The GRASS ROOTS AN OFFICIAL PUBLICATION OF THE WISCONSIN GOLF COURSE SUPERINTENDENTS ASSOCIATION

VOL. XLV ISSUE 1 JANUARY/FEBRUARY 2016





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The 8th Hole at Sentry World in Stevens Point features a 381 yard Par 4. Sentry World hosted our August Meeting.

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If we had no winter, the spring would not be so pleasant: if we did not sometimes taste of adversity, prosperity would not be so welcome.

By English Poet Anne Bradstreet, 1612-1672

This quote by Bradstreet can remind us the cold of winter will give appreciation for the warmth of spring and the trials of life bring greater joy to the triumphs.

THE GRASS ROOTS

is the bi-monthly publication of the Wisconsin Golf Course Superintendents Association. No part of the THE GRASS ROOTS may be used without the expressed written permission of the editor. **EDITOR**

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Persistence Pays Off

By Jim Van Herwynen, Certified Golf Course Superintendent, South Hills Golf and Country Club

For those of you who attended the 50th Annual Golf Turf Symposium titled "How Are We Doing as an Industry", thank you! Participation has increased over the last couple years and we hope this trend continues. For those of you who did not please consider joining us next year as the Golf Turf Symposium is a valuable resource for continuing education, networking, and remaining fresh in an industry that is changing more rapidly than it ever has. Plans have started already for the 2016 Golf Turf Symposium and I am sure you will be delighted to hear about the upcoming topics.

At the Symposium we were enlightened to hear about many topics pertinent to our industry and one that sticks out for me was an overview of the state of the industry. Whether you attended or not I am sure over the last few years you have heard that we have reached a point where we are stabilizing with course construction and closures and we all hope we have seen the worst of budget cuts and a weak economy. We are not there yet but getting closer, and for many it has been a tough time to be in the golf course industry.

There are fewer students getting into the Turfgrass Management Program here in Wisconsin and the market has been dismal at best. I personally see this trend starting to go the other way, in other words, getting better! There appears to be a slow but steady resurgence after talking to many of you and simply paying attention to the industry. What was the norm, for possibly decades is changing rapidly.

Facilities are reinventing themselves, spending capital dollars on infrastructure and amenities to entice, being more aggressive through marketing and offerings for a wide range of skill levels and cliental.

Some may think that they are wasting their time and effort in this industry and I have had close friends change careers whether a Superintendent, Assistant Superintendent, Vendor or Student. I have always said you have to take care of yourself, your family and follow your dreams. Patience sometimes is the hard part. If your passion is golf course maintenance and management hang in there. Educate yourself, stay current with trends and topics, participate in the WGCSA and other turf related organizational offerings and if you're a student join your state and national chapters! By being affiliated you can stay current with the industry. I believe if you fall behind there are a number of great candidates to quickly take the lead.

Some may call it stalking I called it patience and persistence. Sometimes when you know something is right, follow your dreams and be patient, persistence pays off.

Patience and persistence sometimes is not easy. I like to tell a personal story from time to time when I meet new people especially younger individuals who think they can have everything now and are not willing to wait. I enjoy storytelling and I am going to share with you a true story of my life that portrays patience and persistence. My wife and I met in 7th grade, both coming from different elementary schools. She sat in front of me in English class and I quickly realized there was a connection, or at least I thought there was? I asked her to a dance and she said – no.

In 8th grade again another dance the answer being – another no. Ninth grade, the last year before high school, last dance of middle school - no! Now entering high school the stakes are a little higher as I thought I was so much more mature so I asked her to Homecoming - nope. In eleventh grade the cocky side of me took over and thought, I will let her ask me. Today in many high schools all over the country there is a dance called the Sadie Hawkins. At Kimberly High School in the early 80's it was known as "Hag Drag". This is a dance where the girl asks the guy - I never got asked by her. Now we enter the twelve grade - last chance. Somehow I got nominated to sit on the Prom Court but had no date for the prom. I heard the prom queen was available so what the heck I asked her - she said - yes! The only problem was I needed to have someone to dance with me on the court dance because the queen, of course, had to dance with the king. So as one would expect I went back to the well once more, knowing she had a date for the dance - she said yes! I thought this would be the only time to have any relationship with this woman albeit one song. It went very well, I was somewhat content, and we graduated.

After graduation I continued working at North Shore Golf Club in Menasha and she lived one block off of my route so naturally every day after work I would drive by on my motorcycle trying to get a peek of her laying out in the sun. Finally one day I had the courage to stop by and asked about future plans and ultimately asked her to a movie - she said - yes!! Fast forward 30 years and we are still best friends and married for almost 24 years with two wonderful young adults!! Some may call it stalking I called it patience and persistence. Sometimes when you know something is right, follow your dreams and be patient, persistence pays off.



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Cultural and Chemical Weed Management in Non-mowed Fine Fescue Roughs

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

A s native fine fescue rough areas grow, finding effective chemical and cultural management of weeds is becoming a high priority. These areas are intended or are perceived to reduce maintenance costs and environmental impact; however, a solid understanding of how to manage them is lacking which has led to possibly excessive inputs of chemicals and labor to obtain the desired visual effect. In response, the WGCSA, Northwestern Illinois GCSA, and the USGA have graciously provided the funding to evaluate various cultural and chemical management strategies in fine fescue roughs.

We've been working with Neil Radatz, CGCS at Hawks Landing Golf Club in Madison where we've initiated three separate trials. The first trial investigates the impact of three cultural management strategies (mowing and removing mate-

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rial, mowing and returning material, and not mowing) on weed and desirable grass composition. Each strategy is evaluated either with or without chemical control consisting of Barricade (1 lb/acre), Speed-Zone (1.5 oz/1000 sq. ft.), and Milestone (4 oz/1000 sq. ft.). A second trial evaluates the performance of five different herbicides on weed composition. Finally, a third trial evaluates the efficacy of various rates and timings of glyphosate on spring weed control. The hypothesis is that glyphosate at low rates can be useful for controlling early season weeds (i.e. quackgrass) without harming desirable grasses such as fine fescue. For all three studies plot size is 6 ft. by 10 ft. with each treatment replicated four times and arrayed in a randomized complete block design. Visual estimates of plant populations are made in spring, summer, and fall. We are currently in the

middle of these experiments, so the results below are preliminary but might be useful for making decisions this coming year.

For the cultural management trial, we observed that the combination of an annual mowing and spring herbicide application resulted in the lowest weed populations. This finding was not too surprising; however, when no herbicide was applied mowing actually increased weed populations (Table 1). Also if the plots were not mowed at least once per year, herbicide applications had no effect on weed populations in the fall of 2015.

The chemical efficacy trial showed good control of broadleaf weeds in the first two years of the study as all treatments resulted in substantially lower weed populations than the non-treated control (**Table 2**).

October 8, 2015. Mowing treatments and chemical applications were initiated on May 20, 2014.							
Mowing	Herbicide*	Desirable	Bare Soil	Grassy	Broadleaf	Total	
	Applied	Grasses		Weeds	Weeds	Weeds	
Mowed, Returned	Yes	92.5 A	3.8 A	2.5 A	1.3 B	3.8 C	
Mowed, Returned	No	49.5 C	1.8 A	11.3 A	37.5 A	48.8 A	
Mowed, Removed	Yes	88.8 A	3.8 A	6.3 A	1.3 B	7.5 C	
Mowed, Removed	No	62.5 BC	3.8 A	2.5 A	31.2 A	33.8 AB	
Not Mowed	Yes	82.5 AB	5.0 A	11.3 A	1.3 B	12.5 BC	
Not Mowed	No	82.5 AB	3.8 A	1.3 A	12.5 B	13.8 BC	

Table 1. Grass and weed composition of plots under various mowing and chemical management on

* Herbicide treatment included Barricade (1 lb/A), SpeedZone (1.5 oz/1000 sq. ft.), and Milestone (4.0 oz/1000 sq. ft.) in sprayed at 2 gallons/1000 sq. ft.

Table 2. Grass and weed composition on October 8, 2015 as affected by herbicide application. Chemical applications were made on May 20, 2014.

Herbicide Treatment	Desirable Grasses	Bare Soil	Grassy Weeds	Broadleaf Weeds	Total Weeds
Exp. Tmt 1 (4 pts/A)	92.3 A	2.5 A	1.8 B	0.5 B	2.3 C
Confront (2 pts/A)	90.8 A	1.8 A	3.8 AB	3.8 B	7.5 BC
Confront (4 pts/A)	82.5 A	1.3 A	15.0 A	1.3 B	16.3 B
Milestone (6 oz/A)	93.8 A	1.3 A	1.3 B	3.8 B	5.0 BC
SpeedZone (2 pts/A)	88.8 A	1.3 A	2.5 B	7.5 B	10.0 BC
Non-treated control	43.3 B	1.8 A	6.3 AB	48.8 A	55.0 A

WISCONSIN SOILS REPORT



Image 1. Weed management in non-mowed areas creates headaches for golf course superintendents.

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The interesting aspect of this trial is that we are using Milestone, a reduced risk herbicide that is not labeled for turfgrass use. Milestone's active ingredient is aminopyralid and it is used for invasive species control and restoration of native plant communities. It is labeled for wetlands and certain aquatic settings. It has pre and post-emergent control, a low use rate, and is quite economical. Milestone controls many broadleaf weeds and is particularly effective on thistles.

The pesticide program manager for DATCP has indicated that it is acceptable for products labeled for grassland, natural areas, or similarly described noncrop areas (like Milestone) to be used in managed grassland areas on golf courses. This opens up many options, and some that will be more effective and economical than herbicides labeled for turfgrass use.

On the topic of economics and low use rates, our third trial (in its first year) has found that May-applied glyphosate (at very low rates) and Barricade resulted in similar weed control and increased playability than fall applied broadleaf herbicides. (**Table 3 and Image 2**). However, these differences disappeared by October (**Table 4**). The site for this experiment is in a relatively wet area and was very thick with both desirable and undesirable vegetation. Our goal was to thin out all plants, leaving a stand of fescue that someone could find a golf ball in. We strongly caution applying low rates of glyphosate to large areas until we have a few more years of experience under our belts. However, the practice shows promise for thinning out over-grown areas without breaking the bank. We are also testing ForeFront (aminopyralid and 2, 4-D) and Chapparal (aminopyralid + metsulfuron methyl) in this trial as potential for use in these managed grasslands surrounding the play areas on golf courses.

We hope these trials can shed some light on the problems of weed control in the ever increasing areas of non-mowed roughs in Wisconsin. We plan to continue these trials and hopefully gain some more insight as time goes on. If you have ideas on products or strategies we should test, don't hesitate to let me know.

Table 3. Grass and weed composition on July 1, 2015 as affected by herbicide application. Chemical applications were made in spring 2015 with the exception of ForeFront and Chapparal which were applied in Fall 2014.

Herbicide Treatment	Desirable	Bare Soil	Grassy	Grassy Broadleaf		Playability**
	Grasses		Weeds	Weeds	Weeds	
Non-treated control	65 AB	3 D	10 A	23 BC	32 BC	3 A
ForeFront (fall applied)	82 A	4 CD	11 A	3 D	14 C	2.5 ABC
Chapparal (fall applied)	79 AB	5 BCD	7 A	9 CD	16 C	2.75 AB
Glyphosate 1 lb Al/acre in April*	36 C	4 CD	5 A	55 A	60 A	2.75 AB
Glyphosate 2 lb Al/acre in April*	45 C	6 BCD	9 A	40 AB	49 AB	3.0 A
Glyphosate 1 lb Al/acre in May*	75 AB	10 B	8 A	8 CD	15 C	1.75 C
Glyphosate 2 lb Al/acre in May*	57 ABC	21 A	3 A	19 BCD	22 BC	2.0 BC
Glyphosate 1 lb Al/acre in June*	63 ABC	8 BC	5 A	24 BCD	29 ABC	2.75 AB

* also included Barricade at 1 lb of product/acre

**A subjective assessment of the ability of an average golfer to play a shot out of the treatment and back into play with a reasonable chance of success. Rated on a 1 to 3 scale with 1 being playable, 3 being unplayable, and 2 intermediate.

Table 4. Grass and weed composition on October 8, 2015 as affected by herbicide application. Chemical applications were made in Spring 2015 with the exception of ForeFront and Chapparal which were applied in Fall 2014.

Herbicide Treatment	Desirable	Bare Soil	Grassy	Broadleaf	Total	Playability**
	Grasses		Weeds	Weeds	Weeds	
Non-treated control	75 A	0.0 A	15 A	10 B	25 A	3.0 A
ForeFront (fall applied)	65 A	2.5 AB	20 A	13 AB	33 A	3.0 A
Chapparal (fall applied)	80 A	1.3 AB	6.3 A	13 AB	19 A	3.0 A
Glyphosate 1 lb Al/acre in April*	53 A	2.5 AB	6.3 A	39 A	45 A	3.0 A
Glyphosate 2 lb Al/acre in April*	54 A	10.0 A	8.8 A	28 AB	36 A	3.0 A
Glyphosate 1 lb Al/acre in May*	83 A	1.3 AB	5.0 A	11 AB	16 A	3.0 A
Glyphosate 2 lb Al/acre in May*	74 A	3.8 AB	1.3 A	21 AB	23 A	2.5 B
Glyphosate 1 lb Al/acre in June*	79 A	1.3 AB	5.0 A	15 AB	20 A	3.0 A

* also included Barricade at 1 lb of product/acre

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**A subjective assessment of the ability of an average golfer to play a shot out of the treatment and back into play with a reasonable chance of success. Rated on a 1 to 3 scale with 1 being playable, 3 being unplayable, and 2 intermediate.

WISCONSIN SOILS REPORT



Image 2. A combination of Barricade and a low rate of glyphosate (1 lb active ingredient per acre) applied in mid-May killed weeds and thinned out the fescue in this overgrown non-mowed area and kept weeds out for most of the summer. However, the plot was once again too thick for play by October.



TURFGRASS DIAGNOSTIC LAB

2015 Wrap Up

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

We ell winter has finally arrived. Last night we received 6" of snow and freezing rain. For the last month there has been ongoing conversations about re-treating for snow mold. After the recent snowfall and the predicted low temperatures I think the decision was made for us. I am hearing rumors of a few superintendents that are worried about the wet conditions under the snow and possible ice formation on top of what might have been actively growing annual bluegrass. As I write this it may be too early to tell. Since no one can predict what will happen to our turf, it might be time for a small article, blog post or email to golfers forewarning them of the possibility of some disease in spring. As always I hope I am the crying wolf, but better safe than sorry.

