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STATE OF THE INDUSTRY

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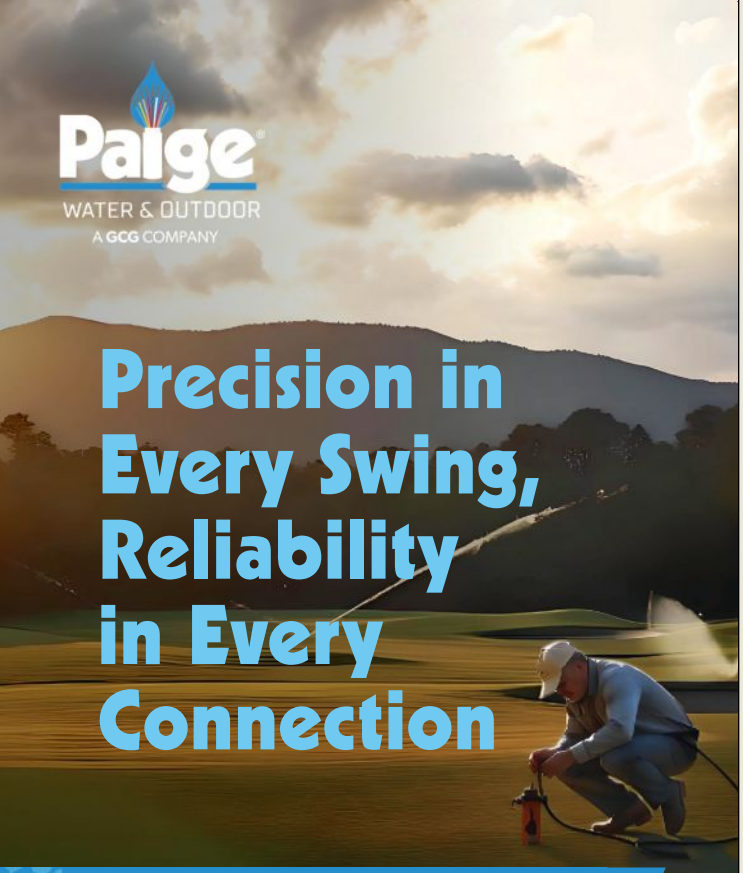
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"My first trip to the Masters was in 2003, the year Mike Weir won. Since then, I've been trying to nab an interview with Brad Owen, Augusta National Golf Club's longtime superintendent."

SETH JONES, *Editor-in-Chief*

Where do I start?

My year is going out like a lion … better buckle up for this one! Where do I even start?

I better start with the cover story.

My first trip to the Masters was in 2003, the year Mike Weir won. Since then, I've been trying to nab an interview with Brad Owen, Augusta National Golf Club's longtime superintendent. I wouldn't say I ever came close, but I had a few almosts, including once when I ran into him when he was on his own on No. 1 green. I said hello, exchanged a pleasantry, told Brad who I was. He was polite and then did the equivalent of the Homer Simpson GIF and disappeared into the bushes.

Well, the curse is broken! All it took was for Brad to semi-retire. He took the time to sit down with me recently for this month's cover story. And we're also honored to have him joining us for the 2025 *Golfdom* Summit, where he'll be on stage with me for a discussion about his career as our newest inductee into the Legends, sponsored by Kafka Granite and Quali-Pro.

Exciting, right? Well, I've got more news for you.

First, I want to say thank you and all the best to our longtime group publisher of *Golfdom,* Bill Roddy. Bill worked on our sister publication, *Landscape Management,* for 12 years. Several years ago, he took a more active role with *Golfdom* and has been our behind-the-scenes leader over that span.

Bill recently took a new job with Envu, one of the many industry companies that supports our magazine. It was a great opportunity for Bill for a few reasons, and while we were sad to see him go, we had to say goodbye.

So that meant we needed to find someone to come in and fill that void. I'm happy to report that I made the trek to West Coast Saloon in Lawrence, Kan., and found my guy. Practically all of you know him, especially if you've played in the GCSAA Golf Championship over the last 20 years.

That's right, we hired my old friend Jim Cummins, who previously was the senior manager of business development at GCSAA, to become our new national sales manager. It's literally Jim's second day on the job as I write this.

Welcome aboard Jim! We know you're going to fit right in with the team. How do we know? Because between me, Scott Hollister and Jim, we used to be a team some 16 years ago when we were coworkers at GCSAA. It's cool that the three of us stayed in touch over the years, remained friends, and now we're coworkers once more. The rest of the team — Craig, Nader, Courtney, Amelia, Nathan, Payton and Will — are excited to build upon the success of last year and continue to make *Golfdom* the industry's favorite brand.

I look back at the year that was, and I'm stunned at all the places I went, all the people I met, all the things I saw. I was at Mardi Gras in New Orleans early in the year, where I saw Shaquille O'Neal go by on a float and ZZ Top in concert. I played a bunch of golf in Florida, traveled to Puerto Rico and Italy, attended trade shows in San Diego, Louisville, Phoenix and Park City. I drove 10 laps on the Texas Motor Speedway. I went to the Players Championship, the Masters, the U.S. Women's Open and the U.S. Open. I took a selfie with my wife in front of the Colosseum in Rome (check out this month's *Golfdom* Gallery, I had to share that photo.)

2025 will go down as a year to remember. I hope your year was equally excellent. Now, onward to 2026!

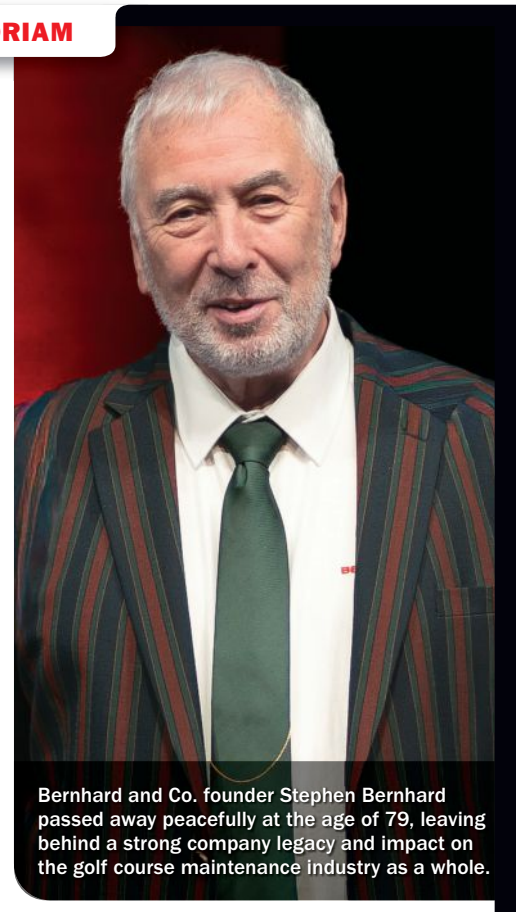
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Starter

NEWS, NOTES AND QUOTES

//IN MEMORIAM

STEPHEN BERNHARD, FOUNDER OF BERNHARD



Bernhard and Co. founder Stephen Bernhard passed away peacefully at the age of 79, leaving behind a strong company legacy and impact on the golf course maintenance industry as a whole.

Stephen Bernhard, a longtime fixture in the golf maintenance industry and the founder of Bernhard and Co., died in early October at the age of 79.

Bernhard founded Bernhard and Co. in the early 1980s and, over several decades, guided the business from its roots in precision engineering and horticulture to become a world-renowned brand in turf technology. His philosophy — that success comes from continuous learning, collaboration and a genuine care for the craft — continues to define how the company operates and serves its customers across the world.

Bernhard established the Bernhard Academy in 2019, designed to provide outstanding opportunities for professional growth and knowledge sharing within the turf industry. His commitment to nurturing talent and supporting others has touched an immeasurable number of lives and careers, and the company said his legacy will continue to inspire the next generations of turf professionals for years to come.

Bernhard contributed enormously to the advancement of the industry. For more than 25 years, he was actively involved with the British and International Golf Greenkeepers Association (BIGGA) Delegation, providing once-in-a-lifetime opportunities for British turf professionals to visit the GCSAA Conference and Trade Show. Most recently, at this year's BIGGA Turf Management Expo (BTME), Stephen was also awarded BIGGA's Outstanding Contribution Award, recognizing his lifelong dedication to supporting the industry.

//THE PH.D. IS ALSO A CEO

APPLEGATE TAKES REINS AT PBI-GORDON

As part of PBI-Gordon's strategic growth plan, Jacqueline (Jackie) Applegate, Ph.D., the company's current chief operating officer, has succeeded Steve Clifford as president and CEO. She will lead PBI-Gordon Companies and its subsidiaries — PBI-Gordon Corp., Pegasus Laboratories, TriviumVet and Pet-Ag. The COO position will not be filled; rather, each of the businesses will report to Applegate.



Jackie Applegate

Applegate joined PBI-Gordon Companies as COO in July of 2024, after spending 32 years at Bayer, with extensive experience in global agribusiness, animal health and specialty markets. In her new role, she will focus on advancing the company's leadership position in the specialty turf and ornamental, animal health and pet care markets.

"I am honored to lead PBI-Gordon Companies and build on the strong foundation Steve has established," said Applegate. "Our talented team is dedicated to delivering trusted solutions that enhance our communities and the lives of our people and pets, and I'm excited about the opportunities ahead."

PBI-Gordon also announced the following new positions within the executive leadership team, designed to propel the company into the next phase of growth and long-term success:

- **Scott Howard, who has been with the company for more than 18 years, has been appointed chief scientific and technical officer.**
- **Tim Demerath has been appointed to a newly formed role of chief transformation officer.**
- **Joyce Lee has joined the company as the general manager/senior vice president for Pegasus Laboratories.**

PHOTO BY: WELLGLAD / ISTOCK-GETTY IMAGES PLUS / GETTY IMAGES (GOLFBALL);



Before and after photos of the 18th hole on Kapalua's Plantation Course.

PHOTO COURTESY OF: KAPALUA GOLF

//CALL IT A COMEBACK

Kapalua's Plantation Course reopens for play

Kapalua Golf's Plantation Course reopened for play in November after having been closed since early September to allow Kapalua's agronomy team to restore turf health following prolonged irrigation restrictions.

While the PGA Tour's The Sentry tournament will still not be contested at the Plantation Course in January, turf health and course conditions have improved to levels that will allow for public play. Kapalua's Bay Course will remain closed until further notice.

"We are deeply grateful for our agronomy team and the work they have done to bring the course back," said Kapalua golf general manager Alex Nakajima. "As a key contributor to the Maui economy, reopening the Plantation Course means a lot for our community and the 300-plus employees who work at the course and restaurants. We look forward to welcoming guests back to Kapalua Golf's Plantation Course."

The agronomy team is still working to restore greens on holes 1 and 8; therefore, only 16 holes will be available for play for the immediate future.

Since early September, Kapalua Golf has followed Tier 3 water restrictions, which is a 60-percent reduction of normal water use. Over this time, Kapalua's agronomy team has worked hard to restore course conditions to the highest possible level. A prolonged period of Tier 4 water restrictions — zero irrigation — caused significant stress and damage to Kapalua's two golf courses over the summer.

In the face of the course closures and the cancellation of The Sentry, Kapalua Golf owner Tadashi Yanai expressed his commitment to supporting the Maui community by pledging $750,000 to various Maui nonprofits, including Scouting America - Aloha Council, Hale Makua Health Services, J. Walter Cameron Center, Ka Lima O Maui, Lahainaluna High School Foundation and Lahaina Junior Golf.

Ask Thad



By Thad Thompson
Superintendent
Terry Hills GC, Batavia, N.Y.

Overall, how was the 2025 golf season?

In Western New York we started our 2025 golf season with an extremely wet, cool and dreary spring. Ropes up everywhere, rain gear every day and planning mowings around rain events. At the time, we were laying down the final plans for the installation of our new irrigation system, but it hardly looked like we'd need one.

Wow, did our year turn on a dime. Like many places, when we dried out, we dried out! It felt as if every day it was 90 degrees, and we got no precipitation. I had under a half inch of rain for June, July and half of August. Temperatures were extreme, and my current irrigation system was barely hanging on. My personal record for days that my pumps stayed on and completed an entire irrigation cycle was three days in a row, all season long! My short turf took several dings, but all and all, we weathered the heat relatively well, but the drought and heat progressed throughout September. That's when the sprayer broke down.

I have never irrigated the golf course in October during my 18 years at Terry Hills. We took our pumps offline on Oct. 1 as planned for the new pumps and pump house install on Oct. 15. Winterberry Irrigation broke ground on our new irrigation system on Oct. 1. The first two weeks of October were hot and dry with little humidity. I would have watered every day! My son, Daley, was married at Terry Hills on Oct. 4. The sprayer is still down.

As I write this in early November, Winterberry Irrigation has three holes of mainline to complete, and all 27 holes will be done and ready for laterals. I aerified tees yesterday in the first snow of the season and woke up to three inches of snow today and had to plow for a 7 a.m. function. I've borrowed a sprayer to do my final applications of the year, and the new one should be here around Christmas. Aloha 2025.

Got a question for Thad? Tweet to ***@TerryHillsMaint*** *and* ***@Golfdom*** *or email Thad at* ***thadthompson@terryhills.com***

//THANK YOU, MARK AND CURTIS

CSI FOUNDER MARK BOYD RETIRES

Mark Boyd, the founder and president of Control Solutions Inc. (CSI), a producer of specialty chemical solutions and part of the ADAMA group, retired in September after more than 33 years with the company. Though stepping away from day-to-day responsibilities, Boyd will continue to support the business as an advisor during the transition.


Mark Boyd

"CSI has always been about innovation and trusted relationships," said Boyd. "I'm proud of what we've built and confident the company will continue to thrive."

To strengthen alignment with global leadership, CSI and Alligare will align to form the newly created ADAMA Professional Solutions Commercial Unit (APS CU). Trey Kendrick will serve as president and CEO of Control Solutions and head of APS CU, reporting directly to Eric Dereudre, ADAMA chief commercial officer. Kendrick brings extensive experience from his long career with CSI and successful leadership as president and CEO of Alligare over the past four years.

Reporting to Kendrick will be Austin Tinsley, Alligare's new president and CEO, who has been with the company for more than 16 years, including the past four years as sales director.

CSI also announced the retirement of Curtis Clark, executive vice president, after more than 20 years with the company.

Clark joined CSI in 2005 as vice president of sales and marketing, bringing with him a wealth of experience from previous roles in the crop protection industry. In 2013, he was promoted to executive vice president, where he took on day-to-day executive management responsibilities across all CSI business units, including CSI-Pest, Quali-Pro turf and ornamental products, Martin's consumer brand, CSI Production Animal and formulator sales.

//GCSAA ROLLS OUT THE HONORS

MCCARTY LEADS GCSAA HONOR ROLL

Bert McCarty, Ph.D., professor emeritus of plant and environmental sciences specializing in turfgrass science and management at Clemson University, has been selected to receive the 2026 Outstanding Contribution Award from the Golf Course Superintendents Association of America (GCSAA), one of four recent major award announcements made by the association. These awards will be formally presented at the 2026 GCSAA Conference and Trade Show in Orlando.

GCSAA also revealed that:

- **Steven Spatafore,** director of agronomy at Los Altos (Calif.) G&CC, has been selected as the recipient of the 2026 Emerging Leader Award.
- **John Patterson,** CTEM, the equipment director at Atlanta Athletic Club in Johns Creek, Ga., has been named the winner of the 2025 Edwin Budding Award.
- **Kevin Komer,** CGCS, director of agronomy at The Mountain Course at Spruce Peak and Stowe (Vt.) Country Club has earned the 2026 Excellence in Government Affairs Award for his legacy of state advocacy work in Vermont.

The Outstanding Contribution Award is given to an individual who has made a significant contribution to GCSAA membership through outstanding contributions to the golf course industry. The contribution must be significant in both substance and duration. The outstanding contribution may be or have been regional in nature.


Bert McCarty


Steven Spatafore


John Patterson


Kevin Komer

//MEET THE NEW BOSS

MARK MUNGEAM ELECTED AS NEW ASGCA PRESIDENT

Mark Mungeam, the principal at Mungeam Golf Design in Douglas, Mass., was elected president of the American Society of Golf Course Architects (ASGCA) at the organization's recent 79th annual meeting on Cape Cod in Massachusetts.


Mark Mungeam

A graduate of Worcester (Mass.) Polytechnic Institute (WPI), Mungeam went to work for Geoffrey Cornish and Brian Silva in 1987. Early new course designs, such as Shaker Hills Golf Club (Harvard, Mass.) and Cyprian Keyes Golf Club (Boylston, Mass.), were named by *Golf Digest* as two of the best new public courses. Mungeam also oversaw several renovations at Olympia Fields Country Club in Chicago, in preparation for hosting several tournaments, including the 2003 U.S. Open.

In 2006, Mungeam opened his solo practice. When designing, Mungeam utilizes a site's natural characteristics to determine the style of the course. He believes frequent and extensive visits during construction are critical to a successful project.

