

Old Tom Morris at St. Andrews Golf Course in Scotland, has been practiced with increasing frequency since the 1970s. Modification of thatch to reduce disease severity is one widely stated objective of topdressing putting greens. However, many have speculated that the incorporation of topdressing sand causes abrasion of plant tissues and these wounds increase the infection of the plant by the anthracnose pathogen.

MAT VERSUS THATCH

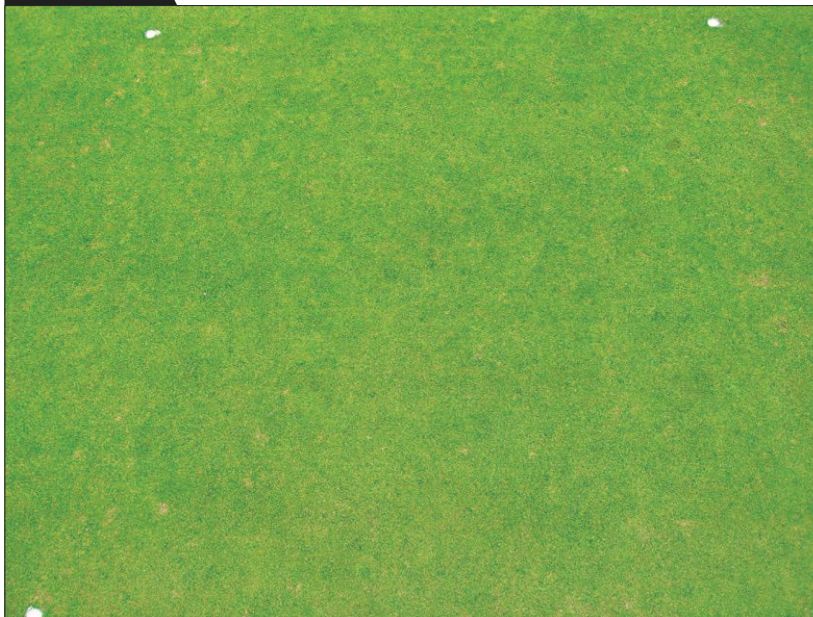
Our initial studies of topdressing found that frequent topdressing (cumulative amount of 800 to 1,600 pounds of sand per 1,000 sq. ft.) during the summer substantially reduced anthracnose severity (Figure 1 and 2). We hypothesize that the reason for disease reduction is due to the formation of a well-developed mat layer rather than a thatch layer at the surface of the turf. A mat layer is a more desirable growth medium for plants than thatch.

Annual bluegrass plants growing in our topdressed plots had deeply buried crowns and much larger, longer leaf sheaths than plants growing in non-topdressed plots. Plant crowns buried and growing in a mat layer are better protected from extreme fluctuations in temperature and soil water during the summer when anthracnose disease pressure is highest compared to crowns growing in thatch.

A mat layer developed from sand topdressing also provides greater physical support and anchoring of grass plants by adding new soil (sand) particles that surround tillers, crowns and adventitious roots, ultimately encouraging better shoot vigor. Moreover, a firmer turf surface improves tolerance to mowing by maintaining a more consistent (higher) effective height of cut, reducing the tendency for mower scalp, especially under wet conditions and low bench settings.

Not surprisingly, higher mowing heights have been shown to decrease

FIGURE 2



Disease severity was only 10 percent in this plot which was topdressed in two split applications totaling 8 cu. ft. per 1,000 sq. ft. of sand during the spring and biweekly with 1 cu. ft. per 1,000 sq. ft. of sand during the summer (image captured on June 6th, 2010).

anthracnose severity on annual bluegrass. As mentioned above, the anthracnose pathogen survives on dead organic matter (as a saprophyte) in thatch when environmental conditions are unfavorable for disease development. Thus, the burying and dilution of disease inoculum with sand topdressing is another plausible mechanism for disease suppression.

