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Unorthodox mowing patterns, touchless putting, outdoor break rooms — course hacks for 2020 and beyond



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“But the lucky ones, superintendents, still get to go to their golf course offices, which they love, every day, as normal.”

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

Hail, hail to the lucky ones

Since I started doing Zoom interviews, I inadvertently invited all of *Golfdom*'s readers into my office. Because I work from my home office in rural northeast Kansas, this was never a concern of mine — presenting my home office to the outside world — since the only in-person visitors I get are my wife, my two kids and my mutt Koko.

But now, thanks to Zoom, y'all have a look into my office. Or at least, the bookcase that's directly behind me. And the item that has drawn the most comments? My copy of *Pearl Jam: Twenty*, celebrating the band's 20th anniversary.

Turns out many of you are fellow PJ fans, guys like Mike Brunelle, CGCS at Upper Montclair CC in Clifton, N.J., who told me (to his everlasting regret) he fronted a Pearl Jam cover band in college, and GCSAA CEO Rhett Evans who told me his favorite PJ song is “Wishlist.” Pearl Jam albums, concerts and songs are a common starting point before I click record on the

ol' Zoom. (Sadly, no one has asked about the Spider-Man memorabilia or even my May 1967 copy of *Golfdom*.) If you know me, you know that music is one of my passions (along with comic books.) And since many of us have Eddie Vedder, Stone Gossard, Mike McCready, Jeff Ament and Matt Cameron in common ... let me tell you what Pearl Jam song summarizes my current working situation.

The song “Hail, Hail,” off their best album — yes, their best — *No Code*. Part of the lyrics go like this:

Hail, hail to the lucky ones, I refer to those in love,

Ah how I love you till the day I die, and then beyond,

Are we going to the same place? If so, can I come?

In this case, *you* are the lucky ones. And I'm the one who wants to come along.

When the pandemic started, I'm the one who got left behind. I used to come play in your sandbox, visiting golf courses from coast to coast. My friend Tyler Otero once jokingly called me “America's guest,” a nickname I can live with.

Then that all got shut down. I've been in my home office for 14 straight weeks, guest to no one.

But the lucky ones, superintendents, still get to go to their golf course offices, which they love, every day, as

normal. You're still seeing the natural beauty, still smelling fresh-cut grass. As I do more and more interviews and I ask superintendents what life is like for them, they talk about the outlet of their golf courses ... and it makes me realize the mindset of a superintendent must be better than office stiff with desk jobs like me.

I spoke to Jeff Reich, director of golf course maintenance operations at TPC River Highlands, Cromwell, Conn., just before he and his team were to host the PGA Tour's Travelers Championship.

“To have somewhere to go to work and be on a golf course ... It's the only thing you can get out for. There's nothing else you can do!” Reich told me. “You're not going to restaurants, you're not going to the mall, you're not going to family gatherings. Guys were chomping at the bit to get back to work. I don't think I've had one sick call-in or no-show because this is their outlet right now.”

It's been suggested to me that I create a video and give a guided tour of my home office. I've been asked, “Is that a can of Duff Beer, from *The Simpsons*?” and “Is that an old spinner rack of comic books behind you?” (Yes — much to my wife's dismay — it is.)

But I'm sick of the home office. I'm ready to come to yours. Hail, hail to you, the lucky ones. Can I come? 📞

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NEWS, NOTES AND QUOTES



// HEAVY TRAFFIC



SINGLE RIDER STRESS

BY SARAH WEBB // Associate Editor



A picture is worth a thousand words, says Matthew A. Marsh, director of golf course maintenance at Mesa Verde CC in Costa Mesa, Calif., but he's never seen anything like the image of GPS lines made by the 121 carts that drove through the course on Sunday, June 13.

"The main issue with the image is, because of COVID-19, we've only been allowing single riders. We've pretty much doubled (the carts on the course)," he says. "Most of us were closed down for two months for the COVID-19 outbreak back in March, so coming out of that, every course was looking fantastic because you don't have the cart traffic wear. We've been open for three or four weeks, but if you have a couple months of wear and use like that, naturally, you're going to see a negative impact on turf."

The image was taken using the GPS technology Visage, which allows users to see where carts have been driven. The club has the system set up on each

of its E-Z-GO golf carts.

While Mesa Verde doesn't have cart paths all around the course, the cart paths that are in place are lined with stakes and ropes, and then there's open area for people to drive.

However, Marsh says he would like to implement a gate system with two stakes on a fairway that direct carts to those gates. The team will then move those gates every day to spread out the wear pattern, so golfers aren't beating down the same areas. The club is also considering an upgraded version of Visage, which sets restrictions on where people can and can't drive by using a warning alarm that will go off in the cart. If the user doesn't heed the warning, the cart will shut off.

Marsh also plans to educate his crew and membership on the importance of using the gate system.

"I'll let golfers know that unless you adopt this program, we're going to have a lot of wear and issues on the golf course," he says.

// NEW MANAGEMENT IN TOWN

TROON TO MANAGE THE VIRGINIAN

Troon has been selected to manage The Virginian and its sister property, Nicewonder Farm & Vineyards, both of which are located in Bristol, Va.

Troon Privé, the private club operating division of Troon, will oversee golf, club and food and beverage operations as well as golf course agronomy and membership marketing.

Set in the Highlands of Virginia, between the Blue Ridge and Appalachian Mountains, the clubhouse and golf course are the centerpieces of The Virginian luxury community. The Tom Fazio-designed, 7,025-yard golf course opened in 1992 and is ranked as one of the state's top golf courses by both *Golf Digest* and *Golfweek*.

// JOINING FORCES

BRIGGS & STRATTON, INGERSOLL RAND PARTNER UP

Briggs & Stratton Corp. entered a new strategic supply agreement with Ingersoll Rand to power Club Car vehicles with its Vanguard Commercial lithium-ion battery packs.

Beginning in July, the company will power Club Car's new lithium-ion line of Fleet golf cars. With lithium-ion power, the fleet charges two times faster, reduces energy consumption, requires zero maintenance and has a long life, said the company.

As a result of this new agreement and rapidly increasing interest, Briggs & Stratton Corp. will also open a new Advanced Battery Manufacturing facility in Tucker, Ga. As of June 10, four production lines will be operational within the new 78,000-square-foot facility. This facility is in addition to the current production space located in Milwaukee, which, going forward, will serve as a developmental facility to support the influx of interested customers in this \$12 billion market, including military, construction, municipal and golf and leisure, in addition to lawn and garden.

// BACK 2 BUSINESS

Back2Golf updates operations playbook

➔ The industrywide Back2Golf initiative has updated its Operations Playbook (version 3.0) to help lead the responsible return of golf. Interim guidance from The Centers for Disease Control and/or feedback from the golf community will result in additional modifications to the Operations Playbook.

“Back2Golf has helped our Allied Golf Associations and member facilities get back to work, provide continuity from state to state and ultimately welcome back golfers to the course in a way that provides connection and great care for all,” said Mike Davis, CEO of the United States Golf Association.

The updated playbook and addendum provide recommendations that guide the industry as it reestablishes amateur competitive events and junior programming, which are part of Back2Golf’s second phase plans. The

addendum provides recommendations for the second phase, which include limiting gatherings to no more than 50 people, prohibiting physical contact of any kind, requirements of cloth facial coverings and other protocols related to registration areas, practice areas, food and beverage operations, equipment, restrooms, on-course play and departures.

Announced in early May, the Back2Golf initiative is driven by key stakeholders of We Are Golf, a division of the World Golf Foundation created in 2010 to spearhead initiatives on behalf of the game. Supporting organizations include Professional Golfers Association (PGA) of America, the United States Golf Association, PGA Tour, LPGA, Golf Course Superintendents Association of America, National Golf Course Owners Association and Club Management Association of America, among others.

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“Had a member tell me the other day that he likes when those green and white posts are separated enough to drive a cart through and would appreciate if we could make them all like that.”

Brent Graham,
CGCS

Director of Golf Course Maintenance, Two Rivers Country Club, Williamsburg, Va.



PHOTO BY: BRENT GRAHAM

// GIVING BACK

BASF DONATES \$25K TO DISASTER RELIEF FUND

BASF donated \$25,000 to the Golf Course Superintendents Association of America (GCSAA) Disaster Relief Fund. The donation will help GCSAA provide immediate financial assistance to its members suffering job loss due to the effects of COVID-19.

“A significant number of our team members are former superintendents,” said Stephanie Jensen, director of BASF Professional & Specialty Solutions. “We are deeply committed to supporting the industry through this unprecedented time and proudly partner with GCSAA to help provide financial relief to those members in need.”

The GCSAA created the Disaster Relief Fund in 2006 in the aftermath of Hurricane Katrina. It continues today as a resource for members who face tragedy caused by natural disasters by providing the opportunity for peers in the industry to help each other through monetary donations.

// A NEW FACE

BOBBY JONES LINKS APPOINTS NEW CFO

Atlanta-based club management company, Bobby Jones Links, appointed Nicole Brook to CFO. Amy Willy, who previously served in this position, has transitioned to her new role as Bobby Jones Links’ senior vice president of accounting and systems.

With extensive financial and accounting experience that spans more than 25 years, Brook will provide valuable guidance to the senior leadership team as Bobby Jones Links continues to expand operations.

She brings more than a decade of direct experience in golf course and equipment lending, as well as vast experience leading a finance organization with a significant number of golf course owned properties under Textron Financial Corporation. Brook graduated from Bryant University with a Bachelor of Science in business administration with a concentration in finance. Brook continued her education by attending Textron’s Six Sigma Academy and is a certified Six Sigma Black Belt. In addition, she completed The Strategic Partnering for Finance Leaders program at The Wharton School of the University of Pennsylvania.



Nicole Brook

The Golfdom

FILES

FROM THE ARCHIVE

Golfdom celebrated its 40th anniversary year from 1966 to 1967 ... and our history of celebrating ingenuity in the golf industry hasn't waned in the pages of this magazine. In this July 1966 article, *Golfdom* founder Herb Graffis takes a look back at the post-World War I golf climate and how much the game owes to a golf salesman and pioneer, Sam Clapper. Clapper helped replace the horse-and-buggy mowers of the day with tractor-pulled cutters, and Graffis highlights his legacy of developing turf maintenance equipment and mower distribution networks. To read the full story, visit Golfdom.com/exclusive, and to learn more about how superintendents are getting creative and adapting to the new demands of golf maintenance in these interesting times, turn to our cover story on page 16.

Giving golfers what they need

BY HERB GRAFFIS

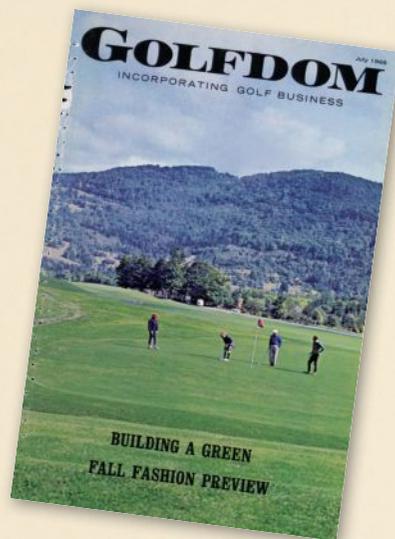
Golf has been very lucky in having course seed, equipment and supply distributors develop it from a sport on pastures and wastelands into a huge business on turf that set the top standard for ornamental and play grass.

