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Waiting in the wings

Karr respects on surviving COVID-19

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To Hell and Back

Karl Danneberger, Ph.D., longtime professor at The Ohio State University and longtime *Golfdom* columnist, retells his ordeal of contracting and surviving COVID-19

COLUMNS

- //6 Keeping up with The Jones—Seth Jones Jones relays how the Golfdom team has kept up with those in the industry, despite coronavirus restrictions
- // **31** Off the Record—Mike Kenna Kenna describes why there's no magic bullet for managing Poa annua greens

DEPARTMENTS

- // 8 Starter
- // 12 The Golfdom Files
- // 34 The Shop
- $/\!/\,36$ The 19th Hole





SUPER SCIENCE

- // 25 Keep dollar spot in check
- // 26 Controlling annual bluegrass on golf course putting greens
- // 32 Battling brown patch



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EDITORIAL

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

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

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@northcoastm 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. PUBLISHER Craig MacGregor 216-706-3787 / cmacgregor@northcoastmed. edia.net

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

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

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

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

DIRECTOR OF MARKETING & EVENTS Michelle Mitchell 216-363-7922 / mmitchell@northcoa

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

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

DIR. OF AUDIENCE ENGAGEMENT Bethany Chambers 216-706-3771 / bchambers@northcoastm SR. AUDIENCE DEVELOPMENT MANAGER

Antoinette Sanchez-Perkins 216-706-3750 / asanchez-perkins@northcoastmedia.net

MARKETING/MAGAZINE SERVICES SUBSCRIBER, CUSTOMER SERVICE 847-513-6030 / golfdom@omeda.com LIST RENTAL Brahm Schenkman 800-529-9020 / bschenkman@inforefinery.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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Keeping up with **The Jones**

"... if you want to see this month's 19th Hole interview with Tim Nielsen ... it's also online, courtesy of Zoom. And Stephen Rabideau, CGCS of Winged Foot GC agreed to a Zoom call ..."

MY MONEY'S ON TIGER AND PEYTON

SETH JONES, Editor-in-Chief & Associate Publisher

Zooming around the industry

uring a Zoom meeting with my team today, I said out loud, "I still have to write my column ... and I don't even know what it's about yet!" Then I quickly corrected myself. "OK, I know what it's about. It's what *everything* is about these days."

Of course everything is about COVID-19. I haven't traveled anywhere or seen any golf courses in person since I flew home from Chicago on March 12, outside of a brief socially distant visit to Wolf Creek. But while I haven't traveled — no one from our team has; we're all working from home — that doesn't mean we've been unable to do our jobs. We've actually talked to more readers in recent weeks than we would have if we were allowed to travel, and those interviews are being posted as they happen on Golfdom. com. We're interviewing superintendents at courses that are open, courses that are closed, courses that are scheduled to host majors. And Zoom meetings are amazing! I didn't know what Zoom was until a few weeks ago. Now, *Golfdom* has an online show called Zoom Views where we talk to readers from around the country.

We didn't change course when we were readying this issue for print. We stuck with our U.S. Open preview, even though the tournament was delayed to September. Golfdom Associate Editor Sarah Webb visited the course last fall and did a great job keeping the story current. That story begins on page 16. As we describe them on the cover, the story profiles the crew at Winged Foot, a resilient group of New Yorkers who remain steadfast during the pandemic.

With apologies to our friends at Winged Foot, the most dramatic story in this issue is our Q&A with longtime Golfdom columnist and longtime professor at The Ohio State University, Karl Danneberger, Ph.D. When you have my job, it's not every day that you do a story about life and death. Turf life and death? Sure — that's every day. But actual life and death? About as common as encouraging stories on green committees.

But Karl's story, which begins on page 22, is a lifeand-death story. It was late March when I learned that Karl had COVID-19. Like the rest of the industry, we anxiously waited, hoped and prayed. When Karl tweeted out on Friday, April 17 that he was home? Huge sigh of relief. How that changed my Friday night!

I just couldn't wait any longer that weekend, and I called Karl on Sunday afternoon as I stood in my driveway. His voice — I'll never pin down what that accent is — was music to my ears. We laughed together and set up our interview. If you'd like to watch the full interview (ZOOM!), you can do so by visiting **Golfdom.com**.

Likewise, if you want to see this month's 19th Hole interview with Tim Nielsen, superintendent at Creekmoor GC in Raymore, Mo., it's also online, courtesy of Zoom. And Stephen Rabideau, CGCS at Winged Foot GC, agreed to a Zoom call once this issue goes live. I'm excited, but also nervous about how my hair will look by then.

To my friends I missed at Augusta National this year, I'm thinking of you, and I look forward to when we see each other again. And it's probably going to be on Zoom before it'll be in person ... but it'll be in person again eventually. I'm sure of it.

Where we're at in terms of the pandemic, golf courses being open and closed, I'm not even going to try to guess. But like Thad Thompson, superintendent at Terry Hills GC in Batavia, N.Y., told me in text and then on Zoom Views, episode four ... I'm here if you need me. **G**

Email Jones at: sjones@northcoastmedia.net.



CONDITION. PERFORM. RECOVER.

BRISKWAY: A proven fungicide for high temperatures

n 2017, Bryan Johnson, superintendent of Valley View Club in Cambridge, Ill., first began using Briskway, a broad-spectrum fungicide from Syngenta that controls and prevents more than 20 summertime turf diseases.

Featuring difenoconazole - a cooling demethylation inhibitor (DMI) active ingredient - along with azoxystrobin (the strobilurin active ingredient also available in Heritage fungicide), Briskway was developed primarily to perform in high temperatures. It has no heat restrictions, and superintendents



can apply it at low-use rates in extremely hot and humid climates.

Johnson, who also is the club's irrigation and spray technician, has used Briskway as a preventive fungicide and has spraved

Bryan Johnson

each of Valley View Club's Penncross greens himself. In doing so, he has seen firsthand how Briskway considerably improved the greens' conditioning and performance, as well as provided complete recovery from two diseases that previously were prevalent issues: anthracnose and brown patch.

Using the lowest recommended rates for both diseases (0.3 fl oz per 1,000 sq. ft.), he's never had to apply the fungicide



Valley View Club maintains peak performance of its Penncross greens.

more than twice a year. However, with its new amended label, Briskway can now be applied up to seven times per year if needed and at an increased maximum rate up to 0.725 fl oz per 1,000 sg. ft. for each disease.

"Late May and early June is the earliest I've used it," Johnson says. "The heat index has, at times, been close to 100 degrees F, while the coolest temperature was around 85 degrees F."

Since first applying Briskway, he hasn't had to worry about the club's greens turning brown. In particular, the fungicide's unique blend of azoxystrobin (1.67 lbs. per gal.) and difenoconazole (1.05 lbs. per gal.) has steadily enhanced each green's conditioning, performance and disease recovery - at any height of cut - without negative growth regulation effects, phytotoxicity or thinning.

"My confidence level has been very high with Briskway," he says. "Its results have been consistent from a conditioning, performance and recovery standpoint, time after time,"

In addition to Briskway, Johnson uses a variety of Syngenta fungicides, including Posterity, Daconil Action, Heritage Action and Secure Action. He considers Posterity, which he uses specifically for dollar spot control, to be "the best thing since sliced bread." Since its release in 2018, he has applied 0.08 fl oz per 1,000 sq. ft. of the fungicide up to four times annually.

"In spite of all the rain we had last year, dollar spot was controlled greatly," Johnson stresses. "You couldn't ask for Posterity to do more than it does."

To control dollar spot even more effectively, Johnson currently rotates Posterity with Secure Action whenever he applies it to the club's greens. During fairway applications, he rotates the fungicide with Heritage Action.

"It's great to have such flexibility, as my trust in each Syngenta product is so high," he says.

Johnson believes this flexibility, especially in regard to Briskway, could increase even further. He stresses that courses in extremely hot climates would specifically benefit from making more applications annually, and at higher rates, than they currently do.

"Nearly every course should consider having Briskway in their arsenal as an insurance policy," he says. "Personally, I'll never let it go to waste."

For the full story, visit Golfdom. com/sponsoredcontent/ ValleyViewClub.

Tweet @SyngentaTurf and tell us how you #ConditionPerformRecover.





OUR GAME, OUR CREW

BY THE GOLFDOM STAFF

Golfdom and the National Golf Foundation have partnered with FAIRWAYiQ to launch Our Game, Our Crew, a COVID-19 relief fund for golf course maintenance workers who are out of work because of the pandemic.

