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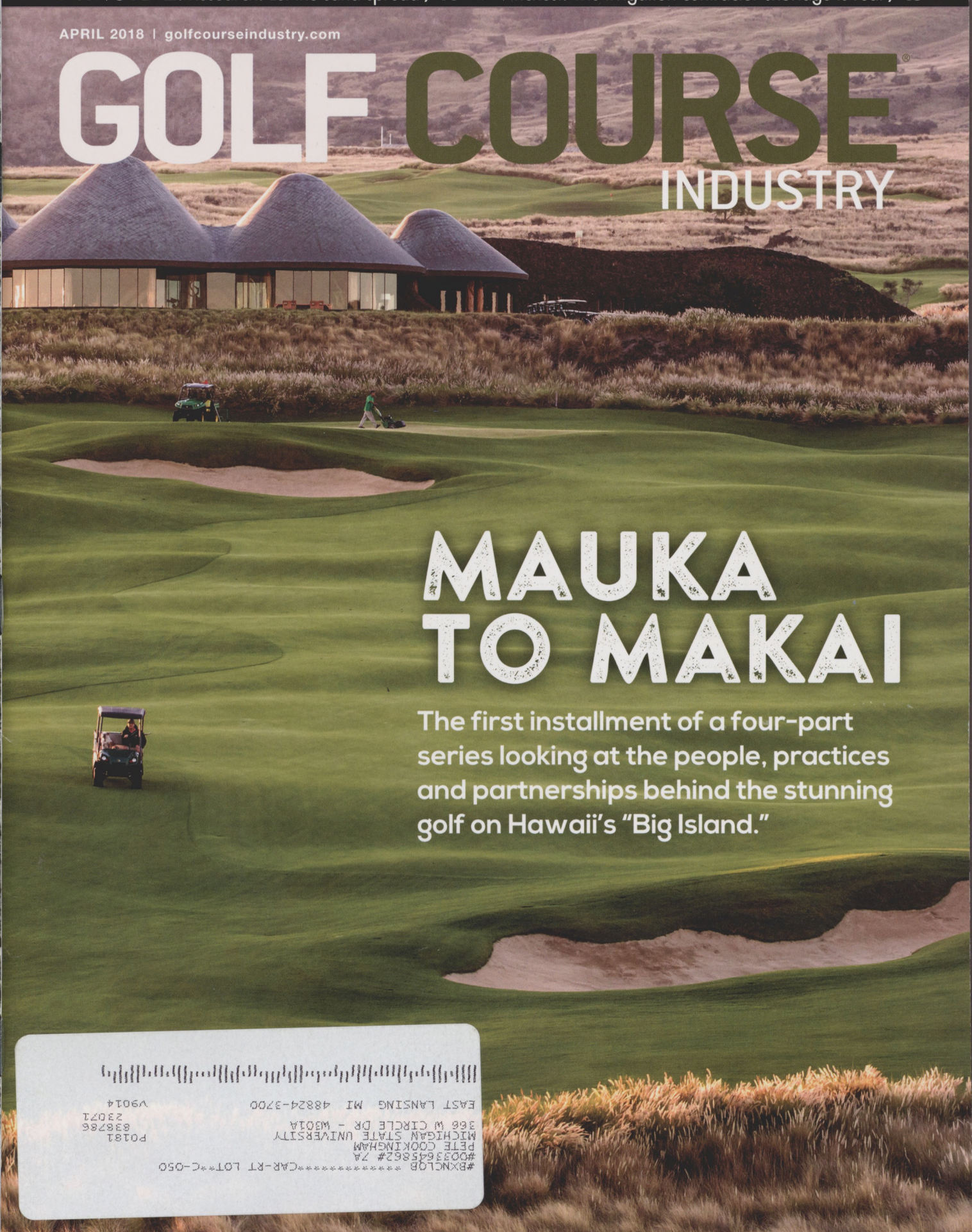

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FROM THE "BIG ISLAND" TO BUFFALO

Alohas are relished while farewells are dreaded in this business.

On the first day touring golf courses on Hawaii's "Big Island" for our "Mauka to Makai" series, I met Brozie Ambrose. A prideful and affable Big Island native, Brozie drives 1 hour, 40 minutes each way for his job as an assistant superintendent at Four Seasons Resort Hualalai. Brozie worked on car bodies before realizing the occupation wasn't good for his health. He turned to landscaping, finding his way to Hualalai, where golf course construction commenced in 1995.

Four Season Resort Hualalai's Brozie Ambrose and GCI senior editor Guy Cipriano.

The work was hard – Hualalai was built on lava rock – but rewarding, especially when the barren landscape developed into a resort and private club with 36 holes. Guests from nearly every state and dozens of countries flocked to Hualalai, giving Brozie a longtime job maintaining a golf course he helped build.

Continuing education via online classes allowed Brozie to parlay a passion into a career. Brozie, along with co-worker Chance Lincoln, who also helped build the Hualalai course, described their journeys during a lunchtime conversation at a restaurant overlooking the Pacific Ocean. After lunch, we walked to the 17th hole, a stunning par 3 that plays over lava rock and along the ocean. Brozie and Chance described how donkeys frequently interrupted construction when they were building the hole. Brozie pointed to a whale in the distance; sea turtles crept ashore by the tee. A delightful – and unforgettable – lunch.

A few days later, the inevitable arrived: my final day on the Big Island. The trip had a memorable conclusion as the Big Island GCSA extended an invitation to participate in their golf outing at Mauna Kea Resort. My cart partner? Brozie.

We traded life stories, exchanged barbs, hit a few good shots, hit some bad shots, stared at the oceanside (mauka) and mountainside (makai) holes, and developed an appreciation for each other's place in the golf industry. Brozie invited me to visit the Big Island "anytime" as we embraced on the 18th green.

From Mauna Kea, I started the 4,500-mile trek to my Northeast Ohio base. I managed a few hours of sleep before scurrying to Buffalo for the first annual "O'Rgan Run" at Transit Valley Country Club.

Running on a cleared path along a snow-covered course provided an opportunity to say aloha to Brian Conn and Scott Dodson, a pair of superintendents involved in a recent kidney transplant. Conn, the superintendent at Transit Valley, gave his left kidney to Dodson, the superintendent at neighboring Park Country Club, on Jan. 9. The pair shared their incredible story for GCI's February cover story during a three-hour interview inside Park CC's clubhouse Jan. 23.

Transit Valley staged the run to coincide with St. Patrick's Day as a benefit for kidney transplant patients at the University of Rochester Medical Center. Brian and Scott's families joined them for a pre-run ceremony and tasty post-run Irish spread. Brian ran the last mile, an inspiring act considering what he voluntarily lost two months earlier.

Buffalo is 190 miles from home. I'm confident I'll see Brian and Scott again. As for Brozie, I'm trying to believe another aloha awaits. **GCI**

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Get goofy with it

Former Patriots stalwart Matt Light stresses importance of workplace levity to New England superintendents.

By Guy Cipriano

BRUSHING, CRANE FLIES, carbon sequestration, fungicide resistance and the New England Patriots. No stop in New England would be complete without hearing a few Bill Belichick stories.

Matt Light brought a few championship lessons to the 21st New England Regional Turfgrass Foundation Conference and Show in Providence.

Haven't heard of Matt Light? You must not watch pro football diligently enough.

Light spent 11 years as the Patriots' starting left tackle. He blocked for Tom Brady and took orders from Belichick, helping clear space for three Super Bowl-winning teams. Elite organizations don't flourish if they don't identify and develop employees such as Light.

Serving as the keynote speaker in Providence, Light displayed an instant connection with an audience that included hundreds of golf course superintendents. Maintenance teams quietly perform jobs essential to the success of a golf facility. A strong correlation exists between a crew's effectiveness and a facility's success. Breakdowns place entire facilities in peril. Superintendents are more like Light than Brady.

Although he doesn't play golf, Light was raised in Greenville, Ohio, a rural community along the Indiana border. A modest upbringing – and playing an essential part in a winning organization – helped Light relate to the NERTF crowd.

Light attended Purdue as an undergraduate (a land-grant university with a turfgrass science program) and continued his education by graduating from the Wharton School of Business at the University of Pennsylvania, the Kellogg School of Management at Northwestern and Harvard Business

School's Entrepreneurial Program. He's a regular on the corporate speaking circuit, yet he relished speaking to a group whose roles resemble the one he held with the Pats. "You guys are in my wheelhouse," Light said early in the presentation. "I would put you guys in the offensive line category."

Playing any position for the Patriots is serious business. Practices are physically demanding; meetings are thorough. The bosses and customers expect excellence. Sound familiar?

But a big difference exists between taking your work and yourself too seriously. This is where Light's presentation should help superintendents. Instead of telling spinning stories about strategy and key plays, Light spent more than an hour stressing the importance workplace levity.

Yes, a few Patriots, especially Light, had fun on the job. "Being able to laugh was always the role that I wanted to play," he said.

From trying to catch a punt to give teammates a temporary respite from exhaustive training camp activities to exaggerating details in a speech he made via phone to a gym full of teammate Ross Hochstein's small-town Nebraska supporters, Light offered a quirky glimpse at the Patriots' success. Even ultra-successful cultures in demanding professions can benefit from laughter. That sense of humor should extend to the highest levels, as Light suggested Belichick, one of the sternest figures in American sports, might have enjoyed some of the goofball antics. Light, after all, started 153 games with the Patriots despite being benched before his first game as a rookie in 2001 because of tardiness to a team meeting. "I have had a lot of strange interactions with Coach Belichick," Lights said. "Really strange interactions."

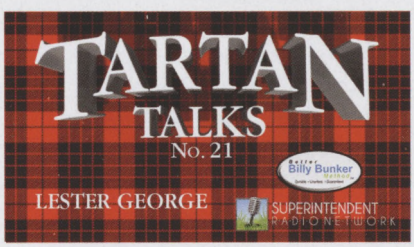
Every organization needs a Belichick (somebody who sets defined standards) and Light (somebody committed to having fun while meeting those standards). The impact of laughter shouldn't be forgotten when maintaining a golf course. A few jokes, silly stories or games can ease the tension associated with an 11th straight 90-degree day or grueling storm cleanup effort.

Other happenings at the NERTF Conference and Show:

- University of Rhode Island masters student Sara Tucker made a compelling case for establishing pollinator habitat. "Golf courses make sense for pollinators," she said. "There's a lot of land that is not used by players and there's already maintenance being done." Select plants that provide year-round forage and vary in height, shape and color. Fall is the optimal time for seeding.
- Mark Mungeam, ASGCA, doesn't recommend performing major renovation work in-house. But he's also aware of budget restrictions, so he offered guidance for courses looking to use their own labor for enhancements. Mungeam described successful projects at Abenaqui (N.H.) Country Club and throughout the Monmouth County (N.J.) Parks System. "You need to understand that course maintenance can't suffer when you are doing renovation work."
- A new season in the Northeast means carts toppling wet turf. USGA Green Section agronomy Dave Oatis cautioned against having overly ambitious expectations when crafting cart management plans. Oatis considers 60 to 70 percent golfer compliance on cart management tactics a "good" result for a facility. A compliance rate of 80 percent puts a facility in a "unique stratosphere."

Guy Cipriano is GCI' senior editor.

Tartan Talks No. 21



Being raised in a military family introduced Lester George to the importance of versatility and adaptability, a pair of traits he has carried into a successful career as a golf course architect.

George joined our "Tartan Talks" series to discuss an extensive and varied portfolio that includes projects ranging from facilities for participants in The First Tee programs to elite private clubs in the Mid-Atlantic. Tackling diverse projects helped put his family-operated firm, George Golf Design, "on the map," he says.

In the episode, which can be accessed by entering **https://goo.gl/Y7BsUy** into your web browser, George details his work at multiple sites, including Langley (Va.) Air Force Base, where crews unearthed dozens of bombs during construction. He also describes the correlation between military work – George ascended to Lieutenant Colonel in the United States Army Reserve – and golf course architecture. "I was a field artillery officer, so I had to do a lot of range estimation, I had to do a lot of terrain evaluation, I had to do a lot of maneuvering through terrain," he says. "It's kind of that application that brought me into it."

SHOULD YOU RAISE YOUR HAND?

Tim Moraghan, principal, ASPIRE Golf (tmoraghan@aspire-golf.com). Follow Tim's blog, Golf Course Confidential at www.aspire-golf.com/buzz.html or on Twitter @TimMoraghan

Golf's tournament season is in full gear, and it isn't only the pros and public who benefit. Tournaments offer superintendents the chance to be an on-course, on-the-ground volunteer.

Done right, volunteering at an event—particularly one of the majors—can be fun, educational, and exhausting. Done wrong, it can be a waste of time and, worse, bad for your present (and future) job.

On the plus side, volunteering opens your eyes to new and exciting opportunities, maintenance practices, techniques, equipment and products. If you do more than simply "show-up, keep-up and shut up," you'll leave the event better and smarter than when you arrived. Here's how:

- You'll see another golf course primed for tournament conditions.
- When you're not working, you can take in some great golf and see good players (if you aren't sleeping).
- It's a chance to expand your professional network. Introduce yourself and ask questions.
- You'll meet interesting people —not only other superintendents but course builders, architects, irrigation techs, organization employees, etc. Bring plenty of business cards.
- You can gain valuable experience, perhaps doing something you haven't done before or for a while. (Don't indicate you can do a task if you haven't done it in a long time.)
- Travel.
- It can be good for the resume.

Don't volunteer if you're looking for a lark or a big drink. Tournament staff must be committed to working long, hard hours and being on-call 24/7, particularly if there are weather issues. A good volunteer knows how and when to rest, refuel and stay hydrated (non-alcoholic). Be sure to make the most of the time away from your regular job and course.

As good as volunteering can be, it also can be a disaster. I've worked with hundreds of "unpaid helpers" over the years and both seen and been affected by the negative consequences of their actions. So, before you raise your hand, consider the following:

- You are representing both yourself and your club.
- Anything you do or say may come back to bite you.
- Staying out to the wee hours thinking you can jump into your morning assignment just as the bar closes doesn't work.
- It is not your course. Criticizing the host, the course, the superintendent or his/her efforts will ban you from future volunteer work. Keep your thoughts to yourself.
- Your real job comes first! Can you convince your home club why it makes sense for you to go away?
- Are you leaving your home club at the height of the season? Don't!
- Can you stay committed for the entire length of your volunteer time? There's no leaving early if you get bored. Nothing less than a true emergency is an acceptable excuse for leaving.
- Don't forget your family. This "free time" is work.
- And speaking of vacations, if that's what you think volunteering is, stay home.

If you've decided that volunteering makes sense and your home club agrees, you should make the most of the experience. For example:

- Have a good reason for taking time to work on someone else's golf course. Even if it's just to help out, keep that reason in mind at all times and live up to its spirit.
- Bring a camera or cell phone (if allowed), and take photos of what you are seeing, doing and learning that might benefit your club.
- Create a daily diary or file social media posts for your members — and for your portfolio.
- Be willing to do anything, and take your time performing the assigned tasks.
- If you're a "senior," know your physical limitations and don't take on more than you can handle. Let the youngsters triple-cut greens twice a day in the heat.
- Observe and learn new techniques.
- If there's new equipment at the event, take a good look and learn its capabilities.

Don't show up without having done some planning. Regarding your home club, are you taking personal days and spending your own money, or are they allowing you time off and paying related expenses? Either way, make very certain everything is covered at home and whoever is left in charge knows to call if anything needs your immediate attention. **GCI**

For more tips, check out the online version of this column at golfcourseindustry.com.