In the pioneering days of U.S. golf, Carter's Tested Seeds and Stumpp & Walter worked with the few who were specializing in golf architecture and with the many pros who were taking 36 sticks and staking out 18 greens, then going back to 18 locations and marking tee sites.

Fairway watering was by the "Nature System." Once in a while, there was a deluxe course with watered greens. Horse-drawn mowers accounted for a rules problem of improving your lie. A good healthy well-fed American horse with mower produced a different shotmaking situation from that of nibbling Scottish sheep.

THEN SAM CLAPPER CAME IN

About this time, there came into golf J.S. (Sam) Clapper, who set up a pattern



of market development through golf course equipment and supply dealers in strategic areas. Clapper had a combination of mechanics and merchandising in his mind which would be called genius today. Right after World War I, it was regarded as something required to make a good living.

Those who know Sam's son, Orville, and Orville's son, Sam, who own and operate the Clapper Co. at West Newton, Mass., see reflections of the bal-

anced market development and service thinking of "Sam the First."

Clapper starred as a salesman with the International Harvester Co. in Iowa around 1900, selling and training horse-shoers and blacksmiths in the servicing of horse-drawn harvesting machines.

Then he went to Gas Traction Co. of St. Paul, builder of a four-cylinder farm tractor that won many awards in tough tractor-testing competitions. Toro Manufacturing Corp. of Minneapolis was the outgrowth of that company.

Sam Clapper was born with a research-and-development temperament. He started in business as a clerk in a hardware store in Paris, Mo., where he was born. He sold windmills and installed in his home in Centralia, Mo., the first running water and sink in that area. Eventually, Sam wound up in Minneapolis as a sales manager for a large buggy and surrey dealer. On one of his sales trips, he met a minister who had a gasoline farm tractor idea. Together, they worked out the Bull tractor, which not only figured in enlarging farm operations, but was a lifesaver for the French by hauling heavy guns in World War I.

GETTING INTO GOLF

After the war, Sam Clapper felt that the budding golf market needed mowing equipment to replace horses and mules that were in short supply as a result of the conflict. He sent out three men in 1920-21 to see if there was a market in golf for a Toro outfit with cutters ahead of the powered rear wheels of a tractor. The scouts reported that there was a certain and warm welcome awaiting the proposed Toro equipment, for even in those days, the demands of the golfers were getting ahead of the equipment greenkeepers had to do their jobs. **G**

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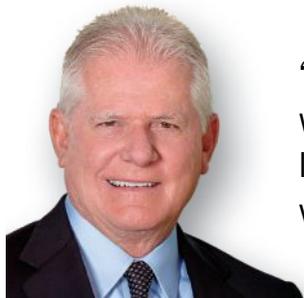
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THE LEADER.



“It’s a proven fact that there’s strength in numbers when it comes to educating and informing legislators and decision-makers about the true value of what golf provides to communities.”

MARK WOODWARD, *Contributing Editor*

Not bad, just different

After taking a bit of a break from writing articles for *Golfdom*, I’m back at it again. I’ve missed the challenge of cranking out an article every month.

It doesn’t matter who you are or what your job is, one can’t help but think about the way life was before the coronavirus. In just a few short months, all of our lives have changed dramatically in every conceivable way. And sadly, it’s a long way from being over.

During these challenging times, golf has been in the spotlight for a number of reasons. Some good, some bad. Many people think golf has been a great way for people to get out into the fresh air and recreate as long as the proper social distancing measures are put in place. Conversely, many people think golf is an activity that should not be played when so many people are suffering.

In my state (Arizona), the governor made the decision that golf was an essential

activity as long as the golf facility implemented safe practices as it relates to social distancing. Therefore, golf courses could stay open with the necessary changes to protect the golfers and the staff.

As we move forward in our personal and professional lives and the golf industry continues to be scrutinized in many ways, now more than ever is the time to get involved with your local association or government advocacy group about this and any other issue your state or region faces that affects the long-term sustainability of our industry.

It’s a proven fact that there is strength in numbers when it comes to educating and informing legislators and decision-makers about the true value of what golf provides to communities.

For example, our state association has continued to work closely with our allied golf associations, and we’ve stayed in close contact with and have attended virtual meetings with our state regulatory agencies concerning water issues, economic impact statements and other policy issues.

We’ve also made a concerted effort to reach out to our senators and representatives and have conference calls with them. These calls have allowed us to tell our side of the story and ensure these decision- and policymakers have factual information about the golf industry, such as the total dollars of economic impact that golf provides to the state, total jobs in the golf industry, taxes paid to the state from golf activities, water use numbers, water management

and conservation, land use numbers, rounds played, total number of golfers, environmental stewardship, etc., so they can see that golf courses truly are individual small businesses that add up to a very large industry in the state.

We are in the process of updating our economic impact study with current information as it relates to golf and tourism to show the impact of COVID-19.

Although it’s far from being business as usual, I believe golf has played a significant role in some areas of the country and provided some semblance of normality in terms of physical and mental well-being.

Obviously, we will all experience a “new normal” not only in our personal lives, but also in the way we conduct business *and* how the game of golf is played.

The challenges we all face are not necessarily a bad thing. They’re just different. If we continue to get or stay involved and be open to getting out of our proverbial boxes and look at everything we do differently, golf can come out of this pandemic stronger and better for all of us.

My heart goes out to all of those who were and have been affected by this awful virus. Stay safe and strong. 🇺🇸

Mark Woodward is director of agronomy at Whisper Rock Golf Club in Scottsdale, Ariz., and a contributing editor for *Golfdom*. He can be reached at mwoodward@whisperrockgolf.com.

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2020 John Deere Classic canceled, but the show goes on

The crew at TPC Deere Run relies on each other to stay motivated, on John Deere to help them get the job done

It wasn't what anyone at TPC Deere Run hoped for, but it was the hand they were dealt. After the John Deere Classic was canceled in late May due to the state of Illinois' limiting of gatherings to 50 people, it was time to refocus.

"The initial reaction was disappointment. You look forward to it every year, and that's your goal to host a PGA Tour event and put on a great community spectacle that everyone puts their hands around," says



Alex Stuedemann

Alex J. Stuedemann, CGCS, director of golf course maintenance operations at TPC Deere Run in East Moline, Ill. "But it was a situation we couldn't control. I stood up in front of our team and said OK, our goal has changed ... In every challenge, there's an opportunity."

The pandemic led to the cancellation of

the tournament, and it also changed the way the team at Deere Run works. Not only do they have to remain diligent in maintaining social distance, but there are six fewer people on the crew, a commonality in the industry.

"With the pandemic, you would think there would be a lot of changes (at the course). But turfgrass and viruses, they don't seem to be a good mix. The grass hasn't stopped growing," Stuedemann says. "We have a plan in place. It's a matter of picking our priorities. We have a good team here at Deere Run that knows what the goal is but also cares about one another and wants to be safe during this pandemic."

Stuedemann says his team is empowered with the latest in equipment to get the job done. First and foremost is their ProGator GPS PrecisionSprayer. He says it allows them to have maximum control over their agronomics.

"It gives us the ability to capitalize on what John Deere has done in the agricultural



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field to give us that precision to put down what we need where we need it, down to the subinch," Stuedemann says. "For us, with 30 acres of bentgrass fairways, and another 5 acres in tees and greens, every little saved square foot adds up."

Stuedemann says another tool will soon be part of the fleet at TPC Deere Run: Deere's 2700 Triplex mowers. The course currently has 2500s, but after a recent demo, it decided to upgrade to the newest and best in Deere's triplex mower offerings.

"It's a machine that can be used across multiple surfaces on the golf course. We're very, very undulated at Deere Run, a lot of steep hills, a lot of fall-off areas," Stuedemann says. "We really put the 2700 through its paces, and that machine didn't even blink. The quality of cut was second to none."

Despite the cancellation of the John Deere Classic, Stuedemann says the show at TPC Deere Run goes on.

"Despite the tournament not joining us this year, our agronomic plan and our maintenance practices haven't changed," Stuedemann says, before smiling and adding, "We're just seeing a different level of golfer for a week in July that maybe isn't getting as many birdies ... But they're going to get the same conditions that the Tour players were going to get for a week."

Commitment to community continues

Despite the tournament cancellation, the John Deere Classic will continue its Birdies for Charity fundraiser for 2020.

"I have to give a hats off to (tournament director) Clair Peterson and his team with the John Deere Classic," says Alex J. Stuedemann, CGCS, director of golf course maintenance operations at TPC Deere Run. "They moved this to a virtual environment that still allows people to donate to Birdies for Charity. And, they've set a very lofty goal of \$10 million, regardless of the tournament not taking place."

To learn more or make a donation, visit BirdiesForCharity.com.





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Unorthodox mowing patterns,
touchless putting, outdoor break
rooms — course hacks for 2020 and beyond

In adversity, ingenuity

BY THE GOLFDOM STAFF

Over the past four months, the pandemic has changed the way the world operates. Golf has not been excluded.

Goodbye, common touch points — ball washers, bunker rakes and water coolers have mostly been moved off the golf course and to the least-visible corner of the maintenance facility yard. The act of touching the flagstick and reaching into the cup, perhaps the most common facet of the game, has been rethought so players don't have to touch anything other than their own ball. That means installing anything from a pool noodle in the golf cup or a system like Standard Golf's Cup Saver Ball Retriever. To make

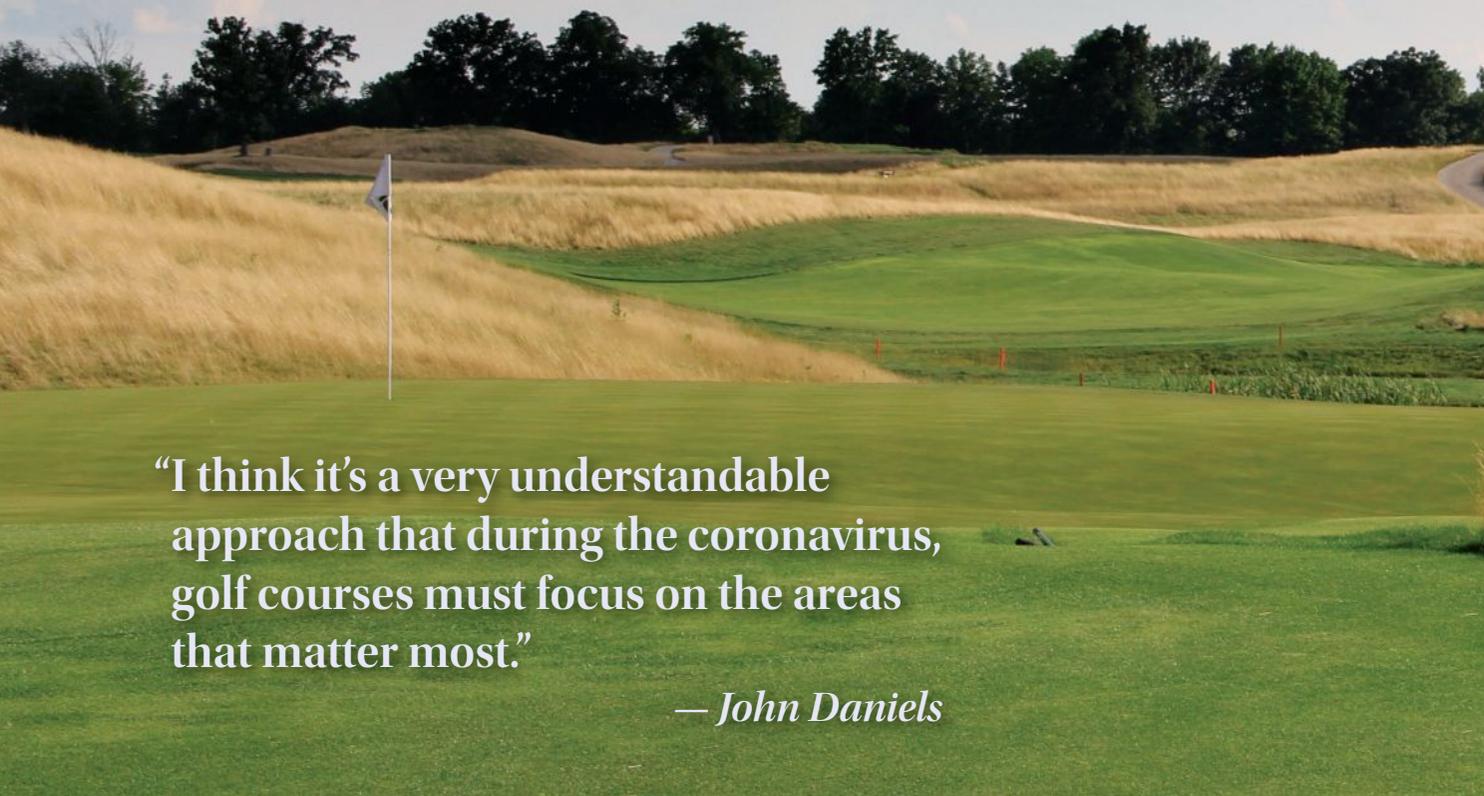
sure golfers aren't touching flagsticks, some courses are even removing flagsticks off the greens completely (see page 21).