Started by FAIRWAYiQ CEO Dave Vanslette, the COVID-19 relief Go-FundMe charity will accept donations to be distributed

as rapid-response grants to golf course maintenance work-

ers who have been disproportionately impacted by the coronavirus.

"The first thing that came to mind is, how do we keep everybody employed? The government programs are out there, (but) some of the classifications of these golf clubs don't necessarily fit into the programs pushed by the government ... it'll take a little while to fix them," Vanslette says. "So, what can we do to get these people sort of a paycheck? Hopefully, (we) have an impact much quicker than the government."

The charity asks anyone who loves golf to kick in and help out the people who mow our fairways, rake our bunkers and cut our cups. Many of these men and women are out of work, and many of them support not only themselves but also their families at home.



Superintendents can nominate individuals, and the charity

will then allocate funds and send out gift cards.

"There are a lot of people out there who want to help but they don't know how to help," Vanslette says. "We personalize this to a very, very small segment of the population. It's a big industry, but it's a small industry ... relative to the rest of the industry around the world."

//ON HOLD

U.S. OPEN POSTPONED, U.S. SENIOR OPENS CANCELED

The 120th U.S. Open, which was scheduled to be held June 18-21 at Winged Foot Golf Club in Mamaroneck, N.Y., has been postponed due to the COVID-19 pandemic. The championship has been rescheduled to Sept. 17-20 at Winged Foot.

"We are hopeful that postponing the championship will offer us the opportunity to mitigate health and safety issues while still providing us with the best opportunity to conduct the U.S. Open this year," said Mike Davis, CEO of the USGA. "We are incredibly thankful to the membership and staff at Winged Foot for their flexibility and support."

In addition to the postponement of the U.S. Open, the USGA has made the decision to cancel the U.S. Senior Open and U.S. Senior Women's Open Championships for 2020.

The 41st U.S. Senior Open had been scheduled for June 25-28 at Newport Country Club in Newport, R.I. The 41st edition of the championship will now be played at Omaha (Neb.) Country Club from July 8-11, 2021. The 3rd U.S. Senior Women's Open, which was scheduled to take place July 9-12 at Brooklawn Country Club in Fairfield, Conn., will not be conducted this year.

Editor's Note: See page 16 for more on how Winged Foot is preparing for the U.S. Open.

//NEW GUY IN TOWN

CLINT FORMBY JOINS THE ANDERSONS AS TERRITORY MANAGER

The Andersons added Clint Formby to its Plant Nutrient Group to serve as territory manager for the professional turf business.

Formby will manage the distribution of the business' turf and ornamental products in the south-central region of the U.S. Formby has more than 15 years of experience in the lawn and landscaping industry. He comes to The Andersons from SePro, and he has held management positions with Native Texas Nursery and Regal Chemical Company, serving nursery, sports turf and landscape markets throughout Texas.



//HELPING HANDS

Industry suppliers step up during COVID-19

BY THE GOLFDOM STAFF

John Deere, in collaboration with the United Auto Workers, the Iowa Department of Homeland Security and the Illinois Manufacturers' Association, started producing protective face shields at John Deere Seeding Group in Moline, Ill.

Deere employees will initially produce 25,000 face shields to meet the immediate needs of health care workers in several of its U.S. manufacturing communities. Materials and supplies are on order to produce an additional 200,000 face shields.

"By working closely with the communities where our employees live and work, we can help support the needs we've identified close to home and, as the project expands, address additional, urgent needs across the country," said John May, CEO, Deere & Co.

FMC Professional Solutions recently donated nearly 165,000 masks to five major health systems in the greater Philadelphia region to assist front-line health care workers during the COVID-19 pandemic.

The company said in a LinkedIn post that it sourced additional personal protective equipment, which was to be used in its laboratories, greenhouses and production facilities, in January.



//FUNDS FOR THE GREATER GOOD

FLORIDA GCSA DONATES TO GCSAA'S DISASTER RELIEF FUND

Money that would have paid for an annual get-together of past leaders of the Florida Golf Course Superintendents Association is instead going to help superintendents affected by the COVID-19 pandemic.

Because of stay-at-home orders, that meeting will be conducted online. The Florida GCSA's gift of \$2,500 is among the latest in a long line of industry giving to the fund, established in 2006 in the wake of Hurricane Katrina. The fund, administered through the Environmental Institute for Golf, helps GCSAA members who suffer personal loss whether from hurricanes, tornadoes, flooding, wildfires or crises like the coronavirus.

//REBATE CHECKS ... CHECK

FMC TO ACCELERATE REBATE CHECKS FOR TRUE CHAMPIONS PROGRAM

FMC Professional Solutions is accelerating the issue of rebate checks to end users enrolled in the FMC True Champions program.

End users who earned a rebate for participating in the 2019 FMC True Champions Program and/or the FMC 2019 Early Order Program will now receive their full rebate checks by May 30. These checks were originally planned to arrive by June 30.

THEY SAID IT

KARL DANNEBERGER, PH.D. GOLFDOM SCIENCE EDITOR on recovering from COVID-19

"I didn't realize so many people love me and everyone's prayers really helped ... it's like I died but then I came back and got to read my own eulogy!"

To read more, please turn to page 22.

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Isofetamid is an SDHI (succinate dehydrogenase inhibitor; FRAC Group 7) fungicide that provides exceptional control of the pathogens causing dollar spot, leaf spot, and spring dead spot.

Tebuconazole is an DMI (demethylation inhibitor; FRAC Group 3) fungicide with a proven track record of broad-spectrum control for a variety of fungi, including those causing brown patch/large patch, anthracnose, dollar spot, brown ring/Waitea patch, and summer patch.

Tekken gives golf course superintendents a product they can rely upon for exemplary disease control, and at a very economical cost compared to competitor products claiming extended interval disease control. Tekken is labeled for use on golf course greens, tees, and fairways, with a maximum of three applications per year.

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The Golfdom

FROM THE ARCHIVE

American soil, so this war is different. It is right at home.

Edward B. Dearie Jr., well-known greens authority in the Chicago district, gives the following opinion on how courses must adjust operations to wartime conditions:

I recall very distinctly that with the period of the First World War, there began a new era in golf course equipment improvement, evidenced by the fact that at that time, I was using horse-drawn fairway mowers at the club employing me. Up to the year 1928, golf had a phenomenal growth, and then followed the worst period of depression known to golf clubs in this country. Golf course maintenance faces a new crisis today. We must be prepared as never before to adjust ourselves to a deficiency in our maintenance program. The lack of manual labor must be met with fully motorized course equipment over tees, fairways and greens. The use of all-out power mowers on golf courses will reduce labor hours one-half. In short, the following equipment will be a necessity: (1) For greens - duplex mowers. (2) For fairways — seven- and nine-gang mowers. (3) For rough — mowers with increased bar lengths and increased cutting units. (4) For tees — all power mowers with a wider cut. We also have improved topdressing machinery and power sprayers and one-man water systems in operation today. We are ready for what may come, and I think some interesting cost figures will result in the years ahead on golf course maintenance. Trial and error are our greatest teachers, and when this war is over, I believe golf course maintenance will have met its greatest test and not been found wanting. **G**

The 2020 golf season has been ... different, to put it mildly. Due to the global coronavirus pandemic, golf is currently not permitted in 15 states, though routine golf maintenance continues across the country. The PGA Tour schedule is set to resume at the end of June with the Travelers Championship. Winged Foot Golf Course (see our cover story on page 16) is now waiting for September to host the 2020 U.S. Open.

From 1942 to 1945, the U.S. Open was canceled altogether due to World War II. In a February 1942 *Golfdom* feature, four veteran greenkeepers gave their views on how wartime restrictions affected the golf industry. Walter E. Langton, superintendent of San Gabriel (Calif.) CC, framed what World War I looked like in the U.S. and how different World War II looked in comparison — a striking picture, given how the coronavirus is changing daily life for Americans in 2020. Edward B. Dearie Jr., another greenkeeping expert, explained how in tough times, golf must adapt to minimal maintenance but that the industry is up to the task. To read the full article, visit **golfdom.com/exclusive**.

