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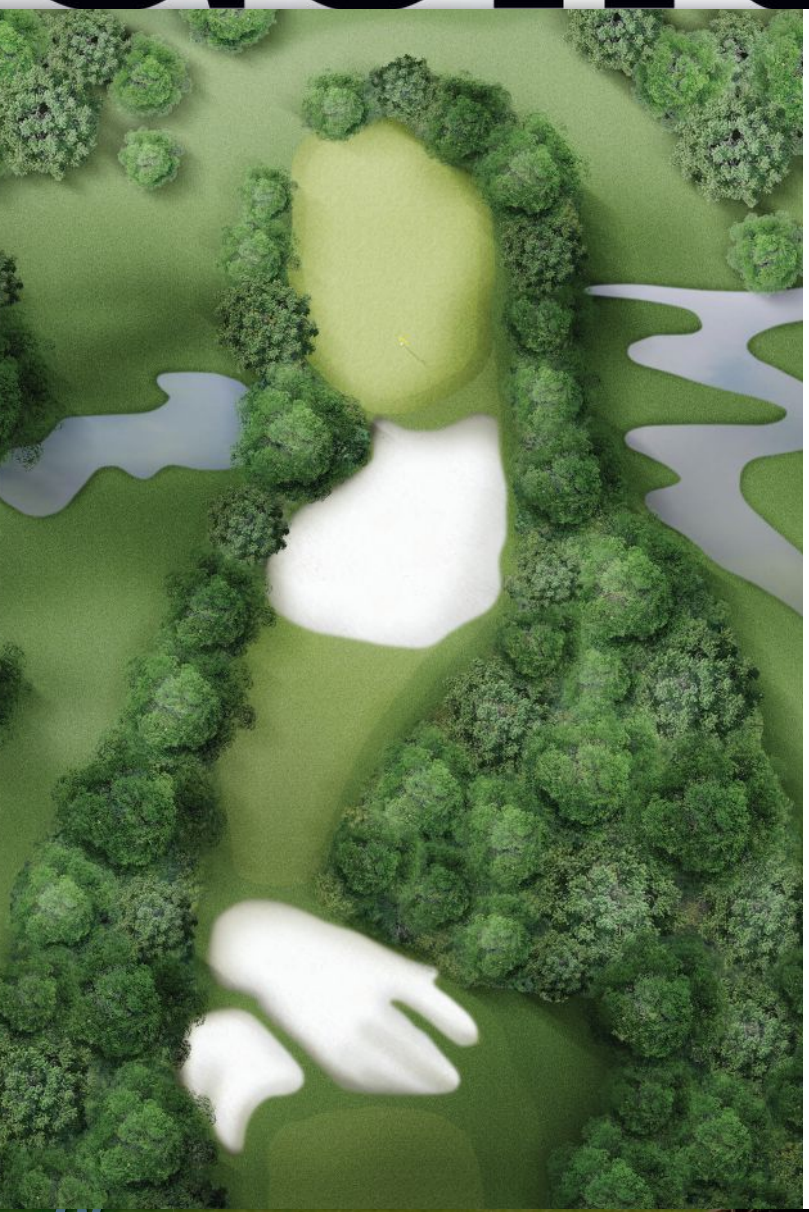

Plus

A NEW WEAPON FOR ABW

IDEAL SAND FOR TOPDRESSING

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Minny makeover

How two neighboring Minneapolis courses underwent successful turf conversions

Jeff Johnson, superintendent at the Minikahda Club in Minneapolis

Plus

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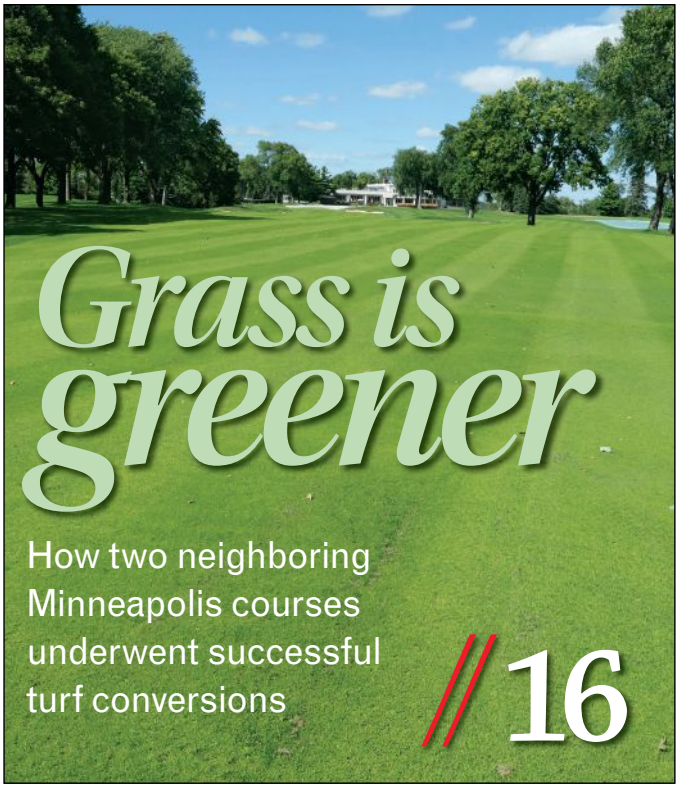
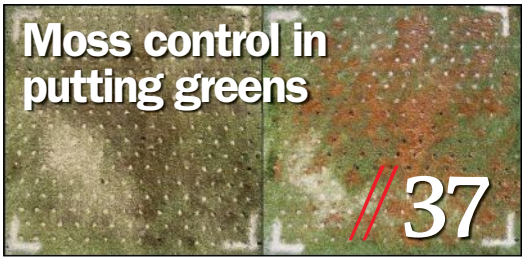


Grass is greener

How two neighboring Minneapolis courses underwent successful turf conversions

// 16

SUPER SCIENCE



Moss control in putting greens

// 37

Light and frequent topdressing programs

// 38

Grass-loving fall armyworms can decimate turf quickly

// 42

A new way to fight ABW

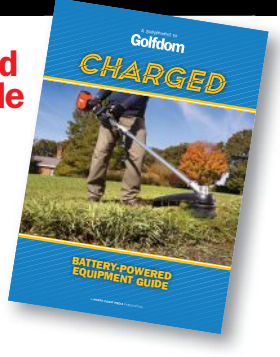
// 44

COLUMN

DEPARTMENTS

Battery-Powered Equipment Guide

// BP1
(begins after page 18)



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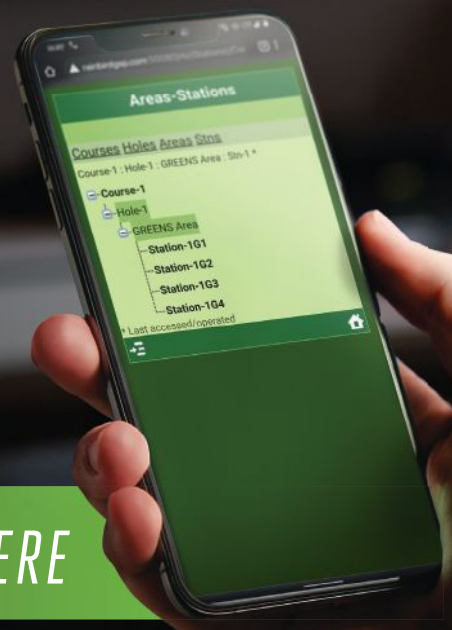

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"I forewarned the kids: There might be more of this to come, wherever we go ... if our favorite places aren't short-staffed, they might be worse: closed."

SETH JONES, *Editor-in-Chief & Associate Publisher*

Sorry folks, park's closed

If you live in the South, you know the glory of Whataburger. I fell in love with Whataburger at an early age, on a family vacation to Dallas. What first drew me in was the flying W logo — it is a mirror image of what was then my favorite sports franchise, the Wichita Wings indoor soccer team. Then I got a hold of one of their cheeseburgers, and a lifelong bond was formed.

Perhaps the only people I know of who are bigger Whataburger fans than me are my wife Adrianne and Kansas City Chiefs quarterback Patrick Mahomes. So, we're talking elite company here. And, Mahomes is bringing Whataburger to Kansas City, as if he hasn't already done enough for the Jones family! (*And my wife, of course, has also done a lot for the Jones family.*)

We took a family vacation to South Padre Island recently, a recurring vacation spot for us. We always stop in Oklahoma for our first Whataburger cheeseburger in months. This year, we eagerly sat down and waited ... and waited ... and waited. Eventually, we were delivered cold cheeseburgers. As we left, we saw the confusion that was the drive-thru line. One old guy was trying to back out of the line, tired of waiting. As we drove off, I forewarned the kids: There might be more of this to come, wherever we go. The pandemic has made the labor situation a mess, and if our favorite places aren't short-staffed, they might be worse: closed.

We stopped in San Antonio in hopes of visiting our favorite restaurant on the Riverwalk, Casa Rio. We got there and were stunned to see it was closed. The sign read, "Due to circumstances beyond our control, we cannot yet open. We hope to be back soon." I told the kids, "Sorry folks, park's closed. The moose out front should have told you." (My kids haven't seen *National Lampoon's Vacation,* but I told them to trust me, Dad just nailed a perfectly timed movie quote.)

This labor quagmire goes beyond my vacation dining woes. A friend told me about the charity golf tournament he plays in every year. Traditionally, there's a breakfast before the event and then a barbecue after. The starter announced to participants that regretfully the club lacked the kitchen staff to accommodate the barbecue this year.

If this is the norm for the kitchen staff, what has it done to the grounds crew? How has the pandemic and COVID-19 relief checks influenced your team? And what has it done to the higher-paid salaried staff?

We're working on this story now for a fall issue. If you have any insights you'd like to offer, my door is open.

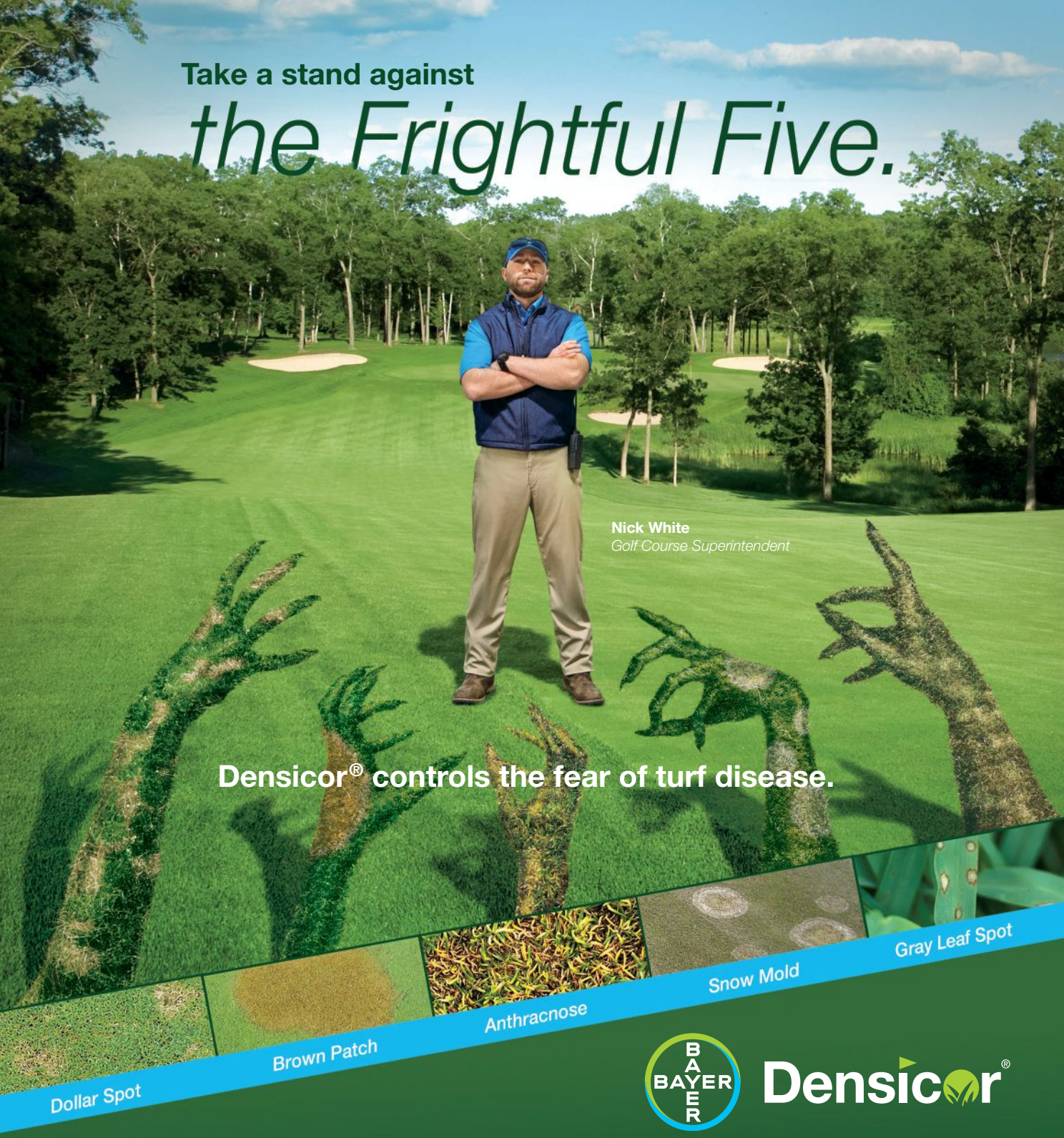
• For the past 26 years, Jeff Heide worked for North Coast Media and its publications. His name never appeared on the *Golfdom* masthead. He was our office manager, our behind-the-scenes guy. When new hires arrived on their first day, Jeff would give them the tour of the office. If a printer was fussing, Jeff would troubleshoot it. Jeff, a Cleveland sports nut, ran the office Super Bowl square pot.