Now on to the 2015 season wrap-up. From the conversations I had with many of you, the year was not a particularly difficult year to grow grass. The number of samples, emails, texts and telephone call to the TDL might challenge that idea. This past year was a very busy one at the TDL. My contact with turf growers when compared with last year looked like this:

ТҮРЕ	2014	2015
Email	333	593
Telephone Call	197	474
In Person	279	596
Texts	127	266
Sample Submission	127	266
TOTAL	975	2006

The wet period from May into June may have been a factor in the increase. In June Dr. Koch and I had many a conversation about how this wet weather and cool soil temperatures favored possible patch disease development. The earlier part of this stretch was perfect for Necrotic Ring Spot, *Ophiosphaerella korrae*. We hypothesized that many general turf areas would be affected by this disease this year. These same conditions pointed to an increase in Take-all-patch, *Gaeumannomyces graminis var. avenae* (TAP) and Summer Patch, *Magnaporthe poae* (SP) for golf courses.



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TURFGRASS DIAGNOSTIC LAB

Combining the soil temperatures and extra moisture the conditions as they say were ideal. On any bentgrass area where drainage might not have been adequate the discussion turned to Basal Anthracnose. Unfortunately as the year progressed the diseases we feared appeared just like predicted. The table on the right shows the comparison of disease from 2014 to 2015.

Each year the TDL becomes more and more a regional lab and that is due to the good work that was done here long before I arrive and the goal to keep our standards high and response time short. I have observed that once the TDL can assist someone in a new region they tell their counterparts and we begin to see more samples from that area. The sample breakdown by state is below:

Use by State	2014	2015
CA	3	1
со	1	2
IA	8	9
ID	0	1
IL	8	24
IN	3	0
кѕ	0	2
мі	6	2
MN	16	29
МТ	0	3
МТ	0	4
ND	4	6
NE	0	8
NJ	1	0
он	8	8
SD	3	4
WA	0	3
WI	76	160
р. 2	137	266

Samples By Disease	2014	2015
Abiotic	28	47
Algae	2	1
Anthracnose	8	10
Ants	3	0
Ascochyta	3	3
Bad Sample	0	3
Basal Anthracnose	16	24
Bill Bugs	0	1
Bipolaris	12	11
Black Layer	0	2
Brown Patch	1	0
Brown Ring Spot	0	1
Chinch Bugs	0	2
Dreschlera	5	0
Grass & Weed ID	4	23
Dollar Spot	2	3
Fairy Ring	1	4
Fertilizer Burn	0	2
Fungus Gnats	0	1
Grubs	0	1
Microdochium nivale	0	8
NRS	12	53
PGR Damage	3	5
Pythium	8	7
Rapid Blight	1	0
Septoria Leaf Spot	0	3
Summer Patch	14	36
Take-all-patch	14	14
Yellow Tuft	0	1
	127	266
	137	200



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TURFGRASS DIAGNOSTIC LAB

The breakdown of samples by submitter was also very interesting:

Golf Courses	151
Sod Growers	10
Lawn Care	51
Homeowners	54

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The majority of the lawn care and homeowner samples were Necrotic Ring Spot (NRS). The lab normally receives a large number of NRS samples from this part of the turf market. Very often these NRS samples come from general turf area that is being irrigated. Irrigation in this market is set it and forget it. The system is charged in April, the controller is then set to water 3 days a week and not changed. Turf normally does not even need to be watered until sometime in June, but the constant irrigation produces the perfect cool, wet conditions for the development of this disease during May and early June. This year however I saw many more cases of NRS on non-irrigated turf. NRS is always present in the soil just waiting for the proper conditions to infect the roots and cause damage. Unfortunately in general use turf there are no curative applications once the symptom become visible, by then the fungus has gone dormant and we have to live with the issue. If the damage is bad enough then over seeding in the fall is required.

The two main golf root pathogens in golf, Summer Patch and Take-all-patch, did their fair share of damage. Just like the NRS by the time we see the symptoms the damage is done.

The cases of Basal Anthracnose this year were up 50%. Like the root pathogens we worry about every year, Basal Anthracnose also flourished in the spring wet cool weather. We see this in bentgrass fairways usually in poorly drained areas. The symptoms can look somewhat similar to the root pathogens but we can make control applications for Basal Anthracnose. The infection is on the crown area of the plant and is the same disease as we battle on Poa annua in the summer. We then know we have many fungicides to battle this infection just like on Poa annua. The key to control of this disease to make sure the control products are delivered to crown area of the infected plants. In some cases the thatch layer in these samples will inhibit accomplishing our goal. Remember we only have acropetal systemic fungicides so that once they are absorbed into the plant they only travel up! Keep this in mind as you refine your fungicide programs for 2016.

As the year came to a close I refer back to the initial paragraph of this article. As scheduled most superintendents sprayed



Symptoms from Basal Anthracnose on creeping bentgrass.

for Snow Mold in early November. Our last big trial was sprayed on November 20 just before the first snowfall of the year. Then October weather came in December and it warmed up, rained in various amount throughout the state, soil temperatures remain above freezing, and the calls came discussing the fate of the fungicide. As the month dragged on the answer became less and less clear as what to do. In the third week of December we had the first reports of Michrodocium nivale, Pink Snow Mold (PSM) on untreated turf. The next week there were a few reports of PSM on treated turf and this was not from a miss applications. Some Superintendents made the decision to re-spray at least greens and some re-sprayed tees and fairways. What was the right answer? Were the condition more like fall and the fungicides were gone? Based of Dr. Koch's PhD thesis were these fungicides gone? The answer is I do not think anyone actually knows for sure. This will be a great year to get some incite into these questions.

By the time you read this we may have more answers since Dr. Koch is again doing Winter Degradation Study for Snow Mold fungicides. We have been taking plugs out of our test plot every two weeks and they are being analyzed for fungicide persistence as you read this article. It will be very interesting to see at what time period he ceases to find these chemistries in the turf. Then we will wait until snow melt to see how the turf survived. It will be a long and uneasy winter.

That is the nickel tour from 2015. I want to thank all our contract members for your support! With the state budget cuts the continued running of the TDL might not be possible without your support. The TDL is your insurance policy for your turfgrass issues. I encourage more of you to become TDL Contract Members. This was the year that the bi-weekly updates were very helpful. If you were a Contract Members you would already know everything I wrote here. If while reading this you thought, "I wish I had heard that last summer", then by all means you NEED to be a TDL Contract Member. Get in touch with me and can explain all Dr. Koch and I do for our contract members.

Get some rest, the unpredictable spring will be here soon!



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Everything Under the Sun 2016 WTA Turfgrass Research Day / Conference and Webinar

By Tom Schwab, Manager, O.J Noer Turfgrass Research and Educational Facility, University of Wisconsin-Madison

The best way to describe this year's WTA Research Day Conference and Webinar is that it had 'Everything Under The Sun.' The conference included traditional subjects of weed control, turf diseases, and insect management, as well as unique topics such as long range weather forecasting, managing risk and liability, and turf care at Miller Park.

The conference was held at the Pyle Center on the UW-Madison campus on January 5th to an appreciative audience of onsite attendees and webinar participants. There were 88 registrants that ventured to Madison for the live conference. An additional 20 registrants participated through the online webinar option that was added three years ago for those who preferred to listen off-site.

The first speaker was Sam Bauer from the Horticulture Department at the University of Minnesota. Mr. Bauer spoke about weed control programs for sports turf fields, although everything he talked about could be applied to any turf area. He stated that a successful weed control program is begun by setting goals and priorities for different turf areas. He emphasized that to fix weed problems, you must first correct any underlying problem such as compaction or poor drainage. He shared information about products and practices to control or prevent most every weed problem you can face. Lastly he recommended a great resource for learning more about turf herbicide and growth regulators, a guidebook from Purdue University called Turfgrass Weed Control for Professionals by Aaron Patton.

The next presentation was by Dr. Chris Williamson who talked about strategies for managing earthworm castings in turf. He started out with earthworm biology, there being 200 species in North America, but only three that we have to deal with in turf. He spoke about their beneficial attributes and also why they've become much more of a problem in certain areas in recent years. This is due to long-lived toxic old chemistries that were used as pesticides 25 to 50 years ago are just now wearing out. There are no current pesticides labelled for earthworm control. Yet some other products have shown success in reducing activity because they prove to be an irritant towards earthworms. Those products are Black Jack and Amber Jack from the coal and paper industry respectively. Another product is Early Bird, an organic 3-0-1 fertilizer. The bottom line according to Dr. Williamson is that there is no specific management strategy that will totally eliminate earthworm castings but various strategies can reduce castings to a tolerable level.





88 turf managers attended the research day conference and webinar at the Pyle Center with more watching through the webinar.

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Next, Dr. Doug Soldat spoke about several of his 2015 research projects and findings. Those included Plant Growth Regulator GDD Tracker, Kentucky bluegrass NTEP results, weed management in un-mowed areas, polymer coated urea performance, potassium soil test calibration, and biological product evaluations. So much good information was presented, but one finding that caught my attention was potassium levels. His research found that as tissue potassium increases, so does grey snowmold incidence on creeping bentgrass. Thus the old practice of applying high K late season fertilizer should be reconsidered if still being practiced on bentgrass.

The last talk before lunch was about trending meteorological topics by Jeremy Nelson from WISN in Milwaukee. Specifically he talked about El Nino, winter, and the long range forecast. The El Nino we are experiencing this winter is one of the six strongest of the last 65 years. But there are other factors other than a strong El Nino that go into long range forecasting. Mr. Nelson looks at weather out in the Bering Sea off Alaska to predict weather that will be hitting us two weeks later. Seasonal long range forecasting predicts weather even further out when more factors are included in the equation. To see if he is correct, I'll share some of his spring 2016 predictions that he made on January 5, 2016. Southern Wisconsin's spring should have above average precipitation with May potentially the wettest. Spring should also have near average temperature until June, which will be above average. If his predictions come true, you may want to subscribe to his twitter account for further updates, @jnelsonweather.

Next came a delicious lunch and time to catch up with fellow participants. Our first speaker after lunch was Michael Boettcher, director of grounds with the Milwaukee Brewers. He explained that Miller Park has been a turf research project from the beginning. The lack of sunlight and using the field for many alternative events like soccer games and music concerts have taken their toll on turf health. But progress is being made through use of more shade tolerant cultivars, renovating with sand-based rootzone sod, using portable grow lights, and other techniques. These improvements resulted in replacing only 1,000 square feet of sod for the 2015 season as compared to re-



18



Jeremy Nelson, WISN Milwaukee, Meteorologist

placing up to 200,000 square feet in some past years.

Following Mr. Boettcher, another interesting talk was given by Dr. Glen Stanosz, Professor of Tree and Forest Health from the UW-Madison. He gave a talk about managing tree risk and liability on your golf course. Dr. Stanosz told us that we are all good at growing grass which has our heads looking down most the time. Sometimes we need to look up and see if a tree has become a potential hazard from disease or storm damage. If we don't feel qualified, we could hire a tree risk assessor. Dr. Stanosz said we could be held responsible if a tree limb fell and injured one of our patrons or employees because as site managers, we have the legal duty to ensure that our properties are safe.

To finish the day's array of spectacular education, Dr. Paul Koch gave a talk about 'The Danger Lurking Below; How Patch Diseases Can Ruin Your Summer,' This was a great refresher on three root infecting diseases, Take-all Patch, Necrotic Ring Spot, and Summer Patch, that can devastate turfgrass in the summer and into the fall. Dr. Koch described the disease triangle of factors that promote infections, how to identify these three diseases, and presented strategies for preventing severe outbreaks and reducing the level of damage should one occur.

WTA Turfgrass Research Day 2016 covered a large range of subjects that were very relevant to attendees. The planning committee of Dr. Soldat Dr. Koch, Aaron Goninen, Audra Anderson, and Bruce Schweiger should be commended. The generous sponsors that helped bring you Turfgrass Research Day 2015 should also be thanked. Please show these sponsors, listed here, your gratitude for supporting quality education. And thank you, speakers, both near and far, for sharing your knowledge with us.







Top Left: Dr. Chris Williamson, UW-Madison, Entomology

Top Right: Dr. Paul Koch, UW-Madison, Department of Plant Pathology

Bottom: Dr. Doug Soldat, UW-Madison, Soil Science Department

Thank you to all our sponsors!



Shane Conroy, Rodney Lesnick and Cameron White

By Josh Lepine, Certified Golf Course Superintendent, Maple Bluff Country Club

NOTE: As a WGCSA Board member, I want to thank everyone who participated in the Membership survey this past fall. The information and feedback obtained was invaluable. The requests for more member spotlight stories inspired me to start this column. I hope to randomly highlight a few members each edition from all geographic areas, facility types and membership classifications. It may take me 20 years to get to everyone in the directory but please be ready for that phone to ring and be prepared to share stories, photos and information about YOU!

Name: Shane Conroy

Company Position: **GCSAA Field Representative - Great Lakes** Years as WGCSA Member: **1** Membership Classification: **Honorary**

18 holes with Shane Conroy:

1. How did you get started in the turfgrass industry? I started working after school and weekends on the grounds crew at Boulder Pointe Golf Club in Oxford, MI at age 16. It turned into a summer job and even though my first job was repairing bunker washouts, I still enjoyed working on the course. The course was in the grow-in phase at that point so there were always fun projects going on.

2. What is the most rewarding part of your career? The most rewarding part is being able to work with so many different superintendents. This truly is a unique industry where everyone works together and helps their neighbors and peers in the industry. The people who work within the turfgrass profession is what makes this such a great industry, I'm lucky enough to help promote the industry and help make the superintendent's job easier and more enjoyable.

3. What would you consider to be your greatest career challenge? Educating the public and policy makers on what superintendents actually do, and how golf courses can benefit communities and the environment. I am amazed by special interest groups and people outside the industry who have a negative outlook on golf and think it's impacting the environment in harmful ways.

4. Which three adjectives describes you the best? Straightforward, caring, humbled.

5. Tell us about your family. After a decade of dating, I'm engaged to Mary Maloney.

6. Any pets? She talked me into getting two miniature daschunds this past summer, still trying to figure out how that happened. They are polar opposites in terms of personality and it's great having them around. As dog owners can attest, it never gets old having them greet you in the morning and when you come home at night.

7. What drives/motivates you every day? I know most people in the industry can say this, but I love what I do and I look forward to making the industry and association better each day. It's a great honor to be working on behalf of superintendents throughout the country and I try do my part to improve not only the industry, but help make their day-to-day tasks easier and make their jobs more enjoyable.



Top: Shane and Mary at Wriggly Field Bottom: The Dachunds Ari and Agnes.



8. Who Would You Admire? My dad. He has been a great example and has taught me the value of honesty and hard work.

9. Who is the person in history you'd most like to meet? Sinatra probably has some good stories.

10. What's a fun fact that people don't know about you? It's not that fun, but, I have artificial bone and nylon ligaments in my right ankle.

11. What do you do in your spare time, favorite hobbies? When I'm able to play, I enjoy soccer, golf and hockey. Also, anything I can repair/update in my house that's relatively inexpensive, I enjoy doing those projects.

12. If you could go anywhere in the world on vacation, where would **you go?** Anywhere in Europe, love the history over there.

13. What is the one thing you would like to learn/accomplish someday? Working with so many Spanish speaking crew members on the golf course, you'd think I'd know more Spanish, but I don't. I would like to be able to have a fluent conversation in Spanish in the future.

