

SINCE 1927—The Resource for Superintendents // Golfdom.com

Golfdom

04.25

PLUS

Hiring better employees
The five levels of autonomy
The right amount of thatch

THE GRAFFIS REPORT

National Golf Foundation CEO Greg Nathan discusses the annual report, and why it's a great time to be in the golf business

No. 18 at Soleta Golf Club, a newly-opened Nick Price design in Myakka City, Fla.

A woman wearing a grey t-shirt, blue jeans, and a grey baseball cap is operating a red Smithco sprayer. The sprayer is a large, open-frame vehicle with a steering wheel and a large tank. It is driving on a green lawn with trees in the background. The image is part of a promotional advertisement for Smithco sprayers.

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Winning an unfair game

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“As Nathan went through his slides, the news he was sharing kept getting better and better. The game of golf is exploding among young people ...”

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

Hanging with the YouTubers and TikTokers

Last October, I had the pleasure of attending the National Golf Foundation’s annual meeting. This edition was held at Omni La Costa Resort and Spa in Carlsbad, Calif. It’s a great spot; the Golf Course Superintendents Association of America has held its golf championship there in the past.

There are a couple of things I particularly enjoy about the NGF meeting. One is the great company. There’s a small group of us there who focus on the maintenance side of the game. We typically find each other and sit together. Think of Par Aide, Standard Golf, Nufarm and the like — great people to hang out with. (If you’re an industry person and you’re not attending, you should join us!)

The other thing that’s good for me is the NGF asks for the content of the meeting to be kept confidential. So rather than sitting there taking copious notes and recording audio of some of the speakers, I sit back and listen, soaking it all in.

Looking back, the October 2024 NGF meeting was es-

pecially impactful. Consider: This was where I first learned of TGL (Tomorrow’s Golf League on ESPN) — the cover story of last month’s issue. This is where I saw GCSAA CEO Rhett Evans’ dramatic presentation on his journey summiting Mt. Everest. It was there when I listened to an influencer do a question-and-answer session and, like the grumpy old man I’m starting to become, I wondered why her story was so important to warrant a seat on that stage. And lastly, this is where I saw NGF CEO Greg Nathan give his presentation on the 2025 Graffis Report.

Why was the influencer so important to be on the stage? Maybe because the NGF wants middle-aged golf businesspeople like me to

realize what an effect they’re having on the popularity of the game. As Nathan went through his slides, the news he was sharing kept getting better and better. The game of golf is exploding among young people and among a wide variety of ethnicities. There were 28.1 million golfers in 2024, a jump up of 1.8 million golfers.

At the recent GCSAA show in San Diego, Nathan walked up alongside me and said, “Walk with me.” We were both hustling, trying to get to where we needed to, but he wanted to catch up while we both had a hot minute. It was then that we set up this month’s *Golfdom* Conversation, where I chat with Nathan about the 2025 Graffis Report, what excites him

about the current state of the game and why this current boom is different than the Tiger boom of the late 1990s and early 2000s.

While at the Players Championship last month, I saw again how these influencers are ... influencing ... the game’s fandom. On Wednesday afternoon — mere hours away from the first tee shot of the 2025 Players Championship — holes 10 through 17 were made available for four foursomes for an eight-hole tournament called the Creator Classic, broadcast live on YouTube. The golfers were all social media celebrities, or as Andrew Lucas, assistant director of golf course maintenance at TPC Sawgrass, called them, “YouTubers and TikTokers.”

Can you imagine? Allowing a mini tournament to go off before one of golf’s biggest professional events?

Well, I believe it now. And it was a solid crowd at the course watching guys like @Barstool-Trent, Fat Perez, ‘the most comfortable man in golf’ and the world long drive champion, Kyle Berkshire. The gallery had a different look and feel to it. It felt more like a rock show than a golf gallery.

It was later that I learned that, while the in-person crowd was good, the online crowd was even better: 700,000 people watched the Wednesday afternoon tournament on YouTube.

Tick, tock, indeed. This is golf’s time. **G**

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Starter

NEWS, NOTES AND QUOTES



//IN MEMORIAM

DENNIS LYON, CGCS, DIES AT 76

BY GOLFDOM STAFF

➔ Former GCSAA President Dennis Lyon, CGCS, died at the age of 76 on Feb. 19, 2025.

Lyon, also a Colorado Golf Hall of Famer and former president of the Colorado Golf Association and Rocky Mountain GCSA, was the superintendent and manager of golf for the city of Aurora, Colo.

"Through his knowledge, activities

and dedication to volunteer service, Dennis has set a very high standard for golf industry professionals," Jim Snow, former national director of the USGA Green Section, said of Lyon after awarding him the 2011 Green Section Award. "In particular, his influence on municipal course management practices extends well beyond the borders of his home state."

Lyon also won the GCSAA's Old Tom Morris Award in 2013, given to an individual who, through a continuing lifetime commitment to the game of golf, has helped mold the welfare of the game in a manner and style exemplified by Old Tom Morris.

Lyon's first assistant superintendent position came at Heather Ridge Golf Course in Aurora, Colo., in 1972. A year later, he took over as superintendent at Aurora Hills.

In 2011, Lyon received the Colorado Golf Hall of Fame's Lifetime Achievement Award and was named the Colorado Golf Association's 'Superintendent of the Century' in 2015.

"A lifelong supporter of the game, he has always had a commitment to promoting public golf and the public golfer. In 2008, one of the Aurora courses, Murphy Creek, hosted the U.S. Amateur Public Links Championship, and Lyon served as general chairman," Lyon's Colorado Golf Hall of Fame bio reads.



Lyon was a Colorado lifer. Born in Hayden, Colo., he received a horticulture degree from Colorado State University and a master's from the University of Northern Colorado.

//A NEW NAME TO KNOW

ENVU PARTNERS WITH BIOCONSORTIA

Envu formed a new partnership with BioConsortia, a microbial crop solutions company, to evaluate and develop biological solutions for non-crop applications in the environmental science industry.

According to the company, this collaboration reflects the growing demand for sustainable alternatives for pest management and plant protection, driven by consumer demand and increasing regulatory pressures.

BioConsortia uses its patented Advanced Microbial Selection (AMS) process and GenePro platform, along with advanced genomics techniques, for the discovery, design and selection of microbes.

"For BioConsortia, this is an exciting opportunity to demonstrate our dedication to biocontrol innovation and bring our cutting-edge technologies into new markets," said Hong Zhu, Ph.D., senior vice president of research and development for BioConsortia.

//NO MO MAINTENANCE

TRIMAX UNVEILS SNAKE S3 MOWER

Trimax Mowing Systems recently debuted the Snake S3, its latest golf and sports turf mower.

According to the company, the Snake S3 builds on the previous Snake series offerings with features designed to deliver zero daily maintenance and enhance ease of use. With two design changes — the Trimax Titan roller bearing system and maintenance-free wheel hubs — the Snake S3 eliminates the need for daily greasing.

"The Snake S3 was developed in direct response to customer feedback," said Michael Sievwright, CEO at Trimax Mowing Systems. "Their input has helped us create a mower that addresses the real-world challenges faced by our customers, reinforcing our focus on delivering practical, effective solutions."



"There's a need for great but accessible courses," said Mike Keiser, the 2025 recipient of the USGA's Bob Jones Award, who partners with golf architects who bring his philosophy to life through golf experiences that are walkable, natural and open. "If you build something pretty special, you want the public to play it."

//KEEP IT LIKE THE KEISER

Mike Keiser to receive Bob Jones Award



Mike Keiser is set to receive the USGA's highest honor, the Bob Jones Award, during the 125th

U.S. Open at Oakmont CC in June. Since 1955, the award recognizes those who personify the character, sportsmanship and respect for the game as its champion namesake.

Keiser, a native of East Aurora, N.Y., started golfing at 9 years old and worked as a caddie throughout his childhood. His love for the game grew as a member of the Amherst (Mass.) golf team and continued during his time in the Navy and early career as the founder of Recycled Paper Greetings, an eco-friendly card company.

That passion for playing the game, both in the U.S. and abroad, led to a

second career in golf course development, focused on preserving and honoring the natural landscapes that his courses occupy. His first project was The Dunes Club, a nine-hole layout in Michigan that he built to save its lakefront property from condominium and townhouse development in the mid-1980s.

"What inspires us about Mike is his love for what is pure and good about the game, his investment in golf that's open to the public, his drive to promote recreational golf and the joy he feels when he plays — and those strong connections have never wavered," said Mike Whan, CEO of the USGA, who made the announcement at the USGA's Annual Meeting at Pinehurst Resort and Country Club.

//NO MO POA

NUFARM'S VELOCITY PM GETS CALIFORNIA REGISTRATION

Nufarm announced California EPA registration of Velocity PM Poa Management Herbicide, which is now approved for use on California golf courses.

Velocity PM is developed and formulated to help golf courses gradually and selectively remove postemergence annual bluegrass (*Poa annua*) and roughstalk bluegrass (*Poa trivialis*) while also reducing *Poa annua* seedhead production and suppressing dollar spot.

At GCSAA's Conference and Trade Show in San Diego in February, Nufarm showcased the effectiveness of Velocity PM Herbicide in conjunction with Anuew PGR to regulate unwanted *Poa* on the golf course.

"Velocity PM is an excellent tool for superintendents who are looking to effectively manage *Poa annua* on their fairways and tees," said Western Regional Sales Manager Krystal Abbott. "Through a transition program, Velocity PM phases out unwanted *Poa* gradually to suit the course's needs."

//FIXER UPPER

BARENBRUG PARTNER TURFMEND FOR NEW PRODUCTS

Barenbrug USA recently launched Pro Repair Sand and Pro Repair Compost. The company says the products were designed to repair divots, bare spots and stressed turf areas.

The Pro Repair products combine TurfMend and Barenbrug's grass seed with a substrate to promote fast germination, recovery and resilience. Barenbrug's Pro Repair Sand and Compost offers a variety of seed blends to meet unique turf needs:

- **HGT (Healthy grass technology):** Kentucky bluegrass with traffic tolerance and recovery.
- **HGT & RPR (Regenerating perennial ryegrass) 80/20 mix:** A blue/rye blend for quick establishment and resilience.
- **RPR:** Perennial ryegrass for long-term durability.
- **RTF (Rhizomatous tall fescue):** Drought-tolerant grass with deep root systems.
- **PanAm:** A bermudagrass for warmer climates.

// A FUTURE LEADER

GEORGIA PH.D. CANDIDATE WINS MUSSER AWARD

The Musser International Turfgrass Foundation named **Erick Begitschke** of the University of Georgia its 2025 Award of Excellence recipient.



