

Golfdom

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REES JONES SPEAKS FOR THE TREES

Tests over a Two-Year Period Indicate Reduce Fungicide Applications

NEW SMITHCO ULTRA 10 AND ULTRA 15 FAIRWAY ROLLERS WITH MONEY-SAVING TOW-BEHIND DESIGN



Ultra 10 Fairway Roller

- The new 5 gang Ultra 15 Fairway Roller has a balanced hydraulic system to keep ground pressure even over its 15' swath. At 10 mph, the Ultra 15 will roll 18 acres an hour – three times as fast as mowing!
- Our 3 gang Ultra 10 Fairway Roller has a 10' swath to provide 12 acres an hour of productivity at 10 mph – twice as fast as mowing!
- The Ultra 15 has a 150-gallon water ballast tank while the Ultra 10 uses a 100-gallon tank.
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Ultra 15 Fairway Roller

Increased Rolling of Fairways can an Average of 50%.

–University of Massachusetts, Stockbridge School of Agriculture

**For years, rolling
was just for greens.
Today you could be
in for a big surprise.**



Geunhwa Jung and Jay Popko
Stockbridge School of Agriculture

TEST SUMMARY

- Plots were unrolled.
- Rolled 3 times/week.
- Rolled 4 times/week (Double roll 2 days).
- Rolled 6 times/week (Double roll 3 days).

Different fungicide spray schedules were tested (Threshold vs Calendar at 21-day intervals) and initial results indicate rolling can reduce fungicide applications if threshold-based spray programs are used by 40 to 50%. This should be a major cost reduction if further test plots confirm this. Testing will continue next year on fungicide application as well as the effectiveness of rolling at reducing dollar spot, thatch and clipping yields.

More rollers with more features than anyone.

Smithco 50 YEARS
1967 ★ 2017





The Wheel Renaissance

The maintenance equipment revolution is coming now. // 15

APPRECIATING THE FOREST FOR THE TREES

A classic course renovation unabashedly embraces the shade

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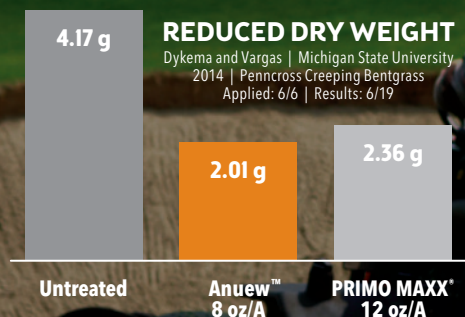
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Golfdom

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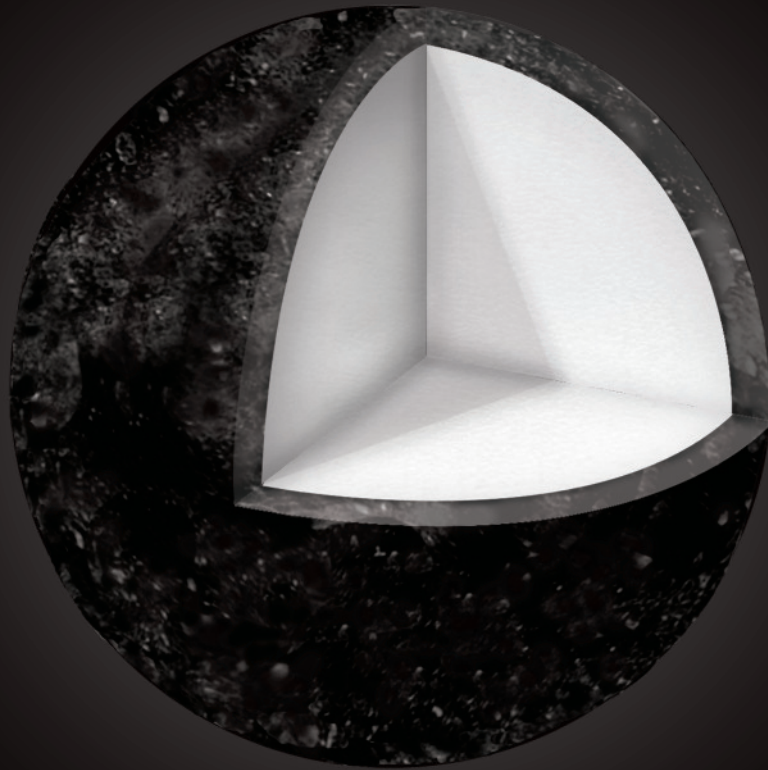
GOLFDOM (ISSN 1526-4270) is published monthly by North Coast Media LLC, IMG Center, 1360 East 9th Street, 10th Floor, Cleveland, OH 44114. **Subscription rates:** For US, Canada and Mexico, 1 year \$58.95 print and digital; two years \$88.95 print and digital. All other countries, 1 year print and digital \$109.95, 2 years \$169.95. For air-expedited service, include an additional \$75 per order annually. Single copies (prepaid only) \$10 plus postage and handling. For current single copy or back issues, call 847-513-6030. **Periodicals postage paid at Cleveland OH 44101-9603 and additional mailing offices.**

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“Golf maintenance isn’t the only industry that’s been growing by leaps and bounds when it comes to new technologies to get the job done.”

SETH JONES, *Editor-in-Chief*

Turf isn’t the only cutting-edge industry

In this issue we celebrate some cool new technologies for the turf maintenance business. I mean, check out the Tweel and the Shark Wheel — they look like they came from an episode of Star Trek: Deep Space Nine. (OK, I realize in that same feature that the Zeblaster essentially is a fancy way to shoot Canadian geese poop off your work boots, but hey, that’s progress.)

Golf maintenance isn’t the only industry that’s been growing by leaps and bounds when it comes to new technologies to get the job done. Allow me to brag about the recent advancements I’ve been able to utilize here at *Golfdom*...

Hand-Held Jolt High Performance 200. Some might call it a cattle prod, but I call it inspiration. It’s the only way I can get Matt Neff to write for the magazine on a semi-regular basis. I’m taking it to Arizona next to help “inspire” Mark Woodward...

TSA Pre-Check. I take about 24 trips a year, and it makes jet-setting from

chapter meetings and golf tournaments so much easier. Honestly, TSA Pre-Check has ruined my ability to wait patiently in an airport. I now enter an airport and expect to be sitting comfortably at an overpriced bar with a microbrew in hand within 10 minutes. (Here’s a tip: A membership is \$85 and lasts five years. If you carry an American Express, AmEx will cover the cost as a member benefit.)

LASIK Surgery. Apologies to my 100-disc jukebox, this is the best thing I’ve ever bought for myself. I was dang near legally blind before LASIK surgery. Now I feel like I can see through walls. My

vision is so good I can catch and correct Associate Editor Grant B. Gannon’s typos from the future.

Greenskeeperapp.com. I’ve seen Bill Kreuser, Ph.D., University of Nebraska, do a presentation or two on this useful tool. OK, so it’s not exactly for me, but Kreuser promised to pay for the bar tab whenever I mention it in the magazine. Bill reminds



me of Biff from “Back to the Future,” if Biff had a good sense of humor and a Ph.D. in horticulture, so he’s good by me.

Aleve. Aleve is a magic medicine. Good for my achy knees after two hours of pick-up basketball or for the morning after my Jayhawks flame out in the NCAA tournament. True story, I once asked my daughter’s pediatrician if Aleve was OK to take following a hard night of drinking, or if it was harmful to my kidneys. She told me it was safe (and as a professional journalist, I can relay this medical advice to you), but then she asked me how old I was, and if I should just consider the alternative: *growing up*.

Waze. This is the ultimate navigation app. My favorite part is that it alerts you to speed traps. But a more practical use is for finding those ultra-high-end golf clubs, because you know the uppity membership likes to hide the front entrance like Bruce Wayne hides the Batcave. But Waze sees all and tells me exactly where and when to turn... in a sexy British accent.

5-Hour Energy drink. Pomegranate flavor. Pomegranate is a fruit, I think. Not sure. But I like the caffeine version.

Lastly, a few overrated technologies I don’t trust: Spell Check, the selfie stick and Facebook.

Don’t trust them, and don’t trust anyone who does.

Email Jones at: sjones@northcoastmedia.net or tweet him @SethAJones.

TWO PASSES, A THING OF THE PAST



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Reduce aeration time and improve turf condition with the Jacobsen GA600 tractor-mounted aerator. The Jacobsen AerStrike™ 4 tine attachment system produces optimal hole spacing and a diamond pattern that reduces aeration time and improves turf condition, all in a single pass. The GA600 with the PerfectStrike™ tine arms ensure that the tines enter and exit the turf perfectly straight. Contact your local Jacobsen dealer today for more information.

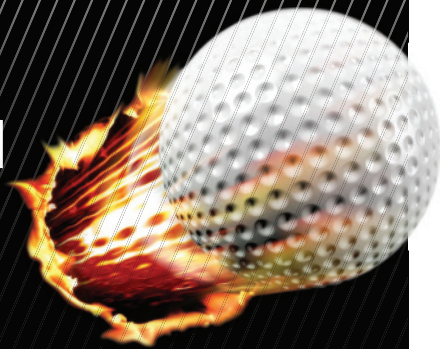


AerStrike 4 Tine attachment System

Discover the next generation of aeration with the new Jacobsen GA600, the industry's only aerator that performs deep and conventional aeration in a single pass.

Starter

NEWS, NOTES AND QUOTES



//TURF BOWL XXIII



(Far left) Former GCSAA President Pete Grass and (Far right) David Plaster, sales manager, John Deere Golf, present the \$4,000 first prize check to Turf Bowl champion team Penn State No. 10 (L to R) Curt Moore, Kevin Heimann, Thomas Goyne, Derek Buganza and their advisor Ben McGraw, Ph.D.

PENN STATE RETAINS TURF BOWL TROPHY

➔ More than 200 students from 58 colleges and universities across the nation competed in the 23rd annual GCSAA Collegiate Turf Bowl, held in Orlando. For the third year in a row, a team from Penn State University was awarded the traveling trophy and the \$4,000 first-place prize at the closing celebration of this year's Golf Industry Show.

The Turf Bowl, presented by John Deere, tested teams on their turf management knowledge and ability to think quickly under pressure to identify solutions to challenges superintendents often face, according to a press release.

"Every year, the Turf Bowl inspires myself and others at John Deere in our

ongoing commitment to elevate and equip the next generation of turf professionals to grow and succeed," says David Plaster, sales manager, John Deere Golf. "The Turf Bowl competition builds a strong foundation for their career, and John Deere is proud to play a role in it."

The four members of Penn State's team No. 10 also received an invitation to volunteer with the course maintenance crew at the 2017 Players Championship at TPC Sawgrass' Stadium Course, Ponte Vedra Beach, Fla., May 11-14.

Teams from Cal Poly Pomona, Auburn University, SUNY Delhi and Michigan State University rounded out the top five finishers.

//FRENCH LICKIN' GOOD

NGCOA NAMES COURSE OF THE YEAR

Larry Bird isn't the only nationally recognized entity from French Lick, Ind. The National Golf Course Owners Association has named French Lick Resort's Pete Dye Course its 2017 course of the year.