14. What is your favorite turf management related tool or technique? Smart phone, it was great to be able to change irrigation programs remotely

15. Favorites:

TV Show: Seinfeld

Movie: Goodfellas & Planes Trains and Automobiles Food: I eat a lot of pizza

Sports Teams: Arsenal FC

16. Do you golf? Handicap? Best shot or golf story? I do golf, my handicap is 15. I eagled a par 4 once, drove the green and somehow made the putt. My only eagle.

17. Top Bucket List Item? Travel More

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18. If you could provide one piece of professional advice, what would it be? Don't be late.

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Shane and Mary in Napa Valley

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Name: Rodney Lesnick Company Position: Golf Course Superintendent, High Cliff Golf Club Years as WGCSA Member: 9 Membership Classification: SM

18 holes with Rodney Lesnick:

1. **How did you get started in the turfgrass industry?** My dad and his brothers worked at Westhaven Golf Course in Oshkosh as kids, so that's where I was encouraged to work as a kid. I immediately fell in love with it.

2. What is the most rewarding part of your career? Hearing positive feedback from golfers when they notice the changes made to the course, both large and small.

3. What would you consider to be your greatest career challenge? Mother Nature

4. Which three adjectives describes you the best? Sarcastic, Laid back, Reliable

5. Tell us about your family. I have been with my wife Sarah for 17 years, married for 10 of them. We have two beautiful daughters, Emma (6 years) and Alexa (2 years).

6. Any pets? 9 year old chocolate lab named Palmer

7. What drives/motivates you every day? Coming to work every day and loving my job, there is no place I would rather be.8. Who do you admire? My wife.

9. Who is the person in history you'd most like to meet? John Lennon



Top: Palmer the Chocolate Lab

Below: The Lesnick Family: Rodney, wife Sarah and daughters Emma and Alexa



10. What's a fun fact that people don't know about you? I am a sucker for chick flicks.

11. What do you do in your spare time, favorite hobbies? What is spare time? I have small children, I do not have spare time.

12. If you could go anywhere in the world on vacation, where would you go? Anywhere with a good beach and a waiter to bring cold drinks to me on that beach.

13. What is the one thing you would like to learn/accomplish someday? I would love to learn how to play guitar.

14. What is your favorite turf management related tool or technique? Soil Probe – Thanks 135.

15. Favorites: TV Show: Seinfeld

Movie: Scareface Food: All

Sports Teams: Packers

16. Do you golf? Handicap? Best shot or golf story? Yes, 5 –ish, Two hole-in-one's – both with a 4 iron. One at The Links at Northfork in Ramsey, MN and the other at Royal St. Patrick's in Wrightstown, WI

17. Top Bucket List Item? Go to the Master's and go to a Ryder Cup

18. If you could provide one piece of professional advice, what would it be? Don't ask anyone to do something that you haven't already done or are unwilling to do yourself.



Emma and Alexa Lesnick



THE GRASS ROOTS JANUARY / FEBRUARY 2016

Name: **Cameron White** Company Position: **Golf Course Superintendent, Prairie du Chien Country Club** Years as WGCSA Member: **21** Membership Classification: **A**

18 holes with Cameron White:

1. How did you get started in the turfgrass industry? I was living in my home town of Platteville making a living as a mechanic. I had just left a service manager position and was planning on leaving the automotive industry behind. I had been a volunteer firefighter for a number of years and through a lot of night and week end training had become a state fire instructor. My plan was pursue firefighting as a career. Mean while I was approached by Rob Udelhofen, the Superintendent of Platteville Golf and Country Club. He wanted me to be part of his staff as his Head Mechanic / Assnt. Superintendent. I loved it. I had been with Rob for 5 years when my current position was posted. Rob urged me to apply for the position and here we are 16 years later, Thanks again my good friend, you showed me the way to success.

2. What is the most rewarding part of your career? Receiving positive comments from members and guests.

3. What would you consider to be your greatest career challenge? Disease Management, our course is located between the Wisconsin and Mississippi rivers. Every morning usually starts in heavy fog.

4. Which three adjectives describes you the best? Dedicated, honest, driven

5. Tell us about your family. My wife Mary and I started dating when I was at Platteville. We got married in 1999, the same year I took the position at Prairie du Chien. Mary had 3 children from a previous marriage, so we had an instant family. Our daughter Jessica lives in Oshkosh with her husband Mark and they have blessed us with 2 grandchildren. Our son Aaron lives in Madison and our son Mathew lives in LaCrosse.

6. Any pets? We are animal lovers, but we are not at home much and we like to travel.

7. What drives/motivates you every day? Family, making my family proud is the most important to me.

8. Who do you admire? My wife Mary, she has been a nurse for 25 years. She has helped so many people over the years.

9. Who is the person in history you'd most like to meet? I used to be a huge Nascar fan so, Dale Earnhardt. Unfortunately my love of the sport died with him.



Top: Mary with son Aaron

Bottom: Cameron with son Matt





10. What's a fun fact that people don't know about you? I love making things with my hands, I have refinished some nice pieces of furniture and have made hope chests for wife, daughter and grand-daughter.

11. What do you do in your spare time, favorite hobbies? Golf, fishing and camping with family and friends on the islands of the Mississippi.

12. If you could go anywhere in the world on vacation, where would you go? Africa, my wife Mary wants to go on safari for her love of elephants.

13. What is the one thing you would like to learn/accomplish someday? I have a love of music, so learn to play guitar.

14. What is your favorite turf management related tool or technique? Fungicides, in 21 years have seen a drastic change in formulas and tank mixes.

15. Favorites:

TV Show: Big Bang Theory

Movie: Pale Rider

Food: Lobster

Sports Teams: Packers and Badgers

16. Do you golf? Handicap? Best shot or golf story? I do play, but not as much as I used to. 14 handicap and have never had an ace, although have witnessed a few.

17. Top Bucket List Item? My wife Mary has not seen much of the United States. I would love to visit all our National Parks with her.18. If you could provide one piece of professional advice, what would it be? Never concentrate on negative people and their comments. Positive people and their comments will be more plentiful anyway if you are providing a good product.









Top Right: Daughter Jessica, Grandson Seth, Mary and Granddaughter Nora.

Bottom Right: Mary and Cameron in Jamaica in February 2011.

Top Left: Mary with 4 good friends in the Dominican Republic.

Bottom Left: Cameron and Mary in Dominican Republic in 2015.



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Mark Kienert Receives Distinguished Service Award

By Monroe Miller, WGCSA Chapter Historian

Editors Note: This article by Monroe Miller is a speech he gave at the 2015 Golf Turf Symposium and is used here with permission.

Mark Kienert is the kind of person everyone knows and likes and respects. He is always in attendance, he is sociable and professional, and is active in everything our chapter does. But he is also a veteran superintendent too many of his colleagues know too little about. I am going to change that this afternoon.

Mark started in golf at the Waupaca Country Club as a caddy. He played high school golf, won three letters, and was inspired to pursue a career in golf course management. The UW-Madison became his home for four years and he earned a degree in Dr. Jim Love's turf management program in 1976.

His student years in Madison gave a hint of what was to come in his career. In 1975 Mark was elected President of the largest student club on the campus of 50,000 – The Saddle and Sirloin Club. When my father first came to the UW-Madison campus in 1940, he became a member of a fraternity – Babcock house. When Mark Kienert was on campus, he filled all the offices of Babcock house, including the Presidency. His propensity for leadership was starting to show. Mark had two excellent mentors during his undergraduate years – Jeff Bottensek from Waupaca Country Club and Randy Smith at the Nakomoa Golf Club in Madison.

Graduation led to a position working with WGCSA Distinguished Service Award recipient Danny Quast at Milwaukee Country Club and then to a really tough job in the transition zone – the sweat belt, if you will – The Fendrich Golf Course in Evansville, Indiana. More lessons to learn, the challenge of dealing with a union and public sector rules, a raft of golfers each day – Fendrich is the busiest municipal golf course in Indiana – and brutal summer weather.



Mark Kienert receives the WGCSA Distinguished Service Award from Chapter Historian Monroe Miller







Top Left: Mark Kienert's Presidential portrait

Top Right: Mark at the 2001 Golf Show with Wayne Horman, Rod Johnson and Randy Witt.

Bottom Left: Mark is congratulated by Mike Kactro for 25 years of membership in 2000.

Bottom Right: Mark and Karen Kienert with the coveted Mr. and Mrs. Mow Trophy at the 1989 Dinner Dance.



Mark took a promotion and returned home to Wisconsin to manage Prairie Du Chien Country Club's Golf Course. During his time in that position, Mark was honored as the Jaycee of the year for that Prairie Chapter. His participation and leadership were recognized by yet another group he was a member of.

Next stop – North Hills Country Club in 1982. This was a chance he took to learn from Bob Musbach, a well known successful superintendent. He was another of Mark's Mentors as Bob's Assistant Superintendent. Mark stayed on the North Hills staff until 1986 when he was hired as the superintendent at Bull's Eye Country Club in Wisconsin Rapids, and where he is still employed. The math tells me that is 30 years.

His WGCSA membership covers 40 years. Mark has filled every office except treasurer, and he was president for two years in 1996 and 1997. He and Tom Harrison served on the WGCSA board as assistants, by the way, and at a time when that was a rarity. I will never forget reminding him as the newly elected President that he had a responsibility to submit a Presidents Message to *The Grass Roots*. I was the Editor in those years, a time when I received his message by fax. The newfangled machines printed messages on rolls of a special blank fax paper, not individual sheets, and when the club secretary called to tell me I had received a fax, she said, "It's a pretty long roll." Boy, was she right! I held the first page at the top of my office door; let it unroll to the floor, and it kept going – seven-plus pages! I thought – "here's a president who has a plan, a program, a philosophy." This was all good. I just had to get him to write short!!

Did you know Mark Kienert was a chapter delegate to the GC-SAA for 7 years? This was a period of transition and chapter affili-



GCSAA assignments have included time on the publications, certification, research (and a recent subcommittee of that one), tournament, historical preservation, chapter relations, nomination, as well as the conference and show committee. No one person in our chapter's 85-Year long history has represented us at the national level like this man.

And I have watched Mark up close on the Wisconsin Turfgrass Association Board. He had had two tours as a board member and has been the WTA Treasurer since 2006. Mark's advocacy for research funds for our land grant university's turf program has been strong and consistent, whether it is the GCSAA EGIF or the USGA or the Noer Foundation. And he has had great success, especially his efforts for snow mold research funding.

Mark has been a speaker at the Golf Industry Show, a contributor to The Grass Roots, Chair of the WGCSA Dinner Dance, and has held his GCSAA certification for 27 years.

I am almost exhausted recounting why this career in golf course management in Wisconsin could only lead to our highest recognition. Mark has been the "Marathon Man" in the WGCSA. And he still is. We could almost, for this one person, call the award the "Lifetime Achievement Award. "He had done so much for us in the past 40 years, and we do appreciate it. It has been a life well lived, with Karen, daughters Cara and Cassie and grandkids Felix and Iris as more evidence. It hasn't been lost on me that we are presenting this award to Mark as we celebrate the 50th Anniversary of the Golf Turf Symposium. Let's give a warm welcome to our good friend and faithful colleague Mark Kienert.



Mark Kienert, Dan Shaw, Mark Hjortness and Joe Kuta enjoy a day of golf at Oshkosh Country Club in 2001.



Mark Kienert awards Dr. Wayne Kussow the WGCSA Distinguished Service Award.

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The Right Tree in the Right Location Understanding the origins of tree use on golf courses will help solve tree problems on your golf course.

By David A. Otis, USGA Green Section, Northeast Region Director

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We enjoy their fruit, their foliage, and their fall color. We use their wood to build homes and furniture, and once upon a time their wood was even used to make golf clubs. So how can trees possibly be bad for golf courses? In order to gain a thorough understanding of the problems that trees pose to turfgrass and golf courses, it is important to understand a little about the history of golf in the United States and the history of tree usage on golf courses.

A SHORT HISTORY LESSON

Golf's popularity exploded in the early part of the 20th century, bringing to bear the golden age of architecture from 1910 to 1937. Surprisingly, many early golf courses had very few trees on them. There were a variety of reasons for this, and the first is a practical one. Early golf courses frequently were built on old farms because the land was already cleared. Clearing trees was an expensive, labor-intensive, and time-consuming enterprise, so avoiding this expensive roadblock helped

control costs. Secondly, and perhaps even more important, many early golf course architects did not believe that trees belonged on golf courses. Most of the early architects came from Europe or learned their craft there, so their experience was primarily with links courses, which generally are devoid of trees.

Several famous golf course architects commented or wrote about trees. The following A. W. Tillinghast quote, from the book titled The Course Beautiful, encapsulates his opinion of trees used as backdrops behind greens: ". . . in the case of a green played directly beyond the slope of a hillock and sharply defined against the sky. Barren of any nearby object, such as a tree for instance, the distance of the shot to the green is much more difficult to judge with accuracy than it would were there a tree or two standing forth. All players of ability will bear witness to the baffling length to a naked green, but few actually realize how much more readily the estimate of the eye would be flashed to the brain if sight should fall simultaneously on a lone tree and its neighboring green." Isn't it ironic that golfers still claim to need a backdrop when yardage aids now are so common?

Other architects stated their feelings more bluntly. Walter Travis flatly stated that "trees have no place on a golf course," while Harry Colt called them "fluky and unfair hazards." Then there was Max Behr, who stated, "It goes without saying that trees lined to hem in fairways are not only an insult to golf architecture, but the death warrant to the high art of natural landscape gardening, aside for the fact that, of all hazards, they are the most unfair." Ali-



The difference in a golfer's perceived difficulty of a golf hole with and without a backdrop of trees is remarkable. Once a backdrop is removed, a green looks smaller, the topography comes alive and the hole looks much more challenging.



ster MacKenzie also fell into the camp of architects who held no great love of trees: "Playing down fairways bordered by straight lines of trees is not only unartistic but makes tedious and uninteresting golf. Many green committees ruin one's handiwork by planting trees like rows of soldiers along the borders of the fairways." To be fair, not all architects disliked trees, and some gradually began to accept them later in their careers. In a 1927 issue of

The Bulletin of the United States Golf Association Green Section, William S. Flynn wrote, "Today the old ideas have been discarded and the prevailing belief is that trees, most emphatically, have a fixed place on a golf course."

With such an inauspicious beginning, it is curious that trees have become such an integral part of so many golf courses and that golfers have so highly prized them for years. In the 1920s, 1930s, and 1940s golfers and course officials wrote many articles for The Bulletin of the United States Golf Association Green Section extolling the virtues of planting trees and shrubs along fairway corridors and around putting greens to "frame" them. Some of these articles described early golf courses as being "barren." Other articles suggested that golfers would enjoy tree plantings and that their beauty might take golfers' minds off poorly played golf shots. Others advocated the planting of fast-growing trees, possibly mixed with slowergrowing trees, to achieve quicker effects. Others advocated planting evergreens to avoid the expense and annoyance of removing leaves in the fall. Many addressed the beauty of nature and the importance of adding trees and ornamental plantings for aesthetics. Few if any articles addressed the need or desire for tree removal.

