

The GRASS ROOTS

AN OFFICIAL PUBLICATION OF THE WISCONSIN GOLF COURSE SUPERINTENDENTS ASSOCIATION

VOL. XLVI
ISSUE 1
JANUARY/FEBRUARY 2017





National Golf Graphics



GOLF COURSE SIGNS | TEE MARKERS | YARDAGE MARKERS
SPRINKLER HEAD YARDAGE CAPS | FLAGS | ACCESSORIES



golf industry show
Booth #1725

To Request a New Catalog Call Peter Meyer at 877-710-9363
or visit my website at www.NationalGolfGraphics.com

TABLE OF CONTENTS

THE PRESIDENT'S MESSAGE
Hello WGCSA 4

TURFGRASS DIAGNOSTIC LAB
TDL Year In Review 6

WISCONSIN ENTOMOLOGY REPORT
Schweiger Steps Up to Manage the O.J. Noer Facility . . . 10

USGA GREEN SECTION
Winterkill - Causes and Prevention. 12

COVER STORY
Jon Canavan Takes The Helm of WGCSA 20

MEMBER SPOTLIGHT
Bret Mullikin 24

WISCONSIN PATHOLOGY REPORT
Old Faces, New Roles: A State of the Lab Update. 26

MADTOWN MUSINGS
The WTA and You 30

WISCONSIN SOILS REPORT
A High performance, Low Cost Liquid Fertilizer Program . . . 32

WISCONSIN TURFGRASS ASSOCIATION
2017 WTA Turfgrass Research Day and Conference. . . 36

EDITOR'S NOTEBOOK
Happy People Make Their Own Sunshine 42

ADVERTISER INDEX 33

EVENT SCHEDULE 41

ABOUT THE COVER

Newly elected WGCSA President Jon Canavan on the 15th Hole at Brown Deer Park Golf Course.

Knowing is not enough; we must apply. Willing is not enough; we must do.
By German Poet Johann Wolfgang von Goeth, 1749-1832
This quote by Goeth can serve as a reminder for us to avoid going through the motions in work and life.

Visit our Website at
www.wgcsa.com

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

David A Brandenburg, CGCS
Rolling Meadows Golf Course
PO 314 Theresa, WI 53091
grassroots@wgcsa.com



2017 WGCSA OFFICERS AND DIRECTORS

Front Row: Jim Van Herwynen, Jon Canavan, Josh Lepine, Jeff Barlow, Scott Anthes. Back Row: Rob Johnson, Garrett Luck, Benjamin LeBarre, Andrew Noll, Mike Bremmer, Joe Sell, Brett Grams

PRESIDENT

Jon Canavan
Milwaukee County Parks
9480 Watertown Plank Rd
Wauwatosa, WI 53226
jon.canavan@milwcnty.com

DIRECTORS

Mike Bremmer
Wisconsin Club
5835 N Shoreland Ave
Whitefish Bay, WI 53217
mikebremmer@icloud.com

VICE PRESIDENT

Josh Lepine, CGCS
Maple Bluff CC
500 Kensington Drive
Madison, WI 53704
joshl@mbcc1899.com

Garrett Luck CGCS
Hidden Glenn at Bentdale Farms
778 Sherman Rd.
Cedarburg, WI 53102
gluck@hiddenglengolfclub.com

TREASURER

Jeff Barlow CGCS
Waupaca CC
1330 Ware St.
Waupaca, WI 54981
jj12barlow@gmail.com

Benjamin LeBarre
The Llegend at Bristlecone Pines
1325 E Bristlecone Dr.
Hartland, WI 53029
blabarre@thellegendclubs.com

SECRETARY

Scott Anthes
Brown County GC
897 Riverdale Dr
Oneida, WI 54155
anthes_sp@co.brown.wi.us

Andrew Noll
Westridge GC
E9051 Klatt Rd
New London, WI 54961
awnnoll6@gmail.com

VENDOR LIAISON

Rob Johnson
Waupaca Sand & Solutions
E3481 Royalton St
Waupaca, WI 54981
rjohnson@waupacasand.com

PAST PRESIDENT

Jim Van Herwynen, CGCS
South Hills Golf & CC
1175 Fond du Lac Ave.
Fond du Lac, WI 54935
jimv@southhillssfdl.com

CLASS C REPRESENTATIVE

Joe Sell
North Shore Golf Club
1276 Meadowbrook Dr #1
Cleveland, WI, 53015
Email: jws227@gmail.com

CHAPTER MANAGER

Brett Grams
WGCSA
N9122 Virginia Dr.
Waupaca, WI 54981
bgrams@wgcsa.com

Hello WGCSA

By Jon Canavan, Golf & Recreation Turf Manager, Milwaukee County Department of Parks, Recreation & Culture

I would like to thank the members of the WGCSA for my election to president of this great association. As a farm boy from the middle of nowhere in Western Iowa I feel I've come a long way and I am excited to take on this opportunity.

Taking the role of the President will have many challenges and rewards. One of my biggest challenges will be filling the shoes of so many accomplished past Presidents. I would like to thank Jim Van Herwynen for his leadership and mentoring. He taught me a lot about being a productive board member and good person!


I met Jim in 2006 when I was the Superintendent at Brynwood Country Club. I was invited to attend a Green Bay Packers game through Reinders; I was nervous about this trip since I did not know many superintendents in Wisconsin. I was lucky enough to sit next to Jimmy V., and he introduced me to several superintendents that day. He really made me feel like part of the association, and I will always be thankful to him for that!

Growing up as a farm kid, I knew that working outdoors would be a part of whatever profession I pursued, but after working one summer digging holes for a landscaping company I knew that role wasn't for me. I went to the local community college to get a 2 year degree in Horticulture. I had a friend who was working at A.H. Blank municipal golf course in Des Moines IA and he got me a job. After one day on the golf course I was hooked. I would like to thank Mark O'Meara for giving me my first opportunity in the Golf Course Industry. I found out later that he was also key in getting me hired at Oakland Hills Country Club.

Two years later I attended Northwest Missouri State and graduated with a bachelor's degree in horticulture in 1999. That summer I was able to secure an internship at Des Moines Golf and Country Club, and during that summer they hosted the U.S. Senior Open. Two of the highlights from that summer were getting to work a very nice golf tournament, and personally meeting Arnold Palmer. I was hand watering a green during the practice rounds when he came up to me and thanked me for all the work

that the grounds crew had done. I wished I could have said more to him. I could only mumble out a quiet thank you!

After graduation I was hired by Steve Cook CGCS MG at Oakland Hills Country Club. Steve taught me so much about being a productive human being. Steve completely changed how I looked at golf course maintenance. He showed me what great customer service is and how to grow a fantastic stand of poa!

I am truly looking forward to being your president. If you ever have any questions or comments please do not hesitate to call me or another board member. 



The WGCSA First Couple Jennifer and Jon Canavan.

WGCSA MISSION STATEMENT

The Wisconsin Golf Course Superintendents Association is committed to serve each member by promoting the profession and enhancing the growth of the game of golf through education, communication and research.

WGCSA VISION STATEMENT

The Wisconsin Golf Course Superintendents Association is dedicated to increase the value provided to its members and to the profession by:

- Enhancing the professionalism of its members by strengthening our role as a leading golf organization in the state.
- Growing and recognizing the benefits of a diverse membership throughout Wisconsin.
- Educating and promoting our members as leaders in environmental stewardship.
- Offering affordable, high value educational programs at the forefront of technology and service.
- Being key to enjoyment and the economic success of the game of golf.

Ride First Class.

The All-New Jacobsen Truckster XD™



Class-Leading Payload Capacity, Power & Comfort

The all-new Jacobsen Truckster XD heavy-duty utility vehicle is the new leader in every category that matters most to you: a massive, 3,550 lb. standard payload capacity; the toughest bed in the industry; and a commanding 52.7 ft.-lbs. of torque from the diesel engine (51.6 ft.-lbs. of torque from the gas engine). More than just pure muscle, the Truckster XD also features 25% more cabin space than the competition. Learn more about how the Jacobsen Truckster XD makes easy work of your toughest jobs at Jacobsen.com.



Burris Equipment Company
Scott Verdun (815) 573 - 1505
Gary Hunerberg (608) 751 - 0073

JACOBSEN®

TDL Year In Review

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

2016 has drawn to a close and what a year it was. The year may not go down in history as one of the more difficult years to maintain turfgrass, but it sure was a test of all of your skills. The summer heat was never that severe or prolonged but the one constant was it was wet! I discussed the amount of rain with many of you and the comment made most often was "I have not irrigated in days to weeks." One brave sole even informed me that he only irrigated his greens 6 times. That is almost unheard of for a Wisconsin summer. The flip side was the number of discussions that revolved around turf under water, the number of days without golf cart revenue, and washed out bunkers.

With that kind of weather, you might think that the Turfgrass Diagnostics Lab (TDL) would have been quiet. With the spring moisture Dr. Koch and I again predicted that as summer rolled on, we would see root pathogens on the increase. Root pathogens were still present but with cooler weather and lack of drought stress, they were not a major issue. Root pathogens infecting turfgrass plants might have been tolerated by the plants due to the low summer stress levels. There were many samples that I diagnosed that had root pathogens present. The one thing Dr. Koch has taught me well is detecting the pathogen does not mean it is the casual agent. Often times the amount of pathogen infection is minimal

and there can be other factors causing the issues. This summer root pathogens appear to be more often secondary.

The two prevailing issues this summer were caused by abiotic issues or basal anthracnose infections. The abiotic issues were varied, with wet wilt, lack of oxygen, traffic issues on succulent turf, mower damage, lack of air movement and poor drainage. I see many of these every year. Dr. Gayle Worf taught me many many years ago that disease diagnosis can be difficult because diseases don't read textbooks and does not know what it is suppose to look like. These chameleon like diseases created few issues this past growing season. Because all samples are examined with both dissecting and compound microscopes, these chameleons were uncovered.

This summer, as with past wet summers, I saw many cases of Basal Anthracnose. As you can see by the table below the top three diseases diagnosed at the TDL were Necrotic Ring Spot (NRS), Take-all-patch (TAP) and Basal Anthracnose. The one that caused the most difficulty was Basal Anthracnose. In many cases the manager assumed they were dealing with a root pathogen, thus control methods were not working. When the sample arrived, I was able to make the diagnosis but sometimes it was too late and serious damage had occurred. Often recovery might not occur until fall.

Diagnosis	2015	2016
Abiotic	47	60
Anthracnose Leaf	10	2
Basal Anthracnose	24	24
Bipolaris	11	11
Algea	1	1
Bad Sample	3	1
Grass ID	14	35
Weed Id	15	3
Dollar Spot	3	5
Brown Patch	0	2
Nematodes	0	1
Summer Patch	36	9
Dereschlera	3	12
Fairy Ring	4	2
Microdochium Patch	8	12
Moss	0	1
PGR Damage	5	4
Pythium	7	6
NRS	53	43
Red Thread	0	2
Rust	3	6
TAP	14	36
Waitea Patch	0	1
Yellow Tuft	1	1
Misc	4	
Totals	266	280



Turfgrass Diagnostic Lab
O. J. Noer Turfgrass Research & Education Facility
2502 Highway M,
Verona, WI 53593-9537
www.tdl.wisc.edu
E-mail:hockemeyer@wisc.edu
Phone: 608-845-2535
Fax: 845-8162



CLESEN
PROTURF
SOLUTIONS

Steve Wasser
(920) 225-9658
swasser@clesenproturf.com

Matt Kinnard
(262) 720-0251
matt@clesenproturf.com

Rob Wasser
(262) 221-5524
rwasser@clesenproturf.com

clesenproturf.com

TURFGRASS DIAGNOSTIC LAB

Over the years, the area the TDL encompasses has changed but we continue to be an excellent resource for turfgrass managers in many states. Even with the lab reaching many states the TDL still remains a Wisconsin resource. Sixty percent of all the work performed at the TDL is done for residents and turfgrass managers in Wisconsin. The TDL was created to be a resource for the residents of Wisconsin and we pride ourselves on our performance to that standard.

The TDL is the only lab in the nation that offers contracts that provide direct access to the lab and the experiences of Dr. Koch and the UW Turfgrass team. With contracts, the bearer receives a set number of sample diagnostics and reports at a discounted rate. Many of our members may not use all their samples each year but they continue to support the TDL so if/or when they might need our assistance the TDL will be there. The TDL is not funded by any taxpayer funds but by the members, diagnostics fee and moneys from Dr. Koch's research lab.

We do receive the support of out of state entities from their contract memberships or as they pay for the diagnosis fees. We thank them for their support and confidence in the TDL. In the chart below you can see what states where the TDL is pro-

viding services.

The number samples in 2015 was a record for the lab for the most samples diagnosed by the TDL in a calendar year. With the moderate growing season during the 2016 summer, the TDL still broke last years' sample record. The TDL is on a great path and has been growing every year for the past four years and we want to thank all of our contract members and supporters for your confidence in the work that is accomplished at the TDL.

With this, I would like to personally thank each of you for all your support and kindness over the past four years. This is my last article I am writing for the WGCSA as manager of the Turfgrass Diagnostics Lab. As of January 1st, 2017 I am assuming a new role as the manager of the O.J. Noer Research Facility. With this new position I will continue to assist all the professors at the UW, do more outreach for the turfgrass industry (WTA) and hopefully provide a seamless transition from the Tom Schwab era. As I transition down the hall to a new office I am still here to be of assistance whenever I can.

THANK YOU all for your support!!!
Bruce Schweiger
Manager OJ Noer Research Facility
608-845-6895

State 2015 2016

State	2015	2016
CA	1	1
CO	2	0
IA	9	8
ID	1	0
IL	24	30
IN	0	2
KY	0	3
KS	2	0
MI	2	0
MN	29	40
MO	0	2
MT	5	2
ND	6	2
NE	8	3
OH	8	15
OR	0	1
SD	4	3
WA	3	1
WI	160	167
CO	2	0
Total	266	280

GOLFCREATIONS





Hawks Landing Golf Club
Verona, WI



Before

Meticulous detail *Versatile approach* *Perfect tie-ins* *Satisfaction guaranteed*

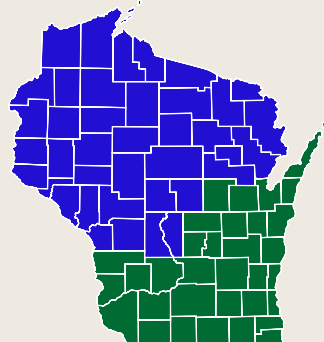
A division of: Lohmann Companies • Marengo, IL • 815.923.3400 • www.lohmann.com *ASGCA, GCBA, Better Billy Bunker Certified

From Reservoir to Rotor... Rain Bird has you covered.



Lush fairways and manicured greens can also be highly water-efficient. Every Rain Bird product is a testament to that truth. From water-saving nozzles to highly efficient pumps to leading-edge Control Technology, Rain Bird products make the most of every drop, delivering superior results with less water. Keeping the world and your golf course beautiful. That's The Intelligent Use of Water.™

To learn more, contact your local sales rep today!



