Sampling the Full Profile of Your Sand Putting Greens

Glen Obear, University of Wisconsin-Madison Soil Science

This method for full-profile sampling is similar to Dr. Norm Hummel's method (www.turfdoctor.com)

MATERIALS	**COST**
One section 2" ID PVC Pipe	$5.00
12" length rebar	$0.97
Rubber mallet	$5.00
Handheld oscillating saw	$40-100
TOTAL COST:	**$50-100**

Figure 1. 20" PVC pipe with sharp edge on bottom and hole drilled in top for handle

Figures 2 & 3. Cut the core open with an oscillating saw (left). Use duct tape over the first cut to create a hinge (right).

STEPS:

1. Cut 2" diameter PVC into a 20" long section.
2. Use a grinding stone to sharpen one end of the pipe. Drill a hole through the other end of the pipe, about 2" from the top. This is where the handle will go (Fig. 1).
3. Use a rubber mallet to pound the PVC pipe into the putting green. Keep pounding until you reach the pea gravel layer at the bottom of the root zone. Be sure to leave 1-2" of space below the hole at the top so that the handle can be easily inserted.
4. Insert the rebar handle into the hole at the top and twist the pipe around several times. Gently pull the sample upwards and out of the ground.
   ** If the sample will not stay intact as you pull it out of the ground, try hand watering the area for a few minutes to increase the soil moisture*
5. Use an oscillating saw to cut along the length of the pipe on one side. Place a strip of duct tape along the cut to act as a hinge (Figs. 2 and 3).
6. Flip the pipe over and cut the other side. The pipe should open up and your full profile will be on display (Fig. 4).

Figure 4. Full profile sample of sand putting green. Sand channels are from deep tine aerification.

Afraid Of The Dark

By Paul Koch, Turfgrass Diagnostic Lab Manager, O.J. Noer Turfgrass Research and Education Facility

The summer of 2012 to date has been historically unpleasant for turfgrass managers, harkening comparisons to the infamously brutal summers of 1995 and 1988. Much of the state is mired in a severe drought, and record high temperatures ruined many July 4th festivities (and emptied tee sheets). While the record high temperatures certainly get the attention of the public at large, as turfgrass managers what should concern us most are the nighttime temperatures.

There are a couple reasons for the importance of nighttime temperatures to turfgrass health. As any Turfgrass Diagnostic Lab contract member would know, I always harp on the forecasted nighttime lows when discussing potential diseases to watch out for. The primary reason is that higher nighttime temperatures nearly always equal higher humidity, due to the fact that moisture can hold heat better than air can. As we're well aware, higher humidity usually equals more disease. Sustained nighttime lows above 65°F often signal that dollar spot will become more active, and lows above 70°F for more than 3 days often signal that it's time to start worrying about Pythium blight and brown patch.

Warm nighttime temperatures go beyond just disease activity, though. As we all know, plants are unique in that they produce their own food. They accomplish this by using the sun's energy to power the conversion of carbon dioxide and water to sugars the plants can use, a process known as photosynthesis. Because the sun powers the photosynthetic production of food, photosynthesis only occurs during the daytime hours. As important as photosynthesis is, though, it only produces the food. To convert that food into energy, a second process called respiration occurs. Respiration is highly conserved amongst life on earth, and occurs in nearly the exact same manner in plants, animals, and other organisms. Respiration occurs 24 hours a day and breaks down the food produced through photosynthesis to energy the plants can use to survive. Since photosynthesis occurs only during the day, and respiration is occurring at all times, there is a period during the night where food is only being consumed and not produced.

What this means is that the plant needs to produce enough food during the daytime hours to sustain itself throughout the night as well.

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During sunny conditions with temperatures between 65-75°F, the plant produces enough food to sustain the plant through the night and also has extra left over to support plant growth (Figure 1). Different conditions can lower the amount of food available, either through reducing the amount of food produced or by using it up faster. Reduced sunlight due to shade or low mowing heights will lower photosynthetic production, resulting in a lack of food. Temperatures above 85°F begin to decrease the efficiency of photosynthesis through a process called photorespiration, a process that also decreases the amount of food produced. In addition, higher temperatures increase the rate of respiration in the plant cell, which can lead to faster utilization of resources.

This becomes especially problematic during periods with high nighttime temperatures. Warm nighttime temperatures increase the rate of respiration, and there is no photosynthesis occurring to compensate with more food. This can lead to energy deficits, which if prolonged can lead to poor rooting and eventually turfgrass death (Figure 2). This condition, when coupled with a multitude of other stressful summer conditions, has been referred to as summer stress syndrome.