What's ahead for golf in wartime?

t is difficult to forecast with accuracy what will happen to the game of golf or what will happen to private and public golf courses before the war ends. If we look back to the last war for any guidance, we find very little similarity either in manner or geographical position. During the last war, we had an expeditionary force in France. It was true the fleet was engaged on the high seas, but we were not mechanically strong in France. We fooled around with the Liberty motor for a long time and never did get into mass production. Very few American-built planes were used in France, but now we see soldiers encamped near home; soldiers marching in full war regalia on our streets. We have authorized military blackouts. We are told what to do and what not to do, and what is perhaps more serious, the enemy has been at our very gates — only 4 miles from Cypress Point, where nestles



one of our most beautiful golf courses and where an American ship has been attacked by an enemy undersea craft. We hear of enemy planes flying overhead, and many American lives lost on

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Certainty in uncertain times

The crew at Winged Foot GC has a lot on their minds ... but not crabgrass

osting a major golf championship — like the 2020 U.S. Open — comes with a unique level of stress. Then add in the COVID-19 pandemic gripping the world, especially New York City, on top of that stress ... it's fair to say that these are stressful days at Winged Foot Golf Club in Mamaroneck, N.Y., host course of the 2020 U.S. Open. On the bright side, there's at least been a few answers to pressing questions in recent days ... first and foremost, the championship has been rescheduled to September, giving the crew at Winged Foot a new target on the calendar for peak conditions.

But even though that provides some relief, it also adds to the stress.

"We were rolling and rolling and then, boom!" says Stephen Rabideau, Certified Golf Course Superintendent at the 36-hole facility. "We now have a harder date now we've got to get through the summer and into September. Our rough has to be perfect ... that's what the U.S. Open is known for — difficult rough." Good thing there's a tool in Rabideau's arsenal he relies on every year that he knows he can depend on: Dimension specialty® herbicide. The team at Winged Foot utilizes the product for crabgrass control on fairways, green surrounds and roughs.



"We get great control with Dimension. I use it each and every year," Rabideau says. "I wait to apply it until mid-May. I don't like to go out too early with it, because if I apply it at the right time, it will get me through the whole summer."

Getting through the whole summer — and then some — is top of mind for Rabideau and his team. Rabideau has an impressive crew of golf maintenance professionals on the facility's two courses, all keyed in on making sure





Our rough has to be perfect ... that's what the U.S. Open is known for — difficult rough.

the 2020 U.S. Open is a success. Each course has its own superintendent, assistant superintendents and assistantin-training. But at the end of the day, it's Rabideau calling the shots. He knows course conditions come down to him and Mother Nature.

"It's easy to write a program on paper," Rabideau says, "but it comes down to watching the weather, making the right timing and sending the team out on sprayers, and some of them on backpack sprayers, to make sure it all turns out right."

As the world continues to monitor the ongoing pandemic, once September rolls around, the 2020 U.S. Open will be played on the beautiful fairways, greens and yes, rough of Winged Foot Golf Club. In these uncertain days, most everyone has learned that things can quickly change. But one thing is certain: Rabideau and his crew won't be worrying about crabgrass.

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Stephen Rabideau, CGCS of Winged Foot GC, is prepared to embrace the uncertainty surrounding this year's U.S. Open.

PHOTO BY: BETH PERKINS

Z

2020 U.S. OPEN

Waiting in the wings

A resilient group of New Yorkers, led by Stephen Rabideau, CGCS, get Winged Foot GC ready for a U.S. Open in unprecedented times

BY SARAH WEBB

which was scheduled to

Mamaroneck, N.Y., has

been postponed due to the COVID-19 pandemic.

The championship has

been rescheduled

to Sept. 17-20

at Winged Foot.

held June 18-21 at ged Foot Golf Club in

or Stephen Rabideau, CGCS of Winged Foot Golf Club, and his crew, the past seven years have been about more than prepping the West Course for the 2020 U.S. Open. The 120th U.S. Open,

Between a full 36-hole restoration of the East and West Courses, headed by golf course architect Gil Hanse, and a brand-new practice facility to boot, the team has dedicated the last three quarters of a decade to restoring the nearly 100-year-old gem of a course to its former glory.

"None of the work was done for the U.S. Open, but we knew we wanted to do work to

get the golf courses back to the standings they were at," Rabideau says, noting that in 2012, the East Course had started to drop down the list in national golf ratings. "There were a lot of long nights working under the lights, trying to make sure we did everything as best we could in going the extra mile." Rabideau, who has been at Winged Foot since 2012 after serving for 10 years as superintendent of Wheatley Hills Golf Club on Long Island, is quick to add, "Hosting the U.S. Open,

> it's an honor. There aren't many people who get to host the U.S. Open. It fulfills a career goal to host a major championship."

> Since the first round of golf was played at Winged Foot in 1923, the Albert W. Tillinghast-designed East and West Courses have hosted five U.S. Opens (1929, 1959, 1974, 1984, 2006), the U.S. Amateur (1940, 2004), The Walker Cup (1949) and a PGA Championship (1997). The East Course has been the site of two

U.S. Women's Opens (1957, 1972), the inaugural U.S. Senior Open in 1980 and the U.S. Amateur Four-Ball Championship in 2016.

The 120th U.S. Open, originally scheduled for June 18-21 Continued on page 18





Continued from page 17

and set to be Winged Foot's 14th major championship, has been rescheduled to Sept. 17-20 due to the coronavirus pandemic. Nevertheless, with a resumé stacked with 13 major championships, a plethora of smaller tournaments and a total of about 40,000 rounds played per season, the team at Winged Foot is focused on polishing the course's pristine reputation.

"A lot of guys have sacrificed stuff in their personal lives, and I think it shows on the golf course," says Weston "Wes" Neff, who has worked with Rabideau over the past 11 years in nearly every capacity, including as an intern, assistant-in-training, first assistant, second assistant, superintendent and now as U.S. Open superintendent. "There's a vibe here with the membership, staff, the town and the golf world that hasn't been back here since (the U.S. Open) in 2006," he says. "People are excited to bring it back and see what the course can do with the history and tradition of this place."

Restoring a gem

Rabideau says it all started back in 2012

when Winged Foot hired Hanse to design its new practice facility.

Soon after work on the practice facility wrapped up, Hanse was enlisted to take on the 18-hole restoration project of the East Course in 2013, at which point, Winged Foot's West Course had just been named as the host venue for the 2020 U.S. Open.

The East Course restoration took place in the shoulder seasons of fall 2013 to spring 2014 for the front 10 holes and fall 2014 to spring 2015 for the back eight holes. The team rebuilt every green, bunker and tee and installed 40 miles of drainage on the property, no easy task thanks to the site's bedrock foundation.

"It wasn't Gil coming in and doing a new plan. It was restorative off of old photos," Rabideau says. "We were trying to go back to the early '20s. The first Open was in 1929, so we had a lot of old photos from that time."

At first, Rabideau says Winged Foot's members weren't receptive to a restoration of the West Course. However, after seeing the East Course results, the members were excited to pursue a West Course restoration.

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// ROLLING WITH THE PUNCHES

Work on the West Course took place in fall 2016 through spring 2017 for the back nine and fall of 2017 through spring of 2018 for the front nine.

"We took what we did on the East Course, and we got better at it on the West," Rabideau says. "We repositioned some of the bunkers farther down so they modernized where the new landing areas are. We lengthened a few holes for tees, so you've got more yardage."

The *Poa annua* greens on the West Course have been expanded by 25,000 feet, while still preserving the same contours.

"It's a different set of greens than what the pros saw in 2006," Rabideau says. "We gained some new hole locations, and the ball will have a chance to run some more with the undulations on the greens."

To maintain the existing contours, the team used a surveying instrument *Continued on page 20*



L to R: Steven Bigelow, Weston Neff and JR Lapan will draw on their experiences of volunteering at other U.S. Opens to prepare for what's to come at Winged Foot.



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Continued from page 19

called the Total Robotics Station. The greens restoration was so precise that the margin of error was .006 thousandths of a surveying foot. "It's basically spot-on," Rabideau says.

As for the finished product of the West Course, Rabideau says it's likely going to play 7,450 yards as a par 70.

"The West Course is long," he says. "It's tree lined. It's got narrow fairways. The rough is thick. It's a classic U.S. Open setup, which is why I think they like coming here."

Rolling with the punches

Unpredictable weather served as the unknown factor leading up to 2020, but no one foresaw the tournament being postponed until September due to a global pandemic.

And yet, Rabideau understands there are many factors out of his — and his team members' — hands.

"I think you just have to try to enjoy the moment and be level headed, because there's just going to be so much that you can't control," Rabideau says. "I think the nature of who we are as golfers and superintendents is we try to control everything."

That advice came, in part, from one of Rabideau's closest friends, Craig Currier, who served as a superintendent at





Bethpage for the 2002 and 2009 U.S. Opens.

"I've been very good friends with him since '02 or before, so we talk every day," Rabideau says. "It's definitely nice and comforting to ask (for advice) firsthand from somebody who has hosted two U.S. Opens."