Jeff Heide

We were all saddened when we learned that Jeff passed away recently at age 61. I'll fondly remember the time I came into the office and Jeff lit me up because he saw me on TV in my Royals jersey celebrating a Kansas City home run in the Progressive Field outfield. "I've been going to games for 50 years and I've never been on TV!" he told me. I told him the key was I was in the visiting team's jersey. He assured me he'd never try that trick.

The company will be attending the Cleveland Indians/Oakland A's game on August 12 to celebrate Jeff. For the first time ever, I'll be in an Indians jersey. Cheers to you, Jeff.

Email Jones at: sjones@northcoastmedia.net.



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*Dollar spot, brown patch, anthracnose, gray leaf spot and snow mold were the five most common diseases according to a national survey among golf course superintendents.

Starter

NEWS, NOTES AND QUOTES

//RULES VS. ECONOMICS

USGA ENDS EXECUTIVE SEARCH SERVICE FOR SUPERINTENDENTS

By Robert Schoenberger // *Senior Editor*

After hearing complaints from superintendents, the United States Golf Association (USGA) ended a short-lived program to evaluate and recommend superintendents for job placements, according to an email sent to GCSAA members from GCSAA President Mark Jordan, CGCS.

In Jordan's email, he said he appreciated the USGA listening to the concerns of GCSAA and its members and that he looked forward to identifying opportunities to partner with the USGA on efforts that advance the game of golf.

Rob Kick, superintendent of the Algonquin GC in Glendale, Mo., praised the USGA's decision, saying the association was overstepping its role by getting involved in hiring decisions.

"The governing body of the game of golf should be doing just that thing," Kick said, adding that the USGA shouldn't promote products, services or personnel. "The rules of golf and the economics of golf are very different."

The USGA announced in April that it was joining with GGA Partners, an international consulting firm, to launch a new service to place golf course superintendent candidates at facilities across North America. Superintendents, through the GCSAA, expressed immediate displeasure, saying the USGA should remain impartial.

"I had a problem with the USGA defining what a top-notch superintendent is," Kick said. "I think we have enough people telling superintendents what to do."

The collaboration was meant to expand the company's offerings, with the USGA Green Section's agronomic and maintenance expertise serving as key factors in targeting the unique needs of each golf course, according to an earlier press release.

//IN MEMORIAM

PERRY DYE, ASGCA, DIES AT 68

Perry O'Neal Dye, ASGCA, died July 8, 2021 in Denver. He was age 68.

Perry Dye

A member of one of the most famous families in golf, Dye received his first experience building golf courses at age 12, when he began an apprenticeship under his father, ASGCA Past President Pete Dye. He accompanied his father to work on sites in the Midwest and the Dominican Republic through his youth and college years.

In 1984, Perry formed Dye Designs, a company that builds unique, environmentally sensitive golf courses. In 1986, Dye Designs expanded internationally. In Japan alone, he designed nearly two dozen golf courses, and Dye-designed facilities can be found in more than 15 countries.

With more than 80 courses to his credit, Perry's dedication to golf included promoting growth within the industry by cooperating with and supporting industry and professional groups, civic organizations and the general public. A member of the Golf Course Builders Association of America, in 2004, he received the inaugural award that bears his name, the Perry O. Dye Service Award, which honors "exceptional individuals who have unselfishly contributed their influence to foster positive changes for the association and have continually endeavored to make it better."

//NEW KIDS ON THE BLOCK

SEPRO ADDS 2 TO ITS RANKS

SePro added Casey Zeller as portfolio leader for turf & ornamental and Aaron Palmateer, Ph.D., as technical development leader for ornamentals.

Zeller, an Indiana native, received a degree in agricultural economics from Purdue University.

Palmateer is well known throughout the industry due, in large part, to his expertise in plant pathology. Palmateer received his doctorate in plant pathology from Auburn University and his master's and bachelor's degrees in plant and soil science from Southern Illinois University, Carbondale.

GETTY IMAGES / ISTOCK-GETTY IMAGES PLUS: WELLGLAD (GOLFBALL), TADAMICHI (PUZZLE), PHANUWATNANDEE (TORN EDGE)

//TEAMING UP

Pinehurst enters long-term agreement with Deere

John Deere and Pinehurst Resort finalized a long-term agreement, naming the manufacturer as its preferred equipment provider.

As a part of the agreement, Revels Turf & Tractor, a large John Deere golf and turf distributor, will provide equipment service and support for the machines used to maintain the nine Pinehurst Resort courses including Course No. 2 and Cradle Short Course.

"We are honored to enter this long-term agreement with Pinehurst Resort, one of the most iconic golf destinations in the world," said Manny Gan, director of global golf at John Deere. "John Deere is committed to leading the industry in technology and precision turf solutions. Since entering the golf industry in 1987, our commitment to golf has resulted in our equipment being used by the best golf courses in the world, which now includes Pinehurst Resort."

Pinehurst has named John Deere as its preferred equipment partner.

As a part of this agreement, John Deere and Revels Turf & Tractor will help support with marquee events, including the 2024 and 2029 U.S. Open Championships, as well as hosting the John Deere World Championship in 2022. In addition to the use of the John Deere equipment at Pinehurst Resort, the agreement will also allow the brand and the golf destination to partner on other industry growth initiatives, such as Green Start Academy.

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Colin Fulks
@Fulksy41
Assistant superintendent at The Ledges Country Club

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//A NEW NAME

ATTICUS REBRANDS T+O LINE AS ECOCORE

Atticus rebranded its professional noncrop market business to EcoCore: "Chemistry at the Core of Environmental Wellness."

The company said this change to EcoCore reflects its mission to fight pests and contribute to the safety and comfort of people, the beautification of surroundings and the protection of personal property and infrastructure.

Atticus recruited industry veteran Michael Maravich to serve as vice president, EcoCore markets. Maravich brings knowledge, leadership and an established industry network to the EcoCore team. In addition, Maravich has served on the boards of directors of Project EverGreen and Responsible Industry for a Sound Environment (RISE), of which Atticus is now a member.

PHOTO BY: *GOLFDOM* STAFF (TOP), COLIN FULKS (BOTTOM)

Rebirth and new challenges

As he leaves Big Cedar Lodge, Agronomy Director Todd Bohn sees "a rebirth" for the golf courses there and the sport

It could have been a disaster.

In four years, Big Cedar Lodge had grown from 27 holes on two golf courses to 77 holes on five — just in time for a global pandemic.

Former Agronomy Director Todd Bohn says things were tense for a few weeks, but it quickly became obvious that golf was the solution to a lot of COVID-19's challenges.

"This pandemic brought golf back," Bohn says. "It was kind of like when Tiger Woods was in his prime playing. Who would have thought that a pandemic would be what golf needed? It's gotten people outside together as a family."

Watching Big Cedar and golf courses around the country thrive gives Bohn a content feeling as he prepares for his upcoming challenge — agronomy director at Desert Mountain in Scottsdale, Ariz., a community with 126 holes on seven golf courses.

The country is coming back to life, things are getting back to normal and people will remember the central role golf played in keeping them physically and mentally fit during lockdowns.

"The positive momentum has continued into the beginning of this year," Bohn says. "In spring, our numbers are way above budget. It's awesome to see all these people out here coming out to play golf and experience our work."

Massive expansion

Big Cedar Lodge and Bass Pro Shops Founder Johnny Morris hired Bohn in 2016 to develop his fast-growing Ozarks resort in Ridgedale, Mo. At the time, the resort owned Top of the Rock, a nine-hole, Jack Nicklaus-designed par 3 and Buffalo Ridge, a Tom Fazio-designed, 18-hole golf course.

"(Morris) was finishing up some course cosmetic things, exposing some rock features and adding some water features. So, I got down here right at the very beginning of the big onslaught of development," Bohn says.

Next came Mountain Top, a Gary Player-designed, 13-hole par 3.

"Then, we moved down over across the hill and built Ozarks National, our Coore/Crenshaw 18-hole golf course," Bohn says, referring to Ben Crenshaw and Bill Coore.

Then came Payne's Valley, a Tiger Woods-designed, 18-hole championship golf course finished in late 2019. As construction wrapped up, the top concern at Big Cedar was launching the golf course with a splash. Bohn hoped for a massive tournament with big crowds, lots of press and global attention to a beautiful set of greens that used the hills and cliffs of the Ozarks to challenge and delight golfers.

COVID-19 made that impossible.

The inaugural Payne's Valley Cup held last September, however, featured Woods and Justin Thomas teaming up against Rory McIlroy and Justin Rose, but no press or spectators.

"We still had a big event, but it wasn't with the people on site like we were wanting," Bohn says.

'Nothing short of fantastic'

One thing the crews at Big Cedar didn't have to worry about throughout the past 18 months was equipment. Part of that was good preparation; the rest was teamwork between Bohn's crews, John Deere and Deere distributor Van Wall Equipment.

"All the stuff for the new golf course was done before COVID-19 hit," Bohn says. "I had the stuff for Payne's Valley in storage, which, looking at hindsight, was the best decision."

However, as golfers returned to Big Cedar, staffing remained very lean. Canceled H-2B visas for workers, higher workloads from more traffic on the courses and challenging weather

conditions made 2020 and early 2021 difficult for Bohn's team.

"When you increase your golfing rounds, and you have a cold winter and a cold spring where the turf really didn't start growing until late in the season, that presents a challenge with trying to keep up with the traffic stress and the play, all the while with short staff," Bohn says, adding that support from Deere and Van Wall were critical.

With all of those personnel and traffic challenges, lack of equipment or delays for replacement parts could have been catastrophic.

"We've been very blessed and had very good support from Van Wall Equipment and John Deere nationally. The teamwork that we've gotten from them has been nothing short of fantastic," Bohn adds.

Looking back, and ahead

During his final days at Big Cedar, Bohn says the pandemic taught him a lot about golf and management, maybe as much as the rapid development years that preceded COVID-19.

"This place has taught me that with perseverance, hard work and dedication, you can overcome anything," Bohn says. "I'm so grateful to Johnny Morris and to Big Cedar's leadership team for trusting me to do this.

"I mean who gets to come to a place and work with Tom Fazio, Gary Player, Tom Watson, Ben Crenshaw, Bill Coore and then cap it off by working with Tiger Woods and his team on building golf courses? I've always said that I was the luckiest grass grower in the country."

More than anything else, though, Bohn says he's happy to see the way the world embraced his sport when it needed solace during a crisis.

"There's kind of a rebirth in the whole world going on right now," Bohn concludes. "I'm sure some people have gotten used to spending more time outside, more time on the grass, and they're going to want to keep that up."

JOHN DEERE

Golfdom Gallery

1 **Take this photo straight to Twitter** Don Humphrey, superintendent at Lake St. Louis (Mo.) GC, with his Twitter pal Seth Jones, editor-in-chief of *Golfdom,* at the joint chapter meeting of the Southern Illinois GCSA and the Mississippi Valley GCSA at beautiful St. Clair CC in Belleville, Ill. Seth was thrilled to be the meeting's keynote speaker.

2 **Up for the challenge** (Left to right) Scott Simpson, superintendent at Benton (Ill.) CC, Todd Thomas, SiteOne, Michael Daugherty, Quali-Pro, and Chris Ashby, superintendent at Green Hills CC, Mount Vernon, Ill., were some of the big hitters vying for the long drive prize at St. Clair.

3 **Luck of the Irish** While playing the Irish Course at Whistling Straits in Kohler, Wis., we saw (left to right) Ron Fuller, irrigation technician, with maintenance employees Maggie Mueller and Alan Tipple all hard at work. We're happy to get their smiling faces in *Golfdom.* Keep up the good work!

4 **Ryder Cup preview** Chris Zugel, CGCS, Whistling Straits (left), took time out of Ryder Cup 2021 preparation to greet Bill Roddy, *Golfdom*'s group publisher, during his round on the Irish Course.

5 **Grand reopening** *Golfdom* was grateful to be invited to Kenwood CC's grand reopening. (Left to right) Jason Straka, ASGCA, Craig MacGregor, *Golfdom* publisher, and Kent Turner, superintendent at Kenwood CC in Cincinnati, with Kent's dog Crosby.