Some of Mungeam's other noteworthy designs include Charleston Springs Golf Course, Monmouth County, N.J.; LeBaron Hills Country Club, Lakeville, Mass.; and Connecticut National, Putnam, Conn.

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Todd Bohn, Director of Agronomy
Desert Mountain Club

"What surprised me the most was the quality of cut, how the rough was more uniform. I use them for mowing our 30 acres of rough and it's uniform every single day. The turf quality improved quite a bit – our members just love it."

Joe Budinich, Director of Agronomy
The Peninsula Golf and Country Club

Schedule a demo

Golfdom Gallery



1 Shaker's super super *Golfdom's* Craig MacGregor (left) and Seth Jones were able to tee it up at Shaker Heights (Ohio) CC. Before they went out, they said hello to course superintendent Bill Lewis.



2 Mr. Popular We don't know how exactly, but Jones was invited to join a group of about 50 influencers (wait, he's an influencer now?) to attend Pipeline, an annual event hosted by Milwaukee Tools. Jones is joined by Ryan Schwoegler and Mike Caelwaerts of Milwaukee Tools.



3 Go Big Red! The *Golfdom* gang — Seth, Craig, Bill Roddy and Scott Hollister — made a trek to Lincoln, Neb., where they caught up with Jason Schmaderer (blue shirt) of Swanson Russell and Stephanie Hays of the Propane Education and Resource Council.



4 Game day in Kansas City Hollister and Jones started a Chiefs game day off early by meeting with Tony Goldsby, Ph.D., The Andersons at Martin City Brewing Co. Bad news, the Chiefs went on to lose to the Chargers that night in Brazil.



5 When in Rome... It's not all work and no play for Mr. Jones — as he shows off with this selfie of him and the lovely Mrs. Adrianne Jones in front of the Colosseum in Rome, Italy. *Buongiorno!*



6 Points taken Professional golfer D.A. Points (left) joined Sam Gardner, superintendent, Isleworth CC, and Kevin Stoltman, president and CEO of North Coast Media, for a recent round in Windermere, Fla.

PHOTOS BY: *GOLFDOM* STAFF (1, 3-6, 9-12); JASON STAHL (2); BOYD JONES (7); HEATHER GOOCH (8)















7 It's a PBI party! What a thrill! Team *Golfdom* was joined by team PBI-Gordon at Seth's party garage, the HOJ (that stands for Hall of Justice — not House of Jones, btw). From left to right are MacGregor, Callie Zevecke Pestock, Jones, Jared Hoyle, Ph.D., Roddy, Melissa McDonald and Andy Scott. Shuffleboard, anyone?

8 Back in the lab again Jones (far right) was invited by Envu to learn about the company's new efforts in mosquito control. From left to right are Larissa Wolfe, Arunas Damijonaitis, Ph.D., Debbie Koufas, Kyle Denk and J. Nolfo.

9 A dinner to remember We brought together four different companies for a fun evening. From left to right, counterclockwise, are Nader Hassen, *Golfdom;* Taylor Turner, Numerator; Kyle Parks, Mulch Mate; Stoltman; John Perry, Greene Country Fertilizer Co.; Nick Carlson, Mulch Mate; Jim Turner, Numerator; and Jones.

10 Party crashers These three are never late for a Crashers concert — a cover band that performs every year at Equip Expo in Louisville, Ky. MacGregor and Hollister are joined by their concert buddy Lynette Von Minden, Swanson Russell.

11 TOWA's triumph TOWA Tools recently formed a partnership with equipment behemoth Husqvarna to provide the company with a universal battery charging platform. Karissa Ogawa and Richard Ogawa commemorate the occasion with their favorite industry editor.

12 "Do you guys sell medical equipment?" That was the question asked of this group by the stoner who walked by. Maybe you could say they sell medical equipment for the turf industry? From left to right are *Golfdom*'s Jones, Stoltman, Tod McClosky, MacGregor with Ryan Karapas, Quali-Pro.



"Dr. Duich wanted me to go work as an assistant at a couple big city clubs after graduation. I just couldn't make myself do that."

MATT SHAFFER, *director of golf course operations emeritus Merion Golf Club, Ardmore, Pa.*

Congratulations to the newest Legend

When I think of Brad Owen, the newest Legends inductee, it takes me back to 1986. I was trying to jumpstart my career at Augusta National Golf Club as an assistant for Paul Latshaw Sr. Brad was one of three interns, all from Penn State. Jon O'Donnell and Jeff Vietmeier rounded out the three.

New beginnings for all of us. I had been a superintendent for 12 years, but I just couldn't get that big job. It was my fault. Dr. Joe Duich wanted me to go work as an assistant at a couple big city clubs after graduation. I just couldn't make myself do that. I originally got into the business because I loved to hunt and fish.

Well, that dream came to a screeching halt when I realized I needed to make money! The straw that broke the camel's back was when I didn't get an interview for a new club called Wade Hampton. Then I learned the assistant from Augusta got the job.

I jumped into my old pickup and drove 60 miles north to Penn State to eat some crow and see Dr. Duich. My first question was how the heck did an assistant beat me out? I had done two grow-ins and worked for an irrigation company.

Now for those of you who never met Dr. Duich, he could be very intimidating — especially when he got upset with one of his students. Oh yeah, on top of all that, he was a former Marine.

I went there rippin' mad and he lit me up!

He got right up in my grill and said, "YOU DON'T HAVE A PEDIGREE!" I was pretty rugged back in those days, and I didn't back down even a little. I said back with way more attitude than I should have, "WHAT THE HECK IS A PEDIGREE?"

Whew, I got dressed down big time. He did say at one point I was a very good super, but that changed nothing. The powers that be at Wade Hampton would much sooner say they hired Billy Fuller's right hand man at Augusta National instead of a great hunter and fisherman from Hollidaysburg, Pa.

Then he reminded me that the assistant's job at ANGC was open. I said to him, "You gotta be kidding me?" Another bad response from me! He went on to say that Paul Latshaw was going to be the new superintendent.

Thankfully, Paul offered me the position, and for once I was smart enough to go to the right job.

Well, guess what? Mr. 12-year-super was way out of his league when I started. Championship golf needs to be learned, and I just happened to be at the greatest club with the most unbelievable mentor.

I was a wild guy back then, and I definitely partied with interns on more than one occasion. They were at our apartment pretty often, eating Renna's great home cooking. Brad had a particular fondness for Renna's cheesecakes. And of course she loved spoiling those guys.

All of us benefited immensely from working for Paul at ANGC. He really changed my life and was always there for me. There were many lessons learned.

One takeaway that I realized was when I had time to hunt around the country and killed five or six big bucks, an elk, an antelope and pheasants, I also had no money.

When I had money, I didn't have time to hunt and fish all over. So, looking back, I wouldn't have changed my career path at all. When I was in my 20s and early 30s, I was running up and down the Rocky Mountains, backpacking and winter camping deep in the mountains, never cutting another man's track.

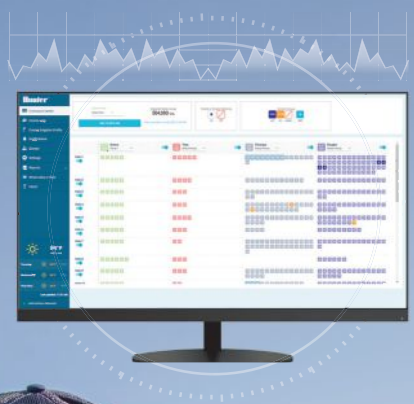
I had a fantastic career, and along the way, I made so many terrific friends, Brad included!

Matt Shaffer, a longtime superintendent, is the owner of Minimalistic Agronomic Techniques (M.A.T.) He was previously the superintendent at The Country Club in Cleveland and is director of golf course operations emeritus at Merion GC, Ardmore, Pa., where he hosted the 2013 U.S. Open. Reach him at matthewgshaffer@gmail.com.

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Brad Owen

Golf development director, North America, Turfgrass

Q&A BY SETH JONES

The longtime senior director of agronomy at Augusta National talks to *Golfdom* — for the first time ever! — about his memories of the Masters, how maintenance has evolved and what it was like being a patron for the first time in 38 years.



Golfdom: I'm so excited to be doing this interview, Brad! Congratulations on winning the Legends Award, sponsored by Kafka Granite and Quali-Pro and presented at the *Golfdom* Summit. I'm sure your office wall is covered with similar awards, like the Georgia GCSA Superintendent of the Year award you recently received. But what does it mean to be called by a colleague like Matt Shaffer and told that a group of superintendents wants to recognize you?

Brad Owen: Well, I certainly have to recognize the wealth of talent that has been recognized over the years, and to be part of that mix is very special. To have Matt Shaffer call me and tell me was special. I worked with him a long time ago; he was an influence on me. I'm extremely blessed and grateful to have him in my work career and as a friend. You know, I don't put up a lot of (awards) on the wall. I'm probably more humble about it, but I'm very, very pleased and honored to be in this group of folks and individuals, and thank you very much for the consideration.



Brad Owen

Golfdom: How is your new job as chief of golf projects, North America, for Turfgrass going? What are you doing with them, and why did you want to make the change?

Owen: This opportunity came about at a point in time when I was ready to move on beyond Augusta National. The timing was perfect. It allows me to do some traveling both in North America and internationally, which is something I've always wanted to do more of. It's a part-time scenario, probably 60 percent of my time. Right now, we're just about seven months into this work relationship. But it involves not only the traveling but also discussing and being a part of planning with a club in the area of project management or project development.

Within Turfgrass here in the United States — we call ourselves Team USA — we have a former USGA agronomist and a former Toro executive. I'm getting to meet a lot of neat people

PHOTO BY: BARRY KOENG; TOTALLYOUT / ISTOCK / GETTY IMAGES PLUS / GETTY IMAGES

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and be a part of another organization's development or improvements.

Golfdom: For so many people, Augusta is a once-in-a-lifetime place. And when they finally get there, they remember everything about it. But you were at Augusta National for 38 years — I can only imagine all the memories and stories you have. Can you give me a few that stand out?

Owen: I have so many memories over those 38 years. I certainly remember the more recent ones, just because my memory is not what it used to be (laughs). The 2019 Masters, Tiger Woods winning on that day, when were we able to finish up. You know, those Sundays of the Masters, where everything comes together and it's complete, the green jacket ceremony has been done, those are just so rewarding to step back and reflect on either being at the — we call it the top of the hill — when you're standing outside the clubhouse looking out over the nine and 18 green and the property. That's just so rewarding, and you've been so motivated after having a phenomenal staff of volunteers and hires put together such a wonderful event. And even though the golf course is all trampled down from patron traffic and whatnot, it's just a really special feeling that you can't get anywhere else.

I was fortunate to work for a great membership, very supportive senior leadership and

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> "I WAS VERY FORTUNATE TO WORK FOR A GREAT MEMBERSHIP, VERY SUPPORTIVE SENIOR LEADERSHIP AND ADMINISTRATION."



PHOTO BY: TURFGRASS USA

The Turfgrass team, from left to right: Julian Mooney, Adam Moeller, Brad Owen, John Clarkin and John Lawrence.



Owen oversaw preparations for dozens of Masters Tournaments during his tenure at Augusta National.

Continued from page 13

administration. And those times when we would be recognized as a group for the efforts we put forth — whether it was by the chairman, the GM of the club — those were just really special times. I'm so blessed because I had a great staff that made me look good. I'm fortunate to have those people come through that organization and just be motivated and driven to do a phenomenal effort.



Owen with his kids Kendall and Will.

Golfdom: What do you think about the way agronomy has changed and evolved over the decades, and how it allowed you to get the job done? What really stands out?

Owen: I think from the science perspective, that would be turfgrass breeding over the years that has given us better and better varieties to work with … whether it's ryegrass, Bermudas or bents. I really kind of had a mindset of a minimalistic approach. We would not spray large tank mixes of products, so I'm not going to give a lot of products the kudos. We kept it simple with fertility. We'd like to get green speed there by more frequent mowing, less vertical cutting, grooming and brooming. We watched our fertility. From a science perspective, I think the turfgrass breeding allowed us to do those things.

I think equipment has made such strides in the last 40 years, whether it's the cutting units of fairway or greens mowers. I think the introduction of the (Toro) ProCore vertification machine was groundbreaking and is so much more common now. Those would probably be some of the bigger things.

Golfdom: What advice was given to you that really stuck with you over the years?

Owen: I think you can imagine there's more than one piece of advice to cover the many facets of our industry, but one of them was, "How do you eat an elephant? You have to do it one bite at a time." Obviously, we can become overwhelmed with what's demanded of us in this industry on some occasions. I think another piece would be from the religious realm of Philippians 4:13, which says, "I can do all things through Christ who strengthens me." Those things help you overcome or handle the demands of the industry.

Golfdom: I've heard stories over the years about how exciting it was for people who got the opportunity to intern at Augusta National, to get a phone call or receive a voicemail from you. With so many

Continued on page 16

PHOTO BY: *GOLFDOM* STAFF (TOP); COURTESY OF BRAD OWEN (LEFT)



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Owen says the Ford tractor was dedicated to him by his mechanics.

Continued from page 14

aspiring turf professionals coming to work for you at Augusta over the years, what was something you'd advise them?

Owen: I think there are more than one or two facets to that, too. One of the most important things is to build rapport with the staff that you're going to be working with. Not to come in cocky and arrogant, but to have some humility about yourself. Also, realize you can learn a lot from the people around you. So not only would we be available as superintendents and assistants, turf graduates, AITs, but we would ask the incoming young people to seek out answers to questions through your irrigation tech, talk to your mechanic, talk to your spray tech, talk to the guy that's been on the crew for 50 years. Get information from them. Build that rapport to, potentially, one day, be the manager of that individual. If you can build that relationship early on, I think it means a lot.

We often think it's all about growing the grass and learning how to spray and fertilize. I'll just mention a famous professor, many years ago, Dr. Joe Duich. Even 40-some years ago, he realized the importance of people relative to turfgrass. He would tell us, the first day in school, he said, "This job you're getting into is 10-percent grass and 90-percent people. Do not lose sight of that going forward." And I think that transcends the generational differences we have with so many people in the workforce. That would be a key thing.

I think the other one was to come into the job with your eyes wide open and not just focus on what your line item is, your job for the day, but look at everybody's. Go to the job board, look at what everybody's doing and see how all the different jobs and tasks interact with one another. And ask questions if you don't understand why something is put up and assigned as it is. We wanted people to be assertive, confident people, which meant

Continued on page 18

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Continued from page 16

them asking some questions. We wouldn't just spoon-feed information to them automatically. A more assertive individual is going to be more successful, so we'd try to get that mindset in the young kids.

Golfdom: For decades, you're at Augusta, and you're so involved in the Masters. Then, this last April, you were a patron. What was this last Masters like for you — not being on the crew, but watching from outside the ropes?

Owen: It certainly was surreal. You can't predict what that's going to feel like. But I hosted a bunch of people at the house, both volunteers and friends who were here for the Masters, which I do every year. But to not have to be up at 4 o'clock in the morning and not be there until 7:30 p.m., 8 p.m., every day in the evening was very pleasing and relaxing.

I will say that I went on the first day of the Augusta National Women's Amateur. I hadn't been there for many months, but this ryegrass was just so outstandingly pure and green … it's like it's the first time I ever saw it! It was refreshing to see what the troops had been able to produce. We left a lot of qualified people there at the helm to continue the excellence that we are known for. It wasn't surprising, but it was a bit overwhelming to see it again. And after seeing it for 38 years, you think you've seen it all, but it's still great to go back to. G

Editor's note

We have lots more with Brad Owen, including his earliest memory of working at Augusta National, his personal favorite spot on the golf course and whether or not he has a Masters garden gnome in his yard … but we are saving this, plus some additional content, for our 2026 Masters Preview issue, which will be in mailboxes in late March 2026.

Hall of famers

The Legends Initiative was started in 2017 by Anuvia Plant Nutrients and presented annually at the GCSAA Conference and Trade Show. In 2022, the award was adopted by Kafka Granite and Quali-Pro as sponsors and presented in a smaller, more intimate venue: the *Golfdom* Summit.

Brad Owen will join previous Legends inductees, as well as Seth Jones and Scott Hollister, for an hour-long panel discussion at this year's *Golfdom* Summit.

Previous winners of the award are Ken Mangum, CGCS (2024); Dan Dinelli (2023); Tim Hiers, CGCS (2022); Shawn Emerson (2021); David Stone (2020); Ted Horton (2019); Bob Farren, CGCS (2018); and Matt Shaffer and Marsh Benson in the inaugural class (2017).



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At the Turn



Jeff Sexton

Superintendent //Evansville (Ind.) CC



Jeff, what are you having?
I'll have a Captain Morgan and Diet Coke.

Tell me about Evansville CC.
We're an 18-hole private club. We've got about 700 members. It's your typical family-oriented country club. We just went through a big renovation back in 2022. We just finished up our second full summer after the renovation, and the membership seems to be really happy with it. I'm in my 15th season here.

