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EXCLUSIVE REPORT

STATE of the INDUSTRY

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and indicators point to —
a gradual increase
in golf's bottom line
for 2018 and
beyond.



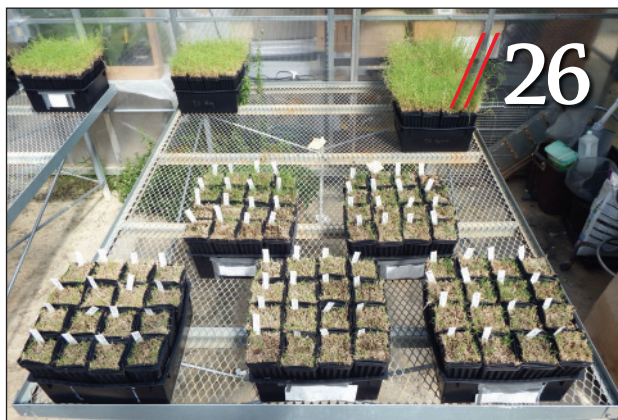
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“Watching the tournament from the West Coast with my feet up on a beach chair? I could get used to that.”

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

Best of 2017

It's hard to believe that 2017 has come and gone. With both of my kids in elementary school now (Evey is in fifth grade, Boyd is in kindergarten), I see that it's true what people say about time moving faster when you're watching your children grow up.

If the calendar doesn't betray me, I took more than 20 business trips this year. I somehow missed both the Masters and the PGA Championship this year (I'll remedy that in 2018), but I still hit a bunch of great events and met some fine people.

Here's a look back at five events that stand out to me from 2017...

5 ANA Inspiration at Mission Hills—This one was tinged with sadness but definitely was a memorable trip. The first major of the year is the LPGA's ANA Inspiration at Mission Hills, Rancho Mirage, Calif. Only days before the tournament, its host, Superintendent Dave Johnson, passed away. Johnson had been at the course for 28 years. There was

a sadness among the crew and the players, but it felt good to be there to recognize Dave and celebrate a man who was so good at his job for so long. Cheers to Big Dave.

4 The NGF Golf Business Symposium—A few years ago, we decided it was a good idea to make the National Golf Foundation's Golf Business Symposium a meeting we regularly attend. This year, the event was held at the World Golf Hall of Fame in St. Augustine, Fla. The tour of the World Golf Hall of Fame and rubbing elbows with the big boys in the business was nice, but this year we had an unexpected honor. During the meeting, the NGF recognized *Golfdom*, their “brother from the same fathers,” at the meeting—

both the NGF and *Golfdom* were founded by Herb and Joe Graffis in 1936 and 1927, respectively. Thanks for the shout-out, bro!

3 South Dakota trip—I crossed off my list another state that I had never been to when I made the trek to Sioux Falls, S.D., to speak at the SDGCSA conference. This event was two years in the making for me, and it turns out the South Dakota supers are about as affable as any folks you'll meet in the industry. But I'll admit I did this trip wrong... I missed the last day of the meeting (sounds like the party is legendary), and I didn't get any golf in. Guess I'll just have to go back...

2 PGA Championship dinner—I mentioned earlier

that I missed the PGA Championship at Quail Hollow, but I did take the crew out to dinner just a few days before the event. Keith Wood and his crew met me at a local Mexican restaurant—just my style—to take in a moment of calm before the storm. I had to fly out the next day, so I turned the coverage of the tournament over to the capable hands of Associate Editor Grant B. Gannon. Watching the tournament from the West Coast with my feet up on a beach chair? I could get used to that.

1 Palm Beach GCSA meeting—Talk about a good gig—the PBGCSA invited me to come down and MC their chapter meeting at the Rees Jones Breakers West course. So, after nine holes of golf, I had to put on a suit and say a few words. Besides the beautiful golf and weather, the next day some PBGCSA friends took me to Tiger Woods' restaurant, and then on a boat tour to check out the giant mansions of some of the PGA Tour's best, like Tiger's, Dustin Johnson's and Rickie Fowler's. It's just a different golf world in that area.