Mike Whitaker
Northern Wisconsin
(309) 287-1978
mike.whitaker@ferguson.com

Dustin Peterson
Southern Wisconsin
(309) 314-1937
dpeterson@rainbird.com

RAIN **BIRD**®

Schweiger Steps Up to Manage the O.J. Noer Facility

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

Shortly after Tom Schwab officially announced his intention to retire after 22 years of dedicated service, the process for identifying and hiring a new station superintendent at the O.J. Noer Turfgrass Research and Education facility began. Four outstanding candidates were identified and interviewed for the position; everyone was top-notch and possessed invaluable attributes. Ultimately, Bruce Schweiger was offered (and accepted) the position and he officially began on January 1, 2017. Many of you are likely familiar with Bruce. He brings a tremendous amount of knowledge, skills and experience to this position. In addition, Bruce has a deep-rooted passion for the turfgrass industry, the University of Wisconsin-Madison and the Wisconsin Turfgrass Association.

It all began nearly 40 years ago when Bruce was an undergraduate student at the University of Wisconsin-Madison where he was studying pre-pharmacy. However, everything changed in 1978 while he working as a summer hourly for Tom Harrison, former golf course superintendent at Maple Bluff Country Club. Through this experience and exposure to the world of turfgrass management, Bruce realized that “he did not want to be cooped-up inside” in an office environment.


Another occurrence that further swayed Bruce’s attention toward the turf world was when he met Dr. Gayle Worf, former UW-Madison Turfgrass Professor, the following summer while working on a *Poa annua* decline research project at Maple Bluff Country Club. This encounter with Dr. Worf both intrigued and inspired Bruce. He gained a new-found passion for all things related to turf so much that he persuaded Tom Harrison to allow him to run Maple Bluff Country Club golf course operations for a week as if he were the superintendent. It was an invaluable experience that had a significant and profound influence on Bruce’s desire to change his academic focus and career path. As a result, Bruce made the decision to forego studying pharmacy and chose to pursue a degree in soil science.

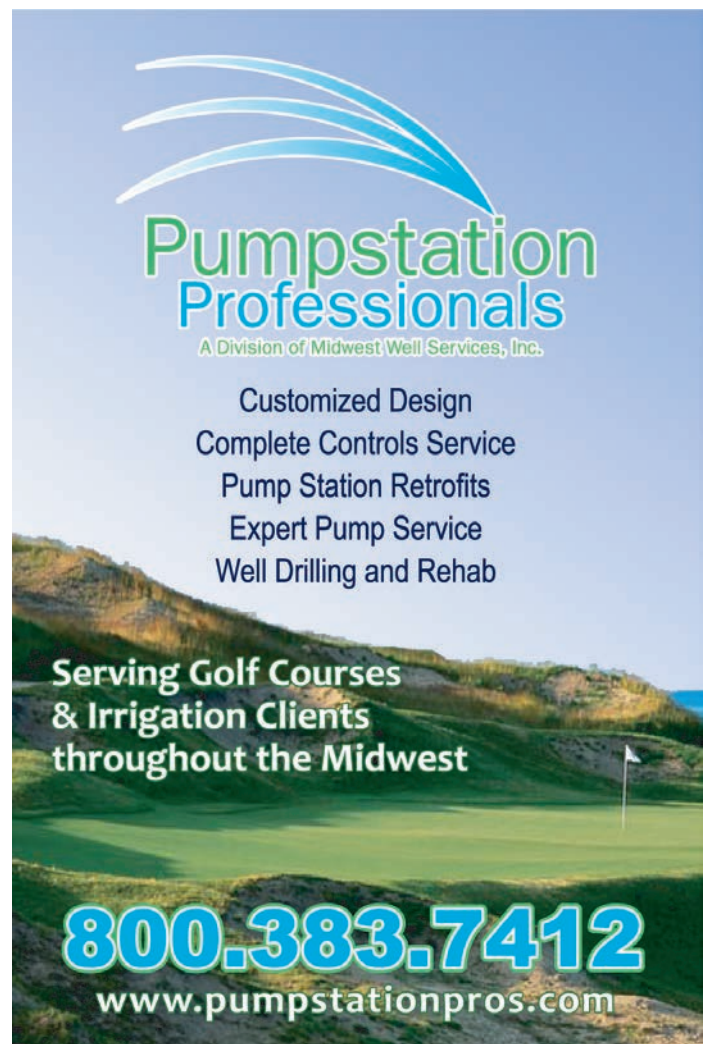
During this same time, several key and influential turfgrass industry people were in the early development process of forming what would later be known as the Wisconsin Turfgrass Association (WTA). Bruce’s services were solicited to assist in a campaign to promote membership in the WTA. One of his first tasks was to “stuff nearly 500 envelopes.” This initial, albeit simple, task led to a 40-year close relationship with the WTA, a relationship that continues today.

After graduating from the University of Wisconsin-Madison in 1982 with a B.S. degree in Soil Science, Bruce became the golf course Superintendent at Riverside Golf Course in Janesville, Wisconsin where he worked for nine years. During this time, he also became the General Manager in 1986 for three years until he decided to make a career change in 1989. Bruce accepted a technical representative/sales position with Scotts where he served the Wisconsin and Northern Illinois markets; unfortunately, nine years later the Scotts direct, in-house golf business was dissolved. Bruce then obtained a soft-goods sales position with Reinders where he worked for the next six years.

In 2006, he returned to the management world of turfgrass

where he became the General Manager at Marengo Ridge Golf and Country Club in Marengo, IL. This endeavor was relatively short-lived, and Bruce returned to Reinders as a sales trainer/educator and sales representative for the next five years. In 2011, he left Reinders for a sales position at Chicagoland Turf Products where he worked in the Southern Wisconsin and Chicagoland markets. Approximately two years later, in 2013, an opportunity in the University of Wisconsin-Madison Turf Diagnostic Laboratory (TDL) opened-up, and Bruce became the Disease Diagnostician for the TDL. He held this position for the last four years.

Throughout his various employment positions, Bruce has had a wide variety of experiences, developed invaluable networking contacts and resources that equip him to be an outstanding Station Superintendent at the O.J. Noer Turfgrass Research and Education Facility. The University of Wisconsin-Madison turfgrass faculty, staff and students, the WTA, and the turfgrass industry are fortunate to have someone like Bruce Schweiger managing the O.J. Noer Facility. His dedication to the turfgrass industry will go a long way to the continued success of the turfgrass program at Wisconsin. 



Pumpstation Professionals
A Division of Midwest Well Services, Inc.

- Customized Design
- Complete Controls Service
- Pump Station Retrofits
- Expert Pump Service
- Well Drilling and Rehab

Serving Golf Courses & Irrigation Clients throughout the Midwest

800.383.7412
www.pumpstationpros.com

HORST DISTRIBUTING, INC.

CELEBRATING 70 YEARS IN BUSINESS

NEW HR700™

The all- new HR700™ is the world's first and only wide area rotary mower with a 14 foot cutting width which increases productivity by up to 25% over traditional 11 foot mowers. The ultra-durable new SureStrength™ decks and superior maneuverability make it the ideal mower for, golf courses, commercial grounds, and parks and green spaces. By utilizing high strength, high performance steel and a compact chassis design, the HR700 series sets a new industry standard for the most efficient use of power.



Optional: Factory installed, ROPs certified, climate controlled cab with A/C, heat, fan, ventilation windows and premium air suspension cloth seat provides operator protection and comfort in extreme temperatures.



Horst Distributing, Inc.
444 N. Madison St.
Chilton, WI 53014-0110
www.horstdistributing.com
gmortimer@horstdistributing.com

JACOBSEN

1.888.922.TURF | www.jacobsen.com

Winterkill - Causes and Prevention

By Bob Vavrek, USGA Green Section, Central Region Director

“This article is reprinted from the *Volumn. 54 (15), August 5, 2016 of the USGA Green Section Record. Copyright United States Golf Association. All rights reserved.*”

Most turf issues arrive more or less on schedule each year —undersized practice tees will become infested with crabgrass and goosegrass by the end of summer, dollar spot will eventually affect turf somewhere on the course, roughs will grow like crazy each spring, and the cumulative effect of heavy traffic will thin out turf in wet, shady areas.

Granted some problems are more serious and difficult to control than others, but the fact that we can anticipate them makes it easier to develop effective management programs to minimize their impact on turf quality.

Unfortunately, winterkill is far more unpredictable. A bermudagrass practice tee or an annual bluegrass putting green might be devastated by frigid temperatures for two consecutive years but then survive the next ten winters unscathed. When golfers arrive in the spring and discover the presence of temporary greens, they can easily overreact to the situation. Recollections of past winter injury and the slow recovery that followed can leave golf facilities grasping at straws, sometimes quite expensive straws, to prevent similar episodes of inconvenience and lost revenue.

CAUSES — RARELY ONE AND OFTEN MANY

Cold-temperature tolerance varies among turfgrass species (Table 1). Winter injury to cool-season grasses can be caused by several factors, including ice suffocation, crown hydration, low-temperature injury, or desiccation. Winter injury also can be caused by various fungal pathogens. These stresses can occur alone, in combination, or multiple times throughout the winter, which makes preventing turf loss extremely challenging.

Winter injury to warm-season grasses is typically caused by low temperatures. However, dead bermudagrass is no less important than dead annual bluegrass

Relative Ranking	Common Name	Scientific Name
Superior	Rough bluegrass	<i>Poa trivialis</i>
	Creeping bentgrass	<i>Agrostis stolonifera</i> var. <i>stolonifera</i>
Good	Colonial bentgrass	<i>Agrostis capillaris</i>
	Kentucky bluegrass	<i>Poa pratensis</i>
Medium	Annual bluegrass	<i>Poa annua</i>
	Fine-leaf fescues	<i>Festuca</i> species
Fair	Perennial ryegrass	<i>Lolium perenne</i>
	Tall fescue	<i>Festuca arundinacea</i>
	Japanese zoysiagrass*	<i>Zoysia japonica</i>
Poor	Common bermudagrass*	<i>Cynodon dactylon</i>
	Seashore paspalum	<i>Paspalum vaginatum</i>
	Hybrid bermudagrass*	<i>C. dactylon</i> x <i>C. transvaalensis</i>
	Manila zoysiagrass	<i>Zoysia matrella</i>
Very Poor	Centipedegrass*	<i>Eremochloa ophiuroides</i>
	Bahiagrass	<i>Paspalum notatum</i>
	St. Augustinegrass*	<i>Stenotaphrum secundatum</i>
	Carpetgrass	<i>Axonopus</i> species

*Considerable genotype variation in low-temperature hardiness is found

Table 1. Cold tolerance varies among turfgrass species (Beard, 1996).

when it comes to unhappy golfers or lost green fees and cart revenues.

RESEARCH —

CHALLENGES AND PROGRESS

Many turf problems are relatively easy to study in the field because they occur on a consistent and predictable basis. However, studying the causes and prevention of winterkill is far more challenging and bears less fruit because the weather conditions that stress turf do not occur every year. For example, it is very difficult to perform field studies on the effects of extended ice cover or rapid drops in temperature.

Often, these conditions can only be consistently created and studied in a laboratory. Fortunately, the latest generation of high-tech growth chambers can replicate a wide range of environmental conditions that cause winter injury, providing meaningful research data that is much easier to

obtain than relying on the weather.

The foundation of cool-season turfgrass winterkill research was established by Dr. James Beard at Michigan State University during the mid-1960s. Beard’s series of experiments provided the 60- to 75-day benchmark for annual bluegrass survival under ice. Many turf managers still refer to that standard today. Beard’s research documented the relative tolerance of cool-season turf species to cold temperatures (Table 1) and clearly demonstrated that creeping bentgrass could tolerate cold temperatures and ice cover far longer than annual bluegrass (Beard, 1964).

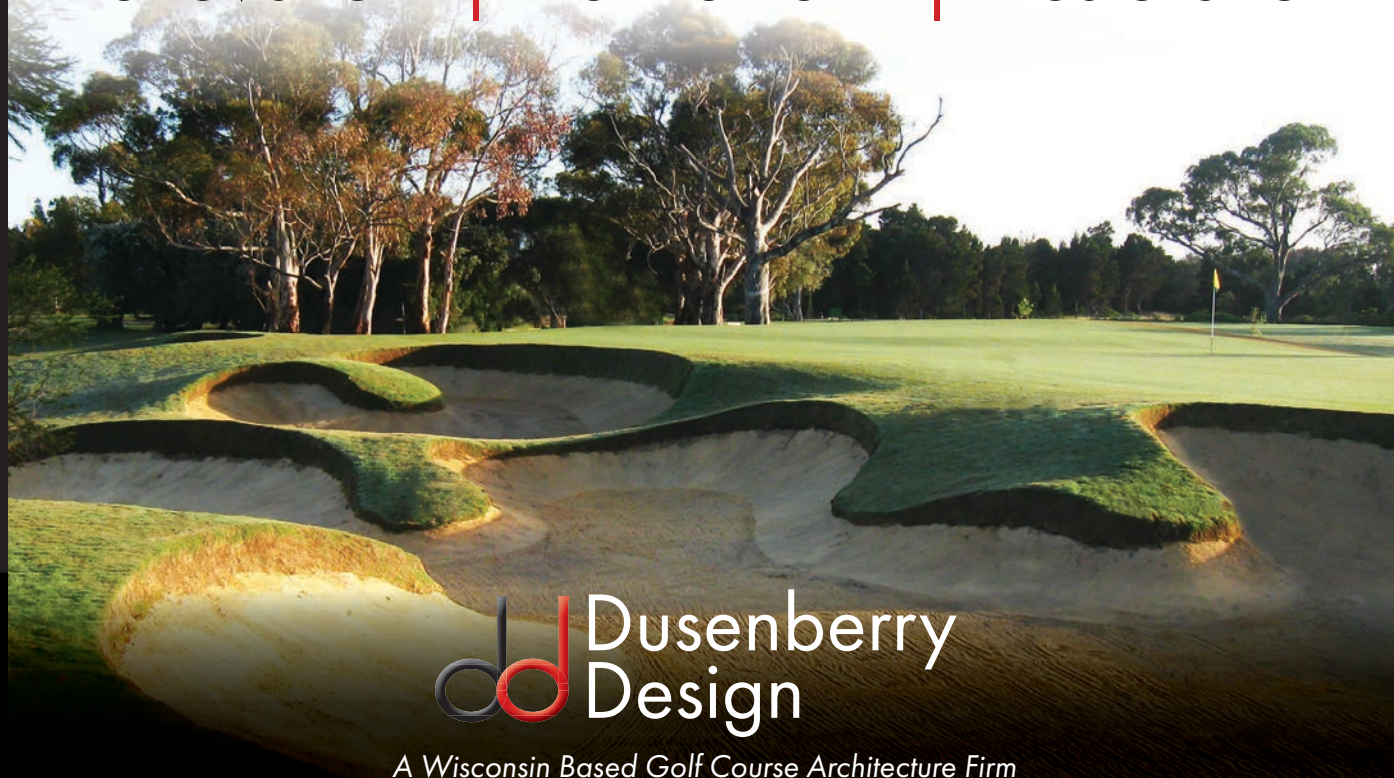
However, perhaps the most important lesson learned from Beard’s work is that winter weather can injure or kill turf in a variety of ways. Understanding the primary causes of turf stress during winter is essential to prevent winterkill.