How did you get into the business?
I've got a dad (Tony Sexton) who was in the business for 42 years. We're originally from the St. Louis market. My dad, a couple of my uncles that worked for him, they were in the business, and I just sat around as a youngster listening about golf course management on the couch during the holidays at Grandma's house, and it just drew my interest from there.

Next time I'm in Evansville, what do I have to do? You need to go to the House of Como and get a steak. It's the best steak in the grungiest restaurant in the city, but a lot of high-profile folks have been through that little restaurant. It's decorated for Christmas year-round. It seems like the silverware and the plates are all garage sale type items. But man, it's a great steak.

What teams do you root for? I'm a Purdue Boilermaker, so I'm watching lots of basketball. I also watch a little St. Louis Cardinals on occasion.

Tell me about your family. I'm married. We've got two boys and a girl. I'm proud to say my oldest son is in the Catholic Seminary. God will take him where he wants to take him. My daughter's a senior in high school, going through the college choice stage of life right now. And then I've got a freshman in high school, my youngest. We like to travel and do things together. We're a real tight-knit group.

What does it take to be successful as a superintendent? I had a conversation a long time ago with a friend of mine … I call it the sixth sense. I try to teach my assistants about the sixth sense of golf course management. I think just the time it takes and to have that sixth sense in your blood, to be able to go above and beyond and just go to the course when needed is a big deal. You just have to live it and understand it and feel it when it comes to weather and wind and humidity. There's just part of this industry that can't be taught.

As interviewed by Seth Jones, Nov. 10, 2025.

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Chapter presidents from around the country say 2025 was a huge success

By the *Golfdom* Staff
Seth Jones, Scott Hollister, Nathan Mader, Payton Szymczak and **Will Coughlin**

Golfdom's State of the Industry Report makes its return after a two-year hiatus, thanks to our sponsor Envu. The team reached out to chapter presidents around the country to ask how the golf season treated the magazine's readers.

Good news: In many parts of the country, Mother Nature was good to superintendents and their crews in 2025.

"It was a little warmer than average, but just ideal for growing grass," says Paul Venable, president of the Idaho GCSA and superintendent at Warm Springs GC in Boise. "It's been warm, wet and just at the right times of year. We've been really lucky as far as the weather."

Combine great weather and high golfer demand, and that equals packed tee sheets. Which is both a blessing and a curse.

"It's good and bad — you're getting a lot of wear and tear, but overall golf is healthy. You just ride the wave as long as you can, you use it," says Nate Bolhous, president of the Midwest Association of Golf Course Superintendents and director of grounds at Briarwood CC in Deerfield, Ill. "It's put a better focus on the golf course. It's the stress of constantly packed tee sheets, but at least more guys are getting equipment. More guys are getting to do renovations and improvements."

What follows are interviews with nine different chapter presidents. The interviews are shortened here for space — to read the complete interviews, visit **Golfdom.com.**

Paul Venable

PRESIDENT, Idaho GCSA

SUPERINTENDENT, Warm Springs Golf Course, Boise, Idaho

How was this year's golf season in your region?

We're one of the busiest courses in the valley here, but even talking to other superintendents around the area, golf has really picked up. It's been busy; we built a new clubhouse, so we've been extra busy. But, golf in general has really, really picked up.



Paul Venable

What was the labor pool like this year?

We were lucky as far as labor. We have kind of a returning staff, generally, of retired guys that want something to do, and the free golf doesn't hurt. We've also had an influx of college kids the past few years, and this year, because of the project we're working on, we got both. I know here recently, a lot of courses were having a labor issue, but we really haven't been hurting that much labor-wise. The superintendents I've talked to, they're pretty happy with their staffing. I think it's been good for our area.

Any notable success stories for your chapter or region this year?

We've undertaken this huge project building a new clubhouse, and they decided to make us the landscape contractor, so we did all the landscaping in-house. We've built several greens and stuff like that all in-house, so it's been wild — something that most courses wouldn't do in-house, but it's been a real learning experience.

What are your expectations for 2026?

I hopefully don't see (golf) slowing down. I mean, if anything in our area, we could fit another course or two. Golf has really picked up, and hopefully that'll come about. Golf has boomed and waned over the years. Right now, we're on the boom trend, so I don't foresee it slowing down immediately.

— N.M.

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Paul Venable says the mix of returning staff and crews of college students helped ease labor challenges, keeping Warm Springs GC operating smoothly.

PHOTO COURTESY OF: PAUL VENABLE

Brent Austin

PRESIDENT, Inland Empire GCSA

SUPERINTENDENT, La Grande (Ore.) CC

How was this year's golf season in your region?

This year was actually quite a nice year for golf in my region. We were able to fill our tournaments. In the last couple years since COVID — even before COVID — we weren't filling our tournaments as full as they used to be prior to that. And just with the change in economy and everything else going on in the world, I think people were getting away from golf. But this year — really the last couple years — each year has gotten better and better. We had all our tournaments filled months in advance. Prior to that, we're scraping, keeping the deadline open to enter the tournament until the day before. So, it was really good in that respect.

Overall, how was the weather?

This year's weather was different for us in that it was probably better for us. We didn't get the *hot-hot* like we sometimes do. We kind of stuck in that 80-90-degree weather through most of the summer. And, normally, we'll hit 100 for one to two weeks, but this year, I think we had one day in the triple digits, and everything else was 95 and lower. We didn't have to worry about the heat stress that we normally have in the years past, and with that, we were able to keep things greener. It was a little easier to keep the consistency in our green speeds because we didn't have to monitor our watering with the heat and everything else quite as much. We've had a good start to the winter already.



Brent Austin

Continued on page 26

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What was the labor pool like this year?

This year, it seemed like I was able to get the employees I needed without any trouble, and I got good employees that wanted to learn and do well in the job that they were doing. They were always wanting to try new things, mow new directions and really put that little extra effort into making it look good. They would see something on TV at a tournament and be like, "We want to try this." It was actually a good year for me in the labor pool.

What are your expectations for 2026?

I like to be optimistic in that things are going to be at least just as good or even get better for my own course. I always hope to see what struggles we did have with this patch of grass here, there, and say, "Hey, you know what? We're going to make that better." I'm hoping the weather gives us the same thing we got this year because it was very helpful to not have that stress from the heat, and that makes life easier on the job.

— N.M.

Joe Budinich

PRESIDENT, GCSA of Northern California

DIRECTOR OF AGRONOMY, The Peninsula G&CC, San Mateo, Calif.

How was this year's golf season in your region?

It was easier this year. We had a pretty cool summer, and I feel like there wasn't much turf loss in this area due to the summer months.

What was the labor pool like this year?



Joe Budinich

I feel like it was great this year. We didn't really struggle keeping the full staff. Talking to other superintendents, I heard pretty much the same. It doesn't seem like people really struggled to keep full staff this year.

Did you have any success stories for your chapter or for your region this year?

We had a few national events that were hosted here. The Walker Cup was hosted at Cypress Point down in Monterey. Then

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The Dye Preserve GC in Jupiter, Fla., where Florida GCSA President Ryan Swilley, CGCS, serves as director of agronomy.

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Continued from page 26

the U.S. Amateur was hosted at Olympic Club in San Francisco. And then Monterey Peninsula, they hosted the U.S. Women's Mid-Am. So we kind of had three major, national events that were hosted in a small area.

What are your expectations for 2026?

I'm a person that tends to be on the cutting edge. I have nine automowers, and then I have a drone that we fly over our property every day that we use for thermal imaging to basically be able to use as data to set water off of. I feel like with technology continuing to improve and becoming more and more prevalent in our industry ... the goal is that the job just continues to get a little bit easier each year, or a little bit more efficient.

— P.S.

Matt Hall

PRESIDENT, Iowa GCSA

SUPERINTENDENT, Burlington (Iowa) GC

How was this year's golf season?

Here at my golf club, rounds were about the same as they've been for the past four to five years. We increased our outings this year, and I don't know if that was just because of some of the other places in town were maybe turning them down. I'm not sure why, but here at my golf club, the total number of rounds was pretty close to the same.



Matt Hall

How did the weather treat you?

I'm the president of the Iowa chapter, but my golf course is clear in the southeast corner of the state, along the Mississippi River. So, as you know with any other state, the weather can change, and just within 10, 15 miles, sometimes 10 or 15 seconds. I know me and some of my guys that I talked with close to me had a super wet July. I think I measured 13 to 14 inches in the month of July. I talked to some guys who were up close to 19 inches who were within 40 miles of me.

It was a wet one, and turf struggled. My turf, fortunately, we were able to stay on top of it and keep things dried out and poke some holes and do everything we could to mitigate Mother Nature's issues. But I know some other places struggled. Either they didn't have the staff to take care of those things, or they didn't have the equipment to take care of those things, or they didn't have the budget to put fungicides down, all that kind of stuff. And when you have some problem

Continued on page 30



The contingent from the Iowa GCSA during National Golf Day 2025 in Washington, D.C.

PHOTO COURTESY OF: MATT HALL

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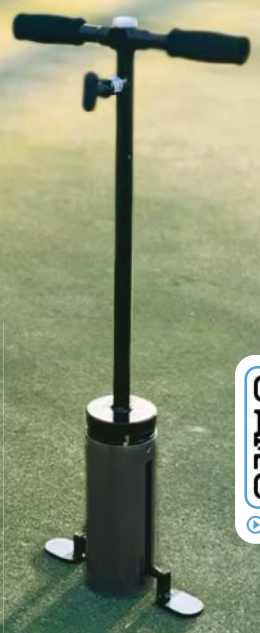




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WATCH IT WORK

Continued from page 28

areas on your golf course, when you have a July like we just had, they get worse, and it really shows its face.

Mother Nature definitely rules the world and what we can and can't do. But golf overall, in my neck of the woods, is still going good.

Any notable success stories coming out of the Iowa chapter this year?

Yeah, I do, it's a sense of pride now because we've grown our Rounds 4 Research donations ... I think we maybe started with two (rounds) originally, and now we're up near 40.

Our chapter, just within the last couple of years, is trying to be really involved at the FFA level. We're trying to get our face at different FFA state-level events. There's a local school district and community college district that just put up a multi-million-dollar building. A couple of superintendents in that area have been in touch with some instructors. We're trying to get to these kids early, show them that, if you want a summer job, you don't have to weed all your life. There are more fun things to it than just that.

What are your hopes for 2026?

My mind tells me that the year is going to start in March, it's going to be 70, and it's going to stay 70 until December! I'm kidding. Mother Nature, like I said, she controls us, and every year is different. Weather events just seem to be getting stronger and stronger. I don't know if it's worse or better, but it's very difficult.

It's a struggle, but it's a challenge that I love, because we don't have the same job every day. You know, day to day, maybe it's kind of the same, but if you look at month to month — it's changing, and being able to overcome those again for 2026 is a challenge that I love and I look forward to.

— W.C.

Garrett Luck

PRESIDENT, Wisconsin GCSA

SUPERINTENDENT, Hidden Glen GC, Cedarburg, Wis.

How was your year? How was the golf season?

The golf season was great. Golf is booming still. I didn't think we'd see it growing like this ever since the Tiger boom, but the post-pandemic boom has been great. I don't know if we're going to meet where we were at last year, but it'll be close, which is still impressive considering last year was a record year. Membership at our club is strong. Throughout the area, it is strong.

How was the weather this season?

May was wet, and then we warmed up, and it got really nice. And then we had record-breaking flooding. In the Milwaukee area specifically, one event we had, in 24 hours, 11 to 15 inches of water. It was a big issue for a lot of courses and clubs, especially where there wer rivers running through them.

But the cool thing about that was seeing how close-knit of a community superintendents are and how they help each other out. Anybody who wasn't affected too severely was willing to help out, offer equipment or assistance to their neighbors. That was the bright side of a really difficult event. We had our August golf meeting at North Hills CC in Menomonee Falls — suburban Milwaukee — and they were one of the hardest hit. We still had our event weeks after the rain event, but it was shortened to nine holes because they had multiple holes that were still out of play.

How was your labor pool?


Garrett Luck

Strong. I think you go back three or four years ago, especially during the pandemic and right after, it was a real struggle to find people. It was a challenge. It seemed like college kids were reluctant to work, and even retirees were harder to find. But in the last two seasons, we've had to turn away people. It's almost like you had to apply early. You'd better apply over spring break, because if you wait until May, there's not room.

I don't know if it's specific to our region, but wages have gone up. Pre-pandemic, we'd start high school and college kids with no experience at $9, $10 an hour. And now, if you're not paying — at least in our market — $15, $16 an hour to start with no experience, people don't even look at it.

For 2026, what are you thinking? What are your expectations?

I think as long as golf remains strong and the economy remains where it's at, I think we're just going to keep on rolling. It's exciting times.

— W.C.

Alex Tolbert

PRESIDENT, Carolinas GCSA

SUPERINTENDENT, Orangeburg (S.C.) Country Club

How was this year's golf season in your region?

Golf around here has really taken off since COVID, and we've actually been able to maintain that level. Everybody wants to know if and when that bubble

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is going to burst, but we're still riding it, and we're going to ride it as long as we can. In the Carolinas, we've seen an uptick in play that has continued over the last three or four years. I know that at my course, we're going to do as many rounds this year as we have in the last nine or 10 years, which is great for us.

Overall, how was the weather this year?

It was kind of a normal year in our region, with a few extremes thrown in. We had a little warm weather in January and February, and the grass was trying to figure out if it was spring or not. Then we sat kind of idle for the next couple of months, where the temperatures were warm enough for everything to be green, but



Alex Tolbert

not warm enough to really grow. We were really, really warm in May, June and July, then came August with a lot of rain and the warm temperatures. And in September and beyond around here, it stops raining unless a hurricane rolls through, and that's what we saw. All in all, it was a pretty normal year for us.

What was your labor pool like this year?

It is still a struggle for us and most courses in the region. I know a lot of places did what we did and changed the way they look at things. We used to want full-time guys who could work a set schedule, whether during the week or over weekends, so you could make sure that everything got done. Over the last few years, a lot of us have been a little bit more flexible and tried to actually hire full-time equivalents.

Any notable success stories for your chapter or region this year?

The chapter had a lot of success again this year in raising money for Rounds 4 Research. We cracked the $150,000 mark, which broke our record for the year before. It's not always easy, but we've been able to keep the momentum going, and in the last two or three years, we've awarded $286,000 in grants for research.

— S.H.

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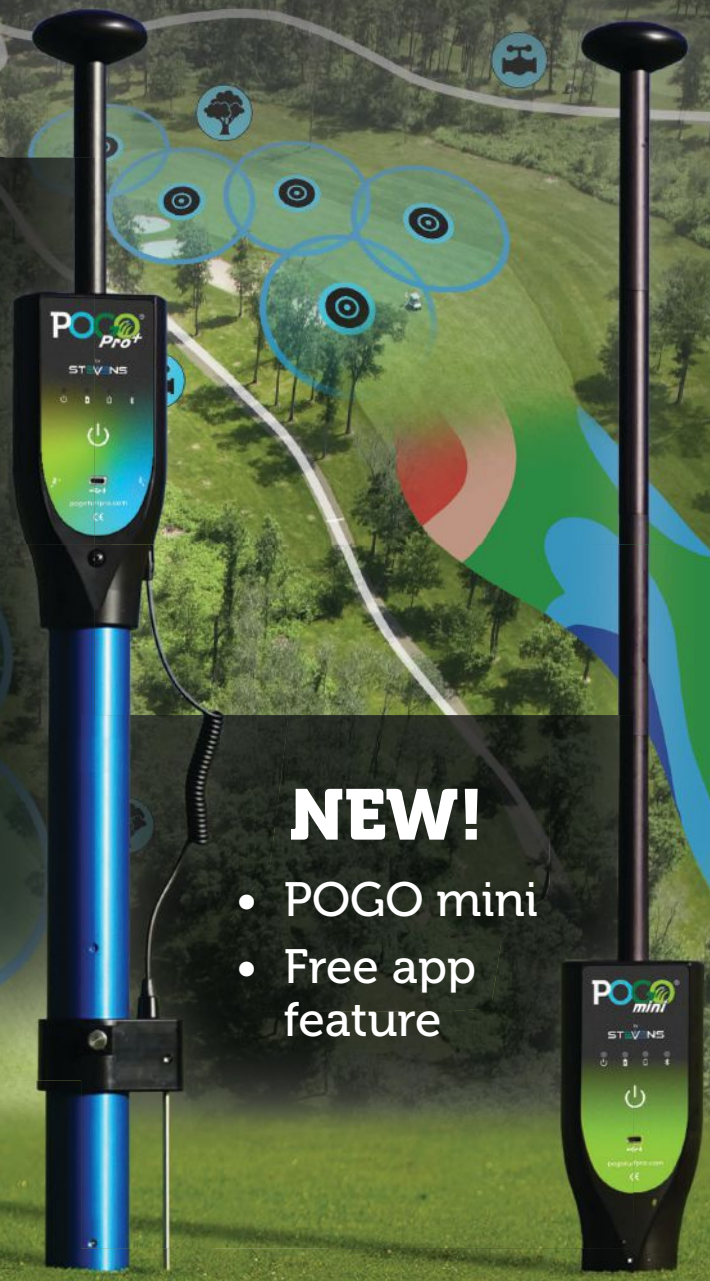


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Reagan Olson

PRESIDENT, Central Texas GCSA

DIRECTOR OF GOLF COURSE MAINTENANCE, Westlake CC, Austin, Texas

What was your golf season like there this year?