To those I left out—golf in Iowa, a trip to Utah, trips to Texas, New York and New Jersey, and others... you were all honorable mentions. And I plan on being back soon, anyway!

Email Jones at:
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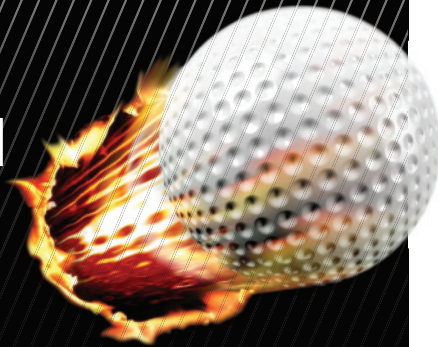
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Starter

NEWS, NOTES AND QUOTES



// WATCH AND LEARN

Fifty assistant superintendents recently traveled to Raleigh, N.C., for the 2017 Green Start Academy.



NO WAITING FOR GREEN START

12TH ANNUAL GREEN START ACADEMY BRINGS ASSISTANTS TOGETHER FOR EDUCATION AND NETWORKING.

BY SETH JONES // Editor-in-Chief

➔ Some 50 assistant superintendents from around the country descended on Raleigh, N.C., recently to learn from some of the best in the business, including Bob Farren, CGCS, Pinehurst Resort, Lukus Harvey of Atlanta Athletic Club and Michael Stevens of Billy Casper Golf, among others.

Co-hosted by John Deere and Bayer, attendees listened and learned, toured John Deere's Turf Care factory and Bayer's Development and Training Center and also networked and learned from their fellow assistants.

"After the first session from Lukus Harvey and Tyler Otero, it opened my eyes for my career and where to take it from here," said Brandon Razo, assistant superintendent at Cross Creek

GC in Decatur, Ind. "It's nice to meet people and see what they have to say and know that they deal with what you deal with."

Mike Bibler, assistant superintendent at Sylvania (Ohio) CC, thought the trip was important enough to his career that he went to North Carolina despite something big happening back home.

"I came with my wife being pregnant; she was gracious enough to let me come," Bibler told *Golfdom*. "I think it's a great opportunity. The biggest thing for me was the networking and getting to know people from all around the country."

"It's not only a career boost, but it's a personal boost," Razo said. "It sets you straight to see where you are in your career and your life."

// AWARD SEASON

ROSSI TO RECEIVE GCSAA PRESIDENT'S AWARD FOR ENVIRONMENTAL STEWARDSHIP

The board of directors of the Golf Course Superintendents Association of America (GCSAA) recently named Frank Rossi, Ph.D., associate professor at Cornell University in Ithaca, N.Y., the winner of its 2018 President's Award for Environmental Stewardship.

Rossi, 55, will officially receive the award Tuesday, Feb. 6, during the Opening Session of the 2018 Golf Industry Show in San Antonio (Feb. 3-8).

The GCSAA President's Award for Environmental Stewardship was established in 1991 to recognize "an exceptional environmental contribution to the game of golf; a contribution that further exemplifies the golf course superintendent's image as a steward of the land," according to the GCSAA.

// SUPER SALES

BRANDT HOLSTERS A MANGUM

Brandt, which includes the Brandt, Grigg and Brandt iHammer product lines, has named Ken Mangum, CGCS-Retired, former director of golf courses and grounds at Atlanta Athletic Club and host of the 2001 and 2011 PGA Championships, as its national sales manager for turf products.

In his new position, Mangum will oversee the company's turf and ornamental territory sales managers, engage with customers and work with the senior management team to set the strategic direction for the turf team, according to a press release. Mangum will report to John Guglielmi, Brandt Specialty Formulations national sales director.

Before joining Brandt, Mangum served as an independent golf course management and development consultant working with courses in the southeastern United States as well as Europe, Asia, South America and Australia.



Ken Mangum

//STEM ED

MVGCSA hosts First Green event

➔ The Miami Valley Golf Course Superintendents Association recently played host to 125 fifth graders at Beavercreek (Ohio) Golf Club to teach about environmental stewardship, the role of golf course superintendents and the game of golf during its maiden First Green STEM event.