Neff, Jamison "JR" Lapan, West Course superintendent who started full time at Winged Foot in 2014, and Steven "Bigs" Bigelow, East Course superintendent, say they've gleaned similar advice after volunteering at the 2019 U.S. Open at Pebble Beach, the 2018 U.S. Open at Shinnecock Hills and the 2019 PGA Championship at Bethpage.

Further adding to the "roll with the punches" mentality is the fact that the entire East Course, which Rabideau mentions is members' favorite, will be destroyed. Because the 288-acre property is surrounded by residential homes, the East Course is the only viable option for corporate hospitality tents, vendor setup and parking.

"It's unlike any other venue because there's no other setup that beats up a Top 100 golf course," Rabideau says.

Bigelow says the cleanup process on the East Course may take between three and six months, but he's looking forward to the challenge.

"There's a lot of work (we have to do) to make sure we're not creating excess damage. We're trying to preserve the East Course as much as possible," he says.

The dream team

Neff acknowledges there's a sense of brotherhood that's filtered through the ranks at Winged Foot.

// ROLLING WITH THE PUNCHES



"I think you just have to try to enjoy the moment and be level headed, because there's just going to be so much that you can't control."

— Stephen Rabideau

"We see each other more than we see our families," he says. "We eat three meals a day together. We argue like brothers, but we also care about each other like brothers."

Bigelow, who's been at Winged Foot since spring 2015, says the camaraderie is heightened by the feeling that it's a privilege to work at Winged Foot.

"Every day getting to be at Winged Foot is enjoyment in itself. The place is very well conditioned. It's a very historic, cool place to work," he says. "Working at a place like this, you get a lot of exposure and you learn a lot of valuable skills and have a lot of experience that will pay off down the line."

Lapan adds that it's the effort on everyone's part that keeps Winged Foot in top condition.

"From the crew guys to our interns, our assistants, our superintendents, Stephen, it takes all of us to produce the product that we produce every day," he says.

Rabideau agrees.

"I sit here, and I do the interview, and I get the credit, but it's all those guys who're doing the work," Rabideau says. "Yeah, they need a leader or somebody to be in charge, but I wouldn't be where I am or the golf course wouldn't be in the condition it is (if not for them)."



The *Golfdom* Conversation To Hel and Back

Karl Danneberger, Ph.D., longtime professor at The Ohio State University and longtime Golfdom columnist, retells his ordeal of contracting and surviving COVID-19

BY SETH JONES

Golfdom: Karl, it's so great to see you and hear you. How are you feeling?

Karl Danneberger, Ph.D.: I'm doing well now. It's been a long six weeks, and I'm happy to be home. I feel pretty good; I'm on a road to recovery.

Golfdom: Can you tell us what happened?

KD: It's interesting, I don't even remember too much. I talked to a colleague who said, 'I saw you at work on Wednesday, you looked great.' I started getting sick, coughing ... and my wife took me to the emergency room on March 16. I don't remember any of that. I went in, they diagnosed me with COVID-19, within a day or two they put me on a ventilator and intubation. For two weeks, I was on that. Then I woke up. I looked around, and I'm going, 'Where am I?' The first question that was asked to me was, 'Do you know where you're at?' I'm looking round, I look out the window and I saw OSU Hospital on the sign ... and I said,

'OSU Hospital?' and they said that's right.

I was in the ICU; they created this door to block me off. I had been quarantined in this area, and I really didn't understand what was going on. I saw all this medical staff, the nurses, people who clean the floors, doctors all going by ... they were all clapping and cheering as they walked by. I asked, 'What's happening?' They said, 'You've been out for two weeks.'

I remember asking one doctor, 'How did I get here? Where have I been?' And he said to me, 'You've been to hell and back. It's good to have you back.'

I went in March 16, and on April 16, I walked out of the hospital on my own.

Golfdom: Wow, incredible. Your column in the magazine — we always joke about it, Karl — you can start off talking about a classic car and then bring it around at the end and somehow make it about maintaining perfect greens. You're very philosophical. What's your philosophy on everything that's happened over the last month?

KD: One, by the grace of God, my family and all my friends in the industry and obviously the medical staff ... I'm here. If you look at me, I'm no spring chicken. There's always hope. You have to have hope, with everything that's happening. There's still good news out there.

I heard this from a number of people, because I got it so early. They said they didn't take it very seriously until we saw it happen to you. This is a serious thing. It's no laughing matter. Man, just do the best you can every day because you don't know what's going to happen. I have no idea how I contracted it. All I know is, God, it's great to be here.

Golfdom: It's great to have you here! What did you miss the most, what were you most excited about, when you got home?

KD: Obviously, to see my wife and my family. Because no one can see you for a whole month! For my wife and my sons,

PHOTO (



Karl described himself as a short, skinny Abe Lincoln as he's lost 20 pounds and grown a beard, which he quickly shaved off upon returning home. He's currently doing physical and speech therapy.

they would get a phone call each evening from the hospital telling my condition. I can't imagine that. You pick up the phone and you don't know what they're going to say. And there was a day or two, I've learned, that was extremely touch-and-go.

When I woke up, I only had ice chips, and they let me have applesauce when I took my medicine. Someone asked me what I want, and I said my dream is an ice cold glass of water that I could just chug down.

Golfdom: The tweet you sent out when you left the hospital, thanking the doctors and letting everyone know you were able to go home ... it has over 1,000 likes on Twitter. How does that feel to know so many people were pulling for you and thinking of you?

PHOTO BY: GOLFDOM STAFF

KD: When I got home ... there were stacks of mail and cards. I went back and looked at my phone ... I get emotional, I'm *Continued on page* 24



(L to R) Craig MacGregor, Bill Roddy, Abby Hart, Karl Danneberger, Ph.D., and Jake Goodman at the 2018 Golf Industry Show.

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sorry. There were people who texted me while I was intubated. All these emails, social media, cards ... to my family and everything. It was amazing. And you know what? I do believe the thoughts and prayers helped.

I didn't know I had so many friends, that so many people care for me. Actually, I still get out some of the cards and read them! It's a real emotional thing. I just don't know how to explain it. You know I told you, and I think you tweeted it out ... although it seems odd, I feel like I passed away, and I came back for my own funeral and eulogy, reading all these cards. I feel very lucky. Lucky to be involved in an industry like ours, where people care a lot. The messages I got, they all meant something to me, and I cherish them all.

To see the full video of this interview, visit Golfdom.com. @



GOLFDOM STA

HOT0

Golfdom's Seth Jones and Karl Danneberger, Ph.D., at the 2016 U.S. Open at Oakmont (Pa.) Country Club.



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Super Science

// ON THE THRESHOLD KEEP DOLLAR SPOT IN CHECK

By James A. Murphy, Ph.D., James Hempfling, Ph.D., and Bruce B. Clarke, Ph.D.

ur research team evaluated dollar spot (*Clarireedia jacksonii*) incidence and disease progress on six bentgrasses that vary in tolerance to the disease. Two weather-based models were used to predict dollar spot epidemics on those cultivars and species. We also investigated the effect of initial fungicide application timing on dollar spot incidence and disease progress on two bentgrass cultivars with low or high susceptibility to dollar spot. Then we determined the effect of the initial fungicide timing on the total fungicide usage for each cultivar. We based subsequent applications on either a disease threshold (at the first appearance of disease symptoms) or a predictive model (risk index = 20 percent).

Although we are continuing this project, there are interesting preliminary observations to report. Dollar spot forecasting with the logistic model had good accuracy



The photo shows plots no longer receiving fungicide applications (left) and those that are treated (right). The five trial runs allowed the Rutgers University team to monitor disease progression through the entire season (April to November).

during the middle of the growing season for the highly susceptible cultivars during 2015, 2016 and 2017. However, our research showed that the risk index selected was too low for the resistant cultivars. We also observed that disease recovery during periods of a decreasing risk index might require a risk adjustment to improve disease prediction.

The threshold-based applications reduced total fungicide inputs and the level of disease control, which ranged from moderate to excellent, depending on the cultivar. Total fungicide input varied with the cultivar and, to a

lesser extent, the initial fungicide timing factor. Threshold-based fungicide applications on Declaration (low susceptibility) creeping bentgrass produced excellent disease control and required only one to five fungicide applications depending on the year and initial fungicide timing. In contrast, threshold-based fungicide applications on Independence (highly susceptible) creeping bentgrass produced moderate disease control and required four to nine applications depending on the year and initial fungicide timing. $\boldsymbol{\Theta}$



James A. Murphy, Ph.D., and Bruce B. Clarke, Ph.D., are in the Department of Plant Biology and Pathology at Rutgers University. James Hempfling, Ph.D., is in Environmental Science Field Solutions at Bayer. You can reach James Murphy at jamurphy@njaes. rutgers.edu. This project was funded in part by the USGA Green Section.