"We are thrilled and humbled to receive this honor from the NGCOA, and to be recognized alongside so many top facilities from around the country," Dave Harner, director of golf at French Lick Resort, told the *Herald-Times*, Bloomington, Ind.

The finalists were selected based on four criteria; quality of golf course, quality of ownership and management, outstanding contributions to the local community and significant contributions to the game of golf, according to the NGCOA.

The course also earned *Golf Digest* and *Golf Magazine* best new course recognition when it opened in 2009.

The other finalists recognized were Canoe Brook Country Club, Summit, N.J., Chi Chi Rodriguez Golf Club, Clearwater, Fla., and Poppy Hills Golf Course, Pebble Beach, Calif.

//LIMITED DRIVE TIME

USGA, R&A RELEASE DRIVING DISTANCE REVIEW

The USGA and the R&A recently published their annual review of driving distance, a research document that reports findings on driving distance in golf. The review examines driving distance data from seven of the major professional golf tours, based on approximately 285,000 drives per year.

Noted in the paper was that between 2003 and the end of the 2016 season, average driving distance on five of the seven tours increased by approximately 1.2 percent, around 0.2 yards per year. For the same period, average driving distance on the other two tours studied decreased by approximately 1.5 percent.

The average launch conditions on the PGA Tour — clubhead speed, launch angle, ball speed and ball backspin — have been relatively stable since 2007, according to the report.

View the 2016 report at usga.org and RandA.org.

// MOVERS & SHAFFERS

Latshaw to Merion, Shaffer to retire

➔ Two big names in the industry made headlines recently when it was announced that one is retiring and the other is having a homecoming.

Paul B. Latshaw, CGCS, director of golf course operations at Muirfield Village GC in Dublin, Ohio, will be returning to Merion GC, Ardmore, Pa. to take the same position. Latshaw was the superintendent at Merion from 1992 to 1998. Upon Latshaw's arrival, current Director of Golf Course Operations Matt Shaffer will take the title of Director of Golf Course Operations Emeritus and work alongside Latshaw during the transition.

Shaffer tells *Golfdom* that at age 64 and after 42 years as a superintendent, the timing is right for him to step aside.



Paul B. Latshaw

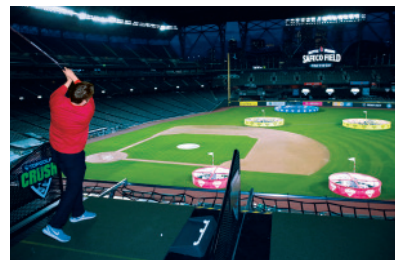
He also says that Latshaw is his best friend and was his top choice for the job.

"They're going to do a big (renovation) project on the East Course. I told them the person who is going to take care of it in the future should be the person who oversees the project," Shaffer says. "I don't want to be the old quarterback who was good but then got old. My batteries aren't fully charged. I'll miss the camaraderie, my crew, the superintendents... but I won't go cold turkey — that would be hard. I'll ease out."



Matt Shaffer

Latshaw's previous experience includes Oak Hill CC, Wilmington CC, Augusta National, Pine Valley and Oakmont. Latshaw is the son of 2017 Old Tom Morris Award winner Paul R. Latshaw.



// STADIUM GOLF

TOPGOLF TAKEOVER

Topgolf recently sold out its limited-time event "Topgolf Crush," hosted at the Seattle Mariners' Safeco Field.

Hitting bays were set up in the stands along the field's first base line toward giant targets in the outfield, ranging from 40 to 150 yards away. Topgolf's ProTracer technology computed the player's score based on the accuracy and distance of the shot and then send the score to the bay screen. Participants could book tee times for one-hour increments at \$65 for general admission and \$125 for VIP Packages.

The company recently took the experience to Orlando, Fla.'s Camping World Stadium.

"We launched Topgolf Crush at Safeco Field in Seattle last weekend and the reception was incredible," says Topgolf Media President YuChiang Cheng in a press release. "The sold-out event proves Topgolf has a fan base outside of the cities where we currently have locations."

// GOLFING ADVOCATE

GOLFER-IN-CHIEF HITS THE LINKS

President Donald Trump has held his residence at 1600 Pennsylvania Avenue for more than a month now, but the multi-golf course owner has made time to play golf with some heavy hitters.

Trump recently was seen on the course at his Trump International Golf Club, West Palm Beach, Fla., with four-time major champion Rory McIlroy and former New York Yankee Paul O'Neill. "He probably shot around 80. He's a decent player for a guy in his 70s," says McIlroy, according to *No Laying Up*.

The previous weekend, the Commander-in-Chief was seen at Trump National, Jupiter, Fla., toting around a golden driver worth more than \$3,000. Japan's Prime Minister Shinzo Abe, who presented the driver to Trump, was Trump's playing partner that day. Another four-time major winner, Ernie Els, joined the pair.

// AT THE MOVIES

YOUNG AND OLD TOM MORRIS ON THE BIG SCREEN

➔ Grab a box of popcorn, because golf will once again make it to the big screen. "Tommy's Honour" is the story of the complex relationship between the pioneering Scottish golf champion and original superintendent Old Tom Morris and his son, Young Tom Morris.

For a 30-minute behind-the-scenes special on the film, mark down Saturday, March 25. It will air immediately following coverage of the Dell WGC World Match



"Do you think American audiences will need subtitles for our Scottish accents, dad?" "Shaddup 'n heet th' guttie!"

Play. The trailer is available at tommyshonour.com. The film is based on Kevin Cook's book, "Tommy's Honour: The

Story of Old Tom Morris and Young Tom Morris, Golf's Founding Father and Son."



“Trees too often are added to a golf course without considering the long-term effect and often merely are used to defend par, add fall color and separate holes.”

SEAN TULLY, superintendent, Meadow Club, Fairfax, Calif.

Stumping for conservative tree use

Trees and grass often are at odds with each other on a golf course, as are the views of golfers when they disagree with what a superintendent believes is best for the course. These kinds of disagreements aren't always in play, but the desire to have a course set up to play as hard as possible shouldn't always win.

Trees can be beautiful things and the key element to some courses, as Rees Jones notes in the story “Appreciating the forest for the trees,” (see page 24.) But when distributed too liberally they can detract from the golf experience. Trees too often are added to a golf course without considering the long-term effect and often merely are used to defend par, add fall color and separate holes.

Back in the 1920s, golf was not about challenging every shot on the course. Fairway widths averaged between 50 to 60 yards(!), allowing for angles of play that could benefit a more thoughtful player. As trees were planted and defense of par became a principal to be followed, golf

courses were narrowed and lined with trees. The change was subtle, but over the years as the trees matured they started choking off angles of play and broad vistas. Too often any open spaces between holes were filled, and lines of trees were viewed as optimal. In addition, fairways became ribbons of their former selves, with trees shading turf, roots impacting play and branches deflecting proper irrigation.

Tree removal has been on the rise lately with the intention of restoring long-lost vistas and architectural features, and removing older, compromised trees.

When trees are removed, the knee-jerk reaction too often is to say the hole will

play too easy, but after only a year or two the idea is moot as most golfers forget about the trees and the hole still is as challenging sans trees.

Yet another issue is planting the wrong trees to begin with. Just because someone grew up in the Northeast with hardwoods and fall color shouldn't mean that the course operators should plant trees that aren't native to an area so they can have a show of color. These trees often are slow growing and can be prone to disease. This results in trees that struggle and look out of place. Finding trees that are native to your locale helps define the course and connect it with the immediate surroundings.

Golfers are drawn to a certain look based on their own

self-interest, and that sometimes doesn't allow a course in another part of the country to have its own identity defined by the trees already there. When golfers complain about the lack of color, I often point out the varying shades of green and browns, and that this is what makes northern California special, in the same way fall color defines the Northeast.

Then there's the idea that each hole should have its own identity, going so far as to block the view of other holes on the course. I've worked on a course that removed a large number of trees that were compromised, considered non-native and in some cases invasive, and it restored broad views that add to golfers' experience. Far too often our sense of place is limited to trees, and having a longer view not only challenges the eye, but it also opens vistas that allow for taking in the topography and immediate surroundings.

Why not see the golf course roll out and develop before your eyes, adding to your experience as you reflect on the holes already played and allowing the excitement to build as you reach the climax of the final holes?


Trees have a place in golf, but I believe that fewer trees, planted in the right locations and using appropriate species, can have just as much of an impact on a golf course as having a course overrun by trees.

Sean Tully is superintendent at the Meadow Club in Fairfax, Calif. He can be reached at stully@meadowclub.com or followed at [@tullfescue](https://twitter.com/tullfescue).

STANDING UP TO STRESS

Why Golf Course Superintendents Are Making the Switch to Protassium+

Many golf course superintendents supply their courses with fertilizers that contain high levels of potassium and chloride. While high potassium content is beneficial, high chloride content often leads to turf burn and increased stress. To avoid the detrimental effects of chloride, golf course superintendents have turned to **Protassium+™ premium sulfate of potash**, a premium K source with more to offer.

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*Lower salt index has higher level of safety.

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²"Turf + K," Compass Minerals, Web. http://www.protassiumplus.com/turf

Golfdom Gallery

1 That's not my McLaren Wherever we found *Golfdom's* Seth Jones, this McLaren was nearby. We're waiting (and worried) to see his rental car receipt.

2 Graffis family Rees Jones (far left) presented 2017 Herb Graffis Businessperson of the Year award winner Tim Cloninger (far right), Shadow Creek CG, Las Vegas, Nev., his award at GIS. The 2014 and 2016 winners, Jared Nemitz, The Peninsula Club, Cornelius, N.C., and Jim Rattigan, The Plant Food Co., came by to help celebrate the honor.

3 Golden Ticket winner Jones congratulates Justin VanLanduit, superintendent at Briarwood CC, Deerfield, Ill., for placing the winning bid on a 2017 *Golfdom* Summit "golden ticket" at the annual Wee One Fundraiser.

4 Jersey style (L to R) Superintendents Russell Harris, Union County Golf Properties, Kenilworth, N.J., William Murray, Pine Brook GC, Manalapan, N.J., Mike Caggiano, River Run GC, Davidson, N.C., and Bayer's Jeff Weld celebrate at the GCSANJ's GIS party.

5 Table for 12 The North Coast Media/Quali-Pro dinner in Orlando was a perfect way to cap off the GIS. From front left to front right are: Marty Whitford, NCM; Kevin Stoltman, NCM; Rick Grant; Quali-Pro; Mike Daugherty, Quali-Pro; Jeremy Moore, Quali-Pro; Pat Roberts, *Golfdom*; Paul Fox, Quali-Pro; Erica Cardenas, Quali-Pro; Bill Roddy, *Landscape Management*; Ty Ferraro, Quali-Pro; and Chris De Cicco, *Golfdom*.