Erick Begitschke

The award is given to outstanding Ph.D. candidates who, in the final phase of their graduate studies, demonstrated overall excellence throughout their doctoral program in turfgrass research.

"I am deeply humbled and honored to receive the Musser Award of Excellence," Begitschke said. "I greatly respect the previous winners and their remarkable contributions to the turfgrass industry."

Begitschke received his bachelor's degree in turfgrass management from the University of Georgia and his M.S. degree in turfgrass weed science at Mississippi State University. His research at Mississippi State focused on utilizing preemergence herbicides in hybrid bermudagrass sod production. Between his M.S. and Ph.D., he worked for SePro Corp. as a research associate at the company's research facility in North Carolina.

// LONE STAR LOCATION

EWING OPENS NEWEST TEXAS LOCATION

Ewing Outdoor Supply hosted the grand opening of its new Liberty Hill Supercenter, located in Liberty Hill, Texas.

According to the company, the Ewing Liberty Hill Supercenter offers a wide variety of products, including irrigation systems, hardscaping materials and bulk items like mulch, soil, rock and gravel. The supercenter is stocked and aims to provide the expert advice needed to help customers succeed, whether working on residential or commercial projects.

"We are thrilled to open the Ewing Liberty Hill Supercenter and offer a convenient, fully stocked location for local customers," said Grant Foreman, regional manager at Ewing. "We know how important it is to have immediate access to high-quality materials, and we're here to provide that with the added benefit of expert guidance."

// DOUBLING UP

BEARD EQUIPMENT EARNS TWO TOP-DEALER HONORS



Beard Equipment, an equipment dealer with locations in Alabama, Florida, Kentucky, South Carolina, Tennessee and Ohio, took home a pair of dealer of the year awards at the 2025 GCSAA Conference and Trade Show.

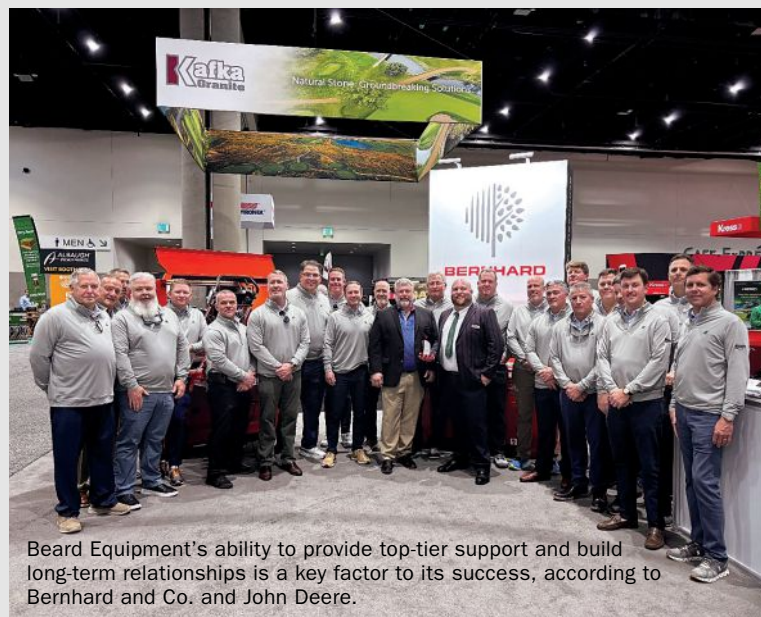
John Deere honored Beard Equipment at a special ceremony during the conference as its golf and sports turf 'Dealer of the Year.'

"Our dealers play a crucial role in supporting the golf industry, and thanks to their dedication, we've earned the trust of top courses worldwide," said Manny Gan, global director of golf at John Deere. "We're especially proud to honor Beard Equipment today for its outstanding commitment to customer care and its continued efforts to grow the game of golf."

Bernhard and Co. also named Beard its distributor of the year, citing growth over the past few years, expanding both in its original territory and within the recently acquired Greenville Turf territory.

In 2024, it was the top Bernhard distributor in North America for total machines ordered. Beyond sales, Bernhard recognized Beard Equipment for its commitment to customer success.

"We are incredibly proud to receive this recognition from Bernhard and Company," Herman Bloch, vice president of the golf and turf division at Beard Equipment, said. "Our success is built on a shared commitment to delivering excellence, and we value the strong relationship we have with the Bernhard team. We look forward to building on this momentum and continuing to provide our customers with the best solutions available."



Beard Equipment's ability to provide top-tier support and build long-term relationships is a key factor to its success, according to Bernhard and Co. and John Deere.

UNVEILING

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Golfdom Gallery



1 Featured on this month's cover
Golfdom Editor-in-Chief Seth Jones enjoyed an amazing round at Soleta Golf Club where he was welcomed by the club's owner, Charles Duff (right). The new course, designed by Nick Price and located in Myakka City, Fla., is featured on this month's cover (was that Nelly Korda that just walked by? Oh yeah, it was).

2 Fine after nine Tom Trammell, CGCS, owner, TBT Turf Services; Joshua Fleisher, director of golf course maintenance, Addison Reserve CC, Delray Beach, Fla., and Mike Davis, Winston Trails GC, Jupiter, Fla., take time for a quick photo following their nine-hole round at The Dye Preserve GC in Jupiter, Fla.



3 What's that truck doing? John Reilly, director of agronomy, the Resort at Longboat Key Club (with his dogs Wingman and Millie, aka "Team 10"), gave Seth a nice surprise when he unexpectedly pulled his truck right up to the tee box toward the end of his round.



4 Shotgun start where the pros play (Left to right) Justin Gille, superintendent, Broken Sound GC, Boca Raton, Fla.; Harry Robishaw, assistant superintendent, Addison Reserve; and Clinton Tingen, CGCS, director of agronomy at Sandhill Crane GC, Palm Beach Gardens, Fla., were dialed in and ready for their round at The Dye Preserve — where most of the members are professional golfers.



PHOTOS BY: GOLFDOM STAFF



5 Bird watching at Dye Preserve Jones and his friend Ted Bokern, Nationwide Insurance, put on a double-bogey display while playing with birdie brothers, Brian Birney, CGCS, the Everglades Club, Palm Beach, Fla., and Jim Rattigan, Plant Food Co.



6 Host supers Hats off to Ryan Swilley, CGCS, (right) and Chris Schultz, The Dye Preserve. These two played host to the Palm Beach GCSA Superintendent and Assistant Superintendent Only meeting. Our own Seth Jones delivered a lecture on how to put your best foot forward when being interviewed, but the highlight of the meeting was enjoying nine holes and seeing the exceptional conditions at Dye Preserve.



7 Happy hour Mike Erik, superintendent, The Bear's Club, Jupiter, Fla.; Case LeValley, Jonathan's Landing at Old Trail, Jupiter, Fla., and Matt Schuster, The Bear's Club, following their nine holes at Dye Preserve.



8 Eye on the prize Terry Kennelly, director of agronomy, Miakka Golf Club, showed Jones the progress on the Fry/Straka Global Golf Course Design build (in partnership with Paul Azingen) located near Myakka City, Fla.

The Golfdom

FILES

FROM THE ARCHIVE

With news of Pine Valley being awarded its third-ever Walker Cup Match in 2044 (yes, you read that correctly), we're going back 51 years to the May 1974 issue of *Golfdom*. In this feature, we look at how Pine Valley maintains its natural beauty. If you're reading this in 2044, let us know how different Pine Valley looks 70 years after "Project '74!" To read the full article, visit [Golfdom.com](https://www.golfdom.com).

PROJECT '74

A bit of wilderness on the golf course

BY FRED V. GRAU

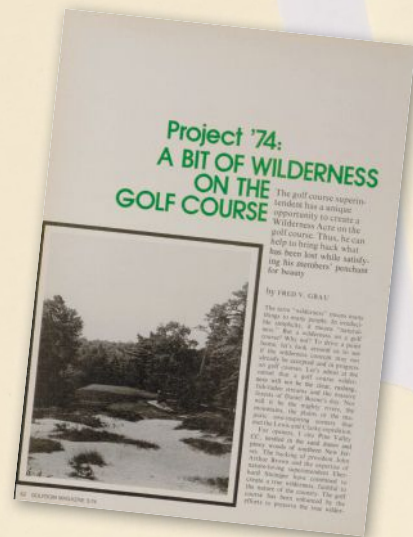
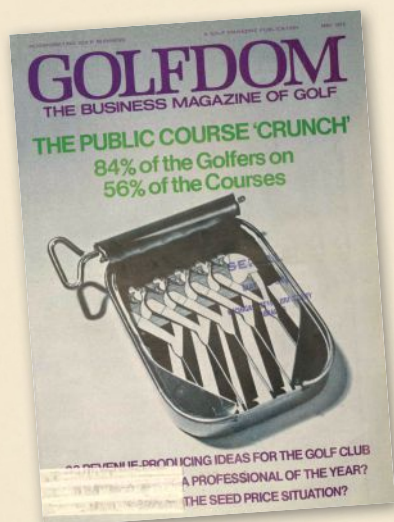
The term "wilderness" means many things to many people. In irreducible simplicity, it means "naturalness." But a wilderness on a golf course? Why not? To drive a point home, let's look around us to see if the wilderness concept may not already be accepted and in progress on golf courses. Let's admit at the outset that a golf course wilderness will not be the clear, rushing, fish-laden streams and the massive forests of Daniel Boone's day. Nor will it be the mighty rivers, the mountains, the plains or the majestic awe-inspiring scenery that met the Lewis and Clarke expedition.

For openers, I cite Pine Valley CC, nestled in the sand dunes and piney woods of southern New Jersey. The backing of president John Arthur Brown and the expertise of nature-loving superintendent Eberhard Steiniger have combined to create a true wilderness, faithful to the nature of the country. The golf course has been enhanced by the efforts to preserve the true wilderness concept.

A few examples. As the golfer walks from the 15 tee, he crosses a bridge where turtles can be seen sunning on

nearby rocks. Wild fowl are present, but not completely trustful of golfers with clubs. In a dense thicket of rhododendron, he stoops to drink the pure, sweet, cold water from a flowing spring.

If his drive on the 18 fades toward a pond surrounded with aquatic plants, the golfer may be rewarded with a glimpse of a wood duck flashing to its nest set in the center of the pond safe from the ever-present marauding muskrat. Or a trophy-sized bass may thwack the surface as it falls back from an attempt at a free-flying insect.