The First Green was started in 1997 and is an environmental and STEM (science, technology, engineering and mathematics) education outreach program that uses golf courses as environmental learning labs.

“I sit on the board of the Miami Valley GCSA, and one of the things we wanted to do was have a First Green event in our area and give back to our community,” says Beavercreek GC Assistant Superintendent Zach Wike.

The students, from Trebein Elementary School, rotated between six stations. They learned about soil and environment sciences by sieving soils and studying the habitats provided for animals at golf courses. They measured the area of a tee box and became familiar with the tools and technology that superintendents use each day.



Students are shown the tools superintendents use day to day.

They learned about general golf course etiquette and took lessons in putting and chipping from local pros.

“The teacher that we worked with told us that it was great to be able to show the students that what we do in the classroom is used in real life,” says Wike. “She also said that they want to come back next year and make it an annual event.”

To learn more about the MVGCSA's First Green event, visit Golfdom.com/blog.



Trebein Elementary students find the area of a tee box.

//MOVIN' ON UP

MACGREGOR, JONES PROMOTED TO PUBLISHER, ASSOCIATE PUBLISHER

North Coast Media recently promoted Craig MacGregor to the role of publisher of *Golfdom*, and Seth Jones to the dual role of editor-in-chief/associate publisher of the magazine.

MacGregor first came to NCM in 2012 as the North American sales manager and then was promoted to group associate publisher of both *Golfdom* and *Landscape Management*. His experience in sales and marketing along with his continued success as group associate publisher earned him the role of *Golfdom* publisher.

Jones was named editor-in-chief of *Golfdom* in 2010, following 12 years at the Golf Course Superintendents Association of America (GCSAA) as an editor on the association's publication *Golf Course Management (GCM)* magazine.

Bill Roddy remains Group Publisher of NCM's green group, which includes *Golfdom*, *Landscape Management* and *Athletic Turf News*.

“Under Bill's leadership, and with Craig and Seth in these well deserved new roles, we expect to see continued success for *Golfdom*,” said Kevin Stoltman, President and CEO of North Coast Media.



CONGRATS TO THE NEWLYWEDS: Wedding bells are again ringing here at *Golfdom*. Congratulations to editorial advisory board member Andrew Wilson, director of operations at Bethpage State Park, and his lovely bride, Delphine Tseng of Landseer Communications and Consulting, on their recent nuptials.

PHOTOS COURTESY: ZACH WIKE (BEAVERCREEK) / PHOTO BY: SETH JONES (NEWLYWEDS)