6 A Cornhusker and a Nittany Lion walk into the *Golfdom* booth... Bill Irving, Wolf Creek Club, Olathe, Kan., and Dean Graves, CGCS, Chevy Chase (Md.) Club, debate the upcoming Nebraska/Penn State game and how they both long for football season.

7 Kelly connection Thad Thompson, superintendent at Terry Hills GC, Batavia, N.Y., presented *Golfdom* associate publisher Craig MacGregor with a Jim Kelly Celebrity Golf Classic pin flag.



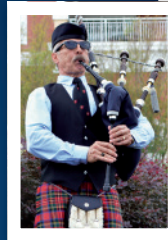
PHOTOS BY: SETH JONES (1, 5-7); GRANT B. GANNON (2, 4); ED HISCOCK (3)

Golfdom Summit

2016 Highlights

“What a great event! I really believe y’all have found a ‘sweet spot’ in the superintendent community, in that we have generally been limited to big conferences where we have no time or really inclination to meet one-on-one, or a very haphazard meeting with a local sales rep. The *Golfdom Summit* really let me dig a little deeper and think about options/products in a more rigorous and detailed fashion. It goes without saying, the chance to interface with such talented superintendents was icing on the cake.”

—SCOTT EBERS, CGCS, COLONIAL CC, FORT WORTH, TEXAS



“The *Golfdom Summit* was a fantastic experience and like no other event, meeting, seminar or gathering of superintendents that I’ve ever experienced. From learning to networking, from fellowship to bonding, it could not have been better.”

—THAD THOMPSON, TERRY HILLS GC, BATAVIA, NY

“Wow, what a great event! I was thoroughly impressed with all aspects of the Summit and came away educated, energized and full of new ideas I can use to make my course better!”

—JEFF ELDRIDGE, CGCS, LAKE QUIVIRA (KAN.) CC

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Golfdom Summit 2017
December, 2017

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"Employees who were expecting a raise were downtrodden. Some employers were happy with the news, and everyone basically got up from the table and walked away."

JARED NEMITZ, superintendent, *The Peninsula Club, Cornelius, N.C.*

A function of the injunction

Well, that was fun! The Golf Industry Show has come and gone. It was a great show — it always is. I'll bet the most discussed topic over drinks was labor — it always is.

Even the virtual discussions on social media went on for months, in anticipation of the new overtime labor law, which was scheduled to go into effect Dec. 1. Oh, how Twitter and Facebook erupted! I was amazed at how many opinions there could be on this issue. The comments and debates thundered:

"What are assistants worth?"

"I can't afford to pay my employees under the new regulations."

"It's about time. We can't expect people to work these hours for such little pay."

"Millennials don't want to work."

"We can't find anyone to work for these wages and hours."

"It's not the law that's the

problem. It was how it's being enacted."

However, at the final hour, a federal judge issued an injunction against the rule.

And just like that, it was gone.

Employees who were expecting a raise were downtrodden. Some employers were happy with the news, and everyone basically got up from the table and walked away.

Here's the rub. Where does that leave all of us? Really. Think about it. We don't *have* to do anything now. But is that true? I don't think it is, not for one second.

Many courses already had made decisions or agreements with their assistants on revising pay structure and hours or on how they would adjust classifications to fit into the

new law's requirements. I did the same thing. My whole department was about to change. But after a judge's injunction, I had the legal right to walk away without raising anyone's pay.

After spending months discussing how I was "underpaying" my management team for the many difficult hours they work, I could just do nothing and act like zilch had happened. As a leader, do I walk into a room where I had admitted that the job pays too little for too many hours and tell my crew that because the injunction's been issued, I don't have to pay you what you are worth? "Now let's get back out there and produce a high-quality product for our membership! Follow me!"

No. My general manager

and I talked at great length and decided that the right thing to do was to keep our word. Pay them what we agreed to, because they have earned it.

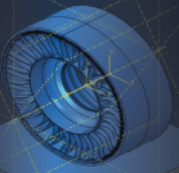
I am not suggesting paying someone below or above what they are worth. I'm just asking that we try to pay our hard-working crews better and make our starting compensation competitive. We can have discussions later about what the job is worth. I think we first need to admit there's a problem. That's the first step, isn't it? It's becoming too easy for turfies to work in other jobs for only 40 hours a week and get every weekend off and earn more than an average assistant's wage.

Our goals now should be keeping the talent we have and nurturing future young professionals in the industry. I don't believe the current compensation levels achieve these goals. We all know if someone in our area is making a competitive wage.

Successful people annually evaluate themselves, their careers, their practices and their facilities.

Please evaluate the current compensation structure within your organization. I may not have been an original supporter of the overtime law, but it did make me rethink how I was running my business. For the future of the industry, maybe you should, too.

Jared Nemitz is superintendent at The Peninsula Club, Cornelius, N.C. He can be reached at jared.nemitz@thepeninsulaclub.com or followed at [@jarednemitz](https://twitter.com/jarednemitz).



THE WHEEL RENAISSANCE



A new way to wheel

Updates to the pneumatic tire make the late 1880s invention look like an old blowhard.

BY GRANT B. GANNON

The pneumatic tire became a commercial success after Irish inventor John Boyd Dunlop unveiled his creation in 1888. Many improvements have been made to the design since then, but one issue remains: flat tires.

A couple of companies are working on improving Dunlop's creation, mostly by taking the air right out of it. The non-pneumatic — or airless — tire is available for purchase thanks to a partnership between two major companies, and soon will be available from another.

Continued on page 16

THE WHEEL RENAISSANCE



“You’ve got ride-quality improvements from the ability of the tire to flex over a given terrain,” says Chase Tew.

Continued from page 15

A Deere approaches the Michelin Man

Michelin’s X Tweel (a combination of the word tire and wheel) Turf non-pneumatic radial tire is a solution for superintendents tired of flat tires on their John Deere Z900 zero-turn mowers. The concept for the technology started as a lunch conversation between two Michelin engineers about alternatives to pneumatic tires.

That concept eventually developed into the Michelin X-Tweel SSL, a non-pneumatic tire for commercial skid steers in 2012. It was around that time when John Deere got involved.

While in the field doing market research, Chase Tew, group product manager of John Deere mowing solutions, watched a landscaping crew spend the first 45 minutes of its day fixing flat tires. He decided then and there that the problem was a big unmet need in the turf market and that it was time to explore introducing non-pneumatic tire technology into golf maintenance.

Tew brought the issue to the experts at John Deere’s Mowing Technical Center of Excellence in Moline, Ill. About eight months of research indicated that Michelin’s Tweel technology was an option that could meet customer needs.

“We met with Michelin to talk about the Tweel technology,” Tew says. “Michelin coincidentally was looking for applications for this technology. So the timing from both perspectives was quite ideal.”

The two companies started working together in 2012. The original Tweel-X SSL design was scrapped, and Michelin’s en-

gineers had to start on an idea from scratch with golf course terrain in mind.

“Our engineers — who have been designing tires for years — were given a new set of performance criteria they had never considered before,” says Jack Olney, director of sales for Michelin Tweel Technologies. “We had never before had to think about side-hill stability or turfing the tire’s tread. They were excited for the opportunity.”



Jack Olney

The new Tweel X Turf was rolled out to the golf industry at John Deere’s booth at the 2015 Golf Industry Show in San Antonio, Texas. After more than two years of research and development, the two teams were able to celebrate the wheel’s inability to go flat, but also, its less obvious advantages.

“Typical tires show wearing, depending on how much they are used on concrete or asphalt, at 750 to 1,000 hours. These tires show barely any wear at 2,500 hours,” Tew says. “You’ve got ride-quality improvements from the ability of the tire to flex over a given terrain. One of the big advantages that most people don’t catch on to is a uniform cut height. There is no variance in tire pressure from the left side to the right side. If a tire gets a small leak or something goes wrong, all of a sudden your machine could be sitting lopsided. (The Tweel X Turf) stays perfectly uniform for the life of the tire.”

The X Tweel Turf currently can be purchased only for use on the John Deere Z900 series mowers, but Michelin recently

Continued on page 18



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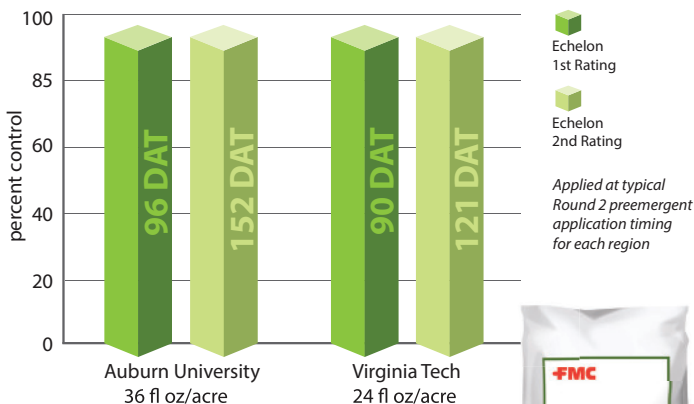
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Source: Tumbleson & Kommedahl, 1961

“ In one year, one sedge tuber can become **6,900 NEW TUBERS.** ”

Source: Tumbleson & Kommedahl, 1961



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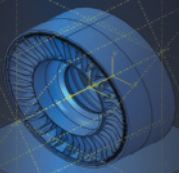


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THE WHEEL RENAISSANCE

Continued from page 16

introduced a separate X Tweel Turf tire for golf carts that fits the same as the standard 18X8.5N10 tires.

From TV to the first tee

John Deere and Michelin are names most people easily can identify, but there's at least one other company working to break into the golf industry with a non-pneumatic wheel.

Shark Wheel, a company that fans of the TV show "Shark Tank" might be familiar with, started as an improved skateboard wheel. The first set of skateboard Shark Wheels was sold in 2013, but inventor David Patrick, a lifelong golfer, says he is excited to see his creation on the golf course.