6 **Backyard bonding** Paul Hurst (center), co-owner of GreensPro and Twitter famous for his band Midlife, was kind enough to host Rob Kick (left), superintendent at Algonquin GC, St. Louis, Andrew Decker (right), superintendent at Effingham (Ill.) CC, and our own Seth Jones (behind the camera) for a few drinks in his backyard in St. Louis.

7 **A great day on the course** Simpson, the focus of this month's 19th Hole Q&A (see page 48) with Algonquin GC's T.J. McKenna (center) and Chuck Gast, director of operations for the MVGCSA, during their round with Jones at the SIGCSA/MVGCSA joint chapter meeting.

PHOTOS BY: *GOLFDOM* STAFF

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Grinding for excellence

Foley Grinders help two courses establish pristine fairways

For equipment managers and technicians alike, having top-of-the-line equipment is imperative. Golfers and superintendents expect excellence when it comes to course preservation, and this can only be achieved with the best mowers, which include a lot of maintenance. Foley offered a solution: superior grinders to keep blades sharp.

Chad Braun and JR Wilson have both been in the industry for more than 20 years, and each has had very particular problems at their respective courses.

"At our course, we topdress quite frequently," says Braun, equipment manager at Town and Country Club in St. Paul, Minn. "We put sand onto the greens, and this ends up dulling the reels. Certain times of the year, we have worm castings on our fairways, which also dulls the reels. It's really important that we have shop equipment that can allow us to get our job done accurately and efficiently."

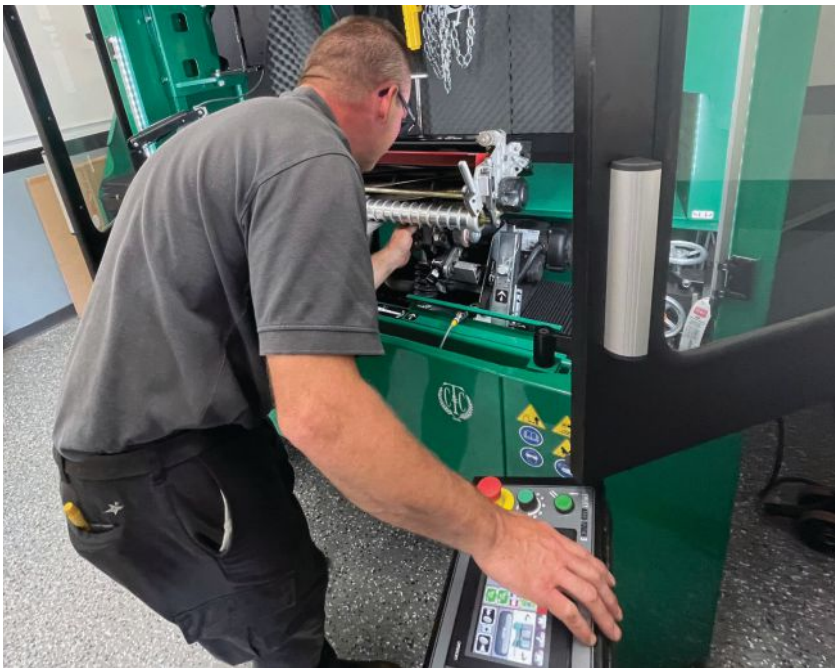
Chad Braun

Braun has relied on Foley grinders since 1997 and has only had positive experiences since. When he began at Town and Country in March of 2020, he was excited to find that they had also been using Foley grinders but had not replaced them since the '80s and were tapering the reel cylinders. After replacing the old grinders and installing new Bedknife and Reel Grinders, Braun has seen a considerable difference in the course.

> "It has had a huge impact on the turf as far as aesthetics and disease reduction."

"In the past, we've had issues with funny-looking cuts on the golf course, a lot of uneven cuts," Braun says. "The ability to sharpen the cutting unit with the old grinder was a large investment of time and didn't get them as sharp as it should have. Now that we have the new grinders, we're able to maintain them to OEM specifications and keep them at peak sharpness all the time. The relief grinding process is very simple to set up and really allows us to put that relief grind on in a matter of five to 10 minutes, and the benefits outweigh the minimal investment in time."

JR Wilson, head equipment



Braun uses the 653 Accu-Master Reel Grinder.

technician for Noyac Golf Club in Sag Harbor, N.Y., has a drive to continually have the course be better to allow for a better overall course experience, which included finding the best technology possible.

JR Wilson

Four years ago, Wilson started employing Foley's Reel Grinder and Bedknife Grinder and has been incredibly impressed.

"We were having some issues with our fairway mowers, trying to get them exactly perfect," Wilson says. "There was a bit of a cone in one of them, causing the cut to be off. Using the Foley grinders, I was able to get it back to being perfect, and we didn't have to replace the reel. It definitely made a huge difference."

For Wilson, the biggest aspects that set Foley grinder apart are the ease of use, the cleanliness and the low noise level. As someone who works in a shop fairly frequently, keeping his shop pristine is important to Wilson. Thanks to the Foley grinders, he no longer has to worry about excessive noise or fine dust particles being everywhere.

"Across the board, the Foley grinders are more user-friendly and cleaner, plus much quieter than anything I've had in my shop. Those things all add up to make this grinder so much better."

For both men, Foley grinders helped change their courses drastically, allowing for not only a cleaner look, but they also give golfers a better play.

"It has had a huge impact on the turf as far as aesthetics and disease reduction," Braun says. "It's been a night and day difference on the course for us and for our members."

FOLEY COMPANY

Grass is greener

Two Minnesota superintendents share lessons learned along the way in back-to-back regrassings of their courses

BY CHRISTINA HERRICK

For Jeff Johnson, superintendent of The Minikahda Club in Minneapolis, Minn., and Jared Keller, superintendent of the Minneapolis Golf Club in St. Louis Park, Minn., the grass truly is greener on the other side of their regrassing projects.

Johnson's decision to regrass was simple: eliminate turf susceptible to dollar spot, snow mold and brown patch and keep his course competitive with surrounding golf courses.

Mother Nature tipped Keller's hand as Minneapolis GC suffered several years of winter injury on its *Poa annua* greens. In 2019, Keller had to deal with ice encasement on top of more winter injury. That was the moment when he decided it was time to find another option. Plus, he saw Johnson's successes the year before, just 5 miles away at Minikahda.

"Two out of three years we got hit pretty hard, and the members decided we just couldn't operate that way," he says. "(Members) voted through the regrass conversion, and that July, we shut down."

Continued on page 18

Jeff Johnson, superintendent of Minneapolis, Minn.'s The Minikahda Club, chose to regrass his course to reduce disease pressure.

Both Johnson and Keller used Turfco's TriWave 60 tractor-mounted overseeders to regrass their courses' fairways.

Continued from page 17

Planning process

Johnson says the regrassing project for his course started about three years before the first burn-down herbicide to eliminate his mix of bentgrass and *Poa annua*. He talked to other superintendents who regrassed to get a better handle on what to expect.

A vital part of the project, Johnson says, was communicating to Minikahda Club members about the scope of the project. He held a town hall to answer any of the members' questions.

"They needed to be informed on what was going to happen, the process, the timing and how long the course was going to be closed," he says.

Keller says while there was talk of starting the regrassing project in the spring of 2019, he decided it was better to aim for mid-August to get a successful bentgrass take and avoid competition from *Poa annua*. From the time his members decided to move forward with regrassing, he had about three months to prepare. Lucky for Keller, Johnson had done his homework for his project, and Keller says his membership was familiar with the work at Minikahda.

Jared Keller

"Between reviewing the NTEP data to see what performed best and with our members' knowledge of what they had done over at Minikahda, it was a pretty easy decision for us," Keller says.

Keller and his team performed an irrigation audit before regrassing. Team members took a look at all the irrigation heads to make sure everything was in top shape and turning as they should be.

"Even with that additional effort, we still ran into some heads

Continued on page 27

PHOTO PREVIOUS PAGE BY: JAMEY GUY PHOTOGRAPHY;
PHOTO THIS PAGE BY: TURFCO

A Supplement to

Golfdom

CHARGED

BATTERY-POWERED EQUIPMENT GUIDE

A **NORTH COAST MEDIA** PUBLICATION

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Stealth mode

A Colorado course invests in battery power in order to be a better neighbor

By Seth Jones

Mariana Butte Golf Course in Loveland, Colo., is a scenic beauty with lots of elevation changes. The course is on the front range, with spectacular mountain views providing the backdrop for nearly every hole. Jordan McCormick has been the superintendent there for 11 years.

The city-owned course has its typical challenges. That includes neighbors who, though friendly, complained about the noise generated by the golf course crew in the early morning hours. In fairness to the neighbors, the course was violating the local noise ordinance. With 40,000 rounds annually, McCormick had to find an alternative to gas-powered greens mowers to get the course ready for play each day.

Five years ago, McCormick started shopping for greens mowers. The process was easy, he laughs, because there weren't many choices. He went with two brands of battery-powered greens mowers. One is powered by a lithium-ion battery, and the other is powered by the equivalent of a golf cart battery. His course was the first in the state to operate a lithium-ion-powered greens mower, and he has learned a lot via observation throughout the last five years.

"We've been able to ascertain some good information of the technologies that exist with the lithium-ion now and how far superior it is, that's for sure," McCormick says. "There were concerns with the (other mower) early on, just because you can't do as much as you can with a lithium-ion unit. We can mow the entire golf course with (the lithium-ion) if we want to, whereas with the other mower, the most that we mowed with that is maybe 11 holes. Twelve would be pushing it."

Mariana Butte recently acquired a permit to surpass the noise ordinance on designated times in the summer, but McCormick's more interested in going the battery-powered route, as opposed to taking advantage of the permit. The course has invested in a Smithco Sand Star E battery-powered bunker rake as well as rotary mowers and string trimmer from Kobalt.

The course uses the rotary mowers, purchased at Lowe's, for smaller tee boxes

Continued on page BP6

The crew at Mariana Butte prefers Smithco's Sand Star E due, in part, to its fast transport speeds.

PHOTO COURTESY OF SMITHCO


SandStar
E

Continued from page BP4

where getting large equipment is difficult. The crew enjoys the battery-powered equipment now that they've gotten accustomed to it, McCormick says. The Smithco Sand Star E has become a favorite of the crew because of its transport speed.

"You can be a lot more efficient, because you can get around the golf course a lot quicker," he says. "It's to the point that (the crew) prefers it because they can get around the course so quickly … I think there's just a lot of positive reasons for (battery-powered equipment), whether it's lessening your footprint or just the sheer weight of the equipment is less. I knew that we would have a limitation on how far the batteries would go, but we don't have a lot of area to cover, and the weight of the machine is much less. Just dealing with them on trailers or putting them in a cart, or however it is you're transporting them around, they're just much easier to deal with."

The right recipe

John Powers, director of product management for Echo, recently made a course visit to one of former President Donald Trump's Florida courses, where he observed the crew using battery-powered string trimmers, blowers and chainsaws. The reduced noise level is what appealed to the course, he says.

Powers says there are multiple professional industries where he sees battery-powered handheld equipment gaining traction. Residential landscaping and commercial landscaping are the two big ones. He's also seen some adoption in the tree care industry.

One of the challenges he sees is that customers want to make a wholesale switch from gas to battery, and that's difficult to accomplish. The right recipe is a combination of battery and gas and playing to the strengths of each. He suggests a good starting point in battery-powered handheld is with hedge trimmers.

A lower noise output is one reason many courses opt for battery-powered handheld equipment.

"It doesn't require as much power as something like a blower or a string trimmer," he says. "It's kind of counterintuitive. You would think you would need a lot of power for a hedge trimmer, but you actually don't. That's the product out of all the main products that is probably the best fit for battery technology."

Steven Johnson, regional sales manager for Smithco, says his challenge hasn't been convincing superintendents of the machine's efficiency or the power of the lithium-ion battery, but in getting the parts from vendors necessary to create the bunker rake. The Sand Star E has become so popular that the demand has outpaced the supply.

He says Smithco soon will be offering another option in the battery-powered realm: a 70-inch greens roller.

"It's going to combine the electric components that we currently are using in our electric bunker rake and the sound and true hydraulic system that we've used in our rollers for the past 10, 15 years, and do a combo," Johnson says. "They're going to get the best of both worlds."

PHOTO BY: *GOLFDOM* STAFF

Battery evolution

John Powers, director of product management for Echo, and Steven Johnson, regional sales manager for Smithco, sat down with *Golfdom* and answered our battery-powered questions

***Golfdom*:** Do you have a good tip, something crews might not think of when they switch from gas-powered equipment to battery-powered?

John Powers, Echo: What I have seen from end users, the way they use the equipment is they need to be a lot more disciplined about not running the equipment when they're not actually cutting or doing the work. One of the things that some of the users are used to, if they're used to running gas equipment, is they'll feather the throttle, or they're used to the unit essentially idling when they're walking from one place to another. So, say if they're trimming one area, they'll do the trimming around a bush, and then if they're used to using a gas unit, the unit idles as they walk to the next area. They need to be a lot more disciplined about not using the battery equipment, not using the charge in the battery, while they're just walking from one place to another.