Can anything be done to prevent summer stress syndrome? Well obviously you can't affect the nightly low temperatures, but there are a few things you can do to lessen the impact of a stressful summer such as this one. First, raise cutting heights to the absolute highest you afford to. Even minor increases can help increase rates of photosynthesis, and research from Michigan State has shown that rolling can help maintain putting green speed. Second, syringing the turf in the late morning will cool the turf plants shortly before entering the warmest portion of the day. This can help to lower the canopy temperature, decreasing the rate of respiration. Third, ensure proper drainage by keeping the organic matter in the putting green rootzone below 4%. Excess water in the rootzone can prevent oxygen flow and hold more heat in the soil, which can increase respiration during the night.

Many superintendents have followed these recommendations and have still struggled to keep turfgrass alive this summer. To be fair, little can be done when conditions are as extreme as they have been this summer. This is especially true for facilities that can't dispatch small armies to handwater struggling areas throughout the day. But with every hot day that passes this summer, it's comforting to know we're one day closer to fall.

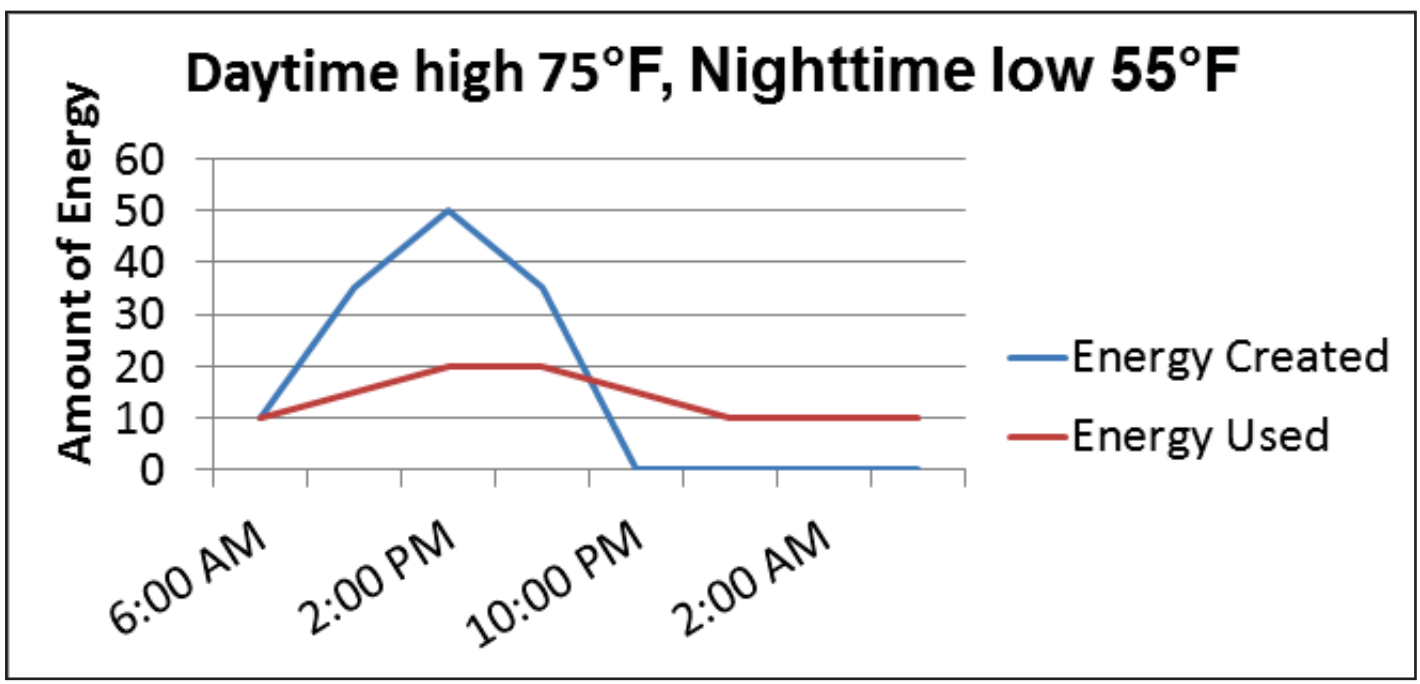

Figure 1. Hypothetical graph showing energy produced from photosynthesis and energy used from respiration at a daytime high of 75°F and a nighttime low of 55°F.