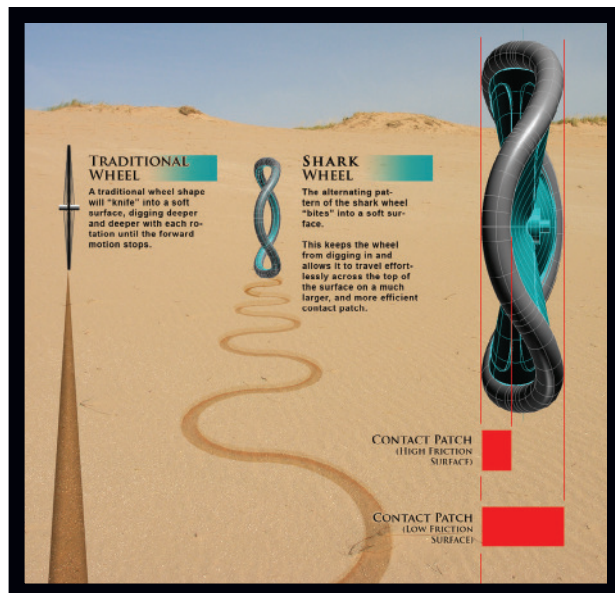
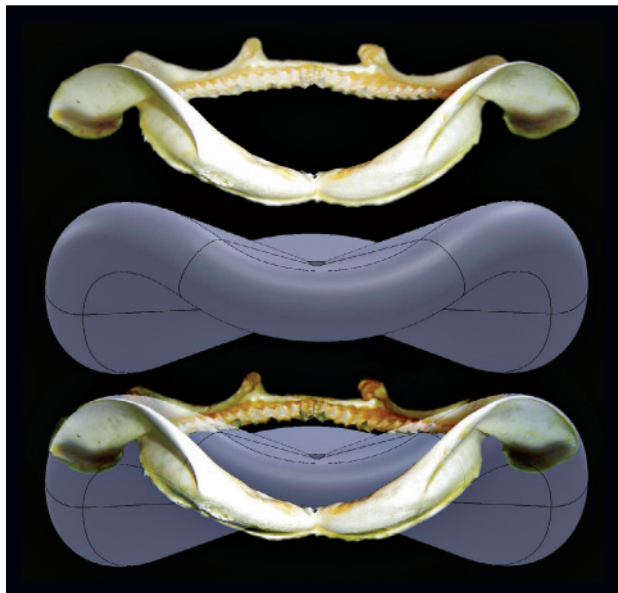


David Patrick

The wheel design — somewhere between a sphere and a cube — looks like it would wobble, but performs like a new-and-improved regular wheel. They work so well that they raised \$100,000 from crowdfunding websites, and received a \$225,000 investment from three of the entrepreneurs on "Shark Tank" (Mark Cuban, Kevin O'Leary and guest Shark Nick Woodman). According to Patrick, a golf-specific wheel was almost the product presented to the entrepreneurs on "Shark Tank."

"We only enter markets that we know that we have a distinct competitive advantage, and golf was right there in the very, very beginning," Patrick says. "We thought to ourselves, 'Well it works great on grass, sand and concrete. Who deals with grass, sand and concrete? Freaking golfers, every day!'"

The company decided to name its invention the Shark Wheel because the wheel's shape resembled a shark's jaws.



"A grippy wheel is normally slow and a fast wheel is normally very slippery," says David Patrick. "We have a fast wheel with great grip that's all-terrain."

The company's plan is to convert the skateboarding wheel to versions for both golf bag pull cart wheels and a 13-inch non-pneumatic golf cart tire. Patrick clearly is excited about the pull cart tire, calling it the "most beautiful wheel you will ever see on a pull cart." The golf cart tire is an enlarged copy of the original.

He brings up two distinct advantages that set his Shark Wheel apart. The wheel travels along a sine-wave pattern that reduces the surface area touching the ground, and when it's on concrete there's low resistance and friction, which extends the cart's battery life.

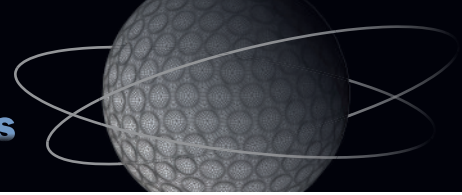
Also, a traditional tire has only one edge on the outside, but the Shark Wheel's helix shape creates three separate edges on its outside that increases the grip. When the wheel starts to slip on a surface it has multiple edges to grip or "bite."

"When you're walking on something soft like grass or sand (the Shark Wheel) pulls itself on top of the grass or sand. It stays up on top just like a wide, big tire would," Patrick says. "But when you're on a hard surface it pulls like there's nothing behind you. It's like the skinniest 10-speed tire you've ever felt. It mimics a snake's movement through the grass. They're using the undulating pattern to pull themselves forward."

Designs are ready and the selling pitch to consumers is in place, but when will superintendents see the Shark Wheel on the golf course?

Patrick says the company is still looking for a strategic partner in the golf industry to work with to release the product. Once they find that partner, he hopes to have a manufactured product within six months. His goal is to have the Shark Wheel on golf courses this year. 

PHOTOS COURTESY SHARK WHEEL



OUT-OF-THIS-WORLD PRODUCTS

If an airless wheel seems futuristic, wait until you see these products.

BY THE GOLFDOM STAFF

While traversing the Golf Industry Show trade show floor, we kept a lookout for the next new — and unusual — products that could help readers make their operations more efficient. We found new products from the Netherlands, New Zealand, France and even one that has been tested in... outer space.

While we haven't had to rocket a copy of *Golfdom* to space (yet), here are a handful of products we believe could make a world of difference.

Trimax Snake

Former Texas-based (and third-generation) superintendent Jamie Kizer was at the GIS wearing a new hat: that of New Zealand-based, family-owned mowing company **TRIMAX**. Kizer says the Snake, a heavy-duty tow-behind rotary mower that cuts a 127-inch width, was a “game changer” for his golf course, and now he’s full-time selling the mowers.

Kizer says the Snake is built by hand and built to last. The Snake increases productivity, allowing some superintendents to reduce mowing times by up to 50 percent. Full-width rollers allow the Snake to mow over extreme undulations without blade strikes. The “Kerb Jump” function enables all three mower decks to be lifted just off the ground without disengaging the PTO for quick turns or traveling paths.

Trimaxmowers.co.nz

Continued on page 20

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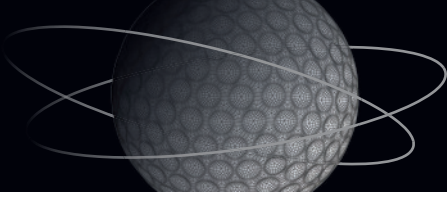
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Trimax Area Salesman Jamie Kizer poses with the Snake heavy-duty mower.

Continued from page 19

Zeblaster

The amount of water used to wash dirty equipment, golf course accessories or crewmembers' shoes can add up quickly when using a simple hose around the shop.

The Zeblaster, from French company **ZELUP**, is a three-in-



The Zeblaster propels extremely fine droplets of water at .06 gallons to .26 gallons of water per minute.

PHOTOS BY: (LEFT) SETH JONES / (RIGHT) GRANT B. GANNON

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one washer, scrubber and dryer cleaning system that uses water efficiently. When the two-fold trigger is fully locked in position, the Zeblaster propels extremely fine droplets of water at .06 gallons to .26 gallons of water per minute. Bristles on the end on the device provide scrubbing abilities. To dry, holding the trigger in the intermediate position releases a stream of compressed air.

Zelup.golf

Vredo Seeder

The Netherlands-based **VREDO** introduced its Vredo Seeder to the U.S. golf market thanks to a partnership with Aqua-Aid. The Vredo Seeder is a lighter, more agile inter-seeder, according to Vredo Export Manager Pieter-Teunis Hoogland, that places grass seed in direct contact with the soil and results in about a 96-percent germination rate.

Hoogland says there's no plowing, cultivating, leveling or rolling out with the Vredo. Two discs in the shape of a "V" make a narrow slit in the turf. The support wheel provides the propulsion of the cam wheel, giving a nearly perfect seed application. The seed is guided between the V shape of the discs and is



Vredo calls the machine an "inter-seeder" as opposed to an "overseeder" because it puts the seed directly in the ground.

then dispersed into the slit at the correct, adjustable depth. The inter-seeder is equipped with skids to preserve the structure of the existing turf. The compaction roller seals the slit and presses the turf back into place.

Vredo.com/en

Continued on page 22

PHOTO BY: ED HISCOCK



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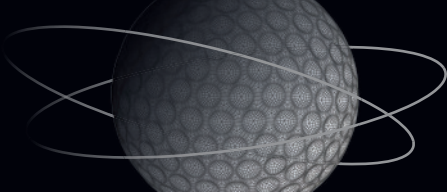
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Continued from page 21

Exteris Stressgard

BAYER GREEN SOLUTIONS Specialist Robert Golembiewski, Ph.D., showcased Exteris Stressgard at work via seven hydroponic cylinders at the company's GIS booth. Combining two AIs — fluopyram and trifloxystrobin — the Exteris fungicide features Leaf-Cote Technology to enhance spray droplet dynamics (droplet coverage, adhesion, etc.) and Stressgard Formulation Technology for enhanced plant health and the alleviation of abiotic, biotic and wear stresses.

"It's clear 'the control' — the untreated creeping bentgrass plug in cylinder 1 — has nowhere near the root depth or density that the Exteris-treated creeping bentgrass plug has in cylinder 2," Golembiewski noted. "The Exteris-treated turfgrass plug in cylinder 2 also has far superior turf color, quality and density."

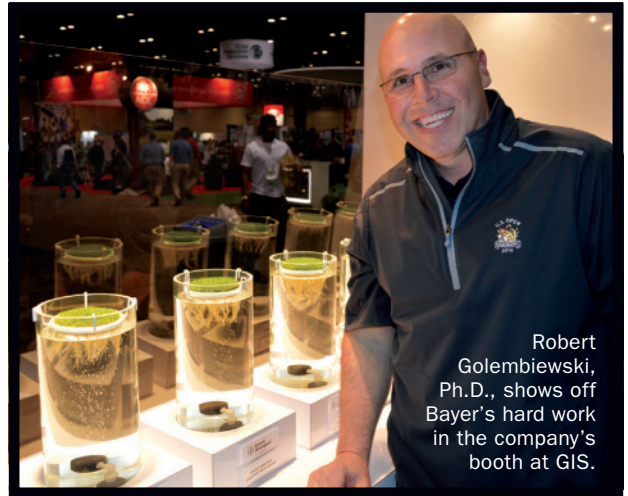
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Polyworx

The new Polyworx line of fertilizers from **HOWARD FERTILIZER AND CHEMICAL CO.** features the latest polymer-coating

technology, GAL-XeOne. Available to golf courses throughout the Southeast U.S., Polyworx is formulated to emit a gradual and controlled release of nutrients into the soil for robust growth.

The GAL-XeOne technology allows water to seep into the fertilizer prill, and then carries nutrients out through a semi-



Robert Golembiewski, Ph.D., shows off Bayer's hard work in the company's booth at GIS.

PHOTO BY: MARTY WHITFORD

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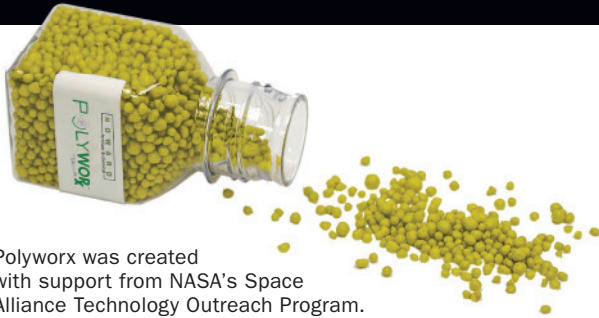
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Polyworx was created with support from NASA's Space Alliance Technology Outreach Program.

permeable membrane into the soil. Brian Buchanan, director of sales, says Polyworx performs effectively in a variety of weather conditions and soil types, and even in outer space (really). And depending on the formulation, it can deliver nutrients for up to 18 months, which helps reduce labor and logistics costs. As an added feature for golf courses, Polyworx's yellow prills easily blend into bunkers — which improves course aesthetics.