Thus, many well-intentioned course officials made it their mission to fill golf courses with trees and ornamental plantings, despite the fact that early golf course architects held little love for them. A. W. Tillinghast commented on the tree-loving passion some golfers displayed: ". . . probably none is better qualified than myself to speak of the sentiment of American golfers generally concerning trees on the golf course. I find that our citizenry, throughout the land, are tree lovers. As a matter of fact they are so violent in this adoration that they 'get in my hair,' for as much as I like trees myself I am not above sacrificing a few every now and then if it is the only way to salvage a golf hole.... I sometimes take my very life in my hands when I suggest that a certain tree happens to be spoiling a pretty good hole. The green committee chairman is like as not to glare at me as though I had recommended that he go home and murder his wife." Clearly, there was conflict regarding trees from golf's earliest days.

It was acknowledged early on that turfgrass shaded by trees struggled, and that certain turfgrass species were better suited to treed areas. It also was assumed that water was part of the problem as it was noted that turf under trees was drier than turf growing in open environments. A USGA study conducted in 1933 showed that shade has a significant effect on both root and shoot growth of turfgrass. However, the negative effects trees have on turf did not seem to attract much attention during the early part of the century, and golfers' strong desire to plant trees and "beautify" golf courses won out over the protestations of golf course architects. Many courses created "tree" or "course beautification" committees whose specific mission it was to plant trees, and golf courses everywhere were methodically planted with trees and ornamentals.

In addition to turfgrass health and playability, it appears that the importance of trees also superseded the importance of course architecture. Eventually, many golfers came to believe that trees were a hallmark of fine golf courses and fine golf holes.



The unnatural tree line on the left side of this hole was added years after the course was built. It effectively shifted the center of the fairway to the right by 10-15 yards, it looks odd, and it penalizes a well-struck drive. More important, it influences play to the right towards an adjacent tee. If trees are to be used on the left side of this golf hole, they should be well left of their current location.

As a youngster cleaning clubs at a golf course in the late 1960s, I recall an adult golfer referring to another local course in a snobbish, derogatory manner, stating that it "looks like a public golf course because it doesn't have any trees."

WHAT WENT WRONG?

One key historical event — thousands of American elm trees dying from Dutch elm disease in the 1960s and 70s — probably fueled the problem. In response to the devastating tree loss, some panicked and rapidly filled the voids left in tree stands with fastgrowing tree species. In an attempt to have the greatest impact in the least amount of time, often more trees were planted — often in areas closer to play — than were removed. However, no other species has the same high arching, vase shape of the American elm, so many of the replacement trees ended encroaching on playing corridors.

Given the background of early golf course architects, I believe it was their intent to build a single large landscape with 18 different trails running through it. Golfers and course officials sought to split the single large landscape into 18 separate smaller ones and in so doing created a host of problems that would take decades to fully realize. The most basic mistake was that golf, course architecture, strategy, and turfgrass health all took a back seat to the importance of planting trees and ornamentals.

- At some courses, every open location became a potential planting site, and trees were often planted with no purpose other than to fill voids. The goal frequently was to line every fairway and surround every green with trees.
- The original architectural design intent was forgotten or ignored, as was the value of having open views and vistas. The appreciation of interesting topography and its impact on aesthetics, playability, and strategy likewise was disregarded.



There are few things more majestic than a properly located, stand-alone specimen tree. It is remarkable what a small tree can become with care and foresight.

- Far too many trees were planted. Furthermore, trees often were placed so close together that they completely shaded turf areas and, as the trees grew, they also began to compete with one another.
- Trees were planted far too close to playing corridors and their eventual size and canopy shape often was underestimated.
- Tree plantings often were arranged unnaturally in straight lines, gentle symmetric curves or other unnatural geometric shapes.
- Many different tree species were used, greatly benefiting landscape diversity. However, key characteristics of trees pertaining to their compatibility with turf, playability, and maintenance were not considered, and many of the commonly planted tree species were prone to surface rooting, were fast growers and had soft wood, produced objectionable debris — e.g., leaves, fruit, bark, etc. — or had dense, low-branching habits that made them ill-suited for use in fine turf and in-play areas. Other poor choices included selecting tree species that are short-lived or prone to pests and diseases.
- Not all of the trees were intentionally planted. At some courses, rough mowing was reduced due to labor and financial constraints and unmown areas gradually reverted to woodlands. Telltale characteristics of these areas are trees of the same general age and large populations of pioneer tree species.
- Tree populations, which evolve more rapidly than most other golf course components, often went unmanaged. Courses that did have tree-management programs mostly concentrated on corrective pruning, fertility, pest control, and still more planting. Shockingly, some golf courses had tree nurseries but did not maintain putting green nurseries.

It is important to note that golf courses are ideal sites for tree growth and development. The water and fertilizer that regularly are applied to maintain turfgrass often benefit trees just as much or more than the turf. Because of this, and partially due to the lack of competition from other vegetation, the growth rate of trees on golf courses is nearly double what it would be in a natural forest environment.

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The effects of tree root systems, which vary with tree species, also were not thoroughly understood. Some species have tap roots, whereas others have fibrous root systems. Furthermore, tree roots usually extend far past the drip line, extending outward one or more times a tree's height, depending on the species. Thus, tree roots have access to a large reservoir of moisture and nutrients, allowing trees to effectively compete against turf for these resources. Ultimately, tree root systems can have a significant impact on turf.

Even with ideal conditions, trees grow slowly. Usually, the decrease in sunlight penetration and air circulation from a few years' growth is not very significant. However, over a longer period of time - i.e., 25-50 years or more - tree growth can have an extraordinary impact on turf health, playability, and aesthetics. Consequently, views and vistas slowly were consumed while playability and aesthetics are reduced by maturing stands of trees. In many cases, clubhouses that purposely were placed on a hill to look out over a golf course gradually lost sight of the course as trees grew. However, properly located trees of desirable species often developed into specimen trees that enhanced aesthetics and playability, with minimal negative impact on turf. Unfortunately, vast numbers of trees were poorly planted — often too close together — leading to stunted, deformed specimens that were unable to reach their full genetic potential.



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The impact trees had on playability was even more severe. Bunkers often were surrounded with trees, reducing their intended visual effect and making recovery nearly impossible. Trees that obscure obstacles, hazards, and intricate topography of key architectural features hide the vital design elements that make golf holes memorable and instill uncertainty and fear in golfers' minds. For example, hiding a pond or stream behind trees reduces its strategic impact while making it much less visually intimidating.

Poorly located trees forced golf holes out of alignment by narrowing playing corridors and reducing lines of play. Golf holes that were originally intended to provide golfers with multiple lines of play became so choked with trees that often only one option remained. Perhaps most significantly, courses that implemented extensive tree-planting programs created situations where offline shots were severely punished and recovery options were eliminated or greatly diminished. It seems the goal of some tree programs was to thoroughly punish every offline shot by preventing all recovery shots toward the green.

The prospect of removing a tree that is 20 yards deep in the rough is often debated during Course Consulting Service visits. Course officials frequently argue that removing the tree "creates an open shot to the green." The counter argument is, "Can a golfer who just missed the center of the fairway by 25-40 yards now miraculously laser a shot to the green?" While a recovery shot certainly is possible, it still isn't likely after the tree is removed. More important, shouldn't the player who hits an errant shot have a chance at redemption? How boring it is to find every single offline shot so severely penalized.

Open, rolling topography may look barren to some, but just as there is abundant life in a desert, there is much for golfers to observe and appreciate in an open golf landscape. Intricately designed putting green and bunker complexes are a prime example. Trees that surround a green shrink a golfer's perceived size of the landscape so the green actually looks larger than it is. Conversely, the same green without a backdrop of trees looks much smaller



For many courses that over-planted trees in the 1920s and 1930s, tree growth corresponded with the lowering of turfgrass cutting heights over time. Ultimately, as those courses matured, tree growth and cutting height converged sometime around the 1980s, signaling a dramatic increase in tree-related turf and playability problems. This graph estimates this phenomenon.

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Trees that block advancement from a bunker doubly penalize a miss-hit shot and are termed "double hazards." For most, golf is a difficult enough game and topenalize a wayward shot so severely just adds insult to injury.

because a golfer's perceived size of the landscape is much larger. Eliminating a backdrop of trees can increase the psychological difficulty of a golf hole. Placing trees further away from greens also helps highlight topography and other strategic features, like bunkers, often causing them to look more intimidating. For years, golfers did not attach appropriate importance to the visual effects of topography and openness on playability.

In short, at courses where indiscriminate tree planting occurred, designs that had once encouraged thoughtful, imaginative play were gradually transformed into one-dimensional, penal designs; courses that once felt expansive were transformed to small-feeling, claustrophobic golf courses. But watching trees grow is like watching a clock, so their impact went unnoticed for years.

Another curious event occurred while the trees were growing: Turfgrass cutting heights steadily were lowered on greens, tees, and fairways. The perceived importance of putting green speed escalated with the introduction of the USGA Stimpmeter in 1978, so as the trees gradually grew taller, the cutting heights got lower, dramatically increasing stress levels on turf. At many golf courses, the lines on the graph of tree growth and cutting heights began to converge in the 1980s.

AN AWAKENING

USGA agronomists and other experts began to identify and discuss golf course tree problems in the 1980s, but convincing courses to remove trees was an uphill battle, given golfers' love affair with trees.

Success required that long-held beliefs about the importance of trees and their impact on playability and course difficulty be countered, and golfers' innate love of trees often brought into play a strong dose of emotion. As trees on golf courses continued to grow and cutting heights continued to get lower, problems with turf health and playability became epidemic in the 1990s and 2000s. Exacerbated by golfer demands for better turf and playability, many courses simply could not sustain reasonable turf health and playability. Turf loss as a result of inferior growing environments became commonplace. Trees also had a major impact on maintenance budgets, though their effects were not recognized until much later.

USGA agronomists began helping courses develop tree-management programs in the late 1980s, and many articles were written and presentations were made on the subject. The path to helping courses identify and solve tree problems was paved by education. Courses began to address tree problems, but only grudgingly at first. Many golfers feared that removing trees would make their courses "too easy" and look barren. Many golf courses initially took baby steps by removing 10-20 trees or so per year. This made it feel as though progress was being made, but for courses that had implemented successful tree-planting programs, removing only 10-20 trees had little impact on the overall problem.

Due to extensive tree-planting programs and years of growth, massive tree-removal programs were necessary at many golf courses. Fortunately, golfers' tolerance of removing trees increased with the identification of tree problems and the recognized benefits of the solutions. As each story unfolded of how courses dealt aggressively and successfully with tree work, it became easier to convince other courses of the need for tree work. The realization and understanding of necessary corrective actions was aided greatly when well-known and highly rated courses embarked upon extensive tree-management programs. It helped even more when their rankings improved as a result of the work.

COMING FULL CIRCLE

There is no denying that trees can serve many valuable functions on golf courses and, when used appropriately and in moderation, they can be used to great benefit. From an environmental standpoint, trees effectively sequester carbon while providing food, cover, and habitat for wildlife. From a practical standpoint, trees are valuable for screening unwanted views and can provide separation where needed. Aesthetically, the natural beauty of a specimen tree offers extraordinary appeal, and the rugged beauty of a craggy, storm-scarred old tree can have an incomparable naturalizing effect. Massed tree plantings also have a place, but the stand-alone specimen trees are the trees that make the most striking visual impact. Trees also can be used to impart strategy; however, it is dangerous to build golf holes around individual trees because they are temporal — one severe storm or a single bolt of lightning can undo a century or more of growth, potentially stripping a hole of its defense in a flash.

It is important to remember that trees are stealthy thieves. When budgeting, most only consider the cost of purchasing and planting trees, which usually is the least expensive portion of a long-term enterprise. Planting a single tree starts a chain reaction of expenses that can absorb resources for 50 or 100 years or more. Multiply those expenses by the number of trees — 100, 1,000, or 10,000 — and trees can become a large and very long-term financial commitment. (See Oatis, David A. <u>"The Hidden Cost Of Trees."</u> *The USGA Green Section Record* May-June (2010): 4-8. TGIF. Web.)



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TREE MANAGEMENT

Perhaps the most significant point to remember is that tree populations require management, and while trees can be pleasing and useful additions to a golf course, they are not an essential component of all courses. Thus, individual trees should be evaluated pragmatically and without emotion, based on specific criteria (See Oatis, David A. "Man's Friend Or Golf's Enemy?" The USGA Green Section Record July-August (2000): 1-6. TGIF. Web.), the most important of which are their impact on turf health, reliability, and playability. WHen reviewing particularly controversial trees, it is helpful to ask the question, "If there were no tree there now, would you add one?" In many cases, the answer is an emphatic, No."

Similar criteria should apply to proposed new plantings in order to avoid repeating past mistakes. Remember, trees that have little impact on play as saplings may narrow golf holes and block shots from teeing grounds or around greens once they mature. If new plantings immediately come into play, they may be in the wrong location long term. When trees are removed, avoid the all-too-common mistake of rushing to immediately replace them. Areas of golf courses are visually transformed when old trees are removed, and it can take time for golfers to become accustomed to the more open look. Waiting a year before deciding whether or not to replace trees is an excellent policy.

It must also be recognized that trees can present a liability issue for golf courses when they are not properly maintained. Admittedly, perfectly healthy, sound trees can fail without warning, but structurally unsound trees that pose an obvious liability should be removed.

The list of golf courses that now have implemented tree-management programs is a long one, but it is a mistake to think that a program, once implemented, is finished. Trees are constantly evolving and adjustments and updates to management plans should be made regularly. Some golf courses take a particularly organized approach and develop tree inventories so as to better track the health, diversity, age, and projected life span of their trees. Trees can disrupt golf and interfere with turf health in many different ways. Here are a few critical points to keep in mind as you



Some tree species have extremely aggressive root systems. Above-ground surface roots are a menace to maintenance equipment, golf carts, and golfers.

consider existing and proposed tree plantings on your golf course:

LOCATION, LOCATION, LOCATION There are many criteria to consider when evaluating tree plantings, but the most important is location. Tree canopies shade turf, reducing its vigor. Tree canopies also can block air circulation increasing disease pressure and reducing turf's ability to cool itself. Turf that does not receive adequate light and air movement is less vigorous and more susceptible to stress, traffic injury, and disease. Adding insult to injury, reduced light also limits turf's ability to recover when problems occur. Furthermore, tree root systems compete with turf for moisture and nutrients. Trees also have a significant impact on traffic flow, as their physical presence funnels traffic. When concentrated traffic, shade, root competition, and poor air circulation all are combined, it usually proves lethal to turf.

