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ABOUT THE COVER

They 6th hole at Ozaukee Country Club plays 209 yards. Ozaukee CC hosted the 2014 Wisconsin State Amateur.

Bunkers are not a place for pleasure. They're for punishment and repentance.

By Thomas Mitchell Morris, Sr. (Old Tom Morris) Golf Professional, Greens keeper, Golf Course Architect, 1821-1908

This quote by Morris gives golf course superintendents a smile as they consider golfer expectations when it comes to bunkers.

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THE GRASS ROOTS

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Chapter Update

By Brett Grams, Chapter Manager, Wisconsin Golf Course Superintendents Association

Well according to my calendar we are now in the second half of the growing season. I know many courses have seen quite a bit of varying weather. Cold and wet, warm and wet, and now even hot and finally even some dry weather. I hope all members are making the best of the challenges thrown your way.

The WGCSA phone calls and e-mails are always reduced in the summer as our members are busy with the golf course operations. However preparations are already under way for planning the remaining functions of 2014 and starting to work on our 2015 season. The WGCSA will celebrate our 85th Anniversary in 2015.

Currently the board is working on a survey that will go out to each member. This survey and the strategic planning that was done earlier this year will help

the board lead us into the next few years. The WGCSA Board of Directors is hoping that everyone will take the time to answer the survey as well as consider taking an active role in our association. If you would like to become more involved please contact me as you can. Board and Committee service can be rewarding with the time required being as much or as little as you prefer. Please consider sharing your time and working with fellow members on our future. We will all benefit if we can get more member leaders involved!

Please join us for the August 18th meeting at Brown County, the Wee One outing September 15th, and mark your calendars for the October 4th Couples event at Wild Rock GC in the WI Dells. These are the last of the golfing events for the year with December 3rd and 4th as the dates of our 49th Annual Symposium in

Kohler. I challenge all members to take advantage of these events. They are all planned and created for you and your fellow members with many costs offset by our generous vendor members. I hope to see all of you at one of these quality events at these great facilities.

In closing please balance the demands of the golf course with the opportunities to spend time with family and friends. I hope you can take advantage of the warmer weather to accomplish your projects on the course while enjoying the outdoors with those you love.

Thanks for your dedication to your golf courses, our industry, and our association!

Please feel free to contact me with any questions or effort I may be able to help you with!

PH 920-643-4888

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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.

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Managing Soil and Canopy Temperatures for Healthy Turf

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

Heat stress comes into varieties, direct and indirect. Direct heat stress injury can occur when the canopy temperature is so extreme that it kills the leaf or plant immediately. Direct heat stress injury often goes hand in hand with drought stress. Plants use evaporative cooling to dissipate heat. During drought stress, the plants close their pores (stomata) and evaporative cooling shuts down resulting in a rapid increase in canopy temperature. Except for plants that aren't water stressed, direct heat stress is a rare condition.

Indirect heat stress is more common and harder to quantify. With direct heat stress, the plant either survived or did not. However, indirect heat stress occurs over a longer time period and the symptoms can be difficult to pinpoint, plants don't die but simply weaken.

Indirect heat stress is a result of an imbalance between photosynthesis (making sugar) and respiration (burning sugar). Generally, respiration increases as temperatures increase, while photosynthesis peaks at about room temperature and declines as temperatures warm. When temperatures get into the upper 80s, cool-season turf hits a break-even point where the plant is using sugar as fast as it can make it. In the 90s, the plant is using more sugar than it makes. At this point, it starts using its reserves and roots depth declines. This can only go on for so long until the turf begins to thin. The moral of the story appears to be that heat kills, and you should do everything you can to keep your turf cool.

