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Winter is Coming

Vol. 49, No. 7 August 2015

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MINNESOTA GOLF COURSE SUPERINTENDENTS ASSOCIATION OF AMERICA ORGANIZED 1927

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Presidential Perspective

by Jake Schmitz, Superintendent at Olympic Hills Golf Club

Golf course professionals are well known to put their jobs and the golf course in front of the needs of family, friends and their own personal health during the season. The compressed schedule of a Minnesota golfing season often has us scrambling to complete a laundry list of projects in addition to the everyday needs of grooming 100-plus acres of our particular property. The sacrifices that are made for a seven month season often cannot be recouped during the off-season, as this time period seems to get shorter and shorter each year. Office projects and our attempts to extend the outdoor season are met with another golf season that sneaks up on us come the end of February. The time allocated for family functions and time with friends is put on the back burner until things settle down at work. While this seems quite ridiculous to the normal working stiff, it is pretty much reality for most golf course superintendents and assistants.

This dysfunctional pattern of all work with no play for seven months can really create a lot of turmoil in life. Superintendents are known to have some of the highest rates of divorce and alcoholism in the workforce. We have all seen plenty of tears at awards ceremonies where seasoned professionals end up crying like babies due to the sacrifices their families made, just so that Mr. Boskowitz could hit a smooth ten-footer to land the tournament of his dreams… the club championship! Don't get me wrong, I absolutely love

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what I do for a living, but it certainly is easy to get sideways on life when one sits down and contemplates the sacrifices that are made for a simple game. Time marches on, and so does the golf course once we are dead and gone.

These were a few of the thoughts I recently had as my left foot was falling asleep and nerve zingers were traveling down my left 'cheek' to my dead foot. You see, yours truly had some decisions to make regarding a herniated disc between my L4 and L5 vertebrae that wasn't getting any better. And you know what my first line of thinking was? You guessed it – I could take care of it after the season was over and I had time for surgery. Unbelievable what this profession can sometimes do to scramble my brain! Here I had an MRI showing a bulging disc that was millimeters away from my spinal cord, and I wanted to put it off because the course 'needed me'. What a joke! After a frank discussion with my wife and my doctor explaining to me the risks of not being able to use the bathroom or bedroom efficiently, the decision to have things fixed suddenly became very easy. Amazingly, surgery was scheduled quickly and I spent a week away from work during the heart of the season.

Taking the time to get repaired when I needed it was probably one of the most valuable lessons I have ever learned. Sometimes putting yourself first can make a lot of things less stressful and much easier. A successful surgery has removed constant pain that often led to a short fuse and impatience. My team at work handled the course brilliantly in my absence, and upon my

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return to the pasture, everything seemed to look a lot nicer than before. It is interesting how a little time away can recreate the zest for optimal performance at a great job. Unfortunately for me, it took a fair amount of pain and a surgery for me to finally realize what I should have known for a long time.

As you traverse through the final leg of the 2015 golf season, my hope is that a little story about my own personal stupidity will shine some light on a problem that I believe many of us deal with. Putting work before personal health, family and friends is a zero-sum game that often results in unhappiness. My attempt for continued improvement as a husband, father, superintendent, etc. is a tall mountain to climb, it's a much more enjoyable journey when the work-life balance is brought back to center. Thanks for hearing my story, and best wishes to you and your staff for the remainder of the 2015 golf season.

The Wee One Committee is looking for prizes to be given away at the Wee One Tournament on October 12th. Please consider contacting your golf professional for a club hat, shirt or even golf balls for this event.

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In Bounds

by Jack MacKenzie, CGCS

Recently the MGCSA attended the first annual Pollinator Summit, hosted by the University of Minnesota, at the Minnesota Landscape Arboretum in Chaska. The program was exceptional and focused upon landscaping to enhance habitat for pollinators. It was interesting that habitat took center stage, as opposed to the elimination of specific neonicotinoid insecticides that had been popular recently.

Kudos to the event planning committee for opening their initial session with a reasonable action item that landscapers, campus grounds keepers and golf course superintendents can implement without sacrificing any tools in their box of tricks and techniques. Rather than throw darts at specific chemistries, which may or may not be detrimental to the pollinator population, the committee was very considerate and provided current material to help property managers increase the habitat and food sources to stabilize the declining bee and butterfly communities.

The Minnesota Golf Course Superintendents Association was a participant throughout the process, from the initial informational meeting to providing patron support in the form of nominal funding of five hundred dollars. You helped sponsor this premier program through your membership support. Mentioned in all promotional materials published prior to the event, and also during the day of the program, the MGCSA and golf was prominent. Kudos for your proactive and dedicated stance on a very heated topic.

You also shared table space with two of our greatest business supporters, Bayer Environmental Science and Syngenta, and provided a fine flier touting the pollinator benefits your course offers. Each of these industry giants have begun habitat enhancement programs as they appreciate this is a practical answer to a serious issue. Thank you John Spaulding, Syngenta and Mike Kelly and Frank Wong of Bayer, for your continued endorsements of the MGCSA.

In about a month, the MGCSA

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will again support, both physically and financially, another program held at the Arboretum. The September 15th event, titled the 2015 Clean Water Summit, will be focused upon Green Infrastructure for Clean Water. The gathering will, according to the agenda "explore the role green infrastructure plays in protecting and recharging groundwater, including regional trends, the latest in technologies, and both policy and planning efforts that focus on reconnecting our landscapes to the groundwater system below."

Do these displays do anything for the MGCSA beyond making the organization feel good?

Over the last three and a half years the MGCSA has been aggressively pursuing recognition for its environmental stewardship efforts. You have attended agency and legislative meetings, provided testimony at policy hearings and requested and participated upon several agency committees with the hopes of influencing the direction of policy. You, along with our golf allied associations, have initiated dialogue and hosted meetings with state agencies to attempt and develop a BMP program that would protect your access to water. You have reached out to elected representatives to hear our "great" story. You have supported public forums. Unfortunately, there has been little tangible recognition for all of the efforts- until now.

It would appear that these public actions, as well as our activities with the state agencies, might be paying off. Last week, Jake Schmitz, President of the MGCSA, was invited to participate upon the Minnesota Department of Natural Resource's stakeholder's committee focused upon the negative impacts of withdrawing ground water may have upon surface waters.

The Legislature directed the DNR as follows in the 2015 environmental omnibus bill (emphasis added):

"Sec. 143. NEGATIVE SURFACE WATER IMPACTS; RECOMMENDATIONS. By December 15, 2015, the commissioner of natural resources shall consult with interested stakeholders and submit a report to the Legislative Water Commission and the chairs and ranking minority members of the house of representatives and senate committees and divisions with jurisdiction over the 'environment and

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natural resources policy and finance on recommendations for statutory or rule definitions and thresholds for negative impacts to surface waters as described in Minnesota Statutes, sections 103G.285 and 103G.287, subdivision 2. Stakeholders must include but are not limited to agricultural interests: environmental interests: businesses; community water suppliers: state, Federal, and local agencies: universities; and other interested stakeholders.

The question of what constitutes negative impacts is important because Minnesota Statutes, section 103G.287, states that "groundwater appropriations that will have negative impacts to surface waters are subject to applicable provisions in section 103G.285." Section 103G.285 includes thresholds for negative impacts to various types of surface waters, including natural and altered natural watercourses, water basins, and trout streams (statutory language included as an attachment).

Among the questions this report will address:

- How should we define negative impacts for each type of surface water body (lakes, streams, wetlands)?
- Are there ways to effectively differentiate and categorize surface waters based on sensitivity, within water body type?
- Which parts of 103G.285 (surface water appropriations) are applicable to groundwater appropriations?
- Recommendations for revisions, clarifications, new definitions and requirements.

This effort will help inform DNR's other groundwater management work. Similarly, we also plan to draw insight for this project from our recent Groundwater Management Area planning and the Groundwater Strategic Plan."

Bureaucracy moves slowly, and just when it seemed our professional organization was working hard without any recognition, we get the nod to sit upon a potentially very influential committee. Congratulations, as your persistence may be beginning to pay off. It is an exciting time to belong to such a progressive chapter of the GCSAA. Your support as social activists will lead to positive outcomes for the industry.

Keep up the good work and positive attitude as you impact change in the industry of golf course management.

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Local Entrepreneur Enhances Original Design: Sure Cut LLC

by Jim Lindmeyer, Sure Cut LLC

My wife and I were both born and raised in New Ulm, MN and for the past 35 years have called Hutchinson, MN our home. We have two boys who grew up in Hutchinson and went to college in the Twin Cities where they both live and work.

I always enjoyed looking at items and trying to build a better mouse trap. My first thoughts of ever designing a replaceable cutting blade were the years I spent on our hobby farm. I mowed five acres of grass with a 60" zero-turn mower. Weekly, I would lift up the mower and remove, sharpen and re-install the three blades. To remove the blades, I grabbed my hammer and wrench holding the blade and hitting the wrench until the nut was loose. I dreaded thinking what could happen if the mower fell off the stand while

removing the blades.

Thinking that there had to be a better way, I began the design process. My first drawings of the new designs were in late 2008 at my home. At that time, I worked as a purchasing agent for a large company. In spring of 2009 during the recession I was laid off from my job. I wasn't able to find work, so I accelerated the lawn mower blade design using a local machine shop in my area.

One of the primary designs was forming and machining a tube to accept the plastic cutting blade. After months of trials and testing at my local machine shop, the blade holder was formed.

During my years purchasing resin for the automotive industry I wanted to design an affordable, replaceable cutting blade. I felt plastic would be inexpensive, durable and surely could withstand cutting grass without getting dull. With that thought in mind, I contacted a company that builds molds and produces plastic parts.

After continuous design changes on the first replaceable cutting blade, we field-tested the product with encouraging results. I applied for a utility patent and attended a few trade shows. I knew this product was needed in the industry when the replaceable cutting blade was awarded 1st place in the 2009 NAEDA (North American Equipment Dealers Association) magazine.

After the show I received calls asking for samples from commercial and golf course companies. I re-

ceived disappointing news, as the product only cut grass for a few hours and would not stay sharp as designed. We tried different plastic resin with the same results.

In early 2010 we over laid a flat steel banding material in the plastic and continued field-testing the product again. By this time, it is was do or die for me as samples were sent out again. The banding material held up, but was flat on the cutting edge and tore the grass.

I stopped the business and found a job purchasing steel and other commodities where I work today. I never stopped thinking of this design and knew someday I would find a better steel cutting tip. Long story short, in fall of 2013 we started working and field testing a new cutting blade design with favorable results. The new design has a sharp steel edge harden cutting tip embedded into the plastic blade. This design is tough and stays sharp after many hours of grass cutting.

If you are looking to reduce your overhead costs in labor and shop equipment, I would encourage all reading this article to include the SureCut blade system to there 2016 orders!

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Winterkill In The Crosshairs:
Cultural Considerations for Preparing Greens for Winter

By Sam Bauer, Brian Horgan, Ph.D. and Lindsey Hoffman, Ph.D. University of Minnesota

Editor's note: This is the first of two articles by the authors on turf survival during winter an it originally ran in the Golfdom issue published June of 2014 .