Complicating shade issues, the position of the sun in the sky — and likewise the hade pattern cast by trees — dramatically changes throughout the year. Sun angles must be carefully accounted for to accurately assess the impact of shade from trees on specific turf areas. You may be surprised to know that shade is even important during the winter when turf is dormant. There is a strong correlation between winter shade and winter injury for both warm- and cool-season turf. Unquestionably, growing environment has a bigger impact on turf performance than virtually any other factor. Trees in the wrong location can have disastrous effects on turf performance.

ALL TREES ARE NOT CREATED EQUAL

There are both appropriate and inappropriate tree species for use on golf courses and in fine turf areas, so choose tree species wisely when developing a tree-management program for a specific location. There always are exceptions, but usually it is wise to rely on tree species that are indigenous to your geographic area because they are more likely to perform well. Observing which tree species are performing well on your course or in the surrounding area also can provide valuable clues as to what trees might be successfully used at your facility. It is extremely important to consider longevity, diversity, and susceptibility to disease and insect pests when selecting tree species. Major pest or disease outbreaks can occur with little warning, severely affecting susceptible tree species. Dutch elm disease decimated American elm tree populations years ago, and golf courses and communities that had large populations of American elms were devastated.

Similar effects now are being experienced in areas where ash trees are heavily utilized, due to the impact of the emerald ash borer. Pest outbreaks can be devastating where tree populations lack diversity. Having species with varying potential life spans also can be beneficial, but avoiding short-lived tree species makes sense in most situations.

Species with aggressive surface roots make for poor playability and can be damaging to golfers, golf carts, and course maintenance equipment. Fastgrowing species generally have softer wood, may sucker when damaged or pruned, and are more susceptible to storm and wind damage. Trees with thorns can cause physical injury to golfers and maintenance staff, and they can puncture tires on golf carts and maintenance equipment.

Some species are notoriously messy dropping leaves, branches, fruit, and bark - so it also is important to consider the debris factor and tree placement during the evaluation process. Messy trees in outof-play areas may not be an issue, but when they are located near tees, greens, fairways, or bunkers, they can annoygolfers and increase maintenance costs. Branching habit is another critical factor to consider. Trees with low branching habits may be ideal for screening but, for a golf ball that comes to rest under one, they pose a severe and indiscriminate penalty from which there is no reward for a skillful recovery shot. Both expert and novice golfers are left to take an unplayable lie or try to hack their ball back into play from under low-branching trees. Neither option requires extraordinary skill. When located in in-play areas, trees with low branching habits are extremely penal; hence they are best left for periphery plantings.

DECISIONS, DECISIONS

Golf courses that have trees must manage them to safeguard their investment in both trees and turf. Proper tree management will ensure that trees remain assets that enhance a golf course rather than liabilities that threaten it. Plenty of decisions about trees on golf courses are relatively easy, such as the decision to remove a diseased, structurally damaged tree that is located in a high-traffic area and shading a putting green. Other decisions are extremely complex because they require the knowledge and imagination to envision how trees will grow and develop and what their impact on turf health, aesthetics, and playability eventually will be. It is the rare individual who has an in-depth knowledge of trees, insect

pests and diseases, sun position angles, turfgrass requirements, and golf course architecture and playability; however, this is the knowledge required to effectively and knowledgably evaluate golf course tree populations, solve current tree issues, and prevent future tree problems. USGA Green Section agronomists have training in all of these areas and are well equipped to assist courses with developing treemanagement programs. Other options include engaging consultants who have specific knowledge in each of the appropriate areas. It is a good practice to involve a competent golf course architect to aid decisions affecting playability and architectural issues.

Tree-management programs invariably involve removing trees, but planting betteradapted, more appropriate trees also is an important part of many tree-management programs. For instance, in locations where screening or separation is desired, it may be wise to add new trees as old ones decline. It may even be necessary to remove healthy trees to maintain adequate separation while also maintaining good tree spacing. The goal of an effective tree-management program should be to continually improve and upgrade tree quality. Many of today's tree problems could have been avoided if courses concentrated more on tree quality than on tree quantity. Tree populations are extremely dynamic, and if trees are an important and desired component of your golf course, developing and continually updating a tree-management program is critical for long-term success. Just keep in mind that trees are not appropriate on all golf courses or in all locations. Furthermore, it is easy to plant a tree; almost anyone can do it. Although dangerous, also just about anyone can cut a tree down. The trick is to plant the right tree in the right location so that it adds to aesthetics and the golf experience without detracting from turf quality, playability, or the bottom line. Remember, trees are not valuable just because they are trees; trees are valuable based on their species, health, form, structure, location, and function.

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50th Golf Turf Symposium How Are We Doing As An Industry?

By David Brandenburg, Editor, The Grass Roots



The 50th Golf Turf Symposium offered attendees a valuable opportunity for education and camaraderie with our peers and educators. It truly is a event we can be proud to host.

After welcoming comments from WGCSA President Jim VanHerwynen we were treated to a presentation by Monroe Miller as he introduced Mark Kienert as our newest Distinguished Service Award recipient.

A full accounting of Monroe's presentation can be found on page 26 of this issue. We are fortunate to have Monroe as our Chapter Historian to be able to speak first hand on the many contributions Mark and others have given to the association.

Many thanks to Jaime Staufenbeil and Jeff Spence from Milorganite who provide silent sponsorship to allow us to offer our members with this great educational opportunity.

As a reminder our registration fee pays for meals and part of the facility fees while Milorganite covers all of the speakers travel and costs along with the rest of the facility fee. We are fortunate to have their support and the availability to have the Golf Turf Symposium at the American Club at a reasonable price. Any funds left over are given to the O.J. Noer Foundation to be used for turf research.

The famous **Pat Jones** started off our topic of "How Are We Doing As An Industry?" set to compliment last years topic of "How Are We Doing As A Professional?".

Pat is the Editorial Director and Publisher of Golf Course Industry Magazine and provided the keynote "A Very Candid Look At The State Of Our Industry".

Jones explained the industry is at a plateau with 12,000 public courses killing each other for play. The twenty years from 1986 to 2006 saw dramatic overbuilding of golf courses with many of those tied to home sales. While the number of courses increased 40%, play only increased 19% during that time.

Pat stated that of the public courses 4,000 are doing good and are the standard premium courses. Unfortunately, 7 to 8 thousand public courses are on the bubble, barely making it and waiting for something to happen. It could be something good such as the

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closing of a neighboring course or something bad such as bad weather to put the course over the edge.

It is not that golf has fallen out of favor as much as life has changed. In 1960 fictional character Ward Cleaver played golf on with the guys on Wed afternoon and often took off for a match on Friday. On Saturday and Sunday he had a regular game with his friends at the club. In Today's world Ward Cleaver would be unemployed and divorced. Life has changed, and that is not bad but the industry has to change as well.

Jones went on to explain a increase or decrease in national rounds really does not matter. What does matter is how is your club doing? Individual clubs cannot sit back and wait for the market to return.

The saying goes a "rising tide raises all boats"... there is not going to be a long term rising tide for golf.



Keynote Speaker Pat Jones offered an assessment of where the industry is, and how clubs can adapt to the new way of thinking.

He suggested if your clubs plan is to wait for the market to improve, you have no plan, and you should run.

On the positive side golf provides a 76 billion dollar national economic benefit. Maintenance budgets have been trickling up after the recession although much of that is rising labor costs.

For the past few years a golf course has closed every 48 hours and Pat suggests a course should close every 24 hours for the next few years to provide a stronger market for the remaining clubs.

Millennials are picking up the game for a fear of missing out on the fun, however they expect a quicker more satisfying experience. Jones expressed women are the key to our future as they look for fitness, fun, friendship, wine and a social experience.

Clubs are reassessing Food and Beverage operations to provide simpler options with less labor.

Jones has seen many clubs offering alternate experiences with foot golf, big cup golf and frisbee golf. Although these ideas can help to promote the game of golf the are not a save the industry business plan.

Pat stated that despite the challenges Golf is okay - and doing better than we should be considering the challenges we have faced from changing demographics and economics.

- Clubs have to get smarter.
- Business development is job 1.
- Labor is the short term issue.
- Water is the long term issue. Although we have not seen shortages in our area we need to remember the Great Lakes account for 21% of the worlds non-frozen drinking water supply and others will be coming for that water.
- The market will get leaner, meaner and smarter with niche driving market positioning. What makes your club special is what will allow it to survive.
- Precision turf management will save labor while bringing measurable metrics and GPS powered technologies.
- Non traditional labor solutions will include robots, H-2B employees and the elimination of labor intensive tasks. Jones finished with two quotes:

"Superintendents manage the thing golfers buy - the big green ATM." Or in my words, the product we produce is the main purpose of the club and the attraction for customers

And being a superintendent is "not a job, its a lifestyle - if your not passionate about it, get out." Or in my words, it is not a career for everyone but it is rewarding to those who enjoy it.



Dr. Bruce Branham gave a presentation on the golf course managers nemesis Poa Annua.

Dr. Bruce Branham, University of Illinois at Urbana-Champaign gave a talk titled "Poa-History and Current Trends". Dr. Branham started by saying poa has been discussed for a long time and he has written the same articles for 35 years as he searches for the answer to poa annua invasion into cool season grasses.

Can we have poa free courses? The problem is poa is better in shade and compacted areas and to have a chance we need to be 100% poa free not just on the greens. He stated "links style courses may have a chance but this is a battle that grants no quarter."

Given our history of futlitiy against poa annu there are many good reasons why we do not accept it as a playing surface. Its propensity to produce seedheads which reduce putting quality is at the top of the list along with injury from winter and summer stresses. Poa annua also is more prone to diseases and insect damage while its shallow rooting leads to hand watering and less than firm playing conditions.



Dr. Branham went on to explain despite efforts to improve poa through breeding it is still just a good weed when compared to other grasses especially bentgrass.

In his 35 years working with poa annua Bruce has learned that ecology rules and with shade and compaction poa is better than no grass. He also learned herbicides alone will not remove all poa as the plant becomes resistant to herbicide classes. Poa control requires a constant commitment due to the seed bank built up in the soil.

Besides resistance, herbicide use has two flaws. First it is hard to find a herbicide to take one perennial grass from another and secondly it is even harder to find one that will remove the poa slowly so the desirable grasses can move in. The "Margin of Safety" is too narrow as the herbicides damage the desirable grasses.

There are many new and old chemistries available. Prograss is the best with ryegrass, however ryegrass playing surfaces have their own limitations with disease and winter-kill.

Velocity has shown promise but it has also shown to damage desirable grasses in a unpredictable pattern.

The new Poa Cure is still in the experimental stage and has shown promise by those with conditional use permits on greens. However it is possible the product will never make it to market due to environmental concerns. Poa Cure has shown to be safe on bentgrass with a single fall application working all year to reduce poa annua populations slowly.

Dr. Branham finished with any strategy to control poa annua must include cultural, mechanical and chemical controls. Problems with shade, drainage and compaction must be fixed in order to be successful.

Pat Jones returned to give a talk titled "Social Media Success for Turfheads." He started with saying that public relations is a form of reputation management and social media is one delivery method of communication.

It is well accepted that more turf managers are fired for communication issues rather than turf issues.

To enter the world of social media Jones suggests we start with a plan.



Dedicated to the Memory of O.J. Noer

Self assessment of where we want to go, what perceptions we want to change and what stories we want to tell.

We need to prioritize our needs and write them down and share them with a trusted friend and colleague.

Also we need to set a few simple goals for our plan.

Blogs provide a avenue to post articles to inform golfers on what you are doing. Pat suggested keeping each post short while using images and captions. Having someone proofread your work is important so a simple error does not hurt your image. Other medias include:

- Pintrest mainly for women to share ideas and items they like.
- Linked In mainly for resume posting, career advancement and professional network building.
- Snap chat mainly used by kids to share images.
- Instagram mainly to share pictures and although it is good at that it is not really a marketing tool.
- Facebook is a personal or business tool to build relationships, share ideas. It provides a easy way to share images and videos quickly to a large audience. Users should avoid posting on politics, religion and anger. Remember current and future employers will monitor posts.
- Twitter is the dominate platform for golf to tell your story in 140 character posts. It is easy to post pictures and videos to share information with customers or other turf managers.

As you enter the world of social media it is important to listen (read) others posts and learn from them. Feel free to tell your story and communicate your programs. Pictures are 313% more likely to get noticed than posts without pictures.

Dr. Ed Nangle from the Chicago District Golf Association joined us to discuss our old foe winter-kill with a talk titled "Ice Damage In Northern Illinois, What We Learned Along The Way."

Coming from England Dr. Nangle had limited experience with winter-kill but quickly learned what the "smell of death" was in the winter of 2012/2013.

As we have all experienced, poa annua dies first under ice so courses with higher percentages of poa annua need more caution when it comes to winter.

In this case Ed showed how the winter started good and the turf was dormant in late November. However a late December thaw brought most of the turf out of dormancy followed by a cold snap.

Another warm spell in January was followed by precipitation, ice and another cold spell. Poa annua starts to lose its tolerance to cold after just one day at 39 degrees.



Dr. Ed Nangle gave a presentation on winter kill and what superintendents learned in the Chicago areas during the winter of 2012 -2013.

As the poa broke dormancy it took up water and then suffocated under 2-6" of ice when the cold came. Many courses suffered from crown hydration damage from the sudden freeze more than length of ice cover. This was proven by courses that removed ice after just one day having dead grass. In the winter of 2012/2013 neither a heavy fall topdressing or permeable turf covers provided relief from damage.

Courses that removed ice and snow had less damage but much of the damage was done on freeze up or even during the late December temperature swings.

Dr. Nangle discussed the many different recovery methods and what seemed to work best was:

- Pigments helped darken the surface and increase soil temperatures.
- Covers increased soil temperatures 10 degrees but fungicides programs need to be followed.
- Scarification removed some of the dead material and opened the turf canopy to increase warming.
- Apply seed early and often through the process to ensure a good cover.

• The less traffic the better.

In closing Dr. Nangle said there was no silver bullet but courses that did something were better than courses who did nothing to recover.

The day finished with refreshments and networking the old fashioned way! Thursday started with the annual Breakfast Buffet with a great choice of food items and more time for networking.

Frank Chieppa, Player Development Regional Manger for the Professional Golfers Association started us off with his talk titled "How The PGA Is Growing The Game And How The Superintendent Can Help!"

Frank stressed how superintendents, club managers and professionals are all working towards the same goal even though we have different but interrelated tasks.

Golf is a entertainment industry and our customers want a great experience. Recent surveys have shown the top reasons to play golf are low scores, good shots and fun with friends.

Golf courses need to welcome families, women, lapsed golfers and new golfers with programs that are fun for them.



PGA Player Development Manager Frank Chieppa discussed how we can build rounds and relationships at our facilities. Frank stated that Player Development = Business Development = Job Security.

He posed three questions for all clubs to consider:

1. Is your facility and staff uniquely qualified to make golf experiences memorable, valuable and fun?

2. Is your facility the center of your golf community?

3. Are you helping to build a vibrant, supportive off ramp for the next generation of golfers?

In order to achieve success we need to provide a meaningful experience that will resonate with golfers on a emotional level?