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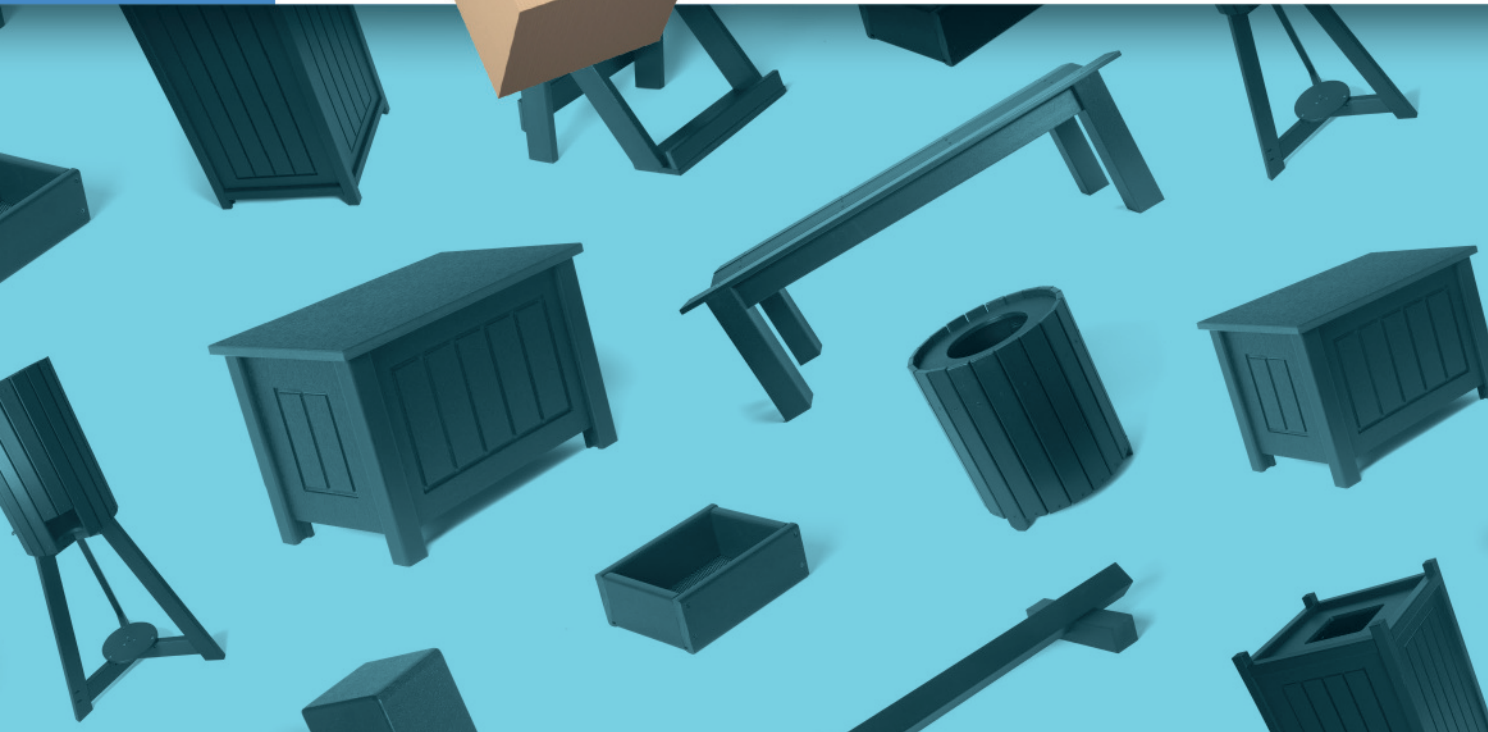
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“With less available land, more stringent regulatory mandates, more environmental issues, the cost and availability of water... what is the sweet spot for the number of golf courses in a particular market?”

MARK WOODWARD, *Contributing Editor*

Are we there yet?

As we near the close of another calendar year, we always find ourselves reflecting on our personal lives as well as our professional lives. In my case, I also look hard at golf, the industry from which we make a living.

It gets harder every year for the golf industry, and I suspect it will continue to be a challenge to keep the industry strong. Our respective professional associations spend a large percentage of their resources, money and staff time to figure out how to keep the industry sustainable and to represent us in front of the public, golfers, regulatory agencies and lawmakers.

It's been almost 10 years since the golf industry last had to push the reset button. Since the economic downturn at the end of 2008, several hundred golf courses have closed, compared with only a couple handfuls of new course openings.

Our industry has seen many changes in the past several years, and frankly, some of them were neces-

sary to keep the industry strong. During the heyday of golf course construction, too many courses were built around the country in too many markets. I hear every day about golf courses that struggle to be sustainable. Golf courses in all sectors of the industry have closed, including municipal, daily fee, resort, semi-private and private.

I'm currently working with a client that is considering closing one or more of its existing golf courses. This client is analyzing financial ramifications, political realities, whether closing a course or two can benefit their other courses by redistributing rounds and revenues more efficiently, and if it can help make the remaining courses stronger and more sustain-

able in the long term. In the case of this client, there are more than 40 golf courses in a relatively small market.

My question: Our industry has seen a relatively large net decrease in the number of golf courses compared with just a few years ago, but where does this trend end? With less available land, more stringent regulatory mandates, more environmental issues, the cost and availability of water in some markets and the ever-increasing challenge of finding and maintaining staff, what is the sweet spot for the number of golf courses in a particular market? I know this question is impossible to answer, but if we are honest with ourselves we must admit that more golf courses are closing in the United States — in all markets — than there

are new courses opening.