USGA GREEN SECTION



Winter injury to annual bluegrass greens can occur across the entire putting surface or in localized areas where water puddles and freezes.

Renovation | Refinement | Restoration



 Dusenberry
Design

A Wisconsin Based Golf Course Architecture Firm

email: matt@dusenberrydesign.com ph: (262) 395-5294 www.dusenberrydesign.com

Dr. Beard recognized that the condition of turf going into winter had a great influence on its ability to survive frigid temperatures, ice cover, crown hydration, and desiccation. Factors such as low height of cut during fall hardening-off, shade, poor drainage, and excessive fall fertilization make turf more susceptible to winter stress.

These concerns are even greater on today's golf courses because of the pressure to mow greens much lower and push the playing surfaces much harder every fall to meet player expectations. Let's review some of what we know, what we thought we knew, and what we have yet to learn regarding the complicated, interrelated processes that can cause winter injury.

DIRECT LOW-TEMPERATURE KILL AND CROWN HYDRATION

Subfreezing soil temperatures are the primary cause of winter injury to cool-season grasses. The mechanism for injury is either rapid ice formation within crown tissue cells or the irreversible loss of moisture from crown tissue as ice forms in the spaces between plant cells. Excess water in the upper soil profile or on playing surfaces is a wild card that can trigger severe turf injury when wide swings in temperature occur during winter.

Grasses differ with respect to cold tolerance. Species such as rough bluegrass and creeping bentgrass can tolerate much lower soil temperatures than annual bluegrass or perennial ryegrass. However, the genetic differences in cold tolerance between grass species are not fully expressed unless the turf has adequate time to acclimate to cold temperatures before winter.

Shorter day lengths and a steady decrease in temperatures to just above freezing cause physiological and biochemical changes to turf. Plant tissues lose moisture and harden, while crowns accumulate sugars, amino acids, and other metabolites. High concentrations of metabolites provide the "antifreeze" that helps turf survive cold temperatures for extended periods of time. Metabolites also provide the energy that dormant plants need for respiration throughout the winter and to fuel spring green-up.

The temperature during the acclimation period is an important factor in the ultimate level of turf cold tolerance. Consequently, cold hardiness varies from year to year. Cold hardiness is at its peak during early winter and steadily decreases

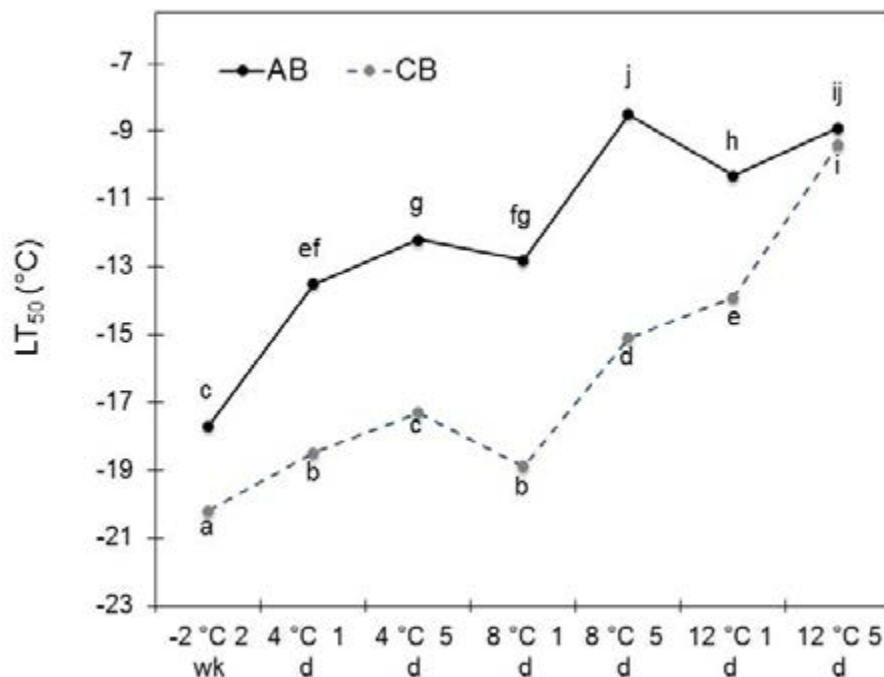


Figure 1. Change in freezing tolerance — i.e., LT₅₀ — in annual bluegrass (AB) and creeping bentgrass (CB) during deacclimation following acclimation at -2°C for two weeks. Different lowercase letters indicate statistically significant differences (p < 0.05) across species and temperature regimes (Hoffman, et al., 2014).

throughout winter.

As soil temperatures increase during spring, the dehardening process begins and the moisture in crown tissue increases (Tompkins, et al., 2000). Dehardening can occur before any visible signs of green-up.

Recent research shows that brief periods of mild weather during late winter or early spring can make annual bluegrass more susceptible to cold temperature stress than creeping bentgrass (Hoffman, et al., 2014). Both species required a lengthy six-week period to fully acclimate to winter temperatures in the lab. Immediately after acclimation, creeping bentgrass had higher tolerance to cold temperature than annual bluegrass. Cold tolerance was measured by determining the temperature that killed 50 percent of plants (LT₅₀) exposed to the cold temperature treatment. After exposing fully hardened plants to 39.0°F temperatures for 24 hours, the LT₅₀ increased from 0°F to 7.7°F and from -4.4°F to -1.3°F for annual bluegrass and creeping bentgrass, respectively (Figure 1).

The rapid loss in cold tolerance of annual bluegrass versus creeping bentgrass after a brief increase in temperature suggests that

an extended thaw or short period of mild winter weather could increase the susceptibility of annual bluegrass playing surfaces to low-temperature injury or crown hydration. In essence, annual bluegrass never achieves the same level of winter hardiness as creeping bentgrass. Furthermore, the tolerance of annual bluegrass to cold temperatures quickly decreases after a short period of mild weather, potentially leading to severe turf loss during periods of frigid late winter or spring weather, especially when playing surfaces are wet. Perhaps we should be more worried about the weather in March than in December.

ICE SUFFOCATION

The potential for severe turf loss caused by dense ice cover on annual bluegrass putting greens is a frightening thought for turf managers. The cause of the problem is visible — you can see when ice forms, you can walk across it, you can even touch it — and each day it remains is one day closer to the time grass could die from lack of oxygen or the buildup of toxic gases.

Some consultants recommend removing ice after 45 days, 60 days, or 75 days, fearing severe turf loss if the putting greens remain ice covered for much longer.

USGA GREEN SECTION

Unfortunately, removing ice layers requires a great deal of effort and there is risk of damage to playing surfaces. Is all this stress and anxiety justified? Is a time bomb actually ticking?

Much of what we know about turf injury following long periods of ice cover is derived from laboratory experiments using freezers or growth chambers. Field experiments related to ice cover have always been challenging to design and replicate because weather conditions vary. Despite the challenges, a considerable amount of research has been done in Canada, where conditions make it easier to maintain ice on turf for extended periods of time.

Dr. Beard's research at Michigan State University found that annual bluegrass and creeping bentgrass encased in ice could survive for 75 days and 150 days, respectively (Beard, 1964). Recent laboratory and field research from Canada studied the effects of ice encasement (turf that is saturated with water, frozen, and

covered with ice), ice cover (turf that is covered by 1 inch of ice), and snow cover on annual bluegrass and creeping bentgrass. In the lab, annual bluegrass died after 90 days of ice encasement but was able to survive 90 days of ice cover and snow cover.

However, ice cover increased annual bluegrass LT50 from -6°F to 25°F, whereas snow cover increased annual bluegrass LT50 from -6°F to 0°F (Tompkins, et al., 2004). In the field, annual bluegrass that was flooded and frozen died after 75 days. A rapid loss of annual bluegrass cold hardiness occurred between 60 and 75 days in the lab and between 45 and 60 days in the field. However, removing ice or snow after 45 days did not improve the ability of annual bluegrass to survive cold temperatures in this study.

It is clear that physiological changes occur in turf under dense ice cover. Of these, the most concerning is that ice cover causes annual bluegrass to lose

winter hardiness and die faster than creeping bentgrass. The explanation may have to do with oxygen levels under the ice. Recent studies indicate that annual bluegrass is more sensitive to low oxygen levels than creeping bentgrass, and that low oxygen levels cause greater turf stress than high CO₂ levels (Castonguay, et al., 2009).

Another study monitored changes in O₂ and CO₂ levels under several types of impermeable covers commonly used to protect putting greens. Greens that experienced the greatest turf injury also had high rates of oxygen consumption, believed to be associated with high levels of organic matter in the soil (Rochette, et al., 2006). Research suggests that thatchy conditions may predispose turf to ice-related injury because soil microbes deplete the limited supply of oxygen available under dense layers of ice.

Even when ice is present, it is not always the cause of winter injury.

Daconil Action™ Fungicide, A New Era in Turfgrass Management

The power of the active ingredient contained in Daconil® fungicide combined with a revolutionary Turf Protein Booster results in longer, more efficient, and broader spectrum turfgrass disease control.

- Boosts turfgrass natural defense proteins (PR proteins)
- Enhances overall plant health
- Increases tolerance to environmental stresses, like drought
- Suppresses activity of fungi, bacteria, viruses, and abiotic diseases

To learn more about Daconil Action, visit DaconilAction.com or contact:

Phil Spitz
Cell: 414-429-2015
phillip.spitz@syngenta.com



 **Daconil Action™**
Fungicide

 **syngenta.**

©2011 Syngenta. **Important: Always read and follow label instructions before buying or using these products. The instructions contain important conditions of sale, including limitations of warranty and remedy. Daconil Action is not currently registered for sale or use in all states. Please check with your state or local extension service before buying or using this product.** Daconil®, Daconil Action™, the Purpose icon and the Syngenta logo are trademarks of a Syngenta Group Company. Syngenta Customer Center: 1-800-SYNGENT(A) (796-4368).

GREEN SECTION RECORD

Anyone who has managed annual bluegrass greens in a northern climate for an extended period has experienced turf loss in low-lying areas where ice cover was present for no more than a few weeks. It may be tempting to blame ice for the injury, but this is not enough time for ice suffocation to occur. The injury was more likely caused by crown hydration or direct low-temperature kill that may have occurred when ice first developed or during freeze and thaw cycles throughout the winter. Winterkill on greens is usually some combination of crown hydration, ice suffocation, and low-temperature injury.

Faced with an unpredictable combination of winter stresses, here are some ways to minimize the risk of winter injury from cold temperatures or ice coverage:

- Avoid excessive inputs of nitrogen or irrigation during fall to prevent lush growth as turf begins the hardening process.
- Address surface and subsurface drainage problems. Eliminate raised collars that prevent water from flowing off greens.
- Raise the mowing height on greens before turf begins to harden off. This provides ample time for turf to produce and store carbohydrates before winter.
- Address shade problems that limit turf growth. Shaded playing surfaces tend to experience the most severe winter injury due to weak turf conditions entering winter dormancy. Shaded areas also are vulnerable because they typically have higher populations of annual bluegrass. Furthermore, shaded sites usually accumulate more ice and snow, and retain ice longer, than turf in full sun.
- Monitor organic matter (thatch) content and employ the necessary cultivation and topdressing practices to prevent excessive accumulation.
- Insulated impermeable covers may be helpful on greens that experience chronic winterkill from ice or crown hydration. The articles *Winter Protection of Annual Bluegrass Golf Greens and Working Undercover: Minimizing Winter Damage to Greens* provide more information about using covers.
- Replace annual bluegrass with creeping bentgrass for more sustainable playing surfaces.

DESICCATION

Desiccation can be a simple but serious threat to turf health during winter. Cold, dry wind blowing across exposed play-

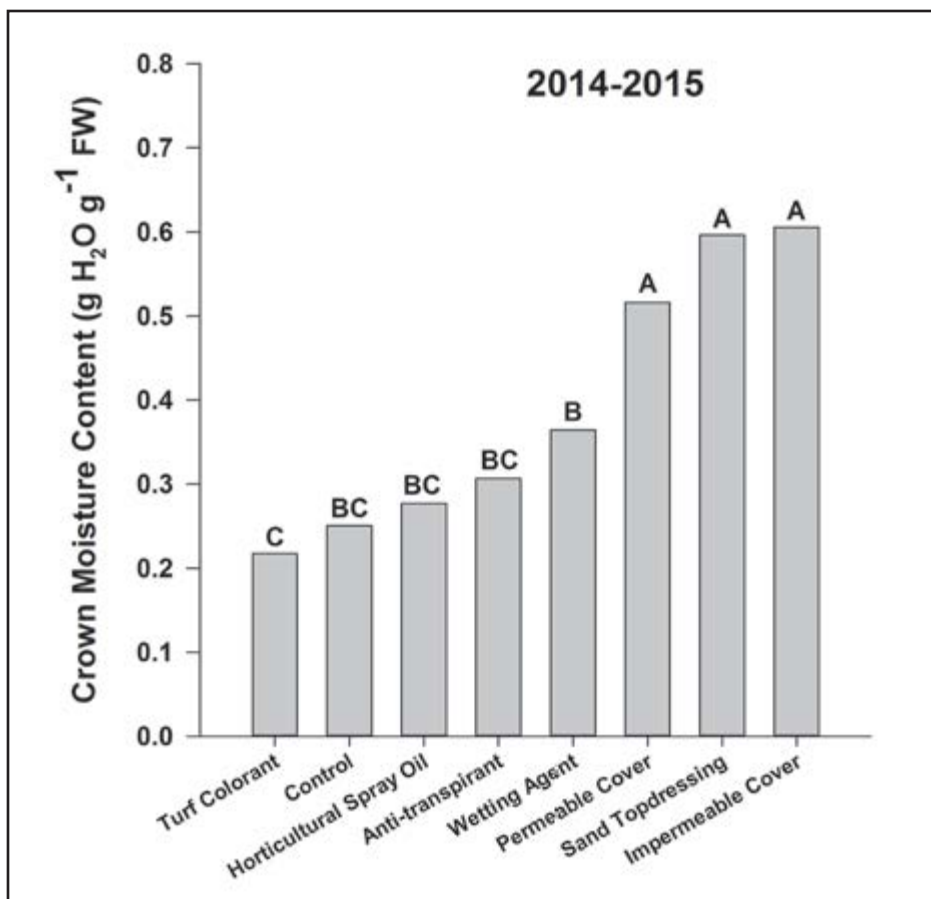


Figure 2. The ability of protective measures to preserve crown moisture through winter (courtesy of William Kreuser, Ph.D., University of Nebraska).

ing surfaces can literally freeze-dry turf to death. Golf courses typically experience the most issues with desiccation when located in areas prone to high winds, frigid temperatures, low annual rainfall, and inconsistent snow cover.