All of this has had to be done on the fly, as golf courses have been absolutely packed this spring. "As one superintendent said to me, weekdays are now like weekends, and weekends are now like holiday weekends," reports John Daniels, USGA Green Section central agronomist. "Superintendents by nature are excellent problem-solvers. When faced with a new problem, they come up with a new solution. From pool noodles in the cup to minimizing touch points, it's good to see creative solutions so quickly."

Golfdom talked to Daniels as well as superintendents around

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“I think it’s a very understandable approach that during the coronavirus, golf courses must focus on the areas that matter most.”

— John Daniels

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the country to learn some new processes that have been installed at courses. Some of these might just be here to stay.

Unnatural natural areas and rakes

Daniels published an article titled, “Nine golf course practices I hope don’t come back” on the USGA’s Green Section Record. In his cross-hairs were elaborate mowing patterns, painting the hole and ball washers.



John Daniels

Another sticking point with Daniels was what he called “unnatural naturalized areas.”

“Natural areas, or if you want to call them native areas, they vary from manicured consistent monocultures of one plant species to something that is much more native and varies from year to year and looks different from one point in the year to the next point,” Daniels says. “To achieve something that is consistent re-

quires a fair amount of inputs, and there is a disconnect among golfers in understanding what it requires to produce some of these very consistent areas.”

Daniels advocates for superintendents to streamline their operations and focus resources on more important areas of the course.

“Those resources could be better served somewhere else on the course, because frankly, these areas are out of play,” he says. “I think it’s a very understandable approach that during the coronavirus, golf courses must focus on areas that matter most.”

Another element of the game that Daniels singles out, common over the last 60 years at least, are bunker rakes. “I have yet to hear any examples of how the removal of bunker rakes has ruined a golfer’s round,” he wrote in his article at [USGA.org](https://www.usga.org).

Superintendents also welcome the removal of these low-lying obstacles, reports Micah Pennybaker, superintendent of the South Course at Carmel CC in Charlotte, N.C.

“From our perspective, it’s easier on the maintenance, especially getting around

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// INNOVATE & CREATE

Continued from page 18

mowing, spraying bunker faces, any of that,” Pennybaker says. “That’s one of the cooler (changes) that I like: Just let the members move the ball around. We’re not playing USGA rules. Just find a good spot.”

“I think we’ll see a number of courses that won’t utilize bunker rakes the way they did before (the pandemic),” Daniels tells *Golfdom*. “Whether that means they have a reduced number of bunker rakes or they don’t put them out at all, and they rake daily before golfers go out and expect golfers to brush aside deep footprints. I can tell you that at a lot of courses I play, people don’t know how to use that rake.”

The ease of mowing around bunkers without rakes could significantly reduce labor hours, Daniels says. And, he adds that bunkers should become more challenging, from the professional level down to municipal golf. (*Editor’s Note: To watch our interview with Daniels, visit Golfdom.com.*)

Daniels says his list of nine things could have been longer. He could have mentioned decorative flowers, an element he finds completely unnecessary for a course. And there’s one more thing he hopes doesn’t come back to golf, but it’s more of a philosophy: irrational expectations for conditions.

“When golf was allowed in some places and not allowed in others, there was an uncertainty,” Daniels says. “The irrational expectations among some golfers — I didn’t hear them, didn’t see them. Everyone was just enjoying the game. That’s one thing I hope can be



reset ... the expectations, day to day, of a golf course. Faster greens don’t necessarily make for a more enjoyable experience. It was fun to see everybody just happy to be out there.”

— Seth Jones

Knocking out greens in a snap

As COVID-19 hit the state of Mississippi, Chase Smith, superintendent at Olive Branch (Miss.) Country Club faced maintaining a golf course with a reduced staff. That’s when he remembered something he did from when he worked at Memphis (Tenn.) Country Club.

Smith had to terminate one full-time employee and was unable to hire seasonal staff at Olive Branch CC so he looked for ways to become more efficient. When Smith was at Memphis CC, the course got a triplex mower and superintendent Jason Bradley implemented a different style of mowing. Smith says that technique saved mow time then, so he thought it would work at Olive Branch.

“You knock out a green in five minutes,” he says. “The pattern is easiest described as mowing your cleanup ring first. Going clockwise or counter clockwise



The elimination of bunker rakes could help crews move easier and more efficiently around bunkers.

to alternate patterns. Say we are going clockwise, you start at 12, go around the cleanup (edge of green). As you get back to 12, you turn the mower to the right and drive straight down to 6. This limits sharp turns. Each turn is the same distance and width from each other.”

Smith says his crew doesn't have to pick up reels on the triplex mowers, so he's noticed decreased traffic on the collars.

“We've been doing this for about three weeks straight and as of now, I have very minimal damage to any of the surfaces,” he says. “This method is different than typical half-and-half patterns because you never pick up the reels. The mower has one entrance and one exit from the green, therefore limited stress to the collars and approach of the green.”

Smith says if there is a point where some stress shows up on the collars, the crew will just pick one direction to let the collars heal.

“If you're a course that is fortunate enough to have big tees,

I would recommend it there,” he says. “Because then you're standing some grass up that you normally might not. You'll get a cleaner cut. I have noticed a cleaner cut on my greens because of that, when you get down to the edge and you turn around and come back, you're hitting it from a few different directions instead of just one. If you decided to double-cut, you're just cutting from the opposite direction.”

As part of the COVID-19 precautions, Olive Branch CC removed all touch points on the course, which included flagsticks. And without flagsticks, the course got creative in how to direct golfers to putt.

“We made a pin sheet, (and) we placed one pin behind the green and we based the hole location off of that pin,” he says. “That way, our members would still have something to share to get a yardage on. Then, we tell them how many paces are left to get to the pin.”

Members seemed to respond positively to the touch-free putting.

“A lot of our members played better rounds without flagsticks in the hole than with them because they were aiming for the center of the green,” Smith says.

— Christina Herrick

Build it and they will eat

When employees were forced to take lunch in their cars and carts due to COVID-19 social distancing measures, Sean Reehoorn, superintendent at Aldarra GC in Sammamish, Wash., knew something had to give.

His solution: a tent for people to eat lunch in. Reehoorn

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// CREATE & INNOVATE

Continued from page 21

bought one for \$200, and all in all, it took about three people an hour to put it up in the parking lot, weigh it down with cinder blocks and spread out tables and chairs.

“Our maintenance facility is an old barn that was built in the ’40s, so it’s small, long and narrow. It’s pretty confined,” Reehorn says. “We thought it was necessary to social distance, and we couldn’t do it in



Sean Reehorn

going into the barn’s break room to use the restroom or wash their hands, significantly limiting traffic in and out of the barn.

the space with the staff we had, but I just don’t think that’s a great representation of us as a club to make people eat in their cars.”

He adds that this way, people are only

going into the barn’s break room to use the restroom or wash their hands, significantly limiting traffic in and out of the barn.



Putting up a tent in Aldarra CC’s parking lot allowed employees to better socially distance themselves and eat their lunches outdoors.

Reehorn says employees like the new addition, so much so that it may become a more permanent fixture than originally intended.

“They think it’s nice to have a place they can still be around each other and chat, joke and laugh and try to be as routine as it would’ve been prior to social distancing,” he says. “Depending on what happens in

the fall and winter, on nice days, we might move it to a different location that’s a little more permanent where if people want to sit outside and eat lunch, they can.”

Overall, Reehorn says he’s tried to create as safe an environment for employees as possible.

“It’s letting people know, if you don’t feel safe, now is not the time to be quiet,” he says. “Now is the time to speak up because maybe the idea you have could be better for everyone.”

— Sarah Webb

PHOTO BY: SEAN REEHOORN

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// TRADING ONE PROBLEM FOR ANOTHER

SULFUR FOR ONE

By Alec Kowalewski, Ph.D.

Sometimes a cultural practice for one disease problem can increase another later in the year. Our research at Oregon State University found this to be the case when looking for alternative control measures for *Microdochium* patch (*Microdochium nivale*) on annual bluegrass (*Poa annua*).

Earlier research from the 1950s and 1970s indicated that lime increased *Microdochium* patch, while sulfur decreased severity. But, as seen by scientists at Rutgers University, acidic soil conditions can increase anthracnose severity. We conducted an experiment looking at the long-term effects of sulfur and calcium applications on the occurrence of *Microdochium* patch in the winter and anthracnose in the summer.

The research area was a USGA sand-based putting green with annual bluegrass. The experiment included three elemental sulfur treatments combined with four calcium sources. From January 2009 to May 2016, elemental sulfur was applied at 0.25 and 0.50 pound of sulfur per 1,000 square feet per month, totaling 3.0 and 6.0 pounds of sulfur per 1,000 square feet annually, respectively.

The four calcium treatments included no calcium, lime, gypsum or calcium phosphate. In May and September from 2005 to 2016, we applied all calcium sources after core cultivation at a rate of 12.5 pounds of product per 1,000 square feet.

From September through May of 2013 to 2016, we made fungicide applications of Banner Maxx II plus Turfcide 400 at 2.0 fluid ounces + 6.0 fluid ounces per 1,000 square feet, respectively. Fungicide applications were made on a per-plot basis when infection thresholds reached five spots measuring 0.25 inch in diameter or one spot exceeded 1 inch in diameter. Fungicides were not applied for anthracnose control from June to August.

As expected, sulfur helped to reduce the *Microdochium* patch, allowing for a more successful scouting-based fungicide program. However, sulfur also increased anthracnose in the absence of fungicide. Plots treated with lime had a higher pH than the other calcium sources. Yet, the calcium sources did not impact the number of fungicide treatments for *Microdochium* patch or anthracnose severity. 