I have seen major soil disturbances in the pine woods where flourishes the sweet huckleberry. Such is the dedication of the entire crew to preserve nature at Pine Valley that one may pass by the disturbed area the next day, and it is as though nothing had been disturbed. This is a vital part of the wilderness concept of naturalness. Even in the huge never-raked bunkers, the wilderness concept is encouraged. Here grow the *Hudsonia*, a native heather; a sedge that develops naturally and is a feature of the course; huckleberry bushes that belong to these woods and broom sedge, a relative of the tall prairie grasses of the Midlands.

These are only a few of the wilderness features that make Pine Valley unique. Steiniger continually patrols the course to see what needs to be trimmed, what to be added, what to be eliminated. He has done this so skillfully and so unobtrusively that golfers believe that nothing ever needs to be done to keep the course perfect.

Do other courses follow the wilderness concept? Yes. But no two are alike. They differ in terrain, soil, natural vegetation, water and, most importantly, in the personality and imagination of the golf course superintendent. **G**



“Lower levels of automation fit more naturally into existing workflows with minimal changes, while fully autonomous, self-docking robots require a bigger shift in mindset but offer the most efficiency gains.”

BENTON HODGES, Owner, Mountain West Turf Technologies

What does “autonomous” really mean?

Are all autonomous mowers created equally? Wait — what does autonomous even mean?

The conversation around autonomous mowing has never been louder, but much of it is clouded by confusion over terminology, with important nuances getting lost in the noise. Earlier this winter, I set out to categorize the different styles of autonomous mowing and found inspiration in the established autonomy levels used for cars and vehicles. While not a perfect match, adapting these levels provides a helpful framework for understanding the varying degrees of automation available in turf management today.

Level 0: No automation

At this stage, all tasks — steering, speed control, reel lift and turning — are handled manually. Traditional riding, push and walk-behind mowers fall into this category. While reliable, they require full-time operator control and come with labor challenges that automation aims to alleviate.

Levels 1/2: Operator assistance and partial automation (retrofit kits, traditional units)

This level introduces automation that assists the operator without removing them from the process. Features like cruise control, controlled reel lift and turning speed adjustments improve efficiency and reduce fatigue while still requiring full operator control. These features are already common in modern fairway and triplex mowers, and many superintendents may not even realize they are using the first steps toward autonomy.

Further along this combined level, aftermarket kits on existing fairway units use GPS/RTK corrections to enable straight-line mowing and more efficient turns.

Operators may still ride along, but their hands-on involvement is reduced. This helps to lower the skill barrier for operation.

Levels 3/4: Conditional and high automation (Drop-and-go, larger robots)

Mowers in this category operate autonomously within designated zones but still require human involvement for transport and oversight. Some aftermarket kits or hybrid autonomous/manual mowers fit into this category if they can run without a ride-along operator.

These units lack self-docking capabilities, meaning they must be manually relocated for charging. However, advanced obstacle avoidance enables self-navigation within designated zones, making them viable solutions for specific areas of the course. Cloud-based operation and remote monitoring enhance efficiency, but at a certain mower size, safety regulations may require direct supervision.

Level 5: Full automation (self-docking, smaller robots) At this level, mowers

return to charging stations independently, enabling continuous operation with minimal human input. Cloud-based controls allow fleet management from anywhere.

While maintenance tasks like blade changing and regular cleaning still require human involvement, daily intervention is typically limited to error resolution and troubleshooting.

Finding the right fit(s) for your course Transitioning from traditional mowing to higher levels of automation depends on factors like equipment cycles, infrastructure, terrain, labor needs and budget. Lower levels of automation fit more naturally into existing workflows with minimal changes, while fully autonomous, self-docking robots require a bigger shift in mindset.

A great starting point for automation is smaller, contained areas that need frequent mowing. Clubhouse lawns, driving ranges and practice areas are ideal spots to introduce fully autonomous, self-docking mowers. These areas let superintendents test robotic mowing with existing infrastructure, remove a time-consuming mowing task and gain hands-on experience before scaling up to larger areas of the course. **G**

Hodges started his career in the turfgrass industry as a researcher at Mississippi State University followed by nearly a decade at high-end golf clubs as an assistant superintendent in the Mountain West. He now focuses his efforts on helping golf courses leverage technology-driven solutions while maintaining a people-first mindset. Find him on X at @BPHTurf or LinkedIn.



**"IT HAS TO BE BOOTS ON THE
GROUND. YOU'VE GOT TO
GO ACTIVELY ENGAGE AND
RECRUIT PEOPLE. YOU CAN'T
WAIT AROUND ANYMORE
BECAUSE THEY DON'T KNOW."**

— TYLER BLOOM

"I don't hire to just hire. I don't necessarily want to just fill a body. I want someone that legitimately wants to be here and is buying into the things we're doing," says David Walter, director of agronomy at Silverado Resort, on how he approaches hiring both crew members and assistants.



Superintendents share how they find, hire and train employees, helping turn golf from a job into a career

Winning an unfair game

BY ROB DIFRANCO

You know the story by now: rounds are up and more people are playing golf than ever before. Golf is still in its post-COVID boom period. Look at the National Golf Foundation's 2025 Graffis Report — named after *Golfdom* founder Herb Graffis — which shows that 28.1 million people participated in “green-grass golf” in 2024, the highest number since 2008 and the seventh straight annual increase.

Unfortunately, the game's growing popularity hasn't created an increased interest in working on golf courses. In the 2022 Capital and Labor Survey conducted by the Golf Course Superintendents Association of America, 63 percent of su-

perintendents described the labor market as bad or very bad.

To get deeper insight into this ongoing labor shortage, *Golfdom* spoke with several superintendents and a superintendent-turned-consultant to gather ideas on how to fill the labor gap and grow the next generation of golf course agronomists.

Where are the workers?

Tyler Bloom recently debuted a new name and expanded vision for Bloom Golf Partners, his executive search and business consulting firm specializing in the golf and private club industries.

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"WE ALL KNOW THAT THIS JOB CAN BE PRETTY THANKLESS AT TIMES, BUT WHEN YOU DO GET THOSE 'ATTA-BOYS,' THEY TEND TO BE PRETTY GENUINE."

— NOAH TUBBS

More people are golfing than ever before, presenting an opportunity for superintendents to get creative with their recruitment efforts. Tyler Bloom, a former superintendent and now a consultant, says that just posting the job and praying is no longer good enough.

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Bloom founded the business, formerly Tyler Bloom Consulting, in 2020. Since then, it has helped to place more than three dozen directors of agronomy and golf course superintendents and more than 300 professionals, including equipment managers and assistant superintendents.

Bloom is a former superintendent himself, most recently spending time at Sparrows Point Country Club in Baltimore before founding his consulting firm. In 2024, Bloom, in partnership with the Center for Generational Kinetics, an independent research firm, and commissioned the *Workforce Trends in Golf National Research Study*, aimed at revealing, debunking and uncovering myths and truths about the current trends, perceptions and practices of working at a golf course and private club.

The study was eye-opening for Bloom, confirming many of the ideas and strategies he's used to help clubs nationwide.

"I would recommend strategies to clubs, but not everybody's going to be cohesive with that sort of recommendation. So, I thought, 'Well, let's do some research so I know that the insights I'm giving are driven by fact,'" he says of the study, which you can find on Bloom's website, BloomGolfPartners.com/Study.

One of the several topics the study tackles is the ever-present question on a superintendent's mind: Where are all the workers?

The answer according to Bloom's study? Only 38 percent of Americans view golf courses as a strong career path. So, how does Bloom suggest golf courses and superintendents boost that? To start, he says the superintendent has to be their biggest brand ambassador.

"The club and the super have to take action. (As a superintendent) I didn't have an issue recruiting people because I took action. If you're posting (the job) and praying for something to happen, you will always be in this state of flux," Bloom says. "To me, it has to be boots on the ground. You've got to go actively engage and recruit people. You can't wait around anymore because they don't know."

That could be by using things like videos and other content on social media to raise awareness. Bloom also notes that the GCSAA and its First Green program are ways to promote the industry and the opportunities it offers in your area — albeit to a younger audience.

"I see too many people using the labor market as, and I hate to use the word, but an excuse. They're not putting forth any actions to be creative or flexible," Bloom says. "They need to communicate. If they are running into issues, then they need help readjusting expectations."

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Continued from page 14

Wages, wages, wages

Usually, getting someone in the door — if they're unfamiliar with the world of golf course maintenance — starts with paying a competitive wage.

Bloom's study shows that one in two Americans view working at a golf course positively, but still carry negative associations to employment such as temporary or seasonal, long hours and high stress.

"If you're not paying people a marketable, competitive wage and benefits and creating a great workplace culture that people want to come to and stay at, then it doesn't matter what you do," he says.

The study found a pretty specific number at which worker retention reaches roughly 90 percent.

"I think you've got to pay people north of \$70,000, or they're not going to stick around. They'll go find another job," Bloom says. "Ironically, our cut-off for any sort of recruiting project has a base salary of 70,000, so I found it fascinating that that data coincides with what we're seeing."

Creating culture

Salary is important — and Bloom's study confirms that, showing 77 percent of working Americans would consider a job change with a 10-percent increase from their current salary. However, Bloom believes that when it comes down to retention, ultimately, it's the culture that will cause someone to stay or leave.

"Yes, salary is important, but sometimes people leave and make lateral moves because they're down (mentally)," he says. "If they're not in an environment that can nurture them to the next step, and you don't have a good workplace culture and a leader who takes action, that's probably the driving force of why people leave jobs at all levels."

Noah Tubbs, superintendent at Glens Falls Country Club in Queensbury, N.Y., knows what it's like to come into a club with a culture built to nurture and grow its employees. Tubbs interned at Glens Falls while in college at SUNY Delhi and later served as an assistant superintendent at the club before becoming the man in charge.



Noah Tubbs

"My old boss, Chris Frielinghaus, helped shape me as an assistant and intern. As an intern, I remember going to greens committee meetings," Tubbs says. "That is not something I or any of my other college buddies ever did."

"I remember the chair coming up to me while I was mowing fairways. It was a Wednesday morning, and he says, 'Noah, can you do a presentation for tonight's greens committee meeting?' and I'm like, 'Tonight?' It's 8 o'clock in the morning, and the meetings at 5. He's like, 'Yeah, tell Chris I told you to go home early so



77 percent of Americans don't know they can earn more than \$100K a year working on a golf course, according to Tyler Bloom.

you could work on a presentation if you needed.”