HEAVY AND LIGHT TOPDRESSING

Topdressing at a cumulative intensity of 800 to 1,600 pounds of sand per 1,000 sq. ft. during the summer is an expensive and laborious practice that will interfere with mowing and play for several days after the application. More typically, topdressing programs on golf courses apply less topdressing sand during the summer than the rates used to reduce anthracnose severity in our initial studies. Large topdressing rates are commonly applied in conjunction with hollow tine cultivation during periods of low play (for example, spring and fall). These large

volume topdressing applications are then supplemented with much lighter and, to varying degrees, more frequent applications of topdressing sand during the playing season.

Such programs are generally less expensive to implement and less disruptive to play than a program that would apply a greater proportion of the total annual sand application during the peak playing season. We are currently evaluating 1) whether topdressing applied during the autumn or spring affects anthracnose severity and more specifically, 2) whether autumn or spring topdressing alters the effect of lower-rate summer topdressing on this disease (Figure 3 and 4). From this work it appears that large volume topdressing in the spring is more effective at suppressing anthracnose than topdressing applied in the fall.

OTHER FACTORS

Superintendents have expressed concern about the potential adverse

Continued on page 32

FIGURE 3



Graduate student Ruying Wang applies sand topdressing to research plots.

Continued from page 31

effects of sand particle shape and foot traffic over recently applied topdressing sand on anthracnose severity. Our study of sand shape on anthracnose found that both sub-angular and round topdressing sand reduce the disease; in fact, sub-angular sand occasionally reduced disease more than round sand, although the difference was very slight. Thus, the shape of topdressing sand does not appear to be a concern with respect to anthracnose disease (Inguaiato et al., 2013).

We have also studied the effect of daily foot traffic on annual bluegrass. To our surprise, topdressing every week during the summer reduced disease severity even under conditions of intense daily foot traffic (Murphy

et al., 2010; Roberts et al., 2010). In fact, the best turf quality in this study occurred on plots treated with sand and foot traffic.

During the first year of many of our topdressing trials we have observed small increases in disease severity; however, these initial increases in disease severity dissipated within a week or two as more topdressing sand was applied during the trials. This initial increase in disease could be due to wounding of crowns that were not yet protected by a mat layer developed from routine topdressing. A threshold (minimum) amount of sand is probably needed before the benefits of sand topdressing (i.e., formation of a mat layer) can be seen in the form of reduced anthracnose disease and

improved turf quality. Observations of greater anthracnose severity on golf course putting greens after topdressing may be an indication that the program is insufficient (cumulative sand rate is too low) to reduce anthracnose severity.

CONCLUSION

In our trials, the overall benefits of topdressing have far outweighed any potential negative effects related to abrasion and wounding. A common recommendation for topdressing is to match the sand rate and frequency of application to the growth of the turf (thatch accumulation) so that sand filters through the leaf canopy and incorporates into thatch to maintain a non-layered growing medium that does not interfere with mowing or play.

Our research is indicating that this approach to topdressing is consistent with best management practices for anthracnose disease suppression. The greatest growth of leaf canopy and thatch accumulation occurs sometime in the spring and fall for cool-season grasses such as annual bluegrass, typically when nitrogen fertilizer is applied and irrigation or rain occurs. Relatively large amounts of sand should be applied during the spring and fall to match greater amounts of shoot growth and thatch accumulation. As growth slows during the summer, much smaller amounts of sand should be applied. The frequency of topdressing can also be adjusted during the summer to match growth.

To avoid falling behind the growth rate on well-fertilized vigorous turf, a weekly application frequency may be needed when very low rates (< 50 lbs. per 1,000 sq. ft.) of topdressing sand are applied.

Our current research is focused on evaluating a combination of best management practices (BMPs) such as topdressing, nitrogen fertility, mowing with varying rates and frequencies of fungicide application. Early indications are that implementing BMPs on

FIGURE 4



Graduate student James Hempfling brushes in sand after a topdressing application.

golf course putting greens can dramatically reduce the fungicide rates needed to control this disease, or allow superintendents to extend the intervals between applications resulting in significant savings while maintaining acceptable turfgrass quality and ball roll distance (green speed). However, additional research is needed to confirm these findings.

Acknowledgements

We would like to thank the United States Golf Association, the Tri-State Research Foundation, and the Golf Course Superintendents Associations of America and New Jersey for financial support of this project.