Alec Kowalewski is an associate professor in the Department of Horticulture at Oregon State University. He can be reached at alec.kowalewski@oregonstate.edu.

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

NEWS UPDATES

SYNGENTA POSTERITY NOW REGISTERED IN CALIFORNIA

Posterity fungicide from Syngenta is now registered in California to control key diseases on golf course turf.

Posterity provides up to 28 days of control and is an active succinate dehydrogenase inhibitor (SDHI) against dollar spot in the turf market.

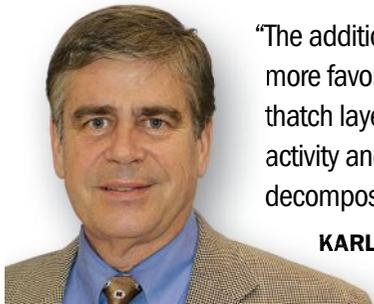
"Posterity has been used extensively by superintendents in other parts of the country since originally launching in 2018," said Dean Mosdell, Ph.D., technical services manager for turf at Syngenta. "We have continued to see Posterity provide excellent disease control, and it has become a key part of agronomic programs to control spring dead spot, so we are excited to have it available in California."

Preventive applications of Posterity are recommended beginning in the spring, prior to the expression of fairy rings, as soil temperature exceed 60 degrees F. Posterity also features curative properties and can be used for extended preventive applications for continued protection. Fall applications for spring dead spot should begin as soil temperatures hit 70 degrees F followed by a repeat application 28 days later.

Syngenta also offers agronomic programs that strategically rotate Posterity with other trusted products to properly condition turf so it will perform at its best and recover quickly from stress.

RESEARCH HAS REPEATEDLY DEMONSTRATED THAT ANTHRACNOSE CAN BE VERY DESTRUCTIVE ON WEAKENED TURF."

James Murphy, Ph.D., et al.
(see story on page 25)



“The addition of topdressing makes the environment more favorable for microbial breakdown of the thatch layer. It is less conducive for microbial activity and dilutes the thatch, resulting in a less decomposed mat layer.”

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

Keeping organic matter under control

Managing the top 1 inch to 2.5 inches of sand-based root zone is critical to the long-term success of putting greens. Organic matter accumulation that occurs between the green vegetation (sward) and the soil surface is often referred to as the thatch and/or mat layer.

Thatch is defined as a tightly intermingled layer of dead and living stems, roots and crowns that occurs between the green vegetation and the soil surface. Mat is similarly defined as thatch, except it is generally in a more decomposed state because of the inclusion of soil or a mineral component like sand. Mat forms when sand topdressing alone or in conjunction with coring occurs. Sand root zones are not as conducive as a general “soil” for thatch breakdown.

Thatch accumulation is dependent on several factors, including the health of the turf (a vigorous growing turf is more apt to produce more stems and roots) and the turfgrass species (turfgrasses that have stolons and/or rhizomes can produce more thatch).

For example, a healthy sward of creeping bentgrass or bermudagrass produces more thatch than a healthy annual bluegrass or perennial ryegrass.

Differences within a species also influence thatch accumulation. The new high-shoot-density creeping bentgrass cultivars (As and Gs) tend to accumulate

thatch at a greater rate than the moderate-shoot-density cultivars.

Similar tendencies occur with bermudagrass varieties. A study conducted in Australia showed that the new bermudagrass ultradwarfs produce a considerable amount of thatch compared to Tifdwarf and Tifgreen. Mini Verde was reported to have the highest thatching tendency (Roche et al., 2010).

Mat occurs with the introduction of topdressing. The addition of topdressing makes the environment more favorable for microbial breakdown of the thatch layer. It is less conducive for microbial activity and dilutes the thatch, resulting in a less decomposed mat layer. The effective amount of sand topdressing needed to successfully manage the organic matter content in a green’s root zone depends on the turfgrass species and the growing season. For cool-season turfgrasses like creeping bentgrass, the range of sand needed is 20 to 30 cubic feet per 1,000 square feet per year, while with a warm-season turfgrass species like an ultradwarf ber-

mudagrass, that range could be 30 to 60 cubic feet per 1,000 square feet per year.

Regardless of frequency or application methods, the total amount of sand applied is key.

Edward McCoy, Ph.D., a professor of soil physics at The Ohio State University has developed a location-based simulation model of organic matter accumulation, decay, dilution and removal to predict the fate of surface organic matter in sand-based putting greens over time. The model inputs include location, management practice and frequency (i.e., topdressing, coring, etc.)

Impressively, the model can look at long-term effects of sand topdressing or placement into the root zone via coring or Dryject.

What both field research and simulation models show is that approximately 25 cubic feet of sand per 1,000 square feet per year is needed to effectively manage root zone organic matter in cool-season putting greens.

In one simulation in Wooster, Ohio, McCoy noted, “...organic matter contents become nearly unchanged after year 15. Thus, the yearly management operations serve to remove or dilute organic matter within all layers equal to the rates of soil organic matter accumulation and decay. Consequently, over the long term, the twice-yearly core aeration plus seasonal light topdressing applying sand at about 25 cubic feet per 1,000 square feet (per year) is sufficient to maintain reasonably low soil organic matter levels.”

A description of McCoy’s model can be found by searching for McCoy and organic matter at bucketurf.osu.edu or at dryject.com.

An updated version of McCoy’s model will be available later this summer. For more information, contact McCoy at mccoy.13@osu.edu. 

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

// ANTHRACNOSE BE GONE

BMPs for anthracnose on annual bluegrass putting greens

By Bruce Clarke, Ph.D., James Murphy, Ph.D., and John Inguagiato, Ph.D.

Anthrachnose (*Colletotrichum cereale*) is a destructive fungal disease that occurs on cool-season turf throughout the world (7, 30). During the mid-1990s, outbreaks of anthracnose on annual bluegrass (*Poa annua*) putting greens increased in frequency and intensity (8, 9, 21, 22). However, scientists within the Northeast U.S. made progress in developing best management practices (BMPs) for the suppression of anthracnose disease on golf course putting greens (23, 24).

Research has repeatedly demonstrated that anthracnose can be very destructive on weakened turf. Plant nutrient deficiencies, ultralow mowing and excessively wet or dry irrigation programs are all critical stress factors that significantly increase the risk of severe damage from anthracnose. As a result, BMPs include practices that address these plant health factors.

The research demonstrated that wounding caused by practices such as topdressing, light verticutting, coring and solid tining does not intensify anthracnose (10, 19, 26). Well-designed topdressing and cultivation programs that strengthen healthy turf will help reduce anthracnose symptoms.

NITROGEN

Superintendents need to evaluate whether nitrogen fertility is limiting turf vigor when attempting to manage anthracnose.

Frequent, light-rate nitrogen fertilization during the summer is highly effective at suppressing anthracnose (15). On research plots without fungicides, fertilization at 0.1 to 0.2 pound of nitrogen per 1,000 square feet per week

FIGURE 1



Researchers at Rutgers University have developed best management practices for anthracnose. In this photo, leaves have turned yellow to brown and are sprinkled with black spore-bearing structures.

greatly reduced disease severity (15, 28). In fact, in some years, 0.1 pound of nitrogen per 1,000 square feet per week, along with the correct combination of mowing height and sand topdressing, suppressed the disease to levels that were effectively managed with early curative fungicide applications (13).

Although some superintendents might consider 0.1 pound of nitrogen per 1,000 square feet a rather high rate, it is not excessive for managing anthracnose. Under high disease pressure, up to 0.2 pound of nitrogen per 1,000 square

feet per week provides optimal disease suppression. Anthracnose did not intensify on putting greens until applications of 0.3 pound per 1,000 square feet per week (28).

The key to anthracnose suppression is maintaining sufficient nitrogen in the plant (about 3.35 percent nitrogen in leaf tissue) through frequent, light-rate applications of soluble nitrogen (14).

Plant growth regulator applications are an effective tactic for maintaining turf quality at low mowing heights and for eliminating excess vertical shoot growth caused by frequent, light-rate nitrogen fertilization. Embark (mefluidide) or Primo MAXX (trinexapacetyl) applied alone or in combination with Proxy (ethephon) have not intensified anthracnose severity (4, 15, 17, 18).

Double-cutting and lightweight

Continued on page 26

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Continued from page 25

rolling are other practices that are useful to maintain acceptable green speed under a light-rate, frequent nitrogen fertilization program without intensifying anthracnose (13, 16).

Spring granular nitrogen applications suppress anthracnose severity better than fall applications (4, 28). Superintendents who struggle to control anthracnose may want to redistribute a greater portion of their fall granular fertilization to the spring.

POTASSIUM

When soil potassium is very low or low (< 50 parts per million (ppm)), anthracnose will be more severe (28). An accurate sampling of the root-zone profile is necessary for a correct assessment of

the soil potassium status. Sample the surface 2 inches, which is composed mainly of sand from topdressing mixed with thatch (organic matter).

Any inclusion of a nutrient-rich soil layer from below the turfgrass root zone will bias the soil test. The result is an inaccurate interpretation that there is more available potassium than the turfgrass root system can access.

Our research, which used the Mehlich-3 extractant method, identified a soil potassium level of 40 to 50 ppm as being critically low. Levels below 50 ppm are likely to result in greater anthracnose severity if potassium fertilization is not applied. Remember that interpretation of soil test data varies for the extractant used by the laboratory conducting the test (3).

Approximately 1 pound of potassium

per 1,000 square feet was needed to offset the effect of low potassium in the mat layer (28). Also, tissue concentrations of potassium below 1.9 percent were considered deficient, and turf suffered extensive damage from anthracnose (28). Annual potassium fertilization rates ranging from 1.1 to 4.4 pounds per 1,000 square feet increased tissue potassium into the range of 2.4 to 3.0 percent.

ROOT-ZONE PH

Although root-zone pH did not have as striking an effect on anthracnose as nitrogen or potassium fertilization, plots with moderately acidic soil (pH < 5.5) exhibit greater anthracnose severity compared with plots with a slightly acidic to neutral soil pH (28). The sampling depth for testing pH was the same as described for our potassium research.

The pH of root zones composed of silica sand and thatch can be adjusted relatively easily compared with the root zones of finer-textured or calcareous soils. Putting greens that received liming (calcium carbonate) treatments that maintained the root zone pH between 6.0 and 6.5 had less anthracnose, but they also had higher levels of extractable soil calcium.