To be clear, I'm not wishing for more golf courses to close their doors. But I'm a realist. I know that many golf courses around the country are financially strong, viable operations and will continue to operate for years. But I also know there is still a large number of courses that continue to struggle.

I know this because I constantly get calls from owners of all types of golf courses who need help to operate their venues more efficiently and improve course conditioning to improve their financial situation and keep competitive in their markets. And these calls are not isolated to a specific location in the country. They are everywhere. Many owners even are considering repurposing their properties to get more return on their investment.

Because of the economy, the reset button probably needed to be pushed. In fact, let me alter that a bit. It *definitely* needed to be pushed. I'm concerned that there still is a significant number of golf courses that are a season or two away from closing. I'm not sure if this a good thing or a bad thing for our industry.

So, the question remains: Are we there — at that sweet spot — yet?

Sadly, I don't think so.

Mark Woodward is director of agronomy at Whisper Rock Golf Club in Scottsdale, Ariz., and a contributing editor for *Golfdom*. He can be reached at mwoodward@whisperrockgolf.com.

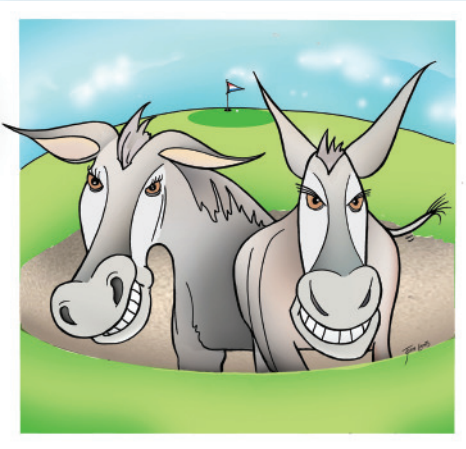
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US Patent No. 8,389,624 B2 Issued March 5, 2013, Additional Patents Pending

MADE IN USA



Golfdom Gallery



1 Turf's most interesting man At the 2017 Green Start Academy, *Golfdom's* Seth Jones (left) and Pat Finlen, CGCS, (right) general manager, Olympic Club in San Francisco, were happy to see Bob Farren, CGCS (center) Pinehurst (N.C.) Resort, fully commit to his "Turf's Most Interesting Man" nickname with the new beard.



2 The future is bright These GSA attendees were happy to catch some rays at the Bayer research facility in Clayton, N.C.

3 Host superintendents Green Start Academy attendees played a 9-hole golf challenge at Bayer's Development and Training Center in Clayton. Gary F. Ryan (left), R&D specialist, and Bob Lippincott, site superintendent, manage the property.



4 This Bud's for you Seth Smith (left), assistant, Royal Oaks CC, Dallas, and Luke McGhee, assistant, Westmoor CC, Brookfield, Wis., enjoy a cold one after golf.

5 Broken glass everywhere Evan Embrey (left), assistant at The Woodlands Club, Falmouth, Maine, and Michael Stevens, regional agronomist, Billy Casper Golf, St. Augustine, Fla., celebrate Stevens breaking a pane of glass "The Big Break" style, in just one shot at the 9-hole challenge.



6 Similar styles Lukus Harvey (left), director of agronomy, Atlanta Athletic Club, and Tyler Otero, superintendent at North Jersey CC, Wayne, N.J., spoke on "how to be ready for the job you want, and keep it." They also could have spoken on, "how to take a great *Golfdom* Gallery photo."

7 Down in a hole Besides networking, budgeting and teamwork, this Green Start Academy attendee also learned the depth of a footgolf hole, the hard way. But at least he didn't spill his beer.



PHOTOS BY: SETH JONES (2-7)



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EXCLUSIVE REPORT

STATE of the INDUSTRY

Industry pundits predict — and indicators point to — a gradual increase in golf's bottom line for 2018 and beyond.