When working with new golfers Frank explained there are many great programs to get them out to become ball strikers but these participants are not golfers until



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they put a tee in the ground. This is why in the Get Golf Ready program that offers a series of 5 lessons the "on course" component is crucial to player development.

Good player development programs requires that the staff understands the consumer, understands the business and understands site operations.

Chieppa explained the long term life cycle that consumers go through from beginner to committed golfers.

Introduction = I want to see if I might like golf.

Recreational = I enjoy golf as a social activity.

Engaged = Golf is important to me.

Committed = Golf is who I am.

It takes a good staff who understands the consumers needs and desires to keep them interested in the game long term.

Programs for any age or gender need to be fun and social while promoting the game.

Frank provided us some great information to take share at our clubs as we work as a team to develop tomorrows customers.

Up next for two sessions was **Dr. Mike Richardson** from the University of Arkansas with talks titled "Gadgets and Gizmos."

Mike opened with expressing we as turf mangers need to measure different metrics to make informed decisions on programs and applications we implement.

Soil Moisture Meters give any employee the ability to make the same decisions as a experienced turf manager. However, it is important to remember that the moisture percentages from one course are of no value at another course due to differences in soil and meters.

Mike taught us how to find field capacity and then the wilt point of our soils so we can make decisions based on fact rather than feel. Although a easy process is should be done for each soil type on the property to ensure a informed decision.

For instance on greens a one year old USGA green may have a irrigation threshold of 9% while a 10 year old USGA green 12% and push up green 18%. Not only does each soil type have its own wilt point it has its own percentage of moisture at field capacity.

To answer the age old question which is better 1.5" or 3" probes, it all depends on our soil type and what level you want to



Dr. Mike Richardson talked about the latest Gadgets and Gizmos turf managers can use to measure results and justify programs and expenses.

measure. However 3" probes will not give a accurate soil reading if they are only in the ground 1.5".

Richardson discussed the difference and value between light meters which measure total light lumens and PAR meters which measure the red and blue or the Photosynthetically Active Radiation or light. PAR light is what is needed by plants to conduct photosynthesis and is filtered out by tree canopy.

A light meter may show good foot candle readings under a tree but a PAR meter will show deficient amounts of light for plant health.

Cumulative light meters can measure the amount of light per day to show how trees affect turf health. Along with the meter a Sun Seeker app for your phone can determine which trees are causing the shade problems during the entire year and changing orbit of the earth.

Both of these tools can provide documentation to allow you to quantifiable argue for pruning and removal of problem trees.

The I-Stimp allows you to measure green speed with your I-phone but is not as ac-

curate as a stimpmeter and may cause undesirable member interaction.

The Sphero looked fun and informative as it can measure green speed, smoothness, firmness and trueness.

The Sphero ball can be matched with a android application from Turf Infomatics to use the devices accelerometer and gyroscopic data to measure putting quality and speed.

Other application or apps that Mike introduced were:

- Clinometer to measure slopes. Since a phone is small in length so users can lie the phone on a stimpmeter or other tool to lengthen the slope of a area.
- Planimeter to measure the area of anything from anywhere. Measure Map is one of the most popular.
- Leaf snap place a leaf on white paper and take a picture to get a tree identification.
- Radar Scope real time radar. This one is \$10 but a real time radar is worth the small investment.
- Fieldscout Greenindex+ Turf will allow I phone users to take color ratings to detect stress.

Turf managers can use specialized lenses for the camera on smart phones. Fish eye, wide angle, polarizing and magnifying lenses all increase the features of your phone. There are even infrared cameras that take thermal images to detect hot spots on greens or equipment. FLIR and Seek thermal are two manufactures to provide attachments for smart phones.



The Sphero is not only a toy for fun and recreation but it can also be used as a putting green quality measuring device when used with the Turf Infomatics application.

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There are plenty of tools that we can use to measure turf conditions to allow us to make decisions that are best for the course and environment.

To finish the morning session **Dr. Brian Horgan**, University of Minnesota spoke on "Science Of The Green Advancing Research Based Sustainability For the Golf Industry.

Brian started by discussing the benefits of the planted urban landscapes as plants provide cooling, carbon sequestration, limit run off and provide aesthete benefits.

Golf courses total 2,250,210 acres in the United States and are part of the 50,000,000 irrigated acres of turf across the country. 3x more turf is irrigated than corn. Although turf is important for the reasons stated above, can we justify the use of valuable potable water on it?

In 2007 golf courses used 762 billion gallons of water and it is estimated that golf course irrigation accounts for 1.6% of the 137 billion gallons used for irrigation nationwide.

Through conservation efforts the recent surveys have shown a 22% decrease in water use by golf courses.

Water reduction produces firmer playing conditions preferred by golfers and in many areas water reduction also saves money. We are lucky in the Midwest to have relatively cheap or free for the pumping water sources. Brian reminded us today is the cheapest our water is ever going to be.

Dr. Horgan discussed how to balance turf quality and player satisfaction with reduced inputs of resources. Currently most



Dr. Brian Horgan spoke on research based sustainability for the golf industry.

courses are in a "zone of normal operation" doing the best we can with the information we have today. Our immediate goal should be to reach the "zone of maximum efficiency" with the highest turf quality for the least inputs while keeping turf quality high.

In the future Dr. Horgan feels our inputs and results should be in the "future zone of maximum stewardship". To reach that level, golfers will need to reduce expectations as golf turf managers offer functional playing surfaces not based solely on aesthetics. Although we can and should continue to look at ways to reduce inputs healthy turfgrass has benefits beyond other crops. Turfgrass reduces water run off and filters rain water entering streams and lakes. Fertilizer use provides for increased shoot density to further reduce run off.

Carbon sequestration is a major benefit of turfgrass. When plants grow they take in carbon and they release carbon when not growing as fast.

Surprisingly, unirrigated turf releases more carbon that it sequesters in most years.

Turfgrass will be around for a long time however gains can still be made to produce quality stands with less inputs.

Dr. Horgan finished with discussions on a new program called Science of The Green to conduct research on the University of Minnesota Golf Course with a 5 year partnership from the United States Golf Association. The project can be followed at Scienceofthegreen.org and will feature a variety of research projects to provide real world answers golf courses can use.

After a great lunch and more networking the panel led by USGA Agronomist Robert Vavrek had a discussion on winter damage and recovery. The event concluded with Bob Vavrek giving the annual Roundup of all the speakers and the take home message of each.

Thank you go out to the speakers, the panel for selecting the topics and Jaime and Brett for organizing the day and most of all you for attending.

See you next year as we start the second 50 years!



Thursdays panel discussion included Dr. Mike Richardson, Dr. Ed Nangle, Ben McGargill, Dr. Brian Horgan and moderator Bob Vavrek.

Influence of Temperature On Fungicide Persistence

By Dr. Paul Koch, Department of Plant Pathology, University of Wisconsin – Madison **Dr. James P Kerns**, Department of Plant Pathology, North Carolina State University

Editor's Note: This article originally appeared in the October 2015 issue of Golf Course Management on pages 78-84. It is reprinted here courtesy of Golf Course Management.

For most superintendents, fungal diseas-es are the primary pest at their facilities. Despite frequent fungicide applications, certain turfgrass diseases such as dollar spot and anthracnose are still commonly observed, especially during hot and humid conditions (Photo 1). Dr. Rick Latin from Purdue University has identified three primary factors that affect fungicide performance in a turfgrass system (7). The first factor is disease pressure, which encompasses several factors relating to the aggressiveness of the pathogen, amount of pathogen inoculum and the susceptibility of the host. The second factor is fungicide deposition, which relates to the fungicide application itself and includes application rates, reapplication intervals and coverage. The third factor is the depletion of fungicides and fungicide protection, which, to date, has been difficult to quantify and is rarely considered by superintendents, technical representatives or diagnosticians when investigating a fungicide failure.

Temperature is a critical environmental factor for the initiation of turfgrass disease. However, temperature may affect not only the activity of the pathogen and the host, but also the persistence of fungicides applied to protect the turf. Of the six processes affecting fungicide depletion on turfgrass, four (volatilization, plant uptake, biotic degradation and abiotic degradation) are directly or indirectly influenced by temperature (9). Research from turfgrass and non-turfgrass systems alike has presented conflicting results on the impact of temperature on fungicide persistence. Increased depletion of chlorothalonil, triadimefon and iprodione was observed at higher temperatures on potato foliage as well as in agricultural soils (1,11,13). Conversely, other research has shown little or no effect of temperature on the degrada-

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Photo 1: Despite numerous fungicide applications --- 10 or more in some locations --- fungal diseases such as dollar spot can still be problematic.

tion of fungicides from peanut, tomato and creeping bentgrass leaves (3,4,10).

These conflicting reports make it difficult to determine the primary agents of fungicide depletion and whether that depletion is influenced by temperature. During the growing season, the most common fungicide reapplication strategy is based on the fungicide manufacturer's label recommendations, often at intervals ranging from seven to 28 days, depending on the fungicide's phytomobility (7). However, these recommendations do not vary based on environmental conditions such as temperature. Measuring the disappearance of fungicides at varying temperatures may show varied depletion rates, and may explain why reducing the reapplication interval and increasing the application rate is an effective means for managing disease during hot and humid conditions. Conversely, if fungicide depletion is reduced at lower temperatures, then reapplication intervals may be able to be extended beyond the interval recommended on the fungicide label.

The primary objective of this experiment was to measure the concentration of the fungicides chlorothalonil and iprodione at 50 F (10 C), 68 F (20 C) and 86 F (30 C) at weekly intervals for four to five weeks following application. We hypothesized that depletion of both fungicides would be greater at higher temperatures.

Materials and methods

Fungicides were applied to creeping bentgrass (Agrostis stolonifera, Penncross cultivar) maintained at 0.5 inch (1.3 centimeters) at the O.J. Noer Turfgrass Research Facility in Madison, Wis.





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The four fungicide treatments were a non-treated control, iprodione (Chipco 26GT, Bayer), chlorothalonil (Daconil WeatherStik, Syngenta), and a tank mixture of both fungicides; the three temperature treatments were 50 F, 68 F and 86 F. The experimental design was a randomized complete block with four replications, and fungicides were applied on June 22, 2010; June 14, 2011; and Aug. 2, 2011. Daconil WeatherStik was applied at the rate of 5.5 fluid ounces/1,000 square feet (1.59 milliliters/square meter) and Chipco 26GT was applied at the rate of 4.0 fluid ounces/1,000 square feet (1.27 milliliters/ square meter). All fungicides were applied in 2.0 gallons of water/1,000 square feet (981.49 milliliters/square meter) and at a nozzle pressure of 40 p.s.i using a CO2pressurized boom sprayer equipped with two XR Teejet 8004 VS nozzles.

Approximately one hour after application, 18 2-inch (5-centimeter) diameter cores were taken from each 3-foot \times 10foot plot. An equal number of cores from each plot were then placed in each of three growth chambers (50 F, 68 F or 86 F) on the University of Wisconsin–Madison campus (**Photo 2**). Temperature was held constant in each growth chamber, and the root zone of each core was kept in 0.5 inches (1.7 centimeters) of water to keep plants hydrated. Each core was then kept in its respective growth chamber for zero, seven, 14 or 21 days in 2010. Because significant iprodione residues remained at 21 days after application in the 2010 trial, additional sampling dates of 28 and 35 days after application were added for both 2011 trials. Chlorothalonil fungicide analyses were conducted zero, seven, 14, 21 and 28 days after application in 2010 and in both 2011 trials. At each analysis date in both 2011 trials, two additional samples were taken from both iprodione- and chlorothalonil-treated field plots. Samples were immediately analyzed in the laboratory to compare fungicide depletion under field conditions to depletion under growth chamber conditions.

Concentrations of iprodione and chlorothalonil were analyzed using SmartAssay ELISA kits purchased from Horiba Ltd. (Kyoto, Japan) (14,15) (**Photo 3**). The kits were designed to detect trace amounts of fungicide on fresh produce heading to market, and we modified the experimental procedure for use on golf course turfgrass (6). Time to 50% depletion (DT50) was calculated by using a mathematical formula to approximate how many days it took for the fungicide to decrease by half of its original concentration.

Temperature Results

Temperature influenced iprodione persistence during all three experiments (**Figure 1**). Iprodione DT50 in 2010 was 8.98 days at 50 F, 6.73 days at 68 F, and 2.53 days at 86 F (**Table 1**). These results indicate that it took approximately nine days for iprodione to deplete to half of its original concentration at 50 F, nearly seven days to reach 50% of the initial concentration at 68 F, and only 2.5 days to reach 50% of the original concentration at 86 F. In other words, in 2010, iprodione depleted 3.5 times faster at 86 F than at 50 F. DT50 values varied in both 2011 trials, but remained highest at 50 F and lowest at 86 F (Table 1). This temperature-based influence may have important consequences for the use of iprodione in disease management. Typically, iprodione is reapplied every 14 to 21 days based on the fungicide manufacturer's recommendation. Although these reapplication intervals are based on field efficacy trials, they do not account for variations in environmental conditions. The rapid disappearance of iprodione at 86 F relative to 50 F suggests that iprodione protection is less persistent at higher temperatures and may leave plants susceptible to pathogen infection. Conversely, the increased persistence of iprodione at lower temperatures may allow for extended reapplication intervals beyond what the manufacturer recommends, limiting unnecessary chemical exposure to the environment and providing financial benefits to the superintendent.

While temperature also influenced the persistence of chlorothalonil on turfgrass leaf blades, the effect was less pronounced than it was for iprodione (Figure 2).



Photo 2: Turfgrass plugs were removed from all test plots and placed in growth chambers at three different temperatures to determine the affect of temperature on fungicide degredation.

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Photo 3: Fungicide concentration was measured using SmartAssay ELISA kits from Horiba Ltd in Kyoto, Japan.

Figure 1. Iprodione concentration over a five-week period following placement in a 50 F, 68 F, or 86 F (10 C, 20 C, 30 C) growth chamber during two separate experiments in June and August 2011. Concentration was analyzed from creeping bentgrass leaf tissue collected from cores at the O.J. Noer Turfgrass Research and Education Facility in Madison, Wis. The tank mixture is a combination of iprodione and chlorothalonil. Data points represent mean iprodione concentration over four replications.

Figure 2. Chlorothalonil concentration over a 4-week period following placement in a 50 F, 68 F or 86 F (10 C, 20 C, 30 C) growth chamber during two separate experiments in June and August 2011. Concentration was analyzed from creeping bentgrass leaf tissue collected from cores at the O.J. Noer Turfgrass Research and Education Facility in Madison, Wis. The tank mixture is a combination of iprodione and chlorothalonil. Data points represent mean chlorothalonil concentration over four replications.