MOWING AND ROLLING

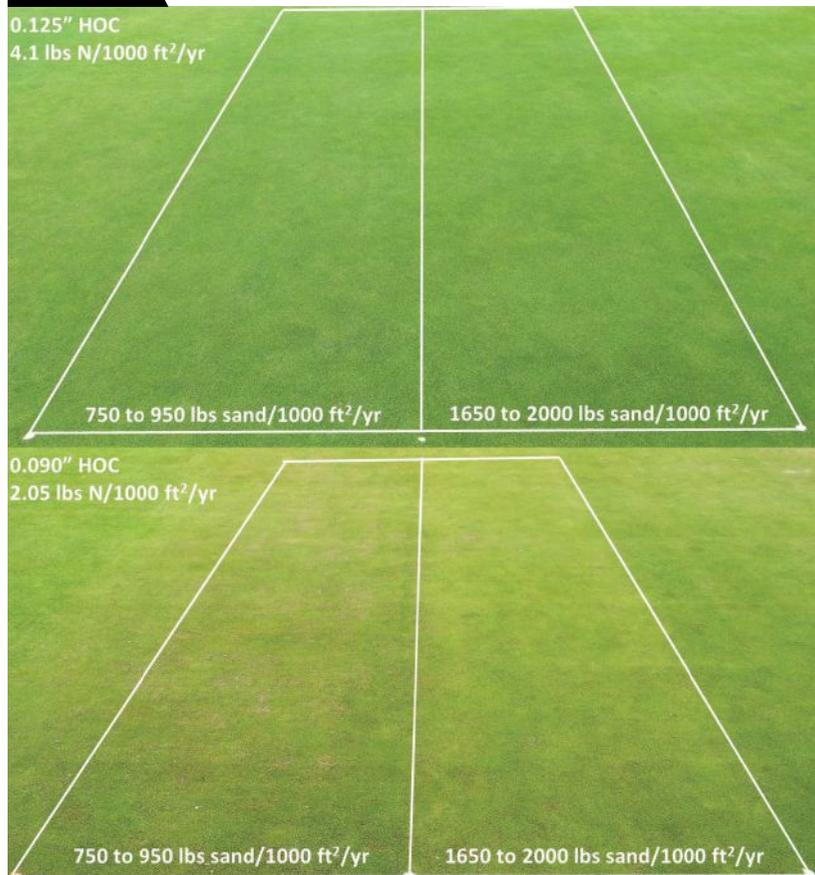
Mowing, rolling, topdressing and irrigation can produce a high-quality playing surface but can also impact the agronomic health of the grass. Creating excellent playability and healthy turfgrass at the same time is a challenge, especially when anthracnose is a constant threat.

Anthracnose is more severe at lower cutting heights (2, 30). Fortunately, other practices that improve green speed, such as double-cutting and lightweight rolling (16, 27), do not increase the severity of this disease (16).

Thus, a practical approach to improving anthracnose management is to identify a combination of lightweight rolling and/or double-cutting that provides the desired green speed at the highest-feasible cutting height.

PHOTO BY: JAMES HEMPELING

FIGURE 2



Sand topdressing had the greatest impact on reducing anthracnose disease severity under lower height of cuts (HOCs) and reduced nitrogen fertility.

IRRIGATION

Both excessively wet and dry soil conditions can intensify anthracnose (25, 30, 31, 32). Admittedly, some drying of the turf and root zone is necessary to produce firm and fast playing conditions. However, the ability to anticipate and prevent wilt stress on putting greens is key to minimizing the risk of intensifying anthracnose under a very dry irrigation program (25).

TOPDRESSING

Topdressing with sand throughout the growing season is a beneficial practice for maintaining a firm and fast playing surface and, fortunately, is also effective at reducing anthracnose severity.

Before our research, initial speculation frequently suggested that sand topdressing would contribute to anthracnose epidemics on putting

greens. However, topdressing has consistently reduced anthracnose in numerous research trials.

Any increase or continuation of a routine sand topdressing program may eventually require subtle adjustments in existing fertilization and irrigation programs to compensate for the increasingly infertile and droughty mat (sand + thatch) layer that develops over time.

The beneficial effect of sand topdressing is useful under conditions of heavy foot traffic (that is, the equivalent of 200 rounds per day with golf shoes fitted with soft spikes; 26). A study of sand incorporation techniques (stiff and soft-bristled brushes, vibratory rolling and light irrigation) and sand particle shape (round versus subangular) indicated that these factors had little effect on disease severity (20).

The cost and interference to play

can be significant challenges to implementing a routine topdressing program on putting greens. Frequent topdressing (100 pounds per 1,000 square feet every two weeks) during the playing season will reduce anthracnose severity (19, 20, 26). Use of finer sand (particles \leq 0.5-mm) for topdressing enables the application of more sand with better incorporation during the summer and a similar or occasionally better suppression of anthracnose than coarser sand (35).

Heavier topdressing during the spring is also effective at suppressing anthracnose and is critically important if a frequent topdressing program during the summer is not practiced (12). The rate of sand topdressing needed during the spring to suppress anthracnose ranged from 400 to 800 pounds per 1,000 square feet (12, 34), which is a quantity sufficient

Continued on page 29

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TABLE 1

Single active ingredient fungicides available for anthracnose control.

Chemical class ^a	Common name	Topical MOA ^b	Utility	Resistance risk	Trade name(s)	FRAC code ^c	Efficacy ^d
Aromatic hydrocarbon	PCNB	contact	preventive	low	Aurilus (AMVAC)	14	3 ^e
Benzimidazole	thiophanate-methyl	acropetal penetrant	preventive/curative	high	3336 (Nufarm), T-Bird (UP), Systeo 1998 (Regal), TM (AmorTech)	1	1/2 ^f
Dicarboximides	iprodione	localized penetrant	preventive	moderate-high	Chipco 26GT (Bayer), Eclipse ETQ (SipcamAdvan), Raven (UP), IP (AmorTech)	2	2 ^g
	metconazole	acropetal penetrant	preventive/curative	moderate	Tourney (Valent/Nufarm)	3	3
	mefenfluoconazole	acropetal penetrant	preventive/curative	moderate	Maxtima (BASF)	3	4
	myclobutanil	acropetal penetrant	preventive/curative	moderate	Eagle (Corteva), Golden Eagle (Andersons), Myclo (AmorTech)	3	2
DMI	propiconazole	acropetal penetrant	preventive/curative	moderate	Banner Maxx (Syngenta), Protopiconazole (Quali-Pro), Sawi (Regal), Strider (Nufarm)	3	2.5
	tebuconazole	acropetal penetrant	preventive/curative	moderate	Torque (Nufarm), Mirage (Bayer), Clearscape ETQ (Sipcam Advan), TEB360 (AmorTech)	3	3
	triadimefon	acropetal penetrant	preventive/curative	moderate	Bayleton (Bayer), Fungicide VII (Andersons)	3	1.5
	triticonazole	acropetal penetrant	preventive/curative	moderate	Trinity (BASF)	3	3
Isoparaffin	mineral oil	acropetal penetrant	preventive/curative	low	Civitas One (Intelligro)	NC	3 ^h
Nitrile	chlorothalonil	contact	preventive	low	Daconil (Syngenta), Pegasus L (UP), Echo (Sipcam Advan), CLT (AmorTech)	M5	3
Phenylpyrrole	fludioxonil	contact	preventive	low-moderate	Medallion (Syngenta)	12	3
Phosphonates	fosetyl-Al	true systemic	preventive	low	Signature (Bayer), Signature Xtra (Bayer)	33	2-3 ^h
	phosphite salt	true systemic	preventive	low	Alude (Nufarm), A-Appear (Syngenta), Fiata (Bayer), PK-Plus (Grigg Bros.)	33	2-3 ^h
Polyoxins	polyoxin D	localized penetrant	preventive	moderate	Affirm (Nufarm)	19	3
Pyridinamine	fluzinam	contact	preventive	low	Secure (Syngenta), Rotator (Nufarm), Sorteria (SePRO)	29	1.5
	azoxystrobin	acropetal penetrant	preventive/curative	high	Heritage (Syngenta), Endow (Sipcam Advan), ZDXY (AmorTech)	11	1/3 ⁱ
QoI	fluoxastrobin	acropetal penetrant	preventive/curative	high	Fame SC (FMC)	11	1/3 ⁱ
	pyraclostrobin	localized penetrant	preventive/curative	high	Insignia (BASF)	11	1/3 ⁱ
	trifloxystrobin	localized penetrant	preventive/curative	high	Compass (Bayer)	11	1/3 ⁱ
SDHI	penthiopyrad	acropetal penetrant	preventive/curative	moderate-high	Velista (Syngenta)	7	3 ⁱ

Note: The list of products in this table is not intended to be complete. Other turf fungicide products/trade names containing the same active ingredients may also be available.

^a DMI, demethylation inhibitors; QoI, quinone outside in inhibitors (also known as strobilurin fungicides); SDHI, superoxide dismutase inhibiting fungicides

^b MOA, mode of action

^c FRAC codes indicate the biochemical mode of action, according to the Fungicide Resistance Action Committee (www.frac.info/). M5, multisite inhibitor; NC, not classified.

^d Efficacy of fungicides labeled for the control of anthracnose based on a 1-4 scale, where 1 = inconsistent control, 2 = fair to good control, 3 = good to excellent control and 4 = consistently good to excellent control in published studies (Source: Chemical Control of Turfgrass Diseases 2020, <http://www2.ca.uky.edu/agcomm/pubs/ppa/ppa1/ppa1.pdf>)

^e To reduce the potential for phytotoxicity, do not apply during hot weather (>90 F) or periods of severe environmental stress. Do not mix Civitas with PCNB, chlorothalonil, DMI fungicides, or iron-containing products during periods of high temperatures and high humidity. Add a pigment (for example, PAK) to Aurilus to mask chlorosis, which may occur at high label rate. After application, immediately irrigate with 0.25 inch of water.

^f Lower efficacy rating applies when fungicide resistant isolates of *Colletotrichum cereale* are present.

^g Variable control can be expected when this product is applied alone. For best results, tank mix with other fungicides known to suppress anthracnose to improve efficacy.

^h Should be tank mixed with other fungicides known to suppress anthracnose under conditions of high disease pressure in order to provide acceptable disease control.

ⁱ More effective when used preventively.

Continued from page 27

to fill both the surface thatch and turf canopy layers. Higher amounts of sand will likely be needed when filling coring holes.

Heavy fall topdressings are less effective than summer and spring topdressing at suppressing anthracnose (34).

COMBINING BMPs

Increased nitrogen, higher mowing and greater topdressing are the most effective management regime for suppressing anthracnose (13). And, in two of the three years of the study with moderate epidemics, this best management regime suppressed anthracnose to levels that would be acceptable at many golf courses without the use of fungicides.

The playability of putting surfaces managed with these BMPs may not be acceptable at some golf courses. The green speed often dropped below the 9.5- to 10.5-foot range under 0.125-inch mowing height, especially when combined with higher nitrogen fertilization.

Only one compromise among the three BMPs (lower mowing height to 0.090 inch; 2.3-mm) was needed to achieve faster green speed (> 10 feet) more than 90 percent of the time (13). Fortunately, lowering the mowing height presented a modest risk for increasing disease severity compared with decreasing nitrogen fertilization.

Sand topdressing was effective in lowering disease under both nitrogen fertilization levels. However, the reduction in the disease was more dramatic under lower nitrogen fertilization (2 pounds per 1,000 square feet per year). Similarly, higher topdressing reduced disease under both mowing heights, but the reduction was more substantial under the lower (0.090-inch) mowing height.

Superintendents should recognize that routine topdressing is most beneficial under lower mowing and lower nitrogen fertilization. Lowering the mowing height to increase green speed will not greatly increase the risk for anthracnose when combined with higher nitrogen and routine topdressing practices.

FUNGICIDE EFFICACY

These BMPs improve fungicide efficacy and make a reduction in fungicide inputs feasible (11). Acceptable disease control was achieved with reduced fungicide rates or fewer threshold-based applications of fungicides (extending the interval between sprays) when implementing BMPs (greater nitrogen and higher mowing).