NEWS UPDATES

SYNGENTA CONTINUES WEEVILTRAK EFFORTS

For the 2020 annual bluegrass weevil (ABW) season, Syngenta is continuing its work with independent researchers to provide golf course superintendents with tools for monitoring

and control through its annual WeevilTrak program.



New for 2020, Ference insecticide is now approved to control ABW on golf course turf in Kings, Queens and Suffolk counties in New York under a Section 24(c) Special Local Need label. Golf course superintendents on Long Island must make applications in accordance with the Special Local Need Label and must have a printed copy of the Section 24(c) label in their possession at the time of application.

Other tools available for 2020 include: the Syngenta Optimum Control Strategy outlining a proven ABW treatment protocol that can help manage resistance as ABW control applications are planned; WeevilTrak text alerts, which provide timely updates on local ABW progression; the WeevilTrak blog, updated by 11 ABW researchers and featuring 189 blog posts from the past five seasons; secondary course monitoring for additional localized stage-progression information; and a growing degree day model designed specifically for ABW.

COMPARISONS OF PGRS AND HERBICIDES WITH TREATMENTS OF IRON SULFATE COULD PROVIDE INSIGHT ON NUTRITIONAL APPROACHES TO ABG CONTROL."

Aaron J. Patton, Ph.D., et al. (see story on page 26)



//LUCKY NUMBER SEVEN

Controlling annual bluegrass on golf course putting greens

By Aaron J. Patton, Ph.D.; Ross C. Braun, Ph.D.; Geoffrey P. Schortgen; Daniel V. Weisenberger; Bruce E. Branham; Ph.D.; Bill Sharp; Matthew D. Sousek; Roch E. Gaussoin, Ph.D; and Zachary J. Reicher, Ph.D.

nnual bluegrass (Poa annua L.; ABG) is a common turfgrass weed that is well adapted to low mowing heights and is the most problematic on golf course putting greens. It usually encroaches creeping bentgrass (Agrostis stolonifera L.) putting greens after establishment, spreads in the spring and the fall and often declines in summer. Cultural practices such as interseeding creeping bentgrass cultivars with increased density, collecting clippings during ABG seedhead production, interseeding creeping bentgrass, reducing shade and reducing nitrogen (N) and phosphorus (P) fertilization partially reduce annual bluegrass in creeping bentgrass putting greens (9, 11, 19, 21). Further, applications of iron sulfate or "ferrous sulfate" (FeSO, · 7H,O) fertilizer have reduced populations of ABG in full sun (3, 10, 12) but not in shaded conditions where iron applications encouraged ABG (22).

Though perennial biotypes of ABG exist, it is commonly a winter annual that germinates primarily in the fall. In Maryland, as much as 75 percent of ABG can germinate between September and November on golf course roughs (15). However, in Michigan, ABG germinates almost equally well in the fall and spring (6). One suggestion to reduce ABG infestation is summer core aerification to avoid cultivating in the fall when ABG germinates (8). However, there is no research examining this idea.

Comparisons of plant growth regulators (PGRs) and herbicides with treatments of iron sulfate could provide

FIGURE 1



Study area being prepared for an application on Sept. 23, 2014. Three injured plots are evident from a late August application of Bensumec followed by early September Velocity applications. The treatment was discontinued shortly thereafter.

insight on nutritional approaches to ABG control. A recent four-year experiment evaluated individual PGR and herbicide active ingredients applied up to 12 times per year in three different U.S. states (20). Some active ingredients were more useful for ABG control in one environment than in others. Trimmit (paclobutrazol) was the most effective in Indiana and Michigan but was in the second tier of performers in Nebraska.



Recent work in the Pacific Northwest on golf course putting greens also showed that ABG control with PGRs varies among locations (2). Therefore, multilocation experiments are necessary if we hope to develop effective ABG control programs across different growing environments and biotypes.

Fall applications of preemergence herbicides are effective at reducing ABG populations in coolseason fairways and roughs. Though many labeled active ingredients exist for fairways, few options exist for putting greens. The use of preemergence herbicides for ABG control on putting greens is rare because of the risk of root injury. Further, preemergence herbicides will only prevent further ABG establishment from seed but have little activity on established ABG or perennial ABG biotypes. Of the two preemergence herbicides labeled for putting greens, Bensumec (bensulide) is considered safer than Dimension (dithiopyr) when applied to creeping bentgrass (13). We investigated the timing of summer aerification along with spring and fall applications of preemergence herbicides in this research to minimize germination and encroachment of ABG.

Among herbicides, PoaCure (methiozolin) can control ABG on putting greens with both pre- and postemergence activity with adequate safety on creeping bentgrass (4, 16, 18). Velocity (bispyribac-sodium) is another effective herbicide for controlling ABG in cool-season fairways (17). Although promising, the label for Velocity does not permit use on golf course putting greens, and its production was ceased in 2017 after this research was initiated.

Creating a system that uses multiple methods (cultural, PGR, herbicides) to manage ABG will help limit the development of ABG populations resistant to a particular herbicide. Currently, 35 cases of herbicide-resistant ABG in turf are reported (14). Most of these are on warm-season turf with repeated use of herbicides having the same mode of action. Repeated use of herbicides or growth regulators in creeping bentgrass golf greens is known to cause genetic shifts after only two or three years of season-long applications (5). Recent models predict that even with proper herbicide rotation, annual bluegrass resistance to herbicides will occur within 35 years (7).

With all of this in mind, our research evaluates the longer-term impact of a systems approach to ABG control on putting greens. We evaluated that seven season-long programs of plant growth regulators, herbicides and iron sulfate fertilizer with summer or early Continued on page 28

FIGURE 2

Area under percent Poa curve (AUPPC) calculated from all visual ratings and vertical point quadrat measurements of percent cover from study initiation through final rating in May 2018 (Indiana and Illinois) and through final rating in August 2016 (Nebraska). Means with the same letter are not significantly different according to Fisher's Protected LSD (P < 0.05) within each state. Means are over three replications and two aerification regimes.



TABLE 1

Subplot treatments evaluated to control annual bluegrass in identical experiments in three states over 2014-2018.

Treatment	Active ingredient	Brand name and formulation	Rate oz/acre	Rate lb a.i./ acre	Application interval	Application dates	Total applications per year
1	Iron sulfate [†]	FeS0 ₄	704	-	4 wk	AprSept.	6
2	Iron sulfate [†] + Bispyribac- sodium	FeSO ₄ + Velocity 17.6 WSP	704 2	- 0.022	4 wk 1 wk	AprSept. AugSept.	6 4
3	Methiozolin [‡]	PoaCure	25.6	0.42	2 wk	SeptNov.	4
4	Paclobutrazol	Trimmit 2SC	16	0.25	4 wk	AprSept.	6
5	Paclobutrazol + Bensulide [‡]	Trimmit 2SC Bensumec 4LF	16 240	0.25 7.5	4 wk Twice	AprSept. Aug. + Apr.	6 2
6	Bispyribac- sodium	Velocity 17.6 WSP	2	0.022	1 wk	AugSept.	4
7	Bispyribac- sodium + Bensulide ^s	Velocity 17.6 WSP Bensumec 4LF	2 240	0.022 7.5	1 wk Twice	AugSept. Aug. + Apr.	4
8	Nontreated	-	_	-	-	-	-

⁺ Iron (II) sulfate heptahydrate (FeSO₄ · 7H₂O).

Bensulide applications were watered in with approximately 0.25 inch of irrigation after application at each site. Methiozolin was similarly irrigated after application in Illinois but not in Indiana and Nebraska

[§] Treatment 7 (Bispyribac-sodium + bensulide) was discontinued in 2015 due to severe injury at all three locations in 2014.

Continued from page 27

fall aerification timing across diverse locations is needed to help equip superintendents with a better understanding of control strategies.

REGIONAL EXAMINATION OF ANNUAL BLUEGRASS CONTROL

We conducted studies on putting greens with a mixture of creeping bentgrass and ABG at Kampen Golf Course in West Lafayette, Ind.; Olympia Fields Country Club in Olympia, Ill.; and Fremont Golf Club in Fremont, Neb. We used a replicated split-plot design with aerification treatments as the whole plots and spray treatments as the subplots (Table 1). Aerification treatments included a July hollow-tine aerification (at any time between July 10 and July 28); or a September hollow-tine aerification (between Sept. 9 and 22). After harvesting aerification plugs, greens were sand topdressed to fill aerification holes. At each site, aerification tine size and spacing were determined by the local superintendent to affect more than 3 percent of the surface area.

