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A Crazy Summer: What Impact Will The Unusual Summer Have On Insects?

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

A crazy summer is probably a huge understatement for many of you, and most of you are likely glad it is finally over! There was little to nothing about this year was anything like "normal." We jumped right-out of the gate in the spring with above normal temperatures, and it seemed to literally never let up with extremely high temperatures and little to no rain for what seemed like months. Initially, many insect populations appeared to be several weeks ahead of a typical year. And then the rain stopped and drought conditions began to manifest.

Just like we humans, insects are highly dependent on water for survival. Without adequate water, insects have little chance for survival. So, for those who kept the water flowing to keep your turf alive, unfortunately by default, you created a hospitable environment for insects and increased your risk for insects infesting your turf than those that choose to allow their turf to go into summer or drought dormancy.

This is especially the case for white grubs such as the Japanese beetle; they prefer low-cut turf that is irrigated! To this end, this fall I have observed areas of turf, where no insecticides were applied and were irrigated throughout the growing season, that were infested with white grubs. To make matters worse, these grub-infested areas also experienced extensive vertebrate feeding damage due to the presence of the grubs, animals such as skunks, raccoons and even turkeys wreaked havoc by ripping-up the turf in search of grubs.

Insects are biological organisms; factors including temperature and moisture contribute to their development and populations. They are cold-blooded animals that are dependent on temperature; most insect species are inactive at temperatures below 50 F⁰ and above 100 F⁰. Because we experienced relatively high temperatures (around 100 F⁰) and we received little to no rain around the time that Japanese beetle adults laid their eggs, most Japanese beetle eggs did not hatch or even survive unless the turf was irrigated. Japanese beetle eggs require adequate moisture to become hydrated and hatch, the gestation period is typically between 3-6 weeks. Despite the fact that Japanese beetle adults emerged about 2 weeks earlier than normal, the development of larvae (grubs) was delayed due to the lack of soil moisture and high temperatures where irrigation was not supplied.

WISCONSIN ENTOMOLOGY REPORT

As far as the impact that this crazy summer has on your management approach of Japanese beetle grubs goes, so long as you made a preventative insecticide treatment (in irrigated turf areas) before or around egg hatch, you should be well protected from damaging grub populations. In the event that you elected to forego a preventative grub control (insecticide) application, and the turf was not irrigated, the likelihood or risk of grub damage would have been quite low.

However, for those areas of turf that were irrigated or somehow were fortunate enough to receive rainfall, but were not treated with a preventative insecticide, they were at a much greater risk of having grubs and likely experienced vertebrate animal feeding damage. As a result, curative or rescue insecticide treatments were probably needed to reduce the grub populations and damage to an acceptable or tolerable level.