Polyworxfert.com

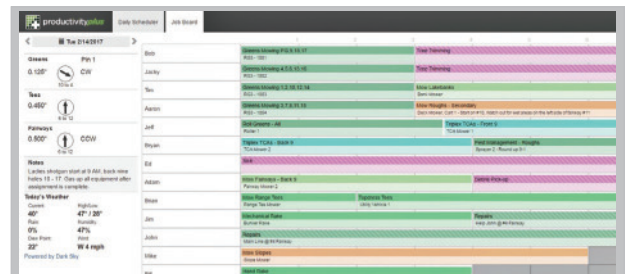
Productivity Plus

Launched at the 2017 GIS, Productivity Plus from **CUB CADET** is an online work board that superintendents can update from near and far, and employees can access from their smart phones.

Cub Cadet spent months observing superintendents and the way they assign daily tasks each morning on the white board in the maintenance building. Jeff Everett, Cub Cadet's director, golf products, says the company saw an opportunity to cut that time in half and give superintendents the ability to adjust job duties on the fly, from their homes, based on changing weather, absent employees, etc. Everett notes that one Indiana-based superintendent beta-tester was able to assign job duties every day, even though he was on a 10-day business and vacation trip out west. (No word on if it can be changed from outer space.)

Productivityplus.com

— S.J., M.W., E.H., G.G.



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APPRECIATING THE FOREST FOR THE TREES

When the Gold Course at Golden Horseshoe Golf Club in Williamsburg, Va., opened for play in 1963, Robert Trent Jones Sr. weighed in (as he often did) with a few well-chosen words on the nature of his creation. In time, the Gold would be recognized among the top 100 courses in the United States. But at the unveiling he hailed it as merely “a natural arboretum upon which a great golf course has been built.”

In the spring of 2016, Colonial Williamsburg — the private foundation that administers the sprawling living history museum in addition to the 45-hole Golden Horseshoe resort — pulled the trigger on a long-awaited overhaul to the Gold Course. Other than a course-lengthening project conducted in 1998, it had never been the subject of consequential renovations. As RTJ Sr. passed away in 2000, his son Rees (who had designed the neighboring Green Course in 1991) was engaged to lead the effort.

Seeing the trees for the forest

Industry attitudes toward golf-enabled arboreta have changed a great deal since 1963. Many architects today brag not on how many trees they preserve, but on how many trees they take down. The parkland style hasn't

A classic
course
renovation
unabashedly
embraces
the
shade
BY
PHILIP
HALL

exactly fallen from favor, but high-profile tree-removal programs at major championship venues like Oakmont (Pa.) Country Club and myriad other classic courses around the country have changed the way many view forested courses today and how they should be renovated, updated and presented going forward.

When the Gold Course reopens June 1, don't expect an open expanse. But, in the view of Rees Jones, the selective, maintenance-centric nature of the tree-removal process in Williamsburg serves as a riposte to what he sees as a dangerous trend in North American course renovation.

“I think this wholesale clearing of trees is a disaster,” says Jones, who has directed a few U.S. Open preps of his own — seven to be exact. “Yes, many of these original sites were not forested, but Ross and Tillinghast also had tree-planting plans for many of their courses. This course here was built in a forest, and that's what makes it a great golf course. Somebody has to stop this absolutely insane trend of cutting down all the trees. It just doesn't make sense everywhere.

“One thing about this course: It was an arboretum. Dad called it that. The trees are very much a part of the routing, the strategy.



Only about 100 trees were removed for the Gold Course's renovation, according to Rees Jones. "Somebody has to stop this absolutely insane trend of cutting down all the trees. It just doesn't make sense everywhere," he says.

We thinned out some trees, but it's still a proper parkland golf course. We probably removed 100 trees, but we did it mainly for the agronomic benefits."

Tree-removal definitely did not wag the dog on this project. Jones, colleague Greg Muirhead, Golden Horseshoe Superintendent Randy Waldron and a construction team from Landscapes Unlimited removed some 100 trees to benefit turf conditioning. They also oversaw the complete re-grassing of all fairways and rough areas with NorthBridge bermuda. Each putting surface was recontoured (four were completely rebuilt and/or re-sited) before being seeded with 007 bentgrass. Eight new tees were added, while every bunker was reshaped and rebuilt using the Better Billy Bunker system.

Perhaps most noteworthy, they managed all this (with help from a new technique) within the confines of Virginia's limited growing season.

The NorthBridge difference

Muirhead, Waldron and Landscapes Unlimited Project Manager Dana Grode all sung the praises of NorthBridge, and not merely for the deep green hue it's been

bred to exhibit earlier each spring and hold longer into the fall.

"We settled on NorthBridge to replace what had been common bermuda because it's much more cold tolerant," says Waldron, formerly the superintendent at the Golf Club of Georgia. "We had 65 to 70 acres of existing common bermuda here. I sprayed it out three times prior to the contractor even being on site. But we used a new concept here: sod sprigging, or sod-to-sprig. Where they used to take a roll of sod, cut it up and spread it, this new method does less of that cutting — the sod is almost viable when it hits the ground. That was a big upside, because it's not a big growing window here in Virginia."

This was the first sod-to-sprig experience for Grode. He came away impressed.

"The application is similar to sprigging, but instead of sprigs being harvested from a turf field and transported to the site as sprigs, what you get on site is actually sod," Grode says. "We run it through a machine that grinds it up and applies it. The grow-in did really well, good coverage."

"We were lucky, too," says Muirhead, "because we avoided some big storms

during grow-in," adding that relatively dry conditions also benefitted Better Billy Bunker installation, where the gravel layer must be relatively dry for the polymers to properly adhere. "We dodged a lot of delays there. That, combined with sod-to-sprig, got this project done on time. But you can't underestimate the presence of Landscapes Unlimited. They have all the resources you'll ever need."

Muirhead is referencing not just the Gold Course, but his firm's additional renovation work at Piedmont Driving Club in Atlanta, Carolina CC in Raleigh and Atlanta Athletic Club. Rees Jones, Inc. worked alongside Landscapes Unlimited at all four venues in 2016.

Trouble over the decades

Fifty years is a long time between grand opening and meaningful renovation. The specimen trees that comprised the original arboretum at Golden Horseshoe have grown ever more mature, and that's just fine with Jones and Colonial Williamsburg. By 2014, however, the turf, drainage, green and bunker situations at the Gold Course had become increasingly trouble-

Continued on page 26

// A FOREST FOR THE TREES

Continued from page 25

some. In retaining RTJ's son to renovate, the foundation hardly could have found a more sympathetic renovator.

"Dad had some nice-looking contours in these bunkers," Jones says. "Often he and Dick Wilson would have smaller bunkers with a single nose. Later on, those bunkers got bigger and you had multiple noses because the excavators were bigger. They are fairly wide and pronounced here, and they're going to look phenomenal, in part because they have the right depth to them now. Most of them are pitched uphill, but because they're Better Billy Bunkers now the ball releases away from the sides, as it should."

For the record, the Better Billy Bunkers at the Gold Course should function to perfection. Landscapes Unlimited is an authorized installer, and Billy Fuller, the man who invented the system, served on the project as an owner's rep.



By sod sprigging, Waldron was able to grow-in the course in Virginia's short growing window, saving a month's time.

Getting the putting contours right

Jones also adjusted the contours on most putting surfaces, and moved No. 18 to the pond, allowing for long views to the lake and clubhouse. Greens were grassed with 007 bent, which replaced a Penncross/*Poa annua* mix.

Muirhead notes that a major project goal was to maintain and improve playability on what has, for 50 years, been a challenging golf course. Hence the new forward tees, two new drop areas and softer contours on the remaining greens. "We're increasing playability and giving the client

an opportunity during tournament play to keep these putting surfaces a little faster than they could before," he says.

While the budget for this renovation (\$2.5 million) was determined in 2015, evolving situations on the ground served to change the equation somewhat.

"Any time you do a renovation like this you don't know what you're going to find," Waldron says. "You feel comfortable with the scope of things, but then two weeks later you find something you didn't expect. One of the things I'd like to articulate

Continued on page 28



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“We had a great year here at Anglebrook and it looks like a beautiful fall is upon us. The best part of this year was we finished the bunker project. After six years and 54 bunkers we are done. The Klingstone was the best decision we made, it has performed exactly as advertised. The bunkers we first did in 2010 look just as good as the last bunkers we did this year. The sub-soil has been sealed in place and our sand is no longer being contaminated after a heavy rain. We could not be more pleased with the application and finished bunker look that Klingstone provides.”

Louis S. Quick, CGCS
ANGLEBROOK GOLF CLUB, LINCOLNDALE, NY

“We have had Klingstone in our bunkers now for 18 seasons and the only place we have had problems is where we tried to skimp on the product. Where we applied the product properly, the Klingstone has held up very well to the rains as well as the freeze/thaw cycles of the winter. Our original goal of reducing or eliminating the contamination of our bunker sand has been a success with Klingstone.”

Tim Johnson
SUPERINTENDENT
SPRING HILL GOLF CLUB, WAYZATA, MN

“In the fall of 2015 our course was flooded 3 times — 10” of rain in October, 14” in November, and another 12” in December. Our Klingstone bunkers performed GREAT throughout these floods!”

Jorge M. Croda, CGCS
(2015 FINALIST, TURFNET SUPT OF THE YEAR)
SOUTHERN OAKS GOLF CLUB, BURLESON, TX

“My members AND crew loved our bunkers this year. Given it was the wettest year ever, that’s saying something.”

Bob McCurdy
GOLF COURSE SUPERINTENDENT
COUNTRY CLUB OF DETROIT, GROSSE POINTE FARMS, MI

“When I took over the maintenance operation at Country Club of Detroit, I’ll admit I was skeptical of the Klingstone which had been installed a few years prior — but it really performs, I’m a believer!”

Ross Miller
GOLF COURSE SUPERINTENDENT
COUNTRY CLUB OF DETROIT, GROSSE POINTE FARMS, MI

“The final stage of our bunker renovation just started last week and I will help endorse your product to any superintendent who is going to be undertaking a bunker renovation. I have built and re-built many bunkers in my career and this product is superior to anything else on the market.”

Kevin Collier
GOLF COURSE SUPERINTENDENT
RIVERBEND GOLF COMMUNITY, LONDON, ONTARIO, CANADA

“We researched all the hardcoat liner systems prior to our full renovation. We chose Klingstone, with zero regrets — it does its job with no surprises, is simple and faster to install, and it’s less expensive!”

Pat Gradoville, CGCS
PALOS VERDES GOLF CLUB, PALOS VERDES ESTATES, CA

“Why isn’t everybody using this stuff?”

Armen Suny
PRINCIPAL, SUNY ZOKOL DESIGN
CASTLE PINES, CO

www.klingstone.com

US Patent # 6,467,991

// A FOREST FOR THE TREES

Continued from page 26

is the willingness of Robert Underwood (Colonial Williamsburg's VP of operations) to allow Landscapes and the whole team to bring things to him and say, 'We uncovered this issue that we didn't know about.' To his credit and Colonial Williamsburg's credit, he allowed Landscapes and us to correct these things."