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MAUKA TO MAKAI
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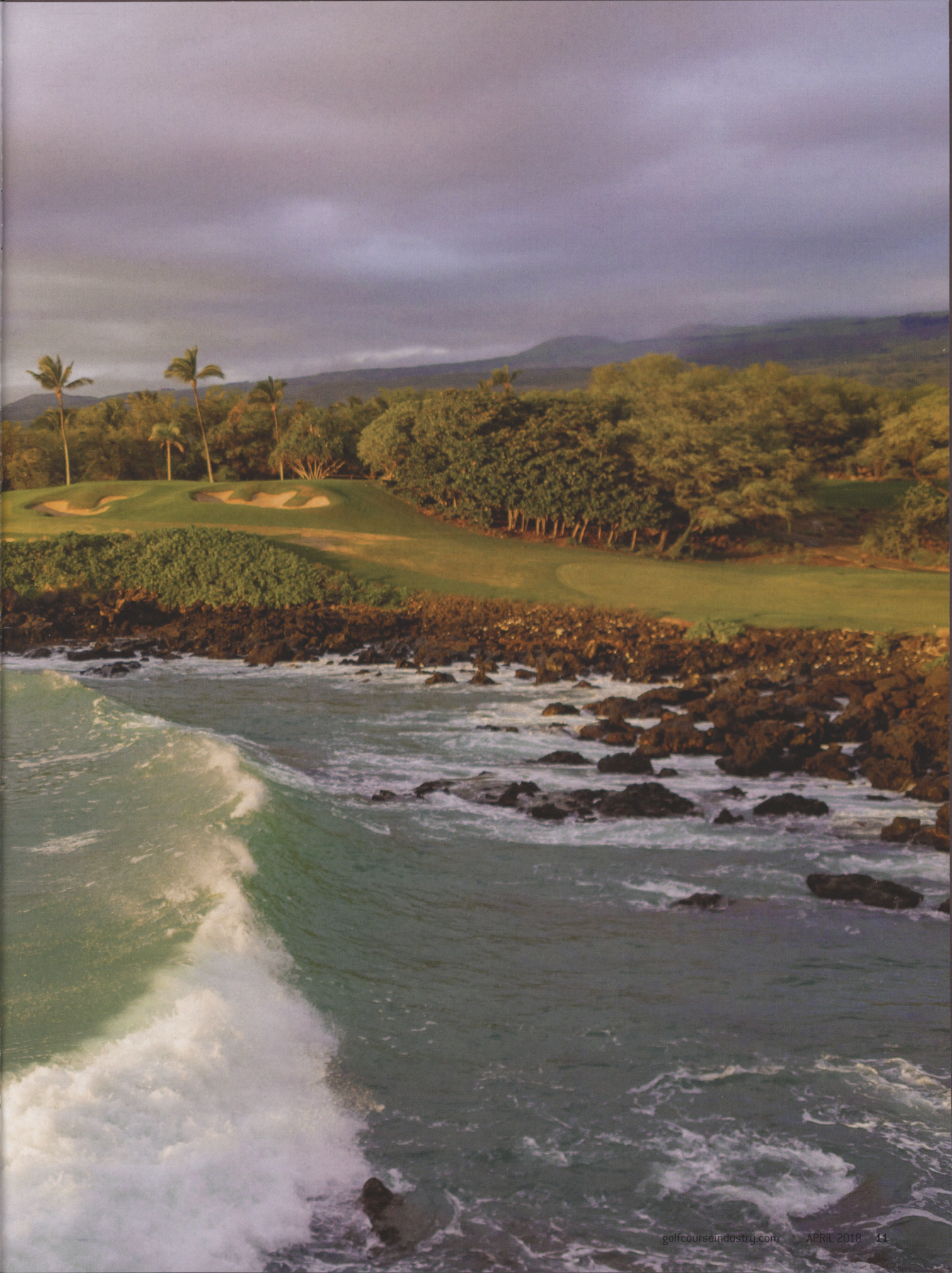
By **Guy Cipriano**

MAUKA TO MAKAI

Part 1: Aloha /əˈlō ˌhä/ (welcome)

A four-part series looking at the people, practices and partnerships behind the stunning golf on Hawaii's "Big Island."



MAUKA TO MAKAI
A SPECIAL SERIES PRESENTED BY JOHN DEERE

JOHN DEERE

FORGET GOLF.

The panorama on a small tee atop a lava rock mound snugged between Nanea Golf Club's eighth green and ninth tee might not exist elsewhere in the world.

Instincts point the body east, facing a meandering par-4 with a view of a modest clubhouse boasting five copper roofs signifying volcanic vents, landscapes natives call pu'u. Mauna Kea, a snow-covered 13,796-foot mountain, towers in the same direction.

Rotating clockwise, the body shifts south to an expansive lava rock field covered with yellowish fountain grass. "You'll turn the corner," director of golf course maintenance Scott Main says, "and you swear there should be a giraffe or something like that sitting there. It's like a savanna."

The westward view suggests whales instead of giraffes. Along with a Pacific Ocean backdrop, comes a glimpse of Four Seasons Resort Hualalai, where Dan Husek sees gigantic mammals when performing his job. "When you go out to 17 tee and look at some sea turtles up on shore and look out along that shelf where the ocean gets deep and a whale is jumping … Yeah, it's pretty special," says Husek, who oversees the maintenance of the resort's 36 holes.

One more view exists from the nearly 100-foot lava mound: the island of Maui sits to the north.

A splendid and diverse landscape attracts golfers to Hawaii's "Big Island," home to 18 facilities, including Nanea and Four Seasons Resort Hualalai. The people responsible for turning tricky terrain – ever try chiseling through blue rock to check an irrigation leak? – are even more fascinating than the landscape.

A crew such as the 24-worker outfit at Nanea can include Hawaiians, Filipinos, Samoans and Tongans. Watching the groups work together to produce elite conditions inspires supervisors, most of whom hail from the mainland.

The Big Island, population 196,248, is viewed as a dreamy place to live and work – until you actually try establishing a life on it. Once a temporary stay becomes permanent, the reality associated with life on an island emerges. Family and friends are one, two and sometimes three plane rides away, and numerous mainland management philosophies become obsolete. Golf course maintenance on the Big Island, the largest of Hawaii's eight islands, doesn't resemble what industry professionals experience on the mainland.

"You can't come in with a bull-nosed type of attitude where you are going to conquer and be this hero or whatever," says Josh Silliman, the director of golf at Mauna Kea Resort. "You really have to come in and embrace what these people are, and you have to learn how different it is."

Or, as Main says, "You're not going to change people. You have to adapt to the culture and accept a change. It's more about seeing their way of life."

What works in Boston, Philadelphia or Chicago is unlikely to yield the same result in Kailua-Kona, the epicenter of the Big Island's high-end golf scene. "Aloha," an upbeat and welcoming spirit, permeates all aspects of life and work, including golf course maintenance.

Instead of immediately scurrying to assignments, mornings often begin with conversations about family activities or recreational pursuits. Telling employees to hustle at 6 a.m. can isolate a manager.

For all its tourist glitz, Kailua-Kona remains a rural place, thus the more casual pace, says Kohanaiki agronomy manager Joey Przygodzinski. Born in Kona Hospital and raised in South Kona, Przygodzinski is a Big Island native leading a 70-worker department responsible for maintaining an 18-hole golf course; common and home landscape areas; more than 200 anchialine ponds; a public and private beach park; and community garden. A key part of his job involves training mainland-educated managers to embrace interactions with co-workers. Reaching a Hawaiian worker, Przygodzinski says, requires a personal approach.

"I always try to get in the trenches with my team," he adds. "If I train you to do something or tell you to do something, I know how to do it myself. I kind of focus my other managers on the importance of training and getting that training done on a personal level vs. verbal."

Aloha goes many ways. Pulling into the gate at a private club can lead to a 10-minute conversation with the attendant. And it's not uncommon for club members to ask crew members about their lives or flash the shaka sign to employees. Created by extending the thumb and little finger, the shaka symbolizes a friendly gesture. Managers are also known to give the shaka to employees. Elaborate handshakes followed by hugs are signs of deeper friendships.

Asking employees to work 10- or 11-hour days to enhance turf can further isolate a manager. Living on the Big Island isn't cheap – gas cost nearly $4 a gallon and a dozen eggs exceeded $5 in mid-March – but beaches, trails, mountains, waves and, most important, remaining close to family make financial hardships worthwhile for natives. Most Hawaiians, in other words, work to live. A 6 a.m. to 2 p.m. workday makes the Hawaiian dream possible. "The hours are great," says

MORE ALOHA: NEVER ON AN ISLAND

John O'Leary experienced the "Big Island" for the first time seven years ago.

"I didn't know what to expect," he says. "It blew me away."

O'Leary, a John Deere sales manager whose territory includes Hawaii, had a succinct purpose for the trip: help his company develop a relationship with Nanea Golf Club, one of the most influential courses on the Big Island. The long trip proved rewarding because the club acquired a fleet of John Deere equipment.

The company's presence on the island has expanded since O'Leary's maiden voyage, as multiple Big Island facilities, including Nanea, Mauna Kea Resort, Kona Country Club, Big Island Country Club and The Club at Hokuli'a, are significant users of John Deere equipment. "It's been exciting seeing things develop here, O'Leary says. "By focusing on our customers, we've been able to significantly grow our business in Hawaii."

With support from his boss Dave Plaster, O'Leary visits Hawaii multiple times per year. The visits are designed to strengthen existing relationships while exploring new possibilities. Plaster, a major proponent of the business possibilities the Big Island offers, and representatives from dealer Pacific Golf and Turf accompanied O'Leary on the most recent visit in mid-March. Each trip reminds O'Leary of the people and landscapes that make the Big Island unique.

"Watching the business grow has been rewarding, but it's about the relationships that I have built with these guys," says O'Leary, who also serves customers on Maui and Oahu. "They are friends now. They are not just a customer. That's how I like to treat them anyway. You're dealing with a friend. That's what sales is all about. People buy from people they like to deal with, and if you can build that relationship, you're going to be successful."

Mowing highly maintained turf is nearly a 365-day-a-year task on many Big Island golf courses, including Kona Country Club.

Chance Lincoln, a Big Island native who started working at Four Seasons Resort Hualalai in the mid-1990s. "We get off early and you can still do things at home. Most of the younger guys leave here and surf."

Requiring employees to wear pants? Good luck finding a crew.

Don't be fooled by the laidback vibe, though. Golf course maintenance represents a serious profession on the Big Island. Visitors don't want to play on patchy turf or dirt-filled bunkers, and they are willing to pay exorbitant prices for quality conditions. The maintenance budgets of elite courses are 20 to 30 percent higher than comparable mainland facilities, according to multiple superintendents and industry representatives. Golf represents major commerce on island.

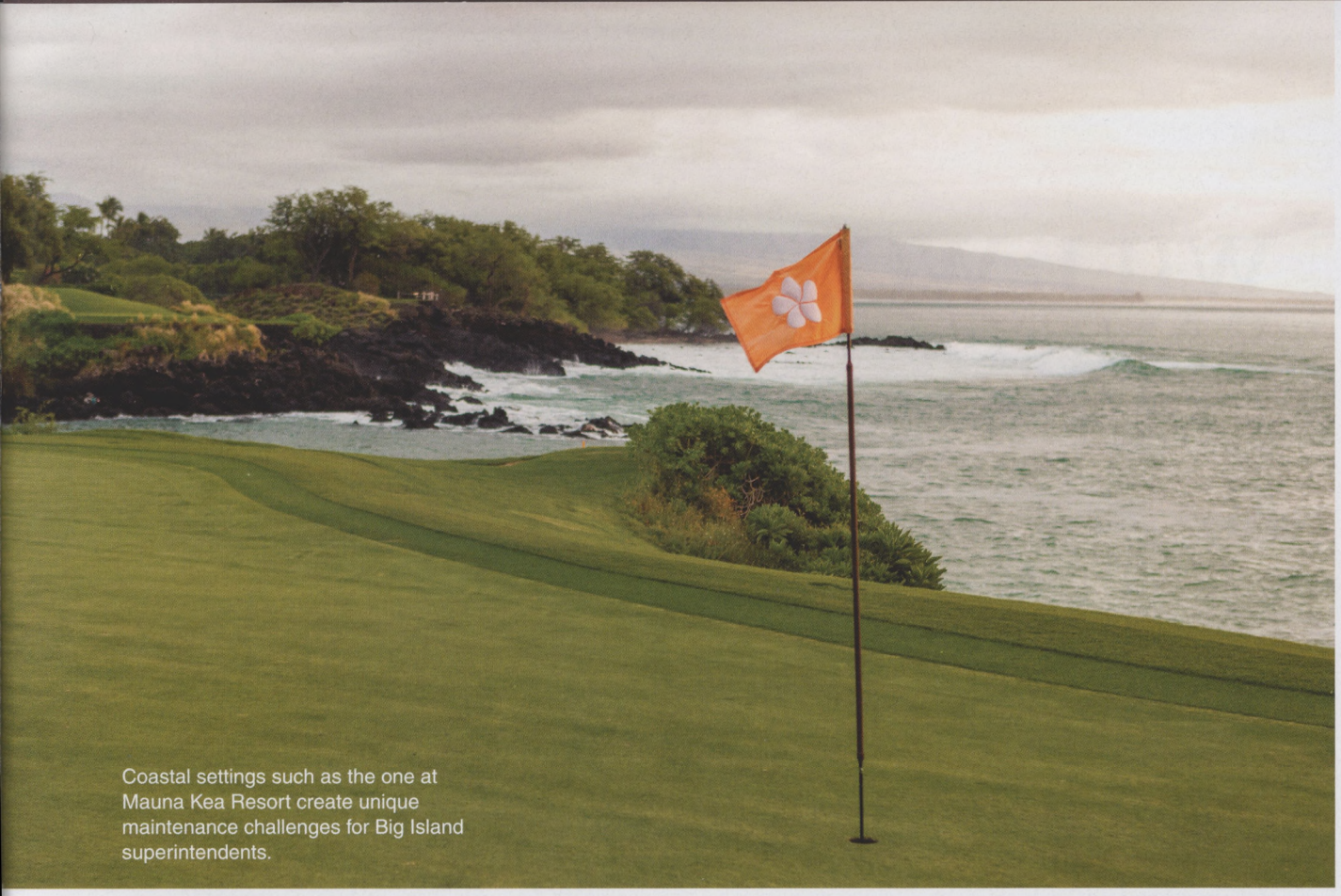
"This industry is a big part of the community because the service industry is a big deal out here," Kohanaiki superintendent Luke Bennett says. "You will find that there are two types of people on the island: there are people who work in the service industry in the morning and there are people who work in the service industry at night."

A Colorado native who has worked at multiple courses in his home state and California, Bennett arrived at Kohanaiki in 2015. His grandmother died a decade ago before fulfilling her dream of visiting Hawaii. When the Kohanaiki job opened, Bennett grappled between mainland security and Big Island curiosity. His grandmother's ambition factored into the decision. "It was something that she never had a chance to do and something that I took to heart when I had the opportunity," he says. "It would have been a very easy situation for me to say, 'No, I'm going to pass.'"