It was a crazy golf season this year. We play golf year-round here in Central Texas. It was a mild winter, and summer was pretty mild, too. We easily average well over 100 degrees, but we were not even close to that this year.

How was your labor pool?

It's been pretty difficult to find and retain. The biggest thing is trying to compete with other clubs in the area. I've got a good core of about 13 to 14 people. We're trying to raise pay rates. We offer discounted meal prices. The cost of living in Austin is pretty high, too, so a bunch of my guys have a second job, which we try to work around that.

Any success stories from the chapter this year?



Reagan Olson

Our association, we've increased our 2024 and 2025 scholarships each year. In the past, we've had to keep it to a certain number of scholarships. But in the last couple years, whoever signs up pretty much gets one. And then one of the new things that we implemented last year was a crew holiday fund. We took our 50/50 drawings through the year and held some money back at the end of the year. Superintendents nominate one person from the crew, and we help them out around the holidays. We've heard some stories from different crew members who are having some hard times, so it's just something we can do to help out.

— S.J.

Nate Bolhous

PRESIDENT, Midwest Association of Golf Course Superintendents

DIRECTOR OF GROUNDS, Briarwood CC, Deerfield, Ill.

Generally speaking, how did the weather treat you guys in the Chicagoland?



Nate Bolhous

I don't want to call it disappointing, but it was basically a false spring. There was a couple warm days, everybody thought it was going be an early start, and then it just was pretty chilly even through May. A lot of stuff didn't really get going. And once we hit July, July was pretty rough. For the 15 years I've been in this area now, it was one of the toughest Julys. The humidity, it rained nonstop. We had high temperatures. It was really bad. And then, the first two weeks of August, it was just a lot of disease pressure. You're trying to push conditions, and you have a big club event, it's just rough. The finish of the year has been good, it's really been beautiful.

How busy was the golf season?

I know a couple of my buddies down the street, public golf is crazy. The only season we've done more rounds was the actual COVID year, and that's because nobody had anything to do. We're getting really close to that again.

How is the labor pool there?

It's good. This is the first year I turned guys away. The GPS mowers, all this stuff is coming. It's here. I've seen some demos. Does it work at my place right now? I don't think so, but it's exciting to see. Where we're going to be five years from now, once it's better implemented, maybe some more efficient machines as guys are struggling with labor. When you look at the labor pool, you'll always have to rake bunkers, there's going to be certain things we always have to do. But the more they can automate rough mowing your large areas … hopefully we can get there.

— S.J.

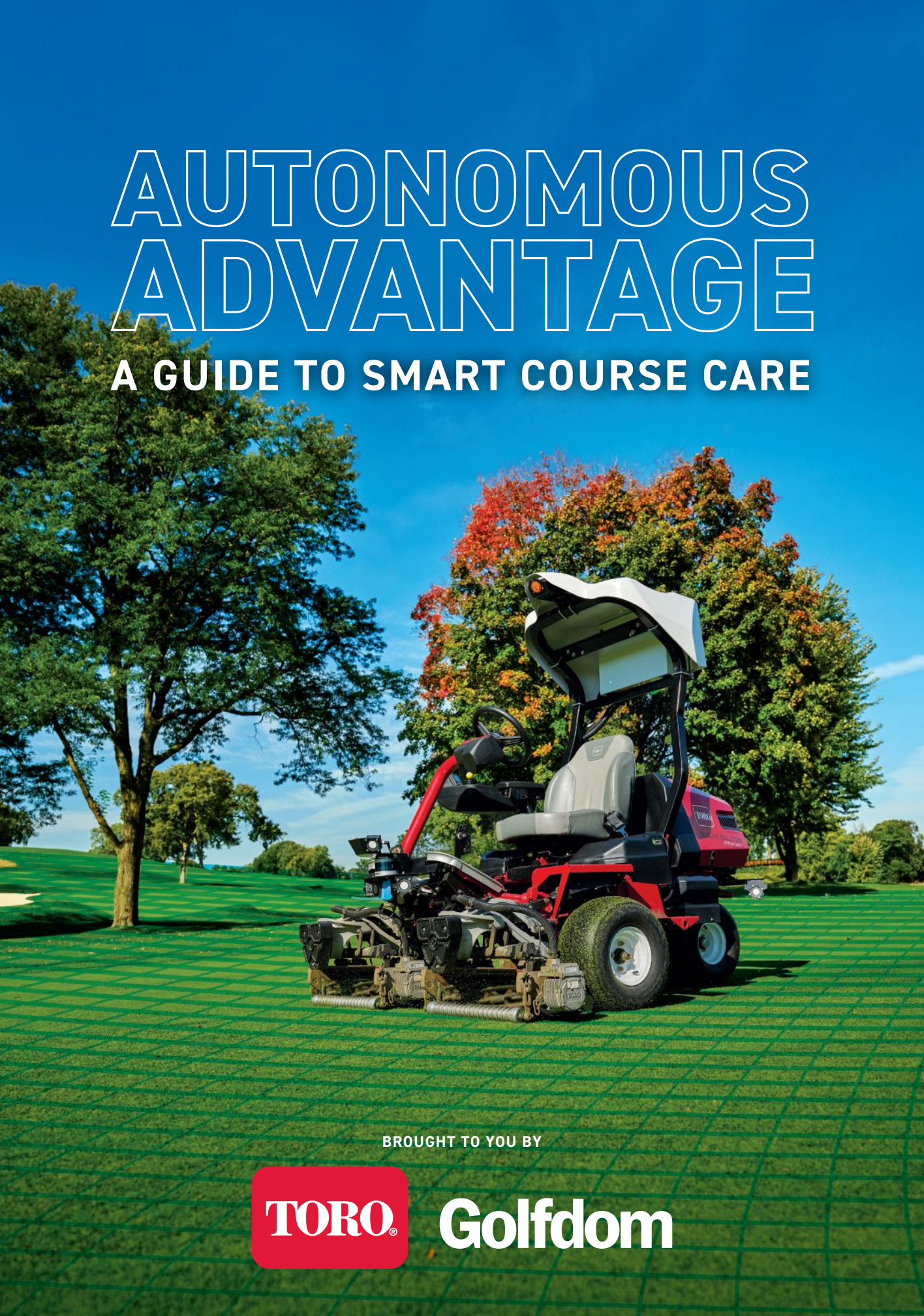
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THE FUTURE IS NOW



GRANT YOUNG
Group Vice President,
Golf, Grounds and Irrigation
The Toro Company

Finding qualified staff, managing tight budgets, and consistently delivering exceptional conditions aren't new challenges for turf professionals. However, the conversation about solutions is changing. Autonomous technology is no longer a "someday" concept — it's here today, and it's not always easy to sort the facts from the hype.

That's why we've collaborated with *Golfdom* magazine to create this guide. It's designed to help you ask the right questions, better understand the state of the technology, and see how some of your peers are integrating these new tools into their operations.

For over a century, our philosophy has been to build real-world solutions based on feedback from you — the professionals who make your living with them every day. Integrating the benefits of autonomy into your golf operation is no different. With your experience and insights, we are building a purposeful evolution of the proven platforms golf courses around the world trust, backed by a deep understanding of what's at stake. This technology isn't retrofitted for golf; it's *built* for golf.

We hope you find this e-book to be a valuable resource. As you consider your next steps, know our world-class distributor network is ready to help with information, training and support every step of the way.

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YOU CAN BUY TIME

Autonomous mowers are flipping the old adage for golf course superintendents

BY **SETH JONES** EDITOR

Every superintendent understands how time is a precious thing. From the time the crew spends on each task maintaining the course to the number of tee times (can we squeeze a few more tee times into the tee sheet?), time is a precious commodity.

Warren Buffett probably put it best when he said, "It's the only thing you can't buy. I can buy anything I want, but I can't buy time."

But what if, in a roundabout way, a superintendent could buy time?

Enter the new Toro Greensmaster eTriFlex 3360 with GeoLink Mow, a mower unveiled in the summer of 2025 and now available in more that 40 countries. It's an autonomous fairway mower with a seat so operators can drive it when they want and let it loose when they want to perform other tasks. The mower is the result of decades of development, Toro's collective knowledge of mowing and recent advancements in robotics and GPS mapping.

It's a mower that never calls in sick, always cuts a perfectly executed clean-up lap, and if it faults, it instantly texts the boss. Optimistic superintendents might ask, "What all can this mower do?" Pessimistic superintendents might ask, "What can't this mower do?"

But, experts advise the question they should be asking is, "how can this mower best be put to use in order to buy me time?"

NOT A BE-ALL, END-ALL

Paul Sibley is the golf course superintendent at Walnut Creek Golf Preserve, a municipal



» Toro's Greensmaster eTriFlex 3360 with GeoLink Mow operating autonomously at Interlachen Country Club.

> **"This machine dials that in. In the future, maybe we'll be able to just send that out to do cleanup cuts and maybe supplement a couple fairways, just to get those cleaner, crisp lines that the GPS and robot can provide for us."**
>
> **Paul Sibley**, superintendent, Walnut Creek Golf Preserve



course owned by the city of Westminster, Colo. A veteran superintendent with 37 years in the industry, Sibley was working for a construction company 28 years ago when he helped build Walnut Creek. It was the last course he built — he joined Walnut Creek's team as the course's assistant superintendent and was promoted to superintendent in June of 2013.

Back in August of 2022, Sibley was asked if Walnut Creek would like to host a beta version of the GeoLink Solutions autonomous fairway mower. The answer was yes, and he and his crew have been observing the mower since.

"When we first got it, I had some preconceived notions (about autonomous mowers)," Sibley says. "As an ignorant superintendent, I truly thought these mowers would be the be-all, end-all and cut everything the way I want it to cut."

Sibley learned that his GeoLink Solutions autonomous fairway mower wasn't a do-it-all machine. It had a specialty: mowing fairways. And the best way to use it was as supplemental support for mowing Walnut Creek's fairways.

"We'll send it out to mow 15, 16 and 18. Then our guys have three less fairways to mow while the mower is tooling around," Sibley says. "Those guys are cleaning up their machines, getting ready for their second duties, and we can get them out the door a little quicker and start doing detail work around the golf course. They're hand-raking bunkers, fixing ball marks, repairing divots."

Last winter, Sibley had a problem with heavy goose traffic on his fairways. Golfers and superintendents alike know what geese leave behind. It's an ugly job, but someone's got to clean it up.

Or in this case, *something*. A robot doesn't complain about a dirty job.

"Previously, I had an employee dragging a blower and blowing that stuff off," Sibley says. "We weren't having to utilize two or three guys to go out and do that; we just sent the robot out."

THE LEARNING JOURNEY

For the last 25 years John Hurst has worked as an engineer for The Toro Co., first in product development for residential and landscape contractors and now, for the last several years, as the senior director of the company's Center for Technology, Research and Innovation.

"It's a very exciting time to see (autonomous mowing) coming to be real," Hurst says. "It's exciting to see it being a solution. We help customers increase their productivity. We help the customers do their jobs."

With so much experience observing and advancing mowing technology, Hurst has a somewhat different perspective when it comes to seeing how people react to the next big development.

"From my chair, I see these things come in different hype cycles," Hurst says. "You have some people with perspectives that say, 'This is going to do everything for me!' And you have other perspectives that say, 'This will never work…'"

The magic happens, he says, when people get through that hype cycle and take the time to think about where the machine can't work and, conversely, where it can work really well.

"They say you can't buy time, right? But this is really buying time," Hurst says. "If you're struggling with labor, you can utilize these. You can supplement those gaps you have. Think about that — the ability to buy time and be highly productive."

To fully understand the power of autonomous mowers, Hurst recommends both attending demonstrations as well as consulting with peers in the industry. Because, like Sibley described, the perception of what the mowers can do and the reality are often misconstrued.

"Part of the learning journey, and even a little bit about overcoming misconceptions, is how do superintendents incorporate this into their processes?" Hurst says. "It is a change in how they do the operations. You're changing your process.

Bells and whistles

Take a quick walk around the Toro Greensmaster eTriFlex 3360 with GeoLink Mow

- **No-look pass** No need to stay close to the mower while it mows; superintendents can monitor and control the mower from any location on the golf course though their phone, tablet or computer. If an issue arises, the mower automatically texts the supervisor.
- **Easy rider** If the course's layout allows, the mower can transport itself from one fairway to the next. It cannot transport itself across streets or through residential areas.
- **Its got the power** Powered by a 14.5-horsepower Kawasaki gas engine that allows for 8 to 10 hours of operation on a single tank. The hybrid engine/generator carries no hydraulic fluid and has all-electric components for traction, steering, lifting and cutting.
- **Back in the driver's seat** Intentionally designed with a backup option for the operator to manually operate the machine in areas where autonomous operation isn't viable. The mower can also be used manually in areas where Triplex reel mowers are used.
- **GeoLink GNSS Navigation** Survey-grade RTK technology offers a higher level of GNSS obedience. Mowing boundaries can be mapped down to the centimeter for consistent cleanup laps.



You're maybe changing how the fleet is sent out, what time it's sent out or how it's doing its job. But the beauty is it always shows up to work, it's always doing what it's told, and it goes out and performs."

ALWAYS ON CALL

Before Walnut Creek Golf Preserve was handed the keys to one of the GeoLink Solutions autonomous fairway mowers, a member of the crew had to complete an online training course about the machine. After delivery, a team from Toro robotics came to the course to help Sibley and his crew get trained on the machine and map the course.

Because the GeoLink Solutions autonomous fairway mower is based on previous Toro mowers, the crew was already familiar with the mower.

Sibley says the onboarding process was "intense," but it was also thorough, which is what he expected from Toro. He says that for as long as he's worked in the industry, Toro has been known for their customer support.

"(Toro) really stood by us, and still stand by us, the whole way through," Sibley says. "When they left, we would be out there mapping and have an issue; we would call them up, and there was somebody, if not on the phone right then, within five, 10 minutes, calling us, whether it was their tech support or engineers. They knocked it out of the park on this one."

From then to now, the mapping process and map are much more intuitive and refined. After minimal training with Toro's trusted Distribution Channel, customers are capable of mapping and maintaining the maps of their course with minimal oversight from Toro or their channel.

Hurst says the mapping technology, its cost and availability have all greatly improved over the last 10 years, allowing autonomous mowers for golf courses to "become real."

"It's cost to value. Whether it's RTK (real-time kinematic), GNSS (Global Navigation Satellite Systems) corrections and availability, if it's things like processing power running on the Nvidia solutions that have come down," Hurst says. "There are significantly more sensors available now than there was even 10 years ago when it comes to things like safety certified radar, to lidars, to sonars. The market availability of those technologies that come into a space … now where we can execute it onto these products and bring it to market."

The autonomous fairway mower uses the GeoLink Mow Supervisory App, a digital tool customers can use to map, control and troubleshoot their machines, accessible from any device with internet including phone, tablet or a computer. The system is precise — once the perimeter of a fairway is mapped out, the mower will never stray off that cleanup pattern.

"The area where I was just ecstatic about this machine was our cleanups and taking the human factor out of doing our cleanups and scalping into the rough or not getting far enough," Sibley says. "This machine dials that in. In the future, maybe we'll be able to just send that out to do cleanup cuts and maybe supplement

a couple fairways, just to get those cleaner, crisp lines that the GPS and robot can provide for us."

WATCH IT WORK

As technology continues to evolve in the autonomous world, more and more people are being exposed to it. In cities with driverless automobiles, seeing an unmanned mower is less of a shock than it used to be.

"If you look at the car you're driving today to the car you were driving 20 years ago, the differences are significant," Hurst says. "In some places, you're not even driving the car anymore — you just happen to be in the car, and the car is driving."

Hurst thinks courses that are becoming more high-tech could see success in attracting younger employees who are interested in learning about and operating the robots.

"The younger generation is not as excited to get into this industry as they were a decade or two ago," Hurst says. "This is a pathway to get some really talented people because they're working with cool products."

Sibley echoes those sentiments and adds that while it's primarily him and his assistant working with the robot, the crew also enjoys seeing the machine at work.

"Everybody thinks it's really cool and loves to see it working out there," Sibley says. "The crew loves it. The fairway crew loves it because they're mowing less fairways. My assistant, sometimes I tear him away from the thing because he likes operating it so much."

Sibley advises his fellow superintendents to go out and see the demos and then assess how they can best be utilized at an individual golf course. A recent demo day for the Rocky Mountain GCSA brought out multiple mower companies and an army of superintendents excited to see what they were capable of.