Reporting by Seth Jones, Grant B. Gannon and Chris Lewis

In September and November of this year, we surveyed *Golfdom* readers, asking for their opinions on the state of the golf industry. More than 700 readers gave us their feedback on topics such as budgets, chemical usage and President Trump.

Thanks to those who contributed to this report, including the 753 survey takers. The winner of the Yeti cooler is Rob Lindsay, Coldwater Golf Links, Ames, Iowa, and thanks to the Rocky Mountain GCSA for submitting the most surveys.



SUPERINTENDENTS, EXECUTIVES ENTHUSIASTIC FOR '18

Golf faces many challenges, but core golfers still are passionate about the game.

Attendees of the 2017 Carolinas GCSA Conference and Show will just have to accept Executive Director Tim Kreger's apologies if it took a little longer to find a place to sit down and have lunch this year. Business is business.



Tim Kreger

Kreger ran out of Myrtle Beach Convention Center exhibit floor space to sell to industry vendors. So, he started carving out sections of the lunch area. The Carolinas lunchroom, which normally accommodates 1,100 people, lost 600 square feet to six new vendors hungry to offer their wares to attendees.

Kreger is happy to report that it was the biggest Carolinas Conference and Show since 2007.

"If we use what happened in November as a barometer of how the industry looks here, it's a very good sign," he says. "There were a whole bunch of companies want-

ing to be seen at the show. There is money circulating in the industry right now. The people who thrive off of supplemental income are doing well — there's a lot of renovation work being done to bunkers, greens and tees."

In Lawrence, Kan., GCSAA CEO Rhett Evans was equally enthusiastic. The 2018 Golf Industry Show, scheduled to take place in San Antonio Feb. 3-8, has seen a 5-percent increase in booth sales from this time last year.

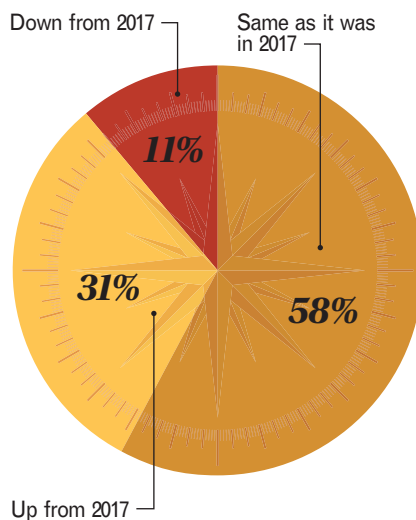
"Booth sales and housing are both ahead of where it was last year, so we're hopeful that we will experience a big-



Rhett Evans

ger show than we did in 2017," Evans says, while joking that, "I've also had a group of local superintendents guarantee me that the weather will be better (than what attendees experienced in San Antonio in 2015)."

HOW DOES YOUR MAINTENANCE BUDGET LOOK FOR 2018?



Evans also reports that GCSAA membership is increasing, largely thanks to the growing equipment manager, assistant superintendent and student member categories. The association also is looking south of the border, to Mexico, to increase membership.

"We're seeing the fruits of our labor," Evans says. "We're in a good place, and I feel strongly that 2018 will be a better year for us than 2017."

Rounds, revenue and profit

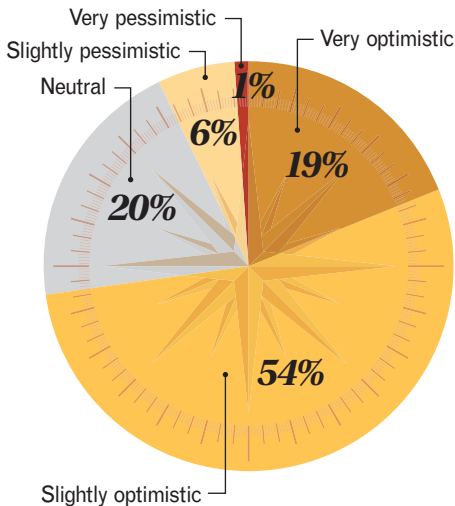
Beyond association executives, high-level golf executives and boots-on-the-ground superintendents also agree that 2018 looks to be a good year for the industry. *Golfdom's* readers were overwhelmingly positive:

Continued on page 18

“THERE WERE A WHOLE BUNCH OF COMPANIES WANTING TO BE SEEN AT THE SHOW. THERE IS MONEY CIRCULATING IN THE INDUSTRY RIGHT NOW. THE PEOPLE WHO THRIVE OFF OF SUPPLEMENTAL INCOME ARE DOING WELL — THERE’S A LOT OF RENOVATION WORK BEING DONE TO BUNKERS, GREENS AND TEES.”