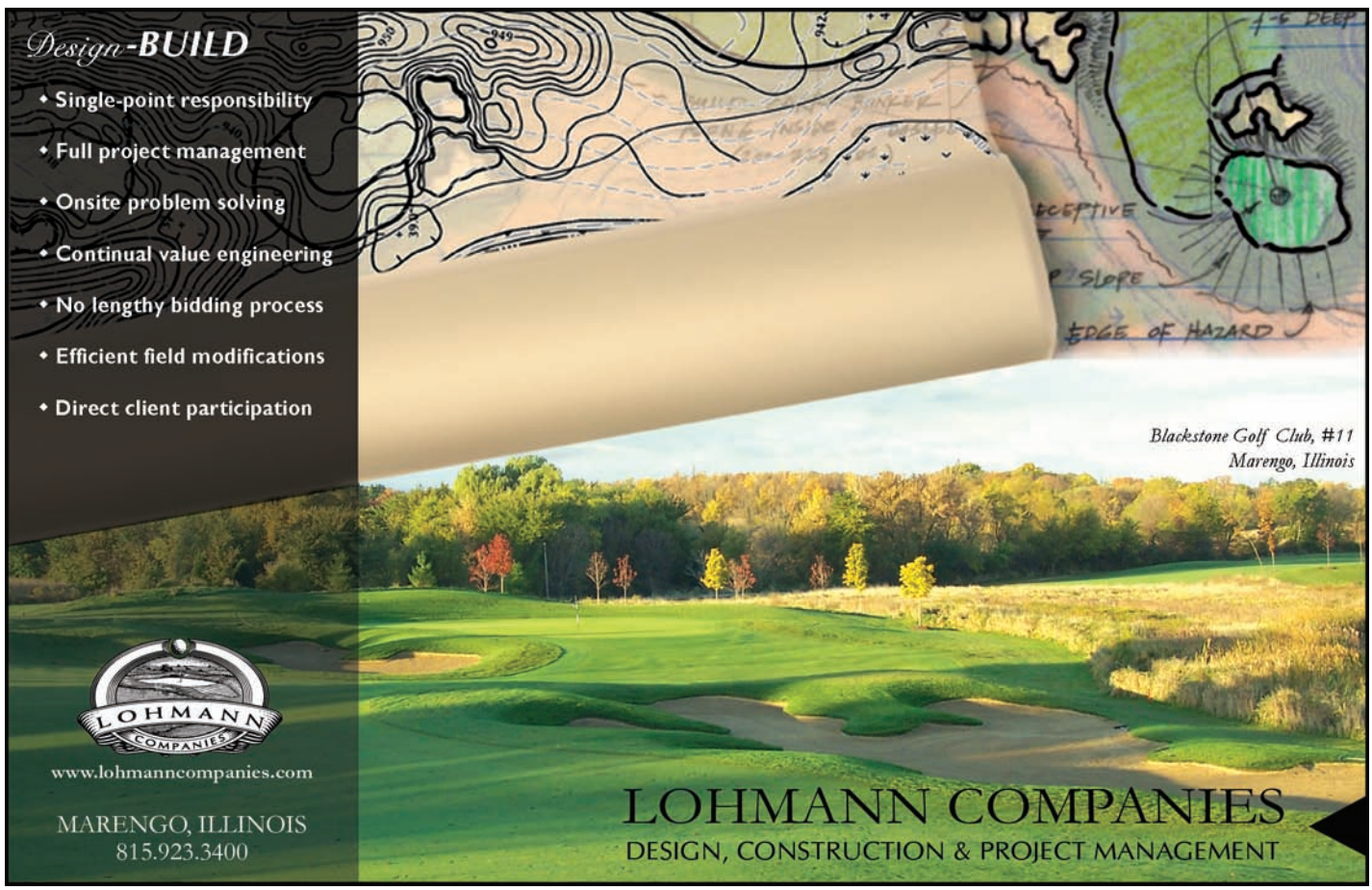
Unfortunately, white grubs are much more difficult to control curatively or correctively compared to preventatively. Most curative (rescue) white grub insecticides have a relatively short-residual activity (< 15 days) and typically provide around 50-75% control while preventive insecticides have rather long-residual activity (> 100 days) and consistently provide > 90% control. For this reason, it is important to routinely inspect the turf for the presence of young larvae so that maximum control can be achieved.

Wisconsin Weekly Weather, Selected Cities, Ending as of 7:00 a.m. on September 23, 2012

City	Temperature						Growing degree days (modified base 50) 1/		Precipitation				
	Avg. max.	Avg. min.	High max.	Low min.	Avg.	Avg. dep. from normal *	Mar. 1 to Sep. 22	Mar. 1 To Sep. 22 normal*	Last Week	Since Sep. 1	Sep. 1 dep. from normal *	Year to date	Year dep. from normal *
Eau Claire	66	41	82	34	53	-5	3057	2374	0.23	1.02	-1.98	20.17	-6.02
Green Bay	66	40	79	32	53	-5	2939	2240	0.41	1.09	-1.33	23.02	+0.46
La Crosse	67	44	78	39	56	-6	3347	2674	0.16	1.14	-1.15	20.13	-6.01
Madison	67	43	76	34	55	-5	3274	2624	0.43	1.33	-1.13	18.30	-7.84
Milwaukee	67	47	77	39	57	-5	3152	n.a.	0.74	2.31	-0.25	22.16	-4.53

1/ Formula used: GDD = (daily maximum (86°) + daily minimum (50°))/2-50°; where 86° is used if the maximum exceeds 86° and 50° is used if the minimum falls below 50°. *Normal based on 1971-2000 data. Source: NCEP/NOAA Climate Prediction Center http://www.cpc.ncep.noaa.gov.
n.a.=not available. T=trace. Source: USDA, NASS, Wisconsin Field Office.

