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## ABOUT THE COVER

The Par 5, 485 yard 15th hole at Racine Country Club, Host of the Wisconsin State Open.

*If the problem can be solved why worry?  
If the problem cannot be solved worrying  
will do you no good*

**By Buddhist Philosopher Santideva,  
8th Century.**

This quote by Santideva reminds us worry and stress is not the way to solving problems.

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## THE GRASS ROOTS

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## Summer Burnout

By Jeff Millies, Certified Golf Course Superintendent, Edgwood Golf Course

This summer sure has been hot and dry for many of us. June was the 5th hottest and 6th driest on record, with July, August and September having a long range forecast that is very similar. Irrigation systems have been running at full capacity, providing you have enough water. Many irrigation ponds are no longer recovering and are very low. Non-irrigated turfgrass has become a fire hazard, while trees are also starting to show signs of stress along with the rest of us.

It's this time of the year we begin to wonder what else is going to go wrong and begin to question why did we become Superintendents? It becomes mentally difficult to stay focus, you start to feel a little burnt out and become less productive than you should be. We've all been there. Hang in there, for it won't be long before

Fall is here. And remember, your ability to adjust when things go wrong will often determine how far you can advance when things go right.


Upcoming events that are beneficial for curing summer burnout are, August 20th Golf Meeting with NGLGCSA at Lake Arrowhead in Nekoosa, September 17th The Wee One Fundraiser at Pine Hills CC in Sheboygan, October 1st the WTA Golf Fundraiser at Ozaukee CC in Mequon, and October 5th + 6th the Couples Weekend at Edgewood GC in Big Bend.

This year the GCSAA Board of Directors will be having their fall meeting here in Milwaukee. They will also be meeting with the WGCSA Board of Directors as well as playing golf in the Wee One Fundraiser. This is an exciting honor for our Chapter that GCSAA wants to meet here

in Wisconsin. I am looking forward to this event.

I would also like to thank Aron Hogden for his time served on the WGCSA Board of Directors. Aron had to resign since he is moving to South Dakota and will be pursuing his law degree. We wish Aron the best.

I would like to welcome Josh LePine from Maple Bluff CC to the Board. He will be serving out the remainder of Aron's term. Josh is a graduate of UW Madison and has been a member of WGCSA since 1993. Please congratulate Josh the next time you see him.

Good luck to everyone through the remainder of the summer and I am looking forward to seeing many of you at the upcoming events. But most of all, I am looking forward to our next rain day. 

### 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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## Sizzling Summer News

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

Well once again Mother Nature has challenged many Superintendents in WI and beyond over the past few months. Central WI is abnormally dry but as of late we have been receiving some much needed rain but the droughty weather combined with the above normal temperatures has made keeping turf growing and healthy a challenge. While most of you have been keeping your irrigation systems running and your staffs manning the hoses I have had some interaction with the GCSAA on two timely issues.

As I write this update I have been in conversations with GCSAA President Sandy Queen, CGCS regarding the GCSAA's Fall Board Meeting. These meetings are held throughout the country and Mr. Queen has chosen our great state for this fall's meeting. Plans are in place for the GCSAA Board of Directors and CEO Rhett Evans to meet in WI over the weekend of September 15-17th. The tentative plans are to have meetings in the Milwaukee area over the weekend and then the en-

tire GCSAA BOD will be joining us in Sheboygan for the Wee One Fundraiser in Sheboygan. The national leadership is a welcome addition to the event and I hope you will consider joining us on September 17th for the Wee One. A great cause, a great golf course, all in the spirit of one of our own late members... Please support the event!


As most of you have heard by now the GCSAA has decided to take over and manage the Rounds 4 Research golf auction that was started by the Carolinas GCSA several years ago. As you know we benchmarked our own online golf auction Play a Round for Research after the R4Research efforts. All affiliated chapters have been asked and encouraged to join in the new national effort which will be spearheaded through the Environmental Institute for Golf, better known as the EIFG. Presently the WGCSA Board of Directors along with the PAR4 Research Committee is considering our options. We must weigh the Pros and Cons of joining forces with the R4Research Auction or

continue on our own. We are looking at total overhead costs, amount of exposure, marketing efforts, and timing of the auction. We also want to make sure that the donors of our past auctions has a say in the matter. Without the generous donations of our member clubs NO auctions are possible. In the coming weeks I will be providing more information to our existing donor clubs to gain feedback and opinions on what our final decision will be. Do you have an opinion on this decision? IF so I would enjoy hearing from you. Please give me a call at 920.643.4888 or [bgrams@wgcsa.com](mailto:bgrams@wgcsa.com)

I hope that seasonal weather and adequate moisture are in the future forecasts! Most of you REALLY deserve it!