—Tim Kreger

HOW WOULD YOU DESCRIBE YOUR EXPECTATIONS FOR THE GOLF ECONOMY IN 2018?



Continued from page 17

Nearly 75 percent of readers surveyed said they were either “very optimistic” or “slightly optimistic,” while only 7 percent were in any way pessimistic (see chart.)

David H. Robinson, CGCS, senior director, golf grounds, Marriott Golf North America, says that while he wouldn’t go so far as saying things are completely back to normal, he believes the business of golf is trending up.

“I’m very optimistic for 2018; I think we’re seeing some good indicators that things are... certainly improving. There are new courses opening in some areas. There’s the housing developments that are popping up with golf again,” Robinson told *Golfdom*. “As far as Marriott, we’re staying strong. If you look at our year-over-year results for the last number of years, we’ve shown some good steady growth pretty much in our three main financial factors — rounds, revenue and profit.”

Based in Orlando, Robinson was quick to call out the devastating hurricanes that hurt golf across multiple states, including



David H. Robinson

his home state of Florida.

“(Hurricane) Irma really hit us hard at our Florida properties. Our property down in Naples, both courses were closed for an extended period of time,” Robinson says. “That’s going to be a pretty big hit — and it was wet in Florida. Overall, we’re going to finish the year pretty strong. We may see a slight decline in revenue and profit because of (the weather), but I think rounds are going to stay pretty strong.”

Jerramy Hainline, vice president of integrated product sales at GolfNow, oversees a sales force of 100 people working daily with golf courses. The company has evolved from a tee-time company to a service business, offering programs such as Ride, a group-buying program through Comcast that offers superintendents everything from chemicals to iron.

Hainline also is bullish on 2018, based on what he’s seeing currently among his sales team, as well as what he sees on TV and at the various golf facilities he visits.

“I’m excited. I’ve been around golf my entire life, so I’ve seen it go through many different cycles. From a macro level, the young stars energizing a different group of people is exciting. The prospect of Tiger returning is exciting,” he says. “People are interested in golf. Look no further than the alternative entry points, the non-conventional green-grass opportunities that are out there for people to experience golf, à la Topgolf. You’ll see that the people are there.”



Jerramy Hainline

Hainline can’t help but wonder, though, is there a way to get these potential new customers from the Topgolf facility to the country club?

“Where I get a little concerned is for traditional golf courses and their ability to adapt to what the consumer and the golfer are looking for,” Hainline says. “If they want to experience golf in a different way, what is being done by the golf course

to give the people what they are looking for? As providers of an experience, this is something they need to consider.”

Slow yet steady

While golf isn’t as popular now as it was 20 years ago, Mike Fast, CGCS at Delphos Country Club in Delphos, Ohio, believes that core golfers are just as passionate about the game today as they were during the Tiger era.



Mike Fast

But he agrees with Hainline in that clubs need to be creative to attract new customers, as there simply are too many distractions (longer work hours, electronics, other sports, etc.) that can lead them away from the golf course.

To increase membership, Delphos CC hosts competitive member outings, including the Old Pal, which is a year-long, two-person, handicapped team competition. It also promotes a junior program for local high school golf teams.

“Since people aren’t hooked on golf like they used to be, you must find ways to get them to the course to spend their time and money,” Fast explains. “There are too many other things that they’ll do if you don’t.” He adds, “Through our membership programs, we should be able to maintain the membership numbers of the past couple years as we prepare for 2018.”

