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Carl's back!

Celebrating the 40th anniversary of *Caddyshack* with Dave Schlagger, the real Danny Noonan and the crew at Bushwood Country Club



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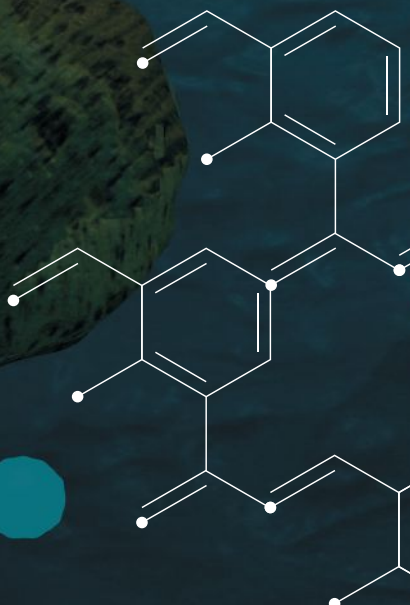
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EDITORIAL

EDITOR-IN-CHIEF & ASSOCIATE PUBLISHER Seth Jones
785-542-2627 / sjones@northcoastmedia.net

SENIOR EDITOR Abby Hart
216-706-3756 / ahart@northcoastmedia.net

EDITOR Christina Herrick
216-675-6009 / cherrick@northcoastmedia.net

ASSOCIATE EDITOR Sarah Webb
216-363-7932 / swebb@northcoastmedia.net

DIGITAL EDITOR Danielle Pesta
216-363-7928 / dpesta@northcoastmedia.net

EDITOR-AT-LARGE Ed Hiscock
ehiscock@northcoastmedia.net

ART DIRECTOR Pete Seltzer
216-706-3737 / pseltzer@northcoastmedia.net

CONTRIBUTING EDITORS

Carlos Arraya, Karl Danneberger (*Science*), Alan FitzGerald, Joe Gulotti, Mike Kenna (*Research*), Matt Neff, Jared Nemitz, Sean Tully, Mark Woodward

BUSINESS

CLEVELAND HEADQUARTERS

1360 EAST 9TH ST, 10TH FLOOR, CLEVELAND, OH 44114

GROUP PUBLISHER Bill Roddy
216-706-3758 / broddy@northcoastmedia.net

PUBLISHER Craig MacGregor
216-706-3787 / cmacgregor@northcoastmedia.net

WESTERN REGIONAL SALES MANAGER Jake Goodman
216-363-7923 / jgoodman@northcoastmedia.net

EASTERN REGIONAL SALES MANAGER Dan Hannan
216-363-7937 / dhannan@northcoastmedia.net

ACCOUNT MANAGER Chloe Scoular
216-363-7929 / cscoular@northcoastmedia.net

EXECUTIVE SALES ASSISTANT Petra Turko
216-706-3768 / pturko@northcoastmedia.net

DIRECTOR OF MARKETING & EVENTS Michelle Mitchell
216-363-7922 / mmitchell@northcoastmedia.net

MARKETING & EVENT MANAGER Allison Blong
216-363-7936 / ablong@northcoastmedia.net

SR. MGR., PRODUCTION SERVICES Rhonda Sande
216-978-9778 / rsande@northcoastmedia.net

DIR. OF AUDIENCE ENGAGEMENT Bethany Chambers
216-706-3771 / bchambers@northcoastmedia.net

SR. AUDIENCE DEVELOPMENT MANAGER
Antoinette Sanchez-Perkins
216-706-3750 / asanchez-perkins@northcoastmedia.net

MARKETING/MAGAZINE SERVICES

SUBSCRIBER, CUSTOMER SERVICE
847-513-6030 / golfdom@omedia.com

LIST RENTAL Brahm Schenkman
800-529-9020 / bschenkman@infofirefory.com

CORPORATE

PRESIDENT & CEO Kevin Stoltman

VP OF FINANCE & OPERATIONS Steve Galperin

VP OF GRAPHIC DESIGN & PRODUCTION Pete Seltzer

EDITORIAL DIRECTOR Marty Whitford

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THE LEADER.



"Dave invited me to come to his club to learn more about Indian Hill, the people there, the backstory ... It's easy to see why Indian Hill Club holds a special place in so many people's hearts."

SETH JONES, Editor-in-Chief & Associate Publisher

It's in your hands

My guess is you read 19th Hole first (seems everyone does that, including me), then went to page 12 to see what was going on with this month's cover story. But if you made your way to this page and haven't read the cover story yet ... I'd recommend you go there first, enjoy some lighthearted reading (pro tip, read Nellie's part in an Irish accent like Maggie O'Hooligan in the movie), then come back to this page.

OK, you're back! How about Ed Murray, huh? And Nellie? It made my day when she called me *darlin'*.

For me, our tribute to *Caddyshack* started a few years ago, either at a Wee One fundraiser in Chicago or a *Golfdom* Summit at Reunion Resort, in a conversation with Dave Schлагetter, superintendent at Indian Hill Club in Winnetka, Ill. That's when I learned the background of the Murray Brothers and Indian Hill and how *Caddyshack*, written by Brian Doyle-Murray, was inspired by the story of his brother Ed winning an Evans Scholars Foundation scholarship while caddying at the club.

Dave invited me to come to his club to learn more about Indian Hill, the people there, the backstory. I finally cashed in that invitation in March. Dave put me in touch with Nellie Kerrigan, longtime clubhouse manager and Dick Wagley, PGA, the longtime pro at the course, both now retired. All three are salt of the earth. It's easy to see why Indian Hill Club holds a special place in so many people's hearts.

Dick set me up with his friend Ed Murray, the oldest of the Murray Brothers, a member of the Caddie Hall of Fame (along with all five of his brothers) and the inspiration for Danny Noonan. Ed

was a wealth of information, and we spoke about more than just *Caddyshack*. He told me about sitting around 25 men in green jackets, the process for interviewing for the Evans scholarship and about his time in the Air Force spying on the world from the back of an airplane. Through the years, he's met presidents, royalty and the King, Arnold Palmer. I asked him about putting me in touch with Bill. He said he'd reach out but then laughed, "Bill's a hard guy to pin down ... he might not come to my funeral."

Already armed with plenty of good material, our friends at Smithco heard about the project we were working on

and asked if they could get involved. They sponsored the story and also put us in touch with Bob Morgan, who worked at Rolling Hills shortly after the movie came out. Bob's stories about the course, their equipment and his perspective on how crews have changed since the movie were a welcomed addition.

Oh, and the final element, the cover? I laughed out loud when I opened the image for the first time. I'd like to take credit for it ... but that was all Dave's idea. When it comes to this issue, like Ed Murray said about *Caddyshack*, "I had a good time ... everybody had a good time."

There's a lot going on in the world right now. The previous two issues of *Golfdom* were somewhat stressful to produce. Trying to navigate the way to properly handle a global pandemic when also dealing with an approximate two-week delay from printer to your mailbox was harrowing. I look back at the April and May issues with a tiny window of hindsight, and I feel pretty good.

And now we're in June. The country is in the process of reopening. Some normalcy is returning (I knock on wood as I write that). After the last two months, the last two issues ... it feels like the right time to crack open a trash can beer and have some fun reminiscing about the most famous movie for our industry.

It's in the **hole** your hands. **G**

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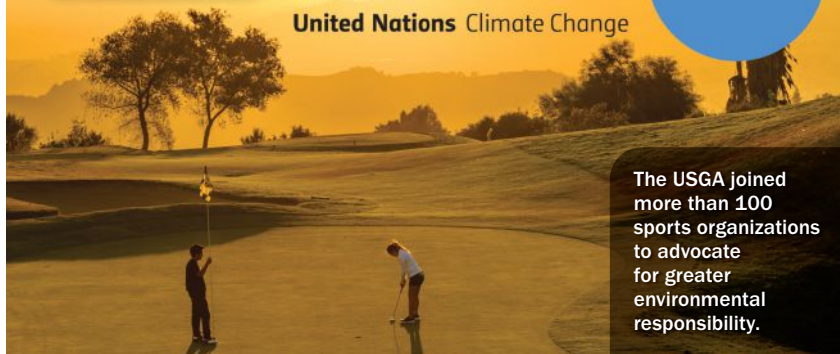
NEWS, NOTES AND QUOTES



// **CHAMPIONS
OF THE
ENVIRONMENT**

Global Climate Action

United Nations Climate Change



The USGA joined more than 100 sports organizations to advocate for greater environmental responsibility.

USGA JOINS UNITED NATIONS SPORTS FOR CLIMATE ACTION INITIATIVE

BY SARAH WEBB // Associate Editor

➔ The United States Golf Association (USGA) joined 100-plus organizations in becoming a signatory of the United Nations Sports for Climate Action Initiative.

“We knew that golf is so closely tied to the environment. There’s no game of golf if there isn’t a healthy, thriving environment,” said Dave Aznavorian, USGA senior director of transformational initiatives. “We thought it was important to be among the leaders in the sports industry on the forefront of change. We thought our participation would serve two goals: We would learn best practices from other signatories and share what we’ve learned and have developed over the course of 100 years under the USGA Greens Section.”

Sports for Climate Action was created in 2018 as a platform for sports organizations to support climate action in a highly collaborative forum. Signatories of the initiative commit

to five key principles: undertaking systematic efforts to promote greater environmental responsibility; reducing overall climate impact; educating for climate action; promoting sustainable and responsible consumption; and advocating for climate action through communication.

Other signatories include the International Olympic Committee, the NBA, the U.S. Tennis Association, the New York Yankees, the International Golf Federation and more.

“The USGA being a signatory means we’re holding ourselves to a high standard and looking to lead by example,” Aznavorian said. “It’s a tremendous source of pride for USGA staff and also important to future staff members to know that the USGA cares about environmental concerns to such a degree that we’ve become a signatory. It underscores the premise of us being a purpose-driven organization.”

// **IN MEMORIAM**

GCBAA MOURNS PAUL FOLEY

Paul Foley, former executive director of the Golf Course Builders Association of America (GCBAA), died of complications from the coronavirus on April 17. Foley is survived by his wife, Judy, four children and nine grandchildren.

Foley served as executive director of GCBAA from 2006 to 2011. During his tenure, Foley dealt with the impact of the downturn in golf construction brought on by overbuilding, recession and changes in the market. He also helped to professionalize the GCBAA with improved certification, new standards, educational opportunities and public relations efforts to grow awareness of the value of choosing GCBAA members for golf construction projects.

He was also instrumental in growing the GCBAA Foundation Sticks for Kids program through a partnership with the National Recreation and Parks Association. The program grew from just 11 sites to more than 500 in all 50 states when Foley retired.

// **NEW FACE AT ANUVIA**

ANUVIA PLANT NUTRIENTS ADDS VP OF R&D

Anuvia Plant Nutrients added Shawn Semones, Ph.D., as vice president of research and development (R&D).

In this position, he will focus on establishing rapid innovative development of new microbial and biological technologies that align with the company’s current sustainable biobased products.

Semones’ career in agriculture R&D spans more than 20 years. He most recently served as executive vice president of R&D and CTO for Concentric Ag. In this role, he was responsible for all aspects of R&D, including regulatory, manufacturing of biological products, as well as business development efforts. Previously, he worked at Novozymes Biologicals, where he helped build its BioAg R&D application division. He holds a doctorate in biology – plant physiology/mycology from Virginia Tech and a Master of Science degree in biology – plant physiological ecology from Virginia Commonwealth University.

//A LONG LEGACY

The Toro Co. remembers Ken Melrose

➔ Kendrick “Ken” B. Melrose, former chairman and CEO of The Toro Co., died Sunday, May 3 at the age of 79.

Rick Olson, current chairman and CEO of The Toro Co., said, “Ken was a great man and the epitome of an exceptional leader. The culture he instilled continues as a positive influence and will guide The Toro Co. long into the future. Ken was passionate about supporting the industries we serve and helping our customers succeed. The impact of his generous philanthropic initiatives will continue to positively affect many in our industry and our communities.”

Melrose joined The Toro Co. in 1970 and over the course of the following decade, served in a number of leadership roles with increasing responsibility. In 1981, Melrose was named president. After leading the company for 24 years, Melrose retired as CEO in March 2005. During his tenure, he



Ken Melrose

oversaw a number of acquisitions including Wheel Horse, Exmark, Lawn-Boy and Hayter, and company sales grew from \$247 million to \$1.7 billion.

He played an instrumental role in forming the company’s partnership with The First Tee in 1998. He established The Kendrick B. Melrose Family Foundation Scholarship Program in 2002 for dependents of company employees, which has supported 189 students with scholarships. He also helped establish the Melrose/Hoffman Employee Critical Need Fund in 2005 to assist employees experiencing economic hardship. In retirement, Melrose founded Leading by Serving. In this role, he wrote and traveled extensively, promoting the principles of servant leadership in both public and private organizations.

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“71-year-old member showed up unannounced this morning asking if he could help. He noticed our hand-mowing areas were getting long. Even brought his own mower, string trimmer and gas. On his way out, he said, ‘I’ll be back again next week.’”

Jason Krogman

@JasonKrogman7

Golf Course Superintendent, Kitsap G&CC, Bremerton, Wash.



//#LIKEARNIE

THE PALMER FOUNDATION LAUNCHES #LIKEARNIE CAMPAIGN

The Arnold & Winnie Palmer Foundation, based in Orlando, Fla., started a campaign of charitable efforts to support people impacted by the COVID-19 pandemic.

Called “#LikeArnie,” the campaign aims to support youth and educators across the country, including those in a number of PGA Tour event communities.

#LikeArnie builds on the Palmer Foundation’s immediate response to the pandemic, in which masks and face shields were provided to more than 20,000 workers at Orlando Health. Through Feeding America member food banks, #LikeArnie will support the provision of nutritious food to children in Orlando, Fla., the foundation’s home city and site of the Arnold Palmer Invitational. The charity will also support food banks in Arnold Palmer’s hometown of Latrobe, Pa., and in nearby Pittsburgh.