The 2015-2016 winter is just ahead. Depending on your location, conditions may include severe and prolonged freezing temperatures (aka: polar vortex), temperature fluctuations above and below freezing, excessive rainfall followed by freezing temperatures and significant snowfall events from December through March.

With this in mind, it is important to understand the multitude of factors contributing to winter injury and the cultural practices that can be implemented to minimize damage.

The term "winter injury" is a catchall term that refers to damage caused by a number of different factors including crown hydration, anoxia and gas buildup, desiccation, low temperature fungi and freezing temperatures. These factors may act alone or in concert causing damage to plants, and are collectively recognized as winterkill. Regardless of the type or number of stresses affecting the plant, the occurrence of winterkill is directly attributed to death of the turfgrass crown.

Management strategies should

be implemented throughout the year to promote crown survival during and following winter months. This involves minimizing or eliminating conditions that would favor the development of stresses such as crown hydration and anoxia. Consequently, preparing for winter injury should be considered a year-long process that encompasses a number of different cultural practices to promote turfgrass health.

GETTING WINTER READY

Winter hardiness of turfgrasses is achieved through the process of cold acclimation, which is induced by decreases in temperature and light during the fall. During this period of time, turfgrass plants undergo physiological and metabolic changes that allow them to become more tolerant to winter stresses. The process of cold acclimation is influenced by plant genetics (such as the species or cultivar) in combination with environmental conditions (such as temperature and moisture).

Along with cold acclimation, temperature fluctuations during winter and early spring months

(de-acclimation) can also influence the winter injury potential of the turfgrass. Largely, cold acclimation capacity and resistance to early cold de-acclimation is control led by genetics; however, there is potential to increase both of these factors through management strategies to ultimately reduce overall winter injury.

Because of the high degree of species variability that exists on putting greens, turfgrass species becomes the major factor influencing winter injury. For example, creeping bentgrass has excellent winter hardiness compared to annual bluegrass.

Research has shown that differences in winter injury potential between these two species is associated with enhanced cold acclimation capacity of creeping bentgrass along with increased susceptibility of annual bluegrass to early cold de-acclimation (Thompkins et al., 2000, 2004; Hoffman et al., 2014). Therefore, one strategy to minimize winter damage would be to promote creeping bentgrass and reduce annual bluegrass populations.

In some situations this may not be an option. In addition, creeping bentgrass may still be susceptible to winter injury, depending on both plant and environmental factors . Consequently, management of annual bluegrass/creeping bentgrass golf greens should focus on promoting healthy turfgrass plants throughout the year while minimizing conditions that favor the potential for winter injury.

So let's look at a few of the major winter stresses, along with management strategies to prepare greens for winter.

ICE, ICE, BABY

Crown hydration and damage from ice cover are two of the most devastating causes of winter injury on putting greens every year. Crown hydration occurs when temperatures increase, causing plants to absorb water, and results in winter injury if followed by subfreezing temperatures. As a consequence, cells rupture due to the formation of ice crystals and this is lethal for the plant. Damage may also be associated with ice formation outside of cells, causing water to move out of the cells

PHOTO 1
An ice melting study at the University of Minnesota's Turfgrass Research, Outreach and Education Center, conducted this last winter. These manufactured ice blocks were treated with 20 different salt and solar absorption products to evaluate ice melting potential. More detail on this study can be found at: www.turf.umn.edu.

and can cause severe dehydration and /or death of the turfgrass.

Ice cover can also be a contributor to crown hydration as ice melts and then refreezes. In addition, nonporous ice can cause anoxia and/or buildup of toxic gases, mainly CO2, and has been shown to be more injurious to annual bluegrass compared to creeping bentgrass.

Tompkins et al. (2000, 2004) studied the impact of ice encasement, ice cover and snow cover on annual bluegrass in a growth cham

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PHOTO 2
Sod cutters are useful in opening up channels for water flow off putting surfaces prior to winter. Water will often back up at the green/collar interface, therefore extending these channels through the collar and into the green can be important.

and can cause severe dehydration and /or death of the turfgrass.

Ice cover can also be a contributor to crown hydration as ice melts and then refreezes. In addition, nonporous ice can cause anoxia and/or buildup of toxic gases, mainly CO2, and has been shown to be more injurious to annual bluegrass compared to creeping bentgrass.

Tompkins et al. (2000, 2004) studied the impact of ice encasement, ice cover and snow cover on annual bluegrass in a growth chamber and in the field. Annual bluegrass plants did not survive 90 days of ice encasement the growth chamber, whereas creeping bentgrass survived for 150 days. In the field, death of annual bluegrass plants was observed at 75 days of ice cover with damage to creeping bentgrass detected following 90 days of ice cover. These interspecific differenc-

PHOTO 3
A five-inch auger bit being drilled three feet deep by staff at Medina (Minn.) G&CC to promote water infiltration in swales on native soil greens with no drainage. Channels are back-filled with pea gravel.

es in winter injury associated with crown hydration and ice cover may primarily be associated with plant genetics; however, reducing overall moisture on greens prior and during winter may help reduce the incidence of both these stresses.

Golf courses dealing with extended periods of ice cover have lessened the damage by removing or melting the ice. A current study being conducted at the University of Minnesota and Michigan State University is evaluating the ice melting potential of several standard salts, specific ice melt products and solar absorption materials. The greatest melt followed the use of black solar absorption materials (Photo 1); black substances increased surface temperatures by up to seven degrees F. Products included in the solar absorption treatments were: Milorganite (6 -2- 0), Sustane (5-2-10), dyed black sand, Top Cut biosolids and


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BioDac (paper by-product). Phytotoxcity of these products to putting greens is also being evaluated. A more detailed explanation of this study can be found on the University of Minnesota's Turfgrass Science website (www.turf.umn.edu).

LET IT DRAIN

While sometimes impossible to predict and manage, surface and subsurface drainage are important for reducing injury from crown hydration or ice cover. Surface drainage is based on the architecture of the green. Low-lying areas that hold water on the surface have the greatest potential for damage and moving water off of putting surfaces during the spring transition will have the biggest impact on survivability. As such, creating pathways and channels for water to travel is important for reducing damage (Photo 2). These areas should be established prior to winter to allow drainage as spring temperatures increase.

Swales on greens often drain poorly, which can result in excess

surface moisture. Minimizing damage in these areas is much more difficult, but can be promoted by creating openings on the surface in these swales. Deep tine and core-aeration prior to winter help to alleviate damage by standing water in the spring, but the trade-off can be increased desiccation in winters that lack snow cover or in areas prone to drying.

Putting greens built on natural soils with minimal drainage will benefit from augering channels to improve water f low in these swales (Photo 3) and should be filled with pea gravel or other porous materials.

MORE TO CONSIDER

Another important component in improving winter survivability is management of thatch and organic matter. On putting greens with thatch levels exceeding 0.25 inches, crowns may be exposed to fluctuating air temperatures during winter months. In comparison, crowns deeper in the soil profile are buffered against such rapid and sometimes extreme temperature changes. Excessive thatch and organic matter also hold moisture at the surface, leading to winter injury issues associated with crown hydration, ice cover and the snow mold pathogens.

Regular, frequent topdressing of sand-based root zones is required to reduce thatch and organic matter buildup. Sand chosen for topdressing should have a consistent particle size w it h t he existing root zone to minimize layering. For native soil putting greens, it is practical to build up a profile of sand through several years of topdressing, and from a winter injury standpoint this is almost always an improvement. Plant growth regulators, wetting agents and other specialty turf products all have t heir place when preparing putting greens for winter. Generally speaking, products that promote healthy turf throughout the growing season will also be beneficial for the plants during the cold acclimation process. No one program works for every superintendent due to site specifics and climatic variation. With that in mind, be sure to use only those products you are comfortable with and have proven successful for you in the past. Test strips are useful for evaluating new products, and untreated areas for justifying current ones.

Proper Planting Practices Pay-off Big Time

By Faith Applequist, Owner, Tree Quality LLC. Originally printed in the August MNLA Scoop Magazine

I cringe every time I see another 'dead tree' being planted. Most people planting container trees dump them right into the planting hole, thinking they will do just fine. Container trees are best sellers because they are lightweight, cheap and easy to plant.

Fast forward about 8 years. The tree is starting to look sick. The trunk is small for its age, the canopy is dying, and the leaves are small and scorched. You watered it and you planted it in good soil, so what could possibly go wrong? Sometimes homeowners and inexperienced landscapers will the mistake of planting too deeply and/or not correcting for root defects— and end up with roots surrounding the stem, creating a very short lived tree in the landscape.

After removing the container, what do we see? Jeepers' creepers, a mess of circling roots on the outer periphery of the root ball!

I rarely find a good root system in a container tree. Container trees are

WEE ONE MINNESOTA GOLF OUTING AT BRACKETT'S CROSSING COUNTRY CLUB

Supporting those in need

MONDAY, OCTOBER 12, 2015

Lakeville, Minnesota
HOSTS: Tom Proshek,
Superintendent and the MGCSA

$125 per Player / $500 per Team
Four Person Scramble *only one MGCSA member per team necessary*

Great Golf Prizes. On course refreshments. Lunch on the course. Heavy hors d'oeuvres immediately following golf with cash bar reception.

Enter Early. Field is limited to 30 teams (120 players).
Taco Bar @ Brats to go (lunch included in registration fee)
Country Club Attire – Collared Shirts. Soft spikes only.

10:00 - 11:00 a.m.	Registration – Driving Range available
11:00 a.m.	GOLF - Shotgun
4:00 p.m.	Prizes and hors d'oeuvres reception (cash bar).

Contests: Must be present at the reception to win.
Pro Shop Certificates 1st Place $500, 2nd Place Draw $300, 10th Place Draw $160, 18th Place Draw $160, 24th Place $160 Draw
Gross Skins Game - $20 per team The Rock "Go-Pro" Challenge Giant Putt Contest prior to shotgun for $100
Mulligan Purchase: 4 for $20 or 8 for $40
Closest to the pin winners on the Par 3's will draw down for a set of irons.
Featured Raffle Prizes – $5 for 5 tickets or $20 for a LONG arm's length.
Green Egg Outdoor Grill, Golf Clubs, IPAD and MUCH MORE.

---------- PLEASE FILL OUT COMPLETELY - THE DINNER COUNTS ARE IMPORTANT ----------

Name: _____ Course/Company _____

Name: _____ Course/Company _____

Name: _____ Course/Company _____

Name: _____ Course/Company _____

REGISTER: ___GOLFERS @ $125 per Player / $500 per Team (Golf, prizes, refreshments, lunch, hors d'oeuvres) Dinner only $ 75

TOTAL ENCLOSED: $_____

PAYMENT METHOD: _____Check _____Credit Card: ___ VISA ___ MASTERCARD ___ DISCOVER

Name as it appears on credit card: _____

Credit Card Number: _____ Security Code: _____ Expiration Date: _____

Authorized Signature: _____

Make check payable to MGCSA and mail to: MGCSA, 10050 204th Street N., Forest Lake, MN 55025

REGISTRATION DEADLINE: SEPTEMBER 30, 2014

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notorious for creating stem girdling roots. Roots that grow in plastic pots will hit the sides and start circling within it. Once these roots circle, they never leave that pattern. Once in the ground the stem and roots increase in size where they eventually come in contact with each other, which is bad. This can severely affect the tree's health. In fact, there's a thought that many tree failures are now a result of stem girdling roots, which act like a python on the trunk, cutting off the flow of water and nutrients.