September 17th, Wee One at Pine Hills CC, Sheboygan - Host Rod Johnson

October 5th and 6th, Couples Weekend at Edgewood GC, Big Bend - Host Jeff and Nicole Millies

December 4th and 5th, WI Golf Turf Symposium, American Club, Kohler 





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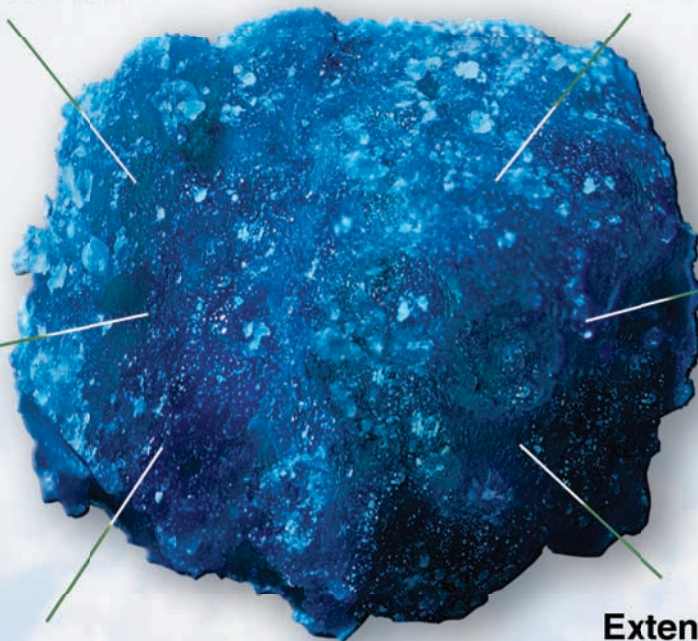
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## What Are We Missing When We Sample Putting Green Soils?

By **Glen Obear**, Graduate Student, Department of Soil Science, University of Wisconsin-Madison

When we talk about taking soil samples, what are we really talking about? Typically, we mean pulling several plugs from the top 3-6" of the profile, mixing them together in a bag, and sending it off to a soil test laboratory. From this, we get a wealth of information that helps us guide the application of fertilizer and soil amendments. We focus on the top 3-6" of the profile because this is where most of the roots are and also where we find thatch and potential organic layers. We like to look at the profile and see how effective our topdressing has been over time. Almost every management practice that we employ is for the benefit of the top 3-6" of the soil. But if you have USGA-spec putting greens, sampling only the top 3-6" may not be enough.

The design of a USGA green allows the root zone to hold water evenly for long periods of time, while still draining quickly during rain events. This is accomplished by the layering of sand over a layer of pea gravel, which creates a

pseudo perched water table. This design has been proven successful since its introduction about a half-century ago but it is not without problems.

In any soil profile with textural boundaries or discontinuities, it is common to see soil chemical changes, such as mottling or redoximorphic features (Fig. 1). In natural soils textural boundaries are typically subtle, but the boundary in USGA greens is very abrupt. When water is perched above the pea gravel layer, the chemistry of the soil and water becomes very important, and potential exists for mineral or organic layering to occur at this boundary.

### Case Study

During a summer internship at a golf course in Hawaii, I encountered a unique soil-layering problem. We first noticed thinning turf, especially in low areas of the putting green where water drained. We found black layer in the surface 6", but this didn't make much sense: the course was only five years old, core aeration was done twice each year, and

greens were topdressed weekly. We decided to dig deeper, thinking that maybe something was blocking water infiltration deeper in the profile.

At the sand/gravel interface of the first putting green we sampled, there was a thin layer of what looked like oxidized iron (i.e., rust) that was cementing sand and pea gravel together (Fig. 2). This layer was brittle, but impenetrable to water, which created anaerobic conditions in the root zone. As we continued investigating, we found this layer in every green we sampled.

Years later, I started graduate school at UW-Madison. The superintendent sent me some samples of this layer, and I confirmed that it was oxidized iron through physical and chemical analyses. I thought that this was a rare, unique problem when I first witnessed it in Hawaii. But now that I've studied it more and more, I have heard of or seen examples of this iron layer in Texas, Missouri, Virginia, Pennsylvania, West Virginia, California, North Carolina, and even Vietnam.



Figure 1. Redoximorphic features in a natural soil. Red color is oxidized iron (i.e., rust).



Figure 2. Iron oxide layer observed at the sand/gravel interface (12" depth) of a putting green.

# WISCONSIN SOILS REPORT

Now I am on a mission to find out exactly what causes this layer to form, how to prevent it, and what to do if you already have it. My hypothesis is that the iron contained in irrigation water, or added through fertilization, is pushed downwards through the profile until it hits the pea gravel layer, where the water is perched. When soluble reduced iron is exposed to this oxygen-rich pea gravel layer over an extended period of time, the iron oxidizes and precipitates along the interface.