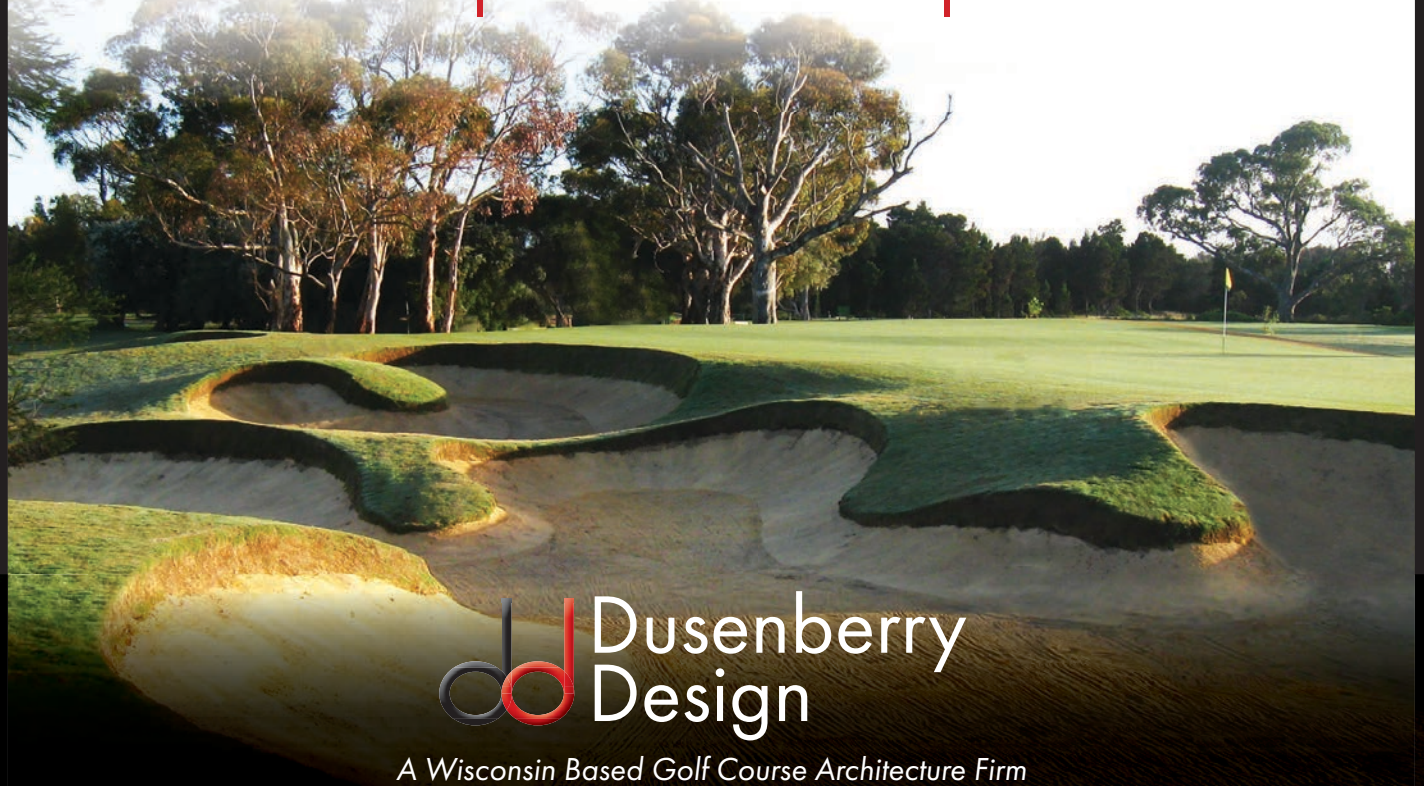
But Dr. Bingru Huang and co-workers (2004) taught us that it is more complicated than that. Her research showed that bent-

grass grown in a growth chamber kept at 68 °F during the day and 95 °F at night died quickly, while the same grass grown at 95 °F during the day and 68 °F at night thrived. From this we can conclude that nighttime lows are more important to managing heat stress symptoms than daytime highs. Here's the bad news, according to CALS Scientist Chris Kucharik (Department of Agronomy), Wisconsin has become warmer by about 1.1 °F since 1950. However, during that period the number of days over 90 °F hasn't changed, but our nighttime lows have been consistently higher (see Wisconsin's Changing Climate: Impacts and Adaptation, 2011). Going forward, we can expect this trend to continue and indirect heat stress will probably become more prevalent in Wisconsin.

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WISCONSIN SOILS REPORT

There are some strategies you can employ to help keep your turf as cool as possible. Dr. Beth Guertal has been conducting soil cooling studies involving fans and irrigation in the Alabama heat for well over a decade. Her results have shown that fans are far more effective than syringing for cooling turf. Syringing (a very light application of water) can create a short-lived decrease in canopy temperature as the water evaporates. It is most effective when done about two hours prior to the daytime high temperature. However, it does not reduce the nighttime lows. For that we need to look to fans and irrigation timing.