John Powers

***Golfdom*:** Is there anything "new" about battery-powered equipment that you want to share?

Powers: In general, battery technology, I would say the area that is most constantly evolving is capacity, which directly relates to what we were just talking about with run time. That's an ever-evolving part of the technology. And that's to solve the challenges that exist, not only in the outdoor power equipment industry but also in the automotive industry, another industry that uses lithium-ion batteries. They're always looking for more energy density in the cells, which gives you more capacity, which gives you more run time. So, that's kind of an ever-evolving part of it. I think that'll probably continue for the foreseeable future.

***Golfdom*:** Steven, you've worked for Smithco for a long time now, which produces a lot of gas-powered equipment for the golf and sports turf markets. Did you think in 2021 you'd be talking about Smithco's battery-powered offerings?

Steven Johnson, Smithco: Back in 1994, when I started working for the company, we were the very first ones to come out with an electric-powered bunker rake, and it hit the ground running. There was a little bit of skepticism at first because everybody was used to gas-powered equipment, but I've seen the writing on the walls for renewable energy, for more cost-effective products. You're looking at pennies on the dollar to operate electric units in lieu of what it costs to run your traditional combustion-style engines when you start figuring in fuels, oil changes, filters, all that fun stuff that has to be addressed monthly.

***Golfdom*:** You know a lot of superintendents around the country. What are the ones who have started using battery-powered equipment telling you about the results?

Johnson: No. 1, superintendents love the fact that it's quiet. They can take it out anytime they want. Courses are short on manpower when it comes to getting out and doing the day-to-day jobs. The ability to go out after golf has started, that's extremely important to them. The other thing is just the maintenance side; they bring it back in, and they plug it in. We have on-board battery management systems that are in place with a 10-year warranty. So, that side of it instills a lot of confidence because most folks keep ahold of their bunker rakes for a good 10 years. A lot of that negativity (toward battery) came from standard lead-acid batteries. And they were looking at replacing them every four years. They don't have to worry about that anymore.


Steven Johnson

PAR FOR THE COURSE

ECHO's pro-grade 58V Cordless lineup brings a standard in quality and performance to the green. Featuring six different tools, our 58V system prepares you for any type of job on the course – day or night. This professional lineup delivers powerful, enhanced, gas-like performance with the convenience and reduced-noise of cordless.

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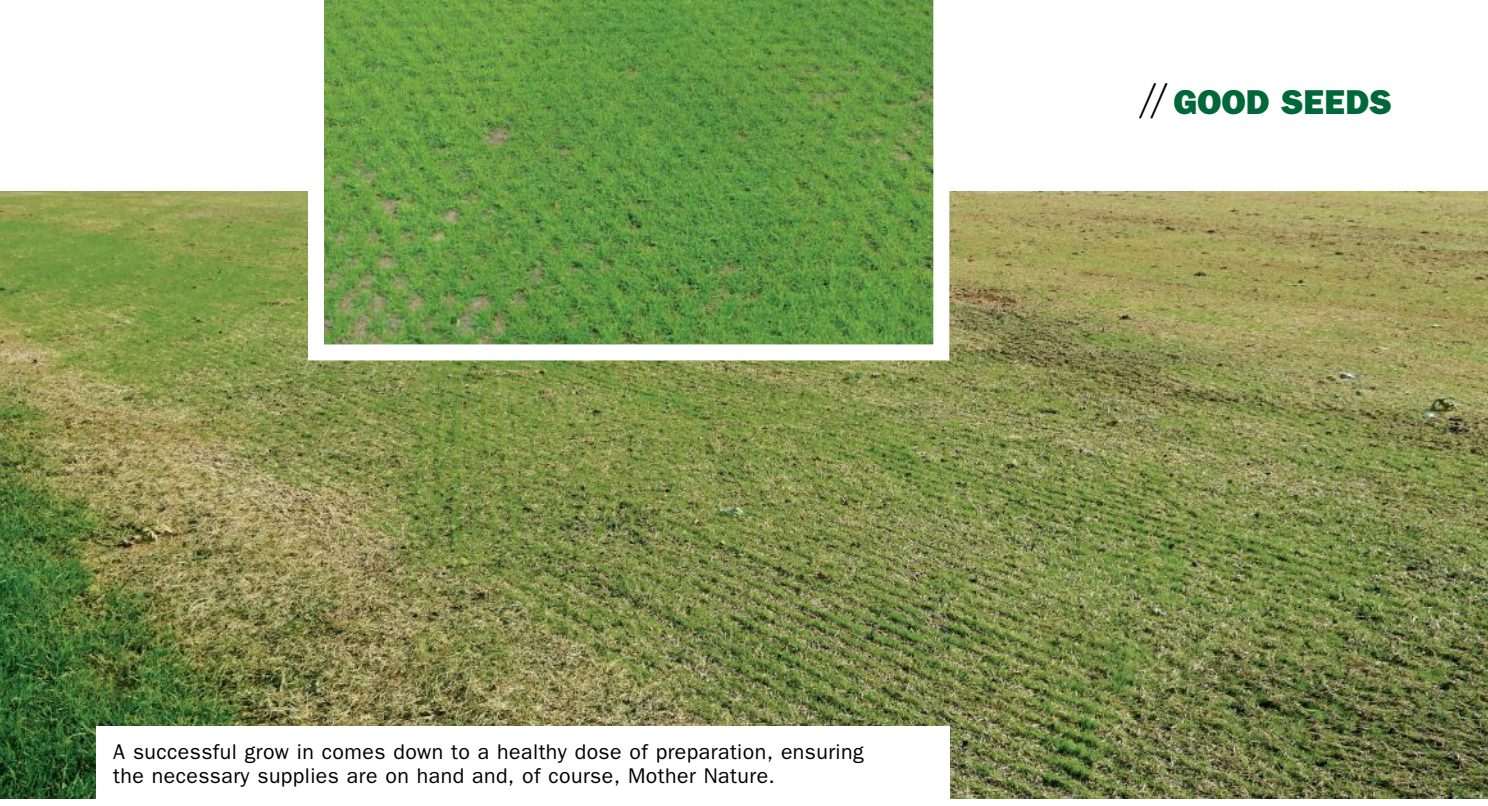


A successful grow in comes down to a healthy dose of preparation, ensuring the necessary supplies are on hand and, of course, Mother Nature.

PHOTOS BY: TURFCO

Continued from page 18

that weren't functioning," he says. "Those issues quickly popped up once we put the seed in the ground. It doesn't get water, and you start to see (irrigation issues) in the first couple of weeks."

Johnson says a successful regrassing project comes down to anticipating and preparing for any issues that might arise such as inclement weather. He says it was also critical to involve and inform his staff throughout the whole project.

"They helped a lot with the planning and the preparation, so they were highly involved with the project from the get-go," he says.

Burn it down, grow it up

Though it might seem simple on paper, Johnson says the idea of essentially killing all the existing 31 acres of fairways and replanting it was a daunting task.

"I grew up in agriculture, and my dad has planted a crop every year, and every year, it comes up," he says. "Planting seeds is really no different than planting a crop. Water and fertilize it, and it's going to grow. Then, you need to start managing it culturally to get it to where you want it to be."

Johnson closed his course on July 23, 2018, and opened 11 months later on June

Continued on page 28

// GOOD SEEDS

Johnson said it was nice to have Turfco nearby to lean on for advice on details such as proper application depth.

PHOTO BY: JAMEY GUY PHOTOGRAPHY

Continued from page 27

25, 2019. Keller closed his course on July 8, 2019, and reopened on July 1, 2020. Once open, Johnson took a conservative approach with the turf and did not allow golf carts the first month.

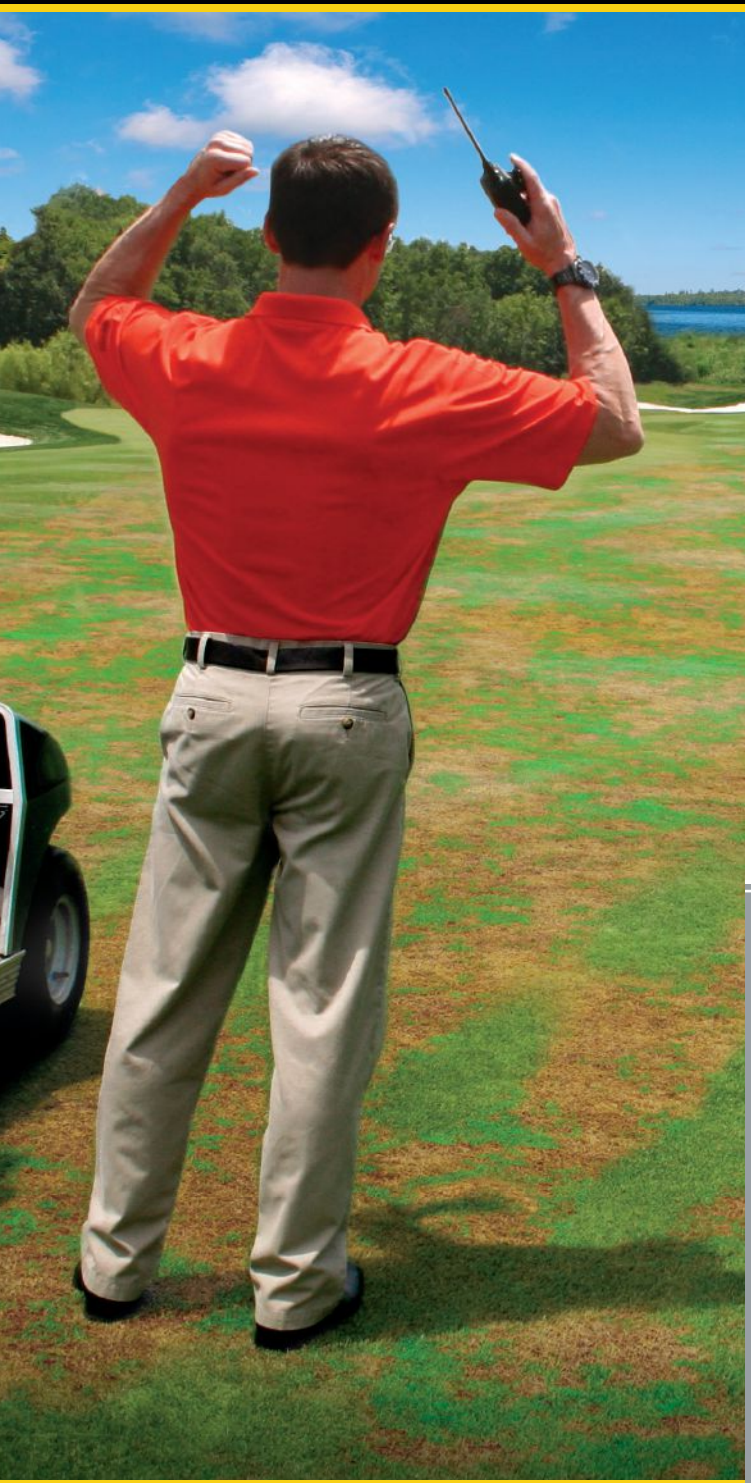
Keller and Johnson selected 007 creeping bentgrass greens and tees and used Dominant X-Treme creeping bentgrass for the courses' fairways. Johnson says the varieties are resistant to dollar spot,

Continued on page 32

PHOTO BY: TURFCO

Both Keller and Johnson selected Dominant X-Treme creeping bentgrass for the fairways of Minikahda Club (photographed) and Minneapolis GC.

PYTHED OFF?



SEGWAY® FUNGICIDE SC

Controlling Pythium Diseases: *If It Ain't Broken...*

The term "early adopter" is big in the tech world. It means you're one of the first to try the latest gadgets, putting you ahead of the pack as a leader on the subject. But once in a while, you come across a product not only does the job, but it excels at it. A shiny, new would-be replacement might not be worth the risk. In other words, it ain't broken, don't fix it.

When it comes to Pythium disease control, that product is **Segway® Fungicide SC**.

Segway sets the standard for control of the four main types of Pythium disease: Pythium root dysfunction, Pythium damping-off, Pythium blight, and Pythium root rot.

Segway features cyazofamid, an active ingredient with a novel mode of action that stops spores from germinating, inhibiting all stages of Pythium fungal development. This mode of action puts Segway in Fungicide Resistance Action Committee (FRAC) Group 21.

SEEING IS BELIEVING:

This photo from a Penn State University plot study illustrates the Pythium foliar blight control Segway delivers.

Labeled for use on golf course tees, fairways, roughs and greens, Segway can be applied two times consecutively; Up to three times per year at the highest labeled rate, and six times per year at the lowest rate. That application flexibility, plus the fact that Segway has no known cross-resistance with other classes of fungicides make it excellent for resistance management programs.

And that's important: the success of the turf industry literally depends on how we manage resistance. That's' why PBI-Gordon developed Rotation Nation, a fungicide and herbicide application programs based on specific regions. Each regional program offers a guideline for effective resistance management, with schedules and tips for applying PBI-Gordon products, as well as solutions for other companies.