The point of this case study is to show that the lower half of the profile can have just as many interesting features as the surface 3-6", and these features can drastically impact the performance of the putting green. If we didn't sample the full profile in Hawaii, we never would have found the iron layer at the sand/gravel interface. Our conclusion would have been to increase aeration and topdressing frequency, and we would have been unaware of what was really causing the problem.

When we only sample the top half of the profile, we are only getting half of the picture. So why don't we sample the bottom half of the profile? Probably because it is inconvenient! Many t-probes aren't long enough to reach the pea gravel layer, and those that are long enough tend to be difficult to push down to that depth. The soil profile samplers that give you a cross-sectional view (Mascaro, Turf Tec, etc.) are an improvement over the t-probe, but even these don't usually sample the full profile down to the pea gravel layer.

## Sampling Your Full Profile

For my graduate research, I am collecting full-profile samples of USGA-spec putting greens from at least 40 golf courses across the U.S., with the help of the USGA agronomists. From my experiences so far, I can share a simple and practical method that you can use to sample the full profile of sand-based putting greens.

The method that I will explain for full-profile sampling is very similar to Dr. Norm Hummel's method (<http://www.turfdoctor.com/>). All of the materials can be purchased at your local hardware/construction store, and the materials are relatively inexpensive, especially if you already have some of these things around

your shop.

First, cut a 2" diameter PVC pipe (schedule 40) into segments that will be long

***"The Point of this case study is to show that the lower half of the profile can have just as many interesting features as the surface..."***

enough to reach all the way down your pea gravel layer, plus four inches (typically 16-20"). About 2" from the top of the pipe, use a drill press to drill a hole that allows a 1 foot long piece of rebar to slide freely in and out through both sides of the

pipe. Use a grinding wheel to sharpen the bottom end of the pipe, which will allow it to pass through the profile more easily.

Use a rubber mallet to pound the PVC pipe into the turf and through the soil profile. Keep hammering, and eventually you will feel the pipe hit the pea gravel layer. Drive the PVC pipe down a few more inches to capture some of the pea gravel, making sure that the hole in the top of the pipe is still several inches above the ground surface. Insert the handle into the hole and slowly twist the PVC pipe, wiggling from side to side as you pull upwards. The soil sample should stay well intact inside the PVC pipe, but if it falls out the bottom, try hand watering the area to increase the soil moisture, and then try again.



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# WISCONSIN SOILS REPORT


Now that you have your full-profile sample out of the ground, it is time to crack it open. It is possible to use a circular saw, but I prefer to use a small, handheld oscillating saw (\$40-100) as it offers more precise control. For safety you will want to build a small platform that will hold the pipe still while you saw it open. If you use a circular saw, the platform will need to be very sturdy, but if you use an oscillating saw, the platform can be as simple as a sheet of plywood with two boards running parallel to each other, spaced 2" apart. With the PVC pipe safely mounted, cut lengthwise on one side from top to bottom, being careful not to dull your saw blades by cutting into the soil. After one side has been entirely cut through, place a strip of duct tape over the cut to act as a hinge and prevent soil from falling out when you turn it over. After the duct tape is

secure, flip the PVC pipe over and cut through the other side lengthwise from top to bottom. If your cuts are nice and clean, the pipe should open right up and your full profile will be fully visible.

Interpreting what you see in the soil profile is the hardest part of this entire process. Experts like Dr. Hummel have made careers out of analyzing soil profiles, and nothing beats experience. If you want an outside opinion, collaborate with your local USGA agronomist, or submit a sample to an experienced soil-testing lab that offers analysis of full profiles. Still, you probably know your greens better than anyone else. It is well worth your time and effort to take a full-profile sample and cut it open to look at it for yourself—you may find something that you didn't know was there (Fig. 2).

Full-profile sampling is not a substi-

tute for sampling the top 3-6". This sampling is more cumbersome, and is not a convenient way to analyze chemical properties of the soil. However, collecting a full profile sample from troubled and healthy areas every 1-2 years would provide you with a better idea of how water, minerals, and organic matter are moving or accumulating in your profile. Take pictures each time you cut a core open—then you will have something to look at for comparison over time.

If you decide to take some full-profile samples and find any interesting layering occurring, we would love to take a look! Feel free to send a picture to me at [obear@wisc.edu](mailto:obear@wisc.edu). The more information we share, the more we can learn about and describe unique soil-layering problems. Chances are, if you find layering in your putting greens, it is probably happening in somebody else's too! 

**Figure 3. Full putting green profile sample. Note the iron layering at 15" depth.**



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