The good news is that turf can be protected from desiccation. Applying sand topdressing or installing protective covers can help maintain healthy moisture levels in crown tissue during winter (Figure 2). Wind breaks or snow fences are other options commonly used for preventing desiccation. Some courses also utilize portable water tanks or sprayers to irrigate greens when winter temperatures are above freezing and the soil can accept moisture.

The bad news is that desiccation can kill creeping bentgrass just as easily as annual bluegrass. Furthermore, the windy conditions that contribute to desiccation injury make it challenging to install and maintain covers.

BERMUDAGRASS WINTER INJURY

Traffic tolerance and rapid recovery from injury make bermudagrass an excellent choice for golf courses in warm climates.

However, poor tolerance of freezing temperatures limits bermudagrass use in northern states and the northern portion of the transition zone. Ultradwarf bermudagrass greens are even more susceptible to injury from freezing temperatures.

The USGA has funded a considerable amount of research at several universities to develop high-quality, cold-tolerant cultivars of bermudagrass. This research has contributed to an increased use of cold-tolerant bermudagrasses in more northern locations.

However, the term “cold tolerant” is relative. Establishing bermudagrass in locations where soil temperatures are likely to fall below 25°F, even for short periods of time, is foolhardy unless steps are taken to insulate and protect the turf. However, the following practices can help prevent bermudagrass winterkill:

- Follow the “25-degree rule” and cover bermudagrass greens with a lightweight, geotextile fabric whenever forecasts predict temperatures of 25°F or lower. Covers can help maintain safe soil temperatures for bermudagrass during cold weather.

USGA GREEN SECTION



An annual bluegrass green covered by a dense layer of ice will be increasingly susceptible to turf loss as winter progresses.

Research indicates that many different covers can provide an acceptable level of protection (Goatley, et al., 2007). Additional insulation, such as double covers or pine straw, may be needed if temperatures fall below 5°F. The Regional Update Covering Guidelines for Ultradwarf Bermudagrass Putting Greens provides additional information about using covers.

- Aggressively manage organic matter accumulation with topdressing and cultivation.
- Maintain consistent moisture levels throughout winter months. This is especially important for sand-based greens and tees because dry, sandy soils do not effectively buffer the effects of cold air temperatures.
- Use cold-tolerant bermudagrass cultivars, such as Riviera, Yukon, Patriot, NorthBridge, and Latitude 36, when trying to establish bermudagrass playing surfaces in the central and northern portions of the transition zone.



PROGRO solutions ABSOLUTE CONFIDENCE

We provide fertilizer, chemical and seed solutions for the golf course, sports turf, landscape and lawn care markets. Contact your local rep for details.

Brett Ziegler, Chicago/WI

- ☎ 847. 302. 9673
- 🐦 @BZiggs4
- ✉ brett@progro-solutions.com

Mike Werth, WI/NW IL

- ☎ 608. 214. 7011
- 🐦 @werthashot
- ✉ mike@progro-solutions.com

John Turner, Key Account Manager

- ☎ 630. 215. 6110
- 🐦 @jtgrassroots
- ✉ jturner@advancedturf.com

Todd Fregien, Wisconsin/Illinois

- ☎ 414. 949. 1089
- 🐦 @TODD_PROGRO
- ✉ todd@progro-solutions.com

Main Office: 815.539.8169
www.progro-solutions.com

USGA GREEN SECTION

CONCLUSION

Beginning the golf season with temporary greens or a delayed opening due to winterkill is a serious setback for any golf facility. The more we learn about the complex processes that occur beneath a seemingly harmless blanket of ice and snow, the better our chances of protecting turf from winter injury.

Turf managers would love a set of simple recommendations that completely eliminate the potential for winterkill — e.g., remove ice from greens after X days, raise the mowing height to XYZ inches in mid-September, and stop watering November 1 and winterize the irrigation system the following day. Preventing winterkill would be simple if the weather was the same each year, but we know that is not possible. Unfortunately, as turf research unravels the mysteries of winter stress, we find very few black-and-white explanations, rather mostly shades of gray.

Perhaps the most important message is that maintaining healthy turf throughout the summer and fall gives turf the best opportunity to survive winter. More than

50 years ago, Dr. Beard recommended establishing cold-tolerant grasses and addressing problems with shade, low mowing heights, thatch, and drainage to limit winter injury. Those recommendations remain sound to this day, but sometimes we forget.

REFERENCES

Beard, James B. "Effects of ice, snow and water covers on Kentucky bluegrass, annual bluegrass and creeping bentgrass." *Crop Science* 4 (1964): 638-640.

Beard, James B. "Low-temperature kill and ice sheets." *Golf Course Management*, May 1996: 60-64.

Castonguay, Yves, Guillaume Thibault, Philippe Rochette, Annick Bertrand, Sophie Rochefort, and Julie Dionne. "Physiological Responses of Annual Bluegrass and Creeping Bentgrass to Contrasted Levels of O₂ and CO₂ at Low Temperatures." *Crop Science* 49 (2009): 671-689.


Goatley, J. Michael Jr., J. Pat Sneed, Victor L. Maddox, Barry R. Stewart, D. Wayne

Wells, and H. Wayne Philley. "Turf covers for winter protection of bermudagrass greens." *Golf Course Management*, August 2007: 107-111.

Hoffman, Lindsey, Michelle DaCosta, and J. Scott Ebdon. "Examination of cold deacclimation sensitivity of annual bluegrass and creeping bentgrass." *Crop Science* 54 (2014): 413-420.

Rochette, Philippe, Julie Dionne, Yves Castonguay, and Yves Desjardins. "Atmospheric composition under impermeable winter golf green protections." *Crop Science* 46 (2006): 1644-1655.

Tompkins, Darrell K., James B. Ross, and David L. Moroz. 2000. "Dehardening of annual bluegrass and creeping bentgrass during late winter and early spring." *Agronomy Journal* 92 (2000): 5-9.

Tompkins, Darrell K., James B. Ross, and David L. Moroz. "Effects of ice cover on annual bluegrass and creeping bentgrass putting greens." *Crop Science* 44 (2004): 2175-2179 



The most effective way to protect an ultradwarf bermudagrass green from cold temperature injury is to cover the turf when temperatures are predicted to drop below 25°F.

SUBSCRIBE TO THE USGA GREEN SECTION RECORD

TEXT GREENSECTION TO 22828 OR VISIT WWW.USGA.ORG/COURSE-CARE.HTML

Offering the latest information on golf course management, turfgrass, culture, environmental issues, research and economic sustainability.



We can help you put together programs with high-quality, high-value products, from herbicides to insecticides, fungicides to plant growth regulators, that will keep your course at its best without compromising your budget. And that makes all the difference in the world.



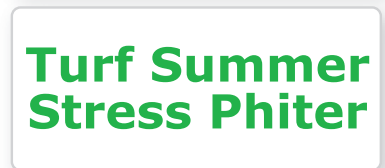
CPR® produces:

- ✦ Superior root mass and depth
- ✦ Superior high temperature stress and drought tolerance
- ✦ Superior low temperature stress tolerance
- ✦ Superior overall plant health, vigor and visual quality



Features & Benefits

- A 90% slow-release organic fertilizer that promotes excellent residual color and Density with slow even growth
- A constructed meal based product that supplies the plant nutrients for healthy turfgrass growth in a wide range of soil types, pH and weather conditions
- All natural ingredients increase the soil microbes, that aid in rooting, thatch reduction and disease management.
- Contains humus as a soil conditioner to buffer salts and improve the nutrients holding capacity of soils.
- Natural chelated secondary elements provide a complete and value-added nutrient package for optimizing IPM program effectiveness.
- A low salt index organic fertilizer ideal for hot weather applications to promote turf recovery and increase wear and stress tolerance
- Contains carbon, vitamins and enzymes needed for basic metabolic processes within the plant.
- A balanced carbon to nitrogen ratio for continuous nutrient availability and a replacement for organic matter lost from clipping removal.
- A complete nutrient packed product line that improves the effectiveness of other sound turf management practices and maximizes fertility value!



Danny H. Quast
danny@dhdproducts.com
920.210.8616

Joe Jehnsen, cgc
jmjehnsen@dhdproducts.com
920.344.4938

Tim Venes
timv@dhdproducts.com
920.210.9059

Turf and Tree Supplies ♦ Fertilizers ♦ Plant Protectants ♦ Equipment

Jon Canavan Takes The Helm of WGCSA

By David Brandenburg, Editor, The Grass Roots

Jon Canavan's road to serve as the 44th WGCSA President was as varied as it was typical for a golf course superintendent. His career has been typical as he grew up on a family hog farm in South West Iowa where he had an early indoctrination into the joys of working outside with the challenges Mother Nature offers us. Jon was introduced to the game of golf by his grandfather as they enjoyed playing at a 9 hole American Legion course. It was his grandfather's love of the game that laid the groundwork for Canavan's future in golf.

His trip in golf has also been varied as he started his golf career at A.H. Blank Municipal Golf Course in Des Moines, IA and spent three years at the historic Oakland Hills Country Club as the assistant golf course superintendent before coming to Brynwood Country Club for his first superintendents position. After 6 years at the private club Jon returned to municipal golf as he joined Milwaukee County Parks to oversee their 15 golf courses.

Although the politics of municipal golf operations are far different from those at a private club both jobs require good communication and that is where Jon excels. He has shown he is able to work with employees, supervisors, vendors and can lead everyone to success. He can talk with golfers and the non-golfing public the same as he communicates with political leaders.

Those interpersonal skills and his experiences in the golf industry ensure the WGCSA is in good hands under President Canavan.

Not wanting to shovel hog poop the rest of his life Jon tried a summer job at a landscaping company but wanted more variety than just digging holes and he enrolled at the local community college to get an associate's degree in horticulture. At the time he had a friend who helped him get a job at the A.H. Blank Municipal Golf Course in Des Moines working for Superintendent Mark O'Meara and from there he was hooked on golf course maintenance.

After the community college Canavan continued his education at Northwest Missouri State to receive his bachelor's degree in Horticulture in 1999. During college Jon was able to intern at Des Moines Golf and Country Club while they hosted the U.S. Senior Open. It was an excellent opportunity to learn about hosting a major golf event and allowed Jon a brief meeting with the King, Arnold Palmer. Palmer came through while Jon was hand watering a green during practice rounds and thanked him for all the work the grounds crew had done for the event. We would like to say Jon carried on an in depth conversation with the Mr. Palmer but he was a bit star struck as he managed a polite thank you.

After graduation in December and with the support of his former boss Mark O'Meara, Jon was hired as Assistant Superintendent at the historic Oakland Hills Country Club in Bloomfield Hills, Michigan. Oakland Hills offered Canavan the opportunity to work under the tutelage of Director of Golf Course Maintenance Steve Cook, CGCS, MG. Jon credits Steve with teaching him about providing customer service and two pieces of advice and his first day of work that stick with Jon today; "Keep it simple



Jennifer and Jon Canavan with their daughters Josephine and Evelyn

stupid" and "We are not shooting rockets to the moon here".


Jon gained more tournament experience when Oakland Hills hosted the 2002 U.S. Amateur on both the south and north courses. After three years in Bloomfield Hills Jon had the opportunity to move up and come to the Badger State as the Golf Course Superintendent at Brynwood Country Club. Canavan served at the course founded in 1927 for 6 years and joined a short list of former superintendents with Robert Farmer 1927 to 1934 (Charter WGCSA Member & President 1933-1934), Les Verhaalen 1935-1971 (WGCSA President 1942-1945), Ron Verhalen 1972-1975 (Les's son), Bob Boltz 1976-1990 (WGCSA President 1983) Steve Blendell 1991-1997 and Gary Johnson 1998 - 2004.



Member 9 With Jon Canavan

1. **First Vehicle?** 1970 Dodge Ram Pickup.
2. **Favorite Piece of Golf Course Equipment?** Twitter.
3. **18 Hole Handicap?** 9
4. **Current Vehicle?** 2007 Honda Pilot
5. **Favorite TV Show?** *The walking dead, The Strain, Vikings and Mountain Men.*
6. **Favorite Pro Sports Team?** *I would have to go with the Iowa Hawkeyes since Iowa does not have a professional team. I'm also a Packers and Brewers fan.*
7. **Favorite Main Course Meal?** *I love Breakfast. Thankfully Milwaukee has some fantastic brunch locations.*
8. **Pets?** *Rudy 13 year old Lab, Tink 2 year old cat, and a fish tank*
9. **Favorite Thing About Working In Golf Industry?** *The people that you meet!*



 **Prevail**[®] you will love it...
better. smarter. responsible. **...and so will your bottom line.**

saves money

eco-friendly



When you choose Prevail[®], you'll achieve superior results *and* capitalize on cost advantage savings by using 20-30% less fertilizer than conventional products. Prevail appeals to a vast new audience that cares about the environment and the footprint they leave behind for future generations. With Prevail[®] you're using high quality products that will provide dependable results, and your customers will love knowing they're utilizing better products to manage their greenspace areas.

But we've just scratched the surface here, to get the full story on why your turf and your bottom line will love Prevail[®], contact Spring Valley[®]. We'll show you how these revolutionary new products work.

Available from **Reinders** 800-782-3300



Moving beyond conventional...
...for a better planet



COVER STORY

In 2009 Jon made his return to municipal golf when he joined Milwaukee County Department of Parks, Recreation & Culture and now serves as the Golf and Recreation Turf Manager overseeing 15 golf courses and many other recreational activities. One of the challenges Jon faces is working with elected officials and other county departments who often view golf strictly as a revenue maker. Canavan is quick to point out to them the courses offer seasonal jobs to people of all walks of life and that golf is good for the community.

For Canavan it is more than just turf as he involved in marketing, public relations, clubhouse operations and is quick to thank his team of turf experts he works with. Mike Stein at Dretzka Park GC, Tim Wegner at Brown Deer Park GC, Matt Sullivan at Currie Park GC, Jason Rosploch at Greenfield Park GC, Ben Zawacki at Whitnall Park GC, Brian Blake at Oakwood Park GC, Brian Danko at Grant Park GC and his assistant Luz Gil. Canavan expressed "These individuals do more with less and make my division the envy of the Parks department!"


Jon's days in turf are like most of ours, only times 15. At any given time there is a project on one of the courses, employees sick or on vacation to cover for, a meeting to attend with golfers, vendors or politicians. It is a large geographic area and it is nearly 30 miles between Oakwood Park and Dretzka Park.