Tubbs says that having opportunities like that as an intern showed him how to manage that aspect of the job. It also helped him go into future meetings as an assistant and then as a superintendent knowing how to handle that.

For Bloom, managers of clubs who don't think making that investment — like the one that Frielinghaus made in a young Noah Tubbs — are setting themselves up for failure.

“People want to be a part of a mentorship culture,” Bloom says. “They want to come into a place where somebody will take them and guide them on the next step whether that's skill development, responsibilities of higher titles or salary increases.”

Promoting from within

Tubbs has a pair of assistants on his staff, and both were promoted from within — one before he took over as superintendent and the other that Tubbs himself hired. Tubbs' current crew consists of himself, a mechanic, two assistants, two full-time laborers and up to 15 seasonal workers.

Tubbs says there are quite a few things he looks for in a staff member that might translate into a potential assistant or full-time laborer, including whether or not they show up on time. But also, he says they have to show a genuine interest in the *why* of what they're doing on the course.

Sometimes, he adds, that might be easy to miss, especially

Continued on page 18

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Continued from page 17

during the busy season when projects take priority.

"I think we as superintendents get so focused on, 'Oh, we just have to get this job done,' that we forget that every moment out there is a teaching moment," he says. "If you've got someone on staff asking a question, don't just say, 'Oh, I don't have time for that.' Take the time to give them the full answer. The two-and-a-half minutes you might spend explaining to them isn't costing you anything over your day.

"We can all attest that we probably waste more time fiddling with our phones than we do taking that extra two minutes to talk about a problem or explain why you want it done this way. If they're asking questions, there's an interest, and you have to cultivate it."

Tubbs' second assistant, Logan Dexter, was one of those employees who showed interest in the why. Tubbs says Dexter was always asking questions about the club's irrigation system, which led him to offer up an opportunity to learn.

"You have to give them a little bit of wiggle room. Ask, 'Do you think you can handle it on your own?'" he says. "I think it's more or less about being able to identify the talent that you have within your department, which isn't always easy, but if you can identify the talent, see if they're coachable and then help educate them. It's only going to help them in the future, and it's only going to help you in the future as well."

Keeping your employees

Once you've identified and successfully trained a new assistant, you've got to keep them on staff for as long as you can until they're ready to take on a head position elsewhere (if that's their goal).

David Walter, director of agronomy at Silverado Resort in Napa, Calif., knows what it's like to cycle through assistant superintendents. Nestled in the Napa Valley about an hour north of San Francisco, the area surrounding Silverado is what Walter calls a "dream location" for some.



David Walter

But for others, like the demographic most likely to be an assistant superintendent, it can be a challenging place to live.

"It's a super difficult place to convince young people to move to. The population is on the older side, so there's not a lot of night-life," Walter says. "You're stuck in the valley, and to get out and explore, you have to go to San Francisco, which can be a two-hour drive pretty easily with traffic."

To land assistants, Walter adds that he has to be creative and understands that the course might be a stepping-stone job for most applicants.

"I have a conversation and let them know that if they're willing to make it work here for the learning opportunities here for three or four years, we'll do everything we can to help you find what's

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As host of an annual PGA Tour event, David Walter requires his assistants volunteer at another event to prepare for theirs.

next for you," he says.

Silverado hosts a yearly PGA Tour event — the Procore Championship, formerly the Fortinet Championship — which gives Walter a chance to get creative with both helping his assistants get more experience and also finding potential future employees.

"We require our leaders to go volunteer for at least one other tournament. So, Jeremy (Turner-Sanchez), our North Course superintendent, went with me to Kapalua to volunteer for The Sentry this year. And then Jose (Tena Jr.) is going to be going to The Truist Championship at Philly Cricket," Walter says.

While volunteering at the tournament, Walter gives his assistants homework. They have to talk with the mechanic and all of the assistants to get all they can out of the experience. It also works as a recruitment tool for Silverado, as Walter says.

"Is there an assistant-in-training on that staff looking for a change or next step? Being at these tournaments is a way to meet these people, and you never know whether they want to come here or a fellow Troon property," he says.

That has helped, according to Walter, as he's been able to help former assistants land new gigs and also drum up interest in Silverado at the same time. Still, the location and other factors have made filling out his team a bit of a struggle, meaning Walter has had to make do with the resources he has available.

"It's not quite a needle in a haystack, but it's close," he says. "But, I would rather have no one than the wrong person. So, if it means that it's a little more difficult to operate because we're short a person, it's better than someone that's not holding up their end of the bargain." ©



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Inside the 2025 Graffis Report

Q&A BY SETH JONES

The National Golf Foundation's annual report gives people working in the game much to be excited about

Earlier this year, the National Golf Foundation released their Graffis Report, which serves the NGF's members as an annual report on golf's economy. The Graffis Report is named after NGF founders Herb and Joe Graffis, two golf trailblazers who also founded *Golfdom* magazine and the Club Managers Association of America.

This year's Graffis Report was particularly notable because the good news was so abundant. According to the report, 28.1 million people played "green-grass golf" in 2024, the biggest number since 2008, continuing a seven-

year streak of upward trends. The 1.8 million jump in the number of golfers from 2023 to 2024 was the largest single-year increase since 2000, when the market was enjoying the Tiger boom. And the game saw the fewest number of course closures since 2005.

Golfdom sat down with NGF president and CEO Greg Nathan to discuss this year's Graffis Report, what it means to those who work in the industry (particularly those trying to keep the course maintained for those record number of players) and what are some of the reasons for the vitality of the game.

Golfdom: Greg, a little shout-out to the Graffis brothers, because we have that common link between the NGF and the magazine. You just released the Graffis Report, and I think everyone would agree that the results were just outstanding. What are some of the things in the report that you see that you find most exciting?

Greg Nathan: There's just such generational positivity around our game right now. I've been here 18 years at the NGF, it's such a different place right now relative to when I started in 2007. When I look at the metrics, it almost makes me a little uneasy just in terms of how, across the board, the numbers are so positive. We certainly embrace them.

The engagement in our game is so strong right now. There are a couple of things in the Graffis Report that I would call out, like in 2024, 137 million Americans either played, followed, read about or watched golf; 137 million Americans! That's above 40 percent of all



Greg Nathan

Graffis Report highlights

- 545 million rounds played in 2024, the fifth consecutive year of more than 500 million rounds
- 28.1 million golfers in 2024, a jump of 1.8 million golfers
- 29 course openings in 2024, the most since 2010
- Lowest number of course closings since 2005
- 64.3 million on-course and off-course golfers combined
- Younger people — ages 18-34 — are the largest age demographic, at 24 percent
- Since 2020, golf participation is up among Blacks (123 percent), youths (48 percent), females (41 percent) and Hispanics (26 percent)

Americans. Golf is becoming so ubiquitous. Golf's growth and social media have really changed golf's image. Previously, there was so much negativity around golf. Golf's brand and image are in such a better place today.

Golfdom: How do you feel about these numbers maintaining their current trends? What are the threats to the popularity of the game?

Nathan: We don't see a lot of signs in the data that would indicate this is not sustainable. I think the biggest threats right now are things that are beyond our control — things like recession or geopolitical events.

Golfdom: For my readers, with the number of rounds played skyrocketing — a record 545 million rounds played in 2024 — is this a little bit of good news, bad news? Good for the cash register, but difficult to get the job done?

Nathan: There's no doubt that when golf courses are super busy, it's stressful. It stresses out the turf, it certainly stresses out the people. I have great sympathy for the long hours and often thankless situation that many of the folks in the greenkeeping community are in — but this is what we hope for in so many ways. I would say that, from my point of view, the most successful segment for the past several years is not clubs and balls, it's not software, it's not golf cars. It's golf facilities. That's the segment that's the healthiest.

We've measured the financial health of golf courses six times since 2009, and the level of the percentage of private and public golf courses that say they are financially healthy, it's gone from a third of courses to 70 percent of courses. What that means for a superintendent's crew is more money to buy equipment, more

Continued on page 22

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(OFF-COURSE GOLF IS) THE ON-RAMP TO TRADITIONAL GOLF. IT'S THE BRIDGE BETWEEN THE COUCH AND THE COURSE.”

Continued from page 21

money to buy chemicals. It doesn't necessarily mean they're going to get to work less, but it might create opportunities for them to make a little bit more money. It might create opportunities to grow staff.

We have no choice but to embrace it because the alternative is less job security and less future opportunity.

Golfdom: The Graffis Report also tracks the growing number of “off-course” golfers, people who play golf on simulators or at facilities like Topgolf. How important are these golfers to the people who run green-grass golf facilities?

Nathan: Really important. There is not a sport or activity that exists in the world that wouldn't give their left pinky toe to have 30-million-plus people participating in an ac-

tivity that's near the traditional activity.

What's important is hitting a real ball with a real club with a full swing. Because only when you do that can you get golf's drug, golf's addictive drug, which we call “shot euphoria.” When you can get shot euphoria, that's the hook. It is already benefiting (the game). That's one of the areas that's changing golf's image. But it's also the on-ramp to traditional golf. It's the bridge between the couch and the course.

Golfdom: During the NGF Annual Meeting, you talked about the Tiger boom and what Tiger did for golf in his heyday. And now, since COVID, we're in this new golf boom. You talked about how the Tiger boom came to a halt, and how this boom is much different. Do you mind going down that rabbit hole for me a little bit and expounding on that?



Nathan (left) and GCSAA CEO Rhett Evans meet up and play what Nathan called a dream course, Cypress Point Club in Pebble Beach, Calif.

PHOTO BY: GREG NATHAN

Nathan: You alluded at the very beginning ... I think it's seven straight years of growth in the number of green-grass participants. We're at 28.1 million golfers. The high-water mark in green-grass golfers was around 2003, 2004 at 30.6 million. When you look back at that period of time — the 'Tiger Slam,' the incredible performance at the U.S. Open at Pebble Beach — we had this participation bubble.

But when the recession hit, a lot of the growth back then came from less committed, less frequent players, and many of them disappeared. We saw a trough form in terms of the decline for many years in green-grass golf participation.

One of the things about the growth we've been experiencing since the pandemic is a disproportionate amount of growth in less frequent, less committed players. We have to pay close attention to that parallel. I don't believe that the numbers dictate that we're heading for a trough coming off this rise in less committed, less frequent golfers. It's a different time today. Back in the Tiger boom era, we didn't have 35 million people playing off-course. We didn't have the boom in screen golf and gamified ranges and Top Golf. Golf wasn't nearly as cool as it is now.

Tiger was cool, but recreational golf's image has changed so much due to the presence of social media, and that's made golf more intellectually accessible. They're wearing different clothes, these people are individuals; they're not the same type of person.

