesions but progress to bleached lesions with reddish-brown borders. Photo from NC State University (https://www.turffiles.ncsu.edu/diseases-in-turf/gray-leaf-spot-in-turf/).

Figure 2. Gray leaf spot damage can spread quickly on perennial ryegrass and tall fescue and resemble drought or grub damage. This picture from Rutgers University (https://plant-pest-advisory.rutgers.edu/touch-of-gray/) show the damage that can occur on perennial ryegrass not preventatively treated with a fungicide.

The Disease

Gray leaf spot is a disease caused by the fungus *Pyricularia grisea*. It primarily affects perennial ryegrass and tall fescue, but can also impact fine fescues. Creeping bentgrass, Kentucky bluegrass, and annual bluegrass are not susceptible hosts for this disease. Of note, the fungus that causes gray leaf spot is an important pathogen of rice, causing the disease called rice blast that is one of the most destructive diseases of a major food crop.

Symptoms of gray leaf spot first appear as small, water-soaked lesions that can resemble either early Pythium blight or Bipolaris leaf spot infections (Figure 1). The lesions progress and coalesce and if left unchecked eventually kill the entire plant. Plant stand symptoms begin as small patches of brown or tan turf that can resemble drought stress, dollar spot, or grub damage. But in optimal environmental conditions the symptoms can quickly spread into large, irregularly shaped areas of dead turf (Figure 2). Microscopic identification is straightforward since the fungus produces very unique spores that resemble small bowling pins (Figure 3).

Optimal conditions for gray leaf spot development are daytime temperatures between 82 and 90°F with high humidity and lots of available moisture. Fast-release nitrogen applications during optimal disease conditions can enhance gray leaf spot development, and higher cut turf found on golf course roughs is often more susceptible to disease than shorter cut turf on fairways. Other abiotic conditions including drought, soil compaction, traffic and others that stress the plant also increase disease severity.

Why is the disease moving north?

When I first started at the TDL back in 2005 I was told that gray leaf spot never occurs north of central Illinois. We have received samples at the TDL containing gray leaf spot from central Illinois, southern Indiana, Missouri, and Nevada. That changed in August of 2018 when we received a gray leaf spot sample from an athletic field on the south side of Chicago and another from a ryegrass fairway on the west side of Chicago the first week of September.

This is the furthest north, and closest to Wisconsin, that we had ever observed this disease. The summer of 2018 was exceptionally warm and humid, but warmer and more humid regions are becoming a trend across the country. As this trend continues, and nighttime lows above 65°F become the norm rather than the exception, it's reasonable to expect gray leaf spot to continue marching northward and eventually cross the cheddar curtain into Wisconsin.

Controlling the Disease

As is the case with any disease, limiting abiotic stresses on the plant will limit gray leaf spot development. Limit drought and traffic stress, alleviate soil compaction through

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cultivation, and limit fast-release nitrogen applications during times of high heat and humidity. Prolonged leaf wetness increases disease so regular dew removal on fairways can help limit disease development.

The most effective strategy to control gray leaf spot is to plant resistant species. Fairways and roughs where perennial ryegrass and tall fescue dominate can be susceptible to gray leaf spot, though typically tall fescue is more resistant to gray leaf spot than perennial ryegrass. Rough or lawn areas that contain mostly perennial ryegrass can be converted to resistant Kentucky bluegrass and (mostly) resistant fine fescues. Fairway areas that contain perennial ryegrass can be converted to creeping bentgrass or Kentucky bluegrass. Perennial ryegrass cultivars with gray leaf spot resistance have been developed at Rutgers University, and if gray leaf spot becomes common in Wisconsin then resistant cultivars of perennial ryegrass should be identified and planted whenever ryegrass is seeded.

Chemical control options also exist to manage gray leaf spot. Dr. Jim Kerns at NC State has identified products containing thiophanate-methyl as highly effective at controlling gray leaf spot, and surprisingly there has been very little gray leaf spot resistance to thiophanate-methyl observed in the field. QoI fungicides like Heritage and Insignia are also effective against gray leaf spot, though gray leaf spot resistance has been reported to both these products and may reduce the level of control. The UW Turf Management Mobile website can also be used to identify effective gray leaf spot fungicides. Simply go to the website (https://turfpests.wisc.edu/), click on the 'Turf Diseases' button, then check the 'Gray Leaf Spot' box and a list of ranked fungicides will appear. Preventative applications are required for effective control no matter which fungicide you choose.

Conclusion

Warmer and more humid summers will change the way Wisconsin superintendents manage their turf in several unpredictable ways. Diseases that we don't traditionally experience may become widespread in the near future as those 'St Louis summers' become more common in Wisconsin. At this point there is no need to develop gray leaf spot preventative management plans, but Kurt Hockemeyer and myself will monitor sample submissions and report any gray leaf spot samples that may continue to track north.