James A. Murphy, Ph.D., James Hempfling, Ruying Wang, and Bruce B. Clarke, Ph.D. are in the Department of Plant Biology and Pathology at Rutgers University. Jim Murphy, Ph.D. is an Extension Specialist in Turfgrass Management, James Hempfling and Ruying Wang are graduate

students and Bruce Clarke, Ph.D. is an Extension Specialist in Turfgrass Pathology. Dr. Murphy can be contacted at murphy@aesop.rutgers.edu for more information.

References

Hempfling, James W., Murphy, James A., and Clarke, Bruce B. 2012. Effect of scarification depth on anthracnose disease of annual bluegrass putting green turf. Proceedings of the Twenty-First Annual Rutgers Turfgrass Symposium. p. 38.

Inguagiato, John C., Murphy, James A., and Clarke, Bruce B. 2013. Topdressing sand, particle shape and incorporation effects on anthracnose severity of an annual bluegrass putting green. International Turfgrass Society Research Journal. 12:127-133.

Inguagiato, John C., Murphy, James A., and Clarke, Bruce B. 2008. Anthracnose severity on annual bluegrass influenced by nitrogen fertilization, growth regulators, and verticutting. Crop Science. 48:1595-1607.

Murphy, James A., Clarke, Bruce B., Roberts, Joseph A., Schmid, Charles J., and Hempfling, James W. 2010. Developing best management practices for anthracnose disease on annual bluegrass putting green turf. 2010 Turfgrass and Environmental Research Summary. p. 2.

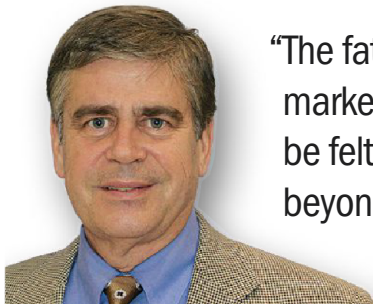
Roberts, Joseph A., Murphy, James A., and Clarke, Bruce B. 2010. Anthracnose severity of annual bluegrass putting green turf as affected by golf shoe foot traffic and sand topdressing. Proceedings of the Nineteenth Annual Rutgers Turfgrass Symposium. p. 49.

Ad Index

Companies featured in this issue

ADVERTISER	PAGE
Air-O-Lator	23
AMVAC	11
Control Solutions	3, 13
Cushman	7
e-par USA	17
FMC Corp	1
GenNext	CV4
Greenjacket	25
Grigg Bros.	15
J2 Golf Marketing	24
Jacobsen	CV2
PBI/Gordon	5
Spectrum Tech	CV3
Standard Golf	4

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.



“The fate of golf courses may follow market forces, but the impact will be felt socially and environmentally, beyond just playing golf.”

KARL DANNEBERGER, PH.D., *Science Editor*

What happens to those green spaces?

I grew up in one of those subdivisions that were built in the 1950s as part of the middle class movement to suburbia. We lived on a dead-end street that abutted what was initially a large farm field that rapidly developed into a city park with slow-pitch baseball fields and makeshift football fields for Pee Wee. Along the southern edge of the park, weeds grew on abandoned farmland. Later I realized that field, with its large milkweed population, was one small reason why we had a large annual monarch butterfly migration through the area.

Our moms often kicked us out of the house in the morning and we all headed for the park where we would spend our summer days playing until it was time for dinner. Just like the old “Leave it to Beaver” shows, all the fathers arrived home from work at the same time.

As time progressed the vacant farmland and subsequently the park, were developed for industrial use. The entrance to the park became a 30-foot-high cement wall. The resulting impact was a drab, decaying subdivision that had lost its property value along with its middle-class population.

Natural qualities of an area or locality that make it an attractive place to live and work are called amenities. Natural amenities can include unique natural characteristics of the region to

recreational opportunities that make it a destination. Natural aspects usually fall in three categories: 1) mild climate; 2) varying topography (for example, mountains); and 3) proximity to water. Given that many areas in the United States do not contain many of the natural amenities associated with growing populations, golf courses have played an important role in community development and dynamics.

In Ohio we found that golf courses planned and developed by local municipalities in the 1990s could not only increase property tax revenue, but change the population dynamics. Golf courses attracted white-collar workers with higher levels of education.