Fungicide efficacy was always best under greater nitrogen fertility, where the fungicide rate could be lowered to 25 percent of label rates (a 75 percent reduction) and still provide adequate disease control. The number of fungicide applications to control anthracnose was reduced by 80 percent when mowing height was higher (0.125 inch), and nitrogen fertilization was greater (4 pounds per 1,000 square feet per year).

Preventive fungicide applications have typically been

considered more effective than curative applications for the control of anthracnose (1, 24), and mixtures of two or more active ingredients applied as a tank mix or prepackaged product often perform better than individual products (33).

Preventive applications are often recommended at least three to four weeks before the typical onset of the disease symptoms on sites with a previous history of anthracnose. The purpose of preventive applications is to reduce the population of *Colletotrichum cereale* in the turfgrass before the occurrence of environmental conditions conducive to anthracnose (hot, humid weather). However, following the suggested BMPs with early curative sprays can result in significant reductions in fungicide inputs and excellent disease control.

Fungicides should be applied in 2 gallons of water per 1,000 square feet, using nozzles that produce a medium-to-coarse droplet size to optimize control (5, 24). Currently, 13 fungicide groups control anthracnose on cool-season turf (Table 1). Of these groups, the demethylation inhibitors (DMI), the quinone outside inhibitors (QoI or strobilurins), benzimidazoles, polyoxins and nitriles have been the most efficacious against anthracnose.

Continued on page 30

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Research Takeaways

- Plant nutrient deficiencies, ultralow mowing and excessively wet or dry irrigation programs are critical stress factors that significantly increase the risk of severe damage from anthracnose.
- Avoiding deficiencies in nitrogen and potassium is critical to reducing anthracnose severity.
- The combination of three BMPs (increased nitrogen, higher mowing and greater topdressing) can suppress anthracnose to acceptable levels without the use of fungicides.
- To improve green speed at lower mowing heights (< 0.125 inch), use higher nitrogen and routine topdressing practices to reduce anthracnose severity.
- Routine topdressing is most beneficial under conditions of lower mowing and lower nitrogen fertilization.
- Fungicide efficacy is improved, and a reduction in fungicide inputs (as much as 80 percent) is feasible with the adoption of BMPs.
- Following these BMPs with early curative sprays can result in significant reductions in fungicide inputs and excellent disease control.

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Chemical classes, including the phosphonate, dicarboximide, phenylpyrrole and SDHI fungicides, have been most effective when applied in a mixture with other anthracnose fungicides (Table 2).

It is good practice to avoid the continuous use of any product to reduce the potential for fungicide resistance. For anthracnose, there are reports of resistance for the benzimidazole and QoI fungicide groups. Also, there are indications of reduced sensitivity (reduced interval and/or rate response) with the DMI fungicides (1, 36). Please refer to *The Fungicide Resistance Action Committee* (FRAC; www.frac.info/) and follow the strategies to reduce the risk of resistance to fungicides. **G**

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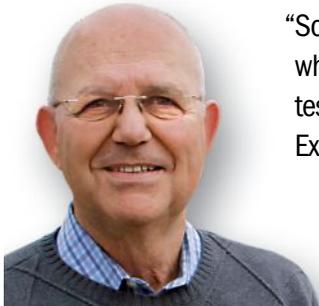
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References

1. Aynardi, B., J. Inguagiato, S. McDonald, B. Clarke, and W. Uddin. 2016. Lessen your anthracnose struggles. *Golfdom* 72 (March 11). (www.golf-dom.com/lessen-your-anthraco-nose-struggles) Accessed Jan. 6, 2018.
2. Backman, P., G. Stahnke and E. Miltner. 2002. Anthracnose update: Cultural practices affect spread of disease in Northwest. *Turfgrass Trends* 11:11-12, 14.
3. Carrow, R.N., D.V. Waddington, and P.E. Rieke. 2001. *Turfgrass soil fertility and chemical problems*. John Wiley & Sons, New York, p. 218.
4. Chen, X. 2016. Influence of seasonal N fertilization, plant growth regulators, and fungicide application timing on anthracnose severity of annual bluegrass putting greens. Master's thesis 996. University of Connecticut. (http://digitalcommons.uconn.edu/gs_theses/996) Accessed Jan. 6, 2018.
5. Clarke, B.B., P.R. Majumdar, S. Flatley, M. Mus, G. Rappa, G. Groben, M. Peacos, T.J. Lawson, J.B. Clark and S. Butterworth. 2015. Anthracnose control with fungicides and biorational products on annual bluegrass putting green turf, 2014. Pages 235-256. In: A.B. Gould, ed. *Rutgers Turfgrass Proceedings 2014*. Vol. 46. Center for Turfgrass Science and the New Jersey Turfgrass Association, New Brunswick, N.J.
6. Clarke, B. B., P. Vincelli, P. Koch, and G. Munshaw. 2020. Chemical Control of Turfgrass Diseases 2020. University of Kentucky, Lexington, KY. <http://www2.ca.uky.edu/agcomm/pubs/ppa/ppa1/ppa1.pdf>
7. Crouch, J.A., B.B. Clarke and B.I. Hillman. 2006. Unraveling evolutionary relationships among the divergent lineages of *Colletotrichum* causing anthracnose disease in turfgrass and corn. *Phytopathology* 96:46-60.
8. Danneberger, T.K., J.M. Vargas Jr. and A.L. Jones. 1984. A model for weather-based forecasting of anthracnose on annual bluegrass. *Phytopathology* 74:448-451.
9. Demoeen, P.H. 2002. *Creeping bentgrass management: Summer stresses, weeds, and selected maladies*. John Wiley & Sons, Hoboken, N.J.
10. Hemphling, J.W., J.A. Murphy, and B.B. Clarke. 2020. Midseason cultivation effects on anthracnose of annual bluegrass turf. *Agronomy Journal*. <https://doi.org/10.1002/agj2.20202>
11. Hemphling, J.W., B.B. Clarke and J.A. Murphy. 2014. Nitrogen fertility and mowing height effects on fungicide control of anthracnose. Page 39. In: T. Molnar and B. Fitzgerald, eds. *Proceedings of the 23rd Annual Rutgers Turfgrass Symposium*. Center for Turfgrass Science, Rutgers University, New Brunswick, N.J.
12. Hemphling, J.W., B.B. Clarke and J.A. Murphy. 2015. Anthracnose disease on annual bluegrass as influenced by spring and summer topdressing. *Crop Science* 55(1):437-443.

13. Hemphling, J.W., C.J. Schmid, R. Wang, B.B. Clarke and J.A. Murphy. 2017. Best management practices effects on anthracnose disease of annual blue-grass. *Crop Science* 57:602-610. doi:10.2135/cropsci2016.06.0492
14. Inguagiato, J.C., and K. Guillard. 2016. Foliar N concentration and reflectance meters to guide N fertilization for anthracnose management of annual bluegrass putting green turf. *Crop Science* 56:3328-3337.
15. Inguagiato, J.C., J.A. Murphy and B.B. Clarke. 2008. Anthracnose severity on annual bluegrass influenced by nitrogen fertilization, growth regulators, and verticutting. *Crop Science* 48:1595-1607.
16. Inguagiato, J.C., J.A. Murphy and B.B. Clarke. 2009a. Anthracnose disease and annual bluegrass putting green performance affected by mowing practices and lightweight rolling. *Crop Science* 49:1454-1462.
17. Inguagiato, J.C., J.A. Murphy and B.B. Clarke. 2009b. Anthracnose of annual bluegrass putting green turf influenced by trinexapac-ethyl application interval and rate. *International Turfgrass Society Research Journal* 11:207-218.
18. Inguagiato, J.C., J.A. Murphy and B.B. Clarke. 2010. Anthracnose development on annual bluegrass affected by seedhead and vegetative growth regulators. *Applied Turf Science* doi:10.1094/ATS-2010-0923-01-RS
19. Inguagiato, J.C., J.A. Murphy and B.B. Clarke. 2012. Sand topdressing rate and interval effects on anthracnose severity of an annual bluegrass putting green. *Crop Science* 52:1406-1415. doi:10.2135/cropsci2011.01.0010
20. Inguagiato, J.C., J.A. Murphy, and B.B. Clarke. 2013. Topdressing sand particle shape and incorporation effects on anthracnose severity of an annual bluegrass putting green. *International Turfgrass Society Research Journal* 12:127-133.
21. Landschoot, P., and B. Hoyland. 1995. Shedding some light on anthracnose basal rot. *Golf Course Management* 11:52-55.
22. Mann, R.L., and A.J. Newell. 2005. A survey to determine the incidence and severity of pests and diseases on golf course putting greens in England, Ireland, Scotland, and Wales. *International Turfgrass Society Research Journal* 10:224-229.
23. Murphy, J.A., B.B. Clarke and J.A. Inguagiato. 2018. Update on Best Management Practices for Anthracnose on Annual Bluegrass Turf. *Golf Course Management* 86 (2) 76-85.
24. Murphy, J., F. Wong, L. Tredway, J.A. Crouch, J. Inguagiato, B. Clarke, T. Hsiang, and F. Rossi. 2008. Best management practices for anthracnose on annual bluegrass turf. *Golf Course Management* 76(8):93- 104.
25. Roberts, J.A., J.C. Inguagiato, B.B. Clarke, and J.A. Murphy. 2011. Irrigation quantity effects on anthracnose disease of annual bluegrass. *Crop Science* 51:1244-1252. doi:10.2135/cropsci2010.07.0444
26. Roberts, J.A., and J.A. Murphy. 2014. Anthracnose disease on annual bluegrass as affected by foot traffic and sand topdressing. *Plant Disease* 98:1321-1325. doi:10.1094/PDIS-08-13-0877-RE
27. Roberts, J.A., J.A. Murphy and B.B. Clarke. 2012. Lightweight rolling effects on anthracnose of annual bluegrass putting greens. *Agronomy Journal* 104:1176-1181. doi:10.2134/agnonj2011.0269
28. Schmid, C.J. 2016. Influence of nutrient management and soil pH on anthracnose severity of annual bluegrass putting green turf. Ph.D. dissertation. Rutgers University (<https://rucore.libraries.rutgers.edu/rutgers-lib/51457/>) Accessed Jan. 6, 2018.
29. Schmid, C.J., B.B. Clarke, and J.A. Murphy. 2017. Anthracnose severity and annual bluegrass quality as influenced by nitrogen source. *Crop Science* 57:S-285-S-292. doi:10.2135/cropsci2016.06.0494
30. Smiley, R.W., P.H. Deroeden, and B.B. Clarke. 2005. *Compendium of turfgrass diseases*. 3rd ed. APS Press, St. Paul, Minn.
31. Sprague, H.B., and E.E. Eveal. 1930. Experiments with turfgrasses in New Jersey. *New Jersey Agriculture Experiment Station Bulletin* 497:1-55.
32. Vargas, J.M., and A.J. Turgone. 2003. *Poa annua*: Physiology, culture, and control of annual bluegrass. John Wiley & Sons, Hoboken, N.J.
33. Vincelli, P., B.B. Clarke, and G. Munshaw. 2017. *Chemical control of turfgrass diseases 2017*. Kentucky and Rutgers Cooperative Extension Joint Publication PPA-1
34. Wang, R., J.W. Hemphling, B.B. Clarke, and J.A. Murphy. 2018. Seasonal and annual topdressing effects on anthracnose of annual bluegrass. *Agron. J.* 110:2130-2135. <https://doi.org/10.2134/agnonj2018.01.0052>
35. Wang, R., J.W. Hemphling, B.B. Clarke, and J.A. Murphy. 2019. Sand size affects topdressing removed by mowing and anthracnose on annual bluegrass putting green turf. *HortScience*: 52(2):237-243. (<https://doi.org/10.21273/HORTSCI14396-19>)
36. Wong, F.P., and S. Midland. 2004. Fungicide-resistant anthracnose: bad news for greens management. *Golf Course Management* 72(6):75-80



“Some of the research busted myths. This is why I love the scientific method — you get to test concepts under controlled conditions. Experiments reveal the truth.”