The information from the United States Department of Agriculture, National Agricultural Statistics Service shows growing degree days well above normal through September 22 while in most cases precipitation was well below normal.



Water Volume Doesn't Matter...Or Does It?

By Renee Rioux, PhD Student, Department of Pathology, University of Wisconsin - Madison &
By Dr. Jim Kerns, Department of Pathology, University of Wisconsin - Madison

Editors Note: Renee Rious is a PhD Student in Plant Pathology at the University of Wisconsin - Madison with a minor in Plant Breeding and Plant Genetics. She received her Masters Degree in Botany and Plant Pathology with Genetics concentration from the University of Main in 2010 and her Bachleor of Science Degree from the University of Main in 2008. Renee was awarded a Watson Fellowship from the Golf Course Superintendents Association in 2011.

College of As a PhD student in Dr. Kerns' turfgrass pathology lab, I study virtually all aspects of dollar spot, from where the pathogen is coming from, to how it infects its hosts, and even the molecular mechanisms governing host resistance. This past summer, we added another small project to my research: evaluating the effect of different water carrier volumes on fungicide efficacy for dollar spot control. This has become an increasingly popular subject in recent years because many view carrier volume as a variable that can be manipulated to optimize disease control. With the many issues complicating dollar spot management, getting the most out of available fungicides is no trivial matter. Our goal with this study is to determine if altering carrier volume enhances the efficacy or expands the duration of dollar spot suppression provided by Chipco26GT and two relative newcomers to the market, Secure and Daconil Action.

The Study

This first of two years of this study commenced this past summer and was performed on a creeping bentgrass (cultivar 'Alpha') fairway maintained at a height of 0.5 inches at the O.J. Noer Turfgrass Research Center. All possible combinations of four water carrier volumes and six fungicide regimes were utilized as treatments and were replicated four times in a randomized complete block design (Table 1). An initial spray was put out on June 14th, 2012, at which time no active dollar spot infection centers were present. Dollar spot severity ratings were made weekly by counting the number of active infection centers present in each plot.

Fungicide reapplications were made based on a 1% spray threshold; thus, when infection centers covered greater than 1% of the area in a single plot the treatment in that plot was reapplied to all four replicate plots for the treatment. This allowed us to determine not just fungicide efficacy, but also differences in duration of control for our different treatment regimes. Based on our 1% threshold, two reapplications were made for treatments 5 and 20, but only one reapplication was needed for all other treatments (Table 1). At the end of the trial, severity data was converted to area under the disease progress curve (AUDPC), which gives a single value for disease progress over time, and means were separated using the Waller Duncan test. We looked for effects of fungicide treatment, carrier volume, and interaction between fungicide treatment and carrier volume. The results of this year's trial are described below.

The Results

Unfortunately (or maybe fortunately for many!) the hot dry conditions we experienced this summer were not particularly conducive for dollar spot and much of this trial went without significant symptom development (Fig. 1). Around mid-July, we experienced moderate disease pressure and this resulted in the extra reapplication mentioned before for treatments 5 and 20. Following this outbreak, another hot stretch limited disease development until mid-August. Conditions around this time were highly conducive for dollar spot and all the plots got hammered, resulting in reapplication of all treatments (Fig. 1).

Based on our disease severity over time, the combination of Daconil Action and Chipco26GT or Secure provided the best suppression of dollar spot (Table 2). All other treatments, with the exception of Daconil Action alone, provided disease suppression similar to that of the Daconil Action/Chipco26GT mix. Daconil Action by itself provided poor dollar spot control across all water volumes and its performance was not statistically different from that of the non-treated controls.

Bayer Environmental Science
John M. Turner
Sr. Sales Specialist - Golf
Bayer Environmental Science
Cell Phone: (630) 215-6110
Office: (630) 443-7807
Fax: (630) 443-7839
Email: john.turner@bayercropscience.com

Table 1 Treatments for trial on the effects of carrier volume for dollar spot control