//A LOOK AHEAD

USGA FINALIZES 2020 SCHEDULE

The United States Golf Association (USGA) made several updates to its 2020 championship schedule, as the organization continues to reconfigure its season due to uncertainty surrounding the COVID-19 pandemic.

The 120th U.S. Women’s Amateur, scheduled for Aug. 3-9 at Woodmont Country Club in Rockville, Md., and the 120th U.S. Amateur, scheduled for Aug. 10-16 at Bandon (Ore.) Dunes Golf Resort, will be conducted as scheduled, provided that Centers for Disease Control recommendations and state and local government guidelines make it possible to do so.

The remaining four 2020 amateur championships will be canceled: the U.S. Women’s Mid-Amateur (Aug. 29-Sept. 3 at Berkeley Hall Club in Bluffton, S.C.); U.S. Senior Amateur (Aug. 29-Sept. 3 at Country Club of Detroit in Grosse Pointe Farms, Mich.); U.S. Mid-Amateur (Sept. 12-17 at Kinloch Golf Club in Manakin-Sabot, Va., and Independence Golf Club in Midlothian, Va.); and U.S. Senior Women’s Amateur (Sept. 12-17 at The Lakewood Club in Point Clear, Ala.)



"I think that like all of these periods in the past, there will be trepidation at first until we get used to the new normal ..."

ALAN FITZGERALD, *superintendent, LedgeRock GC, Mohnton, Pa.*

Optimistic about the future of golf

I have several partially written articles for this column that I had to get over some writer's block to finish, and then the COVID-19 shutdown arrived. The opportunist in me jumped on the bandwagon and wrote about the topic *du jour*.

The spring of 2020 will go down in history as the time that the world shut down. Decades from now, we will be telling our grandkids about the time the movie *Contagion* predicted the future and an invisible virus made everyone stay at home, wear face masks and created social distancing.

Throughout my career, a large percentage of my experience has been at newer clubs, with the one exception being the six seasons that I spent at Pine Valley in N.J. (I guess if you are going to work at an old club, you should do it right!) Working at newer clubs, the construction process and grow-ins really got me interested in golf course architecture from early on, along with the maintenance side of things.

The one big difference with

an old club over a shiny new modern build was the history of the older clubs and how the course and the clubs themselves matured and survived over the decades. Working at Pine Valley not only reinforced what I had learned to love about architecture, but it also introduced me to what architectural perfection is — the design to which all others are compared.

While the overall layout has stayed the same, and although the club is very careful to protect its crown jewel, some design elements have been lost to time. There are numerous reasons why this happened, including making the course easier to maintain, helping the course battle the elements and the course simply maturing with time.

Realizing that a course

and a club are constantly evolving, I started to wonder how economic and societal changes in the greater world had their effect on maintenance and clubs in general. Pine Valley is easy to reference here due to my firsthand experience, but this applies to every "Golden Era" club. From this, I have found it extremely interesting how clubs and courses evolved and how they survived to be what they are today.

I have frequently wondered how people/society and therefore clubs survived major national and world events like the Great Depression and World Wars. Like most of us, prior to March 2020, I couldn't comprehend what one of these huge events would be like and how it would or could

impact a modern world, one that seemed immune to a major crisis that shut down normal life. Yet, here we are. My curiosity has become a reality. I now know how a major worldwide crisis affects the planet and how, as humans, we adapt and make it work.

Thankfully, it is not like sheltering in the Tube dodging bombs and eating rations like in WWII-era London. Our suffering is having to stay in the comfort of our home with the added benefit of having *Tiger King* to keep us occupied rather than a scratchy wireless, but it's a strange new world that we have been thrust into.

What does the future hold? I am hoping that by the time you are reading this, we will be back on the road to recovery. I think that like all of these periods in the past, there will be trepidation at first until we get used to the new normal, and then it will be business as usual. Like the original Lido on Long Island, the greatest golf course that no longer exists due to the Great Depression and WWII, there will be casualties, but golf will recover — maybe even grow if people realize they can easily play the sport while social distancing — and the clubs that survive will be stronger. COVID-19 will be a blip in their history, just like those periods in the past. I'm an optimist, but why should this time be any different — except now, we wonder if Carole Baskin did it? 🐾

Alan Fitzgerald (alan@ledgerockgolf.com) is superintendent at LedgeRock GC in Mohnton, Pa.



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40 years of living the *Caddyshack* dream

BY SETH JONES

Celebrating the 1980 comedy classic with Danny Noonan and (most of) the crew at Bushwood



Danny Noonan, thanks to that scholarship, went on to graduate from Northwestern University and was a successful stockbroker for more than 30 years. Maggie O'Hooligan, like many of her immigrant coworkers, was treated like family as a dedicated lifelong employee of Bushwood. Carl Spackler went on the run after blowing up an entire fairway and was quickly replaced by a clean-cut young buck with the latest skill and know-how.

It's been 40 years since *Caddyshack* opened in theaters across the nation. The film is one of the most frequently quoted movies not just on golf courses, but frequently quoted, period. It stars the most famous greenkeeper ever on film, Bill Murray's Carl Spackler.

In honor of the landmark number, *Golfdom* spoke with people who inspired the movie and who appeared in the movie, as well as superintendents who worked on the grounds that both inspired — and literally was — Bushwood Country Club.

Our story starts off with a boy in a suburb of Chicago just trying to “be the ball.”

From shag boy to Evans Scholar

Ed Murray, the oldest of the six Murray brothers, was at church when divine intervention — in the form of a caddymaster — came into his life.

“They were serving mass one day, and there was a strange man in the sacristy,” recalls Ed Murray. “Nowadays, you’d call the police. He said he was caddymaster at Indian Hill Club,

looking to hire some caddies, and if we came to the club after school, he would teach us how to caddy, and we could make a lot of money.”

Murray, 10 years old, showed up with his friends and learned on the job he was too small to carry a golf bag. By the end of a loop, members would take the bag from him out of sheer pity. He switched to a shag boy, chasing down practice balls on the 11th fairway and then became the exclusive shag boy for Sam Bernardi, head pro. He was making 60 cents per half-hour, but the door it opened with Bernardi, a Chicago legend, was much more lucrative. Eventually, Bernardi started giving Murray lessons. As Murray got older, he was hired to caddy for Bernardi, first for local Chicago tournaments, then the Western Open, then the 1961 PGA Championship at Olympia Fields (Ill.) CC.

Bernardi told Murray about the Evans Scholars Foundation (*see sidebar, page 18*) and encouraged him to apply. Murray says he was an average student at best. One day, Murray came home and his mother read him a letter, trembling. She told her son he had won a full scholarship from the Evans Scholars Foundation. Then one more surprise: The scholarship was to attend prestigious Northwestern University.

“I said, ‘Holy shit, I got problems!’ I was so sure I wouldn’t get in to Northwestern, I didn’t apply,” Murray says. “Luckily, we had a couple members ... Foster McGaw, they named the basketball stadium after him, and Fritz Souder, he was president of Western Golf Association. They said we have to get this kid in. (Northwestern) said, his SATs aren’t high enough. They said it doesn’t matter, he already has a

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“I’m lucky that Carl Spackler was the assistant superintendent, so I lean toward Mr. McFiddish. I’ve never met anyone who didn’t like the movie. Looking back, I think it’s done way more good than bad for us.”

— DAVE SCHLAGETTER
INDIAN HILL CLUB



"It's quite an honor to be in the hall of fame," says Ed Murray of he and his brothers' induction into the Caddy Hall of Fame in 2015. "The next year was Bones McKay, Mickelson's caddie. I introduced myself and said I made it to the hall before you! He retired a year or two later." From left: Joel Murray, Andy Murray, Ed Murray, John Murray, Brian Doyle-Murray and Bill Murray.

Continued from page 12
scholarship. I got in."

Murray winning the Evans scholarship would lead him to a career as a successful stockbroker, but it also inspired his younger brother, Brian Doyle-Murray, who played caddymaster Lou Loomis in the film, with the nugget of an idea: a blue collar kid working at a stuffy country club, hoping to change his life for the better. Danny Noonan was born, based on Ed Murray's wild ride to Northwestern.

Ed Murray, now age 76, says most of the characters in *Caddyshack* were based on people they caddied for or met at the club. He softly laughs and then adds one correction to his character: "I never touched that girl."

A family club

Indian Hill Club, located in the Chicago suburb of Winnetka, Ill., has an appropriate slogan: A family tradition since 1914.

"It's a family club in the truest sense. We do a lot for women and kids," says David Schlagger, longtime superintendent at Indian Hill. "It's not a championship course by any means. We have a strong tennis program, strong swimming and golf is kind of ... family golf."

Though the club indirectly spawned *Caddyshack*, its preferred talking point is how the club has a tradition of hiring young and keeping their employees for the long haul.

"That's how Indian Hill rolls. They hope

you will be here for a long time so they hire young, and they've done it in all areas," Schlagger says. "The golf pro here before me was here for 37 years. The chef when I started here was here for 45 years. We have guys that are busboys that have been here for 25 years. It's a culture of longevity that the club has embraced. They tell us that we're part of the family ... and they walk the walk, too. They treat us that way."

Case in point, his "work mom," Nellie Kerrigan. She arrived from Ireland when she was only 19 years old. Retired now, she worked for the club for 55 years. And she'll tell you — she was *not* the inspiration for Maggie O'Hooligan, Danny Noonan's Irish

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The club put out flags to honor Nellie Kerrigan's 50 years at Indian Hill Club. Schlagetter says of Kerrigan, now retired, "I had coffee with her every day. I miss her tremendously."

Continued from page 14
sweetheart. There were a lot of young Irish girls working at the club at the time, including her older sister and her twin sister.

"I came from Ireland when I was very young. I was only 19, and I came with my twin," Kerrigan recalls. "My sister was here ahead of me, and I never left."

It was the people of Indian Hill — that family atmosphere — that kept her there all those years. She started out as a waitress and finished as clubhouse manager, a mother to all of Indian Hill's members.

"I love the people. The members were amazing. They became my second family. I saw four generations of members; it was unbelievable," she says. "I grew up with

these people. I was only 19, and I'm not 19 now, darlin'. But I feel like I'm 19."

She remembers the reaction in 1980 when *Caddyshack* hit theaters. Some members were offended by the movie, she says, because in many cases, the movie used the real names of the members it was mocking.

She also recalls a cocky young Bill Murray walking toward her in the Indian Hill parking lot.

"He was young and he said, 'You're going to read about me one day in Hollywood,'" she says. "And I said to myself, 'Oh my gosh, what does this kid know at 13, or 11,' whatever he was? But he knew then what he wanted."

The origin of Carl Spackler

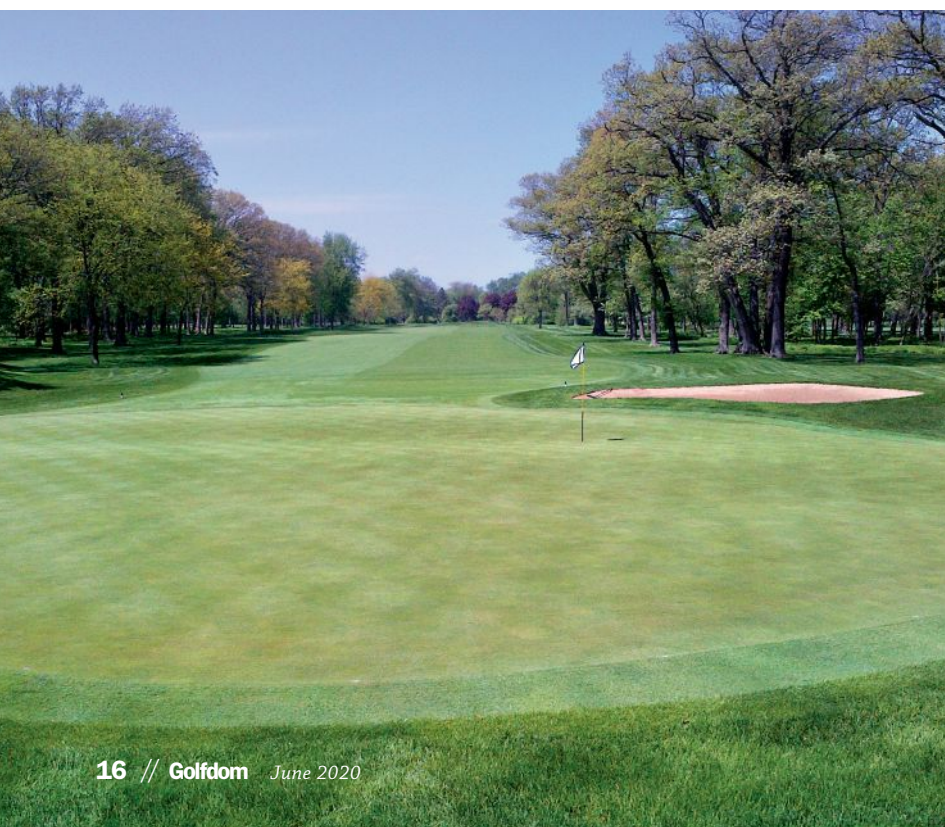
Some have argued that the lowbrow humor Bill Murray portrayed, as assistant superintendent Carl Spackler and his roughshod methods of greenkeeping, was harmful to the image of superintendents. According to the book *Caddyshack: The Making of a Hollywood Cinderella Story*, author Chris Nashawaty writes, "across the board, (film critics) regarded Bill Murray's deranged, camouflage-clad assistant greenkeeper, Carl Spackler, as unsubtle, submental and perverted."

So, Nellie might not have been Maggie (Ed disagrees), and Danny and Maggie never were romantic (Ed and Nellie agree), but who inspired Carl Spackler?

Ed Murray responds with a "who?" The Spackler character is small potatoes to him. He'll talk about the real Ty Webb, the real Lou Loomis. He says Sam Rivera was based on Sam Bernardi. He knew those people. But Spackler?