I took an enjoyable ride around Brown Deer Park with Jon this past fall and from our conversation it was clear he had a clear understanding about each of the 15 golf course operations. What struck me was the team concept he discussed throughout the golf operations inside and out and how they are able to do more with less while serving the public.

When he is not working Jon enjoys golf, coaching youth basketball, maintaining his 30 gallon fish tank and beekeeping. He is very passionate about introducing youth to the benefits of golf and golf courses. Having bee pods at the golf course has allowed them to bring in kids for field trips. Often these trips are the students and adults first trip to a golf course and an opportunity to talk about more than bees.

Canavan wanted to thank his parents for his success and expressed "They taught me the meaning of hard work and to be humble with what you have."

Jon and wife Jennifer met at Northwest Missouri State during his junior year through a mutual friend. The live in Milwaukee with their children Evelyn and Josephine. Jon was also sure to thank Jennifer as "She has put up with a lot of missed weddings, family reunions and birthdays. Being married to a Golf Course Superintendent is not easy!"

Congratulations Jon and we thank you for your service as you give your time and talent to the WGCSA. 



Some of Jon's team: (From left to right) Jason Rosploch, Brian Blake, Greg Miller, Chriss Visser, Ben Zawacki, Mike Stein, Brian Danko



Top: A look inside a bee pod

Right: A bee swarm at Currie Park GC

Below: Guy Smith, Chief of Operations for Milwaukee County Parks holding a bee comb. Guy is the son of Randy Smith, retired long time superintendent at Nakoma Country Club, Madison.



Bret Mullikin

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: **Bret Mullikin**

Company Position: **Golf Course Superintendent, Hiawatha GC, Tomah, WI**

Years as WGCSA Member: **18**

Membership Classification: **A**

Bret grew up outside Elkhorn, WI and attended Lawrence University in Appleton before going to Rutgers for Turf Management. He spent time working at courses in South East WI and the "Dells" before moving to Tomah in 2006.

18 holes with Bret Mullikin

1. How did you get started in the turfgrass industry? I was studying Philosophy and Studio Art at Lawrence while working summers at local golf courses. My brother strongly recommended I change career goals and pursue a line of work that suited me better. Since the Dean of Students agreed with him, I enrolled in Rutgers and have been happy ever since.

2. What is the most rewarding part of your career? The most rewarding part of this career is that most of the "work" is either similar to recreation or chores my Dad had me doing since I was little. It doesn't feel like a job.

3. What would you consider to be your greatest career challenge? Stretching resources to meet and exceed expectation.

4. Which three adjectives describes you the best? Honest, Steady, Dedicated

5. Tell us about your family. I'm married to Amy and have a girl and a boy, Nola and Knox.

6. Any pets? We have a barn cat Mulloy and a sheepdog Mash.

7. What drives/motivates you every day? I'm motivated to be proud of what I've done when the day is finished.

8. Who Would You Admire? I most admire my Mom and Dad.

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

Not that he was historical, but I'd most like to meet me at about 15 years old; I've got a lot to tell him.

10. What's a fun fact that people don't know about you? I played basketball against former Kansas star and NBA player Raef LaFrentz at the University of Northern Iowa camp when I was a sophomore in high school.



Above: Mash the sheepdog keeping guard in the truck.

Below: Mulloy the cat hunting in the family vineyard.



MEMBER SPOTLIGHT

11. What do you do in your spare time, favorite hobbies? Some of my hobbies are working on cars , the vineyard and mowing lawn.

12. If you could go anywhere in the world on vacation, where would you go? Ireland.

13. What is the one thing you would like to learn/ accomplish someday? I would like to learn how to be an accomplished welder, wine maker, and hazelnut grower.

14. What is your favorite turf management related tool or technique? Shovel.

15. Favorites:

TV Show: Keeping Up Appearances.

Movie: The Quite Man.

Food: Walleye.

Sports Teams: Packers, Badgers and Brewers.

16. Do you golf? Handicap? Best shot or golf story?

I don't golf very often. We have to guess at my handicap every time I get into a tournament. My best golf story is probably shooting a "16" twice on the last hole to surrender "D Flight" championships. (*Editors Note: How does a golfer score a 16 on a golf hole? They simply miss the putt for 15!*)

17. Top Bucket List Item? I want to attend a Big Ten Men's Basketball Tournament when the Badgers win, preferably in the Midwest, not out east.

18. If you could provide one piece of professional advice, what would it be? Do the best with what you have.



Above: Meeting Saint Vince at the Packer Game.

Right: The beginnings of a hazelnut grove to complement the vineyard and provide a future cash crop.

Below: The family enjoying the 2011 Brewers playoff game.



Bayer Environmental Science

John M. Turner
Sr. Sales Specialist - Golf
Bayer Environmental Science

Cell Phone: (630) 215-6110

Office: (630) 443-7807

Fax: (630) 443-7839

Email: john.turner@bayercropscience.com

Old Faces, New Roles: A State of the Lab Update

By Paul Koch, Ph.D. Department of Plant Pathology, University of Wisconsin – Madison

What had started out as a lovely, old-fashioned Wisconsin winter with ample snowfall and consistently cool temperatures has turned into a mucky, icy mess. Here's hoping for a couple slow thaws and a restocking of the snow pack in the coming weeks so we can avoid any widespread winter damage. I just completed my 3rd year as a faculty member, and it's hard to believe how fast time travels and how much work the UW turf team as a whole conducts every year. We're by no means the biggest program out there, but our productivity is hard to match. Of course none of this is possible without the support of the Wisconsin Golf Course Superintendents Association and so many of you individually, be it through Turfgrass Diagnostic Lab contract memberships, attendance at WGCSA Monthly Meetings (which support the TDL), hosting of research projects, or through simply providing us with feedback on things you like or areas we can address. We are humbled by your support, and always welcome your feedback.

Since it can be difficult to keep track of all the different things we are doing in the program, let me provide you with an update on some changes to the program over the past year and some of the projects we've been working on.

Staffing Changes at the TDL

Bruce Schweiger has done a fantastic job running the TDL for the past 4 years and it has grown tremendously under his watch. However, as of January 1st Bruce assumed the role of OJ Noer Research Station manager and will attempt to fill the large shoes left by the recently retired Tom Schwab. I want to thank Bruce for his tireless efforts running the TDL and working on so many other issues related to my program's research and outreach efforts. He has been central to our success, and we wish him well in his new endeavor...which lucky for us is working just down the hall (**Figure 1**)!

Kurt Hockemeyer has been named the new manager of the TDL (**Figure 2**). Kurt managed our fungicide testing service for the past year and also was instrumental in getting our Common Ground Initiative up and running. Kurt received his M.S. degree from Purdue University with Dr. Rick Latin a few years ago and has experience diagnosing turfgrass samples from his time with Dr. Latin and during his year-long stint as a turfgrass specialist at the University of Minnesota. Managing our nationally-renowned TDL always requires an adjustment period for the incoming manager, but I am confident Kurt has the skills necessary to keep the TDL the preeminent turfgrass diagnostic facility in the Midwest.

Snow Mold Fungicide Timing and Propiconazole Uptake

When should I apply my snow mold fungicides? It's one of the most common questions I get, and there are many different theories about what is best. We are continuing a study investigating snow mold fungicide timing for the 2nd winter at Timber Ridge GC (Minocqua, WI), Greenwood Hills CC (Wausau, WI), and the OJ Noer Facility (Madison, WI) with a series of fungicide timings beginning 6 weeks before typical snow cover and progressing at 2 week intervals all the way up until shortly before snow falls.



Above: **Figure 1:** Bruce Schweiger is 'sliding' down the hall to take over the OJ Noer Manager position...but we still look forward to closely working with him in his new role.

Below: **Figure 2:** Kurt Hockemeyer has been named the new Turfgrass Diagnostic Lab manager. Kurt received his M.S. degree with Dr. Rick Latin from Purdue University and has experience diagnosing samples.



WISCONSIN PATHOLOGY REPORT

We then rate the timings that provide the best snow mold protection over all three sites and use weather data collected from each site to develop predictive models that can help determine optimal snow mold fungicide timing. In addition, this study is also looking at the impact of temperature on propiconazole uptake in creeping bentgrass in growth chambers at various temperatures to determine whether colder temperatures really do reduce the rate of fungicide uptake. The wild and incredibly mild conditions seen last winter prevented us from collecting much usable data, so we're anxiously awaiting the results this spring! This 2-year study is jointly funded by the Golf Course Superintendents Association of America and the Wisconsin Golf Course Superintendents Association.

Impact of snow cover and anti-transpirants on fungicide persistence

This follow-up to our past work researching the impacts of snow cover on the persistence of chlorothalonil and iprodione investigates the impact of snow cover on the persistence of propiconazole and chlorothalonil. In addition, we are also testing to see whether the addition of an anti-transpirant such as Transfilm® can help prolong the persistence of these fungicides. Last winter was the first year of the study and we found that both fungicides degraded rapidly regardless of snow cover and regardless of the anti-transpirants presence, which is perhaps unsurprising given all the rain and melting snow we experienced last December (Figure 3 pg. 38). These results corroborated many of the same things that we observed in the previous study done with chlorothalonil and iprodione. This 3-year study is being funded by the Canadian Allied Turfgrass Research Office, the WGCSA, Syngenta Professional Products, and PBI Gordon.

Patch disease assay development

Root-infecting diseases such as take-all patch, summer patch, and necrotic ring spot can be some of our most frustrating diseases to manage. One of the most frustrating aspects of these diseases are how difficult they are to diagnose...for both the superintendent AND the diagnostician. With that in mind, we are currently working on developing highly accurate and fast molecular detection assays for each one of these fungi. These assays, termed loop-mediated isothermal amplification (LAMP) assays, have been used in medicine and other areas of Plant Pathology in recent years and are touted for their speed, accuracy, and the fact you don't need pricey equipment to conduct the assay. I am happy to report that we have successfully created LAMP detection assays for both take-all patch and necrotic ring spot, though we're still refining the assay for use on summer patch. We will use these assays to test our visual diagnoses on nearly every one of the 200+ samples that come in to the Turfgrass Diagnostic Lab this summer. This 3-year study is being funded by the OJ Noer Foundation, which is unrelated to the OJ Noer Turfgrass Research and Education Facility.

Nitrogen rate and source impacts on dollar spot pathogenicity

Dollar spot is the number one disease most Wisconsin superintendents face, and nitrogen fertility is known to impact dollar spot development. Though dollar spot is known as a

low-nitrogen disease, it remains unclear exactly what level of nitrogen is low enough to increase dollar spot. In addition, various nitrogen sources have been previously reported to impact dollar spot development. Ron Townsend from the Chicago District Golf Association is conducting this research as part of his M.S. degree requirements and has found that nitrogen applied as urea between 0 and 4 pounds of N per 1000 sq ft had virtually no impact on dollar spot development. However, at 6 pounds of N per 1000 sq ft the level of dollar spot decreased dramatically and provided disease control almost as effective as the highly effective fungicide program (Figure 4 pg. 39). In addition, nitrogen source (among ammonium nitrate, calcium nitrate, and ammonium sulfate) was found to have no impact on dollar spot development. This 3-year research project is being jointly funded by the Chicago District Golf Association, the Illinois Turf Foundation, and the Midwest Association of Golf Course Superintendents.



TOP FIVE

REASONS TO USE MILORGANITE

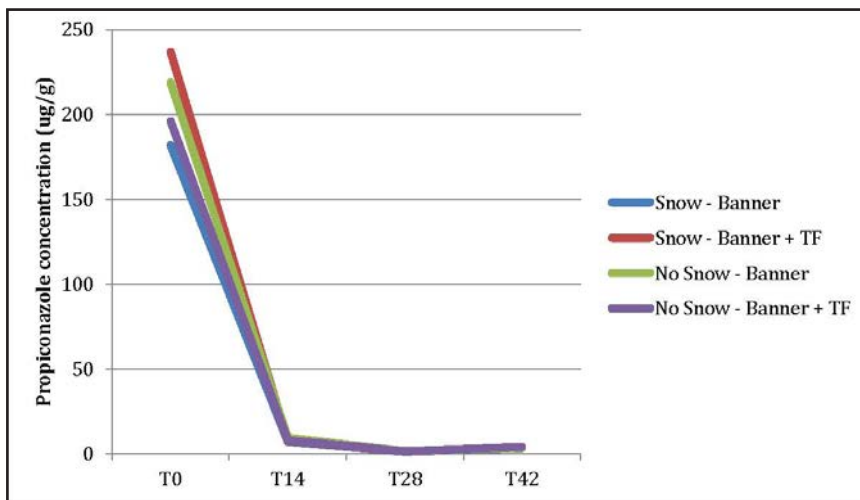
ORGANIC - NITROGEN
Milorganite
FERTILIZER

Cost effective + Non-leaching
Salt free + Iron Rich
Superintendents choice
for over 90 years

Come visit Milorganite at the
Golf Industry Show in Orlando. Booth 2651

14-160_Jan17

Figure 3: Our snow mold fungicide degradation research from last winter (2015-2016) revealed that propiconazole degraded rapidly within 14 days of application. This was the same whether snow was present or not and whether Transfilm (TF) was included as a tank-mix partner or not.



Pesticide impacts on microbial communities

The microbiome is essentially the community of various microbes that interact in a given environment. For instance, the gut microbiome is the microbial community present in your digestive system, and research is showing it has a huge impact on many factors related to human health. The phytobiome is the microbial community associated with plants, and has recently become an area of intense study. We have initiated multiple preliminary research projects investigating the impacts that various pesticides have on the turfgrass microbiome using recently developed molecular techniques that allow for mapping of microbial communities with great detail. The goal of this research is to 1) gain knowledge of the impact that pesticides have on the turfgrass microbiome and 2) to develop methods that will encourage healthy microbiome development that may improve plant health. This research currently doesn't have any direct funding, but we are in the process of applying for numerous national grants with other collaborating universities from around the country.

The Common Ground Initiative

I wrote at length about this new initiative in the last **The Grass Roots** issue and also spoke about it during a presentation at the Wisconsin Turfgrass Symposium in Kohler last December. The primary objectives of this initiative are to make superintendents more aware of the varying environmental impacts that their pesticide applications can have and to encourage movement towards pesticides with a lower environmental impact. A large part of this initiative is to calculate a statewide average of pesticide impact for a Wisconsin golf course, and I am happy to report that we have begun to collect the pesticide records from dozens of golf courses from around the state. It is my hope that we have a statewide average calculated by the spring. This effort is currently being entirely funded by internal turf pathology program funds.

Turfgrass Diagnostic Lab and Fungicide-Testing Program

Though changes are in store for 2017, the Turfgrass Diagnostic Lab and the Fungicide Testing Program both had banner years once again in 2016. Bruce Schweiger diagnosed a record 280 samples at the TDL this year, breaking the previous record held by none other than himself from 2015. But diagnosing samples is only part of what Bruce did, and his efforts on the phone and on

his computer with so many of you in the state and throughout the country adds exponentially to the service level our program can provide. The TDL does not receive any state or university funds and funding provided by TDL contract members is critical to its continued operation.