Chlorothalonil DT50 values were higher at 50 F than at either 68 F or 86 F, but DT50 was actually lowest at 68 F in both 2011 trials (Table 1). Although the impact of temperature may be less consistent on chlorothalonil than on iprodione, it still has important implications for the use of chlorothalonil in disease management. Chlorothalonil reapplication intervals are also based on the manufacturer's label and are seven to 14 days on turfgrass. Based on the research presented here, however, chlorothalonil concentration observed 14 and 21 days after application on turfgrass exposed to 86 F was often half of the concentration observed on turfgrass exposed to 50 F. As was the case for iprodione, this suggests that higher temperatures may lead to increased potential for disease breakthrough as a result of increased chlorothalonil depletion. On the other hand, lower temperatures may extend the need to reapply chlorothalonil beyond the recommended interval.

Despite the differences observed in the depletion of both fungicides, the specific mechanisms responsible for the depletion remain unclear. Iprodione is a localized penetrant fungicide and is, therefore, absorbed into the leaf (7). Fungicides applied to leaf surfaces can take up to seven days to fully absorb into the leaf and, even then, upward of 50% of the fungicide may remain bound on the leaf surface (7). Once the fungicide has been absorbed into the leaf, numerous plant defense responses may be released following exposure to iprodione and rapidly degrade the parent molecule (12). Increased plant metabolic activity at higher temperatures may provide a potential explanation for the increased degradation of iprodione at higher temperatures. Even chlorothalonil, a contact fungicide that resides primarily on the surface of the leaf blade, has been shown to induce plant detoxification responses following application to leaf surfaces (5). It remains unclear, however, what role plant detoxification mechanisms play in chlorothalonil metabolism on the leaf surface. Other phytomobility classes such as the acropetal penetrant demethylation inhibitors (DMI) and quinone outside inhibitors (QoI) may have a distinctly different response to temperature. Further research with these fungicide classes is required before assumptions can be made about how they will react to different temperatures.

Previous research has also demonstrated the ability of soil bacteria to degrade iprodione (13) and chlorothalonil (11). Other factors such as leaf growth, rainfall and volatilization have also been shown to affect chlorothalonil degradation on potato, tomato and creeping bentgrass foliage (10).

Despite the likely influence of bacterial metabolism on the disappearance of iprodione and chlorothalonil from turfgrass and other cropping systems, the degree of impact by microbial metabolism remains unclear and warrants further research.

Comparison to field results

Iprodione and chlorothalonil concentration in the field was compared to concentration in the growth chambers during both 2011 trials. Average daily temperature in the field during both analyses ranged from 60 F (15.5 C) to 75 F (24 C), considerably lower than the constant 86 F found in the warmest growth chamber. Despite warmer temperatures in the growth chamber, iprodione and chlorothalonil concentrations in the field reached zero at least seven days faster than in the 86 F growth chamber (**Figure 3**). Although photodegradation from natural sunlight may have increased the rate of degradation in the field plots, regular mowing of the field plot most likely removed a majority of the fungicide from the turf system. The results presented here suggest that, at temperatures optimal for turf growth, the majority of fungicide may be physically removed from the turf system by mowing and not by a specific degradative mechanism such as bacterial or plant metabolism.

If physical removal significantly influences fungicide loss from a turfgrass system, then a reduction in the amount of leaf area removed during each mowing could prolong fungicide persistence and disease suppression. Plant growth regulators such as paclobutrazol and trinexapac-ethyl are used regularly on golf courses to reduce vertical plant growth and increase stress tolerance of creeping bentgrass plants (16). Extended fungicide efficacy in turfgrass has been observed where fungicides have been applied in combination with a plant growth regulator (2,8). This extended period of fungicide efficacy associated with plant growth regulators may be due to reduced removal of the fungicides from the turfgrass canopy.

Conclusion

Disease management in a turfgrass environment is a complex system that is influenced by host resistance, pathogen virulence, environmental conditions and the presence of fungicides. The activity and persistence of fungicides on the leaf blade is a critical component in effective disease management, but one that has remained largely undefined. It is clear that temperature plays a larger role in disease management than affecting only pathogen aggressiveness or host resistance. Rather than simply using the recommended reapplication interval regardless of the environmental conditions present, future superintendents may consider temperature and other environmental factors when deciding when to reapply fungicides. This may result in more effective disease management at higher temperatures and extended reapplication intervals at lower temperatures. Considering environmental variables such as temperature when planning a fungicide program will lead to more effective and efficient use of fungicides in the future without sacrificing disease management or turfgrass quality.

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Figure 3. Iprodione and chlorothalonil concentration from turfgrass clippings collected from cores sampled from the O.J. Noer Turfgrass Research and Education Facility in Madison, Wis., in August 2011. Concentration was analyzed zero, seven, 14, 21 and 28 days after the application with an additional analysis for iprodione at 35 days after application. Fungicide concentration from iprodione and chlorothalonil samples were compared to iprodione or chlorothalonil concentrations collected from turfgrass samples placed at 86 F (30 C).

The research says

• Iprodione and chlorothalonil deplete faster at higher temperatures.

- Iprodione was more susceptible to temperature-influenced depletion than chlorothalonil.
- Regular mowing removed fungicide from the turfgrass system more rapidly than the warmest temperature tested.
- Temperature-influenced depletion may explain why higher reapplication rates and shorter reapplication intervals provide more consistent disease control in hot and humid conditions.

Funding

Partial funding for this research was provided by the Wisconsin Golf Course Superintendents Association and the Northern Great Lakes Golf Course Superintendents Association.

Days to 50% disappearance for two fungicides

	Iprodione				Chlorothalonil				
Year	ear Growth chambers		Field	Gi	175-1.1				
	50 F (10 C)	68 F (20 C)	86 F (30 C)	Fleid	50 F (10 C)	68 F (20 C)	86 F (30 C)	Field	
2010^{\dagger}	$8.98 \pm 1.15''$	6.73 ± 0.56	2.53 ± 0.31	NA	NA	NA	NA	NA	
2011a [‡]	27.7 ± 4.67	16.1 ± 1.54	3.30 ± 0.63	3.87 ± 0.94	16.8 ± 3.90	3.85 ± 0.95	7.96 ± 1.36	2.24 ± 0.34	
2011b [§]	44.4 ± 8.94	5.37 ± 1.50	3.77 ± 0.93	3.98 ± 0.96	7.83 ± 2.70	4.33 ± 1.90	7.90 ± 4.53	2.25 ± 0.3	

Fungicides applied on June 22, 2010, and samples conducted 0, 7, 14, and 21 DAA.

¹Fungicides applied on June 14, 2011, and samples collected 0, 7, 14, 21, 28 with an additional 35 DAA sampling for iprodione. [§]Fungicides applied on August 2, 2011, and samples collected 0, 7, 14, 21, 28 with an additional 35 DAA sampling for iprodione. ^{*II*}DT₅₀ values measured in days.

Table 1. Time to 50% disappearance (DT50) in days for iprodione and chlorothalonil from 50 F, 68 F and 86 F growth chambers following application to creeping bentgrass leaf blades maintained under fairway conditions. Samples in the growth chamber and field samples were initially collected from the O.J. Noer Turfgrass Research Facility in Madison, Wis. Each value represents the mean of four replications.

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Old Man Winter

By Jake Schneider, LMD Production Manager, The Bruce Company

were spoiled at Blackhawk. Our snow removal obligations consisted of plowing the shop yard with the loader tractor, shoveling next to the buildings, clearing the city sidewalks, and occasionally dealing with ice dams on the roof. The clubhouse area was taken care of by a contractor, and unless they got into a pinch, we generally didn't have to worry about helping. If anything, the snow offered a nice occasional break from the paint fumes and carbon monoxide that filled the shop air during the equipment maintenance and refurbishing months. While I can't say for sure, I think that our dealings with snow were the exception and not the rule as it relates to golf course maintenance staffs. Those were the days...

Aside from the continuing nightmares associated with a six-inch snowfall on December 28 that mixed with warm ground and a significant amount of sleet (read: really, really heavy snow that was a pain in the you-know-what to remove), the idea for this article topic came from the recent State of the Union address and how much presidents age from the beginning to the

end of their terms. Now, making decisions about our national defense may carry more important consequences than helping to manage our snow removal operations, but I'm fairly certain that my burgeoning gray hair population can be directly traced to each inch of snow that falls. Needless to say, it's not an easy business that requires constant adjustments and a little bit of prayer. I should have played Tetris as a kid in preparation for constantly realigning personnel.

While the number can unfortunately fluctuate downwards dramatically during any given event, we have somewhere in the neighborhood of 140 hourly employees and 75 working through subcontractors. And, if you know of anyone, we're still hiring. As I've previously written about, consistent, reliable staffing is the number one, two, three, and four issues that we deal with, and despite a fairly handsome hourly pay rate, finding people who want a job without guaranteed weekly hours that will often require shoveling snow in the middle of the night isn't getting any easier.

Although snow provides an important source of revenue for our company, my fellow snow managers and I aren't exactly heartbroken over the El Nino weather pattern keeping snow totals low to this point in the season. As of the second week in January, we were getting inquiries from properties, including a few major retailers, which still needed snow removal services for this season. We had to turn them down because we simply don't have the staff to handle the additional work, and I know that we aren't alone. To compound the issue, it seems as if perceptions and requirements of people and insurance companies for snow and ice-free conditions are becoming more unreasonable, and it's hard to imagine how folks in northern Wisconsin can function without perfectly clear lots and sidewalks (read: sarcasm). The inputs required to produce these dry surfaces are beginning to show, too.

Not far from Blackhawk, chloride levels

in Madison Water Utility Well 14 have doubled over the last 15 years and a handful of other city wells are also showing signs of being similarly impacted. Road salt has been implicated in causing this chloride spike. New salting technologies and methods have started becoming more common, and by now, we are all familiar with the white lines of brine that highway crews apply prior to winter events. Pre-treated bulk salt is another relatively new option that performs at a lower use rate than the untreated variety, but the product cost is significantly higher. Like most things, changing practices requires significant investment in equipment and training that customers have to be willing to pay for, and as of right now, we haven't seen that push.

Between increasing expectations, negative environmental impacts, and a lack of quality labor, you'd think that something will eventually have to give, but that remains to be seen. Until then, I'm hedging my bets by investing in Just for Men

THE GRASS ROOTS JANUARY / FEBRUARY 2016

Kurt Hockemeyer - A Introduction

By Kurt Hockemyer, Turfgrass Outreach Specialist, UW- Wisconsin Madison

I grew up on a small dairy farm in Indiana. I combined my love for working outdoors with my passion for the game of golf and pursued an undergraduate degree in turf science from Purdue University. As an undergrad I obtained golf course internship experience at Chevy Chase Club near Washington D.C. and at the Ford Plantation near Savannah, GA. These opportunities allowed me the chance to work with both cool and warm season grasses. I was offered the opportunity to conduct a small research project while working at the Ford Plantation and after that decided to pursue a career in turfgrass research.

After graduating with my BS in turf science in May 2011, I started work on my MS with Dr. Rick Latin at Purdue University. My project dealt with quantifying fungicide residues in turf components when the fungicides were applied to control root diseases. I also tested the potency of several fungicides against Magnaporthe poae, the summer patch pathogen.

I graduated with my MS in turf pathology in August of 2014. Soon after that I had moved to the Twin Cities to start work with Dr. Angela Orshinsky as a Research Fellow at the University of Minnesota. I worked on comparing in vitro fungicide sensitivity of the snow mold fungi vs the snow scald pathogen, Myriosclerotinia borealis. I was also charged with getting Dr. Orshinsky's turf fungicide testing program off the ground and assisting graduate students conduct experiments on hops and tomatoes. I was able to expand my knowledge base from just turf and learn about these new crops, and not just because hops are an important ingredient of beer (although that was a very tasty perk of doing hops research).

Then in the fall of 2015 Dr. Koch gave me the opportunity to come work with him here in Madison. As the Turfgrass Outreach Specialist I am in charge of implementing a new program geared towards reducing risk and environmental impacts associated with pesticide applications on turf. While the specifics of this program have yet to be decided, the main focus should remain the same. With increased concern from society and legislators, golf courses and turf in general have come under increased scrutiny with regards to environmental health. It will be my job to establish a baseline of how much pesticides are being applied today, and then implement this program that will allow turf managers and lawn care operators to reduce environmental impacts while maintaining high quality turf. In addition, I will supervise the application of fungicides and evaluation work for the UW Turfgrass Fungicide Testing Program (labs.russell.wisc.edu/tdl/research). I will also assist Dr. Koch and Bruce Schweiger

Kurt Hockemeyer joins the team at UW-Madison as the Tufgrass Outreach Specialist.

Kurt will be working on a new program reducing risk and environmental impacts of pesiticide applications along with the fungicide testing program and Pesticide Applicator Training. Welcome to Wisconsin Kurt!

in the instruction of the Pesticide Applicator Training Program Category 3.0 (Turf & Ornamental) for the State of Wisconsin.

To be able to move 4 hours closer to my family in Indiana was an opportunity that my wife and I could not pass up. Plus we want to see how many Big Ten universities we can work for before the end of our careers (3 and counting!). In all seriousness though we plan on being in Madison for the foreseeable future and are excited to call Madison home. I enjoy the outdoors, especially fishing. I have yet to try my hand at some ice fishing (I hear there is a lot of "hops research" going on while ice fishing)! I look forward to meeting and working with turf managers from around the state of Wisconsin.

Factors That Affect Insecticide Performance

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

Ceveral factors can affect insecticide Operformance, they include 1) abiotic, 2) biotic and 3) chemical factors. Any one or a combination of these factors can reduce the efficacy (performance) or result product failure and consequent poor or lack of insect control. Abiotic factors include sunlight, air temperature, relative humidity, water temperature, wind speed, spray volume, droplet size and tank mix agitation. Many insecticides are susceptible to photodegradation, some more than others. Photodegradation is an abiotic process where the absorption of light energy results in the break-down of the active ingredient of the insecticide negatively impacting its performance (efficacy).

Air temperature and relative humidity can also impede the performance of an insecticide, hot (high temperatures) and dry (low relative humidity; below 40%) can contribute to increased drift because droplets rapidly evaporate and become fine droplets resulting in increased potential for drift. Water temperature is another abiotic factor that many people don't take into consideration, it can negatively affect insecticide performance. The ideal temperature

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The water quality used to make pesticide application is something that is frequently overlooked, but can dramatically impact the performance of an insecticide. Research demonstrates that the quality of water used for spraying can affect how pesticides perform.

range to maximize performance is between 55-75 °F. If the water temperature is below the ideal range, an alternative approach would be to store the water in the sprayer or tank, indoors or outdoors, until the water reaches the desired temperature.

Wind speed affects the distance a droplet will travel before it is deposited on the target; in general, wind speeds of 3-7 mph are preferable. Spray volume or the amount of insecticide and water that is applied (often expressed as gallons/1000 square feet or gallons/acre) can impact

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the performance of an insecticide. For example, low spray volumes (i.e., 0.5 gallons/1000 square feet) to control white grubs are typically too low to ensure the movement of the formulated insecticide into the soil profile where the target organism (grub) is located. Droplet size is influenced by nozzle type, conventional nozzles produce a wide range of droplet sizes.