"Billy's character? In the original script, I used to have it, I wish I had it now because I would have Xeroxed a million copies and given them away at charity auctions," Murray says. "In the original script, there are two or three pages that say, 'Bill will ad-lib. Chevy and Bill will ad-lib.' That's all

Schlagetter has worked 27 years at Indian Hill. "From the beginning, he was a perfect fit — great person, smart, fun and humble," says Dick Wagley, PGA, retired head pro.



it said. So those scenes you saw in the shed, they made that up as they were doing it. Nobody knew what they were going to do. The scenes with the guns and the gophers and stuff, it came from Billy's head."

So, there was no basis in reality for Carl Spackler. It was just Bill Murray and Chevy Chase riffing.

But it was a riff that would become famous and often imitated ("chinch bugs, manganese ... lot of people don't even know what that is ... "a pond would be good for you ..."), at golf courses across the country, for the next four decades and counting.

Spackler's wheels

Bob Harper arrived in Miami in 1979 via Dodge City, Kan. A scratch golfer, he was there determined to do two things: play golf for Florida International University (FIU) and learn the trade of being a golf course superintendent.



At the 2012 AT&T Pro-Am at Pebble Beach, *Golfdom* Editor-in-Chief Seth Jones (left) asked Bill Murray about his inspiration for Carl Spackler. His answer was even more mystical, and indecipherable, than what the Dalai Lama — flowing robes and all — said to Spackler that day in the Himalayas.

To be on the golf team at FIU meant that Harper was going to see some nice golf courses for a kid from the Old West.

One course stood out on his junior season schedule: Rolling Hills CC in Davie, Fla.

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The reason? It was the same course where *Caddyshack* was filmed.

"It was exciting to get to see it," Harper recalls. "I graduated in 1981, and I'll be darned if I didn't get a job to work there on the crew, September 1981."

Harper has made a career in Florida, spending six years at Rolling Hills (now known as Grande Oaks CC) then Grand Palms in Pembroke Pines for 12 years, followed by 16 years at Emerald Hills in Hollywood and now Lago Mar CC in Plantation for four years. It was probably meant to be, since the moment



Bob Harper

he used Spackler's actual pitchfork to do his best Bill Murray impersonation.

"The old red barn, the old ranch house ... (Rolling Hills) was a thoroughbred horse ranch from the 1940s, which later became



a golf course," Harper says. "The old white house where (Maggie) lives? That was the ranch manager's house, which then became the superintendent's office. And the props? Our tools, the pitchfork, were all taken from our barn."

Harper is especially proud of his wheels back then. It was the same ride that enabled Spackler to cause so much devastation at

"Schlaggs," with his dog McKenzie, has plenty of *Caddyshack* stories. "The caddymaster, Lou? That's a real guy."

Rolling Hills that a pilot called in a downed airplane because of the fireball he saw near the Fort Lauderdale Airport. It was a one-seat Cushman Commando, three-on-the-tree, with an 18-hp air-cooled V-twin engine. They even put headers on it. On the back was a 100-gallon Smithco Sprayhawk with a fiberglass tank.

"It was basically awesome," Harper recalls. "It was probably the fastest — definitely the funnest — mode of transportation. We used to race the Cushmans around because they had cart paths all around and it was very hilly."

Don Smith, president of Smithco, remembers the thrill of seeing the company's easily recognizable sprayer on the big screen during the climax of the movie.

"We were the first to introduce fiberglass. The competition used polyethylene or steel. Most sprayers were square; ours was round," Smith says. "Compared to what was in the movie, a lot of advances have been made in sprayers over the years."

Harper says that's not all that's changed over the years. The composition of the golf maintenance crew has also made a diversion from the 1980s, he says.

"To be on a crew back in the '80s was really different," Harper says. "It was almost fraternal, like a frat house. Mostly young

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Goodwill at Indian Hill

Indian Hill Club has a unique history with caddies but also with good causes

"(Indian Hill) has a wonderful caddie history right from the beginning. Chick Evans, a great player of the 1910s and '20s, was a founding member of the club," says Dick Wagley, PGA, retired head pro of Indian Hill. "He was a wonderful influence, in the game of golf as well as building the club."

Evans was the first amateur to win both the U.S. Amateur and the U.S. Open in the same year (1916.) But a series of lessons he filmed jeopardized his amateur status and directly resulted in the creation of the Evans Scholars Foundation.

"He was paid by a sponsor to do those and was in jeopardy of losing his amateur status ... they gave him an opportunity to donate the money," Wagley explains. "Through some of the members at the club, he was able to establish the Chick Evans Scholars Foundation. The rest is history: Now thousands of caddies have gone to college on that scholarship."

Overseen by the Western Golf Association, more than 11,000 caddies have graduated as Evans Scholars since 1930. Not as famous as the Evans Scholars Foundation but vitally important to many superintendents around the country is the Wee One Foundation (WeeOne.org). Named after Wayne Otto, CGCS at Ozaukee CC in Mequon, Wis., the foundation financially supports golf course management professionals and their dependents who incur overwhelming medical expenses. Otto passed away in 2004 from pancreatic cancer.

The Chicagoland superintendents and Schlagetter, a board member, have been a driving force for the Wee One Foundation. The organization has donated more than \$1.5 million to golf maintenance families in 23 states.

"Superintendents always support each other, whether it's helping your neighbor with a challenging turf condition or helping an assistant move up the ranks in his or her career," Schlagetter says. "I'm proud of my accomplishments in the industry, but none more than my involvement in Wee One. It's a special feeling to help out someone who, through no fault of their own, really needs that support."

PHOTO BY: TIM KLEIN

FOCUS ON FUNGICIDES

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// A Word From Our Sponsor

Analyzing the disease triangle of turf

By Brian Aynardi, Ph.D.

Plant disease is a fascinating phenomenon resulting from an interaction between the three components that make up the disease triangle: a host, a pathogen and the environment. The use of fungicides to prevent and control plant disease is widespread and among the top budgetary considerations for nearly all turfgrass managers. The dynamics of plant disease, however, are much less predictable and regular than the management strategies for other turfgrass pests such as weeds and insects.

Disease only occurs when all three components of the disease triangle interface with one another. Among the most frequent questions I am asked are:

"What kind of disease year was 2019?"

"What will 2020 be like for managing turf diseases?"

These are not simple questions because they vary greatly by region and can even be inconsistent within a region throughout the growing season.

In 2019, the mid-Atlantic and Northeast were above average in rainfall from May through July, but below average from July through September. This affects disease development. What was problematic in the Northeast in June 2019 may not have been a significant issue by August. This is because disease incidence (a quantitative measurement) and disease severity (a qualitative measurement) are predicated by conducive environmental conditions. Pathogens lay dormant in various forms and will likely be found in the same locations each year. Use the dollar spot or spring dead spot pathogens as examples.

Likewise, the turf species susceptible to attack from those pathogens typically is not changing from one year to the next at a given location. The environment, therefore, is the critical component. The ambient environment (i.e., sun, air and moisture) is always changing. The more reliable environment for preventive disease management strategies is the soil environment.

Pythium root rot is caused by several *Pythium* species, which are oomycete pathogens (not true fungi). Root rot

is a big problem on bentgrass greens, and I would contend it is currently the most important disease to preventively control. Many of the fungicides registered for use in turf have little to no effect for control of oomycetes, but the Qils, Qols, phenylamides, phosphites and carbamates are effective chemistries for control. Preventive



Brian Aynardi

applications should be initiated by the time soil temperatures at the 2-inch depth are 55 to 65 degrees F for approximately five consecutive days. Starting applications earlier certainly will not hurt the cause.

Segway Fungicide SC (cyazofamid) has become the industry go-to for control of all *Pythium* diseases.

It is currently labeled for use at 0.9 fl oz/1000 sq. ft. on a 21-day interval for *Pythium* root rot, but expansion of the Segway label to accommodate additional use rate and interval recommendations is currently pending EPA approval.

Just as Segway is gold for root rot control, Union Fungicide SC (cyazofamid + azoxystrobin) is platinum. The Union fungicide label provides versatility for application rate and interval ranges, and the combination provides dual modes of action for control of *Pythium* species. The product has generated excitement for the future of *Pythium* control, and performance in university field-testing has been exceptional.

Union and Segway are the best tools for root rot, but proper rotation with different modes of action is imperative for resistance management. Union applications placed at critical times of the year (i.e., seven to 10 days prior to Memorial Day or July Fourth) should be in every turf manager's strategy. As the name implies, root rot affects the roots of the plant, and immediate post-application irrigation in excess of 1/8-inch is critical.

Fairy ring is caused by various basidiomycete fungi. It

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is another disease where preventive applications should be predicated on soil temperatures, particularly when temperatures at the 2-inch depth reach 55 degrees F for approximately five consecutive days in the spring. As with all diseases noted in this article, weather patterns following preventive treatments will dictate the severity of disease symptoms, even though at the time of application, there might not be anything visible.

The pathogens that cause fairy ring do not attack (infect) the plant. Fairy ring symptoms are the result of the pathogen breaking down organic material in the soil, resulting in various outcomes including the release of nitrogen and soil hydrophobicity.

The use of wetting agents and proper fungicide selection are important. Fungicides from the SDHI and QoI classes are top choices for control, and sequential preventive applications are needed. The active ingredient flutalonil has been the go-to for turf managers, and it's now available in a more user-friendly SC (suspension concentrate) formulation — Pedigree Fungicide SC.

Summer patch is caused by the ascomycete fungus, *Magnaporthiaopsis poae*, and is a significant disease occurring particularly on Kentucky bluegrass and annual bluegrass. The pathogen begins to infect the host plant in the spring, so by the time disease symptoms are visible, the only remedy is a "curative" fungicide application to stop the current infection process and allow the dead turf to regrow.

Preventive fungicide applications with active ingredients from several fungicide classes such as the DMIs, QoIs and SDHIs are effective when initial treatment applications are placed when soil temperatures at the 2-inch depth are at 65 degrees F for approximately five consecutive days. Fungicide studies where applications are initiated at that time with two to three sequential applications occurring 21-28 days apart are most effective.

Combinations of active ingredients from these classes are more effective than sole active treatments. Tekken Broad Spectrum Fungicide, which combines isofetamid (SDHI) and tebuconazole (DMI), has proven to be a top-performing treatment since being evaluated for control of the disease. Other combination products such as Fame+T, Headway and Navicon also perform very well.

While you have missed this year's opportunity to make preventive fungicide applications for the diseases highlighted so far in this article, if you are managing bermudagrass, now is the time to be thinking about spring dead spot, caused primarily by two species of the

ascomycete genera *Ophiosphaerella*. Applications for control of this root-infecting pathogen should start when soil temperatures at the 2-inch depth drop to roughly 70 degrees F for approximately five consecutive days. A two-to-three-application strategy should also be deployed for this disease as with soil pathogens.

Spring dead spot has been problematic to control, especially after Rubigan was no longer an option for fungicide control. Other DMI fungicides, such as tebuconazole, have not provided the same level of control as fenarimol. In the past five years, significant advancements with fungicidal control have been observed with the SDHIs.

Kabuto Fungicide SC (isofetamid) has been the consistent solution for control of spring dead spot in university trials and on golf courses. Other SDHI fungicides have also shown good results. A sequential application 21-28 days after the initial application of Kabuto at suggested rates should be the go-to for spring dead spot control this fall. Immediate post-application irrigation is also required for control of this pathogen.

The fungicidal control of root and soil pathogens through preventive applications based on conducive soil temperatures for pathogen activity is essential for optimal disease control. Proper post-application irrigation immediately following treatments for *Pythium* root rot, fairy ring, summer patch and spring dead spot are imperative.

In a year where consistency is not often observed in the many facets of life, there are a few constants: Diseases of turfgrass will occur, the weather will regularly change and PBI-Gordon will continue to provide the top-performing fungicide solutions for every tough-to-control disease in the turfgrass market.



Brian Aynardi, Ph.D., is the Northeast research scientist for PBI-Gordon. Aynardi is a turfgrass pathologist and has conducted numerous research projects on the management and control of anthracnose, along with many other diseases. You may reach him at baynardi@pbigordon.com for more information.



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In full swing

How the team at Des Moines G&CC keeps the course in tiptop form despite a busy start to the season

By Sarah Webb

By early May, Des Moines G&CC typically sees between 3,500 and 4,000 rounds of golf played on its two Pete Dye-designed courses. This year, however, that number has been upped to more than 10,000 rounds of golf by mid-May—with no signs of slowing.

“We opened March 7 this year, a little early for us, but we have experienced a tremendous amount of golf play because, in Iowa, we’ve been able to play (despite the COVID-19 pandemic). So, our members are using the place,” says Rick Tegtmeier, CGCS, director of grounds for Des Moines G&CC. “It’s been good for us, but there’s been a lot more challenges trying to maintain the golf course and keep it healthy and to the members’ standards when we’re having that much play.”

Maintaining top-notch conditions at the 475-acre property wouldn’t be pos-

sible without the diligent efforts of the course’s 44 employees, including North and South Course Superintendents Nate Tegtmeier and Mitchell Meyers, and an extra boost from PBI-Gordon’s fungicide lineup.

The faces that run the place

Rick Tegtmeier started in the golf industry at the age of 13 after a visit to the bank with his father yielded him a position on a local grounds crew, thanks to a job offer from the banker who doubled as a grounds chairman.

Now in his 48th year in the industry, Rick Tegtmeier holds a CGCS certification and a Master Greenkeeper certificate under his belt, with a 2019 induction into the Iowa Golf Hall of Fame to boot.

“Being inducted into the Iowa Golf Hall of Fame was a big milestone in my career,” he says. “You work hard all your life, and when others in golf think you’ve done something for them or for the game, that means a lot.”

His career spanned stretches as su-

perintendent at various golf courses in Illinois and Iowa, including Urbandale (Iowa) CC, Hinsdale GC in Clarendon Hills, Ill., Des Moines G&CC and Elmcrest CC in Cedar Rapids, Iowa, before he finally landed back at Des Moines G&CC as director of grounds in 2006.

“He’s been at it for so long and seen so many things that he’s a wealth of knowl-



Mitch Meyers

edge,” says Meyers, who has served as South Course’s superintendent for six years. “He’s always willing to teach you something new and share the information he has, and he’s always trying to keep people bettering themselves.”