What is the proper way to plant?

1. Remove excess soil to expose the first woody root. Don't assume that the root system is at the top of the soil ball.

2. Look closely. The first main order root is revealed. About five inches of soil was removed from top of the root ball. This top root should be visible at the surface after planting.

3. Remove encircling roots by sawing off sides of root ball. This is referred to as a "Box Cut". I know, it seems...wrong. But truly, in the long run, it's going to be better for the tree. Be ruthless. The thing with circling roots is that those little roots will get bigger. You're not killing the tree, you're saving it.

Have You Registered for The Championship? The Fall Shootout? The Wee One?

Join your EM peers for the fall

Equipment Managers Professional Forum

Where:

Club Car Minnesota

3640 Kenebec Drive
Eagan, MN
Hosted by Dan O'Brien

When:

September 23, 2015

8:30 - 9:00 Registration
9:00 - 9:30 Fleet Operations and Service
9:30 - 12:00 Winterizing Your Carts/Business Tour
12:00 - 12:45 Amazing Lunch Break
12:45 - 2:30 EM Open Discussion and Forum

Cost is $15 per person includes lunch, coffee and donuts
RSVP Requested by September 18
MGCSA and Non-MGCSA members are welcome

To Participate Contact:
Jack MacKenzie, Executive Director, MGCSA
jack@mgcsa.org or call 651 324 8873

4. Dig a hole as deep as the distance from bottom of root ball to top of first main order root. Remember you want to plant a tree, not bury it.

5. Carefully place tree in hole making sure it stands straight and top root is at ground level.

6. Backfill hole to top of first woody root. Layer 2”-4” of hardwood mulch over backfilled area, keeping mulch away from the trunk.

Wha-la, a properly planted tree off to a good start in the landscape. When container grown trees are planted at the right depth, with the uppermost roots level with, or even a little bit above the level of the soil and roots are box cut, there is no chance for roots to circle the stem. This way our trees have a chance of life instead of a slow, strangling death.

The MGCSA wishes to thank Faith Applequist and the MNLA for sharing this great information with us.

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The holder of this certificate is entitled to:

A three night stay at

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2014-2015 Snow Mold Fungicide Research Reports

Paul Koch, Ph.D.
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608-262-6531
Assistant Professor
University of Wisconsin-Madison

Research trials were held at 6 sites across the Midwest – Nakoma CC in Madison, WI, Wausau CC in Wausau, WI, Marquette CC in Marquette, MI, Silver Bay CC in Silver Bay, MN, The Legacy at Craguns Resort in Brainerd, MN, and Spring Hill Golf Club in Wayzata, MN. Speckled snow mold was severe at Marquette CC and pink snow mold was severe at Wausau CC, though disease was generally very low or absent at the remaining 4 sites. Only the active sites are in this amended report.

2014-2015 Snow Mold Control Evaluation: Wausau Country Club - Wausau, WI.

Sam Soper, Bruce Schweiger, and Paul Koch, Ph.D.
Department of Plant Pathology
University of Wisconsin-Madison

OBJECTIVE

To evaluate fungicides for the control of Typhula blight (caused by *Typhula ishikariensis* and *T. incarnata*) and Microdochium patch (caused by *Microdochium nivale*).

MATERIALS AND METHODS

This evaluation was conducted at Wausau Country Club in Wausau, WI on a creeping bentgrass (*Agrostis stolonifera*) and annual bluegrass (*Poa annua*) fairway maintained at a height of 0.5 inches. Individual plots measured 3 ft x 10 ft (30 ft^2), and were arranged in a randomized complete block design with four replications. Individual treatments were applied at a nozzle pressure of 40 p.s.i using a CO_2 pressurized boom sprayer equipped with two XR Teejet AI8004 VS nozzles. All fungicides were agitated by hand and applied in the equivalent of 1.5 gallons of water per 1000 ft^2. Early applications were made on October 16th, 2014 and late applications were applied on November 7th, 2014. The experimental plot area was not inoculated. There was consistent snow cover on the experimental area from late November until mid-March, a total of approximately 120 days. Disease severity, turf quality, and color were recorded on March 20th, 2015. Disease severity was visually rated as percent area affected, turfgrass quality was visually rated on a 1-9 scale with 6 being acceptable, and Normalized Difference Vegetative Index (turfgrass color) was rated using a HCS 100 GreenSeeker® from Trimble Navigation Ltd. Treatment means were analyzed using the Waller Duncan method and are presented in Table 1. In addition, surface temperature on the research plot was recorded using a Spectrum Watchdog® datalogger and is presented in Figure 1.

RESULTS AND DISCUSSION

Disease pressure was extremely high at Wausau CC in 2014-2015, with non-treated controls averaging 90.0% disease. Microdochium patch was the primary snow mold observed (90%), though speckled snow mold was also observed. Despite this intense pressure, 104 of the 119 treatments provided exceptional disease suppression and 77 of those treatments allowed less than 2% disease. Nearly all of these treatments contained at least three active ingredients, with some treatments containing four or even five active ingredients. Turf quality closely mirrored disease severity, with 94 of 119 treatments providing acceptable quality (6 or higher). Differences in turf color were observed using the NDVI meter, though most of those differences were due to differences in disease suppression and not the color of non-diseased turf.

Table 1: Mean snow mold severity, turf quality, and turf color assessed on March 20th, 2015 at Wausau CC in Wausau, WI.

Treatment		Rate	Application Timing[a]	Disease Severity[b]	Turf Quality[c]	Turf Color[d]
1	Non-treated control			90.0a	1.5k	0.400s
2	Civitas Harmonizer Topaz	16.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2	Late Late Late	30.0d-h	4.5e-i	0.548d-r
3	Civitas Harmonizer Topaz Droplex	16.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2 10.0 fl oz/a	Late Late Late Late	18.0fgh	5.5b-g	0.565a-o
4	Instrata Droplex	7.5 fl oz/1000 ft2 10.0 fl oz/a	Late Late	0.5h	7.0a-d	0.623a-l
5	Civitas Harmonizer	16.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2	Early/Late Early/Late	55.0cd	3.3h-k	0.465o-s
6	Civitas Harmonizer Secure	16.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Early/Late Early/Late Late	23.8e-h	5.3c-g	0.493m-r
7	Secure	0.5 fl oz/1000 ft2	Late	11.3h	5.5b-g	0.605a-m
8	654-0520 EXP 654-0505	16.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Early/Late Early/Late	62.5bc	2.8ijk	0.443rs
9	654-0520 EXP 654-0505 Secure	16.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Early/Late Early/Late Late	43.8c-f	4.0f-i	0.455p-s
10	654-0520 654-0653	16.0 fl oz/1000 ft2 0.89 fl oz/1000 ft2	Early/Late Early/Late	35.0c-h	4.8d-h	0.490m-r
11	654-0520 654-0653 Secure	16.0 fl oz/1000 ft2 0.89 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Early/Late Early/Late Late	17.5fgh	5.8a-f	0.505l-r
12	Civitas Harmonizer Torque	16.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2 0.6 fl oz/1000 ft2	Early/Late Early/Late Late	6.3h	6.3a-e	0.538f-r
13	Torque	0.6 fl oz/1000 ft2	Late	23.0e-h	5.3c-g	0.628a-l
14	Civitas Harmonizer Instrata	16.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2 11.0 fl oz/1000 ft2	Early/Late Early/Late Late	0.0h	7.3abc	0.540e-r
15	654-0520 EXP 189-43	16.0 fl oz/1000 ft2 1.3 fl oz/1000 ft2	Early/Late Early/Late	47.5cde	3.3h-k	0.533g-r
16	654-0520 EXP 189-43 Secure	16.0 fl oz/1000 ft2 1.3 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Early/Late Early/Late Late	3.8h	6.5a-e	0.530h-r
17	Turfcide Foursome	8.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Late Late	3.8h	6.5a-e	0.585a-n
18	Turfcide Foursome	12.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Late Late	0.0h	7.3abc	0.583a-n
19	Turfcide Foursome	16.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Late Late	3.8h	6.5a-e	0.560b-p

[a]Early fungicide treatments applied on Oct. 16th, 2014 and late treatments applied on Nov. 7th, 2014.
[b]Mean percent diseased area assessed on March 20th, 2015.
[c]Quality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.
[d]Color was assessed using an HCS 100 NDVI GreenSeeker from Trimble Navigation Ltd®.

Table 1 (cont): Mean snow mold severity, turf quality, and turf color assessed on March 20th, 2015 at Wausau CC in Wausau, WI.

Treatment		Rate	Application Timing[a]	Disease Severity[b]	Turf Quality[c]	Turf Color[d]
20	Interface	3.0 fl oz/1000 ft2	Late	0.0h	7.5abc	0.670a-e
	Triton FLO	0.75 fl oz/1000 ft2	Late			
21	Interface	3.0 fl oz/1000 ft2	Late	0.5h	7.3abc	0.625a-l
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
22	Concert II	8.5 fl oz/1000 ft2	Late	7.5h	6.0a-e	0.655a-h
	Banner MAXX II	1.0 fl oz/1000 ft2	Late			
23	Concert II	8.5 fl oz/1000 ft2	Late	0.0h	7.3abc	0.595a-m
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
24	Insignia	0.7 fl oz/1000 ft2	Late	0.5h	7.0a-d	0.680abc
	Trinity	1.0 fl oz/1000 ft2	Late			
25	Insignia	0.7 fl oz/1000 ft2	Late	1.8h	7.0a-d	0.608a-m
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
26	Torque	0.9 fl oz/1000 ft2	Late	0.5h	7.0a-d	0.665a-f
	26/36	4.0 fl oz/1000 ft2	Late			
27	Torque	0.9 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.595a-m
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
28	Chipco 26GT	4.0 fl oz/1000 ft2	Late	61.3bc	2.8ijk	0.520i-r
29	Daconil Weatherstik	5.5 fl oz/1000 ft2	Late	60.0bc	3.3h-k	0.518j-r
30	Chipco 26GT	4.0 fl oz/1000 ft2	Late	3.8h	6.5a-e	0.555b-p
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
31	Daconil Ultrex	5.5 oz/1000 ft2	Late	0.0h	7.3abc	0.588a-m
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
32	Chipco 26GT	4.0 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.550c-q
	Daconil Ultrex	5.5 oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
33	Daconil Weatherstik	2.75 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.598a-m
	Banner MAXX II	1.0 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
34	Daconil Weatherstik	2.75 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.575a-o
	Banner MAXX II	1.5 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
35	Daconil Weatherstik	2.75 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.615a-l
	Banner MAXX II	2.0 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			

[a]Early fungicide treatments applied on Oct. 16th, 2014 and late treatments applied on Nov. 7th, 2014.
[b]Mean percent diseased area assessed on March 20th, 2015.
[c]Quality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.
[d]Color was assessed using an HCS 100 NDVI GreenSeeker from Trimble Navigation Ltd®.