There are some parallels in the way the growth is materializing, but we're in a very different day as it relates to golf's image and the total golf participation between on and off being so high.

Golfdom: What do you think Herb Graffis would say to you and me today about what we're experiencing in the game?

Nathan: Seth, I always say to you when I see you that we're brothers from the same father. I know he'd be absolutely blown away. He had the vision. When I give my speeches, and I put their picture up on the screen, what I talk about are these two brothers from Chicago who, when golf was purely a private game in America, they looked at it, and they could see that golf was going to be big business in America. Golf was going to be part of the American dream. And if they had any idea that we're going to approach, in the next 10 years, 50 percent of Americans playing, watching, reading, following golf, they would be like, "OK, our vision has exceeded every expectation that we could have had for it."

Golfdom: Well, I'm grateful for those guys, and I'm grateful



Nathan says off-course golfers using simulations of facilities are important to the game, as anywhere that allows getting a full swing in grows the sport.

for you guys. It's great that we get to keep these traditions going. Going into this golf season, I just have to appreciate where the game is because it's going to get really busy for a lot of people. And that's a good thing.

Nathan: It's a very good thing. 

To read the complete Graffis Report, visit NGF.org.

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DOLLAR SPOT RESPONSE ACROSS DMI FUNGICIDES

By Mike Kenna, Ph.D.

Managing dollar spot disease involves regular applications of demethylation inhibitor (DMI) fungicides on golf course turfgrass. However, repeated applications can reduce dollar spot sensitivity to these DMI fungicides.

Research conducted by John Kaminski, Ph.D., and graduate student Maureen Kahiu evaluated the effective concentration (EC50) and relative mycelial growth (RMG) values for dollar spot species across nine commercially available DMI fungicides, determined the optimal concentration (i.e., discriminatory dose) for each fungicide and determined differences among isolates that show varying sensitivity to propiconazole across all commercially available DMI fungicides.

The determined doses (in micograms per milliliter or parts per million) needed to distinguish between responses were .01 for propiconazole and prothioconazole, .1 for flutriafol and tebuconazole and 1.0 micrograms per milliliter of active ingredient on potato dextrose agar for triadimefon, mefentrifluconazole, metconazole, triticonazole and myclobutanil. Mefentrifluconazole entirely stopped the growth of sensitive fungus strains.

There were varying levels of fungal growth suppression among highly resistant isolates (resistance management group > 80 percent). Among these resistant isolates, prothioconazole was the least effective at inhibiting growth, whereas mefentrifluconazole and myclobutanil were the most effective.

The sensitive baseline population showed significant variation in fungal growth when tested with nine different fungicides. The relative growth of the fungus among sensitive isolates and across all fungicides varied from 0 to 62.5 percent in the first experimental run and from 0 to 58.7 percent in the second run.

In both experimental runs, mefentrifluconazole and myclobutanil resulted in the least mycelial growth across isolates of all sensitivity. Triticonazole had similar RMG when screened across sensitive and moderately sensitive isolates. Prothioconazole and triadimefon generally resulted in the highest RMG across all isolates.

When tested with moderately sensitive populations, RMG values ranged from 15.7 to 59.1 percent in the first experimental run and from 5.6 to 59.3 percent in the second. Fungal growth steadily increased as the populations moved from moderately to highly insensitive.

These findings suggest that the effectiveness of commercially available DMIs varies among both sensitive and resistant strains of dollar spot (*Clarireedia jacksonii*). 

Reference

Adapted from Kahiu, M.M., and Kaminski, J.E. 2025. Discriminatory dose determination for DMI fungicides for *Clarireedia jacksonii* and mycelial growth variation across active ingredients. *Crop Science*. 2025;65:e21418. <https://doi.org/10.1002/csc2.21418>



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

NEWS UPDATES

ENVU PROMOTES MICHAEL MIRACLE TO NEW POSITION

Envu has appointed Michael Miracle to the newly created position of golf national account manager within its turf and ornamentals division.

Miracle has been with Envu for three years, working as an area sales manager in Illinois, Wisconsin and northern Indiana. He has an extensive history in the golf industry, working up through the ranks as a superintendent in the Chicagoland area for 10 years.

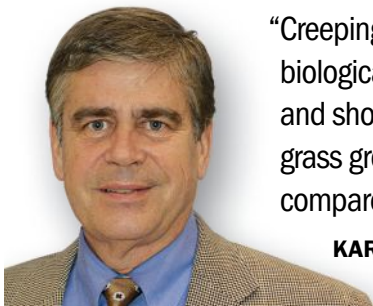
He has a Bachelor of Science degree in plant and soil science from the University of Kentucky and lives in Chicago with his wife and their two children.

"We couldn't be more thrilled to have Michael's expertise, drive and passion for the industry, which will undoubtedly help elevate our efforts as we work to expand and strengthen our presence in these key markets," said Stephanie McKay, head of key account management, turf and ornamentals, U.S., for Envu. "As a trusted partner, Michael will help customers adapt to changes in the industry by bringing proactive solutions forward."

“NO PREVIOUS RESEARCH HAS ATTEMPTED TO DEVELOP A GDD MODEL FOR PGRS ON ANNUAL BLUEGRASS PUTTING GREENS.”

Chas Schmid, Ph.D. and Alec Kowalewski, Ph.D.

(see story on page 26)



“Creeping bentgrass, however, is on a different biological clock than *Poa*. Research on root and shoot growth reports that creeping bentgrass growth comes later in the spring compared to *Poa*.”

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

In a growth drag race, *Poa* wins

In the northern U.S., spring is the time for rejuvenation. Winter is gray and dark, but with the arrival of spring, colors are generally warm and bright. The vibrant and fresh colors are due to the flowers and trees that bloom during spring. Although the colors associated with flowers and trees include yellows, orangey reds, pinks and every shade of light brown, turfgrasses provide a palette of colors, mainly different shades of green.

One of the most vibrant greens on a golf course in the early spring is annual bluegrass (*Poa annua*). The vibrant light-green to green color often contrasts the semi-dormant to bluish color of creeping bentgrass.

On putting greens, *Poa* grows at a relatively rapid vertical rate. In contrast, creeping bentgrass (*agrostis stolonifera*) grows at a much slower rate; often to the point of appearing not to be growing at all. Due to differential color differences between annual bluegrass and creeping bentgrass, the greater density and vertical growth rate of the annual bluegrass results in a blotchy appearance. Additionally, the difference in growth rates makes the greens bumpy due to *Poa*'s faster growth rate.

In some cases, the appearance of *Poa* patches or increased number of patches may appear what may seem like overnight. Greens that appeared

solid creeping bentgrass in early November may appear coming out of winter like *Poa* invaded them. *Poa* seed germination begins mid-fall, which is often visually difficult to detect.

Greens in the fall may appear relatively clean (low *Poa* populations), but once greens emerge from winter, something happens; relatively small *Poa* patches appear.

A common explanation is that annual bluegrass colonizes ball marks. Although this can happen, *Poa* does not need a ball mark to become established. Research has found that *Poa* could germinate in complete darkness at a level relatively close to that observed under light. Although most weeds that produce small seeds need light to germinate, one weed — *Poa* — apparently does not. Although not the only factor (and disturbance is still important), the ability to germinate under a dense turf canopy is a competi-

tive advantage of *Poa*.

To smooth out the differences in growth rates, the temptation exists to push creeping bentgrass to get it growing more rapidly. Creeping bentgrass, however, is on a different biological clock than *Poa*. Research on root and shoot growth reports that creeping bentgrass growth comes later in the spring compared to *Poa*.

If you have developed a solid fertilization program, don't try to adjust it to “jump start” the creeping bentgrass by giving it subsequent elevated shots of nitrogen. Bentgrass doesn't want excessive nitrogen, and the impact can actually be detrimental to root growth. The excessive amounts of nitrogen applied at the time of root growth may stunt growth in favor of pushing leaf growth. The implications will be felt later in the year. And in actuality, you are most likely favoring more growth from *Poa*.

Practices to smooth out the growth rate differences of the two turfgrasses include plant growth regulator applications like trinexapac-ethyl, which start when foliar growth starts. In early spring, this would be timed with *Poa* foliar growth. In combination with light rolling, the putting green will be smoother, and differences in growth will be less noticeable.

Light mechanical practices like brushing, verticutting and topdressing should help improve creeping bentgrass leaf texture. Once consistently warmer temperatures arrive, the differences in growth will disappear. By allowing creeping bentgrass to start growing on its own, you will have a healthier turf through the coming summer months. **G**

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

//SOLVING A PROBLEM

Evaluating PGR reapplication on annual bluegrass putting greens

By Chas Schmid, Ph.D., and Alec Kowalewski, Ph.D.

Plant growth regulators (PGR) are typically applied to golf course putting greens on a calendar-based schedule. Recently, growing degree-day (GDD) models for PGR reapplication interval have been developed to provide season-long growth suppression, including models for applications of Primo Maxx 1ME (trinexapac-ethyl, Syngenta) (4) and Trimmit 2SC (paclobutrazol, Syngenta) on creeping bentgrass and hybrid bermudagrass putting greens (8).

No previous research has attempted to develop a GDD model for PGRs on annual bluegrass (ABG) putting

greens. Instead, superintendents managing ABG putting greens have relied on GDD models developed for creeping bentgrass as a baseline for reapplication intervals. Thus, developing GDD models for PGR reapplication interval on ABG turf is needed.