During all these years maintaining golf courses in Iowa and Illinois, Tegtmeier has kept the same 1973 silver dollar in his pocket. Given to him by his grandfather the year he started in the industry, the coin is unrecognizable today, completely worn from Tegtmeier’s years of walking up and down fairways, tees and greens.

“I’ve carried it as a good luck charm all my life,” Rick Tegtmeier says. “I’ve lost it a few times on the golf course, but it’s always been found.”

What isn’t left to luck is how Rick Tegtmeier runs the facility.

“I’m a stickler for the little things,”



Rick Tegtmeier

FOCUS ON FUNGICIDES



Rick Tegtmeier says. “There’s a place for everything, and everything should be in its place.”

That mentality — coupled with a powerful team dynamic — applies to both courses at Des Moines G&CC.

“Rick tells us at the end of the day, we all represent Des Moines Golf. We have our own people and equipment assigned to each course, but when we have big projects, we can pool people together to get them done,” Meyers says. “If you have that many people that can all work together to get to a common goal, it makes life easier for everyone.”

Nate Tegtmeier — who started working his way through the ranks at Des Moines G&CC in 2007 after many weekends spent as a child helping out at the golf course with his father, Rick Tegtmeier — agrees.

“It’s nice knowing there’s another

superintendent on property. There’s definitely a competitive aspect between the two staffs, more of a pride. It’s fun



Nate Tegtmeier

to be able to look to each other ... you always have something to go off of,” he says.

He adds that while working for his father took a while to get used to, the pair have managed to separate their work and personal lives.

“We joke about it,” Rick Tegtmeier says. “He’s not my son here; he’s our superintendent. We have a little saying that we never talk about work at home, and we never talk about home at work.”

A closer look at the course

Set in the heart of West Des Moines, Iowa, the parkland-style, private coun-

Des Moines G&CC has seen about 10,000 rounds of golf through early May 2020, more than double what’s typical.

try club is comprised of The North Course and The South Course, both par 72. Bentgrass greens, tees and fairways sprawl across the property, nearly 4,800 trees dot the courses and the facility’s 11 lakes and ponds add to the visual appeal — and difficulty of play.

In addition to accommodating about 50,000 rounds yearly, the facility has hosted the 1999 U.S. Senior Open and the 2017 Solheim Cup.

“The Solheim Cup was a big highlight,” Meyers says. “There are a lot of new things that I learned there, especially being fresh out of school. The whole setup and preparation for the Solheim Cup and even the work afterward is something that a lot of people

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Maintaining the 475-acre property requires the help of about 44 employees.

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don't get to experience, and I got it all out of the gate."

To prepare for the Solheim Cup, the facility underwent a four-phase renovation — headed up by Pete Dye — between 2013 and 2016.

The \$8 million renovation consisted of 127 new bunkers, 83 new tees, 12 new greens, four miles of cart path, two new bulkhead walls, two dredged ponds, one reconstructed pond, a main-line irrigation install and extensive drainage work.

"It was really rewarding to get it done, reveal each of the nine holes to the members for play and hear their feedback. The best part of a renovation is that it's new and fresh, and it's just going to get better because it takes time

to grow it in," says Nate Tegtmeier.

Nothing left to chance

While Rick Tegtmeier's foray into the golf industry may have happened by chance, when it comes to maintaining Des Moines' pristine conditions, he leaves nothing up to fate.

To keep its bentgrass a championship-colored green, Des Moines G&CC has implemented PBI-Gordon's Segway fungicide to combat *Pythium* root dysfunction for about three years.

"I had a fellow superintendent in Chicago tell me about it. He's like, 'You've got to try this stuff. It's really good,'" Rick Tegtmeier says. "It's one of those go-to products. In the late spring/early summer, we put it down, and we know that it's going to control the disease and take care of anything that may become a problem for us down the road."

Additionally, almost every fungi-

cide spray that the course puts down contains PBI-Gordon's Ferromec AC, a sprayable formulation of iron, nitrogen and sulfur designed to produce rapid turf green-up without encouraging excessive growth.

"It just produces a very nice green turf that I can bank on," Rick Tegtmeier says. "I know every two weeks when we do a spray, we put a little bit of Ferromec in the tank, whether it's greens, tees, or fairways, and it's going to produce championship color."

Overall, Tegtmeier says it's all about the fine details when it comes to maintaining the course.

"My whole goal is when a member drives in the gate of Des Moines Golf, they have a smile on their face because it is beautiful ... And then when they leave Des Moines Golf, I want them to still have that same smile on their face. That's what we strive for," he says. **G**

PHOTO BY: GARY KELLNER, DIMPLED ROCK

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From experiment to excellent

Chemical companies, university researchers and superintendents work hand in hand to improve fungicide efficacy

By Christina Herrick

When a chemical company releases a new chemistry such as a fungicide to the market, it typically has gone through years of rigorous testing by both the chemical company and universities around the country. It's in this research where many innovations were made that impact golf courses today and that will impact courses in the future.

Researchers test these new fungicide chemistries in trials against a specific target disease at specified rates and intervals to determine the most efficacious way to utilize the product.

"We evaluate how well they work and how efficacious they are," says Bruce Clarke, Ph.D., of these experimental compounds. Clarke, an Extension specialist in turfgrass pathology at Rutgers University, says companies rely on universities to evaluate new fungicides in rigorous field trials over a number of



Bruce Clarke

years before they are released and sold to turf managers.

Generally, these experimental chemistries tackle a wide range of turf diseases known to plague golf course superintendents.

"Typically, this starts with the big four — dollar spot, brown patch, *Pythium* blight and anthracnose," says Jim Kerns, Ph.D., associate professor and Extension specialist of turfgrass pathology at North Carolina State University. "If they pass muster there, then companies start looking at other areas where a fungicide may be useful."

Kerns says sometimes researchers know what class of chemistry a fungicide belongs to, and sometimes they don't. These experimental compounds are sent throughout the country to track their performance in different climates.

"The companies can look at an experimental product all day long in-house,

but until they get it out in the hands of their collaborators in various geographies, they're not going to know how it performs in different scenarios," says



David McCall

David McCall, Ph.D., assistant professor and Extension specialist of turfgrass pathology at Virginia Tech. "That's when we really start to know how a product can perform across the country in a lot of different regions. It might perform just as expected at most sites, but one location might reveal something that we, collectively, might not have ever considered."

McCall estimates about half or more of his test plots are these experimental compounds not yet released.

"Out of every five numbered compounds, maybe three never make it beyond university testing because we find some flaws, either as being ineffective or as causing unintended negative consequences to the turfgrass," McCall says. "Some of the best data that we can give a company is that negative information. They want to know the good, the bad and the ugly in every situation that we can come up with."

Taking a broader look

However, if the experimental compound does perform as expected or better,

FOCUS ON FUNGICIDES



Rigorous field trials, like this one Bruce Clarke is conducting, can help evaluate a chemistry's efficacy, rates and more.

the scope of the research expands.

"This is actually the most fun for me," Kerns says. "A lot of our cooperators will come to us and say, 'hey, we have this material, and we've seen XYZ. Do you think there's anything we should test it on?'"

Kerns says a great example of this is McCall's research on PBI-Gordon's Kabuto fungicide (isofetamid). McCall tested Kabuto for efficacy on dollar spot and included it in his research on spring dead spot, trialing SDHI chemistries, DMI chemistries and QoI chemistries.

"As innovation has it, Kabuto turns out to be one of the best spring dead spot materials that anyone has tested," Kerns says. "It's a nice partnership among the company and the researcher to try to figure out if there is an area that might be lacking."

And it's this relationship between chemical companies and university researchers that is important to fungicide innovation.

"They need us, and we need them," Kerns says. "And in turn, that partnership is helping the end user."



Ongoing research

Once released, university researchers have a wealth of information on a product from colleagues and data from their own trials to draw upon.

"It's been studied by so many people for so long," McCall says. "Our team may look at a product for five to seven years before it is released."

Moreover, the research on released chemistries doesn't stop.

"Once it's labeled, we're going to look at different rates, different timings, different diseases that may not be on the

Cultural management practices often go hand in hand with fungicide trials to better target applications.

label," Kerns says. "A lot of times, that actually comes from the golf course superintendent."

Often, superintendents will use a fungicide for one disease such as fairy ring and anecdotally notice the absence of another disease such as take-all patch. So, researchers like McCall, Kerns and Clarke will take a closer look.

It's in these post-release trials where
Continued on page FS12

Continued from page FS11

researchers will take a deeper look at rates, too.

"We're continually working with (the companies) to try to refine how these materials are used," Kerns says.

Kerns says the original label for Segway (cyazofamid) was a recommended rate of 0.45 to 0.9 fluid ounces in 2 to 4 gallons of water per 1,000 square feet. In his research, Kerns looked at lowering rates to maximize control. "Half the rate, 0.45, was outstanding," Kerns says. "That gives golf course superintendent six applications of that material instead of three, and that innovation led to PBI-Gordon amending the label."

Another innovation of note, Kerns says, is the inclusion of azoxystrobin, a QoI fungicide, with Segway's cyazofamid.

"I think that product came from our research where we found that mixing Segway with a QoI fungicide improved its control especially in June, July and August," he says. "It's performed exceptionally well in our trials. (Also), it adds



Jim Kerns' *Pythium* root rot trial in 2018. The green spots indicate treatment with Segway or Union fungicides.



David McCall's students conduct a post-application study with wetting agents for control of spring dead spot.

in a tank mixture, which is going to help reduce resistance risk from developing."

Clarke says in his trials with *Pythium* blight, he has looked at a number of new chemistries over the years, and cyazofamid has been one of the most efficacious products he's tested against this disease.

"It was a real game changer when we looked at cyazofamid, whose trade name is Segway," Clarke says. "That product was one of the first materials that I've evaluated that consistently provided 14 days suppression of *Pythium* blight when conditions are really conducive to the disease."

Cultural innovation

Moving beyond the innovation of fungicides application strategies, Clarke says when it comes to advancements and fungicides, "some of the biggest innovations have come from focusing on how best management practices influence disease development and fungicide efficacy."

When cultural practices are optimized, Clarke says, fungicides work better and often at lower rates. Instead of curative treatments, superintendents

who regularly scout their course for diseases, utilize disease models and employ best management practices can often successfully apply fungicides on an early curative, rather than preventive, basis.

Moreover, Kerns says his research has helped illustrate the key need for a wetting agent to increase the effectiveness of fungicides against diseases that attack the roots.

"Our research has clearly shown that post-application of irrigation is necessary at 1/8 inch. It has to be immediate, and (superintendents) need to be on a strong wetting agent program in order to facilitate the movement of the material to where this pathogen is," he says. "Our work has helped clear the way because fungicides are not all that mobile; you still retain good protection of the foliage while moving a portion of that material down to protect the roots as well."

Kerns says it's important for superintendents to understand that the relationship university researchers have with chemical companies is vital to continued innovation in both product development and disease control.

"The companies are continuing to innovate and work with academics and themselves to show there's a defined benefit with these materials," he says. **G**

PHOTOS BY: DAVID MCCALL (TOP); JIM KERNS (LEFT)

// Resistance Recon

Understanding fungicide resistance

Addressing the fundamental elements and practical consequences

By Richard Latin, Ph.D.

Everyone engaged in establishing and maintaining healthy turf should be familiar with fungicide resistance. It occurs when a once-effective active ingredient is no longer able to stop pathogen growth and control disease (Figure 1). The phrase “once-effective” is essential to understanding fungicide resistance. It implies that something has changed in the pathogen to reduce the efficacy of a fungicide. The change is genetic, meaning the resistance trait can be passed on to future pathogen generations. Pathogen strains that are not resistant are said to be sensitive — i.e., sensitive to a fungicide’s toxic effect. Although the term “insensitive” is sometimes used to describe fungicide resistance, the term “resistant” is used here with the understanding that there are different degrees of resistance depending on the pathogen and fungicide. This narrative provides an overview of fungicide resistance, addressing the fundamental elements and practical

consequences of fungicide resistance as it relates to turf disease control.

It’s chemical and biological

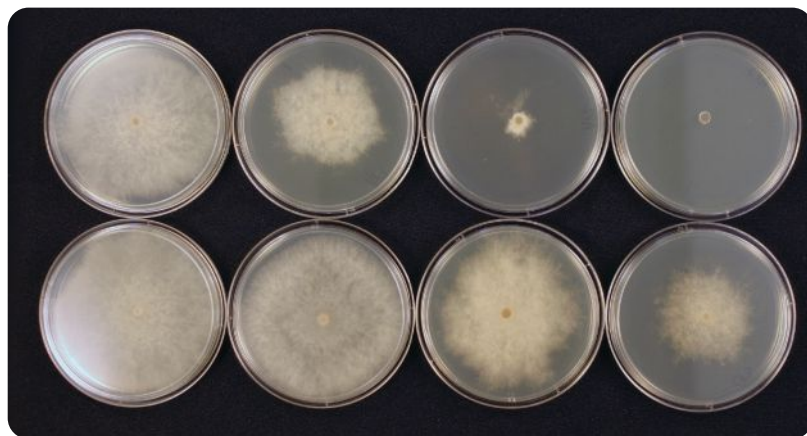
Fungicide resistance has chemical and biological components. The chemical component is defined by the pathogen-inhibiting nature of a fungicide active ingredient. Fungicides are classified as having multisite inhibitors or single-site — site-specific — inhibitors. Fungicides with multisite inhibitors tend to be among the older compounds

but can be very effective. Chlorothalonil is one of the most valuable multisite fungicides. Once inside a fungal cell, chlorothalonil targets groups of atoms — called thiol functional groups — common components of many essential proteins. Such proteins regulate thousands of metabolic functions required for fungal growth. To overcome the effects of chlorothalonil, thousands of simultaneous changes in fungal protein chemistry would need to occur without interrupting other life functions of the pathogen. The likelihood of that scenario is zero or nearly as close to zero as biologically possible.

Almost all of the modern fungicides are single-site inhibitors — i.e., they disturb only a single metabolic function in

Continued on page FS14

FIGURE 1



As increasing amounts of fungicide are applied, the sensitive population (top row) decreases while the resistant population persists.