The application treatments of

Research Takeaways

- Annual bluegrass (Poa annua L.; ABG) is among the most common weeds of highly maintained turf in the United States.
- In three Midwestern U.S. states, the researchers conducted a four-year systems approach experiment to control ABG on putting greens by examining seven season-long programs of plant growth regulators, herbicides and iron sulfate fertilizer with a July or September hollow-tine aerification.
- Aerification timing did not influence annual bluegrass cover at the three locations.
- Monthly applications of iron sulfate alone did not effectively control ABG.
- The effectiveness of season-long treatments varied by location, but PoaCure (methiozolin), Trimmit (paclobutrazol) or Velocity (bispyribac-sodium) consistently reduced ABG. None completely removed annual bluegrass.

herbicides, growth regulators or iron sulfate were in an 80-gallon-peracre spray solution. The applied rates followed recommendations from the label, company representatives, golf course superintendents, as well as previous research experience. We applied the treatments up to six times

TABLE 2

Annual bluegrass (ABG) cover at spring seedhead production during and after four years of season-long applications of herbicides, iron sulfate, growth regulators or aerification treatments to creeping bentgrass/ABG maintained at putting green height in West Lafayette, Ind.

Treatment	May 2014⁺	May 2015	May 2016	April 2017	May 2018
	% Cover				
Iron sulfate	74 a ^{§¶}	49 a	22 ab	9 bc	27 a
Iron sulfate + Velocity 17.6	69 ab	32 bc	7 c	6 c	11 bc
PoaCure	66 b	26 c	7 c	6 c	6 c
Trimmit 2SC	63 b	31 bc	14 bc	12 ab	10 bc
Trimmit 2SC + Bensumec 4LF	73 a	42 ab	17 ab	13 ab	14 b
Velocity 17.6	70 ab	41 ab	15 bc	9 bc	8 c
Nontreated	65 b	51 a	24 a	14 a	22 a

⁺ May 2014 ratings were taken at initiation of the study.

[±] Annual bluegrass cover was estimated with vertical point quadrat method where a 2.5-ft. by 5-ft. frame is laid over the plots with an internal filament grid of 45 intersections. The total number of times ABG was present under each intersection was recorded for each plot, and percent cover was calculated.

[§] Means of three replications and two aerification regimes. Subplot (herbicides, growth regulators or iron sulfate) means are across two aerification levels, and whole-olot aerification means are across subplot treatments.

¹Within a source of variation, means within a column followed by the same letter are not significantly different according to Fisher's LSD (P ≤ 0.05).

per year on four-week intervals (Table 1). Applications began at the end of April or early May 2014 and continued through fall 2017 in Indiana and Illinois and through August 2016 in Nebraska.

In 2014, at all three locations, Bensumec 4LF (bensulide) applied in September after season-long use of Velocity 17.6 WSP (bispyribac-sodium) caused significant phytotoxicity and subsequent thinning of creeping bentgrass. Thus, we stopped the bispyribac-sodium + bensulide treatment after 2014 (Table 1, Figure 1).

We recorded visual ratings of ABG cover, turf quality and turfgrass phytotoxicity throughout each growing season. All visual estimates of percent cover were plotted over days from study initiation through the final rating in May 2018. We present this data as the area under the percent *Poa* curve (AUPPC). The AUPPC is similar to the area under the disease progress curve and provides a long-term summary of ABG cover with lower AUPPC values indicating a decrease in ABG cover.

JULY AND SEPTEMBER AERIFICATION

Except for initial ratings in May 2014 in Illinois, aerification timing was not significant for ABG cover. Further, we did not find significant aerification by treatment interactions for ABG cover, which indicates that ABG populations were not affected by cultivation timing (July vs. September). This conflicts with recommendations that promote summer aerification instead of fall aerification to reduce ABG infestation (8). However, we performed the early fall aerification in September in this experiment, and aerifying later in the fall could promote ABG encroachment due to documented seedling emergence between late September and early October (15). We also did not compare aerification to no aerification in our study. No aerification would minimize the surface disturbance and thus

possibly exclude or diminish the potential for ABG invasion.

HERBICIDE AND PLANT GROWTH REGULATOR PROGRAMS

Since there was significant treatment by location interaction, we analyzed the three sites separately. For AUPPC, the main treatment effect was significant for all three locations and across multiple rating dates for percent visual ABG cover (Figure 2).

Only the Velocity + Bensumec caused significant damage to creeping bentgrass. Bensumec applied in August followed by two Velocity applications caused unexpected phytotoxicity on creeping bentgrass at all three locations in 2014, and therefore, this treatment was discontinued after 2014 (Figure 1). As such, turf managers should avoid using site-specific programs that apply Velocity and Bensumec within a calendar year. All other treatments had acceptable turfgrass quality (≥ 6 rating) at all three sites on all rating dates, with a few minor exceptions (data not shown). These few exceptions of below-acceptable turf quality occurred in Nebraska only with Trimmit + Bensumec in 2014 (data not shown).

In Indiana, all treatments except monthly applications of iron sulfate reduced AUPPC or ABG coverage compared with the nontreated plots by the end of the study, with PoaCure, Trimmit, Trimmit + Bensumec, iron sulfate + Velocity or Velocity equally effective (Figure 2 and Table 2). PoaCure and iron sulfate + Velocity reduced ABG coverage compared with the nontreated plots in all four years of the study in Indiana (Table 2). Similarly, PoaCure also selectively controlled ABG when applied in the spring or fall in Tennessee, Texas and Virginia (1, 4).

Velocity effectively reduced ABG in this putting green experiment similar to previous research in creeping bentgrass fairways (18). In a 2015 study, Trimmit also was one of the most effective treatments at reducing ABG

TABLE 3

Annual bluegrass (ABG) cover at spring seedhead production during and after four years of season-long applications of herbicides, iron sulfate, growth regulators or aerification treatments to creeping bentgrass/ABG maintained at putting green height in Olympia, III.

Treatment	May 2014⁺	May 2015	May 2016	April 2017	May 2018
	% Cover				
Iron sulfate	22§	25	32 a¶	37 a	16 b
Iron sulfate + Velocity 17.6	25	22	1 d	5 c	2 d
PoaCure	22	14	1 d	9 c	3 d
Trimmit 2SC	22	26	13 c	28 b	13 c
Trimmit 2SC + Bensumec 4LF	24	20	18 b	23 b	11 c
Velocity 17.6	25	25	1 d	5 c	1 d
Nontreated	23	26	29 a	37 a	19 a

⁺ May 2014 ratings were taken at initiation of the study using visual percent cover of annual bluegrass for each plot.

⁴ Annual bluegrass cover for May 2015 to May 2018 was estimated with vertical point quadrat method where a 2.5-ft. by 5-ft. frame is laid over the plots with an internal filament gid of 169 intersections. The total number of times ABG was present under each intersection was recorded for each plot and percent cover was calculated.

[§] Means of three replications and two aerification regimes. Subplot (herbicides, growth regulators or iron sulfate) means are across two aerification levels, and whole-plot aerification means are across subplot treatments.

⁴ Within a source of variation, means within a column followed by the same letter are not significantly different according to Fisher's LSD ($P \le 0.05$).

TABLE 4

Annual bluegrass (ABG) cover at spring seedhead production during and after two years of season-long applications of herbicides, iron sulfate, growth regulators or aerification treatments to creeping bentgrass/ABG maintained at putting green height in Fremont, Neb.

Treatment	May 2014⁺	May 2015	May 2016	
	% Cover [†]			
Iron sulfate	18 [§]	9 a¶	37 a	
Iron sulfate + Velocity 17.6	15	3 b	25 bc	
PoaCure	17	2 b	13 cd	
Trimmit 2SC	17	3 b	8 d	
Trimmit 2SC + Bensumec 4LF	18	9 a	17 cd	
Velocity 17.6	18	2 b	13 cd	
Nontreated	17	9 a	29 ab	

[†] May 2014 ratings were taken at initiation of the study.

⁴ Annual bluegrass cover was estimated with vertical point quadrat method where a 2.5-ft. by 5-ft. frame is laid over the plots with an internal filament grid of 45 intersections. The total number of times ABG was present under each intersection was recorded for each plot, and percent cover was calculated.

§ Means of three replications and two aerification regimes.

¹ Within a source of variation, means within a column followed by the same letter are not significantly different according to Fisher's LSD ($P \le 0.05$).

in putting greens (20). All treatments except iron sulfate reduced visual ABG cover at the final rating compared with the nontreated plots (Table 2). For Indiana, the nontreated plots decreased in ABG cover from 65 percent at the initial spring 2014 evaluations to 22 percent in the spring of 2018 (Table 2). The reason was unclear but likely due to hotter summers.