"See what will work, what might not work, but really get proactive in getting these vendors out to your specific facility," Sibley says. "Courses vary so widely. Terrain mounds, all mowing operations … but get these guys out there to assess your property."

He has two more pieces of advice: keep an open mind, and educate your golfers about what you're hoping to accomplish with the equipment.

"It has completely met my expectations. And to be honest with you, the triplex, it has just as good, if not a better, quality of cut than the 5410s," Sibley says. "And really put them out in front of the public. Whether it's public golfers at your facility or members, really open the door to educating them on the why and how we're doing this. And keep an open mind to feedback from them, because if they're going to be negative, it might not work for your facility."

FUTURE PREDICTIONS

As for how quickly autonomous mowers are embraced by the industry, Hurst can't guess. But he is hopeful that with them becoming more common, more of the naysayers will give them a try.

"Whether it's autonomous or electrification, just try it," he says. "You're going to quickly see how you get from being skeptical to comfortable. And you're going to want more of these because you'll see how well they're working and how much more you can do to get the course in pristine condition."

Sibley says he enjoys talking to his fellow members of the Rocky Mountain GCSA about what they're doing at Walnut Creek. He thinks over the next three to four years, as the technology and price point come into full balance, robotic mowers will be much more commonplace.

"I see these things being able to help the industry in ways beyond our belief," Sibley says. "In the beginning, the humdrum was you can reduce labor costs. I'm not getting rid of a single person, even if I have 30 of these things running around out here. There are so many other things we can be doing. Our bunkers are in better shape now. This robotics generation is huge. It's going to be huge for our industry." ■

> **"If you're struggling with labor, you can utilize these. You can supplement those gaps you have. Think about that — the ability to buy time and be highly productive."**
>
> 
>
> **John Hurst**, senior director of Toro's Center for Technology, Research and Innovation, The Toro Company

SAFETY FIRST... AND MUCH MORE

Technology powers the safety features, precision and repeatability that's baked into Toro's new groundbreaking GeoLink Solutions fairway unit

BY **SCOTT HOLLISTER** EDITOR

Any new technology that holds the promise of revolutionizing an industry naturally brings with it questions and concerns from not-so-early adopters and full-blown skeptics alike.

Take self-driving cars as an example. The fleets of Waymo ride-sharing vehicles that have become common in cities such as Phoenix, Atlanta and Los Angeles have elicited plenty of handwringing about their overall safety and whether these driverless cars pose any real threat to riders or pedestrians, all despite a growing mountain of evidence that these vehicles are actually significantly safer than their human-operated counterparts.

In the golf maintenance industry, similar questions have been asked about autonomous mowing, although in a far more thoughtful and levelheaded manner than those raised about the Waymo. Superintendents exploring autonomous solutions rightfully want to know what happens when a mower encounters obstacles on the golf course, what it does when faced with congested cart paths it must navigate to tackle its next task and so on.

Jeff Ische, Josh Lemons and the team of engineers at The Toro Co., who have brought the new Greensmaster eTriFlex 3360 with GeoLink Mow to market, asked all those same questions. And they're confident that the answers to those questions will give peace of mind to both curious superintendents and skeptical golfers.

"Safety was at the forefront of everything our team of engineers did in the development of this mower," says Lemons, a former superintendent who is now a product marketing manager with Toro and has worked on the GeoLink Solutions project for more than a year. "We think the safety system we have in place today provides that extra assurance that it can and will operate safely in all settings."

IN GOOD HANDS

The new GeoLink Solutions autonomous fairway mower will have a familiar look to most superintendents since its framework is the traditional version of Toro's popular Greensmaster eTriFlex 3360 unit. Other than the array of antennas the machine has been outfitted with to give it full RTK GNSS and cellular connectivity, the mower has the same features and cutting units as the 3360. It even comes with a traditional operator seat and steering wheel for manual operation, when needed. That means this unit can mow fairways in autonomous mode one day and be used as a normal triplex mower on the next, bringing extra versatility.

When operating autonomously, superintendents will be able to monitor the mower on their smartphone, tablet or desktop computer using Toro's GeoLink Mow Supervisory app. The mower will even provide updates via text alerts to supervisors overseeing the mower's workday.

Backing up those bells and whistles are the real core of the GeoLink Solutions safety system — a robust obstacle detection system that uses lidar, radar and sonar to monitor its surroundings in any lighting condition, checking for obstacles or hazards that might prevent the safe operation of the mower.

And in addition to the forward-facing sensors, the GeoLink Solutions autonomous mower also has side senors to monitor potential obstacles approaching from the side of the mower while in autonomous mode or initiating autonomous mode. Toro says that makes it the only autonomous mower in the market with that kind of coverage.

"The redundancy in the sensors that are on these machines is the real key to their safety systems," says Ische, a senior product marketing manager for Toro who, like Lemons, is also a former superintendent. "The sensors back up each other and have to agree that there isn't anything that would prevent the safe operation of the mower before it will do anything. That (redundancy) was a step we didn't necessarily need, but with new technologies like this one that people are getting used to, we thought it was an important one."

SUPERVISED OPERATION

Redundant sensors aren't the only precaution that has been baked into the GeoLink Solu-

tions autonomous fairway mower. Considerable thought and pre-launch testing went into determining the best, safest way to deploy the mower and monitor its operation.

First, unlike earlier incarnations of autonomous mowers in golf that had to be transported from hole to hole and operated with full line of sight to a human staff member, Toro's GeoLink Solutions mower can be deployed from a central location on the golf course, beginning and ending its assigned tasks at the same spot.

"While we do require a supervisor on property, it doesn't need to be line of sight, and that person doesn't need to be anywhere near the machine," Ische explains. "Once the first area to be mowed has been looked over by the supervisor, the mowing mission can be started and the mower can navigate on its own from fairway to fairway until completed.

"Some superintendents will interact with the mower more than others, of course. If you're at a golf course that weaves through a housing development or has areas where the mower will need to cross public roads, you'll interact with the mower more than someone at a parkland-style course. But for most, the only engagement superintendents will have with the machine is when they receive a text asking if it's OK for the mower to move to the next hole, which it will send when it's nearing completion of the previous hole. That's about it."

What Ische, Lemons and Toro's engineering team couldn't build into the GeoLink Solutions unit was a feature that stopped curious eyes from staring at the autonomous machine when it first begins its work on a golf course.

"We have seen at our beta sites and customer demos that, at first, everyone stands around and watches it do its job," Lemons says. "Which is just about as exciting as watching a human operator sit on a mower and cut grass, right?

"Once that excitement wears off and everyone realizes it's functioning the way it's intended to, being a spectator kind of loses its appeal. Eventually, we trust the mower to do what we've asked it to do, and we go about our day tackling other higher-value tasks, which is the real promise of autonomous mowers like this one."



"But for most, the only engagement superintendents will have with the machine is when they receive a text asking if it's OK for the mower to move to the next hole, which it will send when it's nearing completion of the previous hole. That's about it."

Jeff Ische, senior product marketing manager, The Toro Company

PEACE OF MIND

Safety and the amount of supervision needed to ensure worry-free operation of the GeoLink Solutions fairway unit aren't the only questions Ische and Lemons get from their former colleagues interested in putting this technology to the test on their golf courses.

"Number one, they want to know whether it is going to work, and not just for the demo, but is it going to work day in, day out," Ische says. "And we can demonstrate that, yes, it is going to work for the long term. We've got beta sites that have been using it on a regular basis that we can point to and show how successful it's been.

"The other main misconception ... is the technology. How fast is it going to evolve? Is this something that, in three years, will be out of date or need a full upgrade to be functional? As the technology and functionality continues to evolve, Toro will provide software updates, similar to the Lynx irrigation control system."

At the end of the day, though, Toro is confident the new GeoLink Solutions autonomous fairway mower is technology that will help superintendents and their teams do the job better, faster and more efficiently.

"While it's not going to be right for everybody and every golf course, that can be said for a lot of products in this industry," Ische says. "When it comes to this machine, we're confident that people who go down this path with us will be pleasantly surprised with how well it works and the benefits they see from it." ■

ARE YOU READY?

Superintendents should consider several factors when determining whether autonomous technology is right for their golf course maintenance operations

BY **SCOTT HOLLISTER** EDITOR

How do you know whether you, your team and your golf course are ready to take the plunge into the world of autonomous mowing?

There are plenty of factors that superintendents need to consider when trying to answer that question. But Jeff Ische, a senior product marketing manager for The Toro Co., and his colleagues swear there is one simple way to determine if a golf course is ready to go autonomous.

"We used to ask, what happens when your WiFi goes out? If their first instinct is to check wires and reboot versus calling their internet provider, then that's probably the right person to be on the cutting edge of autonomy," Ische says.

Being comfortable with technology is only one of many factors superintendents must consider when assessing autonomous mowers and whether they fit in a golf course's operations. And while Ische says it's only smart for a superintendent to carefully weigh all those factors before making a decision, he believes the use case for this technology has reached the point where autonomous makes logical sense for most facilities, regardless of shape or size.

"For someone who's not afraid to open the hood and to try new things, they're on the right track with this technology," he says. "But even if they're a little cautious about new things and new technologies, we're confident that the benefits of autonomy far outweigh any perceived concerns in most situations."

LONG TIME COMING

For superintendents still unsure about autonomous technology and whether it makes sense for their operations, it might be instructive to look back on Toro's journey with this technology and its commitment to keeping the end-user top of mind at every step along the way. When these mowers became commercially available, the company wanted to be able to deliver not only a product that worked, but also one that removed any hesitancy customers might have about the technology.

That was all part of the long-term vision for technology established by Toro CEO Rick Olson, according to John Hurst, the senior director at Toro's Center for Technology, Research and Innovation.

"He put forth three key technology and innovation pillars — alternative power and electrification, autonomous, and smart connected products and solutions," Hurst explains. "So, within that framework, the company invested heavily in autonomous-type technologies for almost a decade. And when you kind of look back over time from where we started to where we are now — from design and development, product testing, and now being ready to bring something to market — it's really exciting."

The path following in the development of the new Greensmaster eTriFlex 3360 with GeoLink Mow is a great illustration of that focus in practice. Early on, the team at Toro knew that the most logical use of autonomous technology would be in fairway mowing, and it had dedicated plenty of brainpower to achieving that goal.

"With skilled labor getting harder to find, our team recognized that there was a need to supplement golf course labor, and this technology could do that," Ische says. "When we talked with customers about how best to use that technology, fairways were top of the list. They're a large part of any golf course, are well-defined areas and have a regular mowing schedule. It was a great fit."

Development efforts jumped into overdrive in early 2021, when Toro purchased the Portuguese company Turflynx, which was already well down the road in developing a robotic mowing solution.

"They already had a working triplex mower, so when they joined Toro, we inherited all the work they had already done, their team … everything," says Ische, who joined the company in June 2020. "That really got things moving in the right direction for us."

From there, it took plenty of trial and error and several years of testing at beta sites on golf courses in California, Colorado, Florida, Portugal and, of course, near Toro's headquarters in Minneapolis to fine-tune the product that superintendents can add to their arsenals today.

"We've completed training all our North American distributors and about half a dozen or so of our largest international distributors. Most of our distributors now have either already received a demo or have a demo unit on order. So, we are actively shipping, actively selling, actively setting these up for customers," Ische says.

TAKING THE LEAP

With that history lesson out of the way, let's get back to this story's original premise — how can superintendents best assess whether their course and their maintenance operations are a good fit for autonomous mowers?

Several considerations should factor into the decision-making process, ranging from a facility's relative comfort with new technology, its willingness to make a financial commitment to cutting-edge technology, the physical layout of the golf course — are there cliffs, ravines or public roads that get in the way? — and the state of a maintenance operation's current equipment fleet.

"We work through things with the golf course and talk about labor needs, what the finances look like and determine if the machine is viable for their location," explains Josh Lemons, a product marketing manager for Toro. "But it really does take those pioneers in the field to take a bit of a leap of faith and take that first step."

And as Ische says, this isn't a process that superintendents will have to go through alone. Toro's network of distributors is prepared to help interested superintendents through the entire assessment process.

"We've equipped our distributors with kind of a toolbox, if you will, to go out and have that initial conversation with a customer," he says. "When a customer raises their hand and says, 'Hey, I'm thinking about this,' we've given the distributors the skills they need to go out to the site, have an informed conversation with that superintendent, tour their property, and begin to understand the challenges that that property may or may not have, and just gauge the customer's willingness to go on this journey."

One superintendent who has already been on that journey is Paul Sibley, who oversees maintenance at Walnut Creek Golf Preserve, a municipal facility owned and operated by the city of Westminster, Colo. He was a beta test site for the GeoLink Solutions autonomous fairway unit, so he speaks from experience when offering advice to his colleagues looking to make the autonomous transition.

"My first piece of advice would be to check out these demos and work with companies like Toro. They're willing to spend the time to come out and assess your property, see what will work, what might not work," Sibley says.

"My other advice is to open your mind to change. You have to be open to change and to trying something new. If you're not going to do that and are set in your ways that you can't do this or you can't do that, then this is not going to work for you. But if you're open-minded, you might just find something that can really help your golf course." ■

An autonomous checklist

Here are some points superintendents should consider when determining whether autonomous mowing solutions like The Toro Co.'s new Greensmaster eTriFlex 3360 with GeoLink Mow are right for their golf course.

1. Are you and your team comfortable adopting new technologies and open to learning?
2. Can you see a path where autonomous mowing integrates with your existing maintenance program?
3. Do you and your team have a mindset geared toward problem-solving when it comes to implementing new technologies?
4. Is your golf course's physical layout suitable for autonomous? Are there severe slopes or obstacles such as cliffs, ravines, or public roads that would need to be navigated?
5. Are you and your team open to adjusting mowing schedules (i.e. extending mowing windows) to maximize ROI?
6. Do you already use other Toro GeoLink products (i.e. a GeoLink sprayer) or are you familiar with GeoLink technology the mower would interact with?
7. Do you have an existing relationship with a local Toro distributor who will provide support and technical assistance?

BEYOND THE MOWER



How autonomous technology is changing the way supers see their course

BY **NATHAN MADER** ASSOCIATE EDITOR

By now, most superintendents have at least a surface-level understanding of what autonomous mowers are and the ways they can save time, money and labor on a golf course.

Mowing fairways autonomously can result in cleaner, consistent cuts and can repurpose staff to more important tasks, which is especially crucial in the ever-present labor challenges facing the industry.

But as technology grows, and autonomous equipment becomes more mainstream in course management, companies like Toro are looking for ways to harness these tools and provide a more complete solution when it comes to turf management. John Dalman, senior product manager at The Toro Co., says automation can help free up some extra hands and provide more data for supers to use.

"I've sat in on some focus groups recently where we've



» Turf Pro and the GeoLink Solutions autonomous fairway mower operating together.

talked to superintendents, and it seems like the reason they are interested in (automation) is because of availability of staff," Dalman says. "They want to be able to use those people to do tasks that are not as easily automated, like some of the work around greens or bunker maintenance or other kinds of tasks that are super visible."

For Dalman, visibility is a key benefit that Toro's autonomous and tech solutions provide. He says while staff can now go around beautifying the course more, new tools can connect with autonomous mowers to bring greater insights into course conditions.

Toro's partnership with TerraRad, for example, can combine the soil moisture sensors of the turfRad system with an autonomous mower (turfRad can also be utilized on traditional mowers, as well), gathering crucial irrigation data. This partnership will result in Toro's Spatial Adjust software, a first-of-its-kind software tool for precision irrigation control, integrating exclusively with the Toro Lynx Central Control platform.

"I think the key is providing data that's actionable," Dalman says. "Collecting data and just giving it to people doesn't necessarily help them that much, but collecting data that has a clear use case, and there's a benefit to it, and then the associated software tools allow somebody to fairly quickly ingest it and then make some decisions, is super valuable."

> **"I think the superintendent is always going to be in charge. The more we can just help them do their job, but not do their job for them, that would be more the goal."**
>
> **John Dalman**, senior product manager, The Toro Company



This turfRad system will be released at the end of the year, and it transforms collected data into color-coded maps that indicate moisture variations, with the software providing individual sprinkler adjustment recommendations that can be made at the click of a button.

ENHANCED DATA, ENHANCED VISIBILITY

Dalman says that software integrations with all of Toro's mowers are a huge goal for the company, and they want to provide the tools that allow superintendents to view all this crucial data in one easily accessible place.

Take Toro's Intelli360 digital toolbox for example, a software solution that Dalman says starts as a go-to interface that can handle fleet management, machine maintenance, real-time machine location, work orders, parts ordering and more. The intent, however, is to expand into autonomous mower and GeoLink Sprayer management, creating a single digital toolbox to view and manage everything Toro.

"We plan to integrate the irrigation system software, so our Lynx Central Control software will have its own outlet within Intelli360, and so all those systems will be integrated together within Intelli360," Dalman says.