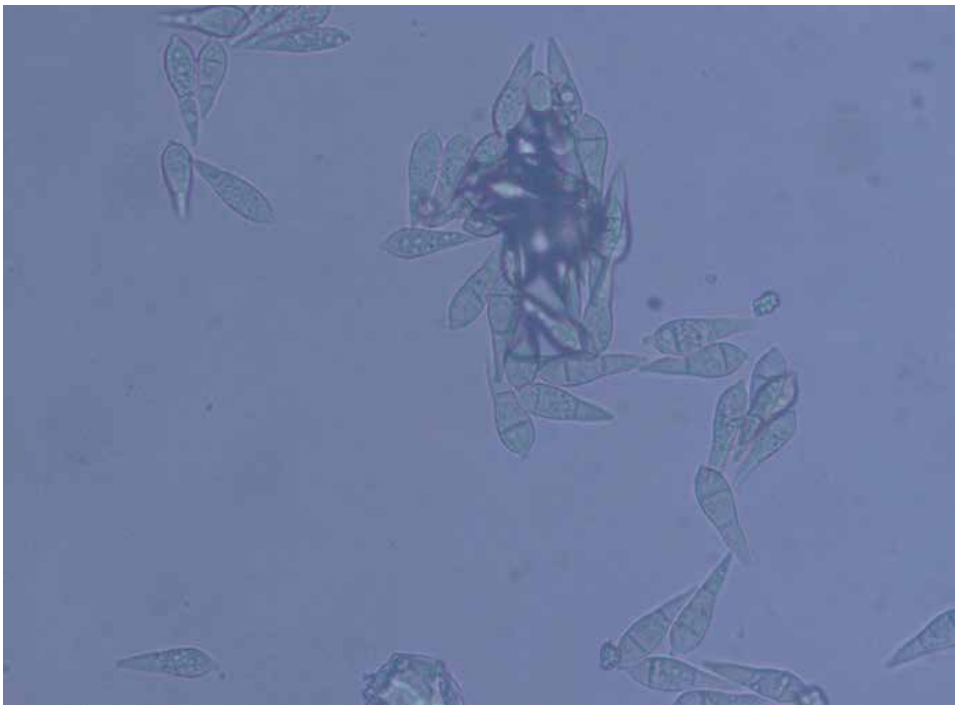

Figure 3. Gray leaf spot spores from an athletic field in Chicago submitted to the Turfgrass Diagnostic Lab in August of 2018. Microscopic identification of gray leaf spot is simple and straightforward due to the unique shape of the spores.

CALENDAR OF EVENTS

2019

January 8	**WTA Winter Research Day – Pyle Center**	**Madison, WI**
Jan 15 – 17	Northern Green – Minneapolis Convention Center	Minneapolis, MN
Jan 22 – 25	STMA Conference – Phoenix Convention Center	Phoenix, AZ
Jan 30-Feb 1	iLandscape Show – Renaissance Convention Center	Schaumburg, IL
Feb 2 – 7	Golf Industry Show – San Diego Convention Center	San Diego, CA
Feb 8 – 10	Garden EXPO – Alliant Energy Center	Madison, WI
Feb 18 – 22	TPI Conference – The Westin	Charlotte, NC
March 6	PAT 3.0 – Ingleside Hotel	Pewaukee, WI
March 20	PAT 3.0 – Ingleside Hotel	Pewaukee, WI
March 27	PAT 3.0 – Upham Woods	Wisconsin Dells, WI
April 3	PAT 3.0 – Metropolis Resort	Eau Clare, WI
April 17	PAT 3.0 – Comfort Suites Rock Garden	Green Bay, WI
April 24	PAT 3.0 – Ingleside Hotel	Pewaukee, WI
May 1	PAT 3.0 – Days Inn Conference Center	La Crosse, WI

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 to include it in the next calendar.

Contact Telephone Numbers

GCSAA	Golf Course Superintendents Association of America	800-472-7878
Great Lakes	Great Lakes School of Turfgrass Science Online	763-767-3518
iLandscape	the Illinois + Wisconsin Landscape Show	630-472-2851
NGLGCSA	Northern Great Lakes Golf Course Superintendents Assoc.	906-424-4176
Northern	Northern Green	651-633-4987
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
WTA	**Wisconsin Turfgrass Association**	**608-845-6536**