Of course, passion for the game varies from region to region. As one of the world’s golf capitals, Florida and its courses have no problem attracting avid golfers of all skill levels and experiences, leading clubs like Sarasota’s TPC Prestancia to renovate both of its courses. One was renovated in 2014, while the other reopened in late October. Unfortunately, the golf economy in other states is less ideal because of the nation’s economy (even though it is stabilizing). An example is Oklahoma, where the wavering price of oil and natural gas has, in turn, negatively influenced

“ SINCE PEOPLE AREN'T HOOKED ON GOLF LIKE THEY USED TO BE, YOU MUST FIND WAYS TO GET THEM TO THE COURSE TO SPEND THEIR TIME AND MONEY. ”

— Mike Fast

the state's golf economy.

“We were hurting for a while, since 37 percent of our membership works in the oil and gas industry,” says Jerry Broughton, superintendent at Twin Hills Golf & Country Club in Oklahoma City. “But we are holding our membership. The economy is getting better, and new businesses will be coming here in 2018, so I'm optimistic.”

Because of the 2008 recession and its decade-long impact, many courses are forced to offer discounts. The influence of these discounts, which often are provided by third-party vendors, has been especially noticed by smaller courses,

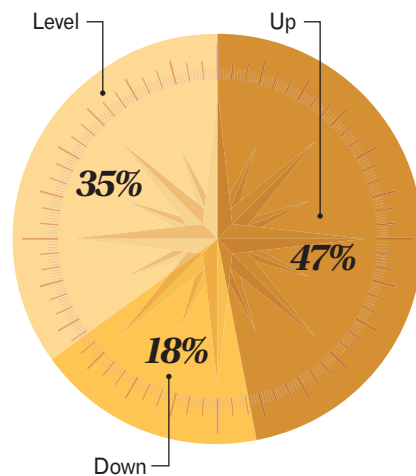
which have been forced to compete with the lower rates of larger courses.

“I don't see an end to discounting, either, as long as the industry is still struggling,” says Lee Johnson, owner and superintendent of Sioux Creek Golf Course in Chetek, Wis. “Everyone is now being affected by lowered rates because everyone is trying to survive.”

With this in mind, Jason Paradise, superintendent at Cyprian Keyes Golf Club in Boylston, Mass., is cautiously optimistic about next year's golf economy.

“The last two seasons have been better than the previous,” he says. “We saw an

AT YOUR FACILITY IN 2017, WERE ROUNDS UP, DOWN OR LEVEL?



uptick in public and outing rounds this year, and expect the same once again in 2018; slow-yet-steady growth.”

— S.J., G.B.G., C.L.

Continued on page 20

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PUT HIM DOWN FOR A PAR

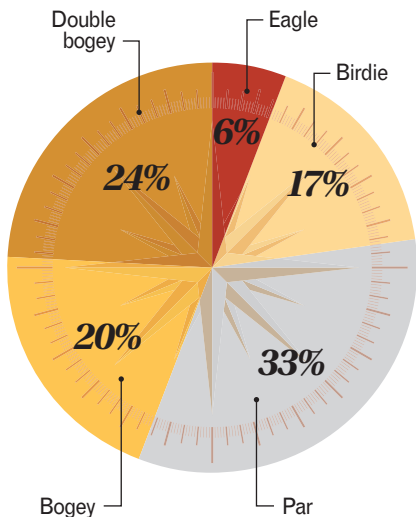
In what would be a roller coaster of a scorecard, 33 percent of *Golfdom's* readers give President Trump a par.

This time last year, *Golfdom* was reacting to the news that multi-course owner Donald Trump would be the next president of the United States. At the time, we asked readers how they believed he would impact the industry (see graphic.)

Now that President Trump has been in office for almost a year, we asked readers to give the commander-in-chief a golf score. The *Washington Post* reported Trump's approval rating at 37 percent, the lowest score since Harry S. Truman, who had a 22-percent approval rating at the same time in his presidency. But *Golfdom* readers were mixed — a par was the most popular score (33 percent, see graphic) and a double bogey was the next most