Bennett encountered a culture and growing environment unlike anything he had experience. The 4,028-square mile island, which is bigger than Rhode Island and Delaware combined but smaller than Connecticut, supports four of the world's five major climate zones: tropical, dry, temperate and polar. Anywhere from eight to 11 subclimates, depending on the climatology source, exist within those four major climate zones,

Kohanaiki's coastal location places it in a tropical zone, making it warm enough for turf to grow every day. "I can't tell you how many days a year we take off mowing the greens," Bennett says, "but it can probably be counted on two hands." Fast-growing turf requiring daily mowing assignments and placing extreme wear on equipment is on the lengthy list of agronomic challenges.

Water quality varies by facility. Nanea



Coastal settings such as the one at Mauna Kea Resort create unique maintenance challenges for Big Island superintendents.

has a well, providing the club with what Main describes as "fairly decent water." Four Seasons Resort Hualalai receives deep well water. The water then goes into a reverse osmosis (RO) plant. The hotel and homeowners receive the treated water while the rejected water enters the golf course irrigation lakes where it combines with well water, creating a salt-infested blend. "I don't think using RO concentrate is common anywhere in the world," Husek says. "Maybe there's another place that's using it. But I don't know of it."

At least Four Seasons Resort Hualalai has a uniform water source. Kona Country Club irrigates its front nine with effluent water and back nine with well water. Salinity levels on the back nine are significantly higher than front nine, says superintendent Derrick Watts. "You have almost two golf courses here," he adds, "and to be able to maintain that is interesting and fun."

Opened in 1966, before Hawaii implemented ultra-rigid environmental permitting policies, Kona Country Club features holes hugging the Pacific Ocean, including the par-4 12th which plays over a blowhole. The layout makes Watts one of the few superintendents concerned about waves washing lava rock over turf and causing tip burn to Bermudagrass.

Lava rock is wonderful for aesthetics, but it's not ideal for holding nutrients. Blue rock, the layer below the lava rock, is even worse. "It's difficult to get down to the root zone and to go as deep as you want to go," Watts says. Longtime Kona Country Club employees have dozens of stories about breaking aerification tines.

Winds range from tranquil to violent. Mauna Kea Resort, a 36-hole facility near the island's north tip, can receive trade winds reaching 70 miles per hour, making replenishing bunker sand a routine assignment. Other facilities might experience weeks without a breeze exceeding 10 miles per hour.

The Big Island might be the only place where courses within a 20-mile radius successfully maintain bentgrass, Bermudagrass and paspalum greens. Nanea, a David McLay Kidd design opened in 2003, is one of the first courses in North America to install paspalum on every playing surface. Neighboring Four Seasons Resort Hualalai supports Bermudagrass surfaces. Nanea battles dollar spot; Four Seasons Resort Hualalai encounters Bermudagrass decline and mini ring.

Contrasting turfgrass landscapes and turfgrass varieties are important parts of the Big Island golf experience. The most endearing aspect – and the key to a manager and visitor achieving a greater understanding – involves the people living and working on the land. "Anybody can come to Hawaii and see Hawaii from the outside in," Lincoln says. "But you have to know Hawaii from the inside out." **GCI**

Guy Cipriano is GCI's senior editor.

ABOUT THIS SERIES

GCI is partnering with John Deere to tell the story of the people, practices and partnerships that make golf on Hawaii's Big Island special. As part of the project, video tours of the courses will be available via enewsletters released at the end of the next four months. Enter https://www.golfcourseindustry.com/form/1/GCI/enewsletter into your web browser to subscribe to GCI's free enewsletters. The series will also include Hawaiian-themed Twitter tours. Follow along @GCIMagazine.

MAUKA TO MAKAI APRIL: ALOHA | MAY: 'OHANA | JUNE: MALAMA 'AINA | JULY: KŌKUA

WILL WOMEN SAVE GOLF?

Henry DeLozier is a principal in the Global Golf Advisors consultancy. DeLozier joined Global Golf Advisors in 2008 after nine years as the vice president of golf for Pulte Homes. He is a past president of the National Golf Course Owners Association's board of directors and serves on the PGA of America's Employers Advisory Council.

Golf has a tendency to exist in a vacuum, one where blinders we sometimes wear with pride make us inattentive to happenings outside the confines of our green fairways. But looking away from one of the most important issues of the day could have calamitous consequences.

2018 may well go down in modern history as the year of the woman and the fight courageous women waged for respect and opportunity. What started as a backlash against a Hollywood movie mogul by mostly privileged women trapped by his influence has spread to other parts of society and is now part of the daily dialogue. It should also be part of the conversations we're having in golf.

Leading up to the World Economic Forum in Davos earlier this year, Erna Solberg, the prime minister of Norway, and Christine Lagarde, the managing director of the International Monetary Fund, wrote that "time is up for discrimination and abuse against women. The time has come for women to thrive."

They went on to say that "giving women and girls the opportunity to succeed is not only the right thing to do, but can also transform societies and economies." If that opportunity has transformative global potential, just think what it could do for golf.

More women in leadership roles – on boards, as general managers, as department heads, as executive directors of allied associations – would do wonders for golf. I continue to be dismayed when I see panels composed of middle-aged white men at industry events. What perspectives are we missing that could inform better decision-making? What experiences are we not aware of that could help us fix problems on and off the course? What nuances are we tone deaf to that would make the game, our courses and our facilities more engaging?

We'll never know until women have the opportunity to demonstrate their leadership abilities. And we won't know the consequences of those omissions until participation and diversity have dwindled even further. Dare we risk that? Golf's good-old-boys club took us so far. It's also one of the reasons momentum has stalled.

There is urgency because, as we have seen dramatic evidence of already this year, women are not content to wait for change to come to them. But are the mostly male leaders of golf and its mostly private clubs prepared to examine their own practices and begin to open the right doors?

Introspection starts close to home. Boards can mandate women fill a minimum number of seats around the table. They can also require that job searches include women (and minorities). General managers can make educational and career-experience opportunities available to women so when management positions become available women and men are competing on a level playing field. Clubs can take the necessary steps to help women stay active in the workplace while raising a family. And without question, clubs can compensate women and men on an equal basis for jobs with similar requirements and responsibility.

Enlightened perspectives should also be customer facing for obvious reasons:

- Women are driving the global economy – the women's market is growing at a faster growth rate than men.
- Women are responsible for $20 trillion U.S. dollars in annual consumer spending.
- Women have a high level of commitment and loyalty.
- Women share positive experiences.

But (news flash!) there are considerable barriers that women must overcome to gain the respect and opportunity most men are granted with few questions. Almost 90 percent of countries have one or more gender-based legal restrictions holding back women. Fortunately, those legal restrictions do not exist in the United States. But we all know that there are other barriers that can be onerous and restrictive, and we don't have to look outside our own organizations to see them. Clubs ignore those hurdles and discriminatory practices at their own peril.

We must realize that recognizing and rewarding women's potential is critical to the future of golf and golf clubs. We may be swimming against the tide of tradition in some cases, but the best practice seems simply to make the most of everybody's talents.

The tide has shifted, the momentum has changed. Today's conversation focuses on broad social change led by women and – yes – men who are speaking out against outdated views that hold all of us back. Helping women make the most of their potential is a job for all of us, and it's time to get started. **GCI**

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TRUE GRIT

IN THE FIRST OF A TWO-PART SERIES, TURF MANAGERS OFFER THEIR VIEWS ON THEIR METHODOLOGY FOR SANDING GREENS AND PROVIDING TOP-NOTCH PLAYING SURFACES.

The unmistakable surface sheen is testament that the greens have been topdressed. An undeniably important agronomic process for golf course superintendents, it's also one not entirely appreciated by players.

In fact, 41 percent of members and players complain that sanded greens play poorly, according to turf managers who participated in recent GCI research. Interestingly enough, this trend of unmet expectations is more prevalent at public courses (44 percent report unhappy golfers) versus 37 percent at private courses. Likewise, dissatisfaction was more common with Ultradwarf Bermuda greens (43 percent) than with Poa (42 percent) and Bentgrass (40 percent), according to the data.

During the first quarter of 2018, Golf Course Industry, in partnership with Premier Sand/ Hayden Group, created a research project to identify trends regarding top dressing and topdressing sand used on greens. The survey was administered online via SurveyMonkey.

More than 400 professional turf managers from around the U.S. and Canada completed the survey. As an added incentive to complete the survey, GCI committed to make a substantial donation to the Wee One Foundation, a charity group started in memory of Wayne Otto, CGCS, that helps superintendents and other turf professionals in need. Lastly, in addition to periodic email reminders to take the survey, GCI provided access to the questionnaire via concentrated social media campaign that involved not only the GCI website, but also Facebook and Twitter.

When analyzing the data, GCI editors broke down the findings regionally based on USGA's boundaries, as well as between public and private courses. In some instances, when appropriate, GCI further broke down data for comparisons of green type, and green turf type.

It's important to know that 54 percent of turf managers participating in this research worked at public facilities; with 29 percent in the Northeast, 37 percent the Central states, 15 percent Southeast; and 19 percent Western states. These superintendents managed primarily bentgrass (50 percent) push-up (50 percent) greens. Nearly three quarters (70 percent) of respondents were working at financially stable facilities, either breaking event (30 percent) or earning a profit (40 percent). Altogether, respondents indicated they spent about $14,500 annually on topdressing sand.

NORTHEAST

MAINE NEW YORK VERMONT MASSACHUSETTS VIRGINIA PENNSYLVANIA MARYLAND WEST VIRGINIA NEW HAMPSHIRE RHODE ISLAND DELAWARE NEW JERSEY WASHINGTON DC

DOES YOUR SAND MEET USGA RECOMMENDATIONS?

PREFERRED SAND PARTICLE SIZE

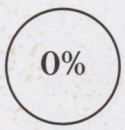
VERY COARSE SAND (1.0MM TO 2.0MM)

COARSE SAND (0.5MM TO 1.0MM)

MEDIUM SAND (0.25MM TO 0.5MM)

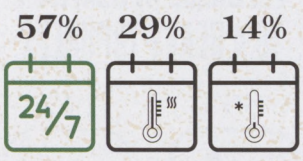
FINE SAND (0.15MM TO 0.25MM)

VERY FINE SAND (0.05MM TO 0.15MM)



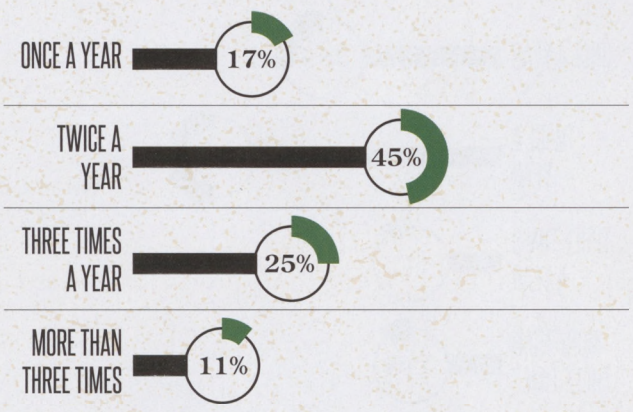
SILT AND CLAY (<0.05MM)

WHEN DO YOU TOPDRESS?

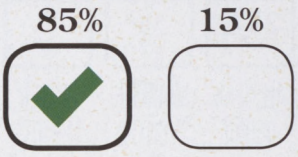


ALL YEAR ROUND | WARMER MONTHS ONLY | COOLER MONTHS ONLY

HOW FREQUENTLY DO YOU PERFORM A HEAVY TOPDRESS?



DO YOU PERFORM A LIGHT (DUSTING) TOPDRESS IN ADDITION TO A HEAVY TOPDRESS

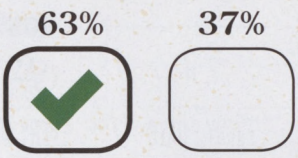


YES | NO

WHEN YOU LIGHT TOPDRESS, WHAT'S THE FREQUENCY?

EVERY 7 DAYS | EVERY 14 DAYS | EVERY 21 DAYS | EVERY 28 DAYS | LONGER THAN 28 DAYS

DO YOU APPLY THE SAME AMOUNT OF SAND AT EACH TOPDRESSING?



YES | NO

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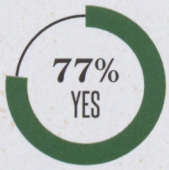
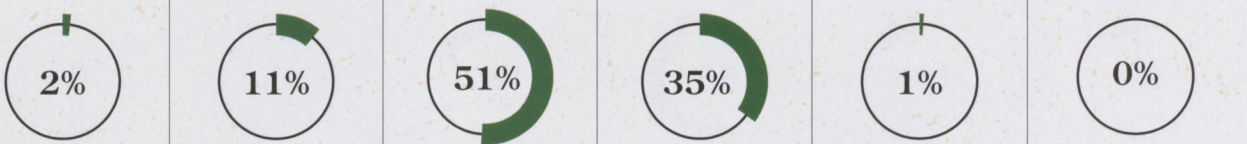
CENTRAL

MICHIGAN OHIO KENTUCKY INDIANA ILLINOIS WISCONSIN MINNESOTA
IOWA MISSISSIPPI NEBRASKA KANSAS OKLAHOMA TEXAS



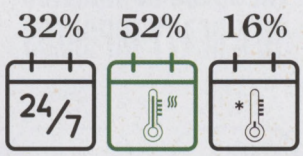
DOES YOUR SAND MEET USGA RECOMMENDATIONS?

PREFERRED SAND PARTICLE SIZE



VERY COARSE SAND (1.0MM TO 2.0MM)	COARSE SAND (0.5MM TO 1.0MM)	MEDIUM SAND (0.25MM TO 0.5MM)	FINE SAND (0.15MM TO 0.25MM)	VERY FINE SAND (0.05MM TO 0.15MM)	SILT AND CLAY (<0.05MM)

WHEN DO YOU TOPDRESS?



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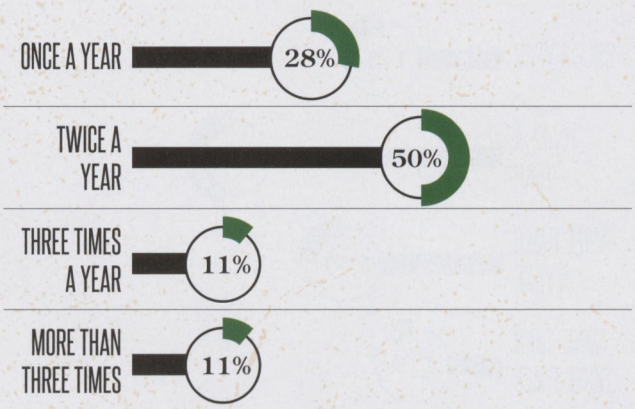

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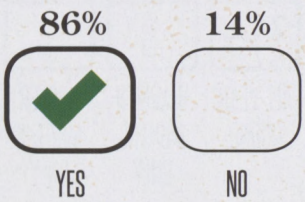
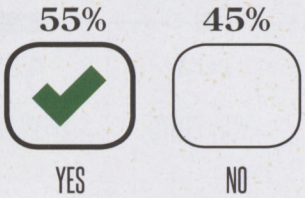


WHEN YOU LIGHT TOPDRESS, WHAT'S THE FREQUENCY?

7%	42%	28%	7%	16%
EVERY 7 DAYS	EVERY 14 DAYS	EVERY 21 DAYS	EVERY 28 DAYS	LONGER THAN 28 DAYS

DO YOU APPLY THE SAME AMOUNT OF SAND AT EACH TOPDRESSING?