PoaCure, Velocity and iron sulfate + Velocity were most effective at reducing AUPPC in Illinois, while iron sulfate was again the only treatment that did not decrease AUPPC compared with the Continued on page 30

Continued from page 29

nontreated plots (Figure 2). Similarly, Velocity, iron sulfate + Velocity and PoaCure reduced ABG cover to less than 3 percent (Table 3). Nontreated plots decreased from 23 to 19 percent during the same four-year period.

The Nebraska experiment only ran from 2014 to 2016 due to the loss of turfgrass on more than half of the golf course putting green at the end of 2016. The loss of turf was due to the removal of a tree next to the putting green and not a treatment effect. Only PoaCure and Velocity decreased ABG coverage in both April 2015 and April 2016 compared with the nontreated plots (Table 4).

RECOMMENDATIONS FOR ANNUAL BLUEGRASS CONTROL

Our data indicate that aerifying golf course putting greens in July instead of early September did not reduce ABG infestation. Golf course superintendents located in climates just north of the Transition Zone, like the golf courses in this experiment, have flexibility in scheduling cultivation in July to early September without concern for influencing ABG encroachment. In colder climates, such as parts of the Upper Midwest and Northeast, annual bluegrass may germinate earlier and may be more likely to invade during the September aerification dates we tested.

Our data also indicate that monthly application of iron sulfate alone is not an effective ABG control strategy on golf course putting greens. Iron sulfate did not reduce ABG but turned the turf and especially ABG a darker green, thus masking the ABG within the creeping bentgrass. Similar research in Pennsylvania (12) documented a decrease in ABG from iron applications when annual nitrogen rates were 0.5 lb. N per 1,000 sq. ft. per year, but not at 3.0 lb. N per 1,000 sq. ft., per year tested in our research. In a separate Virginia experiment (10), ABG decreased from iron applications when nitrogen was 3.0 lb. N per 1,000 sq. ft. per year. This decrease in ABG may be due to the 14-day application frequency used compared with the 28-day interval in our study. Our results from monthly applications do not support the use of iron for ABG control; however, other factors such as nitrogen rate and iron application frequency may increase the ABG control.

The effectiveness of season-long treatments will vary depending on location, but PoaCure (WSSA Group 30 herbicide), Trimmit (Type II, Class B PGR) or Velocity (WSSA Group 2 herbicide) reduced ABG populations. These three options with diverse modes of action may be useful in an ABG management system that also includes mechanical removal, interseeding of improved creeping bentgrass cultivars, the reduction of tree shade on putting greens and careful management of nitrogen and phosphorus inputs.

Recently, PoaCure received registration for use in the U.S. However, Velocity is not labeled for use on putting greens, and its future is uncertain in the U.S. Trimmit also was a useful product that is available for use on putting greens. Products such as PoaCure and Trimmit provide needed options to allow for the rotation or addition of multiple control strategies coupled with cultural control practices in an ABG control system to limit resistance development. **G**

Aaron Patton, Ph.D. is Professor of Horticulture, Purdue University, and can be reached at ajpatton@purdue. edu. Ross Braun, Ph.D., Geoffrey Schortgen, Daniel Weisenberger, Dept. of Horticulture and Landscape Architecture, Purdue University. Bruce Branham, Ph.D., Bill Sharp, University of Illinois. Matthew Sousek and Roch Gaussoin, Ph.D., University of Nebraska. Zach Reicher, Ph.D., Bayer Crop Sciences.

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"Creeping bentgrass is challenging enough without trying to keep the ABG healthy."

MIKE KENNA, PH.D., Science Editor

No magic bullet

nnual bluegrass (ABG) or *Poa annua*, affects almost all golf courses. Do you live with it or try to eradicate it? For years, living and working in the bermudagrass belt, I was in the eradicate group. Yet, I have played golf on Northeast and Pacific Coast courses that have excellent ABG greens.

C. V. Piper, Ph.D., and R. A. Oakley, Ph.D., concluded in their March 1921 Bulletin of the USGA Green Section:

"On the whole, the grass is to be considered desirable rather than a weed. Certainly, it would be very expensive to keep it out of greens altogether, and surely its demerits, if any, are not sufficient to justify the attempt."

These are very prophetic words for where we are nearly 100 years later. Yet, for courses in the Transition Zone and upper south, summers with ABG are unsettling. Creeping bentgrass is challenging enough without trying to keep the ABG healthy. Northern courses worry about winterkill. And then there are anthracnose and annual bluegrass weevil problems to combat.

The USGA supports research on breeding, managing and controlling ABG. The Green Section funded ABG breeding programs in the 1980s through the early 2000s. In 1998, Don White, Ph.D., at the University of Minnesota, released "DW-184" or "True Putt," a perennial putting green biotype. He even suggested a name change to creeping bluegrass (*Poa annua* var. *reptans* to *Poa reptans*).

In 1994 at Penn State University, David Huff, Ph.D., started an ABG breeding program. He collected perennial types from top-name courses with the help of the Green Section. This breeding effort looked promising until it came time to produce seed. The attempt failed because selected seed from ABG putting green types looked nothing like the parents.

Golf course superintendents have benefited from research on the management of the natural ABG biotypes. In 1980, Patricia Vittum, Cornell University, completed her Ph.D. dissertation on the biology of the annual bluegrass weevil (ABW). Albrecht Kopenhoffer, Ph.D., at Rutgers University also has provided annual bluegrass weevil management strategies. Ben McGraw, Ph.D., continues to add to the ABW research effort (see last month's issue). These entomologists, along with Steven Alm, Ph.D., University of Rhode Island, and Richard Cowles, Ph.D., University of Connecticut, are tackling

 $ABW \, insecticide \, resistance \, problems.$

Excellent research on anthracnose management at Rutgers University by Bruce Clarke, Ph.D., and Jim Murphy, Ph.D., busted several management myths. Contrary to what many thought, light sand topdressing and nitrogen fertilization were beneficial for managing the disease. Their work helped reduce the number of annual fungicide applications to manage the disease.

Yet, there is always the question of controlling ABG in favor of creeping bentgrass. The article in this issue led by Aaron Patton, Ph.D., Purdue University, examines a longer-term systems approach. Some of the treatments reduced ABG, but none provided complete control. The recent availability of PoaCure (methiozolin) is promising and will help reduce ABG in putting greens. My concern is the potential ABG herbicide resistance to the repeated use of products with similar mechanisms of action.

Annual bluegrass herbicide resistance has become a big problem and has received national attention. A \$5.7 million USDA grant to a team of 16 scientists across 15 universities is underway. Led by Muthu Bagavathiannan, Ph.D., Texas A&M University, the team will characterize ABG herbicide-resistant populations. They will look for weaknesses in ABG seed biology and growth characteristics. Also, they will develop alternatives to herbicides to supplement current control measures.

I have accepted that annual bluegrass is going to be around for several years. There is no magic bullet whether you are managing ABG putting greens or trying to keep it from invading your bentgrass greens. The good news, though, is that there's more research today to deal with annual bluegrass management and control. **G**

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

Super Science // EXPERTS' INSIGHTS



Brown patch shows up as irregular or circular patches of turf with a brown or tan color in the middle.

Battling brown patch

Brown patch gets its name from the tan or brown color that appears in the middle of irregular or circular patches of turf, according to Jim Kerns, Ph.D., associate professor and Extension specialist at NC State University.

"A smoke ring or dark brown or black border may be evident early in the morning. The smoke ring is usually only visible on turf mowed at a half-inch or less," Kerns says.

If superintendents are unsure about the diagnosis, they should look for the characteristic lesions on the leaves.

"(Lesions) would only be visible on fairway- or roughheight turf," he says. "The lesions are irregular in shape, are brown in the middle and have a purple or chocolate brown border."

The disease is most prevalent when nighttime temperatures are above 70 degrees F and humidity is high. It's usually a summertime disease for cool-season grasses. "It is important to note that brown patch only occurs on cool-season grasses," Kerns adds. "(Also), brown patch was thought to be a high N disease, but our research has demonstrated the disease is related to growth potential rather than N amount."

Cultural practices to help reduce brown patch include removing dew, sand topdressing, aerifying, reducing leaf wetness periods by limiting irrigation late in the afternoon, providing air movement and making sure there's adequate surface and subsurface drainage. Applying wetting agents can also aid in reducing the disease.