Droplet size also is related to the spray volume or nozzle flow rate, nozzles with larger orifices generate greater flow rates and produce larger droplets. Agitation of an insecticide is critical to ensuring the proper mixing of the insecticide spray solution to maximize the performance on the target insect(s). For example, wettable powder and dry flowable formulations of insecticides must be properly agitated to minimize settling-out of the insecticide from the water in the spray tank.

Insect biology (i.e., life-cycle, life stage, behavior, etc.) is the primary biotic factor that can impact insecticide performance. In general, younger insects are more susceptible or vulnerable to insecticides compared to older, more developed insects. For example, 1st instar white grubs can be effectively controlled with most insecticide labeled for grubs; however older, more mature 3rd instar grubs are measurably more difficult to control. Performance (efficacy) of insecticides applied to younger grubs is often > 90% whereas insecticide treatments targeted at older grubs varies ranging from around 30 - 75% control.

Another important biotic factor that can influence insecticide performance is insect behavior. Highly mobile insects such as chinch bugs readily move throughout the turfgrass system (leaf blades, leaf sheaths, thatch and occasionally upper soil profile), thus making them somewhat more difficult to manage when the appropriate management strategy (i.e., insecticide and application equipment) is not employed.

WISCONSIN ENTOMOLOGY REPORT

Chemical factors such as water quality, water pH, insecticide chemical (chemistry) properties and formulation (i.e., inert ingredients, carriers and adjuvants) can have a profound affect on the performance of an insecticide. Water often comprises ninetyfive percent (or more) of the spray solution. The water quality used to make pesticide application is something that is frequently overlooked, but can dramatically impact the performance of an insecticide.

Research demonstrates that the quality of water used for spraying can affect how pesticides perform. Water quality parameters such as acidity (and alkalinity) and dissolved minerals can interact with the active and/or inert (additive) ingredients of an insecticide.

Poor water quality can adversely influence the pesticide by reducing solubility and decreasing absorption by the target pest, resulting in inferior performance and the need for re-treatment. Suspended, positively-charged organic pesticides are attracted to and bind with negatively-charged particles found in the water; product performance may be significantly reduced if water containing soil sediment is used as a carrier. Water hardness can also affect some pesticides negatively. As in magnets, opposite charges attract: negatively-charged pesticide molecules attach to the positively charged iron, calcium, and magnesium molecules (cations) in hard water. Pesticides normally are formulated as weak acids or neutral to weakly-alkaline products.

As a general rule, insecticides (also herbicides and fungicides) perform best in slightly acidic water, pH 4–6.5. When water pH falls outside of the preferred upper or lower boundaries, product performance can be compromised. Water pH higher than 7 creates alkaline conditions can cause some insecticides to undergo degradation or chemical breakdown, a process known as hydrolysis. In general, insecticides are much more susceptible to hydrolysis than are fungicides, herbicides, defoliants or growth regulators.

Organophosphate and carbamate insecticides are more susceptible than synthetic pyrethroids to hydrolysis. The pesticide label may or may not specify the need for water conditioners, additives, or adjuvants, some pesticide labels may prohibit the use of water conditioners or other additives. Checking water quality is important. Time spent addressing the quality of water used in the spray tank can pay big dividends. You can purchase do-it-yourself water testing kits or take your water samples to a water testing professional. The chemical (chemistry) properties of the active ingredient and the formulation (inert ingredients) of a labeled insecticide can also influence its performance.

Depending on the molecular structure of the active ingredient and the formulation, positively or negatively charged, it may have greater binding affinity to organic materials. For example, chlorpyrifos (Dursban) has a high soil organic carbon sorption coefficient (Koc) whereby it binds tightly to soil as well as sediment and organic matter in water. As a result, the effectiveness of chlopyrifos against soildwelling white grubs is minimal, yet highly effective for management of above-ground insect pests. It is important to consider the various factors that can adversely affect insecticide performance to maximize insect control and reduce insect pest management costs.

2015 WGCSA Legacy Scholars

By Josh Lepine, Certified Golf Course Superintendent, Maple Bluff Country Club

The WGCSA Legacy Scholars Program was developed to recognize outstanding students and offer educational aid to children/stepchildren/grandchildren of active class A, SM, C, Class A retired or class AA WGCSA members. Due to rising tuition costs and feedback from our membership, your WGCSA Board of Directors is happy to announce we have budgeted additional funding for our Legacy Scholars program in 2016. We will now be offering two scholarships in the amount of \$1,000 each. In order to improve eligibility for high school seniors, we plan to move the application deadline from Fall to Spring. We will be promoting this change and sending out the new specifics shortly.

Congratulations to our three 2015 WGCSA Legacy Scholars announced at the Turfgrass Symposium this past December.

Name: Logan Ferrie

WGCSA Member Relation: Son of Brian and Kristine Ferrie. Brian is the Class A Superintendent at Horseshoe Bay GC in Egg Harbor, Wisconsin.

Educational Status: Logan is currently a senior at Gibraltar High School in Fish Creek, WI. He has accepted admission to UW-Whitewater for the 2016 fall term. Logan plans to major in Supply Chain/Operations Management.

Achievements and Extra-Curricular Activities: Honor Roll, Rotary Achievement Award, Varsity Football-Captain, Varsity Golf-Captain, High School Band, Project 180, Varsity Letter Club, DECA, Volunteer at Pink Clas-

sic Golf Outing, Football Fundraiser and American Red Cross Blood Drive.

Work experience: Dockhand at South Shore Pier and Harbormaster at Ephraim Yacht Harbor.

Quote from Application Essay: "The attribute that has made my father successful in his profession is his dedication to Horseshoe Bay Golf Club. Spending countless hours on the golf course with my father throughout the years has shown me that hard work and dedication will bring you much success in life. I know that as I start pursuing my college education, the things I have learned from my father will carry me through life."

LAUGHTER ON THE LINKS!

"What a bad day on the course," Tom tells his wife. "Charlie had a heart attack on the third hole." "That's terrible! she says. "You're telling me" Tom replies "All day long, it was hit the ball, drag Charlie, hit the ball, Drag Charlie!!!!

A golfer walks off the 18th green, hands his putter to the his caddie and says, "kid, you have got to be the worst caddie in the world."

The caddie replies, "Sir, that would be too much of a coincidence."

Name: Taylor Archibald

WGCSA Member Relation: Daughter of Steve and Amy Archibald. Steve is the Class A Superintendent at Thornberry Creek in Oneida, Wisconsin.

Educational Status: 2014 Graduate of Bay Port High School. Currently a sophomore at Michigan Technological University in Houghton, Michigan seeking a Bachelor's Degree in Biological Sciences.

Achievements and Extra-Curricular Activities: High School & College Honor Roll, National Honors Society, High School Cross Country All-State Academic Team, Varsity Soccer, Life of an Athlete Club. College Women's Varsity Soccer Team. Special Olympics volunteer, Annual Bellin Run and local Parish volunteer.

Work experience: Banquet Server at Thornberry Creek and Certified Nursing Assistant at Comfort Keepers.

Quote from Application Essay: "The most prominent attribute I would give to my father's success in the Golf Course Superintendent Profession would be adaptability.....I think my dad has not only demonstrated adaptability within his profession, but in life itself. I know I will be able to mimic such adaptability and dynamic decision making. Seeing the success and hard work pay off for him gives me incredible confidence in the ability to do the same."

Name: Annika Lee

WGCSA Member Relation: Daughter of Michael and Nancy Lee. Michael Lee, CGCS, is the Class A Manager of Golf Course Maintenance at Blackwolf Run/Whistling Straits in Kohler, Wisconsin.

Educational Status: 2015 Graduate of Kohler High School. Currently a Freshman at UW-Stevens Point seeking a Bachelor's Degree in Elementary and Special Education.

Achievements and Extra-Curricular Activities: High School Karen Kauger Service award and Gene Reilly "Good Guy" award. Key Club, Student Council, Making a Difference and 4 time state participant in Forensics. UW Stevens

Point 2015 Top Dawgs, student member of WI Education Association and Student Council for Exceptional Children. High School Sunday school teacher in children's ministry, special education tutor, child care worker at Sheboygan YMCA and teacher assistant at Kohler Schools. Annika is also active in Cru (Campus Crusade for Christ) and Pointers of Life.

Quote from Application Essay: I believe that this characteristic of humility has allowed my dad to maintain and build a solid, humble reputation as a golf course superintendent, a reputation that matches his character. He consistently shows humility towards those around him by admitting his mistakes, taking time to get to know his management staff and thanking them often for their hard work....At graduation, I hope humility will be an attribute that I use to describe my pursuit of education."

Event Schedule!

Wednesday February 3rd - Assistants Seminar -Whispering Springs Golf Course, Fond du Lac
February 6-11, 2016 - Golf Industry Show, San Diego, CA
Wednesday February 10th - GIS WI Room 6:30-9:30 PM - Striders, San Diego, CA NEW LOCATION!!!!!
Wednesday March 2nd - Northern Great Lakes Educational Conference - Green Bay Radisson
Monday March 14th - Spring Business Meeting - South Hills CC, Fond du Lac
Wednesday April 27th - Super/Pro Outing w/PGA -Hidden Glen at Bentdale Farm, Cedarburg
Monday May 23rd - May Morning Golf Meeting - Blackwolf Run (Meadow Valley), Sheboygan
Monday June 13th - June Meeting - Brown Deer Park GC, Milwaukee
Tuesday July 26th - WTA - Summer Field Day - OJ Noer Research Facility, Verona
August 15th - Joint meeting w/NGL - Thornberry Creek GC, Oneida
Monday October 3rd - WTA Golf Fundraiser - Pine Hills CC, Sheboygan
Monday October 3rd - WTA Golf Fundraiser - Butte des Morts CC, Appleton
November 5th - Couples Dinner - Wisconsin Club – City Club, Milwaukee
Wed Nov 29-30 (TBD) - Wisconsin Golf Turf Symposium - American Club, Kohler

WELCOME NEW MEMBERS 2015 to January 2016

Steven Ainsworth (D)	Rockford Park District	Ben Larsen (SM)	Green Bay Country Club
Nicholas Bannach (C)	Green Bay Country Club	Rodney Lesnick (A)	High Cliff Golf Course
Brandon Bannow (C)	Oshkosh Country Club	James Lindmeyer (E)	Sure Cut LLC
John Beck (E)	Beck Sports Turf Specialist	Ryan McFarlin (D)	
Alex Beson-Crone (C)	Erin Hills Golf Course	Jake Newman (C)	Geneva National Golf Club
Liza Chmielewski (E)	JRK Seed & Turf Supply	Chris Nicholas (C)	Blackhawk Country Club
Shane Conroy (H)	GCSAA	Andrew Noll (SM)	Eagle Creek Golf Club
Betty Jean Dille (E)	Spring Valley USA	Daniel Pirkle (C)	Milwaukee Country Club
Robert Duhm (SM)	Sand Valley Golf Club	Jeff Plasschaert (SM)	Reid Golf Course
Phil Fredrickson (H)	GCOW President	Emmet Reilly (C)	Milwaukee Country Club
Dominic Frese (C)	Meadowbrook Country Club	Matt Ring (E)	TerraMax, Inc
Kyle Froh (C)	North Shore Country Club	David Rutz (E)	Easy Locator
Richard Hamann (C)	Lake Wisconsin	Mike Shuman (SM)	Lake Windsor Country Club
Michael Haupt (D)	Lakeland Lawn Care	Erik Spong (E)	Intelligro
Connor Healy (SM)	Conway Farms	Jeremy Sprager (A)	Moor Downs Golf Course
Corey Heasley (C)	Medina Golf and Country Club	Garry Sullivan (E)	Green Jacket
John Holberton (A)	Sweetgrass Golf Club	Timothy Van Alstine (SM)Milwaukee County Parks
Nathan Holmstrom (C)Oconomowoc Golf Club	Jim Wallace (A)	Delaware Country Club, IN
Will Hoppe (S)	Rutgers University	Mike Whitaker (E)	Ferguson Waterworks
Joe Jehnsen (E)	DHD Tree and Turf Prod.	Justin Wipperfurth (C) Wisconsin Club
Tyler Kutz (C)	West Bend Country Club	Dan Wubbels (E)	National Golf Graphics

Scholarship and Research

S and R History

2003 - \$23,000 2004 - \$26,500 2005 - \$31,000 2006 - \$20,000	2008 - \$38,000 2009 - \$17,000 2010 - \$32,180 2011- \$45,925	2013 - \$30,875 2014 - \$36,640 2015 - \$38,304 2016 - \$37,600-			In last 14 years we have provided over \$435,000 at an average of \$30,800 per year to our S and R efforts.			
2007- \$24,730	2012- \$34,260	\$47	, <mark>600</mark> 2015 Bud.		2015Act.	<u>20</u>)16 Prop.	
J.R. Love Scholarship		\$	1,500.00	\$	1,500.00	\$	1,500.00	
Legacy Scholarship		\$	1,500.00	\$	1,500.00	\$2	,000.00 *	
M. S. Miller Literary		\$	1,000.00	\$	1,000.00	\$ ·	1,000.00	
TDL Donations		\$	3,100.00	\$	3,100.00	\$ 3	3,100.00	
UW Mad./Wis Turf. Asso	oc.	\$	19,204.00	\$	20,870.98	\$ 19	9,500.00	
PAR4 Research Donation	on	\$	10,000.00	\$	8,333.02	\$ 8	8,500.00	
EIFG		\$	500.00	\$	500.00	\$	500.00	
Other/OJ Noer Foundat	tion	\$	1,500.00	\$	1,500.00	\$	1,500.00	
		\$	38,304.00	\$	38,304.00	\$ 37	7,600.00	

UW Funding Proposed as of 12.3.15

Name of Project	Requested by:	<u>2014</u> Funding	2015 Funding	2016 Funding	Project Total
Golf Cart Compaction Study	Dr. Doug Soldat			\$10,000	\$10,000
Snowcover and Temp. Effects of Chlorthalonil and Azoxystrobin	Dr. Paul Koch	\$10,000.00	\$10,000.00	\$10,000	\$30,000
Bioactivity of Systemic Fungicides and Insecticides in Turfgrass Guttation	Dr. Chris Williamson	dependent Upon USDA Grant Approval	IF Approved FUNDING will come from WGCSA Unapplied funds in WTA Account	\$10,000	\$10,000
EIFG Matching Chapter Grant Studying Propiconazole Uptake and Timing When Used for Snowmold.	Dr. Paul Koch	(50/50 Match)	\$8000	\$8,000	\$16,000
	Annual Totals	\$27,540.00	\$29,204.00	\$38,000.00	\$74,744.00
Wisconsin Chapter GCSAAA					

Scholarship and Research Proposals were approved at the recent fall business meeting after the budget presentation. The funds for Dr. Williamson's study were approved contingent on receiving a USDA Grant. Watch The Grass Roots magazine for results and information on all these studies.

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