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PHOTO BY: RICHARD LATIN

TABLE 1

Disease and fungicide class combinations where resistance has been documented.

Disease name	Fungicides
anthracnose	benzimidazole
anthracnose	DMI
anthracnose	QoI
dollar spot	benzimidazole
dollar spot	DMI
dollar spot	dicarboximide
gray leaf spot	QoI
Microdochium patch	dicarboximide
Pythium blight	QoI
Pythium blight	phenylamide

Continued from page FS13

the target pathogen. For example, DMI fungicides disrupt the biosynthesis of a single compound called ergosterol, an essential component of cell membranes in pathogenic fungi. Without ample supplies of ergosterol, fungal growth will stop because of cell membrane failure, and turf will recover. Changes in a pathogen's genetic makeup to overcome a fungicide's inhibitory effect on ergosterol biosynthesis will allow fungal growth to continue, rendering DMI active ingredients less effective or ineffective. The likelihood that a single metabolic change will naturally appear in a population is reasonably high.

The biological component of resistance relates to pathogen populations. Resistance issues are most likely to occur in pathogens that produce vast populations. To date, fungicide resistance has been identified in pathogens responsible for dollar spot, anthracnose, gray leaf spot, *Microdochium* patch and *Pythium* blight. The dollar spot pathogen, *Sclerotinia homoeocarpa*, is active during the entire season in the Northeast. *Colletotrichum cereale*, the anthracnose pathogen, also will infect over a broad temperature range, and just one infected plant can produce hundreds of thousands of infectious spores. Vast numbers

of aerially disseminated *Pyricularia grisea* spores are produced within individual gray leaf spot lesions. The *Microdochium* patch pathogen, *Microdochium nivale*, is another efficient spore-producer active in the Pacific Northwest for nine or more months every year. Finally, under ideal environmental conditions, the *Pythium* spp. spores are quick to infect, have a short generation time and can create an abundance of spores during a 12-hour period. The only common characteristic of these pathogens is that they produce massive populations.

Several turf pathogens are capable of producing large populations, but not all are equally likely to develop fungicide resistance. Table 1 shows the biological and chemical combinations with confirmed cases of fungicide resistance. All of the pathogens listed in Table 1 generate massive populations of infectious cells, and all of the active ingredients are single-site inhibitors. As new active ingredients are introduced, we must remain cognizant that all single-site fungicides are vulnerable to the evolution of pathogen resistance, especially in the five previously discussed patho-

gens. This is important because SDHI compounds target two of the most notorious pathogens on the list of pathogens with known resistance issues: *S. homoeocarpa* and *C. cereale*.

Resistance expression can be classified as qualitative or quantitative. Qualitative expression means that a pathogen population is comprised of two types, totally resistant and totally sensitive.

Quantitative expression indicates that a pathogen population is comprised of numerous types with various levels of fungicide sensitivity. Interpreting qualitative and quantitative expression is important from a practical standpoint. In the field, quantitative expression — e.g., dollar spot resistance to DMI fungicides — is characterized by a gradual erosion of sensitivity. A fungicide does not completely lose its ability to control a pathogen, and, in some cases, satisfactory levels of control can be achieved with higher application rates or shorter intervals. Qualitative expression is characteristic of benzimidazole — e.g., thiophanate-methyl — resistance in dollar spot populations. Where dollar spot is predominantly benzimidazole-resistant, increasing the product application rate or shortening the application interval of benzimidazole will not result in control.

TABLE 2

Documented cases of cross resistance and multiple resistance for turf fungicides.

Cross resistance	
Disease name	Fungicides
anthracnose	QoI class, azoxystrobin and trifloxystrobin
dollar spot	DMI class, myclobutanil, propiconazole, triadimefon
gray leaf spot	QoI class, azoxystrobin, trifloxystrobin
Microdochium patch	Dicarboximides, vinclozolin, iprodione
Multiple resistance	
Disease name	Fungicides
anthracnose	QoI class and benzimidazoles
dollar spot	DMI class and benzimidazoles
dollar spot	Dicarboximides and benzimidazoles

Cross and multiple resistance

The term "mode of action" is often used when discussing fungicides. Mode of action refers to the interaction between a fungicide and a pathogen. Fungicides with the same mode of action disturb the same metabolic function in pathogens. For example, all DMI fungicides have the same mode of action — i.e., they all interfere with ergosterol biosynthesis in the same manner. The DMI class of fungicides includes metconazole, myclobutanil, propiconazole, tebuconazole, triadimefon and triticonazole. Mode of action is an important consideration because

FOCUS ON FUNGICIDES

when a pathogen develops resistance to one active ingredient in a class of fungicides, it should be expected that it will also develop resistance to the other active ingredients in that class. Resistance within a fungicide class is referred to as cross resistance (Figure 2). It cannot be emphasized enough — pathogen populations that develop resistance to one active ingredient have the potential to develop resistance to all other active ingredients within that class of fungicides.

When active ingredients from two or more fungicide classes with single-site inhibitors are used to control a disease, resistance to more than one class of fungicide — i.e., multiple resistance — can occur. All living things have an inherent natural tendency to change or adapt in the presence of existential threats in order to survive. Where single-site fungicides from different classes have been used against crop pathogens, resistance to multiple fungicide classes has developed. As presented in Table 2, observations of multiple resistance have been reported for several pathogens. The issue with multiple resistance is not if it will occur, rather how quickly and what can be done to delay its development.

Evolution of resistance

A mutation is the first step in developing fungicide resistance. Current scientific thinking holds that the appearance of a fungicide-resistant individual in a population is a natural but rare phenomenon. Since mutation is rare, the likelihood that a resistant individual will appear is a function of population size.

With regard to turf disease control, implementing a preventive management strategy to keep pathogen populations low lessens the chance that a resistant strain will materialize. Odds of developing a fungicide-resistant strain will increase if large populations of pathogen are allowed to develop. Only applying

fungicides in a curative fashion without any preventive management may allow large populations to develop, increasing the risk of resistance.

The first step toward resistance — i.e., a mutation — is likely a natural occurrence. The second step, however, is a human action. One fungicide-resistant pathogen cell will not cause a problem on its own. The situation becomes problematic only when a resistant individual reproduces, causing a pathogen population to shift toward fungicide resistance as resistant offspring proliferate. Ultimately, the evolution of fungicide-resistant populations is a function of selection pressure. In the world of fungicide resistance, selection pressure increases when fungicides from the same class are repeatedly applied. When a fungicide is applied to a pathogen population with resistant individuals, the sensitive strains are neutralized, but the resistant strains are still able to grow (Figure 3). Therefore, applying the fungicide provides a competitive advantage to the resistant strain, eventually allowing it to become predominant in the population. As a result, the efficacy of that fungicide — or fungicide class — will decrease. The dose and frequency of fungicide applications influences the rate at which a pathogen population may evolve into one that is predominantly resistant. Higher doses and more frequent applications hasten the evolution toward resistance. There should be no question that the quickest way to develop a fungicide-resistant population is to exclusively apply fungicides within the same class.

A practical approach

Eventually, a comprehensive understanding of resistance mechanisms will guide the use of fungicides for turf disease control. Until then, disease control should be based on a simple strategy to manage the two-step process that drives

FIGURE 2



Applying different fungicides from the same class will not control a cross-resistant pathogen population.

the evolution of resistance. Since mutations toward fungicide resistance are more likely to occur in large populations, tactics designed to keep pathogen populations low can help avoid resistance. Exercise all nonchemical options to control fungal populations. Preventive disease control is encouraged, especially programs that do not involve fungicides with single-site inhibitors. Fungicides with multisite inhibitors are also important tools because they decrease the likelihood of resistant pathogen populations. Limiting the use of single-site compounds, or tank mixing them with multisite products, will greatly reduce the rate at which resistance develops. Finally, and most importantly, avoid the exclusive use of one fungicide class to control a disease. Rotating among different fungicide classes remains one of the best techniques to avoid fungicide resistance. ©

Richard Latin, Ph.D., is a professor of plant pathology at Purdue University.

Editor's note: For the complete version of this article, visit <https://www.usga.org/content/usga/home-page/course-care/digitalcollections/turfgrass-disease-management.html>

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Continued from page 18

kids, boys and girls. We had at least four or five girls on the crew all the time. A few local guys. Real casual, jean shorts and T-shirts. I had a real kinship with that place. The people, the tools ... we were kind of living that *Caddyshack* dream every day."

The modern day Sandy McFiddish

Cushman, Smithco and Milorganite all can say that Spackler was a customer, as they're all visible in the movie. Too bad for us that when Ty plays through Carl's house, Spackler was studying a turf textbook, and not a back issue of *Golfdom*.

Harper says Spackler's apartment in the movie was the oil room of the barn at Rolling Hills. Schlagetter says there was a ramshackle house at Indian Hill where the assistant superintendent once lived. It was next to the 12th hole, and it once was part of a sanitarium. Maybe that explains some of Carl's behavior.

Since it's Schlagetter's course that spawned Spackler, when people ask him if he's the modern-day Carl Spackler, he points out that he's actually the modern-day Sandy McFiddish, the Scotsman head superintendent who slaps Spackler back to reality with his cap. That character was based on Joe McMoran, the longtime golf pro at Indian Hill.

"I'm lucky that Carl Spackler was the assistant superintendent, so I lean towards Mr. McFiddish," Schlagetter says. "If you're going to be a good superintendent, you have to be Mr. McFiddish. I've never met anyone who didn't like the movie. Looking back, I think it's done way more good than bad for us."

Schlagetter has been better than good at Indian Hill for 27 years now. He gets emotional when he talks about how much he misses Nellie and Dick Wagley, PGA, retired pro. That's just the culture there.

"From the beginning this guy was a perfect fit," Wagley says. "Great person, smart, great experiences at great clubs, terrific leader of staff and members, humble and fun."

"All the stories I hear about golf in the old days and working around the golf clubs?

// ONLINE EXCLUSIVE



Caddyshack videos at Golfdom.com

Be sure to click over to **Golfdom.com** for additional video content on *Caddyshack's* 40th anniversary. In these two videos sponsored by Carl Spackler's preferred brand of sprayer, Smithco, we talk to Indian Hill Club Superintendent Dave Schlagetter about his favorite story from the days the Murray brothers were caddies at the course. And in our other video, we ask superintendents from around the country to share with us their opinion of the movie and what it means to them. Visit golfdom.com/category/golfdom-tv/ to view the videos.

They're all fun," Schlagetter says. "There's a joke around every party, isn't there? And now everything seems so serious."

Don't nobody worry 'bout me

Ed Murray had two jobs at a very early age: He was a caddy and an usher. He says both jobs taught him how to behave around adults, "a lesson in growing up."

"We got chewed out a few times, but most of the time, it's pretty good people," Murray says. "You don't see too many assholes on the golf course. It's mostly good people."

Ed Murray apologizes. First for his language, then for his voice. At times it shrinks to a whisper. He's in poor health, he says. But he says it with such insouciance that it sounds OK. This is Danny Noonan, after all. Queue the *Caddyshack* theme song by Kenny Loggins: *I'm alright; Don't nobody worry 'bout me*.

He says Michael O'Keefe was great playing Danny Noonan. He had a beautiful golf

swing. They played four or five times together the week that Murray was on the set of *Caddyshack*.

"Harold Ramis was the director, and it was the fourth day, and I hadn't really done anything. He said, 'This has to change, Ed hasn't even been in the movie yet,'" Murray recalls. "There's a scene where a lady gets hit in the head with a club. I'm standing there holding a beer, I have orange plaid pants on and I have dark hair. I have no hair now. That was my close-up."

The Evans scholarship was one thing, but did he ever expect the worldwide fame *Caddyshack* — and his brothers — would achieve?

"Did I expect anything like that to happen? No. No way!" Murray says. "We just hoped no one would get arrested, especially before they were done shooting the film."

Were they successful in that?

"I wasn't arrested, but I had a good time," he says. "Everybody had a good time." ©

Looking up ... and ahead

As the country reopens, the outlook for the golf industry is looking up

BY SARAH WEBB

As of mid-May, about 98 percent of golf courses in the U.S. were open for business, according to a survey by the National Golf Foundation.

As of press time, 96 percent of respondents to the second *Golfdom* coronavirus survey reported their courses are open for play, compared to only 44 percent who responded similarly to *Golfdom*'s first coronavirus survey just one month earlier.

As one survey respondent stated, "It's a zoo!"

Another respondent said, "Since reopening, we have had our busiest days ever!"

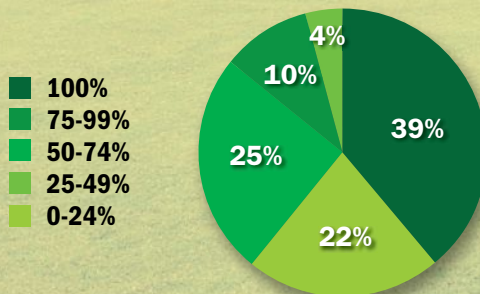
Editor's Note: Learn how rounds have exploded at Des Moines (Iowa) G&CC despite — or perhaps because of — the COVID-19 pandemic. Find the story in our Fungicide Supplement on page FS6.

Many respondents added that while their courses have reopened, they are cautious and careful to adhere strictly to COVID-19 regulations for the safety of crew members and golfers alike.

And so, while it may not quite be "business as usual" for the golf course world, there's certainly hope on the horizon for a productive golf season in 2020.

STAFFING

Mid-May: What percent of your normal staff is currently working?



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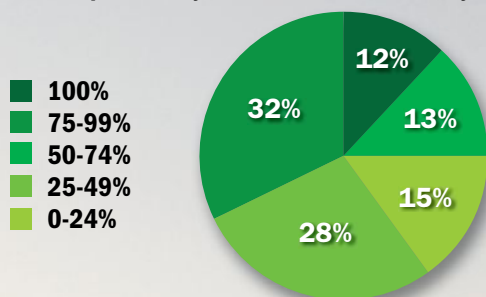


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Mid-April: What percent of your normal staff is currently working?