The effect of N rate on ABG putting green turf quality, disease susceptibility and playability has been well documented (1, 2 and 9), but little is known about the effect of N rate on PGRs applied to annual bluegrass. Specifically, if the N rate influences the PGR reapplication interval for ABG putting greens greater rates of N

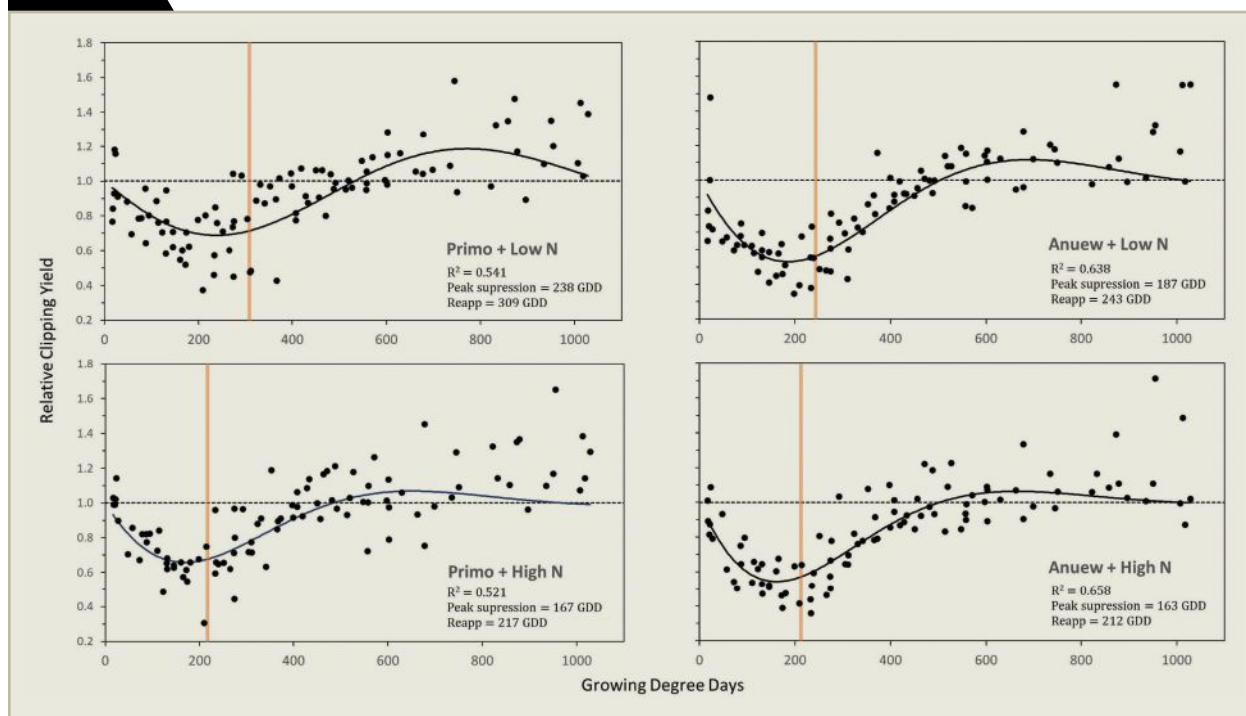
may require a more frequent (<GDD) reapplication interval compared to lower rates. Further research is needed to determine if GDD models for PGRs should be adjusted based on N rates.

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.

MATERIALS AND METHODS

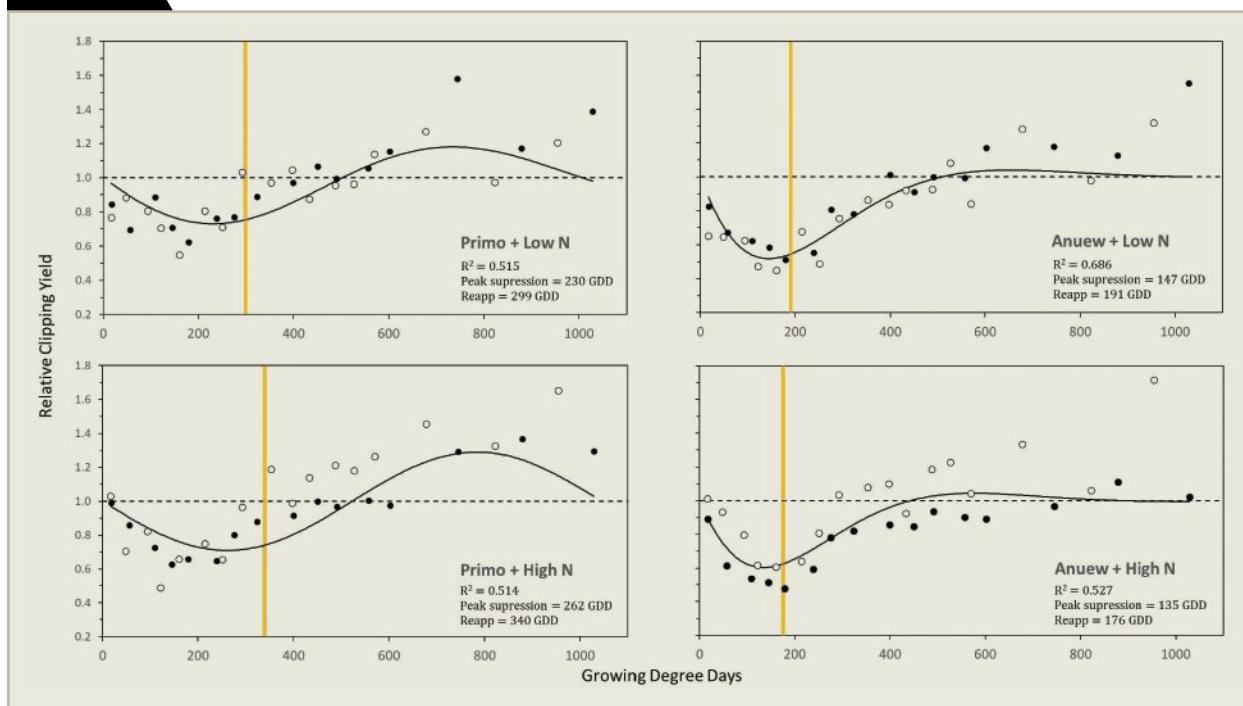
This three-year field trial was initiated in June 2023. The trial is being conducted on a sand-based annual bluegrass

FIGURE 1



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 sinewave model used to calculate relative growth suppression. The vertical line indicates the reapplication interval.

FIGURE 2



Average June (across 2023 and 2024) normalized relative clipping yield of annual bluegrass putting green turf in Corvallis, Ore., 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 sinewave model used to calculate relative growth suppression. The vertical line indicates the reapplication interval.

research green constructed using the USGA rootzone specifications (10). The research green is managed to simulate conditions found on golf course putting greens in the Pacific Northwest. Pesticides with no plant growth effects (e.g., demethylation inhibitors) were applied preventatively to control common diseases and insect pests.

An onsite weather station was used to measure daily air temperatures, which were used to calculate cumulative GDD using methods (7), with a base temperature of 32 degrees F and the stipulation that if the daily mean temperature is less than the base temperature, then the GDD for that day is set to zero.

TREATMENT DESIGN

The treatment design for the trial was adapted from previously published research (5 and 8). The experiment was designed as a two-by-two factorial in a randomized complete block design with four replications. Factors include PGR type, either a single application of

Primo Maxx 1ME (trinexapac-ethyl, Syngenta) at 0.125 fl. oz. per 1,000 ft² or Anuew (prohexadione-Ca, Nufarm) at 0.05 fl. oz. per 1,000 ft², and N rate, either 0.075 or 0.15 lb. N per 1,000 ft² every seven days throughout the trial period (June through September).

Plot size for the trial is 3 x 10 ft (30 ft²). Plant growth regulator treatments were applied with a CO₂-pressured backpack sprayer using a carrier volume of 2.0 gallons per 1,000 ft². Multiple runs of the experiment were conducted each year. In 2023, experimental runs were initiated on June 13, July 13 and Aug. 15. In 2024, applications were made on June 18, July 11 and Aug. 15.

A single application of the PGRs was made to research plots where no previous application of PGRs had been made within those years. Two sets of nontreated control plots were included per replication to improve the accuracy of calculating relative clipping yield (5).

DATA COLLECTION

Clipping collection methods were adapted from previous research (8). Clippings were collected three times per week (Monday, Wednesday and Friday) until approximately 600 GDD. At that point, they were collected once per week until the effects of Primo and Anuew were no longer detectable ($\approx$ 1,000 GDD).

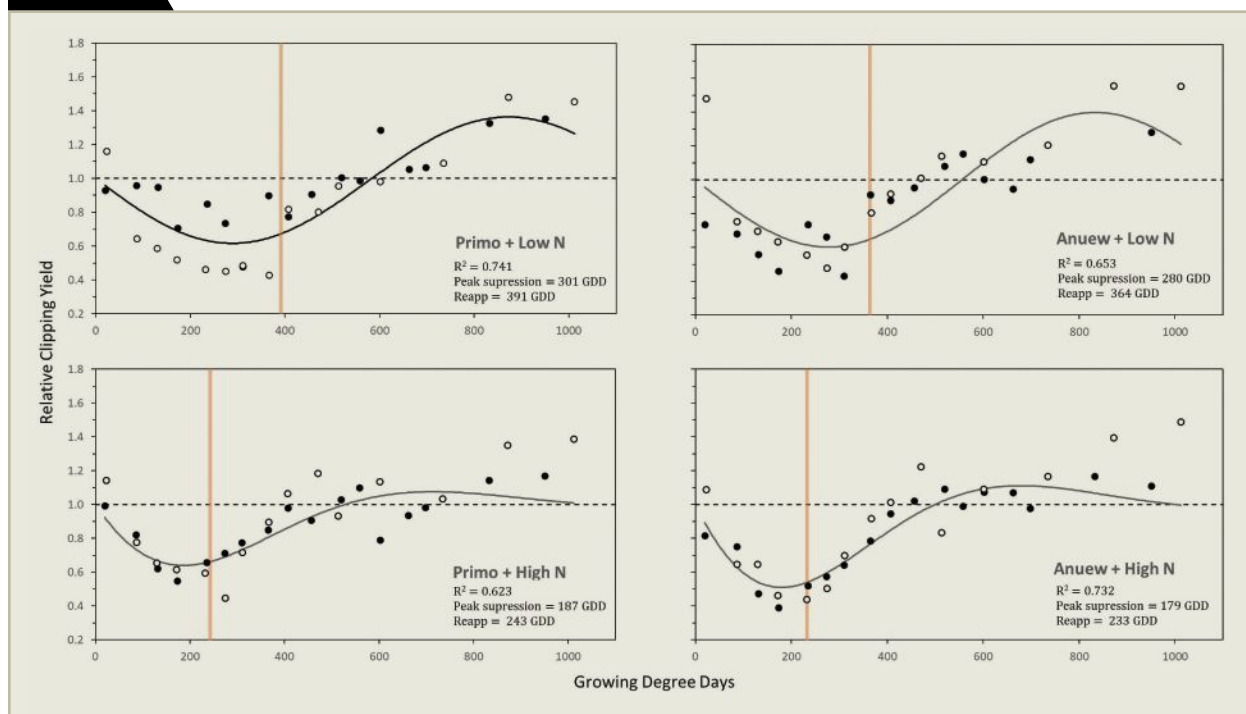
Clipping collection and general plot mowing were done using an electric walk-behind greens mower (eFlex 2120, Toro Company), with the bench height set at 0.110 inches. The entire plot area was mowed six days per week (except Saturday), including when clippings were collected from treated plots. Sand topdressing was withheld from the trial area to prevent contamination in the clipping samples. Any debris was removed from collected clippings before weighing.