Kerns adds that brown patch is easily managed with certain QoI fungicides, which routinely provide 28 days of suppression in trials. He notes that fungicide resistance is unlikely to develop. **G**

Bayer

PAUL GIORDANO, PH.D. Green Solutions Team member



The pathogen for brown patch (*Rhizoctonia solani*) can grow and

infect rapidly when temperatures rise into the mid-80s and especially when nighttime temperatures are in the 70s with high humidity. Superintendents can manage brown patch effectively by closely monitoring weather conditions and acting in advance of an outbreak. During or just prior to the onset of heat and humidity, avoid excessive nitrogen fertilization. Removal of morning dew or guttation water will also help reduce severity of the disease given its propensity for moist, humid microenvironments. The Qol (strobilurin) fungicides like trifloxystrobin are highly effective in managing brown patch and can be used alone or in combination with other actives to broaden disease control. Careful selection of the proper fungicide is important, considering that certain classes like succinate dehydrogenase inhibitors and demethylation inhibitors contain some active ingredients that are ineffective against brown patch.

Nufarm

RICK FLETCHER

Technical services manager, turf and ornamentals

Brown patch is a disease of cool-

season grasses, including bentgrasses, bluegrasses, fescues and ryegrasses, that occurs when minimum air and soil temperatures exceed 64.4 degrees F and 59 degrees F. Periods of high relative humidity (greater than 95 percent) for at least 10 consecutive hours are required for disease development. When turf managed at golf course heights is wet, brown patches are often surrounded by a dark brown or gray ring called a "smoke ring," evidence of active fungal growth on the turf foliage. The turf may recover when disease pressure is reduced by a change in weather conditions or implementation of control practices. In general, factors that impede evaporation or drainage (poor air movement and soil drainage, excessive shade) are conducive to brown patch. Excessive nitrogen fertilization creates dense, lush turf that is highly susceptible to R. solani. Frequent use of organic fertilizers has also been associated with increased brown patch severity.

Quali-Pro

IAN RODRIGUEZ, PH.D. Technical services manager

Turf recovery from brown patch is typically slow in cool-season



turf since disease pressure coincides with slower growth rates on the calendar. Avoid applications of more than .5 lb./1,000 ft² of soluble N by spoon-feeding at lower rates during peak pressure periods. Reduce the duration of leaf wetness by early morning irrigation or whipping dew. Increase air circulation and light to promote a drier surface by strategically pruning or making alterations in the landscape.

Syngenta

MIKE AGNEW, PH.D. Technical services manager

Brown patch is more severe during extended periods of hot,

humid weather. Poor soil drainage, lack of air movement, overwatering and excessive nitrogen can contribute to its development. Minimize leaf wetness, avoid late-evening irrigation and increase air circulation by selective pruning. Morning dew removal is also helpful. Avoid nitrogen applications when brown patch is active. Using low-tomoderate amounts of nitrogen when the disease isn't active is important for plant health. For control, apply penetrant fungicides.

BASF

MARK SEMM BASF turf experience project manager



Brown patch (*Rhizoctonia spp.*) thrives during hot, humid times of the growing season. It is prevalent on coolseason turf. It's a moisture-loving disease. Employ agronomic tools to keep a drier surface and soil profile such as venting, dew removal, moisture monitoring and improving air movement. There are a number of fungicides to help prevent brown patch. This includes, but is not limited to, products containing pyraclostrobin and/ or fluxapyroxad.

MUST-HAVE NEW PRODUCTS



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1 Yamaha UMax UTVs

UMax utility vehicles by YAMAHA combine power, performance and comfort, said the company. They feature six color options, luxurious bucket seats, an underhood storage compartment and large 20-inch tires all with the quietness of a golf cart. The UMAX UTV is strong, versatile, reliable and the perfect match for all golf course maintenance teams' needs, according to the company.

YamahaMotorSports.com

2 Air-o-Lator pond products

AIR-O-LATOR's eco-friendly, highperformance products combine aesthetic beauty with a natural way to improve water quality. The company's aerators and fountains provide a powerful and efficient solution to water management while accentuating the turf landscape. Backed by outstanding customer service, Air-O-Lator fountains are easy to install, service and upgrade. *Airolator.com*



3 Moleaer Clear nanobubble generator

MOLEAER's Clear nanobubble generator is tackling algae outbreaks throughout the country. An alternative to traditional chemical and aeration methods, the Clear is a cost-effective technology to prevent and treat algae. Nanobubbles provide a chemical-free oxidant capable of reducing biofilm growth and suppressing harmful pathogens, even in warm water. Nanobubble generators are simple, shore-mounted, plug-n-play systems that can be easily installed. *Moleaer.com*









4 John Deere TX Work Series UTVs

The JOHN DEERE TX Work Series Gator utility vehicles are designed to power through any job. Equipped with fourwheel suspension, the models offer a smooth ride no matter what the operator is hauling. A 15.5-hp engine delivers high torque, low-end lugging power and fast acceleration. The durable deluxe cargo box offers 16.4 cubic feet of capacity and converts into a flatbed configuration to allow for larger cargo. Regardless of the job at hand, the TX Work Series utility vehicles provide the power needed to complete tough daily tasks. Deere.com/en/golf

5 PondHawk subsurface aeration system

LINNE INDUSTRIES' PondHawk is a solar-powered subsurface aeration system that makes pond maintenance low maintenance. With no electricity or chemicals required, it naturally improves water quality, reduces odors and encourages the decomposition of organic matter with aerobic bacteria. Plus, it works in cloudy, rainy and windy conditions, and it's easy to install. PondHawk is environmentally friendly — and budgetfriendly. It cuts monthly electricity and chemical costs and reduces the need for future dredging, said the company. LinneIndustries.com

6 Toro Greensmaster 1000 Series

TORO's Greensmaster 1000 Series fixed-head walk greensmowers were designed to eliminate variability in the walk mowing process. Several operator-centric features in the line include the innovative telescoping loop handle, simple height adjustment and handle isolation mounts, which give the cutting units consistent contact with the ground throughout the mowing process. The greensmowers come in three models: the Greensmaster 1018, featuring an 18-inch cutting width; the Greensmaster 1021, featuring a 21inch cutting width; and the Greensmaster 1026, featuring a 26-inch cutting width. Toro.com

The **19th Offer** with...

Tim Nielsen

SUPERINTENDENT // Creekmoor GC, Raymore, Mo.

What are you drinking?

A bourbon and club soda ... with a big splash of Tang.



Tell me about your wife and kids. My wife (Kelley) and I just got married a year ago ... she has a senior in high school (Maddy), bummer for her with what's going on right now. And I have two girls, a 10-year-old (Lauren) and (Haley), about to be 7.

How's the pandemic been for you at home? We're having our kitchen redone at this very moment. We're three weeks into it — that's been the biggest challenge. I've got two smokers and a grill in the back, so that helps.

Tell me about Creekmoor GC. The course opened in 2007, for a development. They've been building houses since 2005. The golf course is great but very difficult. We have a hole, 'The Beast," that's 663 yards with trouble all over the place. The course has a slope rating of 147; it's the highest-rated course in Kansas City.

What's been key to your career success? That's an easy one: hiring great assistants.

You're a fellow Kansas City Chiefs fan ... do you think it's OK I scheduled Chiefs fans in back-toback months ... and do you think I can sustain it for a whole year? The biggest problem you're going to have is ...



"MY DAD WAS A SUPERINTENDENT OF SCHOOLS. IT'S A LOT LIKE BEING A GOLF SUPERINTENDENT IN THAT YOU CAN HAVE A MEETING AND WALK OUT OF THE MEETING WITHOUT A JOB. I ASKED HIM HOW HE KEPT HIS JOB SO LONG. HE TOLD ME, 'I KEEP MY MOUTH SHUT."

you're going to have to continue this year after year, for probably the next 10 years!

Next time I'm on your side of KC,

where should I go? Brobeck's BBQ. They'll ask you if you've been there before, and if you say no, they'll bring you a sample of their ham salad. It's a smoked ham salad that's served on a homemade potato chip and it's just incredible.

What's your dinner

specialty? Brisket and wings are my two favorites. I have a Pit Barrel Cooker. I bought it for \$300 eight years ago. I decided to buy a Traeger two years ago; I hardly ever cook on it. The Pit Barrel is the best thing I cook on. It's made by a veteran in Denver. What's your favorite tool in the

shop? The TDR 300 Moisture Meter, easily. The 300 is super simple, really lightweight ... they've changed my career. Before we were syringing greens until five or six at night, just trying to cool them down, thinking we were doing the right thing. Now? We might leave the course on a 100-degree day at 2:30 in the afternoon because we know where

the greens are. We go home, and we

sleep easy. I bet I cut 10 to 15 hours off my workweek in the summertime.

As interviewed by Seth Jones, April 17, 2020.



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