So it is with mixed emotions that I read about golf courses being closed,

abandoned and now being redeveloped for condominiums, rental property and such as the housing market begins to recover. Do I think there are too many golf courses that are too long and difficult, take too long to play and are too costly to play and maintain? Sure I do. Do I think the golf initiatives like Pace of Play and Play Forward as a few examples have come at a good time for the health of golf, especially in light of the courses built in the 1990s? Sure I do, and I’m excited about golf’s future.

Golf courses attract people to live, work and vacation in a community. The impact of a golf course on numerous communities in improving the quality of life, in my opinion, has been astounding. In our study we found that 50 percent of the residents who lived around the golf courses didn’t even play golf. These people bought their homes on the golf course for the aesthetic value and the feeling of being closer to nature.

It is with that in mind that I wonder what impact golf courses that are slated to be redeveloped for housing have on homeowners and the surrounding community. Will there be enough surrounding green space and activities to retain people? Or will these communities mimic strip malls that eventually lose customers and businesses only to be abandoned and replaced by a new strip mall down the road?

The fate of golf courses may follow market forces, but the impact will be felt socially and environmentally, beyond just playing golf. Communities face challenges in what to do with these new green spaces and whether they need to be protected, converted into multifunctional uses or developed. What these communities decide will determine to a large extent how the community is perceived by potential homeowners and to some extent, the value of golf.

Karl Danneberger, Ph.D., *Golfdom's* science editor and a professor at The Ohio State University, can be reached at danneberger.1@osu.edu.

Bacterial etiolation and decline of creeping bentgrass greens

Paul Giordano is a Ph.D. candidate in turfgrass pathology at Michigan State University and the topic of his dissertation research is bacterial etiolation and decline of creeping bentgrass greens. Paul can be reached at giorda13@msu.edu.

Q What is the correct name of the disease you have been investigating?

We use the name bacterial etiolation and decline to describe the disease caused by *Acidovorax avenae* subsp. *avenae* to distinguish this disease from other bacterial diseases in turf.

Q How widespread is the disease?

Since 2009 we have isolated *Acidovorax avenae* subsp. *avenae* associated with etiolation and decline of creeping bentgrass samples from 30 golf courses in 13 states. Most of the courses with the disease are in or around the Transition zone or Mid-Atlantic states.

We have only isolated the pathogen from putting green turf and from plants in the *Agrostis* genus. Creeping bentgrass is by far the most common turfgrass species infested, but we have isolated *Acidovorax avenae* subsp. *avenae* from colonial and velvet bentgrass as well.

The disease can be widespread on a particular golf course, affecting many greens, or sometimes more localized to one or a couple problematic greens.

A common trait among the golf courses with bacterial etiolation and decline is that many are high budget and intensely managed. Often the disease is observed during or immediately after the greens have gone through intense tournament preparation for an important golf event.

Q Describe the etiolation and decline phases of the disease.

Etiolation of leaves is the first symptom of the disease and occurs during warm days and cool nights in late spring or early summer. Etiolated leaves are several times longer than other leaves in the canopy and are noticeably yellow or pale green. The etiolation phase of the disease is more of a cosmetic problem that can result in an uneven playing surface.

When summer temperatures reach around 86° F for several consecutive days, and warm nights with high relative humidity are prevalent, the decline phase begins in areas where etiolated turf was observed. The decline phase will kill grass plants and result in a noticeably thin stand. Up close, the infected plants appear spindly, necrotic and seem to “melt” away as the disease progresses.

With the onset of hot weather, the decline phase can happen relatively quickly, and seems to be worse in cleanup passes and other high traffic areas where the turfgrass is stressed.

Q What steps can be taken to minimize damage from the decline phase of the disease?

First, reduce any and all added stress on the plants. In a few cases superintendents have skipped mowing for a few days and saw symptoms retreat. Do all the common sense steps to reduce stress such as increase mowing height, lay off aggressive cultivation, and give the plants a break.

Bacterial diseases are notoriously hard to control in plants, and no antibiotics are labeled for use on turf. That said, based on our trials and that of colleagues around the country, there

“ON COURSES AND IN TRIALS, APPLICATIONS OF TRINEXAPAC-ETHYL MAKES THE SYMPTOMS WORSE.”

does not appear to be a silver bullet to control the disease remedially.