In addition, our fungicide-testing program has grown to be among the largest 3 or 4 university programs in the country in recent years. This is largely due to the efforts of Kurt Hockemeyer, who manages the day-to-day operations of this huge program and keeps it running smoothly. Though Kurt's fungicide work was mostly behind the scenes, this work was a critical piece to keeping our program running efficiently and providing all of you with up-to-date fungicide efficacy information on a range of diseases right in your own backyard.

Every superintendent knows that he or she is only as good as the people around them, and my position is no different. I am profoundly lucky to have the people in my program that work as hard as they do, and am also lucky to be able to count on your support year after year to fund significant portions of our program. We're ready for what 2017 has in store! 🌱

T. J. Emmerich Associates, Inc
 Irrigation Consultants
 W28620 Beverly Lane • Hartland, WI 53029
262-538-2776
 Golf Course • Commercial • Master Planning
 System Evaluations • GPS Services
 Thomas J. Emmerich
 Certified Irrigation Designer

WISCONSIN PATHOLOGY REPORT

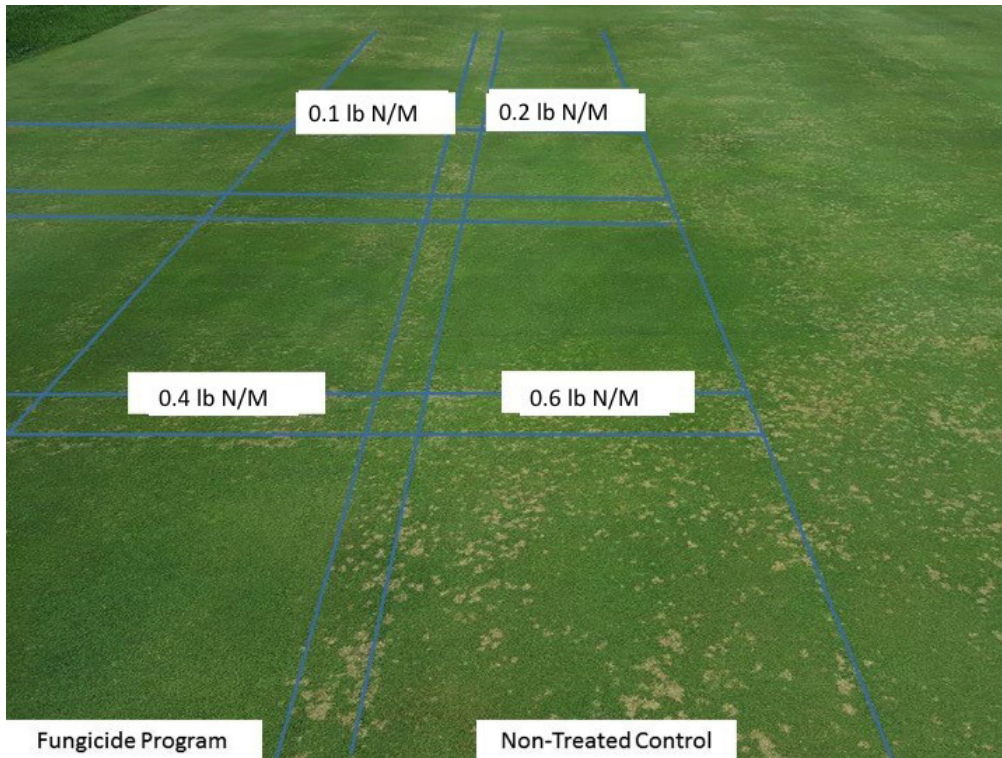


Figure 4: Ron Townsend's M.S. research is showing large decreases in dollar spot severity at 6 lbs of N applied annually per 1000 sq ft (0.6 lb applied biweekly, 10 apps), but much lower decreases in disease at lower nitrogen fertility rates.

GOLFCREATIONS

Billy Bunker
Sand - Gravel - Sealer

Hawks Landing Golf Club
Verona, WI

Before

Meticulous detail

Versatile approach

Perfect tie-ins

Satisfaction guaranteed

A division of: Lohmann Companies • Marengo, IL • 815.923.3400 • www.lohmann.com *ASGCA, GCBA, Better Billy Bunker Certified

The WTA and You

By Jake Schneider, LMD Production Manager, The Bruce Company

If you're employed in Wisconsin's green industry, there's a good chance that the efforts of the Wisconsin Turfgrass Association (WTA) has significantly impacted your career whether you know it or not. Until serving on the board the past few years, I wasn't fully aware of the tremendous impact and influence that the WTA has had since its inception in 1981, and during our early January board meeting, it was generally agreed upon that the vast majority of members in the WTA, WGCSA, and beyond probably don't have a great understanding of the role that the WTA plays, either. Let's change that.

Per the WTA website, the organization has two basic missions: 1) to fund research at UW-Madison to study problems encountered on Wisconsin golf courses, sod farms, athletic fields, cemeteries, commercial grounds, and home lawns and 2) to disseminate research findings to turfgrass professionals in order to help them manage healthier turfgrass and care for the environment. Many of you are familiar with the annual events that are held including the summer field day at the OJ Noer Research Facility, the fall golf outing, and the winter research day. In an era where educational opportunities are found at the click of a mouse and in the comfort of your pajamas, we have been fortunate to have strong attendance at these events, and for that, we thank our supporters. Not only do they serve the mission statement, but they also provide an important source of revenue for yearly operations and for various funding efforts.

Over the years, the WTA has distributed approximately \$2.5 million in funds; quite the impressive number, in my humble opinion. These monies have gone towards many initiatives including the OJ Noer building construction, funding UW-Madison professors' salaries, financing dozens of research projects, graduate student fellowships (having four graduate school fellowships is something that turf programs across the county salivate over), and most recently, towards the OJ Noer manager position's salary that would likely have been a 75% appointment without outside funding. Much of this work flies under the radar, and I suspect that most Wisconsin turf industry folks take what we have for granted. During a ride to a WGCSA monthly meeting, the current dean of the College of Agricultural and Life Sciences, Kate VandenBosch, told Monroe Miller that there are three state industries that she holds in especially high regard due to their involvement and organization with the university: cranberries, potatoes, and turf. That's good company.

Over the years, the WTA has distributed approximately \$2.5 million in funds; quite the impressive number, in my humble opinion.



When you use the best, it shows.

With a portfolio of products unmatched in the industry, Syngenta is a necessity for every great business. From herbicides to fungicides to growth regulators, we have everything you need to maintain healthy turf.

Contact Phil Spitz to learn more about Syngenta products.
Cell: 414-429-2015 philip.spitz@syngenta.com

syngenta.

www.greencastonline.com

©2011 Syngenta Crop Protection, LLC, 410 Being Road, Greensboro, NC 27409. Important: Always read and follow label instructions before buying or using Syngenta products. The label contains important conditions of sale, including limitations of remedy and warranty. Meridian®, Renew®, and Tercary® are not currently registered for use in all states. Please check with your state or local extension service prior to buying or using these products. Scimitar® GC is a Restricted Use Pesticide. Axiom®, Bion® MAX®, Barricade®, Concert®, Dazolil ULTRAX®, Dazolil Weather Strip®, Dazolil Z®, Depature®, Falcid®, Headway®, Heritage®, Insecta®, Medallion®, Meridian®, Monumen®, Pinnant MAGNUM®, Pinn MAX®, Princep® Liquid, Renew®, Renew®, Sontar® GC, Subdue MAX®, Tercary®, Trimm®, and the Syngenta logo are trademarks of a Syngenta Group Company.

MADTOWN MUSINGS



In spite of plummeting undergraduate enrollments in four-year turf programs, including the one at UW-Madison, we are still seemingly on solid footing due to, among other things, the foresight, dedication, and hard work that WTA leadership has exhibited over the past 25+ years. We have a world class research facility, top-notch faculty and researchers, and a program that continues to pump out relevant, cutting-edge information. With rules and regulations likely to tighten in the coming years, never has a strong turf research program been more important to sustaining our industry. With that, a plug to help...

If you're not a WTA member, spend \$150 of your moldy dollars to join and attend our yearly events. What's better than talking turf, socializing, and not being at work? We also have two funds—the Wisconsin Turfgrass Research Sustainability Fund and the Wisconsin Turfgrass Legacy Fund—to which contributions can be made. Great information on these funds, along with anything WTA related, can be found at the website: wisconsinturfgrassassociation.org

The Turfgrass Information File Database



www.wgcsa.com/member_login.php

200,000+ searchable records!



Your trusted sand source

Waupaca Sand & Solutions

715-258-8566 - www.WaupacaSand.com



A High performance, Low Cost Liquid Fertilizer Program

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

A drawback of using granular soluble fertilizers is the immediate nitrogen release causes a spike in growth for a few weeks, then a crash four to six weeks later at which point another application is necessary. Slow release fertilizers (having many different mechanisms from microbial breakdown to diffusion through a barrier) solve this problem by metering out the nitrogen slowly over time, smoothing out the peaks and valleys seen when we use soluble granular fertilizers. Another way to solve the peaks and valleys problem is to employ a spoon feeding approach where small amounts of nitrogen are applied frequently. In this case, the slow release mechanism is the applicator.

I think spoon feeding is the most effective way to fertilize turfgrass because it allows you to control the amount of nitrogen available to the turf and give the plant just what it needs at the right time. Slow release fertilizers may be releasing nitrogen when the plant does not need it.

The main disadvantage of spoon feeding is the labor cost associated with making the applications. The sprayers are also not inexpensive, and often more than one sprayer is required to get the job done. As such, very few managers in the turf industry are in the position to carry out a spoon feeding only program. However, most of those that can also subscribe to this magazine. A large number of Wisconsin golf course superintendents drive a sprayer across greens and tees several times during the season, a smaller but still significant number also spray fairways on a regular basis. This article is intended

for that group, and my goal is to decrease your fertilizer costs without sacrificing your agronomic goals.

I think spoon feeding is the most effective way to fertilize turfgrass because it allows you to control the amount of nitrogen available to the turf and give the plant just what it needs at the right time. Slow release fertilizers may be releasing nitrogen when the plant does not need it.

This program is built from years of data and experience. Every season I test fertilizers on golf turf on small plots at the O.J. Noer Facility. I visit golf courses and ask superintendents about the details of their fertilizer programs and observe the response of the grass. I also pay close attention to my colleagues at other universities doing fertilizer evaluations. These experiences are behind my opinion regarding how to fertilize golf course turf to get the best performance at the lowest cost. My recipe below is highly customizable to fit different grasses, climates and soil types. It revolves around the liquid application of three key ingredients: nitrogen, potassium, and iron. It is more than a theoretical program, as I've worked with some courses who've executed it and have observed positive results over the years.

Nitrogen

Urea is the best soluble nitrogen source.

It has a low burn potential, so is very safe in summer temperatures up to 0.2 lbs per 1000 sq. ft. on greens (2 gallons per 1000 sq. ft.), and even higher rates on fairways. It is also a small non-ionic molecule that is easily absorbed foliarly. Research has shown that up to 67% of the urea can be absorbed by the plant within 1 hour after application (Stiegler et al., 2013). Luckily, urea is one of the least expensive fertilizers you can buy (Table 1).

Ammonium sulfate and ammonium thiosulfate are good sources for spring and fall. Research has shown that use of ammonium sulfate minimizes the severity of patch diseases and algae. However, the burn potential is much higher and I would not apply more than 0.1 lbs N per 1000 sq. ft. to a putting green in the summer unless I was able to water it in immediately. For this reason, I only recommend using ammonium sulfate and ammonium thiosulfate in the spring and fall when temperatures are lower. This is also when many of the patch diseases are active.

Target about 0.1 lbs N per 1000 sq. ft. per week on greens and high use tees and about half that on fairways (assuming clippings are not removed). You don't have to spray every week. If you spray fairways once every three weeks then your baseline will be 0.15 lbs N per 1000 sq. ft. Some weeks you may consider doubling the amount of urea in the tank because of slow growth, or ball marking. Other weeks you may decide to add no urea at all because the grass appears lush enough already. This flexibility is the main benefit of this liquid spoon feeding program.

Fertilizer	Price per ton	Price per lb of nutrient (N or K ₂ O)
Urea (46-0-0)	\$293	\$0.33
Ammonium Sulfate (21-0-0)	\$297	\$0.71
UAN (liquid urea ammonium nitrate, 32-0-0)	\$236	\$0.37
Potassium chloride (0-0-60)	\$297	\$0.25
Potassium sulfate (0-0-50)	\$713	\$0.71

Table 1. Average fertilizer prices in Wisconsin as of November 2016

WISCONSIN SOILS REPORT

Potassium (chloride or sulfate)

Bentgrass – skip this step! If you are nervous to omit potassium from your program (or your soil levels are far below the MLSN guidelines), follow the recommendations for Poa below, but stop adding K to the tank in August because we know that it will increase snow mold damage.

Poa – I recommend target 0.05 lbs K₂O per 1000 sq. ft per week on putting greens in spring, summer, and fall. This will work to minimize anthracnose and winter kill (Schmid et al., 2016), but will increase pink and gray snow mold pressure (Moody and Rossi, 2010).

Iron Sulfate Heptahydrate

I recommend applying 1-3 ounces of iron heptahydrate to greens and fairways with every spray. I don't have an annual target for this application. The iron is intended to enhance color and also decreases dollar spot pressure. At 3 ounces per 1000 sq. ft. you might notice burn on your bluegrass surrounds during the summer, if this happens, reduce the rate or eliminate the iron in the tank for the summer months. Other drawbacks of using iron sulfate is the potential for negative interactions with other

ingredients in the spray tank. Make sure to jar test all mixes, and read pesticide labels for any notes on using with iron.

Finally, if you have USGA style greens with a gravel layer you may be at risk or an iron hard pan forming. If sampling shows this to be the case (Obear and Soldat, 2014), then I strongly recommend not applying iron.

Add-ons

You may benefit from using a seaweed extract product in summer on putting greens. The cytokinins in these products have been shown to keep the roots in better shape during high temperature stress. Research has shown them to be extraneous during periods of low stress. I see no need to apply cytokinins on fairways. Manganese sulfate has been shown to be beneficial for reducing the severity of take all patch. It can be applied at 2 ounces per acre (not 1000 sq.ft) in spring. Phosphorus is often not required for established turf. Follow the MLSN soil test guidelines or simply apply if you notice symptoms of P deficiency, you can temporarily switch your N source from urea to MAP or DAP (also available at very low cost).

Economics

Fertilizer prices fluctuate along with global and local supply and demand, and in the case of nitrogen the price of natural gas. This year, the price of nitrogen is really low. You can get urea in bulk for about \$0.30-0.40 per pound of nitrogen from many Wisconsin co-ops. The cost of ammonium sulfate is more than double that of urea, but still quite inexpensive relative to specialty fertilizers. Potassium chloride (potash) is similar to urea in price, but potassium sulfate is more expensive (Table 1).