Grode agreed: "It turned out *really* well considering all the moving parts, and that comes down to the people involved. Randy is such a hands-on superintendent. He was there every day interacting with our crews. Billy Fuller offered a lot of really great input, mostly stuff that had nothing to do with bunkers. And Greg Muirhead does such a good job working with everyone involved. I found it admirable how he worked with everyone toward solutions."

Waldron has been on site since April 2016. That's when he joined BrightView, the former ValleyCrest Golf Maintenance,



Several greens have been given softer contours. Modern greenspeeds made the original amount of pitch too difficult.

which earlier in 2016 partnered with Colonial Williamsburg to handle maintenance for all 45 holes at the Golden Horseshoe. While Waldron's arrival coincided with the onset of construction last spring, his long-term strategies required little adjustment.

"My attitude toward renovation is to get things in place that will help me *not* do so many of the routine things that take up valuable time," Waldron says. "Not shoveling bunkers, for example, means staff is freed up to tackle the detail stuff that really makes a course jump."

Another example, he says, was chronic drainage issues. "Why not correct those

now, while the golf course is closed? Here's another one: The tree removal we undertook here. There was good bit of it on the front end of this renovation, which means we won't have to remove them later when we're open for play. By taking out those trees, which were dead or dying anyway, we're getting a lot more sun on areas that were struggling. That means less sodding each spring."

That's called seeing and appreciating the forest despite the trees, and it represents a removal strategy most anyone can get behind. Even Rees Jones. **G** Philip Hall is with Landscapes Unlimited.

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// KEEPING WITHIN SITE-USE LIMITATIONS

FERROUS SULFATE FOR DOLLAR SPOT SUPPRESSION

By Camden Shelton, David McCall, Ph.D., Erik Ervin, Ph.D., and Shawn Askew, Ph.D.

Researchers at Virginia Tech demonstrated in 2012 that ferrous sulfate applied at 1 lb./1,000 sq. ft. (20 percent ferrous sulfate-heptahydrate) can reduce dollar spot pressure without traditional fungicides. Because previously tested ferrous sulfate rates were so high, trials were established to determine if lower rates also can provide desired control.

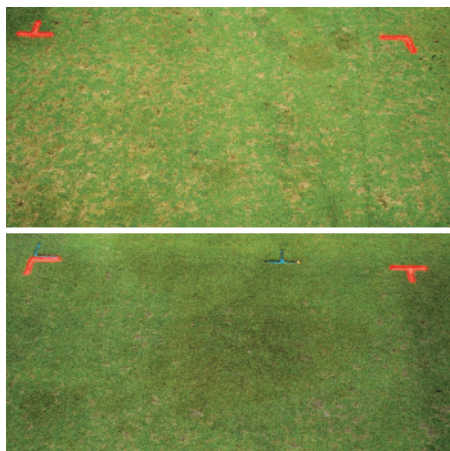
Studies were conducted at the Virginia Tech Turfgrass Research Center in Blacksburg, Va. in 2016 on a 007 creeping bentgrass (*Agrostis stolonifera*) putting green and an L-93 creeping bentgrass fairway. Ferrous sulfate was applied at five rates (0, 0.1, 0.5, 1 and 2 lbs./1,000 sq. ft.) every 14 days and evaluated weekly for its ability to reduce dollar spot.

After one season, our data suggest that rates can be reduced to 0.5 lbs./1,000 sq. ft. without compromising efficacy. The reduction was evident on both greens and fairway trials, but this research needs to be repeated in 2017 to validate our findings.

It was apparent that this strategy alone would not be sufficient for acceptable control. Therefore, we

have begun investigating how the use of ferrous sulfate may impact a chlorothalonil fungicide program. Our data suggest that ferrous sulfate can extend the longevity of dollar spot control with chlorothalonil (3.6 fl. oz./1,000 sq. ft. Daconil WeatherStik) by five days. We also are investigating how ferrous sulfate applied in conjunction with chlorothalonil can maintain dollar spot below an acceptable threshold while reducing the total amount of chlorothalonil applied per year. This research may help turf managers adhere to annual site-use limitations of chlorothalonil while still achieving acceptable dollar spot control throughout the season.

Camden Shelton, David McCall, Ph.D., Erik Ervin, Ph.D., and Shawn Askew, Ph.D., Virginia Tech University. Reach Cam Shelton at cam1@vt.edu for more information.



Dollar spot suppression with ferrous sulfate (FeSO₄) applied at 0 (untreated control-top), 0.5 and 1 lb. per 1,000 sq. ft. on a 007 creeping bentgrass putting green.

NEWS UPDATES

NEW HERBICIDE FOR SEEDING AND RENOVATIONS

SipcamRotam recently launched Lucto, a pre- and post-emergence herbicide with the active ingredient Mesotrione. Packaged in tip-and-pour 1 quart containers, the product is designed to eliminate bentgrass in some cool-season turf grasses as well as control weeds at the time of new seeding or turf renovation. Lucto is absorbed by weeds during emergence or through treated foliage and is active against a wide spectrum of tough-to-control broadleaf weeds as well as some weeds resistant to glyphosate, ALS-inhibiting and triazine herbicides. For additional weed control, Lucto can be combined with SipcamRotam's Cavalcade procliamine product.

Lucto will be added to the family of SipcamRotam herbicides for the specialty products market, which includes Atrazine 4L, Atrazine 90DF, Cavalcade PQ, Cavalcade 65WDG, Eject 4L, Rometsol, Dakota, Rowrunner ATO, Sim-Trol 4L, Sim-Trol 90DF and Topeka. The company expects to have Lucto ready to ship by early spring. To learn more visit sipcamrotam.com.

“...THE BROWN PATCH AND LARGE PATCH PATHOGENS HAVE DIFFERENT AND UNIQUE LIFE CYCLES, AND SUPERINTENDENTS SHOULDN'T TREAT THEM SIMILARLY.”

Lee Miller, Ph.D.

(see story on page 30)

// **LARGE PATCH MANAGEMENT**

Debunking a large patch myth

By John Koehler and Lee Miller, Ph.D., University of Missouri, and Ross Braun, M.S., and Megan Kennelly, Ph.D., Kansas State University

Meyer zoysiagrass (*Zoysia japonica* Steud.) is favored for use on golf course fairways and tees in the United States Transition Zone because of its excellent traffic durability, low maintenance requirements and cold hardiness. Although the species is relatively pest tolerant, large patch continues to be a limiting problem for maintaining aesthetics and playability.

Large patch is caused by the pathogen *Rhizoctonia solani* AG 2-2 LP, and results in matted orange or brown patches ranging from 3 feet to 25 feet or more. Large patch symptoms appear during the slowest and weakest periods of growth, when zoysiagrass is either entering or exiting cold-weather dormancy in the cool, wet fall and spring months. In severe cases, the disease can leave



patches or rings of completely killed turf that recover slowly and open the door for the invasion of weeds such as bermudagrass.

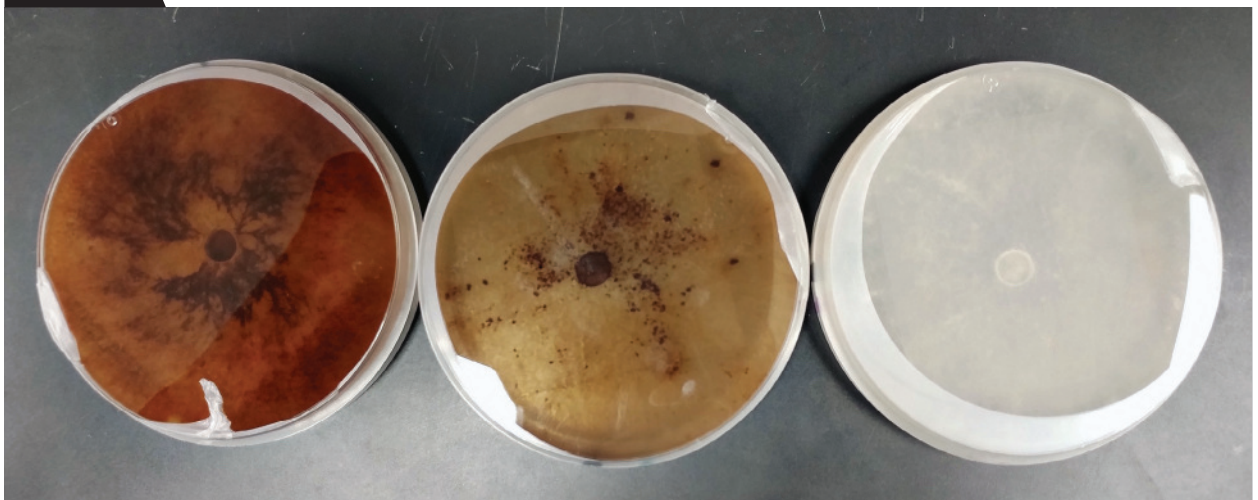
On sites with historically severe symptoms, large patch control currently requires two to four preventative fungicide applications split between the spring and fall months. To reduce the need for fungicide applications, superintendents should combine chemical applications with cultural management practices, including the reduction of leaf wetness and saturated

conditions, raising mowing heights and avoiding aerating or verticutting during disease outbreaks to avoid spreading diseased plant material.

LARGE PATCH VERSUS BROWN PATCH

Because brown patch and large patch are caused by members of *Rhizoctonia solani*, the common belief is that nitrogen applied during the large patch infection period increases large patch severity. Excessive summer nitrogen applications when brown patch is active has consistently been linked to increased disease severity on cool-season grasses. However, the brown patch and large patch pathogens have different and unique life cycles, and superintendents shouldn't treat them similarly. The diseases are caused by different anastomosis groups of *Rhizoctonia solani* (AG 2-2 IIIB for

FIGURE 1



Morphology of *Rhizoctonia solani* AG 2-2 LP on potato dextrose agar (left), calcium nitrate-amended media (middle) and ammonium sulfate-amended media (right).

ALL PHOTOS COURTESY KOEHLER AND MILLER

TABLE 1

First Trial (2013-2015)

Timing*	Kansas**			Missouri**		
	2013	2014	2015	2013	2014	2015
Spring 60°F	13 May	23 April	4 May	14 May	5 May	4 May
Spring 70°F	20 May	26 May	8 June	22 May	27 May	8 June
Fall 70°F	23 Sept	17 Sept	—	20 Sept	16 Sept	—
Standard Summer	1 June	1 June	—	17 June	20 June	—
	3 July	8 July		15 July	14 July	
	12 Aug	8 Aug		12 Aug	12 Aug	

Application dates for fall, spring and standard summer fertilizer treatments for the first trial. Spring and fall nitrogen treatments were applied at a rate of 0.75 lbs. N/1,000 sq. ft. when the five-day average 2-inch soil temperature reached the target temperature. Dates for each application are listed for each year of the study. Spring and fall fertilized plots were supplemented with nitrogen applied in June, July and August to reach a total of 1.5 lbs. N/1,000 sq. ft. per year. Standard summer fertilized plots received 1.5 lbs. N from urea/1,000 sq. ft. per year split equally among applications.