Table 1 (cont): Mean snow mold severity, turf quality, and turf color assessed on March 20th, 2015 at Wausau CC in Wausau, WI.

Treatment		Rate	Application Timing[a]	Disease Severity[b]	Turf Quality[c]	Turf Color[d]
36	Daconil Weatherstik	4.125 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.600a-m
	Banner MAXX II	1.0 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
37	Daconil Weatherstik	4.125 fl oz/1000 ft2	Late	0.0h	7.3abc	0.585a-n
	Banner MAXX II	1.5 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
38	Daconil Weatherstik	4.125 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.605a-m
	Banner MAXX II	2.0 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
39	Daconil Weatherstik	5.5 fl oz/1000 ft2	Late	0.0h	7.3abc	0.595a-m
	Banner MAXX II	1.0 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
40	Daconil Weatherstik	5.5 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.583a-n
	Banner MAXX II	1.5 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
41	Daconil Weatherstik	5.5 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.588a-m
	Banner MAXX II	2.0 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
42	Instrata	9.3 fl oz/1000 ft2	Late	0.0h	7.3abc	0.620a-l
	PAR Plus	0.37 fl oz/1000 ft2	Late			
43	Concert II	8.5 fl oz/1000 ft2	Late	1.3h	7.0a-d	0.630a-k
	Banner MAXX II	1.0 fl oz/1000 ft2	Late			
	PAR	0.37 fl oz/1000 ft2	Late			
44	Concert II	8.5 fl oz/1000 ft2	Late	1.8h	7.0a-d	0.618a-l
	Banner MAXX II	1.0 fl oz/1000 ft2	Late			
	PAR plus	0.37 fl oz/1000 ft2	Late			
45	A13705	4.5 fl oz/1000 ft2	Late	0.0h	7.5abc	0.633a-j
	PAR	0.37 fl oz/1000 ft2	Late			
46	A13705	2.6 fl oz/1000 ft2	Late	0.0h	7.8ab	0.605a-m
	Daconil Weatherstik	5.5 fl oz/1000 ft2	Late			
	PAR	0.37 fl oz/1000 ft2	Late			
47	A13705	4.5 fl oz/1000 ft2	Late	0.0h	7.8ab	0.620a-l
	Daconil Weatherstik	5.5 fl oz/1000 ft2	Late			
	PAR	0.37 fl oz/1000 ft2	Late			
48	A13705	4.5 fl oz/1000 ft2	Late	0.5h	7.0a-d	0.623a-l
	Secure	0.5 fl oz/1000 ft2	Late			
	PAR	0.37 fl oz/1000 ft2	Late			
49	A13705	4.5 fl oz/1000 ft2	Late	0.5h	7.3abc	0.600a-m
	Concert II	4.5 fl oz/1000 ft2	Late			
	PAR	0.37 fl oz/1000 ft2	Late			

[a]Early fungicide treatments applied on Oct. 16th, 2014 and late treatments applied on Nov. 7th, 2014.
[b]Mean percent diseased area assessed on March 20th, 2015.
[c]Quality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.
[d]Color was assessed using an HCS 100 NDVI GreenSeeker from Trimble Navigation Ltd®.

Table 1 (cont): Mean snow mold severity, turf quality, and turf color assessed on March 20th, 2015 at Wausau CC in Wausau, WI.

Treatment		Rate	Application Timing[a]	Disease Severity[b]	Turf Quality[c]	Turf Color[d]
50	A13705 Primo MAXX PAR	4.5 fl oz/1000 ft2 0.2 fl oz/1000 ft2 0.37 fl oz/1000 ft2	Late Late Late	6.3h	6.5a-e	0.600a-m
51	Concert II Banner MAXX II Primo MAXX PAR	8.5 fl oz/1000 ft2 1.0 fl oz/1000 ft2 0.2 fl oz/1000 ft2 0.37 fl oz/1000 ft2	Late Late Late Late	1.3h	7.3abc	0.605a-m
52	Instrata Primo MAXX PAR	9.3 fl oz/1000 ft2 0.2 fl oz/1000 ft2 0.37 fl oz/1000 ft2	Late Late Late	0.0h	7.3abc	0.615a-l
53	Interface Triton FLO	4.0 fl oz/1000 ft2 0.55 fl oz/1000 ft2	Late Late	0.0h	7.3abc	0.645a-i
54	Instrata	11.0 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.630a-k
55	Instrata	10.0 fl oz/1000 ft2	Early/Late	0.0h	7.0a-d	0.595a-m
56	Instrata	9.3 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.628a-l
57	Instrata	7.0 fl oz/1000 ft2	Late	0.5h	7.0a-d	0.613a-l
58	Chipco 26GT Daconil Weatherstik	4.0 fl oz/1000 ft2 5.5 fl oz/1000 ft2	Late Late	10.5h	6.3a-e	0.568a-o
59	Disarm C Chipco 26GT	5.9 fl oz/1000 ft2 4.0 fl oz/1000 ft2	Late Late	1.3h	6.8a-d	0.575a-o
60	Disarm T	0.89 fl oz/1000 ft2	Late	0.0h	7.3abc	0.648a-i
61	Disarm 480 SC Daconil Weatherstik Chipco 26GT	0.36 fl oz/1000 ft2 5.5 fl oz/1000 ft2 4.0 fl oz/1000 ft2	Late Late Late	14.3gh	5.8a-f	0.598a-m
62	Tourney 26/36	0.37 oz/1000 ft2 4.0 fl oz/1000 ft2	Late Late	0.5h	7.0a-d	0.648a-i
63	Tourney 26/36 Spectro	0.37 oz/1000 ft2 4.0 fl oz/1000 ft2 3.5 oz/1000 ft2	Late Late Late	0.5h	7.0a-d	0.640a-j
64	Torque 26/36	0.75 fl oz/1000 ft2 4.0 fl oz/1000 ft2	Late Late	0.0h	7.0a-d	0.663a-g
65	Torque 26/36 Spectro	0.75 fl oz/1000 ft2 4.0 fl oz/1000 ft2 3.5 oz/1000 ft2	Late Late Late	3.8h	6.8a-d	0.643a-j
66	QP Strobe 50 WG QP Enclave Foursome	0.4 oz/1000 ft2 4.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Late Late Late	0.0h	7.3abc	0.633a-j
67	QP Enclave Foursome	6.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Late Late	0.0h	7.5abc	0.643a-j
68	QP Enclave Foursome	8.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Late Late	0.0h	7.5abc	0.640a-j
69	QP Strobe 50 WG QP Tebuconazole Foursome	0.4 oz/1000 ft2 0.6 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Late Late Late	2.5h	6.5a-e	0.645a-i

[a]Early fungicide treatments applied on Oct. 16th, 2014 and late treatments applied on Nov. 7th, 2014.
[b]Mean percent diseased area assessed on March 20th, 2015.
[c]Quality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.
[d]Color was assessed using an HCS 100 NDVI GreenSeeker from Trimble Navigation Ltd®.

Table 1 (cont): Mean snow mold severity, turf quality, and turf color assessed on March 20th, 2015 at Wausau CC in Wausau, WI.

Treatment		Rate	Application Timing[a]	Disease Severity[b]	Turf Quality[c]	Turf Color[d]
70	A20744	0.5 oz/1000 ft2	Late	0.5h	7.5abc	0.648a-i
	A17856	1.09 fl oz/1000 ft2	Late			
	Secure	0.5 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
71	A20744	0.5 oz/1000 ft2	Late	0.0h	7.3abc	0.665a-f
	A17856	1.09 fl oz/1000 ft2	Late			
	Banner MAXX II	2.0 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
72	Secure	0.5 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.628a-l
	A17856	1.09 fl oz/1000 ft2	Late			
	A19188	1.0 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
73	A17856	1.09 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.660a-g
	A19188	1.0 fl oz/1000 ft2	Late			
	Banner MAXX II	2.0 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
74	A18126	0.164 oz/1000 ft2	Late	0.5h	7.0a-d	0.663a-g
	A17856	1.09 fl oz/1000 ft2	Late			
	Secure	0.5 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
75	A18126	0.164 oz/1000 ft2	Late	0.5h	7.0a-d	0.633a-j
	A17856	1.09 fl oz/1000 ft2	Late			
	Banner MAXX II	2.0 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
76	A17856	1.88 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.663a-g
	A19188	1.0 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
77	A17856	1.41 fl oz/1000 ft2	Late	0.5h	7.3abc	0.670a-e
	A19188	0.75 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
78	Instrata	9.3 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.655a-h
	PAR	0.36 fl oz/1000 ft2	Late			
79	Interface	6.0 fl oz/1000 ft2	Late	1.3h	7.0a-d	0.675a-d
	Triton FLO	0.85 fl oz/1000 ft2	Late			
80	A13705	2.6 fl oz/1000 ft2	Late	15.0gh	6.0a-e	0.590a-m
	PAR	0.36 fl oz/1000 ft2	Late			
81	A20744	0.5 oz/1000 ft2	Late	0.0h	7.3abc	0.658a-h
	A13705	2.6 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
82	A17856	1.09 fl oz/1000 ft2	Late	0.0h	7.8ab	0.650a-h
	A13705	2.6 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
83	Secure	0.5 fl oz/1000 ft2	Late	0.0h	7.5abc	0.665a-f
	A13705	2.6 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			

[a]Early fungicide treatments applied on Oct. 16th, 2014 and late treatments applied on Nov. 7th, 2014.
[b]Mean percent diseased area assessed on March 20th, 2015.
[c]Quality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.
[d]Color was assessed using an HCS 100 NDVI GreenSeeker from Trimble Navigation Ltd®.

Table 1 (cont): Mean snow mold severity, turf quality, and turf color assessed on March 20th, 2015 at Wausau CC in Wausau, WI.