A couple of things we have observed on golf courses and in our trials are applications of trinexapac-ethyl seem to make the etiolation symptoms worse. Additionally, ammonium sulfate applications also seem to enhance etiolation. We have much to learn about why this seems to be happening, but for now, in cases where bacterial etiolation is present, we suggest that a superintendent not apply trinexapac-ethyl or ammonium sulfate until etiolation symptoms subside.

Q Anything else to add?

Not all etiolation is created equal. By that I mean etiolation of turfgrass can have many causes. In some cases the etiolation is caused by *Acidovorax avenae* subsp. *avenae* or *Xanthomonas translucens*, but not in all cases. We have received samples in our lab with obvious chlorosis and abnormal growth and etiolation, but showed no sign of bacterial infection whatsoever. Just because a superintendent observes etiolated leaves, it doesn't necessarily mean the cause is a bacterium. A diagnostic confirmation of bacterial infection should come from your local turfgrass pathologist.



Clark Throssell, Ph.D., loves to talk turf. Contact him at clarkthrossell@bresnan.net.

Professional Grade

NEW PRODUCT HIGHLIGHTS // IT WAS A VERY GOOD YEAR

BEST OF 2013

JUST A FEW OF THE PRODUCTS WE HEARD PEOPLE TALKING ABOUT THIS YEAR

BY THE **GOLFDOM** STAFF

1. GenNext Biotech

GENNEXT BIOTECH is a bio-nutritional that contains a water soluble carbon in a fertilizer carrier. It improves color, increases turf density, improves root depth and mass, while increasing green smoothness and speed. A key to GenNext Biotech is that it promotes bentgrass growth, allowing the bentgrass to out-compete *Poa annua*, without actually hurting the *Poa annua*. The C&D balanced turfgrass formulation contains over 3,000 complexes of natural organic ingredients, microbiological bi-products, organic hormones, extracts and enzyme complexes delivered in a high energy liquid fertilizer carrier. gennextbiotech.com

2. Enclave

From **QUALI-PRO** comes Enclave, a new broad-spectrum fungicide, giving superintendents a powerful weapon in the war on fungal diseases in turfgrass and ornamentals. The first product of its kind in North America, the company says, Enclave is formulated with Quad-Control Technology that delivers effective, long-lasting protection from snow mold, anthracnose, brown patch, dollar spot and a broad range of ornamental diseases. Foursome is a unique pigment designed to enhance the aesthetic appearance of turf.

quali-pro.com/products/enclave/

3. GreenIndex+

First featured in our August

2013 issue, the GreenIndex+ from **SPECTRUM TECHNOLOGIES** consists of a board with three colors and a smartphone app. The GreenIndex+ allows users to precisely measure how green the grass is. Users take a photo of the board with the grass as a backdrop. Using the colored board as a control, the app calculates a numeric value as well as an equivalent visual rating for the grass. The value, according to Spectrum Technologies, is to take the guesswork out of applying nitrogen. But we like the idea of telling members that no, the grass literally is not greener at the neighboring club.

specmeters.com

4 ProCore SR

The **TORO** ProCore SR Series of deep-tine aerators works to alleviate subsurface soil compaction on greens, fairways and other areas. The eight models in the ProCore SR Series are available in widths from 48 inches to 75 inches wide and depths up to 16 inches. They have hydraulic remote depth adjustment, which allows the operator to change depth without getting off the tractor. A wide range of solid and coring tines are available for specific aeration applications. Models 864

and 1298 have precision-balanced coring heads to eliminate hopping, rocking and unnecessary vibration. With its 64-inch coring width, the 864 can aerate 1.5 acres per hour. Available in three-point mount and PTO drive.

toro.com

5. Practical Golf Course Maintenance: Third Edition

Co-written by the late **GORDON WITTEVEEN** and *Golfdom* Editorial Advisory Board Member **MICHAEL BAVIER**, this new third edition, released this year, includes major revisions to address the latest information on computer-operated irrigation systems, new equipment for all aspects of course maintenance, water quality and conservation issues. Of course the bread and butter of this classic is the basic techniques, in non-technical language, on maintaining consistent bunkers, topdressing, aerifying, pesticide storage, mowing techniques and more.