Treatment #	Fungicide(s)	Carrier Volume (gal/1000ft^2)	Rate
1	Nontreated control	0.5	
2	Nontreated control	1.0	
3	Nontreated control	1.5	
4	Nontreated control	2.0	
5	Daconil Action	0.5	2 FL OZ/1000FT^2
6	Daconil Action	1.0	2 FL OZ/1000FT^2
7	Daconil Action	1.5	2 FL OZ/1000FT^2
8	Daconil Action	2.0	2 FL OZ/1000FT^2
9	Chipco26GT	0.5	4 FL OZ/1000FT^2
10	Chipco26GT	1.0	4 FL OZ/1000FT^2
11	Chipco26GT	1.5	4 FL OZ/1000FT^2
12	Chipco26GT	2.0	4 FL OZ/1000FT^2
13	Secure	0.5	0.96 FL OZ/1000FT^2
14	Secure	1.0	0.96 FL OZ/1000FT^2
15	Secure	1.5	0.96 FL OZ/1000FT^2
16	Secure	2.0	0.96 FL OZ/1000FT^2
17	Daconil Action Chipco26GT	0.5	2 FL OZ/1000FT^2 4 FL OZ/1000FT^2
18	Daconil Action Chipco26GT	1.0	2 FL OZ/1000FT^2 4 FL OZ/1000FT^2
19	Daconil Action Chipco26GT	1.5	2 FL OZ/1000FT^2 4 FL OZ/1000FT^2
20	Daconil Action Chipco26GT	2.0	2 FL OZ/1000FT^2 4 FL OZ/1000FT^2
21	Daconil Action Secure	0.5	2 FL OZ/1000FT^2 0.96 FL OZ/1000FT^2
22	Daconil Action Secure	1.0	2 FL OZ/1000FT^2 0.96 FL OZ/1000FT^2
23	Daconil Action Secure	1.5	2 FL OZ/1000FT^2 0.96 FL OZ/1000FT^2
24	Daconil Action Secure	2.0	2 FL OZ/1000FT^2 0.96 FL OZ/1000FT^2

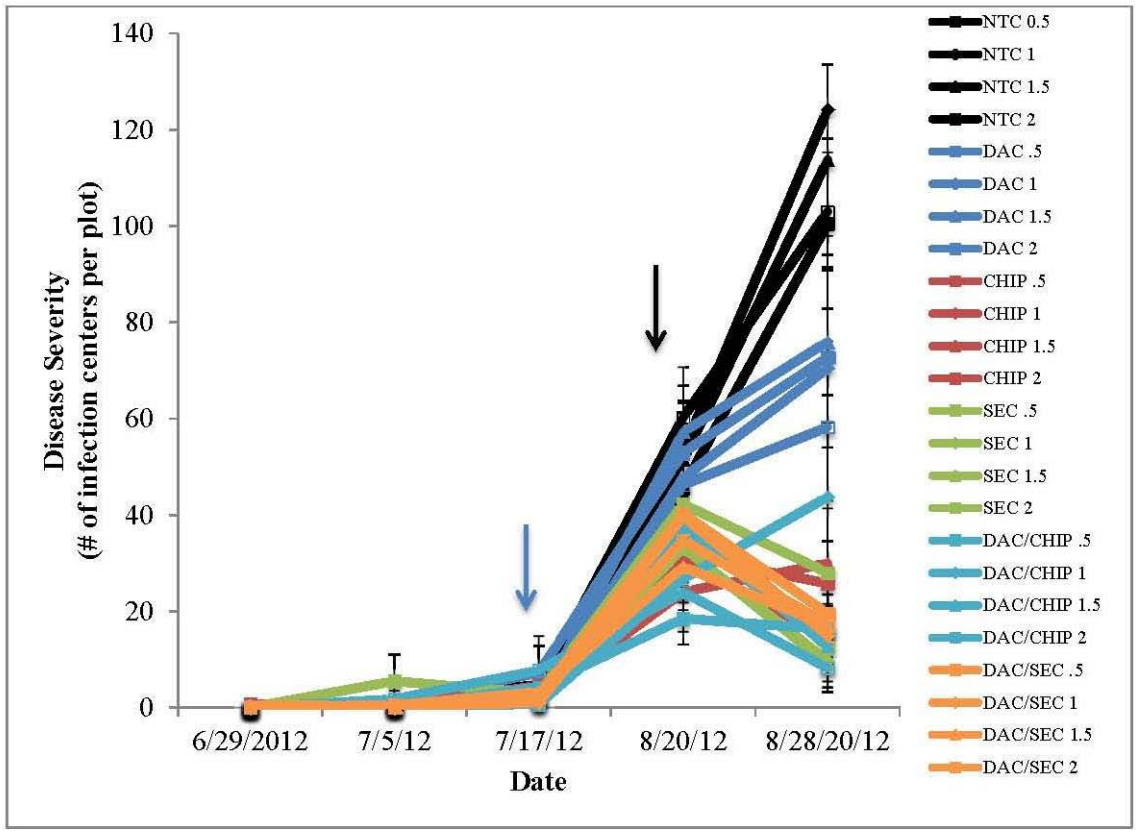


Figure 1. Disease severity over time. Arrows represent fungicide reapplication dates. The blue arrow represents reapplication of treatments 5 and 20 only. The black arrow represents reapplication of all fungicide treatments.