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SOUTHEAST

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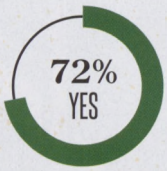
ALABAMA MICHIGAN ARKANSAS LOUISIANA

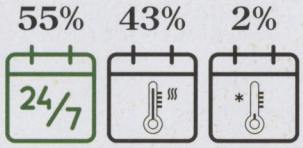


DOES YOUR SAND MEET USGA RECOMMENDATIONS?

PREFERRED SAND PARTICLE SIZE

VERY COARSE SAND (1.0MM TO 2.0MM)	COARSE SAND (0.5MM TO 1.0MM)	MEDIUM SAND (0.25MM TO 0.5MM)	FINE SAND (0.15MM TO 0.25MM)	VERY FINE SAND (0.05MM TO 0.15MM)	SILT AND CLAY (<0.05MM)

WHEN DO YOU TOPDRESS?



ALL YEAR ROUND | WARMER MONTHS ONLY | COOLER MONTHS ONLY

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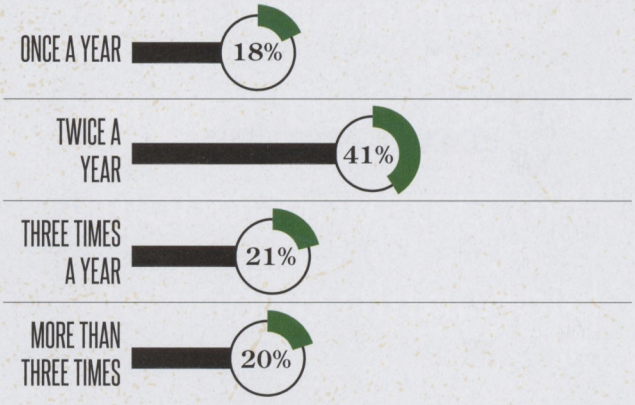

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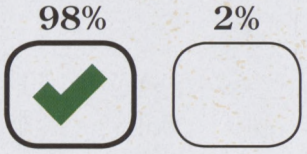
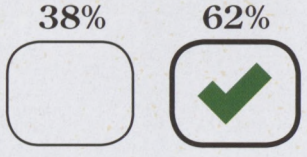


YES | NO

WHEN YOU LIGHT TOPDRESS, WHAT'S THE FREQUENCY?

EVERY 7 DAYS	EVERY 14 DAYS	EVERY 21 DAYS	EVERY 28 DAYS	LONGER THAN 28 DAYS

DO YOU APPLY THE SAME AMOUNT OF SAND AT EACH TOPDRESSING?



YES | NO

WEST

NORTH DAKOTA SOUTH DAKOTA MONTANA WYOMING COLORADO NEW MEXICO
IDAHO UTAH ARIZONA WASHINGTON CALIFORNIA ALASKA HAWAII

DOES YOUR SAND MEET USGA RECOMMENDATIONS?

PREFERRED SAND PARTICLE SIZE

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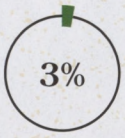
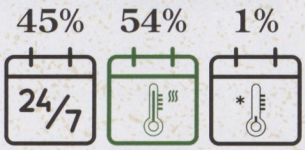


VERY FINE SAND (0.05MM TO 0.15MM)

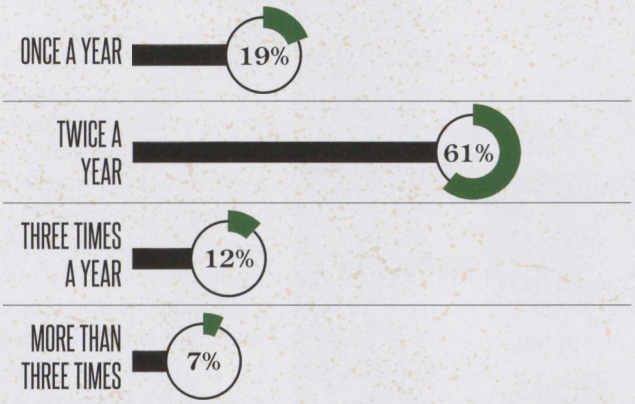
SILT AND CLAY (<0.05MM)

WHEN DO YOU TOPDRESS?



ALL YEAR ROUND | WARMER MONTHS ONLY | COOLER MONTHS ONLY

HOW FREQUENTLY DO YOU PERFORM A HEAVY TOPDRESS?



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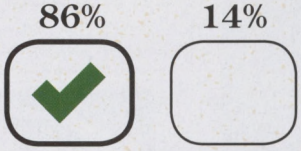
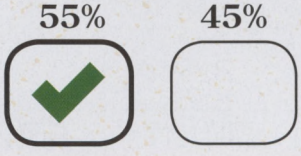


YES | NO

WHEN YOU LIGHT TOPDRESS, WHAT'S THE FREQUENCY?

EVERY 7 DAYS | EVERY 14 DAYS | EVERY 21 DAYS | EVERY 28 DAYS | LONGER THAN 28 DAYS

DO YOU APPLY THE SAME AMOUNT OF SAND AT EACH TOPDRESSING?



YES | NO

The Fearsome Foursome

Turf experts outline a quartet of weeds you may see this season, and how to stop them.

By **John Torsiello**

CRABGRASS: There are about 200 species of crabgrasses native to tropical and warm temperate regions. "Crabgrass typically have spreading stems with wide, flat leaf blades that lie on the ground with the tips pointing upward or outward," says L.B. (Bert) McCarty, Clemson professor of turfgrass science. "Crabgrass seed has a long germination period, requiring light for optimum germination, germinating in early spring when soil temperatures at four inches depth are 53 to 55 degrees Fahrenheit for 24 continuous hours." Crabgrass often invades weak, thin turf where light can reach the soil surface where seed are located. They also germinate earlier on south facing slopes and adjacent to sidewalks and driveways.

"Preventively, a number of preemergence herbicides can be applied," he says. "The key is to apply just prior to germination in your particular area and repeat applications 60 to 75 days after the initial. Post-emergence herbicides are highly dependent on the tolerance to the particular turfgrass species present."

Many preemergent products control crabgrass, such as bensulide, dithiopyr, prodiamine, and pendimethalin. PBI-Gordon has preemergent herbicides to control crabgrass and other grassy weeds; Bensumec 4LF and Tupersan are sprayable, and Pre-San Granular 12.5G is granular, says PBI-Gordon product manager Jim Goodrich. Postemergent, there are several crabgrass-control products, including Q4 Plus Turf Herbicide, which offers effective control, as well as a broad-spectrum broadleaf weed control.

NUTSEDGE: Nutsedges are similar to grasses with long, linear shaped leaves. Nutsedge leaves, however, are arranged in threes and a cross section of the stem is triangular. Leaves are also covered with a very distinguishable (shiny) waxy cuticle.

Yellow nutsedge is a perennial, but their shoots die down

PHOTO: DR. BERT MCCARTY

in winter, McCarty says. Nutsedges are tolerant of wet conditions, so regulate soil moisture by using prudent watering practices and providing drainage."

Preemergence control is available, but being a perennial these products must be applied prior to tuber sprouting, which is hard to determine since the shoots die down in winter but the plant is still alive. Postemergent herbicides should be applied prior to June 21, when tuber production is initiated.

PBI-Gordon products that contain the active ingredient sulfentrazone in different concentrations work to suppress it, like Surge Broadleaf Herbicide for Turf and TZone SE Broadleaf Herbicide for Tough Weeds. Q4 Plus, which has a higher load of sulfentrazone, controls yellow nutsedge. Katana Turf Herbicide eradicates yellow nutsedge from warm-season turf.

CLOVER: Clover leaves divide into three leaflets. White clover is the most widespread in the U.S. It's a low-growing, perennial initially used as a companion crop in pastures due to its ability to fix its own nitrogen. White clover leaves often have a white, angled band partly encircling the base of each leaflet.

"Clovers typically invade low-maintenance turf sites that are insufficiently fertilized with nitrogen,"McCarty says. "Providing sufficient fertilizer discourages this invasion. Being mostly perennial, control is often with postemergent herbicides."

Increase fertilization and raise mowing heights to reduce clover pressure on your golf course. Curatively, many products control clover, but they can require multiple applications, as clover can grow over itself and reduce the amount of product reaching the lower portions of the plant. PBI-Gordon has several products for the postemergent control of clover; SpeedZone Turf Herbicide is a sound choice for clover control, as well as Q4 Plus, and TZone SE.

CHICKWEED: The most encountered chickweeds on golf courses are common and mouse-ear. Common is a mat-forming winter annual. Leaves are opposite, shiny, without hairs. Mouse-ear is a perennial, roots at nodes, and leaves are gray green and hairy. Flowers for both have five notched white petals, occurring in spring.

Postemergent chickweed control should take place in the fall into early winter before seeds are produced for subsequent generations and/or additional spread. Control is mostly with postemergent three- or four-way herbicides. As weeds mature, two applications seven days apart will be needed." **GCI**

Always read and follow label directions.

For more...
Check out this issue's digital edition at golfcourseindustry.com for more information about the four weeds, including images to better identify them on your course.

In the ZONE

Clamp down on these five Transition Zone turf diseases before the season heats up.

By **Kurt Kleinham**

Transition Zone turf such as Bermudagrass or bentgrass is difficult to keep healthy, and whether there's cool- or warm-season turf on the course, a good deal of the year's weather will be stressful. That's especially true in a year like 2018 with a hot weather showing up almost a full month early and intermittent dips back into cold temperatures.

As the weather changes, it's important for superintendents to watch for turf pathogens to slow down or prevent diseases before they become an issue. Here are a few to keep an eye out for:

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Waiting for fairy ring to occur before treating for it can cause significant problems on Transition Zone turf. "Once the fungus gets going, it's like a freight train," says Bayer Green Solutions Team specialist Dr. Derek Settle. "It's hard to stop."

© PHOTO COURTESY OF BAYER

FAIRY RING

Fairy ring is one of the easiest turfgrass diseases to diagnose, with rings that span from about 4 inches in diameter to several feet, says Dr. Derek Settle, Bayer Green Solutions Team specialist. There are three types to look out for, with Type 1 showing up as dead brown rings, with the turf killed in the rings. Type 2 is a green ring, which would be the predominant version seen during an early warmup, and Type 3 involves visible mushrooms and puffballs.

"Sometimes you'll have all three symptoms going at once, but that's what you'll look for," Settle says.

Courses are in danger once soil temperatures reach about 55 to 60 degrees at a 2-inch depth, Settle says. Once those temperatures are covered, superintendents should start off with a cross program fungicide program to prevent fairy ring.

When working with fairy ring, it's important to remember to water fungicide in to the depth of the mycelium, which is generally going to be in the upper inch of the thatch layer, Settle says.

THREE WAYS TO INCORPORATE PROFILE GREENS GRADE FOR OPTIMAL ROI

As the leader in soil modification and erosion control solutions, Profile Golf offers the proven products and expert consultants to help course superintendents generate healthier root zones, enhance nutrient uptake, increase air porosity and optimize growing conditions on greens, tees and fairways.

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Dollar spot is always a disease to watch for in the Transition Zone. Controlling the disease includes combining careful cultural practices with fungicide applications throughout the growing season.

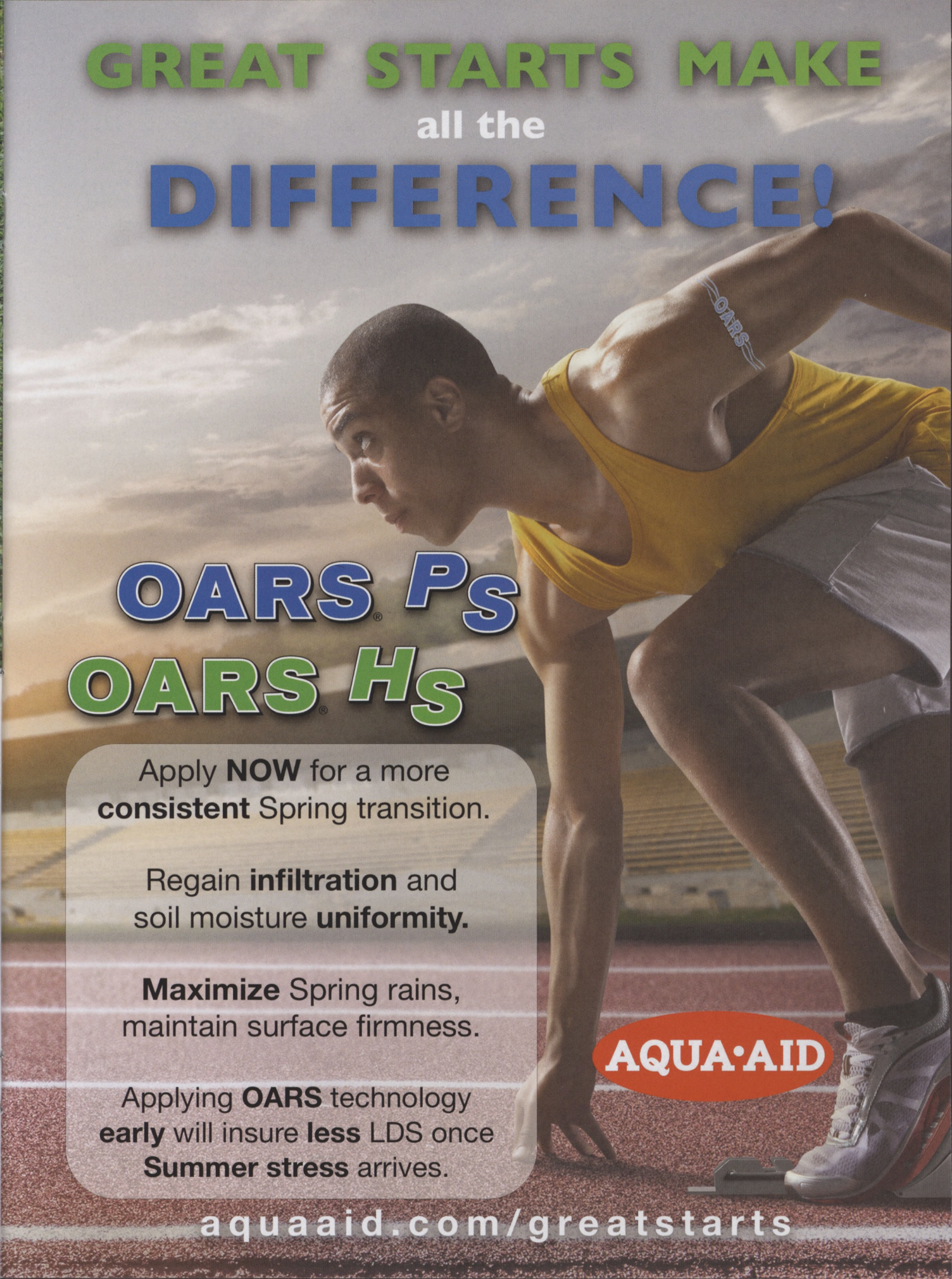
Working in a preventive action is easier for superintendents, because curative rates can be much higher, Settle says. For example, Bayer's Prostar's preventive rate is 2.2 ounces per 1,000 square feet, whereas the curative rate is about 4.5 ounces for the same range. "Curatively, you're going to have to use it at a high rate, and typically you're going to have to address it with a second application in 30 days," he says. "Once the fungus gets going, it's like a freight train. It's hard to stop."

DOLLAR SPOT

Dollar spot is one of the more significant diseases to watch out for in Transition Zone turf in his region, says David McCall, a turf pathologist at Virginia Tech. "Dollar spot is always king in the Transition Zone, because so many applications are needed throughout the growing season," he says.