amazon.com/practical-golf-course-maintenance-green-keeping/dp/1118143744

THOUGHTS FROM OUR READERS

We heard talk of **GenNext Biotech** and the positive impact it was having on turf from several sources, including these reports from Hawaii and Texas:

"Our biggest pressure here in Hawaii is dollar spot. I have been using the product in rotation of my different 'cocktails' and it has changed our cultural practices in six months," says Rick Dunwell, superintendent at the Experience at Koele GC in Lana'i City, Ha. "We have gained 1 to 2 inches of root depth and cut our recovery time in half, when we have dollar spot outbreaks."

"I'm in Central Texas growing Tifgreen bermudagrass greens. I've been very pleased with the results. We have not put any fungicides or insecticides on these putting surfaces for the last three seasons," says Jamie Kizer, superintendent at Hidden Falls GC in Meadowlakes, Texas.



CONTINUED ONLINE

For more of the year's best, go to golfdom.com/category/products

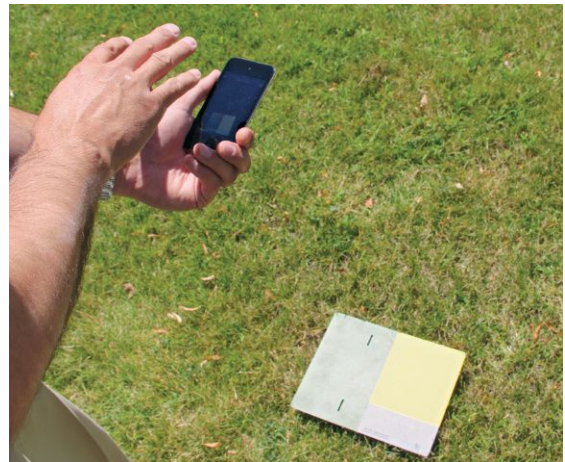
These two photos, submitted by Jim Knulty, superintendent at Bigfoot CC in Fontana-on-Geneva Lake, Wis., show a green that was aerified on Sept. 4th. The first photo was taken on Sept. 6th, the day GenNext was applied. The second photo was taken five days later, on Sept. 11th.



1



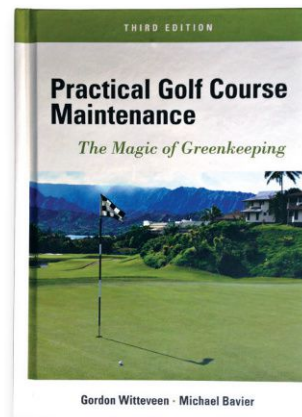
2



3



4



5

THOUGHTS FROM OUR READERS

Jacobsen's Eclipse greens mowers had a lot of people talking, including supers from Tennessee and New York:

"In addition to the many environmental benefits, the Jacobsen Eclipse mowers have also allowed us to provide a quality-of-cut that we haven't been able to produce before," says Paul L. Carter, CGCS at the Bear Trace at Harrison Bay in Harrison, Tenn. "The machines' programmable frequency-of-clip gives us the flexibility to change the amount of grass removed from the green quickly without having to change gears, sprockets or fittings."

"For me, the main selling point was the adjustable frequency-of-clip. We're using the FOC settings to raise the height-of-cut and maintain ball speed. I also like that you can set and lock settings to take the operator out of the equation," says Scott E. Dodson, CGCS at Park CC in Buffalo, N.Y. "If Jacobsen ever comes out with a fairway mower that has the Eclipse technology, I would buy it without a demo."