STATISTICAL ANALYSIS

Relative clipping yield was compared to GDD using an amplitude-dampened

Continued on page 28

FIGURE 3



Average July (across 2023 and 2024) normalized relative clipping yield of annual bluegrass putting green turf in Corvallis, Ore., 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 sinewave model used to calculate relative growth suppression. The vertical line indicates the reapplication interval.

Continued from page 27

sine wave regression model (5). Data was combined across months (June, July and August) and years (2023 and 2024) for each PGR and N rate combination and analyzed to determine their overall effect on relative growth suppression and reapplication interval.

The nonlinear regression function in SigmaPlot 15 (Systat Software) was used to fit the amplitude-dampened sinewave model defined by Eq. [1].

Relative clipping yield

$$(g\ g^{-1}) = 1 + A * e^{\left(\frac{GDD}{B}\right)} * \sin\left(2\pi * \frac{GDD}{B} + \pi\right) [1]$$

Where A is the magnitude of the suppression and rebound growth stages, D is the amplitude decay coefficient, GDD is the cumulative GDD since the last PGR application and B is the period of the model in GDD. In addition, data from each month (June, July and August) was averaged across years (2023 and 2024) for each PGR and N rate combination and analyzed to determine the effect of application

timing on relative growth suppression and reapplication interval.

PRELIMINARY RESULTS

All combinations of PGRs (Primo and Anuew) and N rate (0.075 and 0.15 lb. N per 1,000 ft² per week), averaged across months (June, July and August) and years (2023 and 2024), indicated a significant relationship between relative clipping yield and GDD using a sine wave regression model with R^2 values ranging from 0.521 to 0.685 (Figure 1).

Peak growth suppression for Primo was observed at 238 and 167 GDD for the low and high rate of N, respectively, with predicted reapplication intervals of 309 and 217 GDD. The reapplication interval for Primo, in combination with high rates of N (217 GDD), was similar to previous reports of a GDD reapplication interval of 230 GDD for creeping bentgrass (3). However, when Primo is combined with low rates of N (0.075 lb. N per 1,000 ft²), the reapplication interval appears to be much higher (309

GDD) than previous recommendations or Primo combined with high N.

Differences in peak suppression and reapplication interval between N rates (low and high) combined with Anuew were less dramatic than those observed in Primo treatments. Anuew, combined with high rates of N, resulted in peak suppression at 163 GDD and a reapplication interval of 212 GDD. In contrast, Anuew combined with low N showed peak suppression at 187 GDD and a reapplication interval of 243 GDD (Figure 1). Interestingly, the reapplication interval for Anuew on annual bluegrass was less than the previous recommendations for creeping bentgrass of 280 GDD (3).

A sine wave regression model was also used to look at the relationships between relative clipping yield and GDD for each month (June, July and August; averaged across years) to show nuance in reapplication intervals across a season (Figures 2, 3 and 4).

In June, a few differences in peak

suppression or reapplication interval were observed between low and high rates of N for either Primo or Anuew. Still, the data does indicate that Primo has a longer reapplication interval than Anuew (Figure 2).

During July, significant differences in reapplication intervals were observed between the two rates of N for both PGRs, with low rates of N extending the reapplication intervals compared to high N rates (Figure 3). Then, in August, few differences were observed between PGRs or N rates, with reapplication intervals ranging from 199 to 209 GDD (Figure 4).

These results indicate that when the turfgrass is exposed to high levels of abiotic stress (i.e., during late summer; July applications), the reapplication intervals for PGRs combined with low N rates were extended by greater than 130 GDD compared to high N rates. During months when the turfgrass

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 similar to 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.

had optimum growing conditions (early summer and early fall; June and August applications, respectively), few differences were observed between PGR types and N rates. **G**

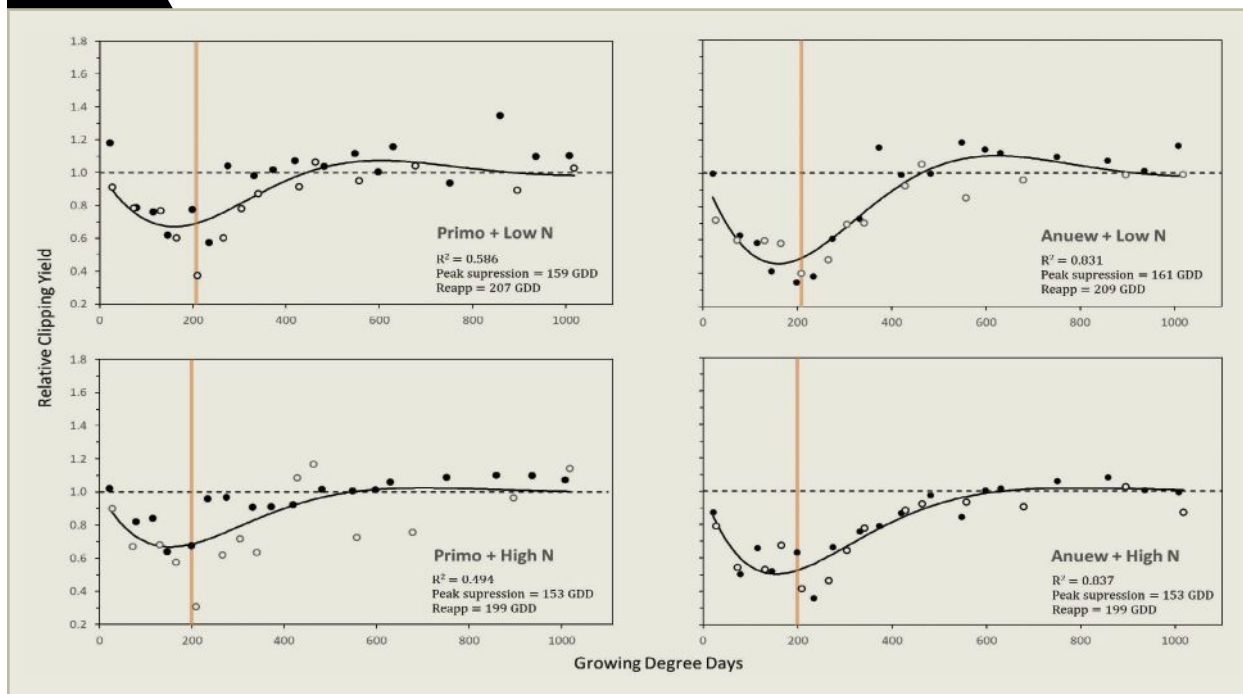
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This article was adapted from Schmid, Chas, and Kowalewski, Alec. 2024. Influence of nitrogen rate on growing degree day models for plant growth regulator reapplication interval on annual bluegrass putting greens. 2024 USGA Davis Progress Reports.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

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FIGURE 4



Average August (across 2023 and 2024) normalized relative clipping yield of annual bluegrass putting green turf in Corvallis, Ore., 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 sinewave model used to calculate relative growth suppression. The vertical line indicates the reapplication interval.



Thatch control is crucial on golf course greens to help ensure a firm and fast playing surface year round.

How much thatch is too much on your greens?

By Rob DiFranco

Controlling thatch is an essential part of maintaining a healthy golf course putting green. But, at the same time, it can be a significant balancing act for superintendents and their crews. Too much thatch can be a death sentence for turf, but having some thatch accumulation can be beneficial.

James Murphy, Ph.D., director of the Rutgers Center for Turfgrass Science and an Extension specialist, says that at some point — it could be up to several years — the thatch layer gets thick enough that the grass root system grows in thatch, not in the soil.

While thatch can be soil-like, it's not truly soil, so the nutrient and water uptake start to be affected.

"Those are the issues that thatch can cause agronomically," he adds. "It becomes easier to stress (the turf) than if it were soil. Soil is more buffered, and the changes aren't as extreme or rapid as they can be in thatch, so you'll see bigger swings in



James Murphy

the health and fitness of the turf when it's growing in thatch."

Finding the golden ratio of thatch on your putting greens isn't easy and has been the focus of a lot of industry research. According to Murphy, for golf course greens, superintendents will want a thinner layer of thatch than you might want on your lawn at home.

"In the growing season, you're using topdressing to try to modify that organic material as it develops to give it a more soil-like characteristic," he says. "With too much thatch, there's only so far that those sand grains will filtrate into that before everything starts bridging."

There are several ways to get a look at how much thatch is on a putting green, including taking a soil profile. But the easiest way, Murphy says, is to take a walk on the green and get down in the dirt.

"Visual inspection is one of the keys," he says. "You can feel it when you walk on it. You can put your fingertips onto the turf and feel the softness that's developing. You don't want to let it get too soft because that's correlated to how thick that thatch layer is." 

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JACOB PARRISH

Regional Sales Representative



Thatch control is vital for healthy, high-performing fairways and greens. Superintendents can manage thatch through aeration, topdressing and proper mowing practices. Aeration alleviates compaction, while topdressing with sand improves drainage and reduces thatch buildup. Regular mowing at the correct height ensures that the grass stays healthy without excess organic matter accumulating.

Proper thatch control is key to maintaining healthy turf. Without it, excess thatch can hinder root growth, impair water infiltration and foster disease. By actively managing thatch, superintendents ensure that fairways and greens remain resilient, providing golfers with a superior playing experience. Our new VC-90, which features three independent cutting heads, is designed for efficient verticutting, especially on undulating terrain. This flexibility allows for fast, precise thatch removal.

STEC

BRANDON COX

Sales Manager



Controlling thatch on a golf course, and especially greens, is very important to their health, playability and golfer satisfaction. A fertilizer/amendment program is one of the ways to control thatch. The two most common practices for controlling thatch are core aeration and verticutting, both of which are often followed by topdressing the greens. Core aeration is going to have about a four-percent organic exchange on your greens. Verticutting is another option, and while not as aggressive or needing as much downtime as aeration, it can provide great results as it removes thatch and also promotes new grass growth. Verticutting is often followed by topdressing as well to help fill in slits and help with changing your soil profile. STEC Equipment has aerators, verticutters and the Sandfiller to help you with all of these practices. The benefits and importance of thatch control are as follows: better drainage on your greens and, in turn, firmer greens, better path for nutrients to your root zone and, as this makes the grass healthier and stronger, increasing its ability to fight off invasive weeds and other types of grasses.