Also vital to controlling Pythium diseases: best management practices. That includes proper irrigation, air circulation, and fertilization, especially with nitrogen, and following a resistance management program. And when you find a product that truly excels, like Segway for Pythium disease control, remember: if it ain't broken, don't fix it.

This photo from a North Carolina State University plot study shows what Segway does to Pythium root rot.

Continued from page 28

snow mold and brown spot. Keller says he made sure to order fertilizers ahead of time to help the seed get off to the right start.

"Aside from just securing the necessary supplies you need, 2,500 pounds of bentgrass seed is not always readily available," Keller says. "We secured that a few months in advance. We got all of our fertilizers on hand."

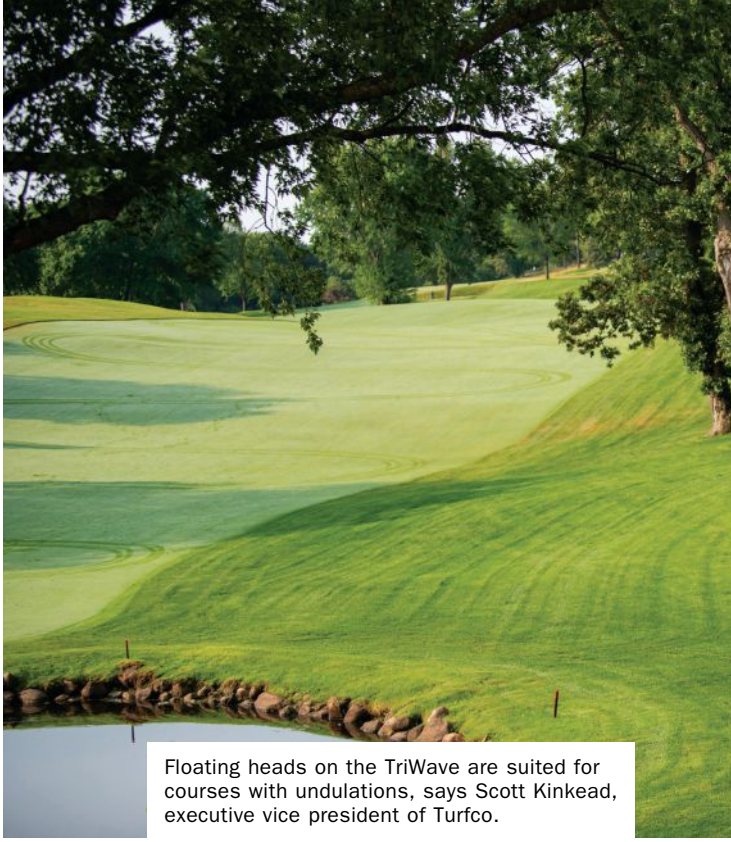
Keller and his crew looked at eliminating shady areas on the course and 36 acres of fairways to prevent *Poa* encroachment.

"We had to address the growing environment first, and we had about 15 trees that had to be cut down to resolve some shade issues," he says.

Johnson says it also helped to have the assistance of Turfco Manufacturing — headquartered nearby — and three of the company's TriWave 60 tractor-mounted overseeders to execute the project on Minikahda Club's fairways.

"It was a comforting knowing that support was right there for us," he says.

Turfco worked with the team to fine-tune the seed depth of the TriWave 60s at Minikahda Club and the Minneapolis Golf Club. Scott Kinkead, executive vice president of Turfco, says this is an important step to ensure consistent application and a more consistent seed take. Kinkead says the TriWave's floating heads and WaveBlades ensure good seed-to-soil contact and follow the courses' contours for consistent application depth.



Floating heads on the TriWave are suited for courses with undulations, says Scott Kinkead, executive vice president of Turfco.

"When you have an older golf course, where you have a lot of undulations, it's pretty critical to be able to make sure you get a good take and you're not having to go in so many different directions," Kinkead says.

One thing both Johnson and Keller say was difficult to plan for was Mother Nature. Keller said his first seed application hit in mid-August, and the last application went down two weeks later.

"We had a dream of mid-August, but we had over a foot of rain the three weeks following," Keller says. "When you're seeding in bare soil, that amount of rain, and as quick as it came, it wreaked

Both Keller and Johnson say communicating with members throughout the regrassing project is a critical step.

PHOTOS BY: JAMEY GUY PHOTOGRAPHY

havoc on the project. We did what we could to cover greens to prevent any damage, but we ended up reseeding and refloating, re-grading our greens three different times because of what Mother Nature had to offer."

He says it was frustrating having areas with thick bentgrass and other areas that were bare.

"We were really happy with the results and the way the equipment performed," he says, aside from how Mother Nature complicated the project. "Getting it to fill in uniformly was frustrating, but we got there eventually."

Words of advice

Keller says it's important to focus on the positive when going through such a big overhaul. There will be spots that don't grow in perfectly at first.

"Focus on the 90 percent positive, and don't dwell on the 10 percent of the golf course that may not be filling in the way that you expected it to," he says. "When you're doing a project of this caliber, you're always going to have certain greens or certain areas that don't fill in the way the rest of the golf course does. I was guilty myself of every morning running out to that spot that might be troublesome, and that can take an emotional toll."

Kinkead says aside from having enough supplies to execute the project and having contingency plans for Mother Nature, communication with members is a big key.

"Having those meetings and making sure that people are for it, that's the first and most challenging step," he says. "A pretty important part is what people you can bring in to be able to explain to the membership the value and the importance of (the project) and how it's going to go."

Still, some members are going to oppose the project no matter what.

"If you change the towels in the locker room, you're going to have members upset," he says.

USGA®

The Beginning of a Technology Evolution

USGA launched Deacon to give superintendents data-based decision-making powers

Jim Moore had an idea. This idea would take a golf course, visualize it on a map and find where the most resources were being used in correlation to the highest-trafficked areas. During his 30-year career with the USGA Green Section, Moore found that resources were being distributed evenly, even though there were areas of the courses that were experiencing much less action.

After several years of testing as a beta version, the USGA officially launched this product, called Deacon, in February 2021. Deacon honors Arnold Palmer's father, Deacon, who was the superintendent at Latrobe (Pa.) Country Club for 50 years.

"For 100 years, we've been doing research and education. About 70 years ago, we started doing consulting visits. For a long time, that was primarily what the USGA was known for providing for golf facilities," says Hunki Yun, director of business development. "A software tool is a bit of a departure for us, but we feel like data-based decision-making is the future of course maintenance, and we want to continue to help make an impact on our industry."

Deacon seeks to improve how courses provide good playing surfaces for golfers, especially greens. Providing good playing surfaces takes resources. The ability to measure what is applied to putting surfaces is also important. Deacon helps users to record data such as clipping yield, height of cut and green speed. Analyzing this data — both in real time and through a historical record — allows course managers to make the best-informed decision possible for that particular area.

Deacon offers many key features to give the best overall insight into a course, including surface management, GPS services, hole location and advanced dashboard.

SURFACE MANAGEMENT helps superintendents and assistants track their daily practices easily and quickly through the convenience of a mobile app.

GPS SERVICE uses GPS tracking to record golfer traffic throughout the course. This allows for prioritizing resource allocation in a way that allows for a heavier focus on places that need it, in addition to assisting with renovations and other projects.

HOLE LOCATION allows for tracking and communicating the exact hole locations, day to day or for special events. That gives supers a better look into players' overall experience and pace of play.

ADVANCED DASHBOARD helps supers communicate with other course managers for decision-making support and insights into the playing conditions and golfer experience through graphs and charts that are easy to visualize and understand.

"We originally developed this to help superintendents and golf facility managers, but there are many other uses," Yun says. "One of the USGA's primary missions is to improve the golfer experience at courses around the country, and we feel that Deacon will make a difference and help courses to provide a better, more efficient product for their golfers. This is the very early beginnings of our journey with Deacon. We're excited to see it start, but more excited to see the future."

"Deacon really has made a difference at Pinehurst No 2. Not only can we easily record and analyze data about our green surfaces, we can share this information with the golf staff, which helps us make better decisions together and improve the playing conditions for our guests."

— JOHN JEFFREYS
SUPERINTENDENT
Pinehurst No. 2

USGA DEACON

SUPPORTING THE USGA MISSION

Deacon supports the USGA mission by helping courses to address two major priorities: improving golfer satisfaction and maintaining courses more efficiently. Deacon supplements the research, education and the recommendations of our consultants by providing data-driven insights that help superintendents and other facility managers to make better decisions. Contact us to learn more about how the USGA can help you and your facility.

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Super Science

// SHOW MOSS WHO'S THE BOSS

MOSS CONTROL IN PUTTING GREENS

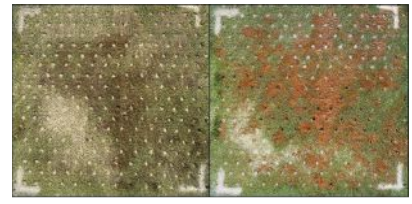
By Mike Kenna, Ph.D.

Silvery thread moss (*Bryum argenteum*) is an undesirable weedy species that colonizes golf greens across the U.S. and has proven difficult to eradicate. Zane Raudenbush, Ph.D. at Ohio State University, initiated field studies to test the effectiveness of two soil surfactants and Quicksilver (carfentrazone-ethyl) on moss growth in creeping bentgrass putting greens.

In September 2020, he conducted a replicated field experiment at Hawks Nest Golf Course in Creston, Ohio, and Scioto Country Club in Columbus, Ohio. He applied four chemical control strategies, along with aerification at both locations.

The four chemical control strategies were: 1) drench application of Dawn Ultra dish soap, 2) drench application of sodium dodecyl sulfate (SDS), 3) spray application of Quicksilver herbicide at 3.3 fl oz per acre and 4) untreated control.

Two levels of hollow-tine aerification (with or without aerification) occurred one day following the chemical applications. The plugs were removed from the 3-foot-by-3-foot aerified plots, and holes were backfilled with dry sand.



Plot treated with drench application of SDS and hollow tine aerification one day after treatment (left) and three days after (right).

Treatments were applied on Sept. 15 and Oct. 9. Percent of silvery thread moss cover in each plot was measured using a rating grid at trial initiation and every two weeks thereafter until mid-November.

Drench applications of Dawn Ultra dish soap and SDS rapidly injured silvery thread moss shoots at both locations. Minimal injury to creeping bentgrass (less than 5 percent) was observed from the initial application on Sept. 15, but a slight increase in phytotoxicity was observed from the Oct. 9 application.

Quicksilver also caused a significant amount of injury to the silvery thread moss shoots, but the overall control was less than the drench applications of Dawn Ultra and SDS. A previous field experiment has demonstrated hollow-tine aerification can reduce the size of a silvery thread moss infestation by providing "available sites" for the desirable turfgrasses to reestablish.

In this study, an aerification hole created within a silvery thread moss colony that was not treated with a chemical control typically healed within four days. However, aerification holes created in moss colonies treated with a chemical control strategy remained open for several weeks.

USGA
This project was funded in part by the USGA Green Section.

PHOTO BY: ZANE RAUDENBUSH

NEWS UPDATES

FMC'S KALIDA RECEIVES EPA REGISTRATION

FMC Corp. received U.S. Environmental Protection Agency (EPA) registration for Kalida fungicide.

The active ingredients in Kalida fungicide include fluindapyr, a novel broad-spectrum SDHI, and flutriafol, a next-generation DMI, which combine to provide effective, broad-spectrum control as a stand-alone product or as part of a program.

"Kalida will serve as a flexible foundation fungicide with proven turf safety, rapid uptake and long residual," said Mike Sisti, marketing manager, FMC Professional Solutions.

Kalida™ Fungicide

Golf course superintendents in the U.S. will have the flexibility to tackle destructive diseases such as *Bipolaris* leaf spot, take-all root rot, fairy ring and mini ring in warm-season turf, as well as anthracnose, fairy ring, summer patch and brown patch in cool-season turfgrasses with FMC's new Kalida fungicide.

Kalida fungicide fits extremely well in turfgrass disease management programs, allowing superintendents to rotate chemistry and achieve outstanding results, according to the company.

"SAND TOPDRESSING IS THE MOST IMPORTANT CULTURAL PRACTICE FOR MANAGING THE ORGANIC MATTER."

Brian Whitlark and **Cole Thompson**

(see story on page 38)

//TOPDRESSING TIDBITS

Light and frequent topdressing programs

By Brian Whitlark and Cole Thompson

The second part of this USGA Green Section article reviews a combination of field observations and recent research, which shed new light on the type of sand and quantity of topdressing needed to manage thatch and organic matter accumulation in putting greens.

Research provided and funded by USGA.

WILL TOPDRESSING WITH TWO DIFFERENT SAND MATERIALS CAUSE POOR WATER INFILTRATION OR INCREASE SOIL MOISTURE RETENTION?

Researchers at Rutgers University are experimenting with topdressing sand much finer than described in this article to investigate whether there would be any negative impact on a creeping bentgrass green (Murphy et al., 2019). The finest material used in this study contained 69 percent fine sand (0.15-0.25 mm) and was referred to as the fine-medium sand in Table 1. The medium-fine sand contained 23 percent fine particles and 77 percent medium particles, and the medium-coarse sand contained only 8 percent fine particles and 58 percent medium particles.