*Plots initially receiving nitrogen in spring or fall in Kansas were supplemented in the summer with the same initial nitrogen source. Plots initially receiving nitrogen in spring and fall in Missouri were supplemented in the summer with urea.

brown patch, AG 2-2 LP for large patch) that cause symptoms on different hosts (cool-season versus warm-season) at different periods of time (summer versus spring and fall) and different plant parts (foliar versus lower crown and leaf sheaths). So, nitrogen management strategies for large patch may differ from those for brown patch.

Previous studies do not demonstrate a link between nitrogen applications and increased large patch incidence. Increased rates of summer-applied urea do not increase large patch severity, and though at this point in the growing season zoysia growth is at its peak, large patch symptoms are lacking and lower infection rates are presumed. A 2013 study found that a combined spring and fall urea application decreased large patch severity compared to summer urea applications at two of the three experimental sites, contrary to the belief that nitrogen applications during large patch activity increase large patch incidence.

In addition to nitrogen application timing, nitrogen source has the potential for limiting disease. Most

previous studies regarding N effect on large patch have focused on urea, which is attractive because of its high nitrogen ratio, quick release characteristic and low price point. Nitrogen sources such as ammonium sulfate [(NH₄)₂SO₄] and calcium nitrate [Ca(NO₃)₂] have not been researched in depth for large patch control and may impact the pathogen's environment in ways that are detrimental to pathogen survival and infection. For soil-borne diseases such as summer patch, plots treated with NH₄-N had lower disease severity than those treated with NO₃-N. In preliminary studies at the University of Missouri, the large patch pathogen *R. solani* AG 2-2 LP was grown on media containing urea, ammonium sulfate or calcium nitrate as its primary source of nitrogen (Figure 1). Typically, the pathogen produces the dark brown pigment melanin in culture. On potato dextrose agar and calcium nitrate-amended media, the pathogen produced melanin and turned brown. However, on ammonium sulfate-amended media, the culture was unable to produce

melanin and remained white in color. A lack of melanin production in other plant pathogens restricts their ability to infect and cause disease in their plant hosts. Therefore, field applications of ammonium sulfate may serve as a tool to inhibit melanin formation in *R. solani* AG 2-2 LP and decrease large patch incidence. Nitrogen source and soil pH may have other direct or indirect effects on the fungus as well.

NITROGEN APPLICATION APPROACHES

These previous findings suggest the potential for developing a large patch management strategy with a specific nitrogen application scheme. In 2013-2015, a collaborative field study conducted by Kansas State University and the University of Missouri focused on pinpointing the best nitrogen application timing for limiting large patch incidence and determining the impact of nitrogen source on large patch severity. The trial was conducted concurrently at two locations in Manhattan, Kan. (Kansas

Continued on page 32

TABLE 2

Follow-up Trial (2014-2015)

Timing*	Date	Nitrogen Source
fall '14	16 Sept.	AMS, CN, U
spring '15	6 May*	AMS, CN, U, D**
fall '14 + spring '15	16 Sept + 6 May*	AMS, CN, U
summer '15-only	20 June	
	15 July	AMS, CN, U
	18 Aug.	

Application dates for fall, spring and summer fertilizer treatments of ammonium sulfate (AMS), calcium nitrate (CN), urea (U) or Duration (D) for the follow-up trial. All timings are based on a 65-degree F, five-day average soil temperature threshold measured at a 2-inch depth. All spring and fall applications of ammonium sulfate, calcium nitrate and urea received 0.5 lbs. N/1,000 sq. ft. on the listed date(s). All ammonium sulfate, calcium nitrate and urea plots received a total of 2.0 lbs. N/1,000 sq. ft. per year.

*Torque was applied once to duplicates of all plots on this date at a rate of 0.6 fl. oz./1,000 sq. ft.

**A singular application Duration CR 120-day was applied at a rate of 3 lbs. N/1,000 sq. ft.

Continued from page 31

State University) and in Columbia, Mo. (The University of Missouri). Treatments included ammonium sulfate, calcium nitrate or urea applied in spring or fall when soil temperatures at a 2-inch depth averaged 60 degrees F or 70 degrees F over a five-day period, and a standard summer nitrogen application schedule (Table 1). A follow-up — and ongoing — study at the University of Missouri combines several factors, including nitrogen application timing, nitrogen source and a single spring fungicide application in an effort to develop an integrated strategy for large patch management (Table 2).

NO THREAT IN SPRING OR FALL N

In both studies, nitrogen was applied just prior to or during visible large patch outbreaks in both the spring and fall. A previous mantra was that nitrogen applications made during the infection period would encourage lush leaf growth and predispose zoysia to more severe infection and symptom development. Another fear was that fall nitrogen applications would predispose zoysiagrass to winterkill. Results from both field studies do not demonstrate either assertion to be true.

No increase in large patch severity was observed with spring or fall nitrogen applications compared to summer

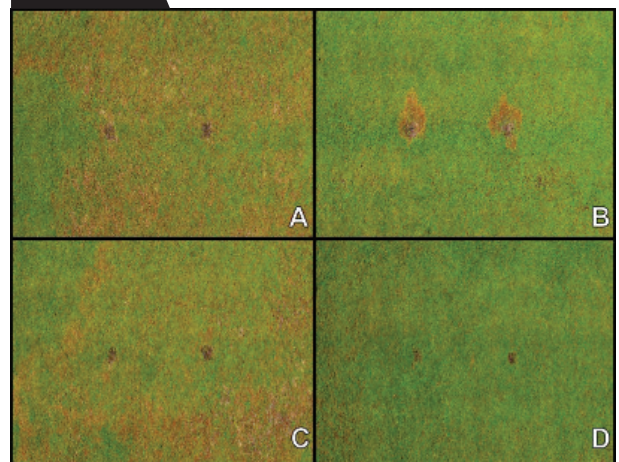
applications in Kansas or Missouri. In addition, Missouri plots receiving a late spring nitrogen application (70 degrees F soil temperature threshold) had lower large patch severity and higher percent green cover compared with those receiving a standard summer program on several rating dates in 2014. This finding was not consistent with results at the Kansas location. The details of this study were published in the peer-reviewed scientific journal *Crop, Forage, & Turfgrass Management*.

The second follow-up study is yielding similar results regarding spring fertility applications. Plots without fungicide applications that received summer-only and fall nitrogen applications had greater large patch severity in the spring than those receiving spring or combined fall plus spring nitrogen applications (Figure 2). In fact, any plot receiving nitrogen applications in the spring without fungicide statistically had similar large patch severity compared with their identically fertilized plots treated with a single spring tebuconazole application (Figure 3). There were no interactions between fungicide applications and nitrogen timing. Plots receiving fall nitrogen applications in both trials had longer sustained green turf in the fall with no increase in fall large patch symptoms and no winterkill damage the following spring. These findings go against previous notions that nitrogen applications during large patch outbreaks increase disease severity and suggest that spring nitrogen applications may encourage zoysiagrass to outgrow large patch infection.

SOURCE OF CHOICE?

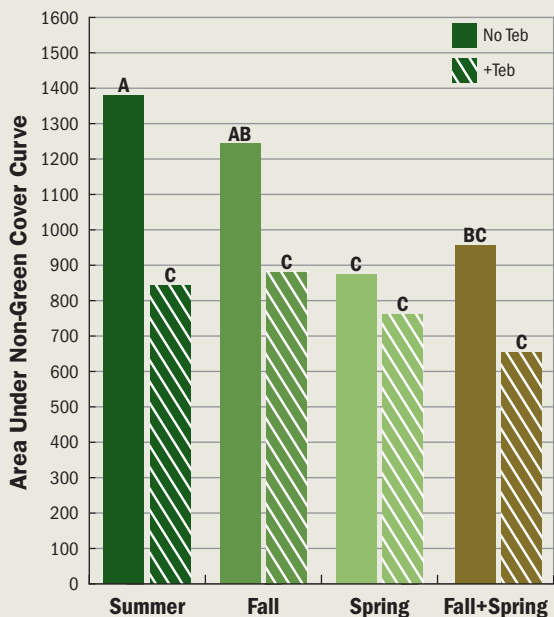
Although urea is the cheapest nitrogen source, other nitrogen sources such as ammonium sulfate may negatively affect the

FIGURE 2



Large patch development on plots receiving nitrogen at different periods of time in Missouri: Summer (A), Spring (B), Fall (C), Fall plus Spring (D). No fungicide was applied to these plots.

FIGURE 3



Area under non-green cover curve (AUNGCC) of all nitrogen timings with and without tebuconazole application in the follow-up trial at Missouri in 2015. AUNGCC is a single variable for total large patch during the spring disease season. Lower values indicate lower large patch severity.

Means were averaged across all nitrogen sources. Columns with the same letter do not significantly differ according to Fisher's Protected LSD ($P = 0.05$).
 + Tebuconazole treatments were sprayed with Torque at 0.6 oz./1,000 sq. ft. on May 6. Colored columns indicate the season(s) nitrogen treatments were applied.

large patch pathogen or its environment. On several rating dates in 2014, plots receiving ammonium sulfate in spring and fall in both Kansas and Missouri had less large patch severity compared with those receiving a neutral (urea) or alkaline-inducing (calcium nitrate) nitrogen source.

This effect was not observed in subsequent trial years, but it does provide some evidence that ammonium sulfate may reduce large patch severity. In the current study, no differences in large patch severity were observed between spring applications of quick-release nitrogen sources and the controlled-release product Duration. Duration did increase turf quality throughout the spring, which may be a consequence of increased nitrogen rate.

Future studies on spring and fall nitrogen application schedules should be conducted to determine if nitrogen source impacts may be amplified with increasing rates. Additionally, all nitrogen applications in these two studies were applied as a granular and watered in. The large patch fungus is thought to survive in soil and thatch but is not a true soil-borne disease. Infection occurs in the lower crown and lower leaf sheaths. Subsequent studies should assess

sprayed-on applications, including different water rates and nozzles, which may potentially improve the distribution and uniformity of nitrogen application and more greatly impact the infection process of this foliar pathogen.

THE BOTTOM LINE

Contrary to the previously held belief that spring or fall nitrogen applications are associated with greater large patch severity, an increase in large patch associated with those timings has not been observed in any of our field trials. Early spring applications of small amounts of nitrogen, (0.5 lbs. N/1,000 sq. ft.), may actually decrease large patch symptoms compared with summer-only applications. Spring fertility practices may boost zoysiagrass metabolism and allow the plant to outgrow and fend off the pathogen during the infection period. Spring ammonium sulfate applications resulted in a decrease in large patch severity in one of the three trial years, but was not a consistent factor in disease reduction. Fall nitrogen applications resulted in a longer fall green period without an impact on large patch severity or predisposition to winterkill.

John Koehler is an M.S. candidate and Lee Miller, Ph.D., is a turfgrass pathologist at the University of Missouri. Ross Braun, M.S., and turfgrass pathologist Megan Kennelly, Ph.D., are at Kansas State University. Lee Miller is available at millerger@missouri.edu for more information.