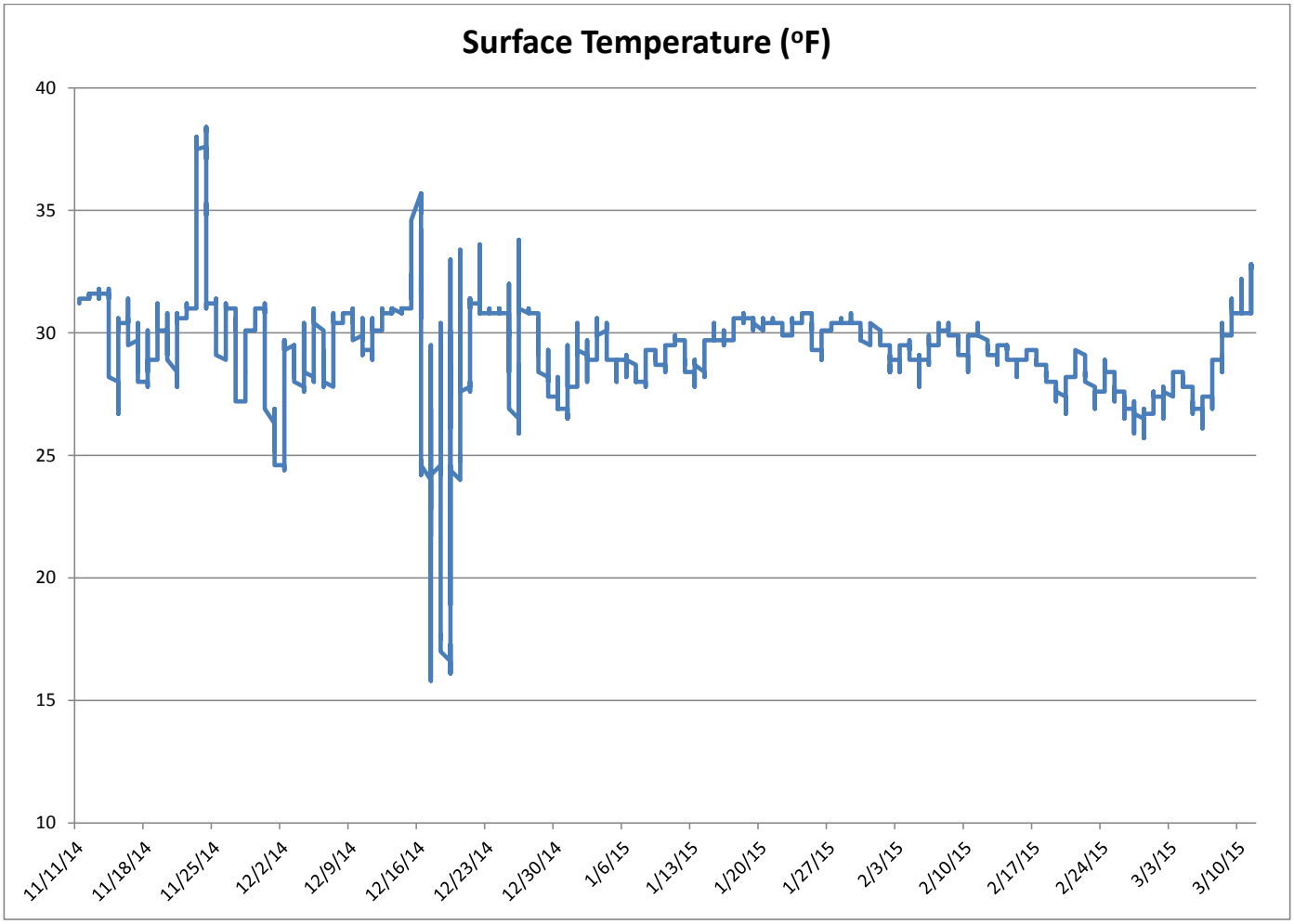
Treatment		Rate	Application Timing[a]	Disease Severity[b]	Turf Quality[c]	Turf Color[d]
84	A13705	2.6 fl oz/1000 ft2	Late	1.0h	7.0a-d	0.645a-i
	Banner MAXX II	2.0 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
85	A13705	2.6 fl oz/1000 ft2	Late	0.0h	7.5abc	0.668a-f
	A19188	1.0 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
86	A18126	0.164 oz/1000 ft2	Late	0.0h	7.5abc	0.645a-i
	A13705	2.6 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
87	Concert II	4.5 fl oz/1000 ft2	Late	0.0h	7.3abc	0.653a-h
	A13705	2.6 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
88	Lexicon	0.34 fl oz/1000 ft2	Late	2.5h	6.5a-e	0.655a-h
	Trinity	1.5 fl oz/1000 ft2	Late			
	Daconil Ultrex	5.0 oz/1000 ft2	Late			
89	Honor	1.1 oz/1000 ft2	Late	3.0h	6.5a-e	0.655a-h
	Trinity	1.5 fl oz/1000 ft2	Late			
	Daconil Ultrex	5.0 oz/1000 ft2	Late			
90	Lexicon	0.34 fl oz/1000 ft2	Late	2.5h	6.8a-d	0.665a-f
	Trinity	1.5 fl oz/1000 ft2	Late			
	Curalan	1.0 oz/1000 ft2	Late			
97	Compass	0.20 oz/1000 ft2	Late	41.3c-g	3.8g-j	0.538f-r
98	Fiata	6.0 fl oz/1000 ft2	Late	1.5h	7.0a-d	0.573a-o
	Turfcide	6.0 fl oz/1000 ft2	Late			
99	Interface	5.0 fl oz/1000 ft2	Late	0.0h	7.8ab	0.685ab
	Mirage	2.0 fl oz/1000 ft2	Late			
100	Interface	4.0 fl oz/1000 ft2	Late	0.0h	7.3abc	0.658a-h
	Mirage	2.0 fl oz/1000 ft2	Late			
101	Interface	5.0 fl oz/1000 ft2	Late	0.0h	7.5abc	0.695a
	Mirage	1.5 fl oz/1000 ft2	Late			
102	Interface	6.0 fl oz/1000 ft2	Late	1.8h	7.0a-d	0.643a-j
	Mirage	2.0 fl oz/1000 ft2	Late			

[a]Early fungicide treatments applied on Oct. 16th, 2014 and late treatments applied on Nov. 7th, 2014.
[b]Mean percent diseased area assessed on March 20th, 2015.
[c]Quality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.
[d]Color was assessed using an HCS 100 NDVI GreenSeeker from Trimble Navigation Ltd®

Table 1 (cont): Mean snow mold severity, turf quality, and turf color assessed on March 20th, 2015 at Wausau CC in Wausau, WI.

Treatment		Rate	Application Timing[a]	Disease Severity[b]	Turf Quality[c]	Turf Color[d]
104	Compass Mirage	0.20 oz/1000 ft2 0.63 fl oz/1000 ft2	Late-Pre1HR Late	0.5h	7.3abc	0.650a-h
105	Compass Mirage	0.20 oz/1000 ft2 0.94 fl oz/1000 ft2	Late-Pre1HR Late	0.0h	7.3abc	0.660a-g
106	Compass Mirage	0.20 oz/1000 ft2 1.57 fl oz/1000 ft2	Late-Pre1HR Late	0.0h	7.0a-d	0.633a-j
107	Compass Mirage	0.20 oz/1000 ft2 1.89 fl oz/1000 ft2	Late-Pre1HR Late	0.0h	7.0a-d	0.650a-h
108	SP102000030109 Mirage	5.0 fl oz/1000 ft2 1.5 fl oz/1000 ft2	Late Late	21.3fgh	5.8a-f	0.588a-m
109	SP102000030109 Mirage	6.0 fl oz/1000 ft2 1.5 fl oz/1000 ft2	Late Late	0.0h	7.0a-d	0.628a-l
110	SP102000030109 Mirage	8.0 fl oz/1000 ft2 1.5 fl oz/1000 ft2	Late Late	0.0h	7.0a-d	0.640a-j
111	SP102000028297 Mirage	4.0 fl oz/1000 ft2 1.5 fl oz/1000 ft2	Late Late	4.3h	6.5a-e	0.658a-h
112	SP102000028297 Mirage	5.0 fl oz/1000 ft2 1.5 fl oz/1000 ft2	Late Late	0.5h	7.5abc	0.665a-f
113	SP102000028297 Mirage	6.0 fl oz/1000 ft2 1.5 fl oz/1000 ft2	Late Late	1.8h	7.0a-d	0.645a-i
114	Tartan	2.0 fl oz/1000 ft2	Late	2.5h	6.5a-e	0.638a-j
115	Trilogy	1.26 fl oz/1000 ft2	Late	18.8fgh	5.3c-g	0.628a-l
116	Trilogy	1.89 fl oz/1000 ft2	Late	7.5h	6.0a-e	0.653a-h
117	Trilogy	2.51 fl oz/1000 ft2	Late	0.5h	7.0a-d	0.605a-m
118	Trilogy	3.14 fl oz/1000 ft2	Late	0.0h	7.3abc	0.658a-h
119	Trilogy	5.56 fl oz/1000 ft2	Late	0.0h	7.0a-d	0.640a-j

[a]Early fungicide treatments applied on Oct. 16th, 2014 and late treatments applied on Nov. 7th, 2014.
[b]Mean percent diseased area assessed on March 20th, 2015.
[c]Quality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.
[d]Color was assessed using an HCS 100 NDVI GreenSeeker from Trimble Navigation Ltd®


Surface Temperature (ºF)
40
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12/2/14
12/9/14
12/16/14
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2/3/15
2/10/15
2/17/15
2/24/15
3/3/15
3/10/15

2014-2015 Snow Mold Control Evaluation
Marquette CC – Marquette, MI

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OBJECTIVE

To evaluate fungicide efficacy for the control of Typhula blight (caused by *Typhula ishikariensis* and *Typhula incarnata*) and Microdochium patch (caused by *Microdochium nivale*).

MATERIALS AND METHODS

This evaluation was conducted at Marquette Country Club in Marquette, MI on a creeping bentgrass (*Agrostis stolonifera*) and annual bluegrass (*Poa annua*) golf course fairway maintained at a height of 0.5 inch. Individual plots measured 3 ft x 10 ft (30 ft^2), and were arranged in a randomized complete block design with four replications. Individual treatments were applied at a nozzle pressure of 40 p.s.i using a CO_2 pressurized boom sprayer equipped with two XR Teejet AI8004 VS nozzles. All fungicides were agitated by hand and applied in the equivalent of 1.5 gallons of water per 1000 ft^2. Early applications were made on October 6th, 2014 and late applications were applied on November 4th, 2014. The experimental plot area was not inoculated. There was consistent snow cover on the experimental area from early-November until mid-March and then again until mid-April, a total of approximately 120 days. Disease severity, turf quality, and color were recorded on April 15th, 2015. Disease severity was visually rated as percent area affected, turfgrass quality was visually rated on a 1-9 scale with 6 being acceptable, and Normalized Difference Vegetative Index (turfgrass color) was rated using a HCS 100 GreenSeeker® from Trimble Navigation Ltd (Sunnyvale, CA). Treatment means were analyzed using the Waller Duncan method and are presented in Table 1. In addition, surface temperature on the research plot was recorded using a Spectrum Watchdog® data logger and is presented in Figure 1.

RESULTS AND DISCUSSION

Disease pressure was extremely high at Marquette GC in 2014-2015, with non-treated controls averaging 94% disease. Speckled snow mold was the primary disease observed in the experimental area (90%), though pink snow mold was also observed. Despite this intense pressure, 80 of the 101 treatments provided significant disease suppression relative to the non-treated control and 62 of those provided excellent suppression under harsh conditions (<10%). Nearly all of these treatments contained at least three active ingredients, with some treatments containing four or even five active ingredients. Turf quality closely mirrored disease severity, with 64 treatments providing a mean quality rating of 6 or higher. No differences in turf color were observed using the NDVI meter amongst products providing adequate disease suppression.