Let's run through the cost of a typical program assuming we have 5 acres (218,000 sq.ft.) of greens and tees which we will treat identically, and 20 acres (871,000 sq.ft.) of fairways. The greens are a mixture of bentgrass and annual bluegrass. Greens will get 3.5 lbs of N (as urea), and we will make twenty four applications, averaging 0.13 lbs N per application. This cost of urea for this would be \$230. The prices listed in Table 1 are bulk prices, so if you are purchasing individual bags you might end up paying closer to \$300 or \$350 for the fertilizer, either way it is dramatically cheaper than specialty liquid fertilizers.

Please Support Our Advertisers

FULL PAGE ADVERTISERS

National Golf Graphics - Page 2

Burris - Page 5

Clesen Pro Turf - Page 7

Rain Bird - Page 9

Horst Distributing - Page 11

DHD Turf & Tree Products - Page 19

JW Turf - Page 35

Reinders - Page 44 (back page)

HALF PAGE ADVERTISERS

Lohmann Companies - Page 8

Dunsberry Design - Page 13

Syngenta - Page 15 and 30

Pro Grow Solutions - Page 17

Spring Valley - Page 21

Milorganite - Page 27

Waupaca Sand and Solutions - Page 31

Lakeland Lawn Care - Page 37

Pendelton Turf Supply - Page 38

THIRD PAGE ADVERTISERS

Herfort and Norby - Page 36

QUARTER PAGE ADVERTISERS

Pumpstation Professionals - Page 10

T.J. Emmerich Associates Inc. - Page 28

EIGHTH PAGE ADVERTISERS

Bayer - Page 25

Helena - Page 43

WISCONSIN SOILS REPORT

Because we have Poa, we'll need some potassium, let's say 1.75 lbs of K₂O and we'll use the more expensive potassium sulfate at \$0.71 per lb of K₂O. That will cost \$271 for the year. The price survey didn't include iron sulfate, but the co-ops can purchase it for about \$75 per ton. It's safe to say that you shouldn't be paying more than \$0.05 per ounce. That if we apply 3 oz at each of our 24 applications, we are only using 4.5 lbs of a 50 lb bag that costs \$10. Iron is basically free. Overall, the cost for nitrogen and potassium for the season on these greens is about \$500.

For fairways, we will target 2 pounds of N per 1000 sq.ft. for the season. No potassium or phosphorus assuming good soil test levels. We hope to spray fairways eight times, with 0.25 lbs of urea at each application. We will use three ounces of iron per 1000 sq.ft. The urea will cost \$575 and the approximately three bags of iron will cost us another \$30. This puts us just north of \$600, and about \$1100 for greens, tees, and fairways combined.

Blake Meentemeyer and Brian Whitlark of the USGA wrote an excellent article in the *Green Section Record* (2016) on turfgrass fertilization. I encourage you to read that article if you haven't had a chance yet. On page 3, they include an economic case study that profiles a golf course in Nevada that spent \$90,000 annually on li-

uid fertilizer products for 4 acres of bentgrass (4 lbs N, 2 lbs P, 13 lbs K). In 2015, they dropped the P and K significantly, switched to less expensive sources and got their cost down to \$15,000 for the 4 acres of bent.

I would put this simple program of urea, iron, and maybe some potassium up against any liquid fertilizer program in the world regardless if it costs \$90,000 or \$15,000.

Hopefully, the extra \$75,000 could be put to use in labor or other high return on investment areas. Excellent work here, no question. However, the program I detailed above using feed grade urea would have cost them only \$240. I am almost certain that phosphorus and potassium are not required (based on the prior year's applications). The cost of the iron heptahydrate would bring it to \$250. I would put this simple program of urea, iron, and maybe some potassium up against any liquid fertilizer program in the world regardless if it costs \$90,000 or \$15,000.

Some folks like the convenience of loading a liquid fertilizer, and for them UAN might be a good option. I haven't tested

UAN in my field plots so I am not familiar with the burn potential of this product, however I suspect it can be used safely at the rates golf course managers use. I will evaluate UAN on greens at the O.J. Noer this summer - come to field day and see for yourself. Also, if you are interested in trying my program out next season I would be more than happy to help make the transition.

References

Meentemeyer, B., and B. Whitlark. 2016. *USGA Green Section Record*. 54(9):1-7.

Moody, D., F. Rossi. 2010. Potassium fertilization affects psychrophilic pathogen susceptibility of annual bluegrass. *International Annual Meetings: ASA-CSSA-SSSAJ*. P. 61292.

Obear, G.R., and D.J. Soldat. 2014. *Golf Course Management*. 82(4):96-98, 100.

Schmid, C. J., J.A. Murphy, B.B. Clarke, M. DaCosta, and J.S. Ebdon. 2016. *Crop, Forage and Turfgrass Management*. February. 2(1):1-4.

Stiegler, C., M. Richardson, and D. Karcher. 2013. Foliar uptake of nitrogen on creeping bentgrass and bermudagrass greens. *Golf Course Management*. 81(8):72-77.



Modern sprayers have increased the feasibility of spoon feeding greens, tees and fairways with nutrients as needed.



**DEPARTMENT OF
SOIL SCIENCE**
University of Wisconsin-Madison



Control like this has always been out of reach. Until now.

The New A Model Mowers from John Deere.

Now your presence can be felt on every part of your course. That's the control you get with the new A Model mowers from John Deere. Thanks to our TechControl display, no matter who is operating the mower, you can easily program these mowers to mow and turn at exact speeds, to transport at safe speeds, and to lock in fuel savings. You can also plug in service reminders and get diagnostic feedback quickly and accurately. And all of your operators can now mow in a more consistent fashion.

The power to control your course is now in your hands. To find out more about our new A Models, call us or sign up for a demo at JohnDeere.com/Demo.

Trusted by the best courses on Earth.

JohnDeere.com/Golf



Our exclusive, password-protected TechControl™ Display lets you program commands for your operators.



J.W. Turf Inc.

www.jwturfinc.com

717 MAIN STREET
ALLENTON, WI 53002
847-683-4653

14 N 937 US HWY 20
HAMPSHIRE, IL 60140
847-683-4653

2017 WTA Turfgrass Research Day and Conference

By David Brandenburg, Golf Course Manager, Rolling Meadows Golf Course

Why waste a sunny day inside is a common theme for the WTA Turfgrass Research Day as rain and snow are common occurrences for this annual event. Fortunately the weather for driving to and from cooperated and most attendees traveled on just wet surfaces.

After refreshments and socializing the day started with the handing out of scholarships. First up was a reminder of the distinguished graduate fellowships and the four families that made them possible through generous donations.

The fellowships total nearly \$1 million so the interest can be used for indefinite support.

- Wayne Kusow Fellowship: Ada Zhou, MS Soils
- Bob Newman Fellowship: Ben Henke, MS Soils
- John and Flora Berbee Fellowship: Emma Buczkowski, MS Plant Pathology.
- Terry and Kathleen Kurth Fellowship: is currently vacant but was most recently held by Lisa Reedich, MS Plant Pathology.

Scholarships

- The WGCSA James R. Love Scholarship of \$1,500: Logan Mohr, Elkorn, WI a senior in soil science.
- The Department of Soil Science James R. Love Memorial Scholarship of \$1,500: Ben Henke, Kansas City, MO a masters student in soil science studying PGR performance on fairways and athletic turf.
- The Charles O. Newlin Scholarship in Turfgrass Management of \$1,000: Qiyu (Ada) Zhou a masters student in soil science studying the impact of sodium on golf course soils.

- WTA James W. Huggett Memorial Scholarship of \$1,000: Durrell Naquin, Reedsburg, WI, senior in soil science.
- WTA Scholarship of \$500: Emma Buczkowski, Portland, OR masters student in plant pathology.


Dr. Chris Williamson, UW Madison, Department of Entomology spoke first on "Why Don't We Find Japanese Beetle Grubs On Putting Greens?"

Chris thanked Glen Obear, Weston Ohl and Megan Kruse for their help in this research. If putting greens offer low height of cut, abundant sunlight and irrigation that attract Japanese Beetles and host few predators to the beetle why are the grubs not found on putting greens?

Adults are seen burrowing in greens, assumably to lay eggs and greens host many other insects including cutworms, turfgrass ateniens and ants.

The team came up with 4 hypothesis. The soil type is wrong due to the sand base of putting greens. The percent of organic matter is too low for the grubs. Even though greens are irrigated the soil moisture level may be too low. Or, perhaps greens fungicide programs provide a sub lethal or lethal dose of fungicides and or plant growth regulators.

Fungicide use seemed the most likely because putting greens usually receiving regular PGR and fungicide applications. Chris said insect endocrine systems varied widely and a product that may have an effect on one grub species may not effect another type of grub.



HERFORD □ NORBY
Golf Course Architects
 Phone: 952.361.0644 Fax: 952.361.0645
 e-mail: knorby@herfortnorbygolf.com web: www.herfortnorby.com



Dr. Chris Williamson Discusses the lack of Japanese Beetle grubs on putting greens.

We already know that insecticides are more effective on younger or first and second instar grubs so can the same be true for fungicides? The research showed that propoconazol killed eggs, first instar and second instar grubs while chlorothalonil killed first and second instar grubs but not the eggs.

No fungicide in the trial showed an effect on third instar grubs, however the insecticide Dylox did.

Dr. Dale Sanson from PBI Gordon joined us via teleconference to discuss "Why Do We Need So Many Different Formulation Types In Pest Management?"

There are many formulations for many reasons starting with is the product is for consumer or professional use, how it interacts with the active product both physically and chemically.

The professional formulations may be more effective but they are also less stable in the tank. It is important to understand your tank water. pH is key along with surface tension, hardness and dissolved solids.

Dr. Sanson showed a chart (Fig 1) with the half life of three active ingredients and how they degrade in the spray tank at various pH levels.

Adjuvants can offset hard water as they can bind with Ca, Mg or Fe in the tank to prevent interaction with active ingredients.

Jar tests are important when using different formulations in a tank mix for the first time. And although the jar test can check for physical or chemical issues they will not show a quick degradation of one or more of the active ingredients.

The MSDS or now SDS sheets should be read thoroughly to understand the products we are using.

Even when the chemicals mix well do not stop thinking before adding fertilizers that may change the pH dramatically. Chelated Irons will not swing the pH but other irons can. Urea as a nitrogen source will not swing the pH but Ammonium Nitrate will.

The last thing to consider is does your spray water change during the year? Does the snow melt run off water filling your pond in the spring turn to a much different water source when you turn to 50 or 100% well water later in the season? The only way to know is to test both your pond water and water from the well.

After a quick break we were back at it with Dr. Doug Soldat discussing a variety of ongoing projects both at the Noer Center and on golf courses.

With most of us comfortable with Growing Degree Day models for growth regulators on bentgrass, Doug along with graduate student Ben Henke are looking at GDD on low mow bluegrass.

Figure 1: Active Ingredient Degradation in Spray tank: Examples of Half-Lives at Various pH Levels (From Dr. Dale Sanson)

Active Ingredient	pH = 6	pH = 7	pH = 9
Carbaryl	100-150 days	24-30 days	1-3 days
Captan	N/A	8 hours	2 minutes
Malathion	8 days	3 days	8 hours

"Lakeland Lawn Care has been treating our course for several years. We are completely satisfied with their top-notch quality and service. They are trustworthy, very professional, and extremely efficient. I would highly recommend Lakeland."

—Darren Dase
Superintendent, Delbrook Golf Course

Saves time and money.

We can spread up to 20 acres of fertilizer or 10 acres of weed control per hour, which means we're in and out quickly – usually before the sun rises.

Custom applications.

Our custom application services include granular fertilizing, liquid weed control, fungicide applications, and insecticide treatments.

Guaranteed results.

We're a third generation family-owned business, and have been in the lawn care industry for over 40 years. References available upon request.



The Haupts, owners

LAKELAND LAWN CARE

Contact us for a free quote:
mike@lakelandlawncare.com or
(920) 330-9010
lakelandlawncare.com

WISCONSIN TURFGRASS ASSOCIATION

So far the work on low mow bluegrasses has shown the Anuew lasts longer than Primo but not as long as Trimmit by GDD. Primo max did provide better results on fairway applications that it did on putting green height when looked at for growth regulation.

At least in these trials Cutless did not provide growth control of low mow bluegrass even though it was expected to match Trimmit due to the past similarities in the products.

To introduce his next talk Dr. Soldat called bluegrass the “dog of the turfworld” due to the wide variety of performance in turf trials similar to the difference between a small chihuahua and a great dane. In the mowing frequency evaluations Doug looked at quality and clipping quantity in plots mowed monthly, every other week and weekly.

Bella bluegrass is unique because it spreads from rhizomes rather than seed had good quality and the tall fescue plot did well if mowed weekly. So far it was difficult to find a quality turf that only needs to be mowed monthly.

Other work in the soils department included Building a better sodium hazard equation which is part of Ada Zhou’s Masters work. Doug has discussed the importance of potassium levels for healthy turf and to avoid snow mold problems in winter. Recent work has shown soil testing is not the best method for test K levels and tissue testing may be better.

At Hawks Landing they are working on weed control in unmowed fine fescue areas using glyphosate and Barricade. And speaking of unmowed areas they are also working on roadside turf selection to help the Department of Transportation. Currently some of the approved grasses under DOT rules take a year or more to reach 70% coverage and by then most of the coverage is weeds rather than turf.



The smiling and friendly faces of Audra Anderson and Monroe Miller greeted attendees at the registration table.

PENDELTON TURF SUPPLY

Ed Witkowski
414-640-6447
edward.witkowski@pendeltonturfsupply.com

805 Ela Avenue
Waterford, WI 53185
Phone: 262-534-3334
Fax: 262-534-2990



FULL LINE OF TURF PRODUCTS
CHEMICALS • TEE & GREEN SUPPLIES
TIRES & TUBES • NEW PRODUCT INFORMATION

SATISFACTION GUARANTEED

Clark Rowles
608-228-1782
clark.rowles@pendeltonturfsupply.com





Dr. Doug Soldat discussed a variety of research programs at the Noer Center including how growing degree days effect growth regulator use on low mow kentucky bluegrass.

The roadside trial has 60 mixtures and at this point is leading towards sod may be the best answer if it is planted at the right time of year.

The soils team is also looking at a variety of biological products and how they increase turfgrass rooting or quality. The work is just starting and soil biology is a very complicated system.

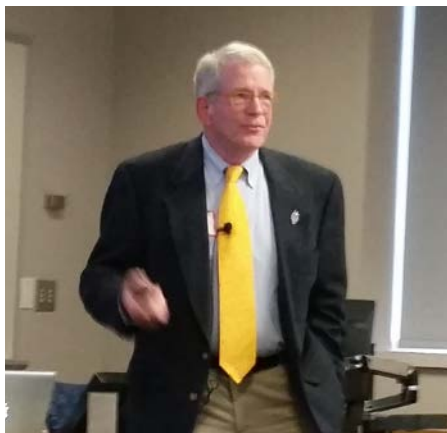
Organic fertilizer trials have all shown promise but little differences between them as this trial gets of the ground.