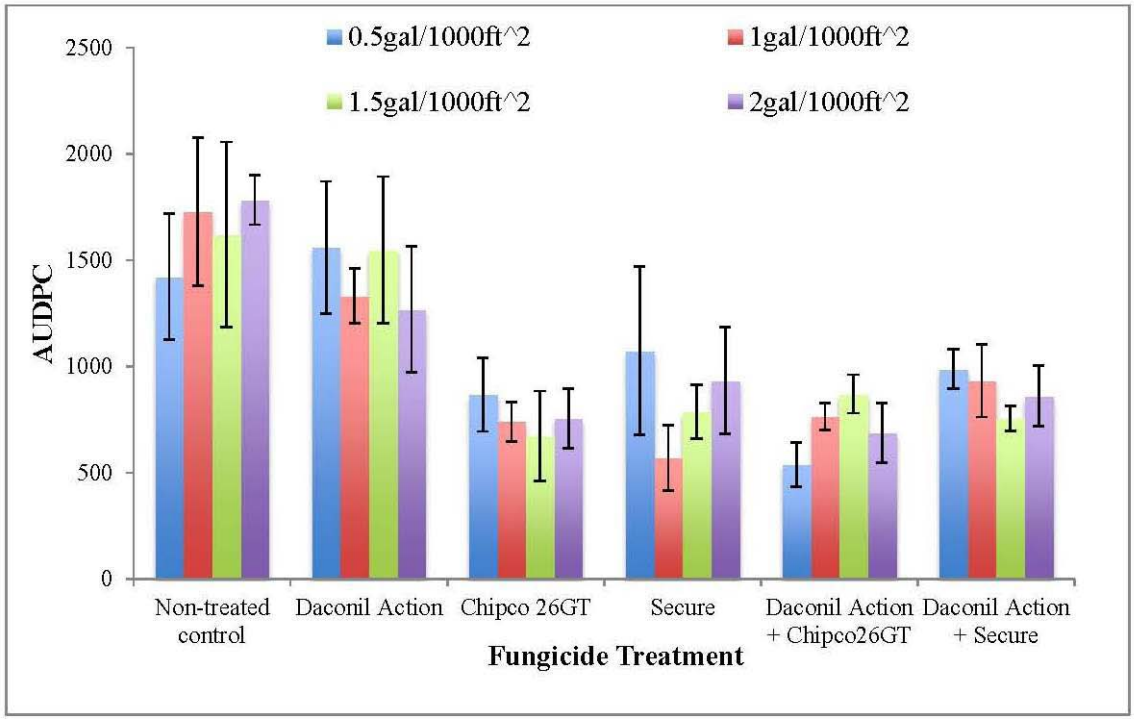


Fig. 2 Dollar spot severity across all fungicide regimes and carrier volumes

This was not a surprise, as the hot, dry conditions in Madison this summer prevented application of the fungicide until it was likely too late to truly prevent dollar spot development. It does, however, reaffirm the need to mix different active ingredients when dollar spot development is extreme. This was evident from both Chipco26GT/Daconil Action and Secure/Daconil Action performing well in our trial. When applied alone, the newest fungicide in our treatment list, Secure, also performed reasonably well when compared to the non-treated control, though not as well as when applied in combination with Daconil Action.

In this year of the study, water carrier volume had very little effect across all of our fungicide treatments (Table 3). Consequently, no difference was detected for carrier volume or the interaction between fungicide regime and carrier volume. These results are reinforced by a comparison across all treatments and carrier volumes (Fig. 2). In general, those fungicide regimes that performed well did so across all carrier volumes and those fungicide regimes that did not perform so well also did so regardless of carrier volume.