Although soil moisture content has increased with the fine-medium sand compared to topdressing with coarser materials, plots topdressed with the fine-medium sand have had lower soil moisture content when compared to plots that have never been topdressed. Furthermore, when core aeration is applied to the fine-medium topdressed plots and aeration holes are filled with the medium-coarse sand, the infiltration rate and soil moisture retention have been similar to that of the plots topdressed with coarser materials and not core aerated. Therefore, the preliminary results of this research indicate that topdressing with a much finer material than described in this article is better than no topdressing at all.

Additionally, any reduction in infiltration rate associated with using the finer sand can be offset by aeration and filling the holes with a coarser material. This Rutgers study is confirmation for superintendents using two different sand materials for topdressing greens — one for routine topdressing and a coarser material that matches the existing rootzone to fill holes following aeration.

For the management of ultradwarf bermudagrass greens, a current study conducted at Texas A&M University is evaluating the impact of sand topdressing with fewer coarse particles than that used to construct the greens (McInnes et al., 2019). Researchers are using rootzone characteristics such as sand particle size, organic matter content and bulk density from multiple greens on nine golf courses to predict soil moisture content and field-measured infiltration rate.

Modeling efforts are ongoing, but some information can be gleaned from preliminary data. As expected, the infiltration rate generally decreases with decreasing particle size and increasing organic matter content, though there are outliers. Even so,

TABLE 1

Sand size distributions of the three topdressing sizes, mat layer and the underlying rootzone at the initiation of the experiment; USGA construction recommendations provided for reference (reproduced from Murphy et al., 2019).

	Particle Diameter (mm) / Size Class				
Topdressing Sand Size	2.0 – 1.0 Very Coarse	1.0 – 0.5 2.0 Coarse	0.5 – 0.25 Medium	0.25 – 0.15 Fine	0.15 – 0.05 Very Fine
	% Retained (by weight)				
Medium-Coarse	0	33.8	57.7	8.4	0.1
Medium-Fine	0	0.1	76.7	22.7	0.5
Fine-Medium	0	5.7	25.8	66.8	1.7
Mat Layer[a]	0.2	25.3	56.4	15.4	2.7
Rootzone	7.0	25.8	45.5	17.5	4.2
USGA Construction Recommencation	< 10	——— > 60 ———		< 20	< 5

[a] Size distribution of sand in 45 core samples of the mat layer collected before the initiation of treatments in May 2016.

the infiltration rate of the majority of sampled greens meets or exceeds the minimum recommendation of 6 inches per hour, and the putting greens are performing well.

These preliminary results indicate that desirable infiltration rate and surface moisture content can be maintained with the use of medium-graded topdressing sands.

WHY REMOVE THE LARGER SAND PARTICLES?

Large sand particles create playability and mower problems. A Rutgers University study on creeping bentgrass putting greens revealed that the particle size of the topdressing sand significantly impacted the size of the sand harvested in mower baskets when mowing the day after topdressing (Murphy et al., 2019). On average, approximately 60 percent of the sand in mower baskets fell in the coarse sand fraction (greater than 0.5 mm) when using the medium-coarse sand (the medium-coarse sand contained approximately 34 percent coarse particles and 58 percent medium-sized particles) for topdressing.

By comparison, less than 10 percent of the sand found in mower baskets consisted of coarse particles when topdressing with the medium-fine sand (0.1 percent coarse particles and 77 percent medium particles). So, the coarser the sand, the more sand will be harvested by the mower. The particles picked up will also be the larger-sized particles — those that have the greatest impact on playability and mowing equipment.

Interestingly, the Rutgers study, as well as two recent studies at Michigan State University and the University of Tennessee (Strunk et al., 2018; Dickson et al., 2019), found that mowers collect 1 to 5 percent of the sand in a single mowing one or two days after topdressings. More sand will be harvested with subsequent mowing, especially if topdressing occurs every few weeks, as recommended in this article. The fact remains that applying larger sand particles will lead to more sand harvesting by mowers, increased equipment maintenance and more negative impact on the putting surfaces.

The medium-coarse sand topdressed plot on the left has significantly better turf density and lower surface moisture than the core-aerated, nontopdressed plot on the right, which has a darker green color due to surface algae.

PHOTO COURTESY OF: BRIAN WHITLARK

APPLICATION RATE AND FREQUENCY

There are two important rates to consider in a topdressing program: the sand application rate for each top dressing event and the annual rate achieved from the sum of all topdressing events, including sand applied to backfill aeration holes. The rate for an individual event must be considered simultaneously with application frequency because these factors are inversely related. As application frequency increases, the topdressing rate needed for each application decreases. The benefits of lighter rates include ease of application and incorporation, as well as reduced mower wear.

Perhaps the greatest benefit is less disruption to the playing surface when compared to heavier sand application rates. In fact, one can argue that greens will be putting greens on 104 different U.S. golf courses. They determined that putting greens receiving at least 20.3 cubic feet of sand per 1,000 square feet per year accumulate less organic matter (Schmid et al. 2014a) than courses topdressing with lower annual amounts.

In a related experiment, the same research group tested the effects of various cultivation strategies on organic matter accumulation but observed no differences among cultivation treatments (Schmid et al., 2014b). All cultivation treatments in the study, including an uncultivated control, received 22 cubic feet of sand per 1,000 square feet per year, and the researchers concluded that the benefits of their topdressing program partially limited their ability to detect differences among cultivation treatments.

Trends observed by USGA agronomists suggest that 25 to 35 cubic feet of sand per 1,000 square feet per year is a good annual target to adequately dilute organic matter. Depending on the other factors described below, more or less than this range may be appropriate.

Why the disparity between current research and industry trends? The answer to this question is complex. The basic premise is that the 20.3 cubic feet of sand per 1,000 square feet per year from survey data is essentially an average of the minimum annual rate that was related to lower organic matter concentrations among golf courses. This amount is an average from 104 golf courses in 14 states with diverse turf maintenance programs. Optimal annual topdressing rates don't directly translate across golf courses, especially across different regions.

Optimal topdressing rates are most

Continued on page 40

Light topdressing rates of 0.50 to 0.75 cubic feet of sand per 1,000 square feet are used during periods of minimal growth.

Continued from page 39

dependent on the length of the growing season and the quality of the growing environment. The turfgrass species and cultivar, nitrogen fertilization program and traffic intensity also determine how much sand is needed to offer a better playing surface on the day of topdressing if the right sand is applied at a light rate.

ANNUAL TARGETS

Planning to reach a predetermined amount of sand for the season is a good place to start with rate and frequency considerations. The goal is to match the growth rate of turf to dilute organic matter that accumulates throughout the season. In search of a benchmark, researchers from the University of Nebraska surveyed 308 annually. Turfgrass growing in an ideal environment over a long season with plenty of nutrition and few stresses, like shade and traffic, will produce more organic matter and subsequently require more topdressing. However, turfgrass under stress for any reason or grown over a shorter season will require less annual topdressing.

Regarding species, 79 percent of surveyed superintendents who have converted putting greens from creeping bentgrass to ultradwarf bermudagrass report using more sand with ultradwarf bermudagrass (O'Brien and Hartwiger, 2014). So, an annual rate of 20.3 cubic feet is a starting point and may be sufficient in some situations. However, in other settings, more sand is typically required on an annual basis to mitigate organic matter accumulation.

THE IMPORTANCE OF FREQUENCY

Around the turn of the 21st century, a standard topdressing strategy was to apply 2 to 4 cubic feet of sand per 1,000 square feet every three to four weeks during the growing season (Rieke, 1999). Lower rates and higher frequency were recommended for high-density cultivars or stressed areas. However, the previously mentioned survey data show that surveyed golf courses that cultivated at least twice a year and topdressed every seven to 14 days had lower organic matter concentrations (Schmid et al. 2014a). Topdressing every seven to 14 days also is more common in successful ultradwarf bermudagrass putting green management programs (Lowe, 2013; O'Brien and Hartwiger, 2014). To follow these recommendations, what topdressing rates would be required to reach the annual topdressing guideline of 25 to 35 cubic feet of sand per 1,000 square feet per year?

First, we should account for sand incorporated during aeration. An estimated 5 to 7 cubic feet of sand per 1,000 square feet is required for backfilling aeration holes, depending on overall surface disruption from tine size, spacing and depth. Given this, a golf course that backfills two aerations annually could apply 14 cubic feet of sand per 1,000 square feet during aeration.

During a 30-week growing season, assuming light topdressing is withheld the weeks immediately before and after aeration, 16 more cubic feet of sand per 1,000 square feet still would be needed over the remaining 24 weeks to reach 30 cubic feet per 1,000 square feet for the season (the middle of the suggested range). If remaining topdressing applications were conducted weekly, only 0.67 cubic feet of sand per 1,000 square feet would be required each week. The necessary rate would increase to 1.23 cubic feet per 1,000 square feet with a 14-day topdressing schedule (Figure 1).

It's often most manageable to determine a rate and frequency for each topdressing event based on annual goals and stick with that plan unless adjustments are needed to match growth and organic matter accumulation. A rate of

Research Takeaways

- Sand topdressing is the most important cultural practice for managing organic matter.
- Recent research confirms the benefits of light and frequent sand topdressing programs that provide less immediate disruption, better playing conditions and better rootzone characteristics over time.
- It is critical to assess putting green performance and the quality of the rootzone to determine if circumstances warrant an accelerated program for improvement beyond what is possible with light and frequent topdressing.
- Regardless of the selected topdressing program, silica sand is preferred because of its tolerance to weathering.
- Aeration backfill should closely match the physical characteristics of the sand used at construction. Still, routine topdressing sand can be somewhat less coarse to ease incorporation and reduce wear on mowers. Ongoing research suggests that this will not impede infiltration or cause an overly wet surface.
- Regardless of the selected topdressing program, it is wise to assess rootzone physical properties regularly by submitting core samples to a soil-testing laboratory.

PHOTO BY: BRIAN WHITLARK

0.5 to 1.5 cubic feet of sand per 1,000 square feet is generally a good range. Rates will likely be on the higher end during higher growth periods and lower when growth slows or when the turf is stressed. A good rule of thumb is to delay a scheduled topdressing or reduce the planned rate if significant sand is still visible from the prior application.

In situations where the soil profile is already ideal, some superintendents effectively manage organic matter only with frequent topdressing and no core aeration. In the absence of core aeration, it is critical that golf courses meet or exceed the annual guideline of 25 to 35 cubic feet of sand per 1,000 square feet.

MINIMIZING SAND HARVESTING

Light sand topdressings can be effectively brushed, rolled or irrigated into the turf canopy. Still, recent research has shown that mowing practices affect sand harvesting even with brushing after topdressing. Backtrack mowing — i.e., two passes in opposite directions over the same area — at a standard frequency of clip or increasing the frequency of clip during a single pass, harvested the most sand following topdressing on both creeping bentgrass and ultradwarf bermudagrass putting surfaces (Strunk et al., 2018; Dickson et al., 2019).

Cross-cutting — i.e., mowing a putting green twice in perpendicular directions — at a standard frequency of clip also collected more sand than a single pass at a standard frequency of clip in the ultradwarf bermudagrass study, but not in the creeping bentgrass study. As a result, backtrack mowing and increasing the frequency of clip should be avoided following topdressing to reduce sand harvesting and wear on mowers. Additionally, it is helpful to note the amount of sand collected and adjust topdressing rates or incorporation practices if necessary.

CONCLUSION

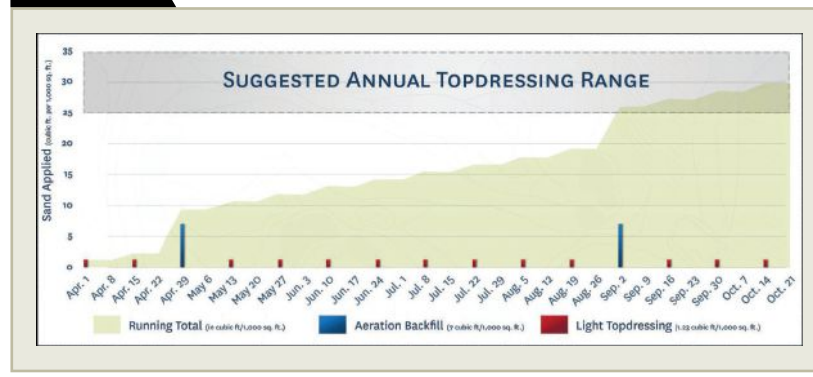
Sand topdressing is the most important cultural practice for managing the organic matter. Recent research confirms the benefits of light and frequent sand topdressing programs that provide less immediate disruption, better playing conditions and better rootzone characteristics over time. It is critical to assess putting green performance and the quality of the rootzone to determine if circumstances warrant an accelerated program for improvement beyond what is possible with light and frequent topdressing.