Dalman says with the data that can be collected through both traditional and autonomous mowing and the technology it can be paired with, maps and other diagrams on the Intelli360 platform are a great way to present this information in an easily digestible way.

"How do we show regular mowers, autonomous mowers, sprayers, the irrigation system — any other assets that are part of that digital system — together? And do things that manage them together, helping to truly leverage the Toro portfolio?" Dalman says.

As these smart systems continue to grow and pair together, Dalman says Intelli360 will be a simple, one-stop shop for taking data gathered and visualizing it through geofences for mowers, spray maps, recommendations on where to apply wetting agents and much more — all within a single application.

"Being able to do that all

within a single application instead of multiple applications, that's the goal of Intelli360," he says. "One product that does a number of different things, but the control, the way you use (data), the color, the map interface, would all be shared amongst those different parts of the application."

Dalman hopes that with autonomous and other smart systems like Toro's all linking fluidly, it will become a massive time and money saver for superintendents, providing actionable data to them in one convenient location. Yet, even with all the maps, information and recommendations that can come from technology, the goal is to keep superintendents in control.

"The goal is not total automation, right? It's almost like the superintendent having another assistant that brings them information that's useful, that they can say, 'OK, now I know these three things that I didn't know before, and so I'm going to make these three decisions based on that information,'" Dalman says. "I think the superintendent is always going to be in charge. The more we can just help them do their job, but not do their job for them, that would be more the goal."

And listening to superintendents will be a huge part of the future of autonomy and the systems that come with it. Toro tools and sensors can collect plenty of data that can be displayed on interfaces like Intelli360, but not everything can come from their tools alone.

Dalman says Toro's IntelliDash platform, which will be integrated into Intelli360, can include more external data and sources into an accessible dashboard, allowing superintendents to choose the information they want to see. Weather and radar streams, evapotranspiration forecasts, digital job board information and irrigation/chemical data from Toro systems can all be included and customized, making Toro's outreach even greater based on what customers need.



» Flawless striping with the GeoLink Solutions autonomous fairway mower.

TIMES ARE CHANGING

For Toro, the evolutions in autonomous and software technology are a natural progression in helping superintendents build turf management strategies and maintain top courses. The ecosystem the company has built — from mowers to soil sensors to software integration — is all designed to work together for a simpler yet more informative way to visualize management.

"If there's no benefit to the superintendent or the end user, then we shouldn't do it," Dalman says. "If it doesn't benefit the customer, then it really doesn't benefit us. If they have to learn and manage lots of different tools, to keep up with all the different subscriptions, it can be complicated. If we can simplify their experience by bringing more and more things into one place with Intelli360, that's a benefit for them."

And the future of all this integration is coming fast. First, it was just the mowers and the labor savings they provide. But now, courses are looking at all the ways these new tools can revolutionize not just labor, but almost every aspect of course management.

For Dalman, he recommends supers check out the tools Toro is offering to elevate their game plans, because he thinks that big changes are on the horizon.

"Things are being done differently all the time, whether it's stuff in your home, or your car, or systems you interact with at the grocery store or ballpark," he explains. "Things are changing, so maybe be open to some of those changes." ■









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Continued from page 34

Ryan Swilley, CGCS

PRESIDENT, Florida GCSA

DIRECTOR OF AGRONOMY, The Dye Preserve GC, Jupiter, Fla.

How was this year's golf season in your region?

I think it was as strong a season as I can remember. We've kind of returned to what seems like a golf boom of courses being built and opening, certainly in my immediate area. It's been exciting to see the popularity of golf continue to be on the rise and young folks playing the game. With it, we've seen the demand for high-quality playing conditions rise as well. As superintendents, we have to continue to become more efficient at what we do and better at saving water and reducing inputs … but overall, it's an exciting time to be a part of the industry.

Overall, how was the weather this year?

I think the best way I could come up with to describe it would be like a mix of extremes. We didn't have any hurricanes, which is great. But I think this mix of extremes is the new normal in our area. It seems we had an unusually dry late winter and spring, and then fast forward to late summer, and it's been intense rainfalls and high humidity. The last part of October and early November have been more indicative of what we would normally see at this time of year. It's been a challenging year, maybe more than some that I can remember in recent history, even though we didn't have to deal with a hurricane or any big tropical systems.



Ryan Swilley

PHOTO COURTESY OF: REAGAN OLSON



One of the Central Texas GCSA's charitable efforts in 2025 was a holiday toy drive.

What was your labor pool like this year?

Labor remains a challenge, and that's not unique to Florida. I think that's across the industry. It just seems there's not enough talent to go around, even though we've seen a rise in wages in our area to try to keep up with the cost of living. That still puts a lot of pressure on a lot of golf courses that maybe can't spend as much money on labor as they would like to. I know a lot of local courses that continue to lean heavily on the H-2B program, and thanks to the industry's advocacy efforts … there's been some positive momentum on things like cap relief and returning worker exemptions, which has been very useful for a lot of courses.

Any notable success stories for your chapter or region this year?

I would say the highlight for me has been this sense of collaboration between local chapters and the state chapter (in Florida) and even across the aisle with our industry partners. We've also seen some great actionable things happening with Rounds 4 Research and with a lot of engaged folks joining our committees and taking on leadership roles there. We've got a lot of good momentum that we just need to keep going.

What are your expectations for 2026?

Overall, I think these are exciting times. As an industry, GCSAA will be celebrating its 100th year at our conference and trade show here in February, and I think that will be sort of a catalyst for the industry. We have a huge responsibility and a huge opportunity to continue to push forward in 2026, so it's an exciting time.

— S.H.

FOURTH ANNUAL

Golfdom 2025 SUPERS' CHOICE AWARDS

COMPILED BY THE *GOLFDOM* STAFF

We asked readers to give a shoutout to one product that they absolutely love to help get their jobs done. This year, we heard some new ones, along with a few of the old standbys.

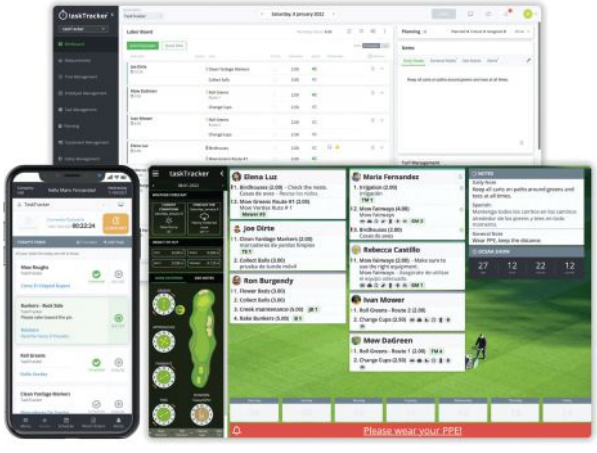
But the most popular answer? By far, it was the number of superintendents who said, "my staff." And we couldn't agree more. So, while the crew will always be No. 1 in the heart of a superintendent, here are some of the tools they like to arm them with …



Moasure ▶
MOASURE

"Using Moasure has saved us time when we are checking distance and elevation. We do not have to pull out the laser level on our smaller projects."

— Corey Voyles
Memphis (Tenn.) CC



◀ taskTracker
TASKTRACKER

"My taskTracker job board helps keep our operation organized and moving smoothly. The look is clean and professional in my break room."

— Jeff Sexton
Evansville (Ind.) CC

Cyclone KB7 ▶
BUFFALO TURBINE

"Our Buffalo blower. I originally thought of it for leaves when it was being sold probably 20 years ago. We now use it almost daily throughout the season. It cleans parking lots, paths, clippings and other debris around the course."

— Scott White
Urbana (Ill.) CC



SUPERS' CHOICE HEADER: GETTY IMAGES; SHAUMAA VECTOR / DIGITALVISION VECTORS (BACKGROUND); SUPERPOPOV / ISTOCK / GETTY IMAGES PLUS (TYPE)

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SUPERS' CHOICE AWARDS



Lynx mobile app ▲

TORO

"I'd say the tool that I use the most is the Toro Lynx mobile app. Saves a bunch of time spot-watering and diagnosing, and I use it all the time."

— Tim Palko
Boulder (Colo.) CC



TDR Moisture Meter ◀

SPECTRUM TECHNOLOGIES

"My favorite tool after this season is hands down the Spectrum TDR Moisture Meter. It's quick, user friendly, and the numbers do not lie. Moisture management is vital in keeping healthy and consistent greens."

— Matt Bush
Glen Oaks GC, East Amherst, N.Y.

WideSpin 1550 ▼

TURFCO

"The Turfco WideSpin. The uniformity it delivers is the best in the business. The versatility of the machine allows us to use it in many applications, saving labor throughout the year."

— Matthew Muhlenbruch
Hillcrest CC, Los Angeles



Kafka Granite ◀

KAFKA GRANITE

"Kafka Granite for cart paths. It's easy to work with, and it holds slopes. Plus, the golf ball doesn't bounce off it like a normal cart path. But mostly, it's just a better aesthetic for a golf course than a traditional cart path."

—Alex Beson-Crone
Erin Hills GC, Hartford, Wis.

HD50 ▼

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"My favorite tool is the PlanetAir HD50. With the ability to slice 3 inches deep with zero effect to my putting surfaces, it's the perfect cultivation piece of equipment to maintain greens in Virginia throughout the growing season."

— Charlie Fultz,
Heritage Oaks GC, Harrisonburg, Va.



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Michigan Chapter GCSAA
Golf Course Superintendents Association of America

SUPERS' CHOICE AWARDS



GS3 ball

USGA

"The GS3 ball from the USGA — it's been a game changer for managing water and monitoring green conditions. It gives me precise data on firmness, trueness and smoothness, which helps me make informed decisions to keep the greens consistent and playable."

— Brian Pero
The Grizzly Golf and Social Lodge, Mason, Ohio



RT165 track loader

GEHL

"The Gehl RT165 skid-steer track loader. We have five attachments, and whether it's grading dirt or unloading pallets to grabbing up logs with the grapple forks, the multi-functionality that this machine gives us is invaluable. How did we ever get by without this?"

— Thomas Tipton, CGCS
Prospect Bay CC, Grasonville, Md.



NanoOxygen System

NANOOXYGEN SYSTEMS

"Our NanoOxygen System has been a major change and improvement to our agronomic program. We have also installed the CO_2 injection to control our water pH. By raising the dissolved oxygen levels, it has made our programs more efficient and improved plant health. The ability to lower our pH with carbonic acid has also provided a safe and more economical solution."

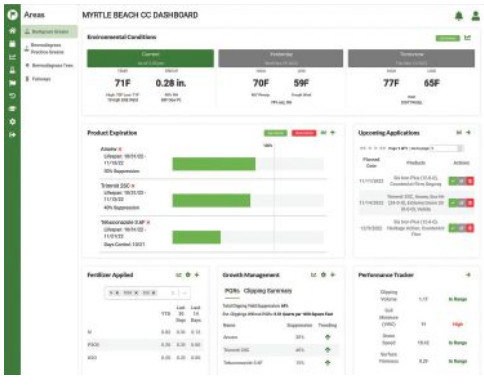
— Alan Brown
Timuquana CC, Jacksonville, Fla.

GreenKeeper app

GREENKEEPER

"Best tool out there is the GreenKeeper app. Couldn't live without it; it is ever-evolving and provides a one-stop shop for all our agronomic tracking needs."

— David Walter
Silverado Resort, Napa, Calif.





Sand Pro

TORO

"We've been pretty project oriented for a while now, and what's really been a game changer for us is the Toro Sand Pro … the three-wheel one, and it has a blade bulldozer attachment on it. As minuscule as it looks, it really gets the job done a lot better than a rake or a shovel."

— Paul Venable
Warm Springs GC, Boise, Idaho

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Non-retouched client photo
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— Brian Boyer
Cinnabar Hills GC, San Jose, Calif.

Hosted by Mike Kenna, Ph.D. | *mpkenna@gmail.com*



Super Science

// VIRGINIA TECH RESEARCH

FUNGICIDE TIMING FOR SPRING DEAD SPOT

By Mike Kenna, Ph.D.

Spring dead spot (SDS) (*Ophiosphaerella* spp.) is a damaging disease of bermudagrass. Fungicides are an effective tool for management of the disease, but optimal application timing can be challenging.

Spring dead spot is more severe on warm-season turfgrasses in areas with cold-induced dormancy. The inconsistency of fungicide applications arises from relying solely on calendar-based applications instead of considering both calendar date and soil temperature.

Wendell Hutchens, Ph.D., and colleagues at Virgina Tech University conducted research to provide information on proper fungicide application timing for spring dead spot suppression in bermudagrass. Their findings show that applications made in the fall when soil temperatures are near 55 degrees F (13 degrees C) provide the greatest disease control.

The field study was conducted at three separate hybrid bermudagrass locations in Virginia to determine the optimal soil temperature and timing for SDS suppression with Nufarm's Torque (tebuconazole) and PBI-Gordon's Kabuto (isofetamid). They applied Torque (1.34 pounds a.i. per acre) and Kabuto (3.66 pounds a.i. per acre) at 11 different timings throughout the year based on soil temperatures at a 0- to 4-inch depth. Plots were assessed for SDS severity in the spring and early summer of 2021 and 2022.

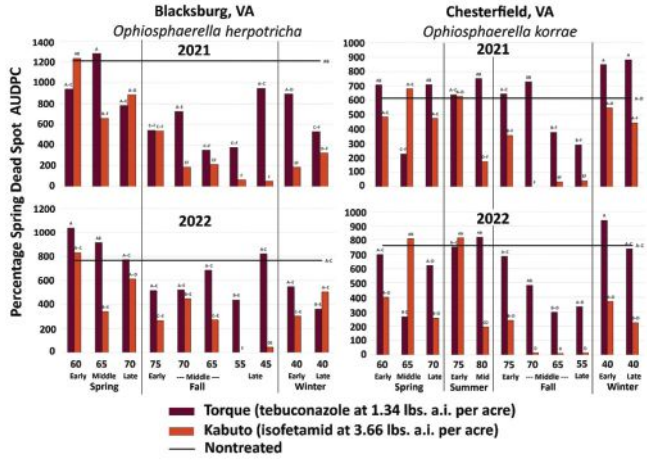


Figure 1. Influence of application timing of Torque and Kabuto on percentage spring dead spot area under the disease progress curve (AUDPC) in 2021 and 2022 at Blacksburg and Chesterfield, Va. Treatments with similar letters are not significantly different.

Results for two of the three locations (Blacksburg and Chesterfield, Va.) are summarized in Figure 1. Fall applications when soil temperatures were 55 degrees F consistently provided the best SDS suppression. Fungicide applications for spring dead spot are determined by considering both soil temperature and the time of year. The most effective fungicide application timing varies between the *Ophiosphaerella* species that cause spring dead spot.

For more information, you can access the entire open access article from *Crop Science*.

Reference

Hutchens, W. J., Booth, J. C., Goatley, J. M., Roberson, T. L., & McCall, D. S. (2025). Optimizing fungicide application timing for spring dead spot based on soil temperature and season. *Crop Science, 65,* e21411. https://doi.org/10.1002/csc2.21411

NEWS UPDATES

ALBAUGH UNVEILS FLUDIOXONIL SC

Albaugh recently announced EPA registration of Fludioxonil SC, a protectant fungicide for control of foliar, stem and root diseases in turfgrasses and ornamental crops.



Fludioxonil SC contains the active ingredient fludioxonil, which features a unique mode of action derived from *Pseudomonas pyrocinia*, a naturally occurring soil bacterium. It disrupts fungal cells by interfering with osmotic regulation, causing them to absorb water, burst and die.

Designed for turf and ornamental professionals, Fludioxonil SC provides reliable, broad-spectrum disease control against key pathogens including patch diseases, anthracnose, botrytis, pink and gray snow mold and rhizoctonia. Its contact activity offers multi-point protection — on the leaf surface, within the thatch and at the soil interface — quickly reducing overall disease pressure and helping maintain healthy, resilient landscapes.

"Turf and ornamental managers need peace of mind with consistent disease control, and Fludioxonil SC delivers just that," says Russ Mitchell, director of Albaugh Specialty Products. "The easy-to-use formulation supports superior resistance management as a group 12 fungicide. And its low risk of resistance makes it excellent for rotation or in mixtures for the key diseases it controls."

//YEAR IN REVIEW

2025 research — in the rearview

Compiled by Mike Kenna, Ph.D.

Another year has passed quickly. Here is a summary of the excellent research information provided by turfgrass researchers and the USGA Green Section that appeared in *Golfdom* this year.

JANUARY *Can golf course ponds be a safe haven for amphibians?*

By Michelle Boone and Holly Puglis

Although a golf course will never replace unfettered nature, it can serve as a green space that helps preserve some of the local biodiversity. Golf courses can potentially benefit amphibians, such as frogs and salamanders, which are experiencing declines worldwide due to habitat loss, disease, chemical usage and the introduction of exotic species.