Staffing

While in mid-April, about 33 percent of respondents said only 10 to 24 percent of their staff was working, the situation changed drastically by mid-May, with almost 39 percent of respondents saying 100 percent of their staff was working.

As one respondent said, "In the beginning, we had half of our guys laid off, but now we are at 90 percent back working. By June 1, we will be back to 100 percent."

Another respondent said, "The extremely cool spring has helped in not needing (as many staff members), but now that the turf is starting to grow more quickly, our remaining full-time seasonal staff are coming back next week."

In mid-May, 61 percent of respondents had 75 percent or more of their staff working, while in mid-April, just 25 percent reported three-quarters or more of their crew was working.

One respondent said, "We were waiting for the club to reopen, and we had to acquire an infrared ther-

mometer and PPE (personal protective equipment) and carefully update our operating protocols to protect our crew members and golfers."

Maintenance

Superintendents proved quick on their feet — and their aerators — during the early stages of the pandemic, with about 34 percent of respondents saying their course changed its typical aeration schedule.

One respondent said, "We already aerified greens, tees and fairways in April, before the course opened. It's normally done in July or August."

Many golf courses took advantage of course closures to perform maintenance ahead of time. Other maintenance changes respondents mentioned include using more plant growth regulators (PGRs) to reduce the frequency of mowing; mowing less frequently; and reducing beautification projects such as mulching and planting flowers. At some courses, weather also had a hand in changing maintenance practices, as one respondent said, "The cool spring has pushed back some chemical applications, so they are going out later than usual."

THE BREAKDOWN

Golfdom's second survey, sent in mid-May, garnered 96 respondents, comprised of 71 superintendents, three assistant superintendents, nine general managers, eight owners and five people in other roles. Golfdom's first survey, sent in mid-April, garnered 200 responses, comprised of 132 superintendents, five assistant superintendents, 30 general managers, 22 owners and 11 people in other roles.

Staying up to date

Sixty-nine percent of respondents said their personal network of superintendents was their top resource for learning about best practices. Industry publications came in second, with 54 percent of respondents including them in their top resources. You can find a plethora of resources — including superintendent interviews, supplier and association updates, Zoom interviews with golf industry experts and more — at [Golfdom.com](https://www.golfdom.com).

On a personal note, we're all thrilled to see our science editor, Karl Danneberger, Ph.D., is recovering and already has returned to the pages of the magazine after only a one-month hiatus. Visit [Golfdom.com](https://www.golfdom.com) for the full story and a video detailing how Karl fell ill and then successfully recovered from COVID-19. The Turf Doc's column can be found on page 43. Welcome home, Karl. 

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The view

The last 16 years have brought dramatic changes to Michigan's Treetops Resort

BY CHRIS LEWIS

Nestled in the heart of northern Michigan, Gaylord's Treetops Resort features 63 holes of golf known as "The Five Wonders of Michigan," including The Masterpiece, The Premier, The Signature, The Tradition and Threetops (a 9-hole executive course that hosted a par-3 shootout from 1999 to 2006 with contestants like Nicklaus, Palmer and Trevino).

When Doug Hoeh, director of outside operations, first joined Treetops Resort in 2004, each course had a superintendent along with a full-time staff. But that changed during the Great Recession, as many staff members were laid off in 2009 and 2010.

"Little did we know, but this would lead remaining staff members to become more efficient and productive," Hoeh says. "For example, we now utilize most of the staff to prep a course that has an outing/shotgun on it and then move them from that course to another that is less busy."

Staff members — typically 35 to 40 throughout the season — always stay busy maintaining the course's more than 1,500 acres of land, yet they rarely, if ever, conduct

course maintenance during busy times. This allows guests to have the most enjoyable experience possible.

"Most days, we're packed from the first tee time, but there's always one course that has leagues and so forth on it, which allows us to move our staff in the middle of the day to that course," Hoeh adds.

Fully utilizing employees by moving them to the course where their services are most required has allowed Treetops to reduce its full-time staff by nearly 35 percent. In addition to moving employees around during slower times of the day, Hoeh has a small crew that mows every evening, which gives his team a head start for the following day.

"I always try to provide our staff full-time hours. We operate a ski hill during the winter, so we're able to offer year-round employment," he explains. "Summer is our busy season, so most employees average 45 hours per week then. Some may even average 50 hours during the golf season."



Doug Hoeh

from the Treetops

This photo was taken behind No. 10 on the Premier course.

This is the only course designed by Tom Fazio in the state of Michigan and is Treetops' most-played course.

"During the spring and fall, we try to provide employees 40-hour work weeks," he explains, "but weather is a big factor in that. And, throughout the winter, there's definitely enough positions available for staff to work 40 hours a week."

Season-long maintenance

Every golf season, Treetops encounters two primary diseases: snow mold and dollar spot. To control snow mold, Hoeh and his crew usually apply Interface Stressgard at a rate of 4 fl. oz. per 1,000 sq. ft. in late October or early November, prior to the first snow accumulation of the off-season. If the weather allows, they'll apply the fungicide at the same rate one more time during a midwinter thaw.

At the same time, they'll also apply Mirage Stressgard at a rate of 1 fl. oz. per 1,000 sq. ft. If

they're able to apply the fungicide again during a thaw, they'll wait at least 28 days before applying it for a second time.

To control dollar spot, Hoeh's team uses a rotation of products based on price and always uses the lowest rates possible. If they decide to use a combination of Interface Stressgard and Mirage Stressgard, they'll apply Interface Stressgard at a rate of 3 fl. oz. per 1,000 sq. ft. for 14 to 28 days on greens and tees, beginning in either March or April (depending on the weather). Furthermore, they'll apply Interface Stressgard at a rate of 2 fl. oz. per 1,000 sq. ft. for 14 to 28 days on fairways and other turf areas. And, at the same time, they'll apply Mirage Stressgard at a rate of 1 fl. oz. per 1,000 sq. ft.

"Our concern is dollar spot resistance, which has developed with old demethylation inhibitors (DMIs)," Hoeh says. "We're leery of using the same products more than once per season. I know there are many schools of thought on this subject of rotation, but this method has been working at Treetops."

Aside from fungicides, Hoeh's crew also applies various wetting agents, which he considers one of the most important products for snow mold control (a close second to fungicides). Hoeh believes that as long as his staff can control soil moisture at levels that ensure turfgrass thrives with proper fertilization, the turf can fend for itself against snow mold, dollar spot and other environmental stresses.

Just as significant as fungicides and wetting agents are to consistent maintenance of pristine conditions on more than 1,500 acres of turf, full engagement with each of his 35 to 40 staff members is equally important.

"The key, to me, is making sure everyone is

Continued on page 40

PHOTOS COURTESY OF TREETOPS RESORT

// 80,000 GOLFERS IN 5 MONTHS

Continued from page 39

completely engaged and listening to each other,” Hoeh says. “I’m not the best greens mower on the crew, so if someone tells me they’d like to try mowing a certain way, I’m all for it.”

He adds, “This goes for any job. I’m open to suggestions and willing to try anything if it helps us accomplish our tasks more easily and effectively.”

A shocking rise in rounds

In addition to Treetops Resort’s 63 holes, Hoeh’s crew also oversees its 350-acre main property, which includes a lodge, an inn, a spa, a golf academy, a convention center and six bars and restaurants. After the Great Recession, Hoeh adapted the ways in which his team maintained the property’s aesthetics, particularly its flower beds and hanging flower baskets.

“The main resort used to be peppered with annual flower beds and hanging flower baskets,” he says. “But, in the past 10 years, we’ve dramatically reduced the number of flowers on the property, as we only plant perennial grasses and flowers now.”

Additionally, Hoeh has focused more on high-traffic areas, especially hotel and restaurant entrances, to ensure the grasses, plants and flowers surrounding them always are lush and healthy. To maintain the beauty of each of these entrances, Hoeh cur-

An aerial view of the Signature Course. No. 3 is located back right, No. 5 is located in the middle and No. 6 is located on the left side. Rick Smith designed the course after a trip overseas to Scotland and Ireland. It has 135 bunkers.

**“These initiatives
... increased the
resort’s annual
total rounds
substantially a few
years ago, from
40,000 in 2010 to
95,000 in 2011.”**

rently has 10 to 15 full-time staff members who focus only on the main property. Much like the team that oversees the resort’s 63 holes, Hoeh’s main resort crew works 45 to 50 hours per week during the summer and roughly 40 hours a week the rest of the year.

“We ultimately want to add more staff members to oversee the main property,” he adds. “This need for more assistance will likely only continue to increase in the coming months and years, mainly due to Treetops’ marketing initiatives.”

These initiatives — primarily brand marketing via an updated website, nationwide magazine advertisements, local and statewide television interviews, trade show plugs and consistent

deals and promotions all season — increased the resort’s annual total rounds substantially a few years ago, from 40,000 in 2010 to 95,000 in 2011.

“Everyone was shocked by this sudden rise in rounds of golf, all within a year,” Hoeh states. “We had tees that didn’t have turf, rough that was beat so bad from cart traffic and bunker edges that were crumbling. We had to regroup and refocus our efforts.”

Less is more

Luckily, the sharp upturn in rounds led to a dramatic increase in Hoeh’s budget, as he was able to focus on turf health throughout the course, from the rough and fairways to the greens, bunker edges and tees. He began to conduct soil tests to see baselines then used the data to identify areas that needed fungicides the most.

“Green doesn’t mean healthy! We need vigorous-growing turf to



PHOTO COURTESY OF: TREETOPS RESORT



This photograph was taken from behind Hole No. 10 of The Tradition. The course was built to be a walking course, but Treetops does allow carts. A throwback to a more traditional-style course that plays “linksy,” The Tradition uses wooden flagsticks with pennant flags, along with wooden rakes and nontraditional tee markers and tee signs.

withstand the daily beating it receives,” he says. “Since then, we’ve been able to target certain areas that need more attention than others, mainly through aerification, fertilization and topdressing.”

Hoeh and his crew have scheduled maintenance days every three weeks. During each maintenance day, the team focuses on only one course at a time, closing it until 3 p.m. Staff members perform most of their cultural practices during this time, including fertilizing, fly-mowing, spiking, spraying, trimming and topdressing.

“As more and more customers continue to visit the mecca of golf that’s northern Michigan, these maintenance days are the only way we’re able to maintain our courses’ exceptional conditions,” he says.

In 2020, Treetops Resort likely will welcome 70,000 to 80,000 golfers. Prior to the COVID-19 pandemic, the resort had anticipated upward of 100,000 golfers in the five-month-long golf season — figures it projects will be fully realized in 2021. As Hoeh prepares to welcome these guests, he will continue to focus on his greatest asset: the Great Lakes state’s extraordinary natural land features.

“We take great pride in what we do and the product we produce,” he says. “We also have a great staff that cares about the courses and how they look and play.”

“And, we’re stewards of the land,” he notes, “as we always give the turf what it needs, but we never overdo. The fewer inputs we use, the better. Less is more, period.”

PHOTO COURTESY OF: TREETOPS RESORT



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Super Science

// PROTECT THE POLLINATORS

MONARCHS IN THE ROUGH

By Mike Kenna, Ph.D.

Monarch butterfly populations have declined by 90 percent during the last two decades. Fortunately, golf courses can make a difference in butterfly and pollinator conservation.

Monarchs in the Rough is a pollinator protection program that has already shown great promise over the last two years. The United States Golf Association (USGA) is working with Audubon International to establish a network of pollinator habitat demonstration sites on golf courses across the country. The sites are marked with educational signs and provide the habitat needed by a variety of pollinators.

In 2018, Audubon International received a \$150,000 grant from the National Fish and Wildlife Foundation (NFWF) to support Monarchs in the Rough habitat projects in Iowa, Indiana, Illinois, Michigan, Minnesota, Missouri, Oklahoma, Pennsylvania, Texas and Wisconsin because those states are on the monarch butterfly's primary migration route. In early 2019, the NFWF allowed the program to add Ohio and all states west of the Mississippi River.




Milkweed plants provide an essential habitat for monarch butterflies in out-of-play areas on golf courses.

The USGA provided \$100,000 of matching funds that will help increase stewardship activities and increase monarch butterfly habitats on golf courses.

Audubon International estimates that there are up to 100,000 acres available for pollinator projects on golf courses. Monarchs in the Rough fits nicely with ongoing efforts at many golf courses to naturalize out-of-play areas and reduce inputs of water, labor, mowing and plant protectants.

Audubon International has a nearly 30-year history working with the golf course industry. It will contact golf courses, track seed distribution and planting success and monitor vegetative and butterfly response in habitat areas. The USGA believes Monarchs in the Rough will accomplish important habitat establishment objectives by coordinating activities at golf facilities.

Don't miss your chance to demonstrate how the golf industry supports the environment. Sign up for Monarchs in the Rough today to get free native and regionally appropriate seed to help support monarch butterfly populations. 



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

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

NEWS UPDATES

TEXAS A&M AGRILIFE BREEDS VIABLE ZOYSIA

The latest turfgrass variety in a recent string of releases by Texas A&M AgriLife Research breaks new ground among market zoysiagrasses, especially in its viability for golf course putting greens, according to Texas A&M AgriLife.

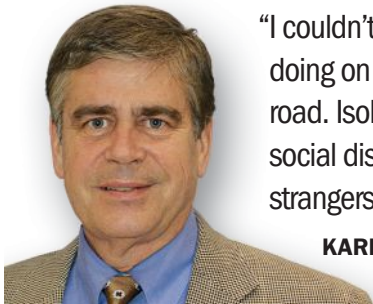
"Zoysias have typically not been considered for widespread use on putting greens," said Ambika Chandra, Ph.D., AgriLife Research professor and turfgrass breeding program lead in Dallas. "This variety marks a very big stride in the viability of zoysiagrasses for this application."

The new variety is a first-generation hybrid developed by crossing the species *Zoysia minima* and *Zoysia matrella*. The result is an "ultradwarf" turfgrass well suited for golf course putting greens in a wide range of environments across the U.S., including the Transition Zone.