Regardless of the selected topdressing program, silica sand is preferred because of its tolerance to weathering. Aeration backfill should closely match the physical characteristics of the sand used at construction, but routine topdressing sand can be somewhat less coarse to ease incorporation and reduce wear on mowers. Ongoing research suggests that this will not impede infiltration or cause an overly wet surface. Regardless of the selected topdressing program, it is wise to assess rootzone physical properties regularly by submitting core samples to a soil-testing laboratory.

This article originally appeared in the May 2019 issue of the USGA Green Section Record (***https://gsr.lib.msu.edu/2010s/2019/2019-05-03.pdf***).

Brian Whitlark is an agronomist in the USGA Green Section West Region, and Cole Thompson, Ph.D., is the assistant director of USGA Green Section Research.

FIGURE 1



An example of a light, frequent topdressing program designed to achieve an annual topdressing rate of 30 cubic feet per 1,000 square feet for a course with a 30-week growing season. The suggested annual topdressing range (gray box) is based on off-field observations and research for both cool- and warm-season putting greens.

Acknowledgment

We appreciate the scholarly contributions of James Murphy, Ph.D., and Mr. Hui Chen, Rutgers University, and Kevin McInnes, Ph.D., Texas A&M University.

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Superintendents can identify the turf-loving fall armyworm by the upside-down Y on its head. Most common in the Southeast, the pest can ravage golf courses without mitigation.

Grass-loving fall armyworms can decimate turf quickly

FLOWERS AND WASPS COULD SUPPLEMENT LONG-TERM PEST MANAGEMENT PROGRAMS FOR COMMON MOTH CATERPILLARS

By Robert Schoenberger

Fall armyworms, a caterpillar common in the Southeast, can rapidly destroy turf as the larvae hatch and eat leaf tissue. So clearly, the answer is to plant more wildflowers. It's an unconventional approach, but Adam Dale, Ph.D., a turfgrass and ornamental entomology professor at the University of Florida Institute of Food and Agricultural Sciences, says the flowers attract stinging insects — in a good way.

"The flowering habitat will recruit wasps that will go out and eat these fall armyworms," Dale says.

Dale says superintendents will likely continue to rely on insecticides, especially during an acute outbreak. Long term, however, using insects to fights caterpillars is about as effective as chemical options, he adds.

Flowering habitats attract predatory insects, primarily the potter wasp. Though it can sting golfers, Dale says the wasps are not territorial and generally avoid people.

However, they absolutely love fall armyworms and will grab armfuls of the larvae, shove them in any hole they can find (spots on the ground, eaves of buildings, knots on trees) and then lay an egg on top of the worms. When the egg hatches, the young wasp has a wormy meal waiting for it.

There are some problems with the approach. Building a habitat is a long-term control solution, and if you have fall armyworms now, you cannot go out and buy a colony of wasps. And, while the wasps attracted by this technique are not aggressive, they can sting golfers if threatened.

"Superintendents are going to use insecticides, so we recommend they use insecticides that are not as toxic to predators," Dale says, adding that products targeting caterpillars can be effective for short- and midterm fall armyworm outbreaks.

The *bacillus thuringiensis* bacteria rids courses of caterpillars without harming more helpful insects, Dale explains. Chlorantraniliprole can control fall armyworms for months in a single application, he adds.

Some course superintendents have responded enthusiastically to Dale's flower-planting suggestions. Wildflowers provide long-term management, beautify courses and offer educational opportunities by posting signs around portions of courses, explaining what flowers are there and why.

PHOTO BY: LYLE BUSS, UNIVERSITY OF FLORIDA

Syngenta

LANE TREDWAY, PH.D.
Senior technical representative

You never know when or where a fall armyworm outbreak may occur. Once feeding damage is observed, it becomes an emergency situation. Most insecticides for the fall armyworm control only last for a few weeks, so you can end up chasing them around the golf course for the rest of the summer. Chlorantraniliprole insecticide is a great solution to this problem, providing long-term protection against fall armyworms and other caterpillars. Depending on the application rate, chlorantraniliprole can provide from four weeks to four months of caterpillar prevention. When fall armyworms feed on treated foliage, they are quickly paralyzed by the diamide chemistry to halt feeding activity. Chlorantraniliprole also has a very favorable safety profile — no personal protective equipment is required for applicators, and it has low toxicity to bees and other pollinators.

FMC

RAKIM K. TURNIPSEED, PH.D.
Product development manager

Fall armyworms can be quite detrimental to turfgrasses, especially well-fertilized and maintained bermudagrass, fescue, ryegrass, bluegrass and bentgrass. First, look for visual indications such as the presence of birds, wasps and ants. If these natural enemies are present, inspect the turf for frass and larvae or use a soap flush to confirm. Consider mowing the grass if needed, not only to mechanically eradicate some of the larvae, but also to reduce the amount of turf that must be penetrated by chemical insecticides. Insecticides containing bifenthrin, imidacloprid and zeta-cypermethrin are most effective when irrigation is avoided for 24 hours following treatment. However, lightly irrigating the turf just before treatment will aid in translocating fall armyworm larvae to the turf surface, making the pest more vulnerable.

Amguard

CHUCK SILCOX, PH.D.
Product development manager

Fall armyworms can occur in large numbers and cause extensive turf damage, typically during August and September. When confronted with large numbers of this pest, a superintendent should immediately apply an insecticide labeled for fall armyworm. A pyrethroid insecticide, such as bifenthrin, or an organophosphate insecticide, such as acephate, are excellent selections. Pyrethroids generally provide longer residual control. Acephate is generally quicker acting and also provides control of late instar mole cricket nymphs, which may be present at this time. Another approach is to control fall armyworms preventively with an application of chlorantraniliprole during the spring or early summer. When applied at a white grub application rate, chlorantraniliprole will provide season-long control of fall armyworms, as well as black cutworm and sod webworms.

Prime Source

BRET CORBETT
Technical services manager

Fall armyworms overwinter as pupae in Florida and then emerge as adults and migrate northward. Females lay eggs on the surface of vegetation and structures, including buildings posts and sidewalks. After eggs hatch, the larvae drop to the soil surface to feed on the turfgrass plant. They get their name because they crawl in armies and feed in a linear pattern, consuming everything in sight. Scouting for egg masses on leaf surfaces and soap flushes are effective methods to see if eggs are present. Once the caterpillars get larger, they will burrow into the soil and pupate. Chemical control works best at the early instar larvae stage of the armyworms. Chemical active ingredients that work well against fall armyworms include pyrethroids, acephate, chlorantraniliprole and indoxacarb.

A new way to fight ABW

QUALI-PRO'S IAN RODRIGUEZ, PH.D., DISCUSSES A NEW MODE OF ACTION SUPERINTENDENTS CAN ADD TO THEIR ARSENAL TO COMBAT ANNUAL BLUEGRASS WEEVIL

By Sarah Webb

Annual bluegrass weevils (ABWs) resist several modes of action to control them, says Ian Rodriguez, Ph.D., technical services manager at Quali-Pro.

With that in mind, Quali-Pro is supplying superintendents with a new tool to fight ABW: Suprado, with the active ingredient, novaluron.

"Pests such as ABW have never seen this mode of action before," Rodriguez says. "That brings a valuable tool to the table because right now, there's a significant amount of resistance out there, and resistance is growing to the existing options."

The active ingredient of Suprado is an insect growth regulator that targets the insect's ability to reproduce chitin, the insect exoskeleton material, Rodriguez says. During various trials, novaluron also attacked ABW adults' fecundity, their ability to produce viable larvae, Quali-Pro research found.

Annual bluegrass weevil damage on the collar of a green.

Annual bluegrass weevils have become resistant to many modes of action that are currently available.

"It's most effective on insects when they molt, when they shed their skin and produce new exoskeletons and go through their next growth stage," Rodriguez says. "The larval stage will go through five different instar stages, so it molts five different times. Each of those molting stages provide the potential for novaluron to kill that larvae."

ITEMS TO CONSIDER

Rodriguez notes that the end user should remember Suprado is not a rapid knockdown product.

"You've got to have a little bit of faith in that if you spray it, and a week later, you still see some adults, it didn't fail. There may still be adults walking around, but they're empty husks — they're not capable of reproducing," he says.

Rodriguez adds that superintendents should time applications appropriately and do their due diligence with scouting and staying on top of what growth stages they have on their courses.

"If you used Suprado at the typical adulticide timing or during stage 2, when the larvae have hatched and are inside the stems, or at the stage 3, right as they're emerging from the stems and starting to feed on the soil, you should get excellent control and prevent damage," Rodriguez says. "If you're already in the fourth and fifth instars, it's a little late right then and there for Suprado."

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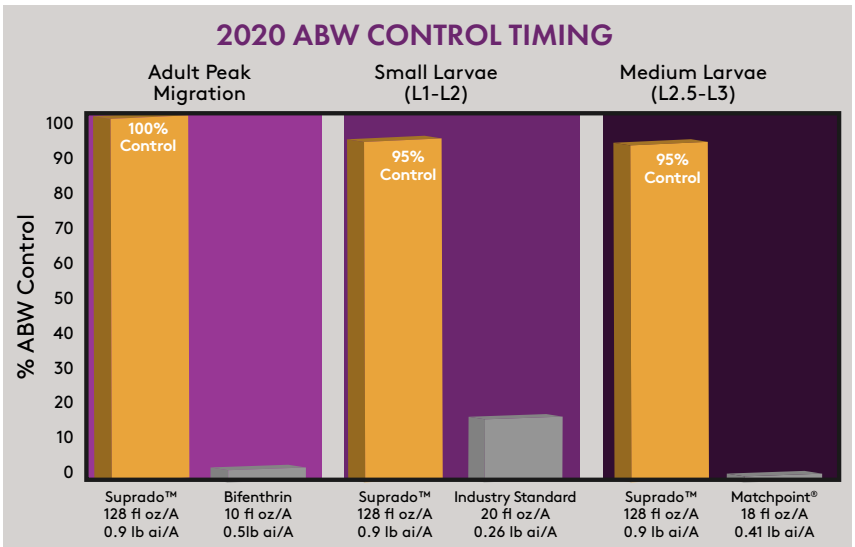
WRECK THE WEEVIL!



Field tests by Dr. Ben McGraw of Penn State University

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1 | GreenTRX portfolio

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GreenTRXAdvantage.com

2 | N-Ext RGS Soil & Plant Formula

The N-Ext RGS Soil & Plant Formula by **GREENE COUNTY FERTILIZER CO.** is a balanced biostimulant liquid that increases rooting potential and decreases stress caused by heat and drought. The biologically active material contains sea kelp and humic and fulvic acids to aid in green-up, root development, buffer and extend nitrogen release rates and add oxygen to the soil profile for greater nutrient uptake. Apply minimum twice per year at label rates. The product is safe for use on all turf types and ornamental plants.

GreeneCountyFert.com

3 | Humic coated urea

Humic coated urea (HCU) by **THE ANDERSONS** is a cost-effective 44-0-0 nitrogen granule that is bonded with potassium humate. Clean, dust-free, spherical, free-flowing 215 SGN granules can be used in dry applications and are 100 percent soluble for liquid applications. HCU provides turf quality and color while also offering strong economics for use on large turf areas such as tees and fairways.

AndersonsInc.com

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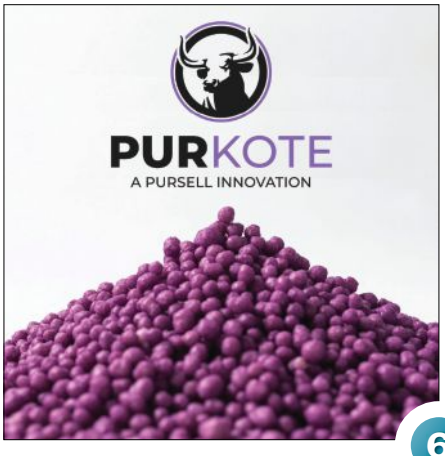

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4 | Turfcide 400 Fungicide

Turfcide 400 by **AMVAC** is powered by PCNB, an active ingredient to control all three major snow mold pathogens. Turfcide 400 can be used as a tank mix partner for control of pink, gray and speckled snow molds and Microdochium patch. Amguard Environmental Technologies is offering a $20 rebate on 2.5-gallon jugs of Turfcide 400 purchased in August and September.

Amvac.com/Snowmold

5 | Galway Bay All-Weather Rainwear

GALWAY BAY's All-Weather Rainwear line includes lightweight, breathable, waterproof Hydro-Flex 32 fabric. The jackets, pants and pullovers block wind and rain and allow the wearer to stretch and move freely while staying warm and dry. New colors include black on black, black on sage and a short-sleeved white jacket with black accents. Galway Bay's All-Weather pants are now available with a quieter, lighter Hyrdo-Flex 32 fabric. The waterproof and windproof pants now come in standard and tailored fit. Both feature belt loops, a 7-inch zipper and 9-inch-deep pockets.

GalwayBayGolf.com

6 | PurKote controlled-release fertilizer

PURSELL AGRITECH's PurKote controlled-release fertilizer delivers the nutrients turf needs at precisely the right time, from 30 days up to 24 months. It combines innovative coating materials and proprietary processing techniques to deliver controlled-release products. With the patented coating technology, nutrients can be customized for specific turf and growing conditions. Regardless of pH levels, moisture conditions or microbial activity, PurKote controlled-release fertilizer delivers broad economic and environmental advantages.