Table 1: Mean snow mold severity, turf quality, and turf color assessed on April 15th, 2015 at Marquette CC in Marquette, MI.

Treatment		Rate	Application Timing[a]	Disease Severity[b]	Turf Quality[c]	Turf Color[d]
1	Non-treated control			94.0a	1.3m	0.295t
2	Civitas Harmonizer Topaz	16.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2	Late Late Late	65.0a-g	2.8h-m	0.405k-t
3	Civitas Harmonizer Topaz Droplex	16.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2 10.0 fl oz/a	Late Late Late Late	62.5a-h	3.0g-m	0.433h-r
4	Instrata Droplex	9.0 fl oz/1000 ft2 10.0 fl oz/a	Late Late	1.3l	7.5ab	0.603a
5	Civitas Harmonizer	16.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2	Early/Late Early/Late	67.5a-f	2.8h-m	0.385n-t
6	Civitas Harmonizer Secure	16.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Early/Late Early/Late Late	71.3a-e	2.3j-m	0.390m-t
7	Secure	0.5 fl oz/1000 ft2	Late	78.8a-d	2.0j-m	0.430h-r
8	654-0520 EXP 654-0505	16.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Early/Late Early/Late	77.5a-d	2.0j-m	0.388m-t
9	654-0520 EXP 654-0505 Secure	16.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Early/Late Early/Late Late	71.3a-e	2.3j-m	0.3680-t
10	654-0520 654-0653	16.0 fl oz/1000 ft2 0.89 fl oz/1000 ft2	Early/Late Early/Late	68.8a-f	2.3j-m	0.373o-t
11	654-0520 654-0653 Secure	16.0 fl oz/1000 ft2 0.89 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Early/Late Early/Late Late	75.0a-e	2.3j-m	0.380n-t
12	Civitas Harmonizer Torque	16.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2 0.6 fl oz/1000 ft2	Early/Late Early/Late Late	37.5e-l	4.5b-l	0.433h-r
13	Torque	0.6 fl oz/1000 ft2	Late	90.3ab	1.3m	0.328q-t
14	Civitas Harmonizer Instrata	16.0 fl oz/1000 ft2 1.0 fl oz/1000 ft2 11.0 fl oz/1000 ft2	Early/Late Early/Late Late	1.3l	7.5ab	0.510a-l
15	654-0520 EXP 189-43	16.0 fl oz/1000 ft2 1.3 fl oz/1000 ft2	Early/Late Early/Late	81.3a-d	2.0j-m	0.425i-r
16	654-0520 EXP 189-43 Secure	16.0 fl oz/1000 ft2 1.3 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Early/Late Early/Late Late	51.3b-j	3.3f-m	0.443f-q
17	Turfcide Foursome	8.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Late Late	15.0jkl	5.5a-h	0.543a-i
18	Turfcide Foursome	12.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Late Late	5.0l	6.5a-d	0.560a-f
19	Turfcide Foursome	16.0 fl oz/1000 ft2 0.5 fl oz/1000 ft2	Late Late	7.3l	6.3a-e	0.558a-g

[a]Early fungicide treatments were applied on Oct. 6th, 2014 and late treatments were applied on Nov. 4th, 2014.
[b]Mean percent diseased area assessed on April 15th, 2015.

Table 1 (cont): Mean snow mold severity, turf quality, and turf color assessed on April 15th, 2015 at Marquette CC in Marquette, MI.

Treatment		Rate	Application Timing[a]	Disease Severity[b]	Turf Quality[c]	Turf Color[d]
20	Interface	3.0 fl oz/1000 ft2	Late	17.5i-l	6.0a-f	0.563a-f
	Triton FLO	0.75 fl oz/1000 ft2	Late			
21	Interface	3.0 fl oz/1000 ft2	Late	1.3l	7.5ab	0.590ab
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
22	Concert II	8.5 fl oz/1000 ft2	Late	5.0l	6.8a-d	0.540a-i
	Banner MAXX II	1.0 fl oz/1000 ft2	Late			
23	Concert II	8.5 fl oz/1000 ft2	Late	0.0l	8.0a	0.555a-g
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
24	Insignia	0.7 fl oz/1000 ft2	Late	75.0a-e	2.0j-m	0.435g-r
	Trinity	1.0 fl oz/1000 ft2	Late			
25	Insignia	0.7 fl oz/1000 ft2	Late	0.0l	8.0a	0.593ab
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
26	Torque	0.9 fl oz/1000 ft2	Late	2.5l	7.0abc	0.550a-h
	26/36	4.0 fl oz/1000 ft2	Late			
27	Torque	0.9 fl oz/1000 ft2	Late	0.0l	8.0a	0.563a-f
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
28	Chipco 26GT	4.0 fl oz/1000 ft2	Late	82.0a-d	1.8klm	0..383n-t
29	Daconil Weatherstik	5.5 fl oz/1000 ft2	Late	90.0ab	1.3m	0.325rst
30	Chipco 26GT	4.0 fl oz/1000 ft2	Late	5.5l	6.8a-d	0.585abc
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
31	Daconil Ultrex	5.5 oz/1000 ft2	Late	0.0l	8.0a	0.568a-f
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
32	Chipco 26GT	4.0 fl oz/1000 ft2	Late	0.0l	8.0a	0.565a-f
	Daconil Ultrex	5.5 oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
33	Daconil Weatherstik	2.75 fl oz/1000 ft2	Late	0.0l	8.0a	0.580a-d
	Banner MAXX II	1.0 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
34	Daconil Weatherstik	2.75 fl oz/1000 ft2	Late	0.0l	8.0a	0.558a-g
	Banner MAXX II	1.5 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
35	Daconil Weatherstik	2.75 fl oz/1000 ft2	Late	0.0l	8.0a	0.565a-f
	Banner MAXX II	2.0 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			

[a]Early fungicide treatments were applied on Oct. 6th, 2014 and late treatments were applied on Nov. 4th, 2014.
[b]Mean percent diseased area assessed on April 15th, 2015.
[c]Quality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.
[d]Color was assessed using an HCS 100 NDVI GreenSeeker from Trimble Navigation Ltd®.

Table 1 (cont): Mean snow mold severity, turf quality, and turf color assessed on April 15th, 2015 at Marquette CC in Marquette, MI.

Treatment		Rate	Application Timing[a]	Disease Severity[b]	Turf Quality[c]	Turf Color[d]
36	Daconil Weatherstik	4.125 fl oz/1000 ft2	Late	0.0l	8.0a	0.593ab
	Banner MAXX II	1.0 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
37	Daconil Weatherstik	4.125 fl oz/1000 ft2	Late	0.5l	7.8ab	0.533a-j
	Banner MAXX II	1.5 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
38	Daconil Weatherstik	4.125 fl oz/1000 ft2	Late	0.0l	8.0a	0.585abc
	Banner MAXX II	2.0 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
39	Daconil Weatherstik	5.5 fl oz/1000 ft2	Late	0.0l	8.0a	0.580a-d
	Banner MAXX II	1.0 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
40	Daconil Weatherstik	5.5 fl oz/1000 ft2	Late	0.5l	7.8ab	0.558a-g
	Banner MAXX II	1.5 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
41	Daconil Weatherstik	5.5 fl oz/1000 ft2	Late	0.0l	8.0a	0.578a-d
	Banner MAXX II	2.0 fl oz/1000 ft2	Late			
	Turfcide	8.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
42	Instrata	9.3 fl oz/1000 ft2	Late	0.5l	7.8ab	0.573a-e
	PAR Plus	0.37 fl oz/1000 ft2	Late			
43	Concert II	8.5 fl oz/1000 ft2	Late	3.5l	6.5a-d	0.523a-j
	Banner MAXX II	1.0 fl oz/1000 ft2	Late			
	PAR	0.37 fl oz/1000 ft2	Late			
44	Concert II	8.5 fl oz/1000 ft2	Late	32.5f-l	4.8a-k	0.488a-n
	Banner MAXX II	1.0 fl oz/1000 ft2	Late			
	PAR plus	0.37 fl oz/1000 ft2	Late			
45	A13705	4.5 fl oz/1000 ft2	Late	2.5l	7.5ab	0.595a
	PAR	0.37 fl oz/1000 ft2	Late			
46	A13705	2.6 fl oz/1000 ft2	Late	47.5c-k	4.5b-l	0.495a-n
	Daconil Weatherstik	5.5 fl oz/1000 ft2	Late			
	PAR	0.37 fl oz/1000 ft2	Late			
47	A13705	4.5 fl oz/1000 ft2	Late	0.0l	8.0a	0.598a
	Daconil Weatherstik	5.5 fl oz/1000 ft2	Late			
	PAR	0.37 fl oz/1000 ft2	Late			
48	A13705	4.5 fl oz/1000 ft2	Late	1.3l	7.5ab	0.575a-e
	Secure	0.5 fl oz/1000 ft2	Late			
	PAR	0.37 fl oz/1000 ft2	Late			
49	A13705	4.5 fl oz/1000 ft2	Late	0.0l	8.0a	0.563a-f
	Concert II	4.5 fl oz/1000 ft2	Late			
	PAR	0.37 fl oz/1000 ft2	Late			

[a]Early fungicide treatments were applied on Oct. 6th, 2014 and late treatments were applied on Nov. 4th, 2014.
[b]Mean percent diseased area assessed on April 15th, 2015.
[c]Quality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.
[d]Color was assessed using an HCS 100 NDVI GreenSeeker from Trimble Navigation Ltd®.

Table 1 (cont): Mean snow mold severity, turf quality, and turf color assessed on April 15th, 2015 at Marquette CC in Marquette, MI.