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Owner and President



The rate at which thatch accumulates in turf is highly influenced by the inputs of the superintendent. Careful attention should be given to only apply enough fertility and water to produce a uniform, healthy playing surface as excess inputs will magnify thatch accumulation. Thatch levels can be manipulated by encouraging healthy biological activity (decay) by incorporating the native soil back into the top portion of the thatch through core aeration and dragging. Topdressing or injection with a blended soil/sand mix or with sand alone are other options superintendents should consider. By incorporating these materials, superintendents can create a “hybrid thatch” or mat, which firms it up and encourages robust microbial activity and decay. Regular incorporation of the desired soil medium will provide the necessary dilution to this organic matter. On sand-based putting greens or sports turf, the injected or topdressed sand should be close to matching the sand in the soil profile. By implementing these best practices, superintendents can effectively control thatch accumulation, improve soil health and maintain high-quality playing surfaces for golfers.

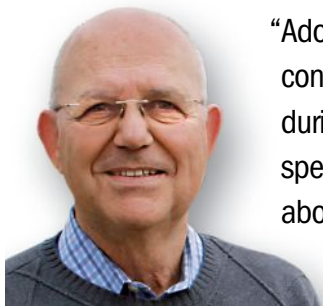
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National Sales Manager



There are multiple ways for superintendents to control thatch, including limiting nutrients and fertilizer to the plant to limit growth and excessive grass clippings that create thatch. The superintendents who take on a lot of golf may not be able to go this route as they will need the extra nutrients. Plant growth regulators (PGRs) for those that can apply will also limit excessive plant tissue growth. Always use baskets when mowing. Grooming and verticutting is another way to actively remove thatch. Using baskets while doing this practice is important but not always labor-friendly as the baskets tend to fill up quickly, requiring extra dumping. Topdressing is another great way to dilute thatch and organic matter. Aerification is a great way to mechanically remove thatch and organic matter by using coring tines. Solid tines could also be used to create voids to be filled with extra topdressing sand that would further dilute thatch.



“Adoption has been slow, hindered by concerns such as potential revenue loss during renovation periods, risk of invasive species like annual bluegrass and uncertainty about the traits of new cultivars.”

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

An update on the USDA-funded dollar spot work group

The USDA NC1208 project, involving numerous universities and research institutions, aims to enhance the management of dollar spot in turfgrass through a series of interconnected objectives focusing on the disease’s biology, epidemiology and management.

The five-year project has five objectives, including:

① Improve understanding of dollar spot biology and epidemiology. Research continues to deepen knowledge of dollar spot through phylogenetic analysis and molecular quantification, particularly in response to the recent change in classification to *Clarireedia* species in 2018. Studies focus on a broad collection of dollar spot isolates to explore taxonomic variability and to assess factors such as host range, pathogenicity and fungicide response.

Researchers also look at the timing of the disease, noting increased severity in different seasons and minimal genetic variation.

Innovations in molecular diagnostics aim to enhance the pre-symptomatic detection of the fungus.

② Assess resistance among new bentgrass cultivars. Efforts are underway to promote the adoption of new creeping bentgrass cultivars developed for improved resistance to dollar spot. These cultivars are tested on new golf courses or renovations. However,

adoption has been slow, hindered by concerns such as potential revenue loss during renovation periods, risk of invasive species like annual bluegrass and uncertainty about the traits of new cultivars. Multi-institutional trials aim to demonstrate the economic and environmental benefits of the new cultivars, including strategies like inter-seeding that minimize disruption.

③ Develop integrated dollar spot management strategies. Research focuses on refining cultural practices and exploring fungicide alternatives to enhance disease control while reducing chemical use. Studies examine the impact of practices like fertility management and lightweight rolling on disease severity. Innovative application methods are also under investigation, such as drone-based precision spraying, alternative treatments like iron sulfate, plant-based fungicides and RNAi technology.

④ Explore the efficacy of antagonistic organisms and microbial communities. Although no commercially viable biological products have yet been identified, research into biological

control options continues. Collaborative efforts involve testing new and experimental biological compounds and investigating strategies to enhance the effectiveness of biocontrol agents. High throughput sequencing identifies and enhances dollar spot suppressive microbial communities.

⑤ Improve communication strategies to disseminate research findings. The project leverages a network of extension specialists, industry partners and digital platforms to disseminate findings. Methods include traditional avenues such as field day demonstrations, trade journal articles, virtual field days and social media approaches.

Current and projected outputs from the NC1208 project include an extension fact sheet detailing the results of a resistant cultivar survey and best practices for managing dollar spots on resistant bentgrass cultivars, encouraging the selection of resistant varieties and reducing pesticide use.

Also, as I wrote about in the April 2024 issue of *Golfdom*, a March 2025 conference gathered stakeholders from various sectors to discuss current dollar spot management knowledge.

In addition to the conference, university field days will showcase research plots to educate superintendents on project outcomes. Virtual events will also share findings with a global audience, which is particularly beneficial for regions like Europe and Scandinavia, where the dollar spot is worsening and fungicide options are limited.

As a result, industry collaborations will focus on developing affordable technologies, like miniature weather stations, to enable precision management of dollar spot, potentially reducing management costs significantly.

For more information, visit the project website here: bit.ly/41yvfYY. **⑥**

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

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2



1



3



1 | Gator GS Electric with lithium-ion battery

The Gator GS Electric line from **JOHN DEERE** now offers a new lithium-ion battery option, providing a high-performance, low-maintenance solution for users who require an electrified vehicle. This upgraded battery delivers longer runtime, reduced weight and improved performance at any charge level, making it ideal for tackling any task on the course, according to the company. Unlike traditional lead-acid batteries, the lithium-ion option significantly reduces maintenance needs, lowers operating costs and ensures more uptime.

[Deere.com](https://www.deere.com)

2 | HR3 ELITE

The HR3 ELITE from **JACOBSEN** leverages the company's electric drivetrain, powered by Samsung SDI lithium battery technology, to deliver a quality cut with zero emissions, less noise and reduced operating costs. The battery system provides more than 40 kilowatt-hours of energy for all-day runtime and is backed by a five-year battery warranty. The HR3 ELITE has a cutting width of 1.52 meters (4.98 feet) and an adjustable cutting height. A high-strength steel frame with solid bumper rails protects the mower from everyday use, and onboard diagnostics allow operators to monitor the mower's performance in real time.

[Jacobsen.com](https://www.jacobsen.com)

3 | OnePack XR

The Trojan Lithium OnePack Extended Range (XR) from **TROJAN BATTERY CO.** is a 48V, 171Ah lithium-ion battery pack. Its overall performance makes OnePack XR ideal for low-speed recreational vehicles (LSEVs), such as 6-8 passenger golf carts. The battery allows for extended travel times, with a range of up to 75 miles at only 48V, creating safer operation than comparable high voltage (>60V) options. Trojan Battery offers the OnePack XR Bundle, which includes the battery, vehicle-specific mounting brackets, a state-of-charge gauge kit and power button and various charger options.

[TrojanBattery.com](https://www.trojanbattery.com)



4

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5



6

4 | Revotruck

MECALAC'S Revotruck is available in 6- and 9-ton payload configurations and is the first site dumper to feature a rotating cab. The rotating cab also increases operator safety by eliminating the need to twist and turn for visibility of the travel path and job site. Its off-road capabilities make it a valuable tool for construction, concrete, landscape and golf course applications. The Revotruck 6 features a 13,288-pound payload with a total operating weight of 13,040 pounds and is equipped with a hydrostatic transmission top speed of 17.4 miles per hour.

Mecalac.com

5 | Automower 580L EPOS

The Automower 580L EPOS from **HUSQVARNA** is built for course roughs, fairways, tee decks and sports fields such as soccer, football and baseball. According to the company, the 580L can handle high-quality turf up to two acres by maximizing productivity, uptime and longevity with its 80W cutting motor. The 580L also has an adjustable cutting height down to 10 mm, rotating wheel brushes, advanced object avoidance and a rubberized body that offers extra protection against golf ball impacts.

Husqvarna.com

6 | VGR TopChanger XP

The VGR TopChanger XP from **STEC** uses high-powered water injection to aerate the soil. When injected under high pressure, water forces channels into the soil, fracturing the layers and creating aeration holes to allow oxygen and water into the soil. The soil absorbs the water, allowing the TopChanger to aerate without leaving any surface disturbance. The aeration holes are immediately filled with sand or various soil-improving products, which helps the water infiltrate into the lower layer of the soil, leaving the top layer of the playing surface level and firm.

STEC.com

The 19th Hole

Patrick Parkins

SUPERINTENDENT // TPC Las Vegas



Patrick, my first question is always the same. After 18 holes, what are you drinking? A Coors Light, followed by a bourbon.



Tell me about TPC Las Vegas. It's a pretty tight golf course. We've extended it a little bit in the last couple of years —

// BEST ADVICE

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we're trying to get to right around 7,200 yards. You have to stay well-hydrated year-round because in the summertime, it's between 100 and 120 degrees, and in the wintertime, you're going to have 20 to 30 mph winds.

What is your favorite tool to get the job done? I would have to say my TDR. Being out in that type of arid environment, it doesn't matter what time of year, you have to be on top of your moisture management.

Who are your teams? The Denver Broncos and Penn State football. That's about all I watch.

Do you have a family, and what do you do for fun? I have a girlfriend. She had just started to play golf when I met her, so I'm trying to get her to play a little bit more. We like to go out in the afternoons or on my weekends off and play. Other than that, hang out and have some drinks with friends and go to some sporting events and concerts.

There's plenty to do in Las Vegas, but what would you recommend? You can never go wrong with the steak houses there. But right now, the biggest attraction is the Sphere.

Do you have a most memorable day at work? The '22 overseed. We were 13 holes into an overseed, and a monsoon came through and dumped about two-and-a-half inches of rain in

30 minutes. It washed a little bit of seed away, but most of it stuck on the ground. It destroyed three cart paths and broke a bunch of main lines, of course in the middle of overseed. I needed to make sure that we could get water back to the golf course as quickly as possible. We were able to get all the repairs done and cart paths fixed within a couple of weeks, but I had water back on in about three days. I was able to keep the grass and really had one of my best overseeds in my career.

Were you on the course when it hit? I was at home — I live on the golf course on the eighth fairway, and I was doing a fantasy football draft. The rain just started coming, and I looked out. We have an arroyo right there, and it was raging. I said, "This isn't good!"

How did your draft go?

I quit, put it on auto-draft and ended up winning the league that year. So maybe that's the way to do it!

As interviewed by Seth Jones, Feb. 4, 2025.



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