Summary

With a single year of data and less than ideal conditions for both dollar spot development and fungicide application, we are currently unable to make any conclusions about the influence of carrier volume on fungicide efficacy for dollar spot suppression. Though results from this year indicate a minimal influence of carrier volume, we may see a completely different trend next summer. Once we this second year of data and are able to make more informed decisions about the role of carrier volume on dollar spot suppression, we will be sure to share our findings. Hopefully, this will allow for the selection of carrier volumes that optimize the efficacy and longevity of fungicide applications for dollar spot management.

Table 2 Dollar spot severity over time as affected by fungicide

Treatment	AUDPC[1]
Nontreated Control	1638.4 a
Daconil Action	1427.1 a
Chipco26GT	884.4 b
Secure	859.0 b
Daconil Action Chipco26GT	758.4 b
Daconil Action Secure	715.5 b

[1]AUDPC values followed by the same letter do not differ significantly (Waller Duncan test, p=0.05)

Table 3 Dollar spot severity over time as affected by carrier volume

Carrier Volume	AUDPC[1]
0.5gal/100ft^2	1075.2 a
1.0gal/100ft^2	1048.3 a
1.5gal/100ft^2	1042.4 a
2.0gal/100ft^2	1029.8 a

[1]AUDPC values followed by the same letter do not differ significantly (Waller Duncan test, p=0.05)

A New Format For The WTA Winter Expo

By Dr. Doug Soldat, Department of Soil Science, University of Wisconsin - Madison

The WTA Winter EXPO has a new look. In fact, the changes were so sweeping, we decided to change the name too. That name is WTA Turfgrass Research Day. The inaugural event will be held on Tuesday, January 15th, 2013 at the Pyle Center in Madison, WI. For those familiar with Madison, the Pyle Center is on Lake Mendota next to the UW Memorial Union.

With so many competing educational events (Reinders Show, Spring Valley Turf Fair, WGCSA Symposium, etc.), we felt the WTA EXPO no longer provided the unique experience it once did, so we made some changes to regain that uniqueness. First, you will be able to attend Turfgrass Research Day via webinar. While in-person attendance is still encouraged and available, many turf professionals are comfortable and may even prefer an online viewing option. The online option may also be preferred by folks that need to plow snow in the event of a storm.

Second, the format of the presentations will be different. The UW-Madison turfgrass team has several talented graduate students and staff that are heavily involved in the research. The WTA funds many of these students through the four Distinguished Graduate Fellowships in Turfgrass Research (the Berbee, Kurth, Kussow, and Newman Fellowships), and many of their projects are also funded by WGCSA. We wanted to give those team members a chance to present the results of the studies they work so hard on every year. The talks from the students and staff will be short and to the point, while the professors have longer more traditional time slots and will cover topics more broadly. Bringing in outside speakers will remain an option for future years, but there is so much turfgrass work being done at UW-Madison that we wanted to share that work with the industry that supports us. Check out the schedule below to get a feel for the variety of presentations being made.

Turfgrass Research Day will be held at the Pyle Center on Lake Mendota in Madison on January 15th, 2013.

We are very excited about the new format and hope you are too. This is only the first year, and we have already discussed some other innovative and exciting ideas that will be implemented in future years.

Registration costs are very reasonable. WTA member price is $25 and non-member is $40 for the online webinar. The cost is $40 to attend the live research day at the Pyle Center and that will include snacks, refreshments, and lunch. You may register and pay online at www.wisconsinturfgrassassociation.org, or print off a registration form from the website and mail in your fee. Contact Audra Anderson at 608-845-6536 or ajander2@wisc.edu if you have any questions. Hope you are able to partake in this inaugural Turfgrass Research Day. There will be so much to learn!