MIKE KENNA, PH.D., *Research Editor*

The truth about anthracnose

A favorite television show of mine was *MythBusters*, hosted by Jamie Hyneman and Adam Savage. I enjoyed watching the two interact on how to run experiments testing the validity of rumors, myths and adages. They stamped the outcome of the myths tested as busted, plausible or confirmed.

Each year, we made annual visits to all USGA Green Section research projects. A few committee members, Green Section staff and I would travel to different universities. We would listen to a summary about the previous year's results. Then, we were off to the lab, greenhouse or turfgrass plots to see the research progress for ourselves. Some of the research busted myths. That is why I love the scientific method — you get to test concepts under controlled conditions. Experiments reveal the truth.

Busting myths never was so dramatic as the anthracnose (*Colletotrichum cereale*) research on annual bluegrass (*Poa annua*). In the 1990s, this disease was damaging annual bluegrass greens throughout the northern U.S.

Myth busters Bruce Clarke, Ph.D. and James Murphy, Ph.D., proposed research to test cultural practices thought to cause or prevent the disease. The two scientists and their supporting cast of graduate students busted one myth after another. A crew of additional

university researchers in the Northeast made contributions to the development of best management practices (BMPs) for the disease. The following are a few myths investigated.

Myth 1: Anthracnose severity increases with sand topdressing.

BUSTED. Light, frequent topdressing decreased anthracnose, especially at lower cutting heights. Topdressing with sand throughout the growing season also provides firm and fast playing conditions for the golfer. Biweekly applications of 100 pounds of sand per 1,000 square feet during the summer playing season reduced anthracnose severity significantly.

Myth 2: Fertilizer applications increase disease severity.

BUSTED. Avoiding nitrogen (N) and potassium (K) deficiencies were critical in preventing anthracnose. Weekly, light-rate applications of 0.1 to 0.2 pound of N per 1,000 square feet reduced disease severity. But, weekly applications of 0.3 pound of nitrogen per 1,000 square feet

was too much. Anthracnose was more severe when potassium dropped below 50 ppm in the surface two inches of the root zone. Keeping the pH above 6.0 to 6.5 also helped prevent disease severity. Tissue testing of clippings helped dial in a fertilization program that keeps nitrogen around 3.35 percent and potassium above 2.4 percent in the leaf.

Myth 3: Wounding from mowing, rolling and traffic increases anthracnose. **BUSTED.** This could be true if you ignore the results busting myth Nos. 1 and 2. Height of cut below 0.125 inch increased plant stress and emphasized attention to fertility and topdressing. Double-cutting greens and lightweight rolling did not increase anthracnose severity and should be implemented at the highest possible cutting height to obtain the desired green speed.

Myth 4: A preventive fungicide program is necessary. **BUSTED.** The effectiveness of fungicides tested improved with proper fertility and light sand topdressing. The curative fungicide approach provided adequate control and reduced the annual amount needed. Reducing fungicide use saved money and also reduced the risk of anthracnose resistance to products.

Clarke and Murphy conducted a logical, stepwise list of experiments to test the impact of daily cultural practices on the severity of anthracnose. By providing healthy, less stressful growing conditions, the severity of anthracnose on annual bluegrass decreased. Clarke admitted on one visit he never thought a curative fungicide program would control anthracnose. Yet, that year, they only made four fungicide applications.

Turfgrass managers are very fortunate to have great scientists at land grant universities to bust myths. The USGA, GCSAA and other associations have helped pay the bills. What myths do you want to see busted? 🍷

Mike Kenna, Ph.D., is the retired director of research, USGA Green Section. Contact him at mpkenna@gmail.com.



Plant growth regulators allow superintendents to better manage their grass clipping yields.

The 411 on PGRs

If managing turfgrass is like driving a car, then superintendents use plant growth regulators (PGRs) as their brakes, says Bill Kreuser, Ph.D., assistant professor and Extension turfgrass specialist at University of Nebraska-Lincoln.

“It’s like hitting the brake pedal of your clipping yield, so when your grass is growing fast in the middle of the summer, you can push harder on your PGR to keep that yield where you want it to be,” he says. “We’re encouraging people to look at the clipping volumes to see how much grass is in that bucket. During those periods when it’s a lot of grass, apply a higher rate of PGR, usually early spring and then mid-to-late summer.”

Other reasons superintendents use PGRs can include color enhancement, plant health benefits and annual bluegrass control, Kreuser says.

Kreuser recommends applying PGRs consistently and

continuing to apply them throughout the season.

“I’m encouraging superintendents to not use the same rate over and over but to be more dynamic and adaptive to the clipping yields they’re seeing,” he says.

It’s also important that superintendents try to spray only the intended area, such as a green, and understand that heat and humidity can cause PGRs to break down faster.

To understand how turf might react to PGRs in a given time frame, Kreuser suggests consulting growing-degree-day models.

“Temperatures impact how long the products last, and application rates impact how much suppression you’re going to get,” he says. “On fairways, one application could last a month to six weeks, but the same product with a similar rate on a bentgrass green when it’s hot might only last a week.”[®]

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Bayer

ZAC REICHER, PH.D.
Green Solutions Team specialist



Now is a good time to evaluate how your *Poa annua* seedhead control program worked this year, based on the use of your growth regulator products. Since *Poa* seedheads are variable from year to year, leave small (4 foot by 4 foot) untreated areas each application for an accurate determination. We know that *Poa* seedheads are initiated in the fall/winter, so a late fall application of a product with the active ingredient of ethephon will improve seedhead suppression next spring. Many superintendents include this type of product in their snow mold application or when mowing slows in December in areas that don't receive snow cover. In areas that go dormant, make two more applications next spring to effectively control seedheads. In areas where *Poa* greens do not go dormant, like in the northern Transition Zone or Pacific Northwest, three or more spring applications may be required to maximize control since seedhead production in those areas can be extended. Seedheads on zoysiagrass fairways are also challenging each spring because they are impossible to mow.

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BRUCE JUMP
Turf seed product manager,
strategic account lead



PGRs work best in a programmed approach, so superintendents should think in terms of season (not one or two applications). It's also important to think through additive, multiplicative, divisible and subtractable factors. Ask yourself these questions: Do the products you're mixing with the PGR have a surfactant in them? If yes, the PGR might work harder than without a surfactant, so consider adjusting the reapplication interval or PGR rate. If you need to add water to the tank mix, what effect does that have on the PGR performance? How does weather influence the reduction in growth from the PGR application? It can be difficult to determine the most effective time to spray PGRs and what the spray interval should be: A growing-degree-day model can help. To have the best success with PGR applications, always consider what additional factors might improve or limit performance.

Quali-Pro

IAN RODRIGUEZ, PH.D.
Technical services manager



There has been an increased interest in PGR use this spring due to COVID-19-related staff reductions and temporary closures. Longer-term growth suppression is best achieved by planning multiple applications rather than increasing rates on singular applications. Keep in mind that in addition to species and height-of-cut considerations, daily temperatures play a large role in determining regulation duration. As air temperatures climb, the rate at which a plant breaks down the PGR increases. Maintaining longer-term regulation requires timing follow-up applications to avoid the PGR effects wearing off completely and helps avoid rebound growth. Keeping track of clipping production can help gauge when regulation is on the wane. There are well-established growing-degree-day models and trackers available that predict optimum reapplication timing for cool season turf uses.

Syngenta

DEAN MOSDELL, PH.D.
Senior technical manager



PGR application frequencies can be determined in different ways but all are based on turf growth. A calendar-based application, such as every two or three weeks, can be effective if the PGR rates are adjusted so growth is not under- or overregulated; a simple volume measurement of clippings can indicate a need for reapplication; or some growing-degree-day (GDD) calculators will email or text personalized alerts. In this case, growth rate of turf treated with PGRs is correlated with the accumulation of GDDs for reapplication intervals. No matter what application method you employ, PGRs are a valuable tool for maintaining high-quality turf. When using PGRs on fairways and roughs, growth control and density are often important considerations, but water use and prestress conditioning can also be factors. When turf is actively growing, PGRs can reduce foliar growth and green waste, saving mowing time. Plants regulated with PGRs are more compact, have thicker cells and increased density, contributing to a reduction in water loss.

The Shop

// MUST-HAVE NEW PRODUCTS



1



3



2

1 TDR-X contour roller mower

The TDR-X contour roller mower from **PROGRESSIVE TURF EQUIPMENT** features a 10.5-foot-wide cut and a height-of-cut range from $\frac{3}{8}$ inch to 3 $\frac{3}{8}$ inches. The three independently floating decks allow the TDR-X to closely follow contours on both fairways and roughs. No daily greasing is needed, and the maintenance-free blade spindles reduce time and worry. The TDR-X produces a professional quality cut that will impress both superintendents and members alike, the company said.

ProgressiveTurfEquip.com

2 Muck Boots

The **MUCK BOOT CO.**'s muck boots allow golf course superintendents to complete muddy tasks while still offering solid foot protection from the elements. The boots come in a variety of sizes and styles including hardworking everyday boots and modern silhouettes — all designed to keep the user's feet warm and dry in any conditions, according to the company.

MuckBootCompany.com

3 Boundary Force Flex flags

Part hazard marker, part force flex and part flag, **STANDARD GOLF**'s new boundary flags are used to mark course boundaries. The flags can be color-coded to match the specific hazard or boundary, while the “force flex” portion of the set allows users to drive or mow over the marker. They fit any large tube practice green flag and come with an anchor to ensure proper installation.

StandardGolf.com



4



5

CHECK OUT MORE NEW EQUIPMENT ONLINE

To stay up to date on all the latest products and services, visit golfdom.com/category/products



6

4 | TM-2000 autonomous mower protective disk

The **ECHO ROBOTICS** TM-2000 autonomous turf mower can handle up to 5 acres of turf efficiently and quietly while also finely mulching clippings to promote turf health. Now, the machine also offers a patented protective disk accessory that protects the blades while also keeping golf balls from becoming chipped, damaged or compacted into the turf. These disks help save time and money by not having to pick golf balls off the range before mowing — courses will keep a constant high-quality cut, and pros and superintendents won't have to work around each other when it comes to mowing maintenance.

EchoRobotics.com

5 | PrecisionCut reel mowers

The 6080A, 6500A and 6700A PrecisionCut reel mowers leverage all of the mower technologies from the **JOHN DEERE** A Model family of mowers. These mowers are equipped with a 24.7-hp diesel engine, three-wheel smooth tire configurations and high performance and comfort features. Additionally, they provide exceptional cut quality thanks to the standard LoadMatch feature, while the eHydro transmission eliminates linkages between the pedals and the hydrostatic pump.