A substance with a high heat capacity resists changes in temperature. Another way to look at it is a substance with a high heat capacity will take a lot of heat to increase the temperature, and a long time to cool down relative to materials with lower heat capacities. The heat capacity of air is essentially zero, which is why air is a great insulator. Water has a high heat capacity relative to other substances. This means that soils with more air will cool down much quicker. The wetter the soil, the slower it will cool down. But irrigation

water temperature matters too. Groundwater is quite cold, so when you add cold water to a cool dry soil, the soil will remain cooler for a large portion of the day. But if you irrigate a dry soil in the afternoon or evening, the soil is warm and transfers that heat to the water, which will retain it into the night. Therefore, the best time to irrigate soil for managing heat stress is in the morning, when the dry soil has had time to cool to the minimum and the cold groundwater will resist heating up until later in the day. This is essentially what Dr. Guertal and Dr. Han found in their latest study (2009). However, they reported that irrigation timing didn't matter if you are running a fan 24 hours. I highly recommend reading the 2009 report for more details.

While we don't have the challenges of Alabama, I think fans are an underutilized tool in tough growing environments. But they are out there, I still remember seeing my first fan in the early 1990s near the 14th green at the Janesville Country Club, and University Ridge has recently employed a number of fans to protect their new bentgrass greens. While, the cost-

benefit of having fans probably doesn't make sense for the majority of Wisconsin courses, I would encourage you to keep them in mind for those problem greens. Finally, remember that keeping soils dry, but safely above the wilt point at night and watering in the morning will be your best bet to combat indirect heat stress. 

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A fan on the 2nd green at University Ridge (photo: Adam Wepfer)





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University of Wisconsin Snow Mold Review

By Dr. Paul Koch, Department of Pathology, University of Wisconsin – Madison

The summer of 2014 has been relatively low on stress for most superintendents to date, though that's not to say we haven't experienced our share of difficulty (mainly heavy rains and flooding). The transition to fall is always welcome, however, and with that transition comes preparations for snow mold. To help us prepare for this winter, let's take a quick look back at the research results from 2013-2014.

The 2013-2014 Wisconsin Snow Mold Research Trials were



Figure 1: Disease pressure at Wausau CC averaged nearly 90% in non-treated areas and was nearly 100% in this plot in 2013-2014

conducted at five sites around the upper Midwest: Tumble-down Trails GC in Madison, WI; Wausau CC in Wausau, WI; Marquette CC in Marquette, MI; Cragun's Resort in Brainerd, MN; and Silver Bay CC in Silver Bay, MN. The trials were the largest since at least 2005, testing over 100 different fungicide treatments at the Madison, Wausau, and Marquette sites. Pressure was highest at Wausau (mostly pink snow mold) and Marquette (mostly speckled snow mold), moderate at both Craguns and Silver Bay, and nonexistent at Madison. The full reports for each site, including pictures of each treatment, can be viewed at the TDL's website (www.tdl.wisc.edu/results). In addition to the full reports, there were three key points observed from last year's trials. Let's look at each of these points in a little more depth.

1. Even under heavy pressure, you have lots of options.

Average snow mold on non-treated plots over four replications at Wausau CC was 87.5% (**Figure 1**) and at Marquette CC was 95%. That is very heavy pressure. But despite this pressure, numerous treatments worked quite well at both locations. At Wausau, over half of the treatments (56 of 108) suppressed disease by 85% or more. At Marquette, 35 treatments provided over 80% suppression while 6 treatments provided over 95% suppression. Many of these effective treatments include widely-known products such as Instrata, Interface + Triton FLO, Torque + 26/36, and QP Enclave. However, some newer products such as Lexicon performed well when mixed with other fungicides, and Turfcide 400 also performed well when mixed with Concert II. Bottom line, you should be able to find a snow mold mixture that works for you and won't bust your budget.

2. Multiple active ingredients are required under heavy disease pressure.

This is not a new or novel point, but rarely is it illustrated as well as it was in Wausau last year. Interface at 3.0 fl oz per 1000 ft² applied with Triton FLO at 0.75 fl oz per 1000 ft² provided excellent suppression at Wausau last year, allowing only 3.8% disease. However, taking away the Triton FLO completely caused the protection to break down as Interface applied alone at 3.0 fl oz per 1000 ft² yielded 62.5% disease. But it's not as if the Triton FLO was doing all the work in the mixture, as Triton FLO applied alone yielded 31.3% disease (**Figure 2**). The same thing was seen with Torque + 26/36. Together the mixture had only 1.8% disease, while Torque applied alone had 33.8% disease and 26/36 applied alone had 71.3% (**Figure 3**).