PursellFertilizer.com

The 19th Hole with...

Scott Simpson

SUPERINTENDENT // Benton (Ill.) CC

You had to carry me all round, drinks are on me. What would you like? I'm having a cold Bud Light.

Tell me about your family. My wife Diane, we just celebrated our 10-year anniversary last weekend. We have a little boy, Brendan. He's 7. And I have two older boys: Thomas is 27, and Andrew is 25.

Tell me about Benton CC. Our golf course is nine holes, chartered in 1919. The greens we're taking care of today were built in 1946: 75-year-old pushup greens. As you can imagine, it's a lot to deal with in the summer months.

How did you get to be superintendent there? I was on the board of directors and was the greens chairman. The person who was taking care of the golf course left, and the board said, you need to give it a shot and see what you can do. I said, I'll try it. If I can't make it better, then I'm going to step back. I had no experience, and I knew just enough to ask a lot of questions to the right people. That was 15 years ago. I'm still going strong.

What were you doing at the time? I had a sales job with a company in St. Louis, and then I went out on my own. I was in the rubber industry — O-rings, gaskets and so on. I'm actually still in it today. It was a side job I kept going.

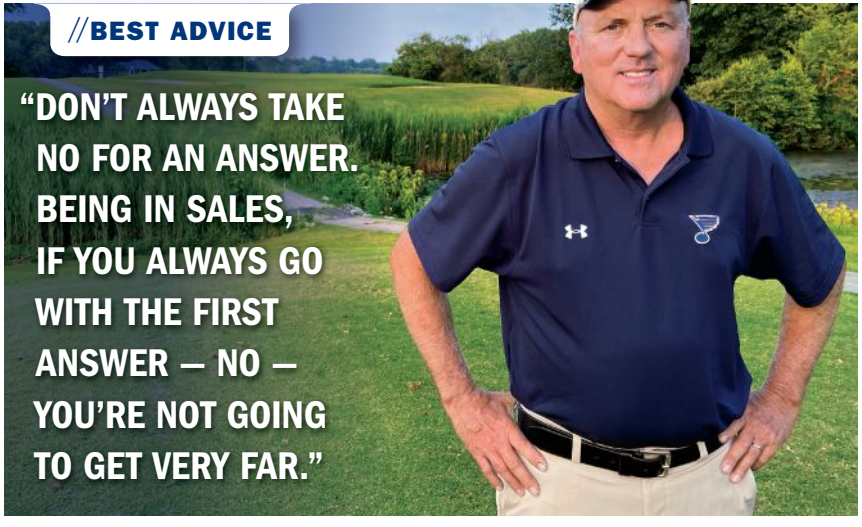
You're a former greens chair turned super. I like that. I was crazy enough to take the challenge, and here I am.

What's the strangest thing you've seen on the course? It was April of this year ... we had a massive flock of white pelicans. They took over the lake, and they were feeding all over. There were thousands! In 15 years here, it was the only time I've seen them.

What sports teams do you root for? I'm a lifelong St. Louis Blues fan. I'm also a Cardinals fan. My son Thomas went to Mississippi State, so going down and seeing him at school got me hooked on Mississippi State and particularly SEC football.

What's the best sporting event you've seen in person? That's a tough one. I have three, maybe four. I've been to two Kentucky Derbys, both an unbelievable time. I've been to four Wednesday practice rounds and the par three tournaments at Augusta. Two years ago, I did a football doubleheader with my son. At 1 p.m., we saw Alabama play at Mississippi State. After that game, we drove up to Oxford and saw LSU play Ole Miss. At the time, LSU and Alabama were No. 1 and No. 2. But, hands down my best sporting event wasn't even a real sporting event — it's the 2019 St. Louis Blues parade through downtown St. Louis. A few thousand people and I having a great time.

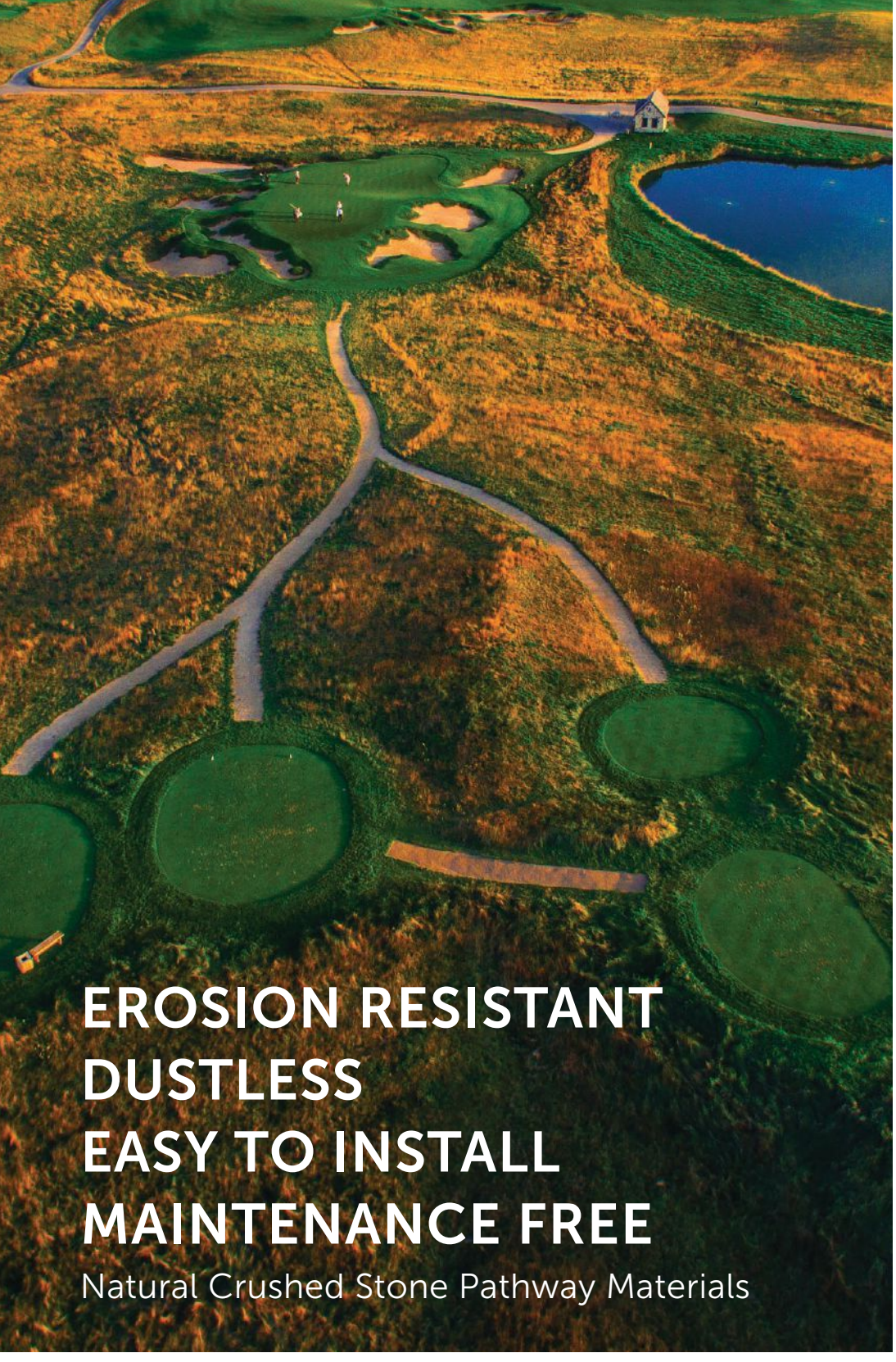
As interviewed by Seth Jones, July 6, 2021.

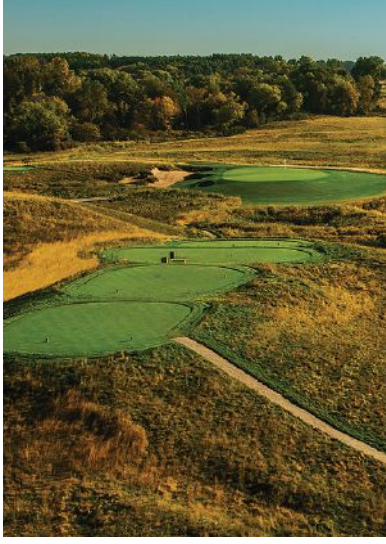


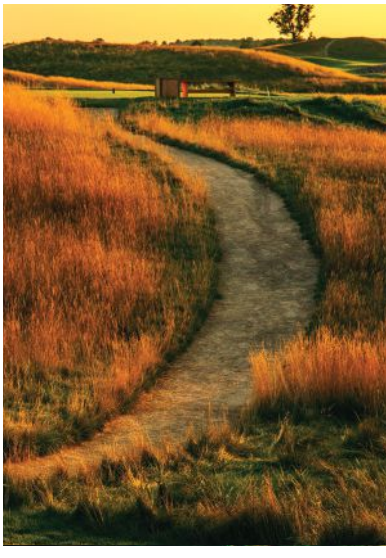
//BEST ADVICE

"DON'T ALWAYS TAKE NO FOR AN ANSWER. BEING IN SALES, IF YOU ALWAYS GO WITH THE FIRST ANSWER — NO — YOU'RE NOT GOING TO GET VERY FAR."

PHOTO OF SCOTT SIMPSON BY: DIANE SIMPSON; GETTY IMAGES; ISTOCK-GETTY IMAGES PLUS, KIRK HEWLETT (PELICANS), EKATERINAZAKHAROVA (O-RINGS);







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Turf professionals across the South are calling it the most all-encompassing and easy-to-use herbicide for southern turf available today. Coastal™ can be used safely on all four of the major warm-season turf grasses, and with three active ingredients, it provides superior control of *Poa annua*, crabgrass and other tough weeds with no tank-mixing required. It can be used successfully in a single or sequential application program 6–10 weeks apart (see reverse for sequential program details).

SIPCAM AGRO USA, INC. Talk to your Sipcam Agro representative to learn more, or visit sipcamagrousa.com.

COASTAL™ APPLICATION OPTIONS

1. **Single Application Program: One 48–64 fl. oz. application**
2. **New Sequential Application Program: Two 32 fl. oz. applications 6–10 weeks apart.**
   - » Time the first application prior to emergence of weeds targeted for control.
   - » Excellent option when there are turf tolerance concerns or when conditions may shorten the duration of a single application.
   - » Consider adding a post-emergence herbicide tank-mix partner for more complete control of existing weeds and grasses.

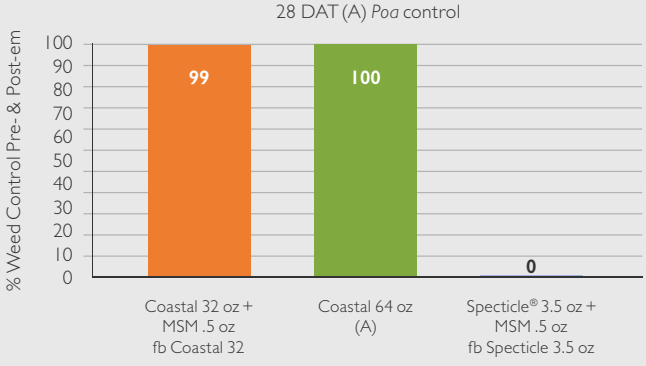
UNIVERSITY TESTED AND PROVEN

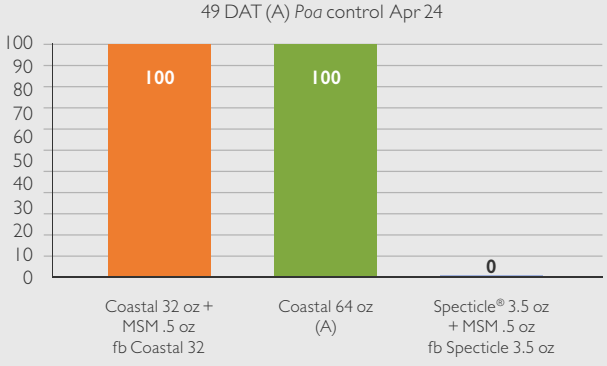
Trials at leading universities across the South compared the efficacy of Coastal in a sequential program to Specticle® sequential programs and Coastal 64 oz. programs. Results were consistent across the trials (see Auburn University data for example). Sequential programs fit the LCO segment that uses a 6–8 week treatment interval.

The trials also evaluated the Coastal programs for turf tolerances in the warm-season transition zone — sequential versus the full 64 oz. program — in addition to testing the efficacy between the two programs, especially on *Poa annua*.

AUBURN UNIVERSITY SPRING 2020 *POA ANNUA* TRIAL

Application Dates: March 6 (A) | April 21 (B) | May 28 (C)





For more information about Coastal when used in a sequential program, contact your Sipcam Agro representative or visit sipcamagrousa.com.

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