Treatment		Rate	Application Timing[a]	Disease Severity[b]	Turf Quality[c]	Turf Color[d]
50	A13705	4.5 fl oz/1000 ft2	Late	1.8l	7.3ab	0.565a-f
	Primo MAXX	0.2 fl oz/1000 ft2	Late			
	PAR	0.37 fl oz/1000 ft2	Late			
51	Concert II	8.5 fl oz/1000 ft2	Late	8.0l	6.3a-e	0.493a-n
	Banner MAXX II	1.0 fl oz/1000 ft2	Late			
	Primo MAXX	0.2 fl oz/1000 ft2	Late			
	PAR	0.37 fl oz/1000 ft2	Late			
52	Instrata	9.3 fl oz/1000 ft2	Late	0.5l	7.5ab	0.543a-i
	Primo MAXX	0.2 fl oz/1000 ft2	Late			
	PAR	0.37 fl oz/1000 ft2	Late			
53	Interface	4.0 fl oz/1000 ft2	Late	54.3a-i	3.5e-m	0.460b-p
	Triton FLO	0.55 fl oz/1000 ft2	Late			
54	Instrata	11.0 fl oz/1000 ft2	Late	0.0l	7.5ab	0.568a-f
55	Instrata	10.0 fl oz/1000 ft2	Early/Late	0.0l	7.3ab	0.603a
56	Disarm C	5.9 fl oz/1000 ft2	Late	2.5l	6.5a-d	0.603a
	Chipco 26GT	4.0 fl oz/1000 ft2	Late			
57	Disarm T	0.89 fl oz/1000 ft2	Late	0.0l	7.5ab	0.583abc
58	Disarm 480 SC	0.36 fl oz/1000 ft2	Late	5.5l	6.3a-e	0.540a-i
	Daconil Weatherstik	5.5 fl oz/1000 ft2	Late			
	Chipco 26GT	4.0 fl oz/1000 ft2	Late			
59	Tourney	0.37 oz/1000 ft2	Late	3.0l	6.8a-d	0.543a-i
	26/36	4.0 fl oz/1000 ft2	Late			
60	Tourney	0.37 oz/1000 ft2	Late	0.5l	7.5ab	0.590ab
	26/36	4.0 fl oz/1000 ft2	Late			
	Spectro	3.5 oz/1000 ft2	Late			
61	Torque	0.75 fl oz/1000 ft2	Late	3.0l	7.3ab	0.588ab
	26/36	4.0 fl oz/1000 ft2	Late			
62	Torque	0.75 fl oz/1000 ft2	Late	0.0l	7.5ab	0.570a-f
	26/36	4.0 fl oz/1000 ft2	Late			
	Spectro	3.5 oz/1000 ft2	Late			
63	QP Strobe 50 WG	0.4 oz/1000 ft2	Late	0.0l	8.0a	0.598a
	QP Enclave	4.0 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
64	QP Enclave	6.0 fl oz/1000 ft2	Late	0.0l	8.0a	0.575a-e
	Foursome	0.5 fl oz/1000 ft2	Late			
65	QP Enclave	8.0 fl oz/1000 ft2	Late	0.5l	7.8ab	0.580a-d
	Foursome	0.5 fl oz/1000 ft2	Late			
66	QP Strobe 50 WG	0.4 oz/1000 ft2	Late	32.5f-l	4.5b-l	0.520a-k
	QP Tebuconazole	0.6 fl oz/1000 ft2	Late			
	Foursome	0.5 fl oz/1000 ft2	Late			
67	A20744	0.5 oz/1000 ft2	Late	0.0l	8.0a	0.605a
	A17856	1.09 fl oz/1000 ft2	Late			
	Secure	0.5 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			

[a]Early fungicide treatments were applied on Oct. 6th, 2014 and late treatments were applied on Nov. 4th, 2014.
[b]Mean percent diseased area assessed on April 15th, 2015.
[c]Quality was visually assessed where 1 = dead, 6 = acceptable, 9 = dark green.
[d]Color was assessed using an HCS 100 NDVI GreenSeeker from Trimble Navigation Ltd®.

Table 1 (cont): Mean snow mold severity, turf quality, and turf color assessed on April 15th, 2015 at Marquette CC in Marquette, MI.

Treatment		Rate	Application Timing[a]	Disease Severity[b]	Turf Quality[c]	Turf Color[d]
68	A20744	0.5 oz/1000 ft2	Late	1.3l	7.3ab	0.573a-e
	A17856	1.09 fl oz/1000 ft2	Late			
	Banner MAXX II	2.0 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
69	Secure	0.5 fl oz/1000 ft2	Late	0.0l	7.8ab	0.613a
	A17856	1.09 fl oz/1000 ft2	Late			
	A19188	1.0 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
70	A17856	1.09 fl oz/1000 ft2	Late	0.0l	7.8ab	0.565a-f
	A19188	1.0 fl oz/1000 ft2	Late			
	Banner MAXX II	2.0 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
71	A18126	0.164 oz/1000 ft2	Late	0.5l	7.8ab	0.600a
	A17856	1.09 fl oz/1000 ft2	Late			
	Secure	0.5 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
72	A18126	0.164 oz/1000 ft2	Late	0.0l	7.5ab	0.588ab
	A17856	1.09 fl oz/1000 ft2	Late			
	Banner MAXX II	2.0 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
73	A17856	1.88 fl oz/1000 ft2	Late	0.5l	7.5ab	0.613a
	A19188	1.0 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
74	A17856	1.41 fl oz/1000 ft2	Late	0.5l	7.5ab	0.603a
	A19188	0.75 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
75	Instrata	9.3 fl oz/1000 ft2	Late	0.0l	8.0a	0.575a-e
	PAR	0.36 fl oz/1000 ft2	Late			
76	Interface	6.0 fl oz/1000 ft2	Late	25.0h-l	5.0a-j	0.520a-k
	Triton FLO	0.85 fl oz/1000 ft2	Late			
77	A13705	2.6 fl oz/1000 ft2	Late	17.5i-l	5.5a-h	0.548a-h
	PAR	0.36 fl oz/1000 ft2	Late			
78	A20744	0.5 oz/1000 ft2	Late	25.0h-l	5.5a-h	0.548a-h
	A13705	2.6 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
79	A17856	1.09 fl oz/1000 ft2	Late	1.0l	7.5ab	0.613a
	A13705	2.6 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
80	Secure	0.5 fl oz/1000 ft2	Late	1.3l	7.5ab	0.580a-d
	A13705	2.6 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
81	A13705	2.6 fl oz/1000 ft2	Late	11.3kl	6.0a-f	0.568a-f
	Banner MAXX II	2.0 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
82	A13705	2.6 fl oz/1000 ft2	Late	5.0l	6.8a-d	0.578a-d
	A19188	1.0 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			

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Table 1 (cont): Mean snow mold severity, turf quality, and turf color assessed on April 15th, 2015 at Marquette CC in Marquette, MI.

Treatment		Rate	Application Timing[a]	Disease Severity[b]	Turf Quality[c]	Turf Color[d]
83	A18126	0.164 oz/1000 ft2	Late	7.5l	6.5a-d	0.558a-g
	A13705	2.6 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
84	Concert II	4.5 fl oz/1000 ft2	Late	1.3l	7.5ab	0.578a-d
	A13705	2.6 fl oz/1000 ft2	Late			
	PAR	0.36 fl oz/1000 ft2	Late			
85	Lexicon	0.34 fl oz/1000 ft2	Late	44.3d-l	4.0c-m	0.480a-o
	Trinity	1.5 fl oz/1000 ft2	Late			
	Daconil Ultrex	5.0 oz/1000 ft2	Late			
86	Honor	1.1 oz/1000 ft2	Late	28.8g-l	4.5b-l	0.503a-m
	Trinity	1.5 fl oz/1000 ft2	Late			
	Daconil Ultrex	5.0 oz/1000 ft2	Late			
87	Lexicon	0.34 fl oz/1000 ft2	Late	67.5a-f	2.5i-m	0.450d-p
	Trinity	1.5 fl oz/1000 ft2	Late			
	Curalan	1.0 oz/1000 ft2	Late			
88	Interface	6.0 fl oz/1000 ft2	Late	2.5l	7.5ab	0.563a-f
	Mirage	1.5 fl oz/1000 ft2	Late			
89	Interface	6.0 fl oz/1000 ft2	Late	2.5l	7.5ab	0.555a-g
	Mirage	2.0 fl oz/1000 ft2	Late			
90	Mirage	2.0 fl oz/1000 ft2	Late	0.0l	8.0a	0.583abc
	Interface	6.0 fl oz/1000 ft2	Late			
	Daconil Ultrex	3.67 oz/1000 ft2	Late			
91	SP102000030109	5.0 fl oz/1000 ft2	Late	27.5h-l	4.5b-l	0.493a-n
	Mirage	2.0 fl oz/1000 ft2	Late			
92	SP102000030109	6.0 fl oz/1000 ft2	Late	56.3a-h	3.0g-m	0.455c-p
	Mirage	2.0 fl oz/1000 ft2	Late			
93	SP102000030109	8.0 fl oz/1000 ft2	Late	58.8a-h	3.3f-m	0.448e-p
	Mirage	2.0 fl oz/1000 ft2	Late			
94	SP102000028297	4.0 fl oz/1000 ft2	Late	90.0ab	1.3m	0.398l-t
	Mirage	2.0 fl oz/1000 ft2	Late			
95	SP102000028297	5.0 fl oz/1000 ft2	Late	88.3ab	1.5lm	0.365o-t
	Mirage	2.0 fl oz/1000 ft2	Late			
96	SP102000028297	6.0 fl oz/1000 ft2	Late	75.0a-e	2.0j-m	0.418j-s
	Mirage	2.0 fl oz/1000 ft2	Late			
97	Tartan	2.0 fl oz/1000 ft2	Late	43.8d-l	3.8d-m	0.490a-n
98	Tartan	2.0 fl oz/1000 ft2	Late	26.3h-l	5.3a-i	0.513a-l
	Mirage	2.0 fl oz/1000 ft2	Late			
99	Tartan	1.0 fl oz/1000 ft2	Late	17.5i-l	5.5a-h	0.533a-j
	Mirage	2.0 fl oz/1000 ft2	Late			
	Interface	3.0 fl oz/1000 ft2	Late			
100	Tartan	1.0 fl oz/1000 ft2	Late	6.3l	6.8a-d	0.605a
	Mirage	2.0 fl oz/1000 ft2	Late			
	Interface	5.0 fl oz/1000 ft2	Late			
101	Tartan	1.0 fl oz/1000 ft2	Late	1.8l	7.3ab	0.570a-f
	Mirage	2.0 fl oz/1000 ft2	Late			
	Interface	3.0 fl oz/1000 ft2	Late			
	Fiata	4.0 fl oz/1000 ft2	Late			