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WISCONSIN TURFGRASS ASSOCIATION

Turfgrass Research Day Schedule (January 15, 2013)

8:00: Coffee and donuts
8:30: Welcome/Introductions/Announcements/Scholarship Presentation
8:45: Radiometric sensing as a turfgrass evapotranspiration measurement tool (Brad DeBels, Soils Ph.D. Student)
9:00: Understanding the dynamics of carbon storage in turfgrass system (Sabrina Ruis, Soils Ph.D. Student)
9:15: Iron layering in sand-based putting greens (Glen Obear, Soils M.S. Student)
9:30: Algae and bicarbonate: is there a connection? (Glen Obear, Soils M.S. Student)
9:45: Trends in bentgrass fertility (Dr. Doug Soldat)
10:15: Coffee Break
10:30: Plant defenses against dollar spot (Renee Rioux, Plant Pathology Ph.D. Student)
10:45: Effect of snow cover on the duration of Microdochium patch control provided by chlorothalonil on golf course turfgrass (Dr. Paul Koch)
11:00: Effect of temperature and mowing on the persistence of iprodione and chlorothalonil on golf course turfgrass (Dr. Paul Koch)
11:15: Getting the most out of your fungicide program (Dr. Jim Kerns)
12:00: Lunch
1:00: Controlling black cutworm: some products work, other just don't… (PJ Liesch, Entomology Research Staff)
1:15: Which caterpillars are chewing on your turf, and what is chewing on them? (PJ Liesch, Entomology Research Staff)
1:30: Do fungicides provide control of white grubs? (Glen Obear, Soils M.S. Student)
1:45: Year in review, and a glimpse to the future (Dr. Chris Williamson, Entomology)
2:30: Coffee Break
2:45: Nitrous oxide emissions and nitrate leaching from synthetic and alternative turfgrass management programs (Mark Garrison, Nelson Institute for Environmental Studies Ph.D. Student)
3:00: Do native plant mixtures reduce invasions along roadsides in Wisconsin? (Joslyn Mink, Agronomy Ph.D. Student)
3:15: Organic and Reduced Risk Turf Management (Dr. Doug Soldat, Soil Science)
4:00: Adjourn

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What Is Plant Health?

By Dr. Jim Kerns, Department of Pathology, University of Wisconsin - Madison

Much time was spent lately discussing plant health and focusing agronomic programs on promoting plant health. This is an interesting discussion because I ask myself what plant health actually is. For some, it seems to mean spraying a cytokinin or a pigment for others it's a more holistic approach. Lets take a step back and try to remember what a plant actually needs to survive: light, food, air and water. Periodically a plant protectant of some sort is required as well. Before thinking about next season, try to reflect on this past summer and ask yourself did you provide the basic necessities for the plant.

Light:

Regardless of what is said about shade tolerance, most of the grasses we grow on golf courses need light. Of course I would say that data is the best way to evaluate the quantity of light your putting surfaces are getting, but it is very true. Now Spectrum Technologies has developed portable light meters and have also had an article published in GCM (Mark Leslie, September 2012) on how much light is needed. Most of the article focuses on providing ultra-dwarf bermudagrass with the appropriate amount of light, but the work can be applied to annual bluegrass/creeping bentgrass putting greens. Once again I would suggest collecting data on problem putting greens and compare that to non-problematic putting greens. This will give you an excellent idea on what might be causing issues on the problem greens. At the very least these meters may help you remove inadequate light as a means of poor plant health.

Air:

Airflow is of utmost importance for maintaining healthy turf on putting surfaces. Why? Air movement across putting surfaces can cool the surface by 5 to 7 degrees, which is why fans are a great idea for putting greens that are in secluded, sheltered areas. Moreover as air moves across the plant surface it facilitates transpiration because it moves the water molecules out of the sub-stomatal cavities. Remember that stomates are essential to cooling the plant surface without transpiration the plant cannot cool itself. I think the most important tool to evaluate airflow or surface temperatures is a thermometer.

An infrared thermometer would work, but so would an old fashion soil thermometer. If there is a green that is struggling and you suspect airflow is the major reason then start collecting data documenting temperature differences between putting greens with excellent airflow to those that have poor airflow. I know this may not convince golfers to remove trees or conduct some minor renovations, but at least now you have data to show them when they ask why this one particular green is struggling.

Roots need air as well. Roots are dependent on the shoots for carbohydrates and to burn the carbs oxygen is needed. To facilitate air movement, venting is needed as well as light and frequent topdressing. Both of these practices will also likely reduce soil temperatures and promote root survival.

To my knowledge, I have not seen research documenting temperatures in response to topdressing and venting practices. Yet I suspect topdressing and venting help reduce soil temperatures temporarily especially at night. Plus I saw a presentation from Dr. Roch Gaussoin from Nebraska show data that topdressing is the most effective method to reduce organic matter!

Fans like this one at Farmlinks Golf Club are needed to increase airflow on secluded putting greens.