Deere.com

6 | Turfco Torrent 2 PTO debris blower

TURFCO's Torrent 2 PTO debris blower substitutes on-board engine power with tractor-mounted power-takeoff (PTO) hydraulic power. It weighs in at less than 340 pounds, making it a lightweight, agile turf performer that's also quiet, low on fuel consumption and easy to maintain, according to the company. Superintendents can connect the PTO version to a standard turf tractor — a minimum of a 20-hp engine is required to run the blower hydraulics. The supplied handheld controller enables operators to change nozzle direction fast, without having to slow down and wait for the nozzle to swivel around.

Turfco.com

The 19th Hole with...



Micah Pennybaker

SUPERINTENDENT // South Course, Carmel CC, Charlotte, N.C.



After 18 holes, what can I get you? A Juicy Jay IPA. It's a Charlotte beer I'm pretty fond of.



Tell me about your club. Carmel is a 36-hole facility. Brannon Goodrich is the director of operations. We've got the best of both worlds here. We're bent-grass on the South Course, which I oversee, and the North Course, which Eric Downs oversees, is Ultradwarf Champion Bermuda. Members get to enjoy a little bit of everything. We're in south Charlotte; we're next door neighbors to Quail Hollow.

You worked at Quail Hollow, right? Yeah, for five years. I started out at Victoria National, in southern Indiana — one of the most brutal internships of my life! Then Quail, then an assistant's job at Charlotte CC under John Szklinski. Then a superintendent's position opened here. I've been here for three-and-a-half years.

Tell me about your family. You've got a couple little ones? I met my wife here in 2014, and we got married in 2016. We've got a 2-year-old son, Brooks. And Hadley Grace is our newest addition, she was born March 30, in all this COVID-19 stuff.

That's a stressful time to be in the hospital! You ain't kidding, but it was smooth. Two days, in and out. That was it.

What's the golf scene like in



// BEST ADVICE

"YOU WORK TO LIVE ... YOU DON'T LIVE TO WORK. ENJOY YOUR LIFE OUTSIDE OF WORK. FAMILY IS VERY IMPORTANT TO ME, AND I'M LOVING WATCHING MY KIDS GROW UP."

Charlotte? Rounds are up, a lot. Everyone wants to get out and play — it seems like you can't do anything else. You can't travel, so the golf course is where you want to be.

What's your favorite tool in the shop? I'm pretty fond of the greens



mower. We have the Toro Flex 21s. I like hopping on a mower every once in a while and showing the guys how to mow straight lines.

When was the last time you saw something at work that was so stupid you just had to laugh? This morning, I had a guy out topdressing some tees, and he topdressed right over a

bunch of leaves. That kind of defeats the purpose.

What's your fantasy football team named? Penny for Your Thoughts. I've been in a league since 2008, and I've won

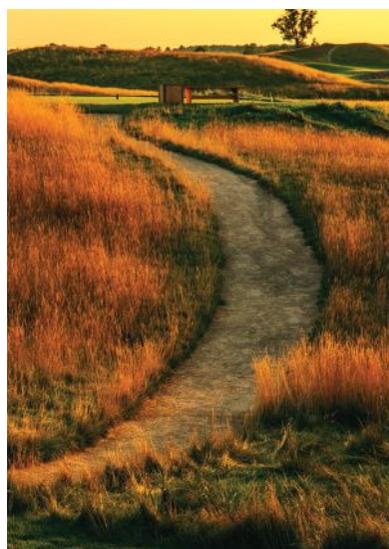
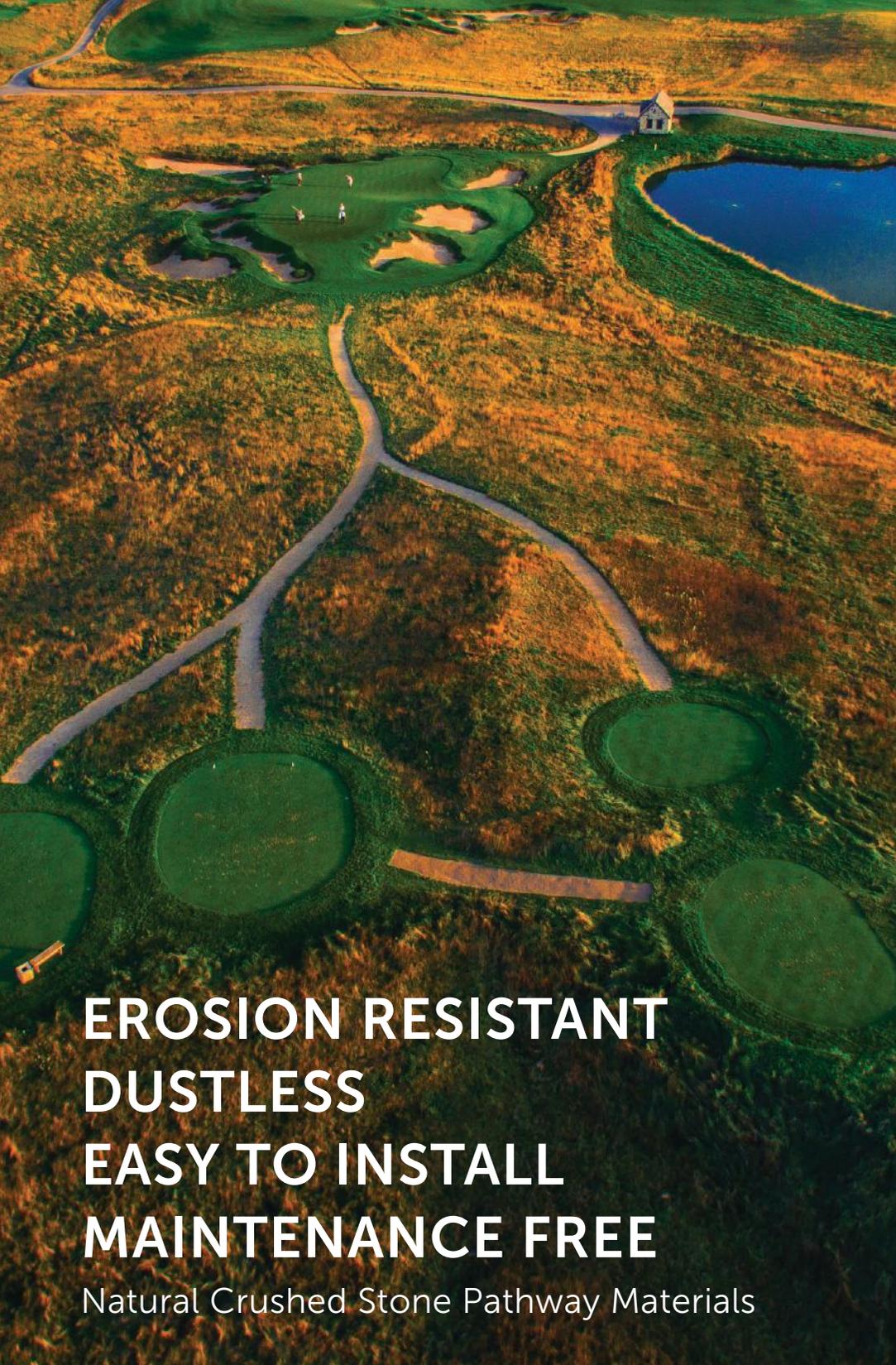


it four times. I've got my name on that trophy in a couple spots. My best record is probably 12-1. I've never had a perfect season, but I'm usually in the playoffs.

What's the most unusual thing you keep in the shop there? ... I know. We have a snowplow that we can put on a skid-steer ... for all the snow we get here in Charlotte.

As interviewed by Seth Jones, June 15, 2020.

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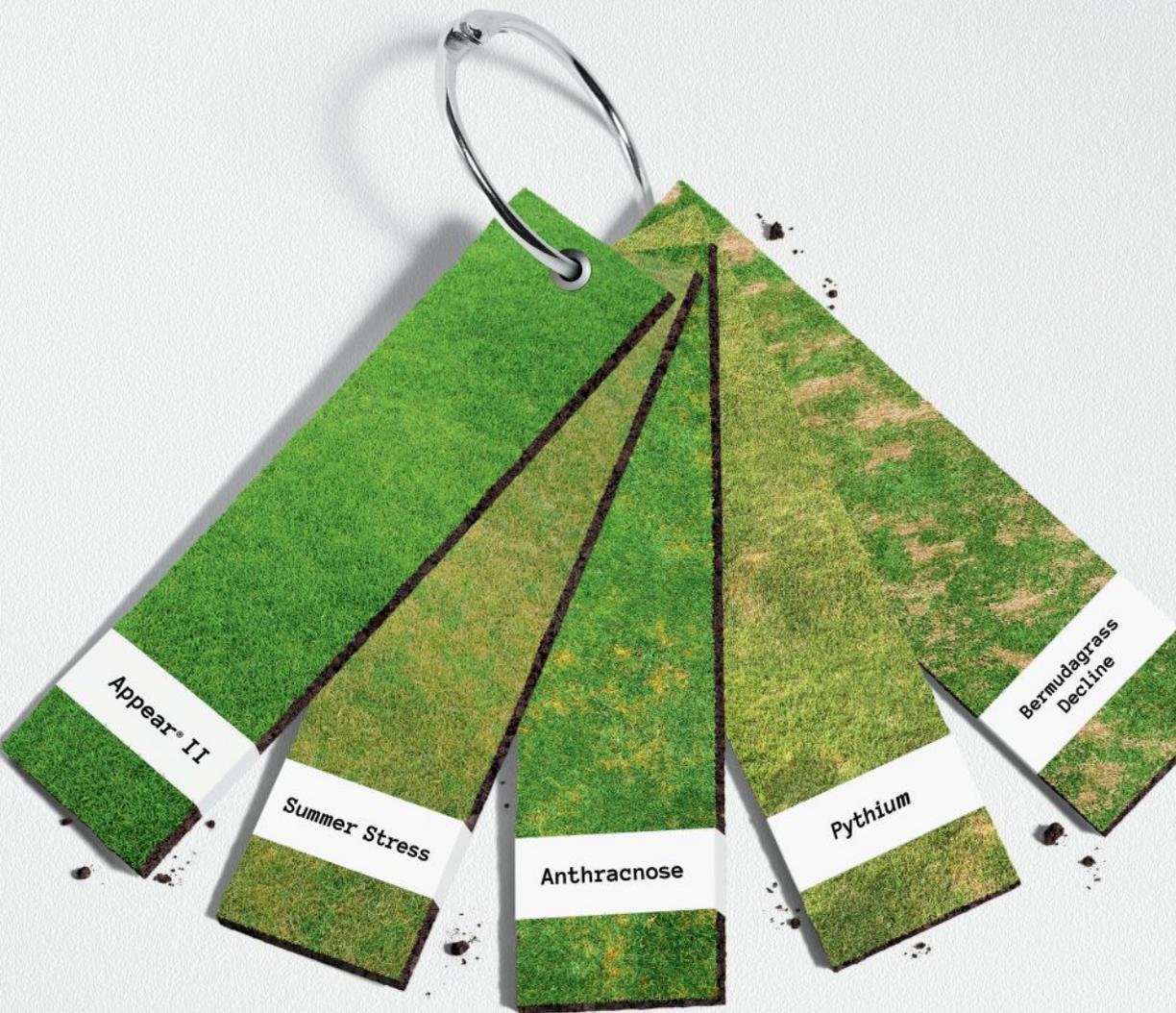
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