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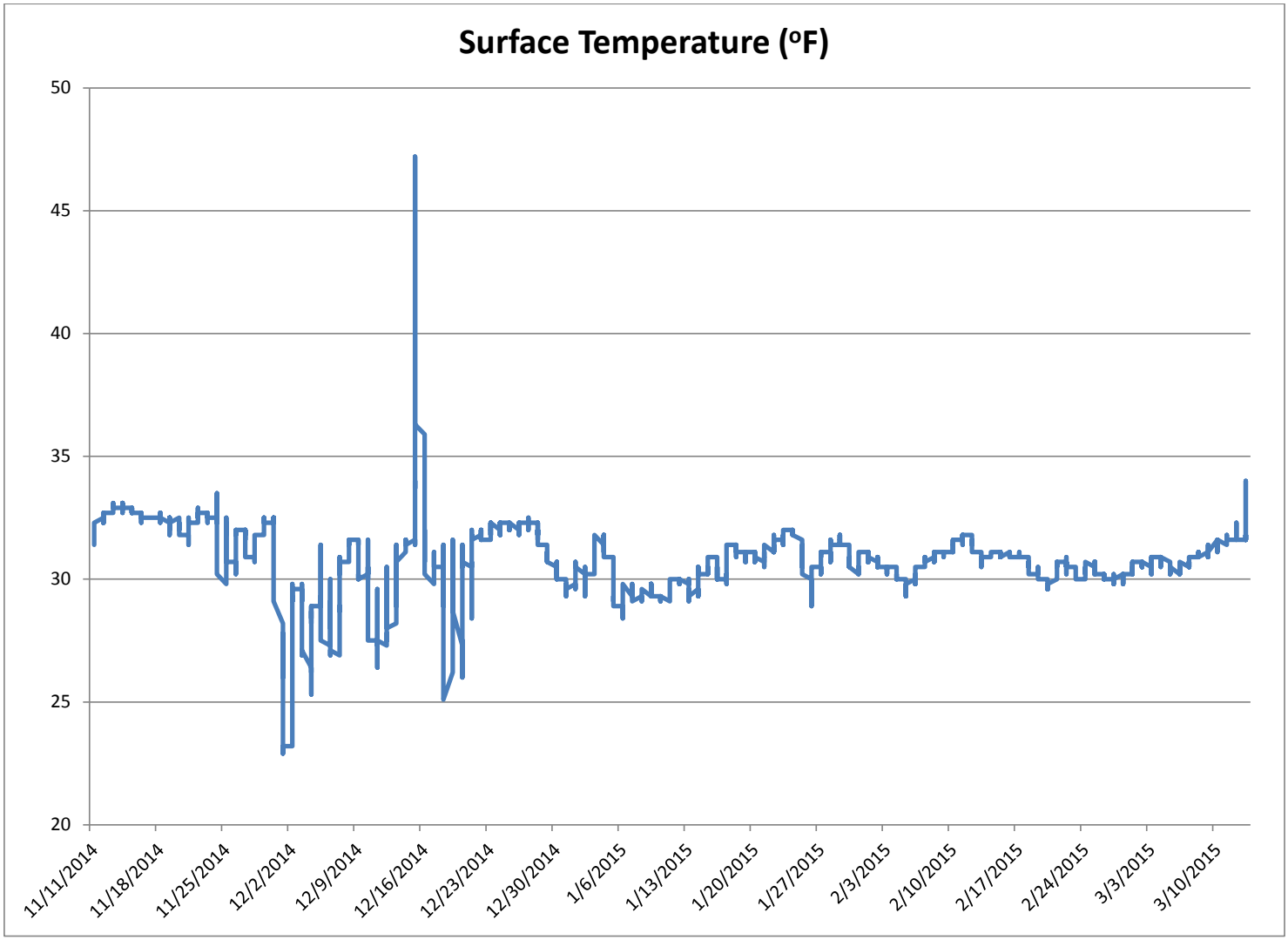

The membership of the Minnesota Golf Course Superintendents' Association wish to thank the University of Wisconsin, Madison, turfgrass pathology research team of Dr. Paul Koch, Sam Soper and Bruse Schweiger, for their dedication to snow mold studies. Although it is always a "hit or miss" endeavor, with varying amounts of diseases pressure, superintendents in the upper mid-west are pleased that Snow Mold Control Evaluations are conducted across a wide range of territory.

As Minnesota superintendents prepare to apply a one-time annually insurance policy against snow mold diseases, your research is very appreciated.

MGCSA Affiliate Spotlight:

With a rich history of innovation at its foundation, Syngenta continually develops products that have a significant impact on the golf industry. With its dedication to research and development (R&D), complemented by a robust and experienced team of agronomic experts in the field, Syngenta is able to provide golf course superintendents around the world with groundbreaking solutions that improve playability and increase productivity.

Innovations from Syngenta and legacy companies go back multiple decades with the launch of Daconil® fungicide in 1967, and Primo® plant growth regulator in 1992. Both were revolutionary products that are still cornerstone tools for managing turf today. Over the years, Syngenta continues to enhance products to improve formulations, discover new uses and to provide additional benefits for superintendents.

To develop cutting-edge turf and landscape products, Syngenta devotes a significant amount of time and resources to R&D. In 2014, the company invested $1.43 billion globally. This commitment allows Syngenta to continuously provide superintendents with top-of-the-line products for disease, insect and weed control, as well as plant growth regulation.

The quality of Syngenta products is supported by a well-trained, passionate agronomic team of experts that are dedicated to understanding the needs and concerns of their customers. Made up of more than 1,000 years of collective industry experience developing and marketing products for turf and landscape,

Syngenta is the ideal industry partner. Syngenta employees have walked in the shoes of golf course superintendents, green keepers, sports turf managers and lawn care operators, which gives them unbeatable first-hand knowledge. With this level of experience, Syngenta is able to develop innovative products that are tailored to meet industry needs.

Syngenta has continued its legacy of innovation with the launch of four additional products in less than a year, which include Appear® fungicide, Ference® insecticide, Heritage Action™ fungicide and Velista™ fungicide. These offerings join the ranks of other Syngenta products that have made significant contributions to the turf maintenance industry, such as Heritage™ and Secure® fungicides.

Not only does Syngenta offer great products but they are also a leader and advocate

for turf management professionals on and off the course. One example is the Syngenta Business Institute (SBI), which offers golf course superintendents the opportunity to improve their business acumen and leadership skills through a three-day executive training program. Another notable initiative is Operation Pollinator, a program that provides expertise to ensure pollinating insects thrive while providing golf course superintendents resources to promote their positive efforts to their customers and community. Syngenta also gives back to the industry as Gold Partner level sponsors of the GCSAA and through support of organizations such as the Wee One Foundation, a group that provides financial support for superintendents and their families when medical needs arise.

For additional information or to find your local Syngenta rep, visit GreenCastOnline.com.

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2015 MGCSA Shoot Out Mixer!

Thursday, September 17 at the Horse and Hunt Club

http://www.horseandhunt.com/

Event Cost: $45.00 **RSVP by September 3**

Additional costs include ammunition, along with gun rental if you or your team can not provide a gun. It is suggested to buy your own ammo before hand at your local gun supply store.

To even the field, each team will be assigned an "experienced, level 5" shooter, if available. Either make your team of four shooters and you will be assigned a "level 5", make your own team of five total or teams will be created based upon ranking. We are shooting (no pun intended) for 20 teams of 5 shooters on each team.

9:30 – 10:00 a.m.	Registration
10:00 – 11:00 a.m.	Get A Buzz On Your Course; Bee Keeping a - z
	Presenter Dr. Becky Masterman, UMN B-Squad
11:00 – 12:00 noon	Lunch
12:00 – 3:00 p.m.	Sporting Clay Shoot

PLEASE CIRCLE YOUR EXPERIENCE LEVEL. "1" IS A BEGINNER AND "5" IS AN EXPERT

Name:_____Course / Co._____Experience Level: 1 2 3 4 5 Gun: Yes No

Name:_____Course / Co._____Experience Level: 1 2 3 4 5 Gun: Yes No

Name:_____Course / Co._____Experience Level: 1 2 3 4 5 Gun: Yes No

Name:_____Course / Co._____Experience Level: 1 2 3 4 5 Gun: Yes No

Name:_____Course / Co._____Experience Level: 1 2 3 4 5 Gun: Yes No

Please register _____person(s) at $45 ea. For a total of $_____

PAYMENT METHOD: _____Check _____Credit Card: ___ VISA ___ MASTER ___ DISCOVER

Name exactly how it appears on credit card: _____

Credit Card Number: _____ Security Code: _____ Expiration Date: _____

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FALL MIXER 10050 204th Street North, Forest Lake, MN 55025

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(Opening Keynote)

The official kick-off for the Northern Green Expo, the keynote speaker always packs a punch! The 2016 keynote speaker, Dennis Snow, led Walt Disney's customer service for 20 years and will discuss why creating a culture of customer service is imperative no matter where you work or what you do.

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Three days to visit with your suppliers in a dedicated environment. Check out the Expo hall–which boasts nearly 1,000 booths–and talk to all the industry players in one place at one time.

Register today! Use the code MGCSA2016 before November 1 to receive a 10% discount on your registration fees!

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Within the Leather

by David Kazmierczak, CGCS

Dad Gummit, I forgot. You know how sometimes you forget? I forgot.

So at that very moment I step on the accelerator on my electric Club Car, trying to coax a few extra miles per hour out of a vehicle that has been programed not to give it to me. I press hard on the pedal because that will somehow make it go faster. Why don't you just pick up the phone and call you might ask? Well, that works really well unless you just left it in the office.

Barreling into the shop yard I see my assistant and spray tech putting water into their respective tanks for first rinse. I'm too late.

"Don't suppose you happened to tank out the little berm that's getting eaten up…," I started until interrupted by my assistant.

"By dollar spot on 15?" he blurted out glowingly. "Sure did!"

I raise my arms triumphantly, thumbs extended high into the sky. It was a grand moment, not just because the little ugly spot got treated and not just because my absent-mindedness on both the initial forgot to tell you, but the oops left phone in office as well had been trumped. More so, it was because my assist had been perceptive. His mind was thinking like mine, which is what we all strive for in all of our employees, but especially our assistants.

It left me with almost a warm, fuzzy feeling, like you get after the quarterback you put money on throws that oh-by-

the-way meaningless touchdown with 13 seconds left to cover a double-digit spread. But I digress.

Crisis resolved, I walk into the office where aforementioned assistant is now standing. After some bantering I start to go over some irrigation issues.

"Check out this and that," I said, as a few dry areas were starting to pop up after a rare seven days of no rain this year. "Oh, and take a look at the front right bank head on number eleven. I popped it up this morning and it looks like it is off. There is a big dry spot on the bank that is not usually there."

"Oh yea, I noticed that last week or whenever when we were watering in something," he said with a nonchalantness that about knocked me over.

"Really," I said a bit astonished. "Any plans on relating this to me or writing it on the board?"

"Yea I kind of spaced that off, sorry," he said. "I'll get right on it. Do you want me to fix the head on six first?"

"What head on six?" I said.

"Well there was a stuck head on six tee yesterday and I isolated the tee complex. That's why I asked you (in the evening after we had all left) if you were watering as you said no." he said.

!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

"I changed my mind!" I said, blood now boiling. "So you are telling me that none of six tee ran last night, not that the stuck head area needed anything but the rest certainly does."

"Yes," he replied, tail now firmly between legs. Goodbye, warm fuzzy feeling, hello field goal with 13 seconds left to make it a one score

game when you are laying seven (points).

"In the future please say: Are you watering tonight? Because six tee is isolated," I said and retired to the office chair to comprehend the discussion that had just taken place.

Welcome to the dog days of August. It is just that time of the year, and especially this year. It feels like we have been doing at a rapid pace since March- because we have. This is the time of the year that the college and high school kids get that glazed look in their eye and a little drool drips from their lip as they try to get through another round of push mowing and weed whipping. The management team starts um, missing things. The equipment manager? Fed up weeks ago.

But we should all be used to it by now. It happens every year, some worse than others. In some sense, it is kind of like the final push to the summit, with aerification being the pinnacle. It's all downhill from there. The only question is whether you can keep your sanity or not.

After calming down internally, (I rarely need to calm down externally, just not productive) I took a deep breath and looked at the calendar. Five weeks until Labor Day, and this year everybody leaves with two weeks left. That's OK. With another couple deep breaths, some forward planning and some resolve, things will get done. They always do. Fall will be here before we know it.

Here is hoping you don't need too many deep breaths during the dog days, keep mentally sharp and finish the season strong.