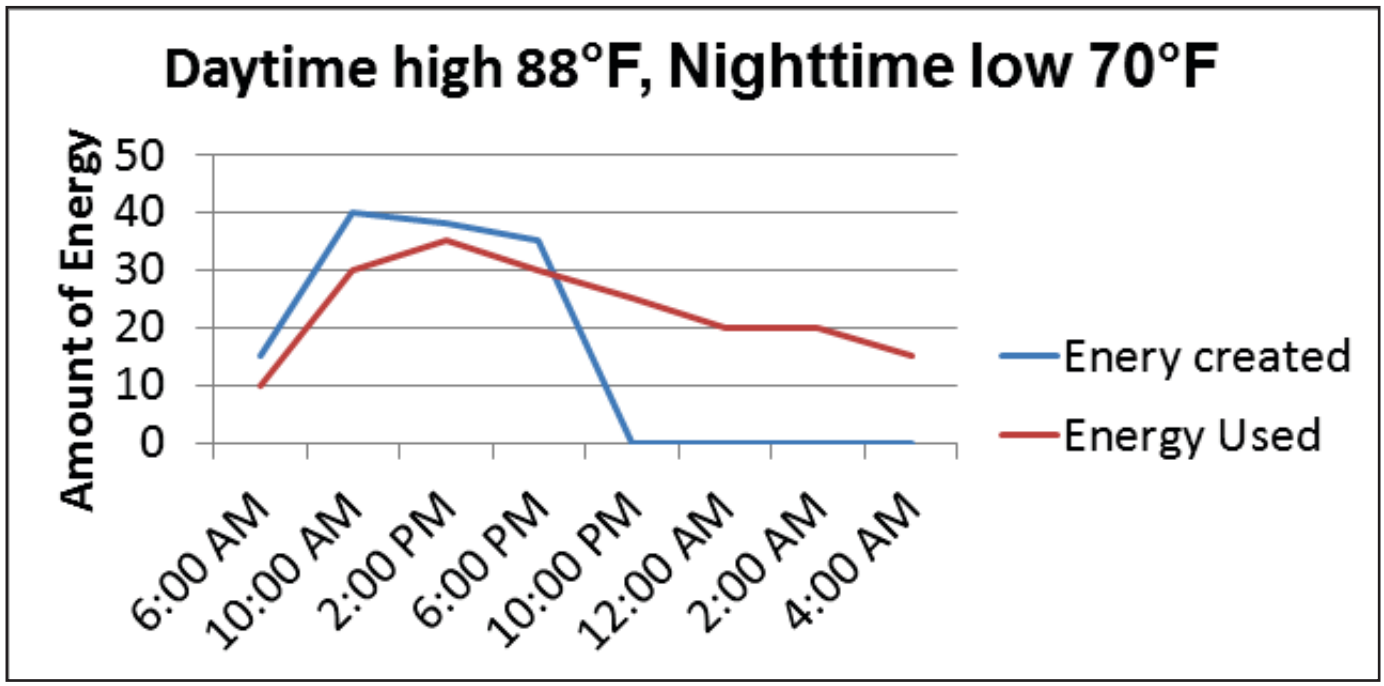

Figure 2. Hypothetical graph showing energy produced from photosynthesis and energy used from respiration at a daytime high of 85°F and a nighttime low of 70°F

June Tournament Meeting At Oshkosh Country Club

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

Monday June 25th provided a great day for Kristopher Pinkerton Certified Golf Course Superintendent, Kathryn Lifke, Assistant Golf Course Superintendent and the staff at Oshkosh Country Club to host the WGCSA Tournament Meeting.

The course was in excellent condition and provided a challenge for many of us with the exception of a few event winners. Congratulations to Scott Bushman, Golf Course Superintendent at Fox Valley Golf Club for shooting a gross score of 78 to win the event.

The day started with Mr. Scott Schara of The Pond People with a discussion titled "Proactive Pond Maintenance".

Scott gave a very interactive talk with a lot of input from the audience. That makes sense considering most golf courses have ponds and many of them have stagnant water allowing for the growth of weeds and algae.

Pond Facts

Aging - Ponds age naturally and Scott expressed a pond without help will go from new to gone in about 100 years depending on the terrain and depth. Ponds that have the water turn completely over once a year will have triple the life span.

Algae Cycle - Algae is a natural occurring thing in all ponds but most people do not like it especially when it forms mats or distracts from the aesthetics or use of the waterway. Nitrogen and Phosphorous promote algae blooms with Phosphorous being the main culprit. The challenge is phosphorus can enter the pond from leaves, grass clippings, soil erosion and from algae dieing.