Dollar spot shows up in silver-dollar-sized lesions on the turf, with a bleached or light color. It can be very unsightly, but if it doesn't kill all the way down to the ground, rescue applications can be sufficient to control the disease and slow it down for a little while, McCall says.

Cultural practices play a tremendous part in handling dollar spot, with the right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amount of fertilization, rolling and irrigation, he says. "There are several strategies you can use to minimize the amount of disease you see, and probably the biggest one is managing how you use your nitrogen," he adds.

Use nitrogen when turf is a little lean, with small amounts over a longer time period. McCall recommends going with a program of about .1 to .2 pounds of nitrogen every 10 to 14 days. "You'll still need fungicide, but you'll reduce the overall amount of dollar spot," he says. "It all starts with cultural practices, that is definitely number one."

Fungicide options for dollar spot come from multiple classes. DMI fungicides like propiconazole are a strong choice, but have confirmed cases of building resistance, McCall says. SDHI fungicides are also commonly used, though some resistance has been recorded with SDHIs like fluxapyroxad and boscalid in studies at the University of Massachusetts.

To reduce the likelihood of resistance in dollar spot, switch modes of action throughout applications. "You want to rotate with different single-site modes of action, or with multi-sites like chlorothalonil or fluazinam," McCall says.

FUSARIUM PATCH/PINK SNOW MOLD

With grass greening up earlier than expected, pink snow mold and fusarium patch, both caused by Microdochium nivale, can be an issue for Transition Zone turf, in the Mid-Atlantic regions, says Brian Aynardi, PBI-Gordon's Northeast Research Scientist. The disease can be present from above-freezing temperatures to about 60 degrees, but usually in the mid-40s in rainy weather that doesn't have time to dry when the ground isn't frozen.

"Anytime you have freezing/thawing cycles is where you'll see it," Aynardi says.

Pink snow mold patches will be circular, from 3 to 6 inches in diameter, and will

Pink snow mold *Microdochium nivale*

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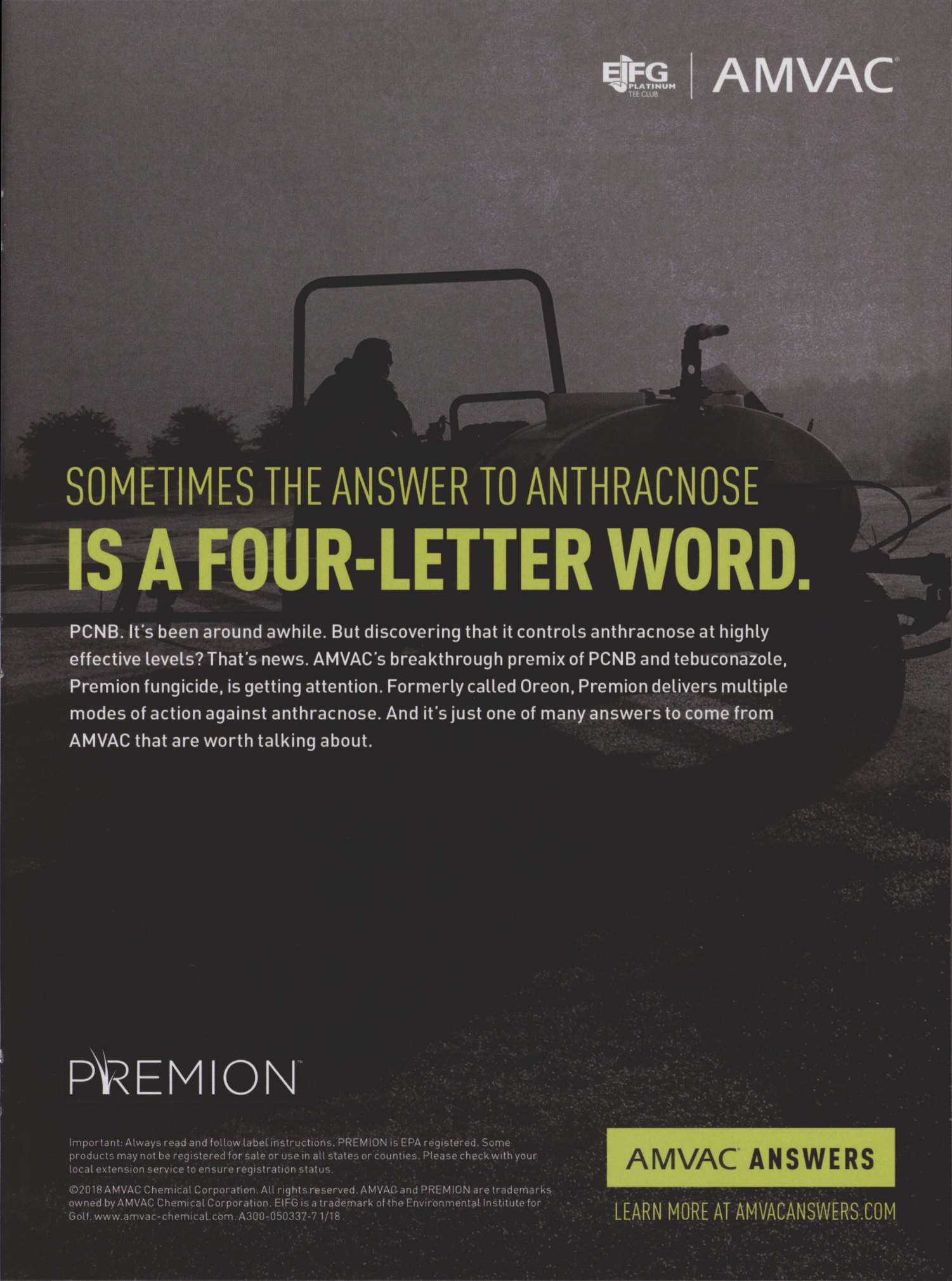
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Wet soil can make Transition Zone turf susceptible to Pythium, which is one of the most challenging diseases to identify before symptoms become visible. Pythium is most frequently spotted during warm months such as July and August.

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appear pink under sunny conditions, or straw-colored.

DMIs are a good choice for control, as are combination products that contain DMIs with strobilurins or anything containing chlorothalonil, Aynardi says. "Keep an eye out in March and into April, when things start to green and warm up," he adds.

PYTHIUM ROOT ROT

Anytime the soil is wet for a prolonged time period, Pythium root rot can be a threat to Transition Zone turf. "Unfortunately, it is very difficult to identify before you start to see symptoms, so it'd be difficult to do any preventive diagnostic sampling if you don't know exactly where to pull from," McCall says.

Once symptoms appear, they'll often show up in patches in low-lying areas and the areas of the course that stay wet the longest, he says. "You might see the disease track down through waterways," he adds.

Pythium is a disease that often shows up more during

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warmer months like July and August, where there's also heat associated with thunderstorms or overirrigation, but they can show up in spring or fall when conditions reach about 70 to 80 degrees with increased moisture, McCall says.

"If you can understand where your problem areas are with drainage and the areas that stay wet the longest, one thing you can do is focus on site-specific management and try to alleviate some of those problems," he says.

Symptoms can be orange or yellow patches and can show up in irregular patches and patterns.

If Pythium is suspected anywhere on the course, take samples as soon as symptoms develop and send them off to a diagnostic lab, McCall says. "Because this disease is so destructive, if you suspect you have it, you want to get that confirmation, but it may not be a bad idea to go ahead and make an application while you're working with a diagnostician to determine if it is the cause," he says.

Working with an application of something like Segway will be the best option, though there are also other chemistries available on the market, McCall says. There isn't any known resistance, but the possibility always exists that some could develop given the single-site mode of action and the broad genetic diversity of Pythium.

One issue with Pythium is that it isn't a true fungus, and most fungicides shouldn't be expected to cover them the way they do other fungi, McCall says. "You need a plan for Pythium root rot as well as Pythium blight. You should have a plan for your putting greens," he adds. "Pay attention to your weather forecast, and if it's going to be hot and wet for a prolonged period, you need to have some kind of protection."

LEAF SPOT

The first reports of leaf spot for this year are starting to come in, and they're about a month early, Settle says. The disease, which shows only on Bermudagrass, has initial infection centers with a purple coloration, always occurring on the stressed areas of the green. On a green, look toward the outer ring on the cleanup lap where the mower causes a lot of wear and stress to the turf.

"The main note I would make is that we sometimes tell superintendents to get a sample to a lab, because it's the lookalike for Pythium blight," Settle says. "It's another example where the human eye is very, very good, but you

Reports of leaf spot on Bermudagrass emerged before spring officially started. Bayer Green Solutions Team specialist Dr. Derek Settle recommends using a broad-spectrum fungicide with two active ingredients when treating for the disease.

© PHOTO COURTESY OF BAYER

always want to get a sample and send it to a university to double-check."

The best approach for leaf spot is a broad-spectrum fungicide, like Interface Stressgard, with two active ingredients, Settle says.

Leaf spot is one of the most chronic diseases for Bermudagrass, popping up in shoulder seasons when temperatures are cool and the grass is not growing vigorously, Settle says. "By the time we get to late spring or summer, you'll never hear mention of leaf spot," he says. "By that point, environmental conditions have changed, and the fungus is no longer in the sweet spot for its growth and development." **GCI**

Kurt Kleinham is a contributing editor from Akron, Ohio.

THE DISTANCE DEBATE ... AGAIN

Jeffrey D. Brauer is a veteran golf course architect responsible for more than 50 new courses and more than 100 renovations. A member and past president of the American Society of Golf Course Architects, he is president of Jeffrey D. Brauer/GolfScapes in Arlington, Texas. Reach him at jeff@jeffreydbrauer.com.

In February, the distance debate came up again – and again – pairing new distance data with age-old arguments, but little new insight.

To recap, the new USGA/R&A joint distance data came out, showing a three-yard increase over last year for the PGA Tour, after many years essentially no distance gains. Jack Nicklaus called for the golf ball to be rolled back 20 percent. And, then, we were off to the races! I tire of these discussions, perhaps worn out by numerous high-volume, low-intelligence, Facebook faceoffs.

The distance arguments can be summed up simply:

- Anyone who hits it further than me has an unfair advantage which needs to be curtailed.
- The <1% who are extremely long hitters believe it's unfair to limit their advantages of physical prowess and years of practice.
- The equipment makers are against roll backs of both distance and profit.
- Traditionalists believe we should keep older courses in use for major tournaments.
- The USGA and R&A have "committed" vaguely to further discussion, which sounds like a stall tactic. Like me, I believe they see no real problem.

For proponents of a roll back, much of reality is ignored:

- Basing the distance debate on the top 25 to 50 longest hitters in the world skews the argument horribly. The pros have influenced course design toward longer and harder courses. Too many design discussions drift to the subject of, "Would the pros tear this course up?" even on the design of easy peasy municipal courses. Worse yet, sometimes those thoughts become actions, even though the pros are never, ever, going to show up.
- 99 percent of courses don't need major changes to accommodate either every day play, or even lower level tournaments, were length is held down to protect the bottom half of the field.
- 99 percent of America's 15,000 courses do vitally need to keep and attract players, while about 1 percent (about 150) of America's course want to, but can't, host tournaments solely due to their length.
- The same distance study that started this round of arguments also showed average golfers losing length. Most courses ought to be thinking in terms of adjusting middle and forward tees.

Progress is a universal aspect of human endeavor. Do cars go too fast, potentially causing more accidents? Do medicines heal too well, while potentially causing some addictions? And do golf carts lead to out of shape golfers? Yes, but progress continues.

Rolling the ball back will assuage some egos, help a few clubs to host tournaments, and possibly save several hundreds more from being "forced" to spend millions to add length. In truth, for most courses, the cost of reasonably adding length via new back tees is comparatively inexpensive to other renovations drivers, like rebuilding greens or improving bunkers, but it doesn't stop the argument from being raised.

Better equipment has undoubtedly met the standard of doing the "greatest good for the greatest number" of golfers, who want and need longer, higher flying, easier to hit golf balls and forgiving clubs to ease their golf struggles. The number of courses becoming obsolete for tournaments is quite small. The number of golfers wanting more distance is exceedingly large.

Like many, I look forward to seeing Shinnecock Hills, Winged Foot, The Country Club, Los Angeles Country Club, Oak Hill, Bethpage and Pinehurst host majors. I love the traditional (to us) British Open Rota, has been tweaked over the decades. Prestwick, the first Open course, was last used in 1925, after a 60-year run. Musselburgh Golf Links was replaced after hosting six early Opens in 15 years. Royal Cinque Ports eliminated after hosting two Opens across just 11 years. Which goes to show, times have always changed.

That said, 75 to 80 percent of the next 24 majors will be contested on courses that also hosted them in the 1920s, nullifying the "obsolete courses" argument. In any version of Darwinism, 80 percent survival over time is remarkable. And, while the courses have lengthened, and some changed character over the years, it's a strength of their original design to be adaptable with length additions and design tweaks to unforeseeable conditions a century (or centuries!) later. **GCI**

For more on this topic, see the online digital version of this column at golfcourseindustry.com.

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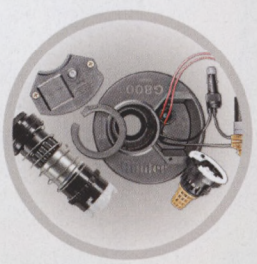

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CUT AND

That first mow of the season has the potential to make or break your course. Our experts tell you how much to take off the top this spring.

John **Torsiello**

D RUN

Ah, spring. It's warm, the sun is shining and golfers are eager to get onto your course.

But before you produce that heady fragrant smell of freshly mown grass that sends golfers onto reverie, consider just how low you should go, with the first cut that is.

For both greens and fairways, the first cut of the season should be the same height as the last fall cut when the turf went into dormancy, says Dr. John Sorochan, distinguished professor and the turfgrass science director in the Center for Athletic Field Safety at the University of Tennessee. As

"As a rule, most golf courses and golf course superintendents will not cut more than 25 percent of the plant at one time," OB Sports' Luke Beardmore says. "In general, it is best practice to mow at most only 10 to 15 percent of the plant."

the turf begins to grow, Sorochan says, superintendents will be mowing the dormant brown leaf tissue. For cool-season greens and fairways, mowing heights are not increased going into the fall. Rather they are occasionally raised during summer heat stress periods of June through August.

"For warm-season putting greens, the mowing height going into the fall occasionally is raised to keep dormant putting green speeds from becoming too fast," Sorochan says. Still, during spring green up, superintendents will want their initial mowing to remain at the same height until the turf is actively growing. Lowering the mowing height going into late spring to early summer should be done incrementally over a few weeks and should coincide with grooming and light sand topdressing.

Michael Hileman, field and technical specialist at JRM Inc., ascribes to the "One-Third Rule" for most courses. "Incremental drops in height from there typically seem to be the chosen route," he says. "Weather dictates all but have a plan ahead of time. I don't think you can put a date on a first mow, but you can put a plan to the height when conditions call for mowing."

An important step to take prior to the first mow is to roll the greens, says Dr. Karl Danneberger, a professor in the Department of Horticulture and Crop Science at The Ohio State University. Rolling — which includes the greens mower with reel disengaged — makes smooth the surface and reduces the likelihood of scalping with the first mow. "Scalping really stifles uniform early spring green up," Danneberger says. "You will get varying ideas, but I don't believe there is a standard percent increase. I would start at a higher height of cut and try to get down to normal height fairly quickly."