1



2



3

1. Eclipse greens mowers

2013 was a banner year for **JACOBSEN'S** hybrid and all-electric walking and riding greens mowers. The greens mowers are the first of their kind to offer separate, adjustable settings for reel speed and mow speed on an easy-to-read LCD screen. This allows superintendents to quickly and easily set the frequency-of-clip to match course conditions. With no hydraulic oil to change (or leak), coupled with significantly reduced noise and exhaust emissions, the Eclipse line appeals to superintendents with environmental concerns and noise restrictions. jacobsen.com

2. Briskway fungicide

Briskway fungicide from **SYNGENTA** combines a cooling DMI (DeMethylation Inhibitors) active ingredient called difenoconazole with azoxystrobin, the strobilurin active ingredient found in Heritage fungicide. The differing modes of action from azoxystrobin and difenoconazole work together at a calculated rate that performs in high temperatures, reducing the risk of harmful side effects. Together, they enable Briskway to control a broad spectrum of diseases, including dollar spot, while delivering the plant health benefits of azoxystrobin — all without any heat restrictions or PGR effects. greencastonline.com

3. 7500A fairway mowers

The 7500A E-Cut Hybrid fairway mower from **JOHN DEERE** was sneak-previewed at the 2013 Golf Industry Show, but it turns out we'll have to wait a few more months before we can get our paws on it. The 7500A features a TechControl display for improved supervisor controls during operation, maintenance and diagnostics; LoadMatch settings for improved cut quality and productivity; enhanced operator comfort with increased legroom and multiple steps; and is Tier 4 compliant. deere.com



CONTINUED ONLINE

For more of the year's best, go to golfdom.com/category/products

THE Golfdom

APP FOR iPad®



**NOW
AVAILABLE!**

FREE

**DOWNLOAD
IT TODAY!**



Search **Golfdom HD** on the App StoreSM

Direct link: <http://itunes.com/apps/GolfdomHD>

For more information, visit **Golfdom.com**



The 19th Hole



Bill Maynard, CGCS

DIRECTOR OF GC OPERATIONS // The CC of St. Albans, St. Albans, Mo.



What can I get you, Bill? I prefer Miller Lite, but in St. Louis, Millers are few and far between.

What is St. Albans known for? Quality. Quality from their culinary team, professional service staff and quality golf experience on two top-10 ranked courses in the state of Missouri.

So any suggestions from the menu?

Grilled salmon on sautéed vegetables and spinach.



What has been your golfing highlight?

Two hole-in-ones, both within 9 months of taking a new job. The first hole-in-one was the very next shot after a member holed out on the par

three eighth at Milburn CC (Overland Park, Kan.) during the member-guest.

Back-to-back holes-in-one? C'mon! It was a "beat the pro" contest, I was asked to sub for the injured golf pro. After we celebrated the member's hole-in-one, I said "there is no way I am getting it

closer." As luck would have it — and odds of 1,700,000 to 1 if Tiger Woods were hitting the shot — I knocked it in the jar on top of him. I was told to shut my exuberant mouth when I proclaimed "you haven't beat me yet, tee it up again!" The golf professional explained, his ball is on the bottom of the cup, therefore he *did* knock it closer. The member won a set of irons, I won a slice of humble pie, a reputation for a golf game I don't

have and a muzzle for my mouth.

How will you and your staff celebrate the holidays? A pot luck lunch in the shop, a gift exchange and some fun games. My favorite staff game is grown men on children's tricycles relay games.

You don't really have guys getting on children's tricycles? I sure do! Hint to success — push over the guy next to you right at the start, then pedal like your life depended on it.

Fill in the blank: The state of our industry is: Getting smarter and smarter. We never stop learning. We are learning from each other, university researchers, technology and our association. Golf maintenance professionals are gaining recognition across the globe and we are pulling our weight like never before at our facilities.

Dressing better than ever, too. Is that a half Windsor knot? Actually, it's not — I go for the full Windsor. I try for the middle ground of the Shannon Sharp 4-inch-wide knot and the Blues Brothers 1-inch-wide knot.

What is the ugliest tie you own? A tie from my college days that I used to tie my toga at the Sigma Alpha Epsilon house toga party. I still keep it in the closet because you never know when you'll get invited to another toga party.



As interviewed by Seth Jones, Nov. 22nd, 2013



"SERVING ON GCSAA'S BOARD OF DIRECTORS HAS GIVEN ME THE ABILITY TO GIVE BACK AND SERVE OUR MEMBERSHIP... AND HONESTLY, I THINK THE WHOLE THING HAS MADE ME A BETTER SUPERINTENDENT."