Copper - Copper is the worst thing for ponds but pond owners often forget about their pond until the algae mat appears in late spring or early summer. Then they treat the pond with copper because it is a cheap effective solution. The problem is treating only the algae is a short term solution. As the algae dies it sinks and the pond looks good but algae has a lot of phosphorous in it so as it decomposes that phosphorous is released in the water and a new bloom starts worse than the first. This cycle will get worse unless the pond owner reduces phosphorous levels. Copper is a long term challenge because algae will build up a tolerance to it and as a heavy metal it can take years to get rid of in the pond muck. This is a problem because copper kills good bacteria reducing future options for pond maintenance.

Bacteria Treatments - Bacteria treatments can be used to help destroy pond muck but Schara thought a pond with more than 24" of muck should be drained and dredged for effective treatment. Aeration is great for maintaining bacteria.

Pond Liners - Liners are needed in some cases but they have been shown to warm ponds 2-4 degrees which in turn reduces dissolved oxygen in the body of water.

Cattails - Can be burned down with Reward or glyphosate but must be actively growing. Owners can also cut cattails repeatedly below the water line. Sickle mowers work better than weedeaters.

The Perfect Pond - A Perfect Pond has the banks bermed so there is no unfiltered runoff into the water. The water is turned over each year. The pond has one 20' hole per surface acre.

Dye - Dye is good for the pond by reducing sunlight penetration and helps keep the pond cooler. Many owners do not go heavy enough with their dye or retreat enough. Dye should be retreated periodically weather rain dilutes it or not.

Overall Scott provided some great information for the group and it became clear for most cases it is cheaper in the long run to hire a professional rather than treat ponds with guesswork and the wrong products.

Thanks again to the staff at Oshkosh for providing a great lunch and after round hors d'oeuvres along with the great weather and golf course. Along with the speaker and fun the best part of any WGCSA is the camaraderie and education that comes from spending time with our peers.

Oshkosh Country Club Event Winners

Overall Low Gross - Scott Bushman (78)
A FLight Low Net - Mike Lyons (69)
A Flight 2nd Low Net - Marc Schwarting (70)
B Flight Low Net - Tim Wegner (68)
B Flight 2nd Low Net - (73)
Affiliate Low Net - Todd Quinto (65)
Affiliate 2nd Low Net - Matt Lohman (73)

Long Putt Hole 1 - Mike Skenadore
Long Drive Hole 6 - Dominic Freese
Closest to Pin Hole 8 - Trenton Tabbert
Long Drive Hole 13 - Troy Jastal
Closest to Pin Hole 18 - Marc Schwarting

6/25/12 Meeting at Oshkosh CC

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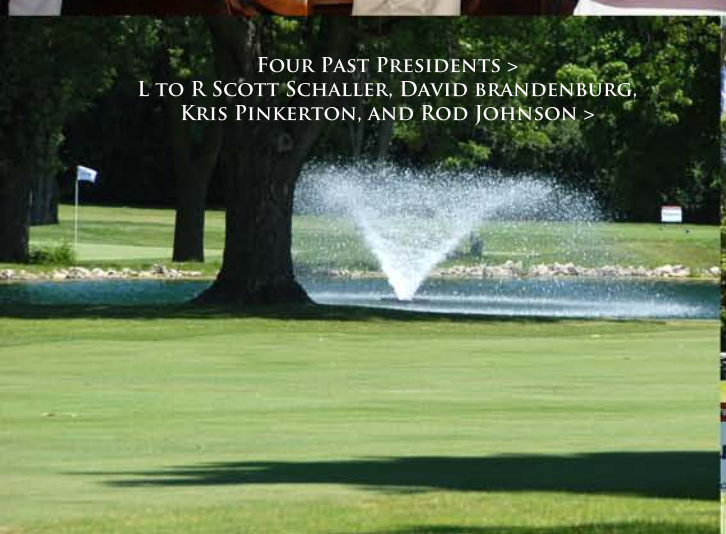
< Our Host, Kris Pinkerton , CGCS

Our Low Gross Champion
Scott Bushman, CGCS >

Below: Interactive Meeting

Four Past Presidents >
L to R Scott Schaller, David brandenburg,
Kris Pinkerton, and Rod Johnson >



Scott Schara (center) and
his Assistants were our Speakers on
Proatcive pond Maintenance.

Bacterial Diseases Of Turf: Are They Real?

By Dr James Kerns, Department of Pathology, University of Wisconsin - Madison

This summer has been absolutely brutal for golf course superintendents. It has been extraordinarily hot and in many places extremely dry. So dry in fact that many of my inoculations at the Noer have been unsuccessful. Yet I keep hearing about a potential bacterial disease plaguing creeping bentgrass putting greens throughout the Midwest. Relative humidity levels have been so low that there is not a lot of leaf wetness, even though we continue to irrigate putting greens. Without leaf wetness fungi and bacteria have a difficult or impossible time penetrating a plant. The simplest thing I learned in all my studies is the most important thing to a microbe is water. Water this summer is in short supply and we are not irrigating enough to maintain consistent leaf wetness.