For warm-season grasses, build the turf from the ground up after the last frost date has passed, and have mowing heights at levels that are cutting away most of that dead tissue, says Dr. Michael Goatley, turfgrass extension specialist and professor in the Crop and Soil Environmental Sciences Department at Virginia Tech University.

"Scalping is probably too harsh of a word to use but getting pretty close to a scalp cut is what I have in mind in order to remove as much of the dead material as you can," Goatley says. "This stimulates a lot of new growth and development, but this is also why it is important to ensure that you aren't going to have an extreme cold event that could damage succulent tissues. Then bring your turf up to its intended maintenance height for the rest of your growing season, tweaking it as needed for special events, etc."

With cool-season turf, the first mowing events in late winter/early spring are usually happening at a time when environmental conditions and plant growth and development responses are tilted toward root development, often setting the stage for success in the coming growing season. "There is a lot of flexibility with lower mowing heights during this time of root development," Goatley says. "And soon after there will be a flush of new stems from one of the year's most active tillering periods."

Turf density and playability can be optimized by closer,

How to handle the first mow of the spring on cold- and warm-season grass varieties is a debated topic among superintendents, researchers and other industry experts.

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Executing an early season scalp cut or getting close to a scalp cut is a way to remove as much dead material as possible before incrementally bringing turf up to intended mowing heights for the growing season.

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regular mowing at this time, but as temperatures warm and root development slows, plant health will be improved at taller heights of cut that still meet turf performance expectations.

For both warm- and cool-season grasses, Goatley says to keep in mind one of the most basic management, and that is "the difference between what you can do and what you should do when it comes to long term plant health. Don't get greedy!"

The first cut of the season is solely dependent on the height of cut going into winter, says Luke Beardmore, senior vice president of agronomy and construction for OB Sports Golf Management. "As a rule, most golf courses and golf course superintendents will not cut more than 25 percent of the plant at one time," he says. "In general, it is best practice to mow at most only 10 to 15 percent of the plant."

"The height and timing depend on the grass type, which varies based on location, says John O'Leary, golf and sports turf sales manager for John

Deere. While typically the height of cut doesn't change from fall to spring, the species does impact the general height. He says in areas with warm-season grasses that go dormant, the height of cut is increased to help protect the plant during the winter months. This can be achieved by either raising the height of cut or by stopping mowing prior to the grass going dormant.

"The timing of the first cut is determined by the grass type and location," O'Leary says. "Cool-season grasses, such as bluegrass, ryegrass and bentgrass, will green up much sooner than warm-season grasses, like zoysia or Bermuda. The mowing of cool-season grasses typically starts in early April, while warm-season grasses start in late April

The height of the first cut is important because scalping can delay green up. "As a best practice, aim to remove no more than one-third of the leaf blade at any mowing to avoid damage to the plant." O'Leary says. "Mowing too high will not remove enough of the dormant leaf blade, making the grass appear less green. This may result in an undesired shaggy appearance."

Cutting warm-season grasses too short in the spring followed by a cold snap could cause a lot of turf damage or setback spring green up, Sorochan says. Mowing too high will impact playability speed and consistency."

> "Maintaining an actively growing, healthy turf is a never-ending process."

Superintendents tend to incrementally adjust heights to where they want to be in the summer season. "The same can be said of the majority of cool season guys as well," Hileman says. "But, everyone is getting to that ideal height of cut much faster into the season."

Other factors that come into play, as well. For example, as superintendents want their turf to be growing and healthy

heading into any spring cultural practices (aeration/verticutting, etc.) so as to ensure a fast recovery. "A superintendent I look up to in the Charlotte, N.C., area told me the goal is to return the greens back to the membership or customers as quickly as possible, Hileman says. "And mowing low too early could be very detrimental to their recovery."

Hileman says weather dictates when the first cut should be made and how low the cut should be.

"Mainly, the first cut is typically dictated by temperatures, short term and long term, and the moisture level," he says. "A ton of rain or soft conditions make it difficult to cut, so in those cases the mowers would typically be adjusted higher than the plan. "

Acknowledging that golf turf managers are "involved in a balancing act every day of the week" in their turf management programming, Goatley says meeting expectations of the public regarding playability while maintaining an actively growing, healthy turf is a never-ending process. "Pushing cutting heights to the very limits of possibilities is a stress-inducing practice that will ultimately reduce the health of the turfgrass, thus limiting its ability to handle environmental stress, and combat a variety of pests (weeds, diseases and insects)." All of these issues are likely to cause more damage and reduce the turfgrass' ability to rapidly recover from the rigors of such intensive maintenance and use. "And never forget that it's not just the grass that is stressed in these situations – it's the superintendent too."

The approach toward the first cut of the season has been affected by the trend toward faster green, and sometimes, fairway speeds, says Hileman. "It is obviously lower now than say 20 years ago," he adds. "But, that is because you have to be at more demanding speeds all around. This in turn creates the need to have to get to the optimal height of cut earlier, beginning lower than sometimes needed."

To be certain, turf conditions for professional tournaments and country club members are now centered around speed. But most golf courses were built in days of slower greens and more slope remains, Hileman says. "We have seen the market evolve with that change as well. Our very popular bedknives have progressively gotten thinner. With lower heights of cut, coupled with sloped greens, comes the need to have to watch things like dragging and scalping on greens mowers."

Says Beardmore, "Most private club memberships tend to demand faster greens. This generally

Communicating conditions to members and customers is an important spring task for superintendents because lowering mowing heights too early can create less than optimal playing surfaces during peak periods of play.

is accomplished through a variety of management strategies, and the height of cut is almost always one of them. The other key factor to consider is the severity of the contours of the greens. Lower heights of cut almost always leads to faster greens speeds, which can be negative if the contours are severe." He adds that it is imperative for superintendents to find their "sweet spot" regarding green speed and height of cut.

"Everyone is a paying customer whether you are at a country club or a daily fee facility," Hileman says. "They may not pay in the same manner, but they are all your customers. Superintendents have to be thick-skinned individuals. If a golfer leaves a putt short, the greens were slow. If they blow it by, the greens were too fast. The superintendent's goal is to deliver the needs of the customer while balancing the overall health of the turf. You have to care about perception, but it is only a piece of the puzzle. You cannot sacrifice growing healthy turf for guys who have the need for speed too early."

Superintendents risk the ire of golfers when it comes to the most valuable commodity a course has; the playing surface. If that means the greens run a little slow and the ball doesn't bounce as high or run out as far on fairways in early spring, so be it. **GCI**

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CONTRACTOR SHORTAGE

Brian Vinchesi, the 2015 Irrigation Association Industry Achievement Award winner, is President of Irrigation Consulting, Inc., a golf course irrigation design and consulting firm with offices in Pepperell, Massachusetts and Huntersville, North Carolina that designs golf course irrigation systems throughout the world. He can be reached at bvinchesi@irrigationconsulting.com or 978-433-8972 or followed on twitter @bvinchesi.

Today's golf irrigation market is explosive, probably more so than the renovation market. Many golf courses are expanding, revitalizing or restoring their irrigation systems. Even more courses are planning for renovation or replacement in the next two to three years. This is both good and bad news. It's good news for golf irrigation manufacturers and suppliers, both good and bad news for irrigation contractors, and bad news for golf courses.

Manufacturers and suppliers are thrilled with the irrigation work out there. They have not seen this level of sales since the 1990s, but their margins are not quite as good because the manufacturers are so competitive with each other. Depending on the course, there is not a lot of money being made on the manufacturer/supplier side on the hard goods (Hunter, Rain Bird and Toro). Ironically, the courses that can afford the new irrigation system the most pay the least and the small "ma and pa" course pays the most as the manufacturer wants the reference.

Even though I am a designer, I am a firm believer that golf course irrigation systems are all about the installation contractor. The design matters and so does the equipment, but if the system is poorly installed, then it doesn't matter how good the design was or how great the equipment is. If the installation contractor does a poor job, you will end up dealing with the consequences for 20 to 40 years. So, what's the problem? There are only a limited (small) number of good golf irrigation contractors in the United States. Most specialize in golf irrigation only and have a limited number of crews. Given the amount of current and pending work out there, there are not enough good, qualified irrigation contractors available.

In a good economy like this with lots of golf work, some commercial irrigation contractors will decide to expand into golf irrigation. Some golf course renovation contractors will decide to add irrigation installation services, as well. We have seen this story play out before. The problem with the commercial contractor is they do not understand golf. There is a big difference in installing 12-inch pipe versus 2-inch pipe. Golf requires different equipment: large trenches, tractors with hauling trailers, wire racks, rock saws, excavators, storage containers and utility vehicles. It also requires larger crews. Most of today's systems are installed on existing turf, not dirt. Therefore, renovation skills are extremely important. Materials are much more expensive and cash flow is nowhere as good as with smaller commercial and residential projects. Upfront costs are significant.

Lastly, the paper work is much more detailed as it is a more formal process when compared to other types of irrigation. Commercial crews are also not used to dealing with golf course players, members and staff. Builders are used to dealing with golf courses, but they may not have the specialty equipment needed or the installation experience. All this work is good for the established contractor, but also bad as they have new competition that usually, at least to start with, has lower pricing as they do not realize all the costs involved in installing golf irrigation systems. Be careful not to jump on an inexperienced contractor because their price is low. Likewise, try not to let the board or owner do so either. The good contractors price where they do for a reason. The best way to keep an experienced contractor from bidding is to not let them bid in the first place.

All this work is bad for the golf course because a good contractor can be selective about the projects they take on. They will take on the higher profit projects, the closer projects, the easier projects or, ideally, the project that is a combination of all three. There will not be any deals to be had out there in this market and if the contractor chooses to not do your course, they just can pick another. Much different than five years ago.

So, what do you do? First, plan and plan early. It is not uncommon these days to start planning/designing for a new irrigation system three to four years before it is going to be installed. This gives time to cover all the required design and permitting bases and collect necessary information. Because today's golf irrigation systems are so expensive, it also gives, the owner, board or corporation time to determine how the new or renovated system will be paid for. Lastly, it allows the course to bid early – as much as a year ahead of time –to get one of those good, qualified irrigation contractors, which is the key to a successful project. **GCI**


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ORGANIC MATTER MANAGEMENT

Extract and replace versus injection on sand-based greens.

By **Jeff Broadbelt, VP of Operations, DryJect Inc.;**
Ed McCoy, Ph.D., Ohio State University

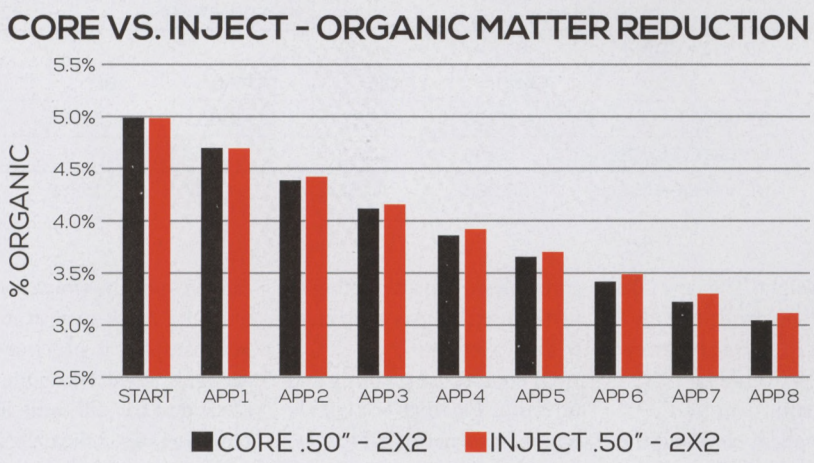
If you are in a situation where you need to reduce your organic matter percentage on sand-based greens, what is a good program to implement? Conventional wisdom tells you to core aerate, remove the plugs, topdress heavily with sand and brush it in to fill the holes. Intuitively, extraction and replacement is more effective then sand injection alone using either high pressure water injection or solid tine and backfilling with sand. But how significant is the difference? In fact, there are people out there that say you cannot effectively manage organic matter without extracting a portion of the root zone (Moeller, A., Lowe, T. 2016). The purpose of the article is to examine the math

behind both extraction and replacement or sand injection alone. Understanding the effect each method has from a direct mathematical standpoint will help you create a suitable plan of action that has the least cost and disruption to play.

Suppose you have greens that are testing out to be 4.57% organic matter (OM) within the top 3 inches of your greens. Your goal may be to reduce it close to 3.25% as quickly as possible and maintain it somewhere at or below that threshold in the future. You set the time period that you would like to achieve this at 1.5 growing seasons. During that time period you estimate that you may gain another .43% OM so you set the start point for reduction at 5.00%. How many times do you need to core aerate and with what size tines? Of course, the larger the tines diameter and the tighter the spacing, the fewer the number of applications will be needed. In the case of injection, the same logic applies where the tighter the spacing, the fewer applications you will need to perform the task. This logic is related to the "area of disruption" often spoke about and where the USGA and others have recommended (Hartwiger, C., O'Brien, P. 2001, et al.) that the total of any given growing season fall under the guidelines of 10-20% surface disruption for organic matter control.

For this exercise we will assume that all core holes can be successfully filled with topdressing. Excess sand topdressing left in the turf canopy is assumed zero and subsequently not factored in. Although this does not occur in practice, we adopted this simplification to directly compare core extraction and filling with sand to injection.

Figure 1. Bar chart showing 8 consecutive applications:



An additional component of these calculations is determining the bulk density of the soil mix. The equation used for this calculation comes from the Estimated Bulk Density Calculation from USDA-NRCS (undated) which employs data of the component sand (1.56 g cm-3) and organic matter (0.22 g cm-3) bulk density values. This equation, BD = 100/(% OM/OM BD)+((100-%OM)/ SAND BD)) computes to an existing BD of 1.196 g cm-3 after the assumed growth is factored in.

Following core extraction and refilling with sand, the average organic matter content across the green is calculated by using a soil mixing equation adapted from Taylor and Blake (1984). In this equation for core extraction and refilling the mass of organic matter remaining after extraction is divided by the mass of added sand plus the mass of the remaining root zone. Thus, extraction of organic matter and presuming that the added sand contains essentially zero organic matter serves to reduce the average organic matter within the green itself.

For sand injection, the mixing equation is a bit different because no organic matter is removed by coring, so here the mass of the existing organic matter prior to application is divided by the mass of the added sand plus the mass of the existing root zone. Presuming the added sand also contains essentially zero organic matter, injection by itself serves to reduce the average organic matter within the green, in this case by dilution. To reset the total soil weight back to the 0-3-inch zone we then use the new bulk density multiplied by the total volume of the 0-3-inch zone.

The present situation tracks the organic matter changes within the surface 3 inches of a green and 2 by 2 inch spacing on both the coring tines or the sand injector. The calculations are also for 0.5 in diameter tines or equivalently 0.5-inch diameter injection holes. The calculation procedure is, however, adaptable for different depths, spacing and hole diameters.

The results for these calculations following eight consecutive applications of either core extraction and refilling with sand or sand injection demonstrate an essentially equivalent degree of organic matter reduction within the green where core reduced the OM to 3.04% and injection to 3.11% **(Fig. 1)**.