It will be marketed and sold under the brand name Lazer Zoysiagrass. It produces narrower and shorter leaf blades as well as a shorter "dwarf" canopy compared to Diamond, a variety also developed by AgriLife Research. In research trials, Lazer displayed resistance to tawny mole crickets and boasts a low seedhead production.

**TROPICAL
SIGNALGRASS
INFESTATION CAN BE
MINIMIZED BY
CAREFUL MAPPING
OF INFESTED AREAS ..."**

Bert McCarty, Ph.D.
(see story on page 44)



"I couldn't think of a safer, more fun thing to be doing on a beautiful day than cruising down the road. Isolated in the car, I wasn't worried about social distancing nor coming into contact with strangers, just other hot rods and muscle cars."

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

On the open road

Returning from a four-week hospital battle with SARS-CoV-2, also known as COVID-19 or the coronavirus, one of the things I was most looking forward to was driving my 1969 Pontiac Firebird. When the opportunity presented itself, I headed to the garage.

After removing the car cover, I went through the car's interior disinfecting and cleaning. I even got under the car and cleaned the rollover coils and steering arms. Cleaning these exterior parts had nothing to do with the coronavirus, they just happened to be my newest installations and I wanted a reason to look at them. After an initial setback (the battery was dead), I headed down the road to join my car club and other car clubs in an event to support a local food bank.

I couldn't think of a safer, more fun thing to be doing on a beautiful day than cruising down the road. Isolated in the car, I wasn't worried about social distancing nor coming into contact with strangers, just other hot rods and muscle cars. I joined the cars from my car club and others in the donation line. While waiting, I stared out the window at an adjacent parking lot filled with men and women standing around their cars talking and congregating

into groups. Some wore masks but most did not, and social distancing was a foreign thought. I wanted to yell out, "People, what are you doing?"

Car cruising is a lot like golf course management. Several of the daily management practices like mowing greens, fairways, roughs, along with spraying, bunker raking and trimming are often solitary practices. The result is staff and crew are often isolated from each other and spread across acres of turf. Considering that one of the maintenance goals is to avoid golfers so as not to disturb them, social distancing occurs naturally.

The potential for coronavirus infection and spread occurs at times when staff and employees congregate: during meetings, breaks, lunch, at the start of the day and at day's end. Staggering when employees can gather, social distancing and wearing masks need to be instituted to reduce potential disease risk and spread. Be aware and

plan to reduce the potential for any infection and spread when staff and crew congregate. Additionally, have a protocol to meet with "mobile visitors" like salespersons, extension personnel, consultants and others. Be aware that practices that you put in place to reduce the risk of virus exposure not only protects you but also your visitors.

For me personally, to experience this life-threatening disease firsthand and the impact it had on me, my family, friends and colleagues, I have little tolerance for people who think it's a hoax, overblown or dwell in conspiracy theories. If you have staff or crew who refuse or think the implemented safety measures are a joke and do not apply to them, my advice would be to send them packing. A corrosive attitude and actions by a self-denier are not only dangerous to them, but also put you and your staff at risk along with your families.

Lastly, I would rather be writing in my area of agronomic expertise, but given how coronavirus dominates not only daily golf operations but our everyday life, it is critical to develop a comprehensive plan to account for the potential likelihood of the disease. As golf course managers, this disease should be a priority and concern for how you keep yourself, family, staff members and golfers healthy.

I came across a quote from a hot rod magazine (*Good Guys*) that I think, with a few word substitutions, describes in a clear, concise manner what course operations will look like for the foreseeable future.

"Hot-rodding is built on the concept of overcoming obstacles, finding solutions and making things better. That is just what our team is doing."

Stay aware and stay safe. **G**

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

// **SEE YA, SIGNALGRASS!**

Tropical signalgrass — bringing an old foe to its knees?

Much research and product introduction have a problematic weed finally on the back burner

Bert McCarty, Ph.D.

INTRODUCTION

Tropical signalgrass (*Urochloa subquadriflora*; formerly *Brachiaria subquadriflora*), is a warm-season perennial grass that spreads by stolons and seeds (Figure 1). The common name is from its seedhead producing two to seven branches angled to resemble a signal flag (Figure 2). It is native to tropical Asia, and being a warm-season perennial, it dies back with frost, regenerating itself from both stolons and seeds.

In the U.S., it currently occurs from coastal South Carolina through Texas with isolated stands in other states, but the majority of the problem is throughout the state of Florida. In areas lacking frost, such as much of Florida, tropical signalgrass (TSG) remains green year-round, forming large patches from stoloniferous growth.

Germination for TSG occurs when soil temperatures reach 77 degrees F (25 C), and a soil pH of 5 to 6 is optimal for germination (4). Seed germination requires moisture, and during extended droughts, TSG infestations diminish.

Tropical signalgrass infestation can be minimized by careful mapping of infested areas and recording spray applications to ensure proper herbicide application timing. Sanitation practices to reduce spread should include rinsing mowers between uses, controlling TSG in hard-to-treat areas such as ditches and fence rows and planting with weed-free stock.

Attempts to control TSG in St. Augustinegrass (*Stenotaphrum secundatum*) have primarily been unsuccessful

FIGURE 1



Tropical signalgrass is a major problem in tropical and subtropical turfgrasses. With the loss of the effective organic arsenical (e.g., monosodium methanearsonate) herbicides, it has exploded in the past 10 years in areas like Florida. It spreads by seeds and stolons, often forming large, unsightly patches.

(5). In bermudagrass (*Cynodon* species), repeat applications of members of the organic arsenical herbicide families traditionally provided acceptable suppression/control. However, since the prohibition of these products for use on turf in Florida, an explosion of TSG infestations has occurred in that state.

Previous research identified several herbicide options with postemergence TSG activity (1, 3). However, these can be expensive and tend to work best with fall applications. This timing interferes with ryegrass overseeding and does not allow sufficient time for the bermudagrass to cover voids left by

dead TSG plants.

This article covers our 10-plus year experience at Clemson University on battling this weed with the latest management practices that have proven successful for TSG control.

CONTROL OPTIONS

For TSG control in bermudagrass, several options exist depending on costs, how quickly control is desired, turf tolerance and the season control is attempted (Figure 3). A summary of these options is presented in Table 1.

Many of the products listed perform best in combination with a different

PHOTO BY: BERT MCCARTY

mode of action herbicide. As noted in the table, fall applications provide the best control at the lowest price. However, these can interfere with overseeding, and voids created by control may have insufficient time to recover before winter. Spring, as well as summer options, are generally less effective, requiring multiple applications and increasing turf phytotoxicity potential.

The cheapest option is using Plateau, a plant growth regulator (PGR), but control will be the slowest, requiring at least two years of continuous use. In addition, with persistent use, Plateau typically controls many sedges and broadleaf weeds, releasing bermudagrass and allowing it to become the dominant species again. Plateau, like most PGRs, is a program requiring repeat applications throughout the bermudagrass growing season. If applications cease, the rebound effect will occur, resulting in a major flush of bermudagrass growth, leading to excessive scalping and weaker root systems.

For TSG control in seashore paspalum (*Paspalum vaginatum*), options are more restrictive both in terms of weed control efficiency and turf phytotoxicity (Table 1). Xonerate is probably the most effective option in

FIGURE 2

Tropical signalgrass leaves and a spikelike seedhead. Signalgrass refers to the right-angle leaves that originate from the stem, resembling a signal flag.

FIGURE 3

Shown is an effective tropical signalgrass control with several herbicide combinations. Control requires persistence with most products over several years.

Research Takeaways

- Tropical signalgrass is a warm-season perennial grass that spreads by stolons or seeds and occurs when soil temperatures reach 77 degrees F (25 degrees C).
- Herbicide application timing is improved with careful mapping of infested areas and recording spray applications.
- Fall herbicide applications are most effective, though, in many situations, they interfere with fall overseeding or do not allow sufficient time for turf recovery before winter.
- All products and combinations will require multiple applications to achieve adequate control.
- To lengthen control, include a preemergence herbicide such as indaziflam, oxadiazon or prodiamine.

paspalum but will need repeat applications and currently is the costliest. Certainty provides approximately 70 percent control with a single application; thus, it will require repeat applications. Pylex is a tricky product because weed control improves with increasing use rate, but so does turf whitening. For many Florida golf courses, summer turf phytotoxicity is somewhat acceptable as sufficient time occurs before peak play resumes in fall. With seashore paspalum,

an additional option is to apply salt as a burndown product. Though rarely lethal, it does burn TSG down until fresh water such as rainfall flushes the salts, leading to regrowth.

CONCLUSIONS

Our research program at Clemson University has evaluated numerous herbicides and combinations over the past 10 years. No particular program

Continued on page 46

TABLE 1

Summary of postemergence herbicide options from research trials for tropical signalgrass (TSG) control in bermudagrass and seashore paspalum. Some rates, if reapplied, may exceed maximum yearly allowable amounts. Rotate to other programs to avoid this.

Trade Name Example	Rate	Comments
Bermudagrass		
MSMA 6.6L	1 to 2 lb. ai/ac (1.2 to 2.4 pt/ac)	Traditional means of control. Repeat applications on 10-day intervals. Higher rates provide better control with less reapplications but turf phytotoxicity increases and for longer periods. MSMA + metribuzin (Sencor 50W) at 0.3 lb./ac increases control but also increases short-term turf phytotoxicity.
Tribute Total 61WDG	3.2 oz./ac	Two applications are needed, 14-21 days apart. Fall applications are best.
Revolver 0.19L	26 oz./ac	Two applications are needed, 14-21 days apart. Fall applications are best.
Xonerate 4SC	10 oz./ac	Two applications are needed, 14-21 days apart. Fall applications are best.
Dismiss South 4SC	14 oz./ac	Two applications are needed, 14-21 days apart. Fall applications are best.
Celsius 68WDG	3.7 oz./ac	Two applications are needed, 14-21 days apart. Fall applications are best.
Xonerate 4L + Tribute Total + MSO	7.25 oz./ac + 3.2 oz./ac + 0.5% v/v	Good spring/summer control with two applications, 14-21 days apart.
Xonerate + Revolver	7.25 oz./ac + 26 oz./ac	Good spring/summer control with two applications, 14-21 days apart.
Tribute Total + ammonium sulfate (21-0-0)	3.2 oz./ac + 15 lb./ac	Good control with spring spot (two to five) treatments.
Manuscript 0.42L	19.2 oz./ac	A total of 19.2 oz./ac is allowed yearly. Adigor surfactant is included. Spot treatments are more effective as are tank mixes with Monument 75DF at 0.33 to 0.56 oz./ac, Dismiss South, Revolver, Tribute Total &/or Xonerate. Refer to the label for specific spot treatment recommendations.
Asulox 3.34L	5 pt/ac	For use only on bermudagrass grown for sod. Expect short-term turf phytotoxicity.
Plateau 2S	2 to 3 oz./ac	A PGR that typically eradicates TSG with several years consecutive use. Approximately 1.5 weeks turf PGR suppression occurs with each ounce of product applied.
Seashore Paspalum		
Xonerate 4SC	10 oz./ac	At least two applications are needed, each 14-21 days apart. Fall applications are best.
Pylex 2.8SC	0.125 to 0.25 oz./ac	As rate increases, both control and turf whitening increase. Mix with triclopyr ester (Turfion Ester 4L) at 1 pt/ac to reduce whitening and increase weed control.
Certainty 75WG	1.25 oz./ac	Provides partial control. Repeat applications will be needed, 28 days apart. Add Xonerate to increase efficacy.

Note 1: With all treatments, adding 5 oz./ac glyphosate, and possibly 15 lbs./ac ammonium sulfate, typically increases control ~5 to 10%. Ammonium sulfate additions act as a pH modifier and work best in areas with high (>~7.5) pH spray water. Also, unless noted otherwise, all treatments should have NIS added at 0.5% v/v.

Note 2: Incorporate a preemergence herbicide such as prodiamine (Barricade, others), oxadiazon (Ronstar, others) or indaziflam (Specticle) with any postemergence program to help prevent TSG reestablishment from seed.

Note 3: Most programs require two full years for complete eradication since TSG reproduces by stolons and seeds. Resources and dedication to multiyear programs are necessary for success.

Note 4: With any weed management program, to avoid potential resistance, no one herbicide mode-of-action program should be used continuously. Tank mix or rotate other modes-of-action to help delay this.

Note 5: Although the author has evaluated numerous other compounds and combinations, the ones listed have consistently performed. However, if a golf course has a program that works, stick with it. Just consider Note 4.

Continued from page 45

will satisfy every course as acceptable herbicide costs, and turf tolerance will vary considerably.

Overall, fall applications are most effective, though, in many situations, fall applications interfere with fall overseeding or do not allow sufficient time for turf recovery before winter. All products and combinations will require multiple applications to achieve adequate control. Tank mixing glyphosate 4L at 5 ounces per acre and/or ammonium sulfate (21-0-0) at 15 pounds per acre often improves control

by five to 10 percent. To lengthen control, include a preemergence herbicide such as indaziflam, oxadiazon or prodiamine. **©**

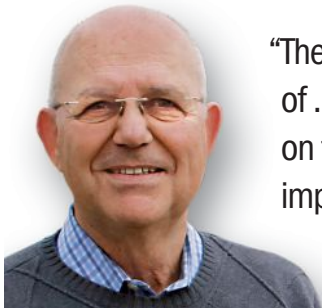
Bert McCarty, Ph.D., is a professor of turfgrass science & management within the Agricultural and Environmental Science Department at Clemson University, S.C. McCarty can be contacted at bmcrry@clemson.edu.

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"The MSMA controversy reminded me of ... when the USGA initiated research on the environmental benefits and impacts of golf courses."

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

An important turf decision

One of the figure captions in this month's Super Science article from Bert McCarty, Ph.D., struck a chord. He said, "... with the loss of the effective organic arsenical (e.g., monosodium methanearsonate (MSMA)) herbicides, (tropical signalgrass) has exploded in the past 10 years in areas like Florida."

The MSMA controversy reminded me of environmental issues in the 1990s when the USGA initiated research on the environmental benefits and impact of golf courses.