I think many understand the importance of water for fungi. We have not seen much Pythium and brown patch although temperatures have been conducive. Dollar spot is trying to develop, but is slowed when we enter periods of low relative humidity. Anthracnose maybe showing now, but our work indicates that the fungus started the infection process in late May or early June when soil temperatures were between 65 and 70oF. Yet, I still keep hearing about a mysterious bacterial disease that threatens creeping bentgrass greens throughout the United States. Seems puzzling to me considering that bacteria also require water to grow and thrive on plant tissue.

A couple years ago, Dr. Joe Vargas isolated a new bacterium from creeping bentgrass putting greens in North Carolina: Acidovorax avenae subsp. avenae. Symptoms associated with this bacterium included necrosis, etiolation (abnormal shoot elongation), chlorosis and decline, but these symptoms were isolated to perimeter of the putting green and somewhat into the collars (Image 1 and 2) (Giordano et al., 2010). When the summer of 2010 hit much of the bentgrass suffered in the transition zone, likely due to extreme heat throughout the region. However, because a new disease was discovered rumors of this problem started to spread. The whole issue reminds me of stories I've read about Orson Wells' reading of War of the Worlds. Just a single person reading a story so passionately convinced many that Martians were invading us.

Image 1. Etiolated creeping bentgrass shown from above. Note the extremely long growth and the bleached appearance.

I am not trying to down play the importance of this potential disease, but I am trying to demonstrate a point about putting the horse in front of the cart. This disease is still unknown. There are many questions that remain unclear about it. What are the actual symptoms associated with the disease? This has been problematic because when researchers try to inoculate with the pathogen and the symptoms described by Dr. Vargas cannot be reproduced (Latin 2010 and 2012). It is possible that Acidovorax lives on the plant surface as a saprophyte and waits for the plant to decline before increasing its numbers or there could be another bacterial pathogen that is causing the symptoms. It is not unlikely that a bacterium is associated with elongation as many bacteria produce plant hormones like auxin and gibberellic acid. There are also many articles demonstrating that bacterial populations can increase yields of cereal crops (Bottini et al., 2004). However, this has yet to be demonstrated in a turfgrass system.

In the July issue of GCM, Dr. Rick Latin (2012) wrote an excellent article summarizing the current state of knowledge regarding bacterial diseases in turf. There are three diseases associated with bacterial pathogens: bacterial wilt, bacterial brown stripe and bacterial decline. The latter is the disease that is spreading fear through the golf course superintendent community. It is extremely important to understand the differences between these diseases. What we are currently seeing associated with creeping bentgrass is not bacterial wilt. Dr. Latin uses the term bacterial decline to describe the current problem associated with Acidovorax avenae. This is a good way to describe this disease because it seems like the disease is only observed when creeping bentgrass is under extreme stress.

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Image 1. Etiolated creeping bentgrass shown from above. Note the extremely long growth and the bleached appearance.

What can be done to manage bacterial decline? Traditional fungicides will not work at all. The best bet to manage this disease is to maintain a healthy plant. Easier said than done I know, but there are keys to maintaining plant health during stress. Do not back off nitrogen. As the plant root respiration and growth slows so does their ability to take up nitrogen therefore a consistent supply is needed to maintain healthy plants. Keep poking holes in the putting surface even if it is extremely hot. Poking holes will allow for air exchange, which can also cool the soil slightly. Maintain consistent regulation with Primo. Dr. Soldat's work with GDD and Primo applications clearly demonstrate the need to keep creeping bentgrass under regulation. As temperatures increase so does the metabolism of trinexapac-ethyl, the active ingredient in Primo. As creeping bentgrass plants come out of regulation they enter a rebound phase of growth and coupled with any plant growth promoting bacteria could induce extreme elongation of plants. Monitor soil moisture with a TDR probe. I saw the benefits of this probe first hand during a recent visit. Dr. Soldat and I were at a golf course with Poa annua suffering and using the probe we determined that soil moisture was between 18 and 24%. This was adequate soil moisture, so the plants were either suffering from fungal infection or plain old heat stress. Finally, do not apply products that could potentially harm the plants. These would include DMIs, Zerotol, any copper products, and other growth regulators such as Trimmit.

Bacterial decline is still a mysterious disease that warrants further investigation. There are a number of researchers working with this disease and we will continue to monitor their progress and provide updates as needed. As for now, if you happen to suspect bacterial decline please send a sample to the TDL prior to making any management decisions.

References:

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