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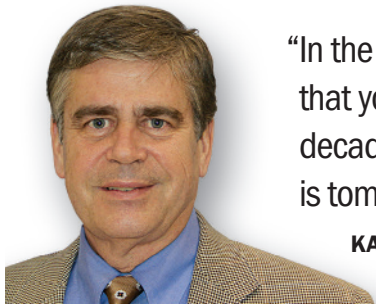
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“In the past, the future was something that you were told was years or decades off. But it seems the future is tomorrow.”

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

Man and machine

Innovation came in two forms this year at the Golf Industry Show (GIS) in Orlando. The first form was at the Opening Session Tuesday night when retired golf course superintendent Paul Latshaw received the Old Tom Morris Award. I try not to miss this presentation, when GCSAA recognizes one of its own. As I listened I couldn't help but reflect on Latshaw's innovation and impact on how we manage golf course turf and golf itself.

Latshaw created and perfected the idea of “volunteer superintendents” at professional golf tournaments. It was the 1978 PGA Championship when he sent the word out for volunteers. Seven heard the call. The volunteer superintendent idea has evolved into an army at all major tournaments.

He embraced the concept of fast and firm greens as a true test for professional golfers. At the 1988 Masters, where Latshaw was superintendent, the greens came under intense player criticism because the greens “had been hardened to the texture of a table top, so the balls won't hold.” After hearing Latshaw speak at the Old Tom ceremony, I think he might have taken criticism from professionals as a compliment.

Latshaw was first to mow fairways (crosscut) with walk-behind mowers for a national golf event, during the 1997 U.S. Open at Congressional. Considered over-the-top by many at the time (and

discontinued), the reason behind the practice — to neither damage nor influence the playability of the rough due to the turning of multiplex mowers — changed rough maintenance. We tend now to mow in a push/pull pattern (tee to green), in part to protect the edges of the rough from the wear of turning mowers, to use blowers in tournaments to fluff up the rough, as well as to give added attention to how we irrigate and fertilize roughs. I still see remnants of the walk-behind mowing at old golf courses with narrow fairways, where they mow a fairway clean-up pass with a walking mower.

So many Latshaw innovations come to mind, from collar mats to hand rolling to managing greens on the “edge” via the art of watering. These are just a few of the innovations that have raised golf to a new level of maintenance and playability, which has not gone unnoticed by golfers. Some of the changes have not come without criticism. The

increased work hours required and amount of hand labor needed often is associated with this higher level of management.

Latshaw's impact and influence will continue. In attendance at the GIS awards session — besides Latshaw — were 170 golf course superintendents and assistants with professional lineage to him. His philosophy of golf course management permeates the golf industry through his mentoring.

The second form of innovation occurred the following day on the GIS trade show floor.

Walking through the booths, you couldn't help but notice how technology is changing the golf business. Much like the car show “How It's Made: Dream Cars” on the Velocity Channel, where a few workers control robots that assemble the cars, the technology and innovation I saw on the floor will change the landscape of golf course management. (*Editor's note: Some of these innovations are featured in this issue on pages 15-23 and pages 38-39.*)

A sampling of those innovations ranged from lighter and more powerful batteries that will power turf equipment, to mowers and sprayers guided electronically without an operator, to computer software that can monitor just about anything from a superintendents' computer, notepad or smartphone. Could the future superintendent manage a course with only a few “technicians” and fleet of computer programmed and guided equipment?

In the past, the future was something that you were told was years or decades off. But it seems the future is tomorrow. It will be fascinating to watch the innovation of golf course management represented by Latshaw merge with the technological advancement of the industry.

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

Goldskeepers

Congratulations to the *Golfdom* editorial and design teams on winning an industry-leading 17 TOCA Awards!



Once again, *Golfdom* has been recognized for outstanding editorial, graphic design and photography, winning 17 awards at the 2016 Turf & Ornamental Communicators Association (TOCA) awards ceremony.

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» Photography, Video, Multimedia

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“Search. Tap. Sold!,” Pete Seltzer, Seth Jones, Grant Gannon

» Special Projects

Writing for special projects
“The *Golfdom* Report,” Seth Jones, Grant Gannon, Pete Seltzer

» Writing

General feature article – commercial publications
“Getting by with a little help from friends,” Seth Jones

» Writing

Column – commercial publications
“You might be a turf guy if...”
Matt Neff

» Writing

Ornamental feature article – commercial publications
“The buck stops here,” Hannah Schrum



Spring dead spot in bermudagrass

Lane Tredway, Ph.D., is a turfgrass pathologist with Syngenta. Lane has conducted many research projects on spring dead spot and has written extensively on the biology, management and control of spring dead spot. Lane is available at lane.tredway@syngenta.com for more information.

Q Provide a brief overview of spring dead spot.

Spring dead spot (SDS) is a perplexing disease. After 50-plus years of research, we know SDS is a complicated disease and we have much to learn. SDS is caused by three separate fungi; *Ophiophaeella korrae*, *O. herpotricha* and *O. narmari*, all of which respond differently.

The SDS pathogens are active in fall and infect the bermudagrass, but cold weather is needed to kill the turf. Infection by the pathogens alone will not kill turf. In general, SDS is favored by a cool, wet fall followed by a cold winter. The cold winter can be a prolonged period of cold or a sudden, severe cold snap.

There tends to be more SDS damage in wet, shaded areas, north-facing slopes and on sites that are desiccation prone.

Q What cultural control practices are recommended to manage SDS?

Implement a program of year-round, best management practices for healthy,

vigorous bermudagrass or zoysiagrass. SDS can be a problem on zoysiagrass as well. Promote winter hardiness of bermudagrass.

Just to give you an example of the challenge and frustration of managing SDS, we used to recommend acidifying the soil to help manage

“Spring applications of fungicides generally are not effective controlling SDS but may help the surviving turf recover more quickly.”

it, but recent research casts doubt on that approach. In a three-year trial in North Carolina, *O. korrae* effectively was controlled by calcium nitrate, which would tend to increase soil pH, but was not affected by ammonium sulfate. A different SDS pathogen, *O. herpotricha*, was exactly the opposite — it was suppressed by ammonium sulfate but not calcium nitrate.

While it is possible to identify which fungal species is causing SDS on a site, the process is expensive and

time consuming, and I’m not sure if any disease diagnostic labs offer the identification service.

Q What fungicidal control options are available?

Fungicides can work well to control SDS. Historically, superintendents have applied Rubigan (fenarimol) on putting greens in the fall to control annual bluegrass (*Poa annua*), and a side benefit was control of SDS.

Rubigan is no longer offered for sale and existing supplies are limited.

Several fungicides are available to control SDS in fall, including Velist (penthiopyrad, Syngenta). Velist should be applied twice in fall, 28 days apart, with the first application made when soil temperatures consistently fall below 80 degrees F at a 1-inch to 2-inch depth, followed by a second application 28 days later, making sure soil temperature at a 1-inch to 2-inch depth has not fallen below

60 degrees F. It’s important that both applications are made before bermudagrass enters dormancy.

Spring applications of fungicides generally are not effective controlling SDS but may help the surviving turf to recover more quickly.

Q Is there anything else you would like to add?

Before assuming the disease is SDS, be sure to get a diagnosis from a reputable lab. Extreme cultural practices used to manage ultradwarf bermudagrass greens have created additional stress on the grass, which has led to disease issues that are relatively new. Take-all root rot (*Gaeumannomyces graminis* var. *graminis*), rhizoctonia leaf and sheath spot (*Rhizoctonia zeae*) and cream leaf blight (*Limonomyces roseipellis*) all cause symptoms similar to SDS. It’s possible a fungicide will control SDS, but not one or more of the other pathogens mentioned above.



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

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3

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Toro.com

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StandardGolf.com

3 | FieldScout TDR 350 Soil Moisture Meter

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Specmeters.com



4



5



6

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4 | Custom Fairway Markers

UNDERHILL INTERNATIONAL fairway markers are available as standard disks in a range of colors or custom disks with course name and logo. Each marker has a bold 3 ½-inch yardage number and is offered with an optional 8-inch in-ground mounting pipe. Fairway markers typically are positioned in specific configurations for greater visibility, such as: three or five markers down the fairway's center at 50-yard intervals; or a diamond layout with markers placed on sides and the center.

Underhill.us

5 | Power Trackbarrow with Hydraulic Assist

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Yardmax.com

6 | ELiTE Series golf carts

Activated by Samsung SDI lithium technology, **E-Z-GO's** ELiTE Series lithium golf cars offer zero-maintenance batteries with a five-year unlimited amp-hour warranty and increased energy efficiency. Powering these vehicles are zero-maintenance lithium batteries that don't require watering or terminal post checkups. ELiTE Series vehicle batteries are half the size and a fraction of the weight of lead-acid batteries, reducing turf damage and soil compaction from vehicle weight, according to the company.

Ezgo.com

The 19th Hole



Colin Seaberg

CGCS // Barton Hills CC, Ann Arbor, Mich.



Colin, what can I get you? I like my beer as much as the next guy, but I could use an ice-cold Mountain Dew.



Tell me about your family. I've been married to my beautiful wife (Andrea) for 20 years. My daughter (Alayna) turns 16 in a few weeks; I'm scared to death about that. We've got two boys, Chase is 12, he's a gamer. Blake is 8, he's just a cool dude, likes to hang out.

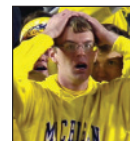
Help me out. Associate Editor Grant Gannon is getting married this month and I'm lousy with cards. What should I write? Hmm... just make sure you keep your wife happy. How about, "Make sure you take care of Momma and things will be good for you."

You and I have the same favorite NFL player: Barry Sanders. I'm the biggest Lions fan ever. My Barry Sanders jersey is the best thing my wife's ever bought for me, she got it for me the first year we were married.

You told me you wanted to work at Congressional so you could learn to grow grass in the toughest area. So

you're willing to say that D.C. is the hardest area? When I was younger and first starting out in the business I'd say, "No one has it worse than us." But now... St. Louis guys don't have much fun. Neither do guys in Cincinnati or Evansville, Ind. I think the whole Ohio Valley down to Potomac, that's just a tough area to grow grass.

Best thing you've ever witnessed? Other than my wedding and the birth of my kids... my assistant and I were working hard, and the president of the club was walking by. That was the year Michigan State played Michigan in the Big House. "Hey Mr. Buckler, you know anybody that has any tickets?" He says, "You know what, you guys have done such a good job, you guys be my guests." My assistant and I found ourselves in the luxury box at the Big House! It was a tight football game, Michigan State never led. The confidence level of the Michigan fans was growing throughout the game, to the point it was the fourth quarter and Michigan was lining up to take that punt. I remember saying, "You still got to field this punt." They said you're crazy. You know the history, he fumbles the snap, Michigan State scored and won.



Did you lose your mind? I went totally ballistic! We were rooting for MSU but not overly so — we were tactful up until then. Let's put it this way, no one has invited us back as guests since.
As interviewed by Seth Jones, Feb. 16, 2017.



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