The initial three-year program started 21 research projects by 1992. The objectives were to 1) understand the effect of turfgrass pest management and fertilization on water quality and the environment, 2) evaluate valid alternative methods of pest control to be used in integrated turfgrass management systems and 3) determine the human, biological and environmental factors that golf courses influence.

Eleven of the projects started in 1991 focused on the fate of pesticides and nutrients. By 2010, the USGA funded \$5.5 million on 54 projects investigating what happens to pesticide and fertilizer products applied on golf courses. One of the projects was under the direction of George Snyder, Ph.D., and John Cisar, Ph.D., at the University of Florida. They were looking at what happens to pesti-

cide products applied to a USGA putting green with Tifdwarf bermudagrass.

In some ways, the research conducted in Florida signaled problems with the use of MSMA. Both dimethylarsinic acid and arsenic leached through the sand root zone of the green. But, the amounts found in the water were parts per billion (micrograms per liter).

In 2006, water samples from two Florida golf courses tested high for arsenic. Shortly after, the Environmental Protection Agency (EPA) proposed the cancellation of all agricultural uses of MSMA. In 2009, the EPA announced details to phase out MSMA usage on all turfgrass. Companies would not be able to sell products containing MSMA after 2012. By 2013, the EPA launched a registration review for MSMA. The timeline for completion was January to March 2019. During the review process, the label for MSMA includes golf courses in several states, but Florida is not one of them.

The Organic Arsenical Products Task

Force (OAPTF) consists of two companies: Drexel Chemical Co. and Luxembourg-Pamol. They submitted scientific data to the EPA about the potential risk of MSMA to human health or the environment. As of this writing, I could not find a final decision by the EPA.

According to the OAPTF, the date for completion of the review is uncertain. It believes it will be in 2022. In response to requests from turfgrass users, the registrants of MSMA will be pursuing an action under the Pesticide Review Improvement Act (PRIA) to make the current turfgrass uses permanent.


Based on user requests, the PRIA submission will seek to expand the label for current uses and restore other turf uses voluntarily canceled under the agreement with EPA in 2009. It will request the restoration of broadcast applications for golf course fairways, as well as the label inclusion of Florida.

OAPTF will file the PRIA application before the end of this year. Other turfgrass organizations, such as Turfgrass Producers International (TPI), are working to restore turfgrass use of MSMA under PRIA permanently. TPI met with the EPA in Washington, D.C., in May 2019 to discuss how vital MSMA is to turfgrass sod production.

Unless the EPA makes a decision, the current application restrictions will remain. Visit the following two websites if you are interested in the most current information on the status of MSMA.

The United States Environmental Protection Agency website for organic arsenicals: <https://www.epa.gov/ingredients-used-pesticide-products/monosodium-methanearsonate-msma-organic-arsenical>

Organic Arsenical Products Task Force: <http://www.oaptf.com>

Please contact me at mpkenna@gmail.com to provide any comments or questions about the status of MSMA. 

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



Crabgrass, as seen on this *Poa annua* green, can be controlled by preemergence herbicides.

Get ahead of crabgrass

When it comes to crabgrass control, preemergence herbicide applications are critical. Fred Yelverton, Ph.D., professor and Extension specialist in turf and forage weed science at North Carolina State University, says superintendents should track soil temperatures in their area using data from the closest agricultural research station.

Monitoring the mean soil temperature will ensure applications hit at the most effective time. Yelverton says golf course superintendents should think about preemergence applications two weeks earlier.

"I've moved my recommendations for preemergence (herbicides for) crabgrass up because it is germinating earlier," he says. "I've seen it germinate in North Carolina at the end of February two out of the last three years. I haven't seen that in the previous 30 years."

Yelverton says he's looked at long-term climate data, and he says he's noticed five out of the last 30 years have been the warmest years on record, and none have been the coldest years on record.

"When you drill into the data a little bit closer, what you see as the reason for the warmer temperatures is nighttime temperatures are not cooling down as much as

they were," he says. "That clearly shows a warming trend. I think this is something that'll bounce around a bit from year to year. But I'm comfortable with moving the preemergence herbicide applications up two weeks."

He says an early application is better than a late application because preemergent herbicides don't break down much in the soil when temperatures are below 60 degrees F because soil microbes aren't very active.

"There isn't a big penalty for putting (the preemergence application) out too early, but there is a big penalty for putting the preemergence herbicide application out too late," he says.

Beyond tracking soil temperatures, Yelverton also encourages superintendents to follow the growing degree day data.

"I don't look at that as much for specific germination for crabgrass, but certainly growing degree days will tell you how far ahead or behind you may be," he says.

He says at the start of this year, North Carolina was three weeks ahead of the 30-year average for growing degree days. Since then, spring had been cooler, so the state is only a little ahead of the average. **G**

PBI-Gordon Corp.

ERIC REASOR, PH.D.

Southeast research scientist



Crabgrass is a summer annual grassy weed that germinates in spring when soil temperatures are 55 degrees F for several days. Most crabgrasses have a membranous ligule, hairs on the collar and pointed leaves. Maintaining an actively growing turfgrass with proper mowing, fertilization, irrigation and cultivation is the foundation of an integrated management program. Preemergence herbicides are important for managing crabgrass. Make initial applications prior to germination and then a secondary application two months later. There are also several postemergence options available. Crabgrasses can be an issue in any turfgrass situation all over the country. Furthermore, low turfgrass mowing heights allow more light into the turfgrass canopy, facilitating more germination. Turfgrasses at lower mowing heights are also less competitive against crabgrass.

Bayer

ZAC REICHER, PH.D.

Green Solutions Team specialist



Preemergence herbicides like Ronstar can be applied to both cool- and warm-season turf, but herbicides like Specticle can only be applied to warm-season turf and should be applied at least two weeks prior to expected germination. Research suggests applications can be applied to cool-season turf months prior to germination, especially in areas with light pressure or where a sequential application will be made in early summer. Sequential applications of preemergence herbicides are the most effective way to manage crabgrass in high-pressure areas from the northern Transition Zone and farther south. On occasion, crabgrass will escape a preemergence application. Herbicides with fenoxaprop-p-ethyl should be applied to young crabgrass for most effective control, and superintendents should include a preemergence herbicide in the tank mix through midsummer to limit future germination.

Syngenta

DEAN MOSDELL, PH.D.

Technical services manager



Crabgrass is one of first summer annuals to emerge in the spring. It is difficult to identify as seedlings, but easier in the multitiller stage and once inflorescence develops. The two major crabgrass species are smooth and large (hairy) crabgrass. The pubescent leaves and stems of large crabgrass help distinguish the differences between the two species. Preemergence herbicides are very effective for controlling crabgrass. Applications must be made prior to germination. Crabgrass needs light and space to develop, so manage turf to minimize voids in the turf canopy and use maximum mowing heights where feasible. Postemergence active ingredients that can control emerged crabgrass, depending on the turf species, include monosodium acid methanearsonate (where available), quinclorac and mesotrione for cool-season grasses and pinoxaden for bermudagrass and zoysiagrass.

FMC Specialty Solutions

KEN HUTTO, PH.D.

Product development manager, herbicides/fungicides



Golf course superintendents primarily deal with large and smooth crabgrass. Both have round to oval stems and tall, membranous ligules. Large crabgrass has hairs on the leaf and stem, whereas smooth crabgrass has none. Adequate fertility, irrigation and proper mowing are vital to produce a dense canopy. Preemergence herbicides with active ingredients prodiamine and sulfentrazone are effective if applications are properly timed. Postemergence herbicides with active ingredients quinclorac and sulfentrazone can be effective on crabgrass especially when targeting smaller plants. Crabgrass will infest all turfgrasses when density is reduced. In certain regions, crabgrass may not be a primary concern. Crabgrass often appears in thinned rough areas, bunker faces and practice range tees. These areas are susceptible to traffic, drought stress and excessive divots.

The Shop

// MUST-HAVE NEW PRODUCTS



1 | F-19 Air Force hover mower

The F-19 Air Force Hover Mower by **SEAGO INTERNATIONAL** features a tall impeller for high performance. This increased air flow combined with an advanced deck design means a high power-to-weight ratio. The mowers offer long handles as well as a reinforced engine and handle mounts. Under the deck, the F-19 offers three blade options and heights of cut from 0.75 inch to 3.75 inches (with the optional clip-on Hi-Lift kit).

SeagoUsa.com

2 | Standard Golf personal bunker rake

Courses have removed bunker rakes due to “no-touch golf,” but **STANDARD GOLF**’s personal bunker rake/cart rake gives members and players the ability to help maintain the course and offers clubs an extra revenue opportunity. These rakes are lightweight, durable and easily carried by golfers in their bag or on a cart, the company said. The 48-inch-long wood handle screws into the 15-inch-long, high-impact plastic head.

StandardGolf.com

3 | Oregon BLH120VX handheld blower

The **OREGON** BLH120VX handheld blower has power for quick jobs that professionals require, and Oregon’s backpack battery platform offers long run times. With an air speed of 166 mph and CFM of 520, the blower boasts a blowing force of 18.5 newtons, all while maintaining a bystander noise level of 56 decibels, plus a weather-ready IP56 dust and water protection standard.

Oregon120V.com



4



5



6

CHECK OUT MORE NEW PRODUCTS ONLINE

To stay up to
date on all the
latest products
and services, visit
[golfdom.com/
category/
products](http://golfdom.com/category/products)

4 | Smithco fairway rollers

The five-gang Smithco Ultra 15 fairway roller by **SMITHCO** includes a balanced hydraulic system that keeps ground pressure even over its 15-foot swath. At 10 mph, the Ultra 15 can roll 18 acres per hour. The three-gang Ultra 10 fairway roller has a 10-foot swath to provide 12 acres per hour of productivity at 10 mph. Both come with a tow-behind design.

Smithco.com

5 | Par Aide AccuForm AccuSeed

The AccuForm AccuSeed by **PAR AIDE** is designed with stainless steel, spring-loaded spikes that puncture the turf 5/8-inch deep while dropping bentgrass seed precisely into the holes, allowing for ideal seed-to-soil contact, according to the company. Grass seed is easily filled into the black housing and is only released when the spring-loaded head compresses. There is minimal impact to the surface due to the flat plate of the seed housing, which causes little disruption to play.

ParAide.com

6 | BlueBird Turf HM200 hover mower

BLUEBIRD's HM200 hover mower has a 20-inch cutting width and is designed for durability and productivity to conquer the most demanding golf course applications. Its precise CG Aspect Ratio provides optimum balance and maneuverability in all operating conditions, the company said. This, combined with the machine's proprietary fan and cutting blade designs, assures users get a perfect cut. Cut height is adjustable from 1 inch to 3 inches.

BlueBirdTurf.com

The 19th Hole

Patrick Affolder

SUPERINTENDENT // McAllen (Texas) CC



Patrick, if I was there with you right now, what could I get you for a drink? Any local IPA. I like to assimilate myself into the local culture.

So, where are you from, and how'd you get to McAllen? I'm originally from Cranberry, Pa. I'm sort of the journeyman of superintendents. I've been all around. Before here, I was in Austin ... I've also been to Florida, South Carolina and western Pennsylvania.

How did you end up becoming a superintendent? I was a cart boy in high school cleaning golf carts. I slowly realized I wanted to (work in golf) as a career. I was terrible at golf, and I didn't like teaching people, so I couldn't be a golf pro. I enjoyed being outside, so I went this way and have been doing it ever since, for more than 20 years.

What's going on there in McAllen, in regard to the pandemic? Everything is opening back up this week, the restaurants, the gyms. The country club will be completely reopened starting tomorrow. Before that, it was just golf and takeout food. So tomorrow will be a big day for the country club.



How hot does it get there in the summers? One word: hot. It's unbelievable. We're talking heat indexes sometimes over 120 (degrees F), for days on end. The golfers tee off at 12:30 for some reason. I don't understand how they can do it.

What are your sports teams?

Steelers. That's the only team there is.

We're celebrating *Caddyshack* this issue. Hate it or love it?

I love it. Working at country clubs, I can see that movie really happening, with the employees going to pool day. The superintendent could have been better played, but he's funny.

Tell me an underappreciated part of your job. The time commitment that it takes to make a course look pristine. People don't realize how much time that takes.

When was the last time you said to yourself, 'Huh, you don't see that every day?' That was probably last week, when one of the guys raking bunkers came up to me said, 'hey ... a guy came on to the golf course, climbed a tree and is taking a nap.' So, we had to chase him off. Right next to the green, too ... up in a tree sleeping away.

When you get a day off, what's on the agenda? I'm at the pool with my wife and 5-year-old twin daughters, Ava and Gabriella, attempting to cook some barbecue.

What do you mean attempting? I'm a terrible cook, but I try hard. I can mess up a hot dog.

As interviewed by Seth Jones, May 18, 2020.

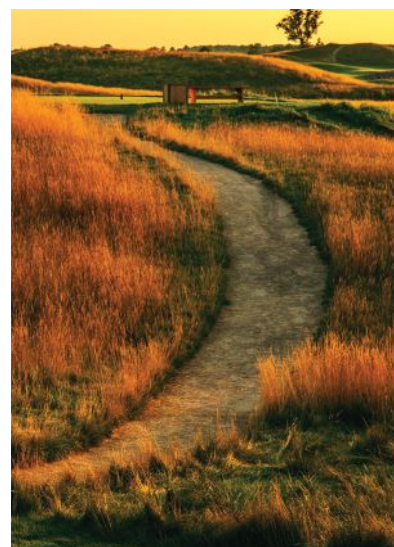


// BEST ADVICE

"MY DAD, AN OLD-SCHOOL CARPENTER, ALWAYS SAYS, 'NEVER EAT LUNCH ALONE.' I TAKE THAT ADVICE AS GO SIT WITH THE CREW. SIT WITH SOMEONE YOU DON'T KNOW ... AND LEARN ABOUT THEM."



PHOTO OF PATRICK BY: JEFF LOWDER. MCCAG/ISTOCK-GETTY IMAGES PLUS/GETTY IMAGES (OPEN SIGN). HALLOPINO/ISTOCK-GETTY IMAGES PLUS/GETTY IMAGES (HOTDOG).



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