Using conditional probability when coring and refilling allows for a "shortcut" to arrive at the net change in soil weight and percent OM when a total number of applications are entered. Conditional probability factors in the amount of new amendment extracted from the previously filled core holes. In other words, the percent of hitting virgin green space diminishes each time. The equation is 1-((1-area of disruption)X(1-area of disruption) to the power of (# of applications -1) or 1-((1-4.91)X(1-4.91)-(8-1)=33.15%. The product of 33.15% is then multiplied by the original OM weight of the soil profile to arrive at the weight extracted. It will be replaced with sand that is 7.091 times heavier then OM (SAND BD 1.56/OM BD.22). This new sand weight is added to the original sand weight and the new OM weight to arrive at

Table 1

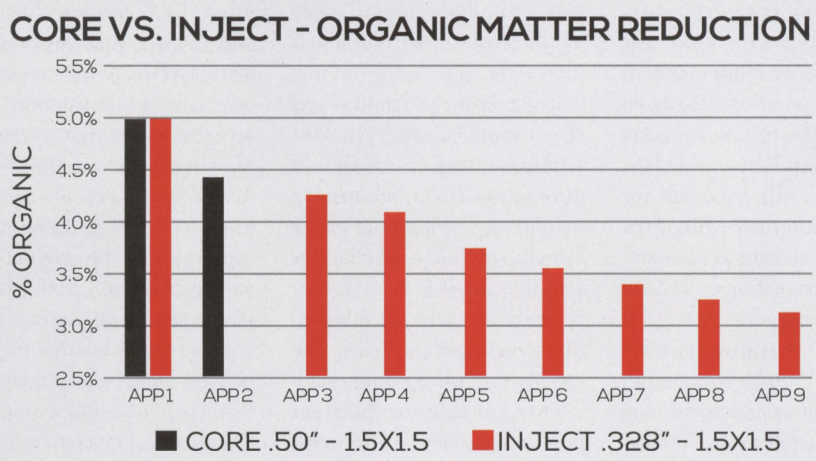
			CONDITIONAL PROBABILITY:			
			% OF GREEN HIT		33.15%	
APPLICATION #	8					
	SAND	OM	TOTAL	BD	SAND	OM
START	17730	933.2	18663	1.1958	95%	5%
WEIGHT CHANGE	2193	(309.31)				
NEW WEIGHTS	19,923	624	20547	1.3165	96.96%	3.04%

total soil weight. The new OM weight is then divided by total soil weight to arrive at the new percent OM **(Table 1)**

Sand injection will, of course, result in elevating the green over time. Coring and then filling the holes will add to elevation also but not near as much. It does this because it would be impossible to get 100% of the sand brushed into the aeration holes. About 20-30% more sand topdressing needs to be applied in addition to what the math works out for the aeration holes alone. In general, the greater the area of disruption, the higher the percentage will make it to the holes. Careful consideration has to be given to not oversaturate the surface area between the core holes when attempting to fill them as this may contribute to sand layering.

Of course, using coring and injection together is a viable option. A scenario that may be sensible when on a short timeline to reduce organic matter percentage dramatically is to start off with a very aggressive core aeration and backfilling. This way you get the benefits of extraction without the harvesting of newly amended sections of the green. Coring after multiple injections is just like coring after coring and backfilling. Its effectiveness diminishes because of the extraction of new material already in place. Using .50-inch tines at 1.5 x 1.5 inch spacing is a lot of work but gets you down to 4.45% organic quickly, which is close enough to pick away at it with less disruptive to play injection methods. It will take quite a bit of sand to backfill these holes, but if you can endure the pain, it is a great jump start. The total tons needed to fill JUST the holes for 100,000 square feet will be 106. You will need to order approximately 20-30% more to account for sand left in the turf canopy and waste in general. Following up with multiple injections at 1.5 x 1.5 inch spacing with an average hole size of .328 will slowly get you to your target zone. After eight injections, the OM has dropped to 3.10%. Each injection will use 45.72 tons of sand based on 100,000 square feet **(Fig. 2)**.

Figure 2. Depicts a very aggressive core aeration followed by 8 injection applications:



Once you have gotten the percent organic matter down to where you want it, the next goal is to maintain that percentage uniformly in the upcoming years. You have already done the hard part. It should not be too difficult to manage going forward. Percent organic matter build up over a given amount of time could span a broad range. It is dependent on the type of turf you are maintaining, fertility inputs, climate, etc. Regular testing will help to determine if you are on target with your maintenance regime.

There has been quite a lot of discussion on the amount of sand required to be applied during any growing season to prevent organic matter build up. Again, there are many variables that could influence this. Research and surveys have put the range as low as 18 or as high as 50 cubic feet per 1,000 square feet (O'Brien, P., Hartwiger, C. 2003., Gaussoin, R.). For the most part, it does not matter how you get it there, but common sense would have you using the several known methods in combination while making sure it stays in the target zone. At this point the target zone could be 0 to 2.5" in depth. In reality, once organic matter is under control, the best thing you can do is make sure you have a reasonable topdressing program that uses light infrequent applications to thoroughly cover 100% of

Table 2

MAINTAIN ORGAINIC %

CORE & REPLACE

	WIDTH	LENGTH
SPACING	3	2
TARGET DEPTH	2.5	

INJECTION:

	WIDTH	LENGTH
SPACING	1.5	2
TARGET DEPTH	2.5	

AREA OF DISRUPTION

CORE		3.27%
INJECTION		2.82%
		6.09%

ORGANIC % REDUCTION

CORE		-0.13%
INJECTION		-0.12%
TOPDRESSING		-0.15%
		-40.00%
NEW OM%		3.00%

OM% START	3.10%
1 YR GROWTH	0.30%
TOTAL TARGET	3.40%
TINE SIZE:	0.500
HOLE SIZE:	0.328

SAND CUBIC FT/1,000

CORE	6.82 *
INJECTION	5.87
TOPDRESS	12.00
	24.69

TOPDRESS

^APPS	CUPIC'/M	TOTAL
16	0.75	12
^3 APP EQUIVELENT WHEN FILLING CORE HOLES WHEN LEFT IN CANOPY. 13 STAND ALONE APPS.		
TOTAL TONS SAND BASED ON:		
100,000	SQ.FEET	120.2
*AMOUNT NEEDED TO FILL ONLY HOLES		

the surface area. This method covers the surface area organic build up. To make sure organic build up stays diluted underneath the canopy and in the most active root zone area, some form of aeration and incorporation method should be used. It could be a combination of several methods such as coring and replacing, injection, deep verticutting and replacing, or solid tine and backfilling. Each has its own attributes. The positive thing is that since you are starting at a good point, the total area of disruption does not have to be as dramatic as when your goal was to drop organic percentage. Consider leaning toward methods that have tighter spacing but with smaller holes or verticut lines to ensure a more homogeneous coverage. Keep in mind that core holes smaller then ⅜" are very difficult to backfill with sand. Our soil mixing tools can be useful in making decisions on maintenance.

Table 2. Demonstrates a maintenance regime after the organic matter percentage has been dropped to a healthy level. It is based on the assumption that there is an average of a .30% increase in organic matter percent per year for the entire 2.5-inch zone. It is acknowledged that the OM growth is greatest near the surface and progressively less with depth. This assumption can and will fluctuate in different climatic regions and will change with differing maintenance inputs and turf varieties.

If you are able to replace all extracted material properly, coring and replacement will slightly exceed straight injection from a mathematical standpoint in reducing organic matter percentage by weight. Relying on straight coring alone would be very labor intensive and disrupt play quite a bit during your short corrective time period. Because of the injection method's low impact on playability, you may want to seriously consider incorporating this method into your program. Could you even try to use injection all by itself? The math should help you decide.

Table 3. Shows the impact of tine size and spacing or comparable sizing for injection on sand material needed and impact at certain levels on OM reduction. **GCI**

Table 3

AERATION SURFACE AREA, VOLUME AND ORGANIC MATTER IMPACT

TOTAL SQ FEET: 100,000

SPACING	HOLES PER SQ. FT.	SINGLE TINE SQ. INCHES	% SURFACE AREA IMPACT	DEPTH	VOLUME EXTRACTED OR DISRUPTED CU. INCHES/F T	POUNDS DRY SAND PER 1,000 TO FILL HOLES ONLY OR INJECTED	% OMREDUCTION IN HOLE DEPTH PROFILE*	TONS OF DRY SAND TO PERFECTLY FILL EACH HOLE FOR ABOVE SQ T	OM REDUCTION AFTER 4 XS IN SHORT TIME PERIOD*
CORE AERATION					**1/4" TINES**				
1 X 1	1.44	0.0491	4.91%	3	21.21	1,195	6.31%	59.8	22.54%
1 X 2	72	0.0491	2.45%	3	10.6	598	3.18%	29.9	12.00%
2 X 2	36	0.0491	1.23%	3	5.3	299	1.59%	14.9	6.20%
3 X 2	24	0.0491	0.82%	3	3.53	199	1.06%	10.0	
3 X 3	16	0.0491	0.55%	3	2.36	133	0.71%	6.6	
					3/8" TINES				
1 X 1	144	0.1104	11.04%	3	47.71	2689	13.94%	134.5	
1 X 2	72	0.1104	5.52%	3	23.86	1345	7.08%	67.2	
2 X 2	36	0.1104	2.76%	3	11.93	672	3.57%	33.6	13.39%
3 X 2	24	0.1104	1.84%	3	7.95	448	2.39%	22.4	9.14%
3 X 3	16	0.1104	1.23%	3	5.30	299	1.59%	14.9	6.20%
					1/2" TINES				
2 X 2	36	0.1963	4.91%	3	21.21	1195	6.31%	59.8	22.54%
3 X 2	24	0.1963	3.27%	3	14.14	797	4.23%	39.8	15.66%
3 X 3	16	0.1963	2.18%	3	9.42	531	2.83%	26.6	10.74%
3 X 4	12	0.1963	1.64%	3	7.07	398	2.12%	19.9	
					5/8" TINES				
2 X 2	36	0.3068	7.67%	3	33.13	1867	9.78%	93.4	24.23%
3 X 2	24	0.3068	5.11%	3	22.09	1245	6.57%	62.2	17.17%
3 X 3	16	0.3068	3.41%	3	14.73	830	4.40%	41.5	15.38%
3 X 4	12	0.3068	2.56%	3	11.04	622	3.31%	31.1	13.29%
DRYJECT INJECTION					**TOPCHANGER HD MANIFOLD 0.328" AVERAGE HOLE DIAMERTER**				
1.5 X 1	96	0.0845	5.63%	3	24.33	1371	7.22%	68.6	10.13%
1.5 X 1.5	64	0.0845	3.76%	3	16.22	914	4.84%	45.7	6.92%
1.5 X 1.7	56	0.0845	3.31%	3	14.31	807	4.28%	40.3	
1.5 X 2	48	0.0845	2.82%	3	12.17	686	3.64%	34.3	
					ORIGINAL MANIFOLD 0.40" AVERAGE HOLE DIAMETER				
3 X 2	24	0.1257	2.09%	3	9.05	510	2.71%	25.5	
3 X 3	16	0.1257	1.40%	3	6.03	340	1.81%	17.0	
3 X 4	12	0.1257	1.05%	3	4.52	255	1.36%	12.7	
					MAXIMUS MANIFOLD 0.70" AVERAGE HOLE DIAMETER				
6 X 5	4.8	0.3848	1.28%	9.5	17.55	989	N/A	49.5	
6 X 6	4	0.3848	1.07%	9.5	14.62	824	N/A	41.2	
DRILL & FILL					**3/4" TINES**				
7.5 X 7.5	2.56	0.4418	0.79	10	11.31	637	N/A	31.9	
					1.0" TINES				
7.5 X 7.5	2.56	0.7854	1.4	10	20.11	1133	N/A	56.7	
GRADEN					**5/64" BLADES**				
1 INCH	N/A	N/A	7.81%	1	11.25	634	3.37%	31.7	
					9/64" BLADES				
1 INCH	N/A	N/A	14.06%	1	20.25	1,141	6.03%	57.1	

*GRADEN % ORGANIC MATTER REDUCTION BASED ON DEPTH PROFILE OF: 3 INCHES

Q&A WITH THE **EXPERT**

Steve Fasano on
CONSERVATION

Chris Gray Sr on
FERTILIZER

Jason Fausey & Rick Fletcher on
FUNGICIDES

Lane Tredway on
NEMATODES

Q&A WITH AQUATROLS

Steve Fasano Global Marketing Communications Manager

1. At the 2018 Golf Industry Show, the major theme in the Aquatrols booth centered on "Conservation." Why was that a focus this year?

Conservation has always been central to everything we do at Aquatrols. This is a 63-year-old company with a heritage based entirely on making better use of resources. A key priority for our CEO Matt Foster is that we honor that heritage as we continue to move forward.

We introduced a new motto last year: "Respect the Drop."

Internally it's a reminder that each of our employees represents more than 60 years of Aquatrols' history, something much larger than ourselves. Each one of us plays a critical role in carrying on that heritage and reaching our shared goals as a company.

Externally, it's a reminder that water is vital to every aspect of life. If we're going to continue to grow as a global population and sustain our way of life, we need to be responsible and respectful consumers of water and other natural resources. That's what Aquatrols has always been about.

2. While you are honoring that heritage, there have been some changes at Aquatrols over the past few years. What kind of changes might we see in the coming year?

Our company vision is clear: to pioneer solutions that advance conservation and health for the agriculture, horticulture, and turf industries. To that end, we are building an organization that can make the largest relative impact possible. This doesn't mean that every individual project has to achieve some extraordinary contribution towards conservation in its own right, but a significant amount of our resources will go directly towards the work of stewardship and conservation in our industry.

We'll also be working to introduce products that advance true efficiency in terms of utilizing renewable natural resources. We are working to establish a "Conservation Based Solutions Portfolio" that extends beyond the scope of water management. Our product pipeline is focused on new products in three distinct areas: water management, nutrition conservation, and AI distribution and retention.

3. Are any of those products available now?

We launched two new products – Zipline powered by AquaVita™ Technology and Aqueduct Flex – at GIS 2018. Zipline is something entirely new for Aquatrols. It is truly a "nutrition conservation" product as it helps to unlock existing bound nutrients in the soil, making them more available to the plant. We are very excited about the AquaVita Technology component, a proprietary technology that we'll be doing more with in the future.

4. What else can we expect to see from Aquatrols in 2018?

We pride ourselves on being a resource for our customers and our ability to inspire the industry as a whole, especially when it comes to conservation. It takes bold steps from bold individuals to accomplish that. As the 2018 season goes on, we will be rolling out new videos and podcasts focused on the golf industry – from addressing struggles, to celebrating successes, and everything in between. We're going to be including superintendents and thought leaders in the discussions. We want to make it as interactive as possible. We are going big when it comes to having serious conversations in our industry. Stay tuned.

5. In your view, what is the most important factor for superintendents when thinking about the future of our industry?

Optimism. Today the news cycle is absolutely exhausting. If it is not Washington D.C., it is violence, the climate or social upheaval. But largely we believe most people working in this industry today are happy and enjoy what they do and see a bright future. We need to get much louder about the positive things going on out there. This industry is full of brilliant people who are driving innovation and being proactive in their efforts to be environmental stewards. We need to share these important initiatives – with each other and with the general public to tell the true story of golf to the world. Our goal as a company is not only to continually innovate and improve, but also to inspire others. We might not be able to change the world, but we can change our corner of it.

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Aquatrols.com/Zipline

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Q&A WITH CHRIS GRAY

Golf Channel Manager, LebanonTurf

TRUE PERFORMANCE
TURFGRASS PROGRAM

The True Performance Turfgrass Program is LebanonTurf's new, unique putting green program specifically designed to deliver the proper amount of necessary nutrients and biostimulants to effectively manage stress and provide a high quality putting surface all season long. Based on independent university research, the True Performance Turfgrass Program features Country Club MD granular fertilizers and Emerald Isle foliar products.