January 8th, 2019 Turfgrass Research Day Conference & Webinar

702 Langdon Street, Madison, WI

8:00-8:30am	Registration
8:30 – 8:45	Welcome and Scholarships
8:45 – 9:30	**Jessica Cebula– University of Wisconsin – Health Services**
	Safety for the Green Industry
9:30 – 9:50	**Qiyu (Ada) Zhou, Ph.D. student, University of Wisconsin - Soil Science**
	Effects of Nitrogen Rate, Golf Footwear Traffic and Soil Organic Matter on Creeping Bentgrass Growth
9:50-10:15	**Michael Bekken, Ph.D. student, University of Wisconsin - Soil Science**
	Methods for Quantifying Sustainable Resource Use on Golf Courses
10:15 – 10:30	Break
10:30 – 11:15	**Audrey Simard, M.S. student – University of Wisconsin - Entomology**
	Effects of Pesticides in Guttation Water on Pollinators
11:15 – 12:00	**Dr. Brian Horgan – University of Minnesota**
	Value of Urban Greenspace as a Natural Resource
12:00 – 12:50	**Lunch**
1:00 – 1:30	**Kurt Hockemeyer – Turfgrass Diagnostic Lab**
	2018 TDL Update
1:30 – 2:15	**Mike Krupke - Insight FS** & **Josh Veit - Midwest Athletic Fields**
	Resurfacing Made Easy
2:15 – 3:00	**Dr. Paul Koch – University of Wisconsin - Plant Pathology**
	Impacts of Cultural Practices and Pesticide Applications on the Turfgrass Microbiome

Qiyu(Ada) Zhou is a Ph.D. student in the Department of Soil Science at the University of Wisconsin-Madison. She received joint B.S. degrees in Prataculture Science and Crop and Soil Science from Sichuan Agricultural University, China and Michigan State University. She earned a M.S. degree from UW-Madison in soil science. She is currently studying turfgrass growth model.

Michael earned a B.S. in Biology and Geology and played collegiate golf at the College of William and Mary in Virginia. Michael is currently pursuing a Ph.D. at the University of Wisconsin-Madison under the direction of Dr. Doug Soldat where he is studying resource use efficiency on golf courses.

Audrey received her B.S degree in May 2017 from the University of Wisconsin – Madison in Genetics. She studied identifying the genetic bases of desiccation and cold tolerance in Drosophila melanogaster. She is currently researching how pesticides affect honeybees.

Brian Horgan is a professor and associate head for the Department of Horticultural Science at the University of Minnesota. He holds degrees from Michigan State University, North Carolina State University and the University of Illinois. His research interests focus on the fate and transport of pesticides and nutrients, water conservation strategies, and low-input turfgrass systems.

Kurt manages the Turfgrass Diagnostic Lab at the O.J. Noer Research and Education Facility. He also oversees the field trials conducted as part of Dr. Paul Koch's research program. He received his B.S. in Turf Science and his M.S. in Turf Pathology both from Purdue University. He has been a member of Dr. Koch's research team since fall of 2015.

Josh has over 10 years of experience with athletic field construction. He also has international field experience with Major League Baseball. He received his B.S. in Horticulture, Turfgrass Management from Iowa State University.

Mike is a Certified Turf Specialist for Insight FS. He has spent much of his 25 year turf career as a golf course superintendent. Now his focus is consulting with sports turf managers throughout southern Wisconsin in improving and maintaining their playing surfaces through sound agronomics and turf science.

Paul Koch is an assistant professor in the Department of Plant Pathology as well as the Molecular and Environmental Toxicology Center at the University of Wisconsin-Madison. He joined the faculty in January of 2014. His research has focused primarily on fungicide breakdown in the environment and snow mold diseases on golf course turfgrass.

Complete the registration form below and mail with payment to:
WTA / O.J. Noer Facility / 2502 Highway M / Verona / WI / 53593
You may also register online by going to www.wisconsinturfgrassassociation.org
You may fax completed forms to 608-845-8162. Registrations must be received by December 31st, 2018. Registrations received after December 31st, will be an additional $10 per person.

If you plan on participating in the webinar, make sure your email is included in your registration information. You will be emailed the webinar link by January 4th, 2019. We understand that Wisconsin weather can quickly change. If for some reason your plans change and you are unable to attend at the Pyle Center, contact Audra and she will make sure you get the webinar code.

Company Name_____
Mailing Address_____
City/State/Zip_____
Phone Number_____
Email Address_____

List of names that will be attending at the Pyle Center_____
_____
_____

Non-WTA member	$50 ea X ___ =	$_____
WTA member	$40 ea X ___ =	$_____
2019 WTA Membership Dues	$150 ea	$_____
Total Amount Enclosed		**$**_____

Credit card #_____Exp date_____Security code_____

If you have any questions, contact Audra at audra.anderson@wisc.edu or 608-845-6536. Registrations must be received by December 31st, 2018.