Newly retired Dr. David Hogg from the Department of Entomology joined us discuss the "Care and Maintenance of Honey Bees". In retirement David is working with Dr. Williamson to put bees on 5 or 6 golf courses and help the course get the program started. If you are near Madison and are looking to volunteer your course contact Dr. Williamson.

Dr. Hogg actually hired Chris in 1998 and has served for 37 years with 2 terms as Department Chair and a interim stop as the Dean of the College of Agriculture and Life Science. He has been keeping bees as a hobby for 5 years and he and his wife have turned it into a small retirement business.

The honey bee or *Apis Mellifera L.* is not native to the United States but is the state insect in 15 states including Wisconsin. Dave was quick to point out that yellow jackets are not honey bees or bees at all as they are actually wasps that just look similar to honey bees.

Honey bees to not drink your soda or eat your hot dog at picnics as the wasps often do in the later parts of summer and fall. The other difference is most of the wasps die at



Dr. David Hogg discussed The Care and Maintenance of Honey Bees.

the first frost which is why we see so few in the spring as it takes them time to build up their colony.

Honey bees on the other hand overwinter as a colony keeping each other warm in the hive. The bees may not fly around but they are not hibernating and shiver to keep the hive at a constant 92 degrees. They make honey so they have food through the winter months.

Honey bees are social insects and spend most of their time working. They build combs with 6 sided cells to store honey, raise new bees and store pollen in a very organized way. Bees are very effective pollinators and very important to fruit, nut and vegetable crops. A typical hive of 50,000 workers collects about 80 lbs. of pollen each year. As they bees collect pollen they also spread it from plant to plant on their bodies.

The worker bees are female and the only difference between the worker and the queen is the queen is fed royal jelly to change how it grows. The eggs are identical when laid.

Bees swarm when a queen leaves the nest and takes half the workers with her. Prior to this a dozen or so new queens are prepared in special cells and fed the royal jelly. The first queen to emerge kills the other queen pupae and takes over the hive. Her first job is to fly out and mate with a male or drone bee.

The males who cannot sting are larger bees and come from unfertilized eggs and do not work. They just eat and hang out and fly around to look for virgin queens. Each fall the female workers kick the males out of the hive to save food for the winter period.

Bees can travel up to 6 miles searching for food and will return to the hive and recruit

others and use waggles based distance and on the location of sun to direct other foragers.

The value of bee pollination is estimated at between 10 and 15 billion dollars and professional bee keepers travel the country following the need for pollinators with semi-loads of hives. The professional bee keepers often receive 2/3rds of their income from pollination with the rest from honey sales.

Most honey consumed in the US is imported and David was clear in saying having home or work hive is more of a hobby and a source for great honey than a money maker.

Bees have been in the news as their numbers decline due to the varroa mite, wax moth and small hive beetle. Bees and their interaction with insecticides used for crop protection has also been in the news lately. Miss-applications or improper timing of insecticides especially the neonicotinoids can be detrimental to bees can lead to large kills.

Dr. Hogg recommended Capital City Bee Supply as a source for information and the tool needed to get into bee-keeping. In most places it is not necessary to plant wildflowers to have hives or pods as the bees are able to travel to where the flowers are.

Honey is used for many things and can last for years. The taste of a hives honey is dictated on what type of plants the bees receive their pollen from. If you and your staff or family is looking for a hobby beekeeping may be for you.

The golf courses that have bee hives have used them as opportunities to bring non-golfers and youth groups to the golf course to learn about the bees and honey.

After a great lunch we were joined by the duo of Chelsea Gallagher and Jacob Schneider from the Bruce Company to discuss the ever challenging area of worker recruitment and retention.

Chelsea serves as the Human Resource Generalist and Jake is A LMD Production Manager and relies on Chelsea to fill key positions to keep going.

Landscape construction and maintenance companies along with golf courses have found it harder in recent years to find and keep good workers. The seasonal nature of work in Wisconsin only makes it worse.

The Bruce Company has used job sites like Career Builder, and Monster but those are for fee services. Chelsea has had recent luck with the Job Center of WI and the H-2B Program.



Chelsea Gallagher, Human Resource Generalist for the Bruce Company discussing employee recruitment and retention.



Jake Schnieder LMD Production Manager for the Bruce Company explains how recruitment and retention work in the field.

The H-2B Program has been paying off by providing great employees for the 9 month season and then they have to return to their home country before coming back for a new season.

The program is subject to limits placed on it by the federal government and a company has to show it cannot find local workers to fill the positions to use it.

Other success in recruitment have come from probation and parole programs and work release programs. The Bruce Company has a referral program that rewards the new worker and the current worker after the new employee works out.

Jacob discussed the importance of training and standard operating procedures (SOP's) in retaining employees. When the employee understands what is expected of them they are more comfortable with the work experience.



He also said that it is important to get to know your employees and be sure to praise more than criticize. Supervisors should show a positive attitude and avoid using the work but... "You did a good job there but". Instead a supervisor can say "you did a good job there and next time it can look even better if you also... do this."

At the Bruce Company they pay weekly and have the option to pull health premiums for full time employees only during the in season months when checks are larger due to overtime or at minimum 40 hour weeks.

One key Jacob and Chelsea both mentioned was "Performance reviews should not be the first time a employee hears about something they need to work on." Providing regular feedback keeps the conversation flowing and employees happier.

Dr. Paul Koch was next with his talk "Precision Spray Management; Current Strategies and Future Research Needs." Our goal should be to spray only when and where we need to as a method of providing a quality product at the lowest cost and impact on the environment.

Preventative applications will use more product but it is a insurance policy against disease development and provide better control against diseases when compared to curative applications.

Fungicide applications have tended to be calendar based while the diseases they control are weather based. By using im-



Dr. Paul Koch discussing precision disease management.

proved models we can forecast the probability of dollar spot and have a window of 2 to 3 days to schedule a spray rather than the immediacy of curative applications.

By using the weather based models we can reduce the number of applications in the season and save budget dollars.

Paul recommended updating weather stations to include multiple sites to avoid full course applications when only parts of the course are forecasted to be a problem.

Dr. Koch's future work includes models for other diseases and how to factor in pathogen variability, fertilizer levels and resistance.

Finishing up the great day of education was Nathan Wolfe a Environmental Enforcement Specialist with the Wisconsin Department of Trade and Consumer Protection (WDATCP). Nathan's territory includes Rock, Green and Lafayette Counties.



Nathan Wolfe, Environmental Enforcement Specialist for DATCAP discussed how our local specialist can be a great resource for operations.

Wolfe said if WDATCP comes calling it is usually to do a inspection and not looking for trouble. They prefer to be proactive rather than reactive and welcome questions before trouble occurs. He and the 17 other specialist strive for uniform enforcement of the rules to be fair to applicators and businesses.

Their main goal is to gain compliance rather than to punish but warns that obstruction or to purposely mislead them is taken seriously.

Snacks and beverages allowed little time to socialize before heading out with our heads full of valuable information. A big thank you to the UW, WTA and Conference Chair Aaron Goninen for bringing together a great lineup of educators.



Ben Henke receives congratulations from Dr. Soldat for being awarded the Department of Soil Science James R. Love Memorial Scholarship. Ben is from Kansas City, MO and working on his masters in soil science.



Emma Buczkowski receives congratulations from Dr. Soldat for being awarded the Wisconsin Turfgrass Association Scholarship. Emma is from Portland, OR and is working on a masters in plant pathology.

Event Schedule!

- February 4-9 - Golf Industry Show, Orlando, FL
- February 8 (Wednesday) - GIS Wisconsin Room, 6:30 - 9:30 Brickhouse Tavern and Tap, Orlando, FL
- TBD - Assistants Seminar, Whispering Springs GC, Fond du Lac
- February 27 (Monday) - Spring Business Meeting, South Hills Country Club, Fond du Lac
- February 28 (Tuesday) - NGLGCSA - Business Meeting and Election, The Waters of Minocqua
- March 1 (Wednesday) - NGLGCSA Spring Education Conference, The Waters of Minacqua
- March 15 & 16 (Wednesday / Thursday) - Reinders Green Industry Conference, Waukesha
- April 26 (Wednesday) - Super Pro Outing with PGA of Wisconsin, The Oaks Golf Club, Cottage Grove
- May 15 (Monday) - May Golf Meeting, West Bend Country Club, West Bend
- June TBD - June Golf Meeting, Grand Geneva, Lake Geneva
- July 25 (Tuesday) WTA Summer Field Day, OJ Noer Facility, Verona
- Aug TBD - Joint WGCSA - NGLGCSA Meeting
- September 18 (Monday) - Wee One, Pine Hills Country Club, Sheboygan
- October TBD - WTA Golf Fundraiser
- November TBD (Saturday) Couples Dinner
- November 29 & 30 (Wednesday / Thursday) Golf Turf Symposium, American Club, Kohler

(Check back next issue for the complete schedule or visit our website at www.WGCSA.com)

Happy People Make Their Own Sunshine

By David Brandenburg, Editor, The Grass Roots

The winter that started with a nice snow cover and cold temperatures to the pleasure of snow sport fanatics and turf managers quickly went downhill with a snow melt followed by rain and the worst of all weather, freezing rain.

The temperatures have been close to normal in the 30 and 90 day look back but it has just seemed so dark. Mid December to Mid-January are the shortest days anyway but when we have cloudy day after cloudy day it weighs attitudes down.

It is days like these we need to make our own sunshine. Do something you enjoy with people you enjoy and take the opportunity on those few sunny days to get outside and take a walk to soak up those rays!

By Mid February the days are clearly getting longer and the sun is gaining strength through it's higher angle and turf mangers and golfers start to feel the hints of spring fever.

In job changes that have been sent our way, Jack Soderberg the longtime superintendent at Western Lakes is retiring and Karl Braem has moved up from assistant to superintendent.

The same senerio is playing out at Westmoor Country Club where Patrick Reuteman has moved up to take over for his retiring boss Bryan Bergner.

Todd Fregien has changed shirts and is now selling for ProGro Solutions after a long time with Pendelton Turf Solutions

Best of luck to all!

Speaking of ProGro Solutions, Mike Werth reports the business is opening a store-front and warehouse in Madison. The store will be right off of Pflaum Road near Farm and Fleet on Hwy 51.

If you are wondering why your new job or baby and other life events are not on these pages it is because someone has to report those items and that person is usually you. Feel free to toot your own horn and send me a email with your news. (grassroots@wgcsa.com)

The most recent issue of Golf Digest has two articles golfers look for each winter. First, the biennial report on salaries from around the game is a quick reminder how much money is involved in the PGA Tour as they have a number of the top salaries.

Superintendent salaries listed included a "Fazio designed top 100 course in the west" at \$220,314, a "Prestigious Private Club in The Midwest" at \$121,259, a "National Average Private Course at \$103,359 and "National Average Public Course" at \$69,448.

Although interesting, the article is just averages and I for one choose to worry about what I can control not what others are getting.

The other article was the annual 100 greatest courses listing that is subject to varying opinions over cold beverages at many clubhouse lounges. The big news was Pine Valley in New Jersey passed Augusta National at the top spot.

Badger State leaders included Whistling Straits (Straits Course) at 22, Erin Hills at 44, Milwaukee Country Club at 71, Blackwolf Run (River Course) at 92. It will be interesting to see where the new Sand Valley lands on the list next year.

I hope your winter goes smooth and you find the time to take in some of the educational opportunities provided from the WTA, WGCSA, NGLGCSA or the granddaddy of them all the Golf Industry Show and GCSAA Conference in sunny Orlando.

Thank you to all our advertisers who pay for this publication and the writers to make it worth reading. I read quite a few publicaitons from around the country and *The Grass Roots* can stand up to any of them due to our writers.

Spring is around the corner and while we are waiting for warm sunny days remember to "make your own sunshine!"



INVITATION

WEDNESDAY
FEB 8
6:30 PM - 9:30 PM

Wisconsin Chapter
GCSAA

Hospitality Room

at the Golf Industry Show in Orlando, FL

All WGCSA members & spouses welcome!
100% OF EXPENSES PAID FOR
by generous company sponsors.

Brickhouse Tavern and Tap
8440 International Dr. Orlando FL
brickhousetavernandtap.com



14-160 Jan 17

EDITOR'S NOTEBOOK



Bob Giesler, Salesperson for Reinders and former mechanic at Green Bay Country Club landed this nice 13 point buck opening day of the gun season. Congrats Bob!



YOUR STRONGEST SUPPLY LINK

Renova **CoRoN** Soaker 

For healthier, higher quality turf, Helena offers a full range of nutritional products and premium wetting agents. For more information, contact Shawn Hilliard at hilliards@helenachemical.com or (608) 516-4006.



People...Products...Knowledge..

helenachemical.com | Always read and follow label directions. Helena, CoRoN, Soaker and People...Products...Knowledge... are registered trademarks of Helena Holding Company. Renova is a trademark of Valagro SpA. © 2015 Helena Holding Company



**Reinders 23rd
Green Industry
Conference**

March 15-16, 2017
Waukesha Expo Center
Waukesha, WI

GreenStories17
Partners Growing Together



One of the highlights every other March is the Reinders Show held at the Waukesha County Expo Center. It is highly attended event with a mix of golf and lawn care turf professionals. They offer education for the entire staff with different tracks for turf, irrigation, equipment service and landscaping. Dr. Joe Vargas is making a return for I think his 23rd time and will be joined by Dr. Ed Nangle, Dr. Jim Kerns and Dr. Bill Kreuser. Excitingly Zach Reineing will be discussing how they are "Preparing For The 2017 US Open".

Reinders and the other vendors put on a valuable education event and trade show to get us excited right before the season starts.

REGISTER TODAY @ gic.reinders.com



Reinders 23rd Green Industry Conference

MARCH 15-16, 2017

WAUKESHA EXPO CENTER
SUBURBAN MILWAUKEE, WI

Single Day: \$59 in advance, \$69 at the door **2-Day Pass:** \$99 in advance

GreenStories'17

Partners Growing Together

Dr. Joe Vargas
Michigan State University

Dr. Bill Kreuser
University of Nebraska - Lincoln

Dr. Ed Nangle
Ohio State University

Dr. Jim Kerns
North Carolina State University

Amy Fouty, CSFM
Michigan State University

Visit with more than **80** leading industry suppliers
and choose from **35+** educational seminars geared to you

Earn certification credits ■ Latest equipment & product innovations
Lunch, refreshments ■ Door prizes each day ■ Exclusive show specials
Enjoy hot homemade donuts each morning

NEW FOR 2017!
REINDERS INNOVATION THEATER

Register early @ gic.reinders.com
262-786-3301 • 800-785-3301