1 What's the underlying philosophy behind the program?

A: Managing stress throughout an entire growing season in putting greens is one of the biggest issues that all Superintendents face. It requires a mix of both granular and foliar fertilizers, along with the stress-buffering properties of biostimulants, to successfully mitigate the effects of stress and maintain the required high quality standards of the putting surfaces at today's golf courses. By developing a scientifically backed program, proven to accomplish just that, we're bringing a new strategy to the industry for putting green management.

2 What universities performed the research that the program is based on?

A: We enlisted Purdue University and the University of Arkansas to conduct identical, simultaneous research studies to evaluate multiple programs containing nutrients and biostimulants to determine which ones provided the best the overall turf quality under stressful conditions. Ultimately, there was one program that performed in the best in both studies, which became the basis for the True Performance Turfgrass Program.

3 Since all golf courses aren't the same, how can one agronomic program fit them all?

A: That's absolutely correct; all golf courses aren't the same. That's why we have flexibility built in to the program. Because the True Performance Turfgrass Program utilizes both Country Club MD granular and Emerald Isle foliar products, Superintendents have the ability to customize all the granular components of the program for their specific golf course. The foliar applications don't have this flexibility. Because the Emerald Isle foliar products contain the largest amount of biostimulants but are applied in smaller amounts more often, these specific products and number of applications are at the heart of the stress management benefits that the program delivers, as determined by the university research.

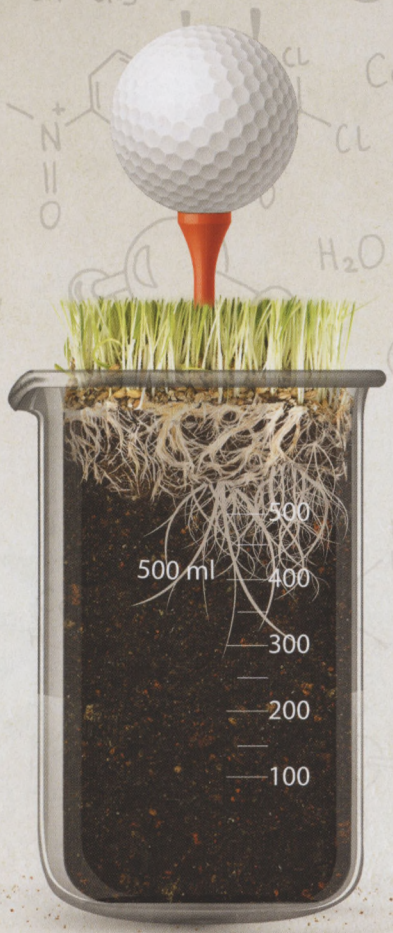
4 Is the True Performance Turfgrass Program only going to be for bentgrass greens?

A: For this year, yes. But due to the incredibly positive response from Superintendents we've received since its introduction, we're already planning to expand the program. We're in the final stages of lining up new university research to be conducted on Ultradwarf Bermudagrass using the same type of format as the previous research studies. We will have an entirely new True Performance Turfgrass Program available in 2019 for golf course managing Ultradwarf Bermudagrass. Additionally we're already looking into developing programs for both tees and fairways in the future.

5 How is the 10% rebate provided to the golf courses who participate in the program?

A: There are two ways to for the Superintendent to choose to receive the 10% rebate on the total purchase price of the True Performance Turfgrass Program when the claim is submitted to us. They can select to receive a check directly from us that will be mailed directly to them at their golf course. Or they can select the 10% rebate as a credit with the distributor that the products were originally purchased from. This credit can used to purchase anything from that distributor, not just LebanonTurf products.

TRUE PERFORMANCE
TURFGRASS PROGRAM



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AND DONE OUR HOMEWORK

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Q&A WITH JASON FAUSEY &

Director Technical Services, Turf & Ornamental, Nufarm Americas

RICK FLETCHER

Technical Services Manager, Nufarm Americas

1 How can this product help me manage disease resistance on my course?

A: Because of Traction's unique formulation containing two different mode of action groups and two different plant location strategies, Traction is very effective for use in fungicide resistance management programs. Regular use in a rotational program with other modes of action or as a tank-mix partner will prevent or delay the development of disease resistant populations at your location.

2 How is Traction going to offer a benefit over Secure with the same active ingredient?

A: Traction offers several benefits over fluazinam alone. Fluazinam is a broad-spectrum highly active multiple site contact fungicide, yet the addition of the DMI fungicide tebuconazole brings another broad-spectrum systemic active ingredient with a second mode of action for resistance management.

3 Can I be comfortable applying Traction in the summer since the tebuconazole is a DMI?

A: Yes. In our university evaluations, Traction has displayed excellent results and turf tolerance. We feel confident when used in a rotation program that Traction can be applied in all seasons.

4 Why does Traction have only one label rate?

A: The single use rate for Traction is based upon the EPA mandated fluazinam rate per acre. The application rate for Traction maximizes the amount of fluazinam allowed per application and provides a proven rate of tebuconazole.

5 Where is the best place to fit Traction into my rotational spray schedule?

A: Traction has the flexibility and spectrum of activity to be placed throughout the spray season. It makes a great product to use and ensure a broad range of foliar diseases are controlled prior to utilizing a more targeted fungicide with a different mode of action such as Pinpoint.

"TRACTION PERFORMS AGAINST MAJOR TURF CHALLENGES, CONTROLLING 19 SUMMER DISEASES AND ALGAL SCUM WHEN AND WHERE YOU NEED IT."

JASON FAUSEY
T&O Technical Services Director,
Nufarm Americas

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Traction™
FUNGICIDE

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Grow a better tomorrow.

Q&A WITH LANE TREDWAY

Technical Services Manager for Syngenta

1 How do nematodes cause turf damage?

A: Plant parasitic nematodes have needle-shaped mouthparts that allow them to draw nutrients from plant cells. Most nematodes feed on turf roots, reducing the depth and density of root growth. Nematodes rarely kill turf outright, but instead make it more prone to drought, heat, mechanical wear, nutrient deficiency and disease.

2 How are nematode problems diagnosed?

A: Nematode problems can be difficult to diagnose since symptoms are so variable. Areas that are constantly weak, lack root growth or are prone to other stresses may be infested with nematodes. These areas should be sampled to determine if nematodes are present. Visit www.GreenCastOnline.com/NematodeKnowledge for a video and downloadable PDF guide about collecting nematode samples, and a list of 30 labs to submit samples to.

Nematode assay results are usually expressed as a number per 100 cubic centimeters of soil, and compared to threshold values for each nematode species on each turf type. If populations are above the threshold, turf is likely to benefit from a nematicide application.

Assay results are often inconclusive if populations are borderline, or if multiple nematodes are present in moderate amounts. A more definitive way to diagnose a nematode problem is to apply a nematicide to see if it improves turf health and quality.

3 When is the best time to apply a nematicide?

A: Nematodes have the greatest impact during periods of turf root growth. This is the key time to manage populations with a nematicide like Divanem®. Even though symptoms of nematode damage are most common in mid-summer, spring and fall are the best times to apply nematicides in most climates. We generally recommend three to four Divanem applications (12.2 fl. oz./A) on a 28-day interval in spring and early summer when root growth is occurring. These applications keep nematode populations under control, allowing turf to grow a deeper, denser root system in preparation for summer stress.

4 How do I tell if a nematicide is working?

A: Nematode counts are a valuable diagnostic tool, but aren't a good judge of nematicide performance. Nematode populations naturally ebb and flow with root growth and weather conditions, so comparing assay results before and after a nematicide application can be misleading. You must sample untreated areas at the same time to determine how the background population changed, and how the nematicide influenced it.

Left: Soil surfactant only
Right: Divanem: 2 apps 12.2 fl. oz./A + soil surfactant

The goal of a nematicide program is to increase root growth and create turf that is more stress-tolerant and resilient. Focus on turf health and quality as primary indicators of nematicide performance, and leave an untreated area for comparison.

5 Why do you recommend tank-mixing fungicides with nematicides?

A: Diseases are an additional stress that contribute to the decline of nematode-infested turf. Wounds created by nematode feeding are susceptible to infection by root diseases like take-all, summer patch and Pythium. Compared to applications of Divanem alone, tank-mixing Divanem with a fungicide like Heritage® Action™ or Velista® consistently provides better turf quality and root growth.

Get tougher turf up here.

By controlling nematodes down here.

Divanem® nematicide delivers excellent turf quality through proven, broad-spectrum control including sting, lance, and root-knot nematodes. The innovative formulation moves quickly into the soil where nematodes are most active and provides drought tolerance and quicker recovery from stress. Get stronger, healthier turf from the ground up.

Visit GreenCastOnline.com/Divanem to view trial results.

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#NematodeKnowledge

Terry Buchen, CGCS, MG, is president of Golf Agronomy International. He's a 41-year, life member of the GCSAA. He can be reached at 757-561-7777 or terrybuchen@earthlink.net.

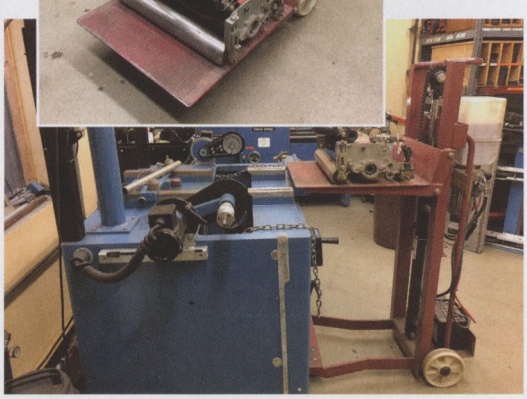
Travels with Terry

Globetrotting consulting agronomist Terry Buchen visits many golf courses annually with his digital camera in hand. He shares helpful ideas relating to maintenance equipment from the golf course superintendents he visits – as well as a few ideas of his own – with timely photos and captions that explore the changing world of golf course management.

CHERRY PICKER ATTACHMENT

This very effective implement can be attached to any front-end loader tractor with a forklift attachment. Tree trimming — or anywhere high-height access is required — can be performed easily with employee safety in mind. A recycled DJ platform from the clubhouse made from ½-inch thick plywood using approximately 60 feet of 2-inch by 8-inch support beams underneath the plywood for structural strength. The railings and further support were made from approximately 20 feet of 4-by-4 and 30 feet of 2-by-4, costing about $200 for the lumber. The remaining material list: four eye hooks ($20); 12 carriage bolts ($24); two heavy-duty ratchet straps ($25); and a climbing harness ($100). Total cost approximately $369 with about 12 hours labor time. Brian Goleski, superintendent, and J.R. Wilson, equipment manager, of the Noyac Golf Club in Sag Harbor, Long Island, N.Y., built another great idea.

CUTTING UNIT LIFT FOR GRINDERS



Lifting heavy cutting units by hand up to the reel grinders is a thing of the past at the Noyac Golf Club in Sag Harbor, Long Island, N.Y. This platform lift has had a hydraulic motor powered by a 12-volt battery added for ease of operation. The material list includes:

- Strongway four wheeled platform lift, Northern Tool ($630)
- Nortrac dump trailer double-acting cylinder power unit with heavy-duty 12-volt DC Motor, Northern Tool ($469)
- Lion welded hydraulic cylinder 3,000 PSI 24-inch stroke model, Northern Tool ($200)
- NAPA gel battery ($100)
- NAPA trickle charger ($25)
- Two hydraulic hoses ($30, made in-house)

Total cost was approximately $1,454 and about four hours of labor. Brian Goleski, superintendent, and J.R. Wilson, equipment manager, makeup the very creative team at Noyac.

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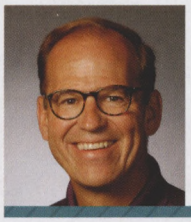
THE CONVERSATION



Pat Jones is editorial director and publisher of Golf Course Industry. He can be reached at pjones@gie.net or 216-393-0253.

"Uh...

Mr. Jones, can I ask you a question?"

Thus begins many of the conversations I have with young turf professionals when I'm out speaking to a chapter or attending a conference. It's one of the great joys of my life to talk with newbies about their careers and their dreams. But, sometimes I wish they'd ask different questions. Here's that conversation.

Me: "Of course. And please don't call me Mr. Jones. My name is Pat and I feel old enough without that crap."

Young Turf Pro: "Oh sorry...Mr. Pat. But I was just wondering what advice you'd give me about my career?"

Me: "You're never gonna get rich but if you're passionate about the lifestyle you'll probably be happy."

YTP: "Wait...what? What do you mean by lifestyle?"

Me: "Being an accountant is a career. Being a superintendent is a lifestyle. Pretty much every aspect of your world will revolve around your course and the culture of the profession. It's immersive."

YTP: "Okay, you also said I won't get rich but I have $90,000 in student loan debt from my 4-year turf degree. How am I going to pay that back?"

Me: "Lottery tickets? No, seriously, there are still good-paying jobs out there but you have to be realistic. There are 15,000 golf courses in the U.S. but probably only 5,000 or so that genuinely treat their superintendent like a professional and compensate them appropriately. You need to find a track towards a job at one of those facilities. Otherwise 15 years from now you'll be stuck at some mom-and-pop course making $47,000 a year with crappy benefits and barely functional equipment."

YTP: "So how do I get a good job'?"

Me: "Network the crap out of the people who have them now. Figure out who the top 10-15 supers are in your area, email them or call them and ask them good questions. Create a relationship. Go to as many local chapter meetings as you can. Remember, this is a who-you-know business."

YTP: "I've been doing some of that but haven't had any luck yet. What should I do?"

Me: "Well, remember that probably half of those 5,000 jobs are held by old farts like me and many of them are going to be retiring – voluntarily or involuntarily – over the next 5 years or so as the Baby Boomers age out. I know you don't want to hear this but be patient and keep networking."

YTP: "What else have you learned in your career that I should consider?"

Me: "Avoid drinking vodka straight out of the bottle at 7:30 a.m."

YTP: (stares at me goggle-eyed)

Me: "Sorry...I figured you knew I am a recovering alcoholic. I guess my point would be don't try to self-medicate your problems with drugs or booze. This can be a very stressful business because, ultimately, you can't control Mother Nature. I've found over the years that a lot of superintendents are OCD and can get really get wrapped up in worrying constantly. Try to find healthy outlets for anxiety now before you develop bad habits later."

YTP: "Anxiety?"

Me: "Yup...everyone feels it to some extent. And some people have it so bad it's crippling. They tend to "catastrophize" everything. Kind of like Chicken Little thinking the sky is falling. For a lot of folks like me, coping with that "death spiral" feeling and simply living in the present are incredibly important."

YTP: "My girlfriend helps to keep my head on straight. She's awesome."

Me: "If your serious about her, make sure to introduce her to some veteran turf wives so she can understand what the hell she's getting into. She needs to buy into this career as much or more than you do. Marriages suffer in this profession unless your spouse comes in with eyes wide open and a clear understanding that there are times your big green mistress will come first."

YTP: "Big green mistress. That's funny."

Me: "Yeah I get paid for coming up with crap like that."

YTP: "What else should I know?"

Me: "Don't pick a job, pick a boss. You could luck out and get hired at a Top 50 club and have to report to some miserable son of a bitch who has totally different priorities than you. That might be a GM, an owner or even a club leader. Make sure you don't get too excited about taking a job until you know how you're going to get along with the person who signs your checks."

YTP: "Thank you for all the great advice sir! Can I use you as a reference?"

Me: "Damned right...and don't call me sir. **GCI**

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