Looking to nature as a guide for management can serve as a means of preserving all the necessary habitat components and restoring ecosystem services in managed areas. With over half of the world's wetlands lost, habitat destruction is a significant issue for aquatic species that rely on these ecosystems for survival. When green spaces, such as golf courses, can help mitigate the effects of habitat destruction to some extent, everyone benefits.

Research Takeaways

- Amphibian communities are most diverse in habitats with temporary ponds since these habitats are nutrient-rich and lack fish, predators that frequently eliminate most species of amphibians.
- Cricket frog (*Acris crepitans*) and green frog (*Rana clamitans*) survival was reduced dramatically when reared in experimental ponds with grass carp (*Ctenopharyngodon idella*) or predatory bluegill sunfish (Lepomis macrochirus).
- For grassland species like cricket frogs, unmown fields provide a refuge from the desiccation of the sun and wind, a place to hide from predators, a pathway to disperse and a source for insects on which they prolifically feed.
- Buffer zones of three feet or more around ponds increased the survival of cricket frogs.

Adapted from Michelle D. Boone, Ph.D., and Holly J. Puglis. 2013. Keeping all the Pieces: Restoring Natural Processes for Easier Golf Course Management. *USGA Turfgrass and Environmental Research Online.* 12(4):1-5.

FIGURE 1



Introducing herbivorous grass carp or predatory bluegill sunfish into ponds poses a threat to the survival of many smaller amphibians. Bullfrogs, which overwinter in ponds, also reduce the populations of smaller amphibians. Cricket frogs reared in enclosures on golf course ponds performed similarly to natural reference ponds.

PHOTO BY: MICHELLE BOONE AND HOLLY PUGLIS

FEBRUARY *Understanding nematode depth and distribution in bentgrass greens*

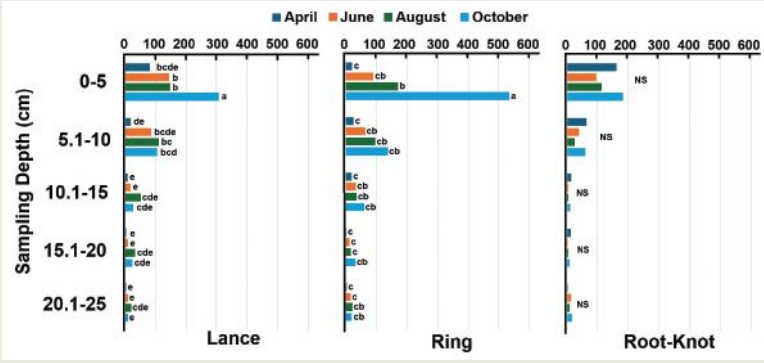
By Asa McCurdy, Jefferson Barizon, and G.L. Miller

Plant-parasitic nematodes (PPNs) present a serious threat to the health and aesthetic quality of golf course putting greens. The sand-based root zones commonly used in these greens offer large pore spaces that facilitate nematode movement and population growth. Combined with the high levels of stress caused by frequent mowing and aggressive maintenance, even minimal feeding damage by PPNs can have significant effects. However, effective control of these pests is challenging.

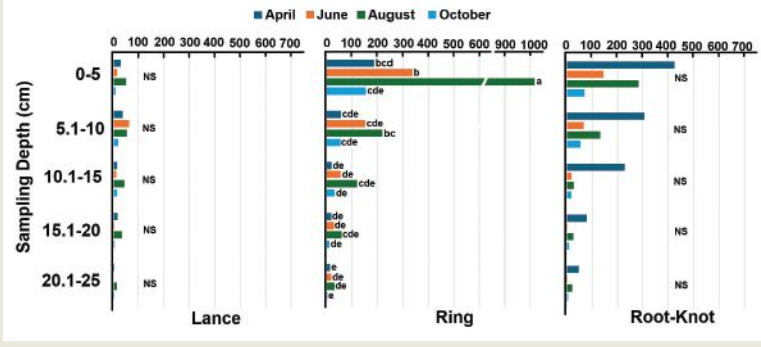
One major obstacle to controlling PPNs is the limited mobility of many nematicides. These chemicals often have low water solubility and a high affinity for organic matter, causing them to remain in the thatch layer rather than reaching nematodes deeper in the soil. Additionally, PPN species differ in their

FIGURE 2

Mean nematode population density per 100 cm² — Kansas and Missouri



Indiana



Eastern Kansas, Missouri and Indiana (2021) total nematode population densities by sampling depth and month, with soil samples aggregated. Letters indicate significant differences between sampling depths by month analyzed within that individual species ($P < 0.05$), and "NS" indicates no significant depth-by-month interaction.

behavior and location within the root zone; some reside inside plant roots, while others remain in the soil. This study investigated whether PPN populations, specifically lance (*Hoplolaimus* spp.) and root-knot (*Meloidogyne* spp.) nematodes, reach a peak at a consistent and targetable soil depth and time of year on putting greens in Missouri and Indiana to improve nematicide timing and effectiveness.

Research Takeaways

- Overall, PPN populations were more abundant in Indiana (2022) than in Missouri/Kansas (2021), possibly due to the lack of nematicide applications at Indiana sampling sites. Lance nematodes were targeted and more prevalent at Missouri/Kansas sites, while root-knot and ring nematodes were more abundant in Indiana sites.
- In October, lance nematode populations in Missouri/Kansas (2021) peaked in the 0–5 cm soil depth, showing significant depth-by-month interactions.

Root-knot nematode populations in Missouri/Kansas (2021) were consistent across months, with the highest density at 0–5 cm depth. Indiana (2022) populations peaked in April, with higher densities in the upper soil layers (0–10 cm).

- Ring nematodes were the most abundant parasitic nematodes found in both regions, with higher populations in Indiana sites. Ring nematodes, however, do not cause as much feeding damage as other species and are seldom above any action threshold.

Adapted from McCurdy, Asa L., Barizon, Jefferson, and Miller, G.L. 2024. Depth distribution of plant-parasitic nematodes on bentgrass golf greens in Missouri and Indiana. *Journal of Nematology.* 56:1-15. DOI: 10.2478/jofnem-2024-0006

MARCH *How much nitrogen is needed to establish seeded bermudagrass?*

By Jada S. Powlen and Cale A. Bigelow

Common bermudagrass has become increasingly popular on golf courses in temperate regions due to genetic improvements that have enhanced the quality of seeded cultivars, making them comparable to vegetative hybrids. These improvements offer advantages such as easier establishment, greater genetic diversity, improved winter hardiness and lower costs. However, while nitrogen (N) guidelines for mature turf are well-established, optimal N rates during seed establishment remain unclear. Some turf managers use extra nitrogen to accelerate establishment. Still, excessive use — particularly of soluble N — can harm turf health, promote shallow roots and excessive growth, reduce rhizome development and increase the risk of nutrient runoff.

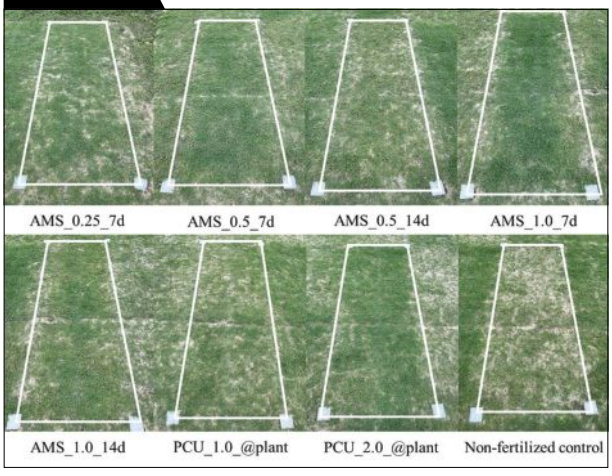
Reducing application frequency and using controlled-release fertilizers may lower total nitrogen (N) requirements during establishment and reduce off-target N movement. A two-year field study was conducted to determine the optimal N establishment program for a seeded bermudagrass cultivar on native soil, using two N sources with varying application rates and frequencies.

Research Takeaways:

- 'Rio' bermudagrass was seeded

Continued on page 62

FIGURE 3



A two-year field study was conducted to determine the optimal nitrogen (N) establishment program for a seeded bermudagrass cultivar on native soil, using ammonium sulfate (AMS) and polymer-coated urea (PCU) sources with varying application rates and frequencies.

Continued from page 61

in June 2020 and 2021, testing eight granular N-fertilizer programs using ammonium sulfate (AMS) or polymer-coated urea (PCU).

- Total N applied ranged from 0.0 to 6.0 lb. N per 1,000 ft², with application strategies including PCU only at planting and repeated applications of AMS every seven or 14 days after germination.
- Time to reach 50 percent green coverage (GC50) ranged from 20 to 24 days in the first year and 23 to 30 days in the second year, showing variation across N programs.
- Applying 2 lb. N per 1,000 ft² of PCU at planting achieved a similar time to 90 percent green coverage (GC90) compared with other fertilization programs, but with fewer applications and less total N used.
- Results suggest that applying more than 3 lb. N per 1,000 ft² during the first 60 days of establishment does not provide additional benefits regarding time to maximum turf coverage.

Adapted from Powlen, J. S., and Bigelow, C. A. 2024. Seeded bermudagrass establishment as affected by nitrogen source, rate, and application frequency. Crop, Forage & Turfgrass Management, 10,e20250. **https://doi.org/10.1002/cft2.20250**

APRIL *Evaluating PGR reapplication on annual bluegrass putting greens*

By Chas Schmid and Alec Kowalewski

Plant growth regulators (PGRs) are commonly applied to golf course putting greens on a calendar-based schedule; however, growing degree-day (GDD) models have recently been developed to optimize reapplication intervals for season-long growth suppression, particularly for creeping bentgrass and hybrid bermudagrass, using products like Primo Maxx 1ME and Trimmit 2SC. However, no such models exist for annual bluegrass (ABG) putting greens, where superintendents currently rely on models based on bentgrass. While nitrogen (N) rate effects on ABG turf quality, disease susceptibility and playability are well documented, little is known about how N rate influences PGR performance or reapplication intervals. Higher N rates may necessitate more frequent PGR applications than predicted by current GDD models, underscoring the need for research to determine whether ABG-specific GDD models should be adjusted based on N rates.

For annual bluegrass putting greens, our objectives were to develop a growing degree day model for PGR (Primo Maxx and Anuew) application intervals and determine if nitrogen rate influences a growing degree day model.

Research Takeaways

- The predicted reapplication interval for Primo Maxx 1ME on annual bluegrass ranged from 309 to 217 GDD for low and high N rates, respectively.
- Primo, combined with high N, was like previous recommendations for bentgrass.
- The predicted reapplication interval for Anuew on annual bluegrass ranged from 243 to 212 GDD for low and high N rates, respectively; both estimates were lower than previous recommendations for bentgrass.
- Trends suggest reapplication intervals for PGR varied by month of application.
- PGRs applied to annual bluegrass under stressful environmental conditions during July resulted in longer reapplication intervals, particularly when combined with low N rates, which increased intervals by greater than 130 GDD.

Adapted from Schmid, Chas, and Kowalewski, Alec. 2024. Influence of nitrogen rate on growing degree day models for plant growth regulator reapplication interval on annual bluegrass putting greens. 2024 USGA Davis Progress Reports. USGA ID# 2023-15-782, pp. 140-150.

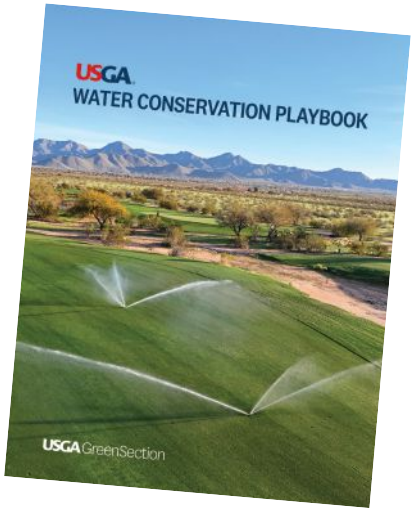
MAY *An inside look at the USGA Water Conservation Playbook*

By USGA Green Section

Golf courses are facing growing threats from rising water costs, unpredictable water supplies and increased water restrictions. Proactive water management is essential to secure the sport's future.

The USGA has invested $30 million over 15 years to help courses reduce water use while maintaining playability and aesthetics. For over a century, the USGA has supported golf courses through research on turfgrass and resource management. Now, the organization is collaborating with

PHOTO BY: CALE BIGELOW



turfgrass and golf course management leaders to drive water conservation across the industry.

Research Takeaways:

Experts have outlined in the USGA Water Conservation Playbook nine key actions in three major areas:

1. Fundamental Irrigation Stewardship

- Monitor water use, schedule irrigation based on weather and maintain systems to prevent leaks.
- Manage golfer expectations to balance playability and aesthetics with water conservation.
- Use water-efficient products to maintain turf quality under reduced irrigation.

2. Advanced Irrigation and Conservation Techniques

- Use soil-moisture sensors and remote sensing for precise, site-specific irrigation.
- Implement drought-tolerant turfgrass and reduce winter overseeding.
- Minimize irrigated acreage by replacing unnecessary turf with low-water plants and hardscape.
- Install subsurface drip irrigation to deliver water directly to roots and reduce waste.

3. Water Sourcing and Storage Stewardship

- Optimize surface water use by minimizing evaporation and seepage.
- Utilize alternative water sources, such as recycled wastewater, to reduce reliance on potable water.

JUNE Pythium *species management recommendations*

By Lee Butler and Jim Kerns

Managing *Pythium* species is tough, particularly in the transitional climate zone, where temperature extremes complicate disease timing and reduce the efficacy of fungicides. The following are the current recommendations for managing *Pythium* blight, *Pythium* root rot and *Pythium* root dysfunction. The symptoms, development factors and cultural and chemical control are summarized.

Research Takeaways

- Symptoms and appearance: *Pythium* blight is a foliar disease, while *Pythium* root rot or dysfunction are root diseases but differ in appearance and host specificity.
- Development conditions: *Pythium* blight is driven by high humidity and leaf wetness, and *Pythium* root rot thrives in saturated soils at any time. *Pythium* root dysfunction infects bentgrass on putting greens in cool temperatures but can also appear under heat/drought stress.
- Cultural management: *Pythium* blight targets leaf wetness, poor airflow and excessive nitrogen. Focus on water management and drainage for root rot, while root dysfunction on putting greens emphasizes soil structure, root zone oxygen and drought mitigation.
- Chemical control: *Pythium* blight is mostly foliar-focused preventative applications, root rot is generally curative with a specific sequence of applications and root dysfunction requires precise fungicide classes and delivery to the root zone.

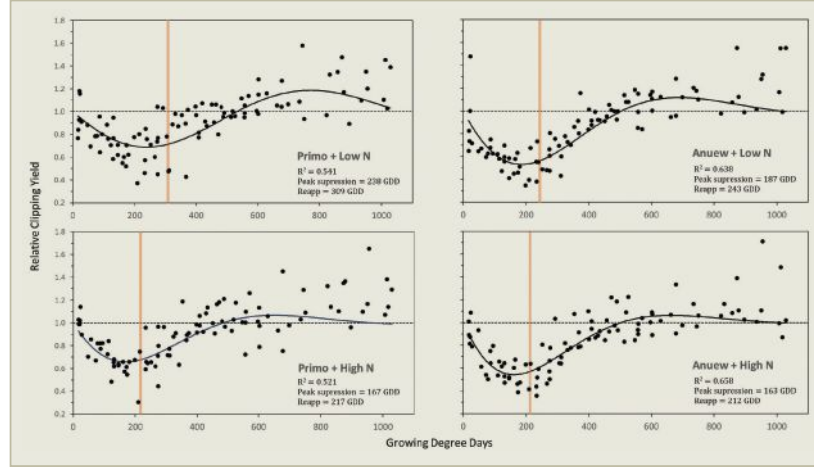
Adapted from Jim Kerns and Lee Butler, NC State University Extension, Turfgrass Diseases. Pythium Blight, Pythium Root Rot, and Pythium Root Dysfunction. Last updated 2025.

JULY/AUGUST *A million ways for grass to die in the winter*

By Paul Koch

Continued on page 64

FIGURE 4



The normalized relative clipping yield of annual bluegrass putting green turf in Corvallis, Ore., averaged across June, July and August treatments during 2023 and 2024, after a single application of Primo (left) or Anuew (right) combined with weekly applications of nitrogen at low N (top) or high N (bottom). Equation and R^2 values are from the sine wave model used to calculate relative growth suppression. The vertical line indicates the reapplication interval.

FIGURE 5

Comparison of symptoms, development, management and chemical control for *Pythium* species on turfgrass

Pythium	Symptoms and Appearance	Development Conditions	Cultural Management	Chemical Control	Turf Susceptibility
Blight	Rapid foliar disease with greasy, matted, dark-colored leaves; visible gray mycelium in humid conditions. Appears as small sunken patches or spots.	Develops during humid, wet conditions with night temps >65°F (cool-season) or >50°F (warm-season). Triggered by thunderstorms and lush foliar growth.	Focus on reducing leaf wetness, limiting nitrogen, improving drainage and equipment sanitation.	Preventative fungicides are applied during high-risk periods (14- to 21-day intervals).	It affects many turf types, but especially damaging to ryegrass and bluegrass; fast spread.
Root rot	Affects the roots, crowns, rhizomes and stolons. Causes yellow/orange irregular patches; roots appear greasy and dark with shallow root systems.	Requires prolonged soil saturation; can develop year-round. Driven by poor drainage, heavy rain and excess thatch.	Emphasis on improving drainage, removing thatch, increasing airflow and, in severe cases, reconstructing greens.	Preventive and curative fungicides, especially ethazole products, followed by systemic fungicides. All products must be watered in.	Can affect many turf types in persistently wet areas, prevalent on poorly drained greens.
Root dysfunction	Affects creeping bentgrass roots, especially on newer greens. Causes wilted, orange patches that collapse, primarily during heat/drought. Roots lack hairs and easily lose sand.	Infection occurs during cool seasons (50–75°F soil temps), but symptoms show in the summer heat (>85°F). Exacerbated by drought, low fertility and poor soil oxygen.	Requires managing soil structure (15% organic matter), maintaining fertility, raising the mowing height and frequent aeration/topdressing to improve oxygen.	Best controlled with a rotation of Serata/Resilia/Segway. Both curative and preventive programs are used.	Primarily affects creeping bentgrass on newer putting greens (<10 years old).

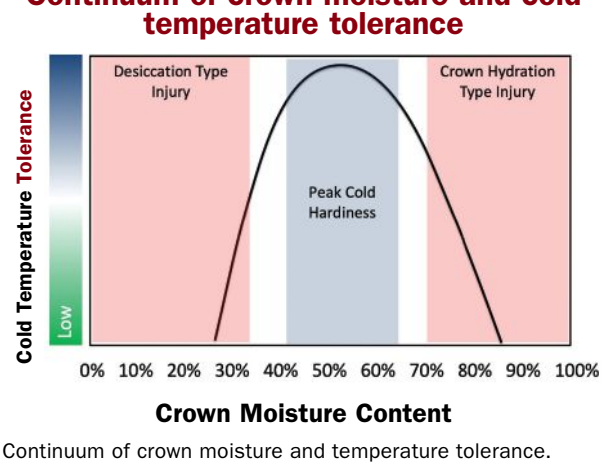
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The past few winters in the Midwest have clearly demonstrated that what can kill your grass from one winter to the next can be completely different. In one winter, it might be early winter rainfalls and heavy late winter snowfall that led to destructive snow mold outbreaks. In another winter, it might be a nearly complete absence of snow that leads to widespread desiccation injury. However, regardless of the winter conditions, something can still harm or injure your grass. Let's review the various types of winter injury that can occur and the best methods for preventing each one.

Research Takeaways

- Snow mold prevention and management: Snow mold, caused primarily by pink, gray or speckled fungi, is best prevented with one or two late-fall fungicide applications timed to avoid rainfall or snowmelt events, which can degrade protection. Cultural practices such as limiting late-fall nitrogen have modest effects, while potassium fertilization may increase or decrease snow mold depending on turf species. To see the full results from all our snow mold research, please visit **https://tdl.wisc.edu/results/**.
- Recent snow mold pressure and research: Snow mold pressure was generally low across the northern U.S. last winter, with exceptions in certain pockets. Research trials in Wisconsin and Minnesota saw limited disease due to dry, cold conditions, while Marquette, Mich., had moderate pressure (54 percent in untreated plots). Fungicide treatments with multiple active ingredients provided excellent control, even under reduced pressure.
- Desiccation injury: Major issue across the western Great Lakes in 2023–24, caused by prolonged drought, cold snaps and wind exposure. Creeping bentgrass on elevated, sandy or thatchy sites was most affected. Research indicates that physical barriers, such as covers and heavy sand topdressing, offer the most effective protection, while wetting agents, pigments or anti-transpirants provide minimal benefit.
- Ice injury (crown hydration and ice encasement): Crown hydration occurs when water inside plant cells freezes, while ice encasement deprives turf of oxygen and accumulates toxic gases. These are more common in the Great Lakes and Northeast. Prevention strategies include surface drainage, avoiding sand dams and using covers to reduce water infiltration and limit ice contact.

FIGURE 6



Continuum of crown moisture and temperature tolerance.

• Direct low-temperature injury: Grass species vary in cold tolerance; annual bluegrass is injured near -4°F, while creeping bentgrass can survive near -40°F. Drought-stressed turf is more vulnerable, as seen with severe injury during the 2023–24 cold snap. Covers and heavy sand topdressing provide the only real protection.

SEPTEMBER/OCTOBER *New USGA research evaluating plant growth regulators*

By Mike Kenna

The USGA continues to support research evaluating plant growth regulators and their impact on new creeping bentgrass cultivars, fertilizer rates and how they could aid in transitioning from annual bluegrass to bentgrass. Two research projects currently underway, one at the Ohio State University and the other at Rutgers University, are summarized in this article.

At Ohio State University, Ed Nangle, Ph.D., Dominic Petrella, Ph.D., and Florence Sessoms, Ph.D., are conducting a three-year project to evaluate how new creeping cultivars respond to lower nitrogen application rates, both in the presence and absence of various plant growth regulators. This research will help guide turfgrass management practices, especially for golf course superintendents transitioning greens to newer cultivars.

Research Takeaways

• Creeping bentgrass cultivars responded differently to lower rates of nitrogen.

• Two cultivars have already displayed significantly higher levels of organic matter accumulation than Penncross.

• Penncross displayed lower quality turf in response to lower nitrogen rates, while the new cultivars have provided higher levels of shear strength.

• Penncross provided higher firmness numbers that align with less turfgrass in the canopy.

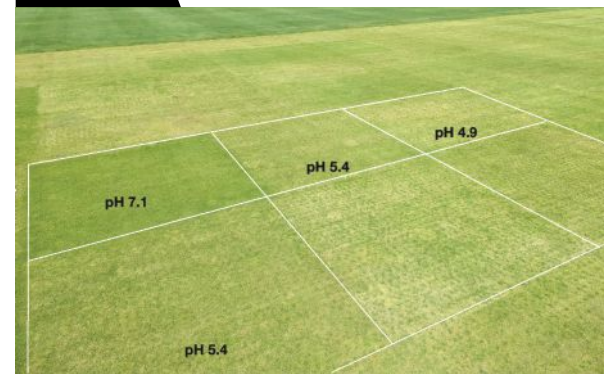
• Applications of Trimmit (paclobutrazol) and Anuew (prohexadione-calcium) led to enhanced shear strength.

• Applications of Trimmit and Anuew increased green speeds by 9 to 12 inches compared to the untreated control.

Adapted from Nangel, E.; Petrella, D.; and Sessoms, F. 2024. The impact of Nitrogen Rate and Growth Regulators on Modern Creeping Bentgrass Cultivars. USGA Mike Davis Program for Advancing Golf Course Management: 2024 Progress Reports. p326-331. USGA ID 2024-12-822.

At Rutgers University, Matt Elmore, Ph.D., and Jim Murphy, Ph.D., are finishing up with two projects to suppress annual bluegrass growth. Their first objective was to evaluate a combination of cultural (phosphorus and pH) and Trimmit (paclobutrazol) for annual bluegrass suppression in bentgrass putting greens (Project 1). They hypothesize that a strongly acidic rootzone (pH ~5.5) combined with relatively low rootzone phosphorus (6 to 10 ppm) will promote creeping bentgrass encroachment into annual bluegrass.

FIGURE 7



Visible differences in annual bluegrass turfgrass color on Sept. 4, 2024, for Project 2. Selected plots are labeled with the mat layer pH according to the June 2024 sampling.

They expanded the research to include an additional field trial to study the population dynamics of annual bluegrass and creeping bentgrass on putting greens using a five-level pH gradient and comparing 'Penncross' with 'Oakley' creeping bentgrass (Project 2). The 2024 objective was to adjust the phosphorus and pH levels in the annual bluegrass putting green before seeding creeping bentgrass and measuring its spread in 2025.

Research Takeaways

• The mat layer pH was adjusted from 6.0 to 6.3 to a mean of 5.3 in acidic plots and 6.3 in neutral pH plots (as of November 2024). The acidic treatments are exhibiting poorer turfgrass quality for annual bluegrass in summer.

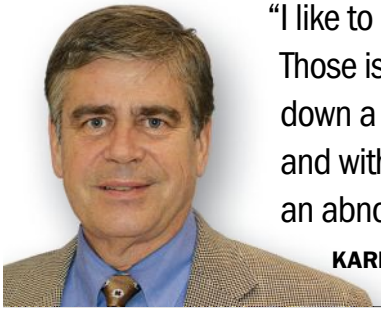
• The phosphorus depletion target for Project 1 has not been achieved despite phosphorus not being applied in over two years. The mat layer P averaged 47 ppm (Mehlich III) across the site in November 2024, an increase from 38 ppm in May 2024.

• A mat layer pH gradient ranging from 4.8 to 7.0 was established for Project 2. Significant differences in annual bluegrass turfgrass quality are evident across the pH gradient.

• 'Penncross' and 'Oakley' bentgrasses were established in 2024 for transplant in 2025.

Adapted from Elmore, Matthew T., and Murphy, James A. 2024. Integrating phosphorus and pH management with a plant growth regulator for annual bluegrass suppression. USGA Mike Davis Program for Advancing Golf Course Management: 2024 Progress Reports. p332-336. USGA ID 2023-38-805.

PHOTO BY: RUTGERS UNIVERSITY



"I like to call these maladies 'What's that?' Those issues you face when walking down a fairway or across a green, and without any warning or disruption, an abnormality to the turf appears."

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

A case of 'What's that?'

Maintaining annual bluegrass golf courses is often challenging and sometimes a surprising endeavor. A well-maintained annual bluegrass provides an excellent playing surface both on greens and fairways. However, there are ongoing challenges throughout the season. Spring brings pests like annual bluegrass weevil and pathogen infections for diseases like summer patch. Winter brings injury from pathogens and environmental conditions like ice cover, freeze injury and desiccation. Summer includes environmental stresses like heat and drought, along with the potential for a plethora of diseases.

Even during times of the year when annual bluegrass is healthy and conditions are favorable for growth, something invariably out of the normal appears. I like to call these maladies "What's that?" Those issues you face when walking down a fairway or across a green, and without any warning or disruption, an abnormality to the turf appears. Two abnormalities that occur that trigger a response like "What's that?" are annual bluegrass etiolation, or mad tiller disease, and white leaf.

Etiolation of annual bluegrass symptoms appear as abnormally long shoots and leaves. These plants have grown rapidly, becoming thin and elongated. These elongated leaves may show chlorosis, with a yellow to pale-green color. Over time, the turf patches may become thinner, and some root loss may occur.

Etiolation of annual bluegrass occurs during a period of cloudy, wet conditions. The duration of favorable conditions may range from less than a week to longer. The symptoms are similar to what you would expect from low light conditions. Plants tend to elongate when shade or reduced light occurs. Initially, the malady was solely associated with low light. However, further research revealed that a bacterium *Acidovorax avenae* subsp. *avenae* was associated with causing the symptoms. It is believed that the bacterium disrupts the plant's natural hormone balance, leading to the abnormal etiolated growth. The name mad tiller disease is associated with the bacterium pathogen.

Given the bacterium disrupts the plant's hormone imbalance, some plant growth regulators (PGR) have been shown to induce or worsen etiolation. Some have suggested that avoiding PGRs may be a way of reducing the etiolation. I have tended to encourage removing etiolation through mowing after a PGR application versus stopping treatment.

One additional disease that occurs during wet cool conditions in the fall and may cause confusion with mad tiller disease or etiolation of annual bluegrass is yellow tuft. Yellow tuft occurs in late summer and can produce yellow spots. The fungal pathogen is *Sclerophthora macrospora*. Leaves and tillers are yellow and clustered due to a fungal-induced proliferation of tillers. These tillers are often abnormal in that they appear swollen. Yellow tuft is best controlled with fungicides applied preventatively. Often the disease is left to run its course.

White leaf is what it says — white leaves of annual bluegrass appear in clusters, sometimes occurring in other turfgrasses, too. The leaf appears white or bleached out due to the degradation of chlorophyll. The pathogen is a phytoplasma, which is classified in a group of similar prokaryotic organisms known as mollicute. The difference between normal bacteria and mollicutes is no cell wall is present with mollicute organisms. Phytoplasma appear to be transmitted through leafhoppers which deposit the pathogen in the plant's phloem. With white leaf, there is not much you can do. Basically, you wait for symptoms to disappear on their own.

When managing annual bluegrass, you're never on cruise control. During periods when one would expect annual bluegrass to be thriving and doing well (and it does), a disruption occurs. It is those minor "What's that?" issues that sometimes require that you may just be better off letting them go.

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The 19th Hole

PennState

Matt McDonald

SUPERINTENDENT // Water's Edge Golf Club, Worth, Ill.

Matt, what are you having? I'm having a beer, and I'm not too picky. I'll go anywhere from Miller Lite to IPAs or whatever they got.

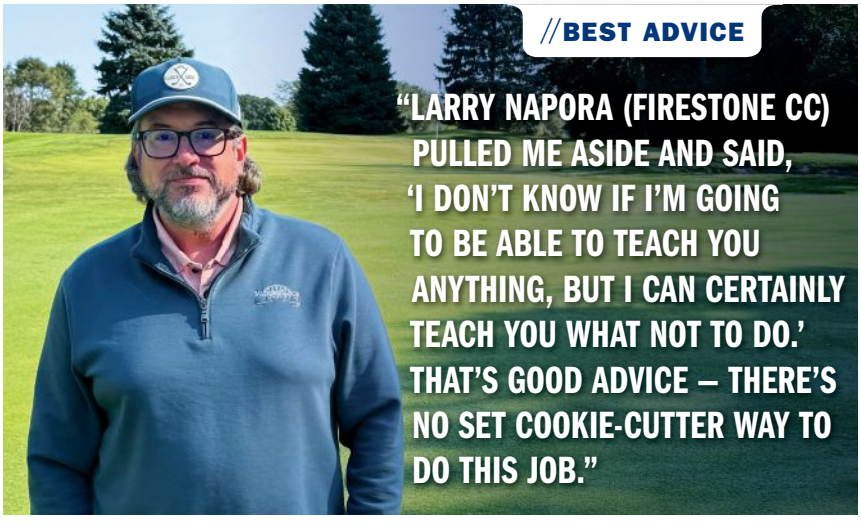
Tell me about Water's Edge. It's a municipal course owned by the Village of Worth. It's your typical 1990s construction. We've been through our ups and downs like every other place did with the economy the past 25 years. But we're moving in the right direction.

How did you get into the business? I went to Penn State as a chemistry major. I quickly realized I didn't want to spend all my time in a lab. The guy living next to me was a turfgrass science major — I didn't even know that was a thing. After that first semester, I transferred with no golf course work experience prior to that.

Did you keep in touch with your neighbor? I did. We've had a text string going since college. But he's not in the business anymore.

What do you and your wife do for fun? We enjoy hosting cookouts at the house or just sitting around, maybe having a glass of wine. And we go to concerts.

What are your music tastes? Give me a recent show. The most recent was Gary Clark Jr. and the Black Keys. I wasn't a big Black Keys fan going in, to be honest, but they opened my eyes … they were amazing.



//BEST ADVICE

"LARRY NAPORA (FIRESTONE CC) PULLED ME ASIDE AND SAID, 'I DON'T KNOW IF I'M GOING TO BE ABLE TO TEACH YOU ANYTHING, BUT I CAN CERTAINLY TEACH YOU WHAT NOT TO DO.' THAT'S GOOD ADVICE — THERE'S NO SET COOKIE-CUTTER WAY TO DO THIS JOB."

What teams do you root for? I was born and raised in Pittsburgh and only moved out to Chicago about 15 years ago. Being raised in Pittsburgh, you can't get rid of those allegiances.

Do you have an all-time golf highlight? I made my first hole-in-one last year. It was during our superintendent's match play event, too, so it meant something … although we ultimately went on to lose the match, which was unfortunate.

Tell me the story… what course, club, and did you see it go in? It was No. 11 at Rolling Green CC, Arlington Heights, Ill. We were down three, and I hit kind of an easy nine. I thought it was a decent shot but you never expect it to go in, I hit it up there close, it took a couple bounces and caught a hillside … so I just bent over to pick up my tee, and the other guys are like, "I think that went in!" I looked up, and there's no ball up there.

Was it a costly celebration? Actually, no. It was just the four of us, and my playing partner was pretty upset with the way he played — we lost the match on the 18th. He didn't want anything to do with anyone, so he was out. And one of the guys on the opposing team is not a drinker. It was low-key, I got off easy.

As interviewed by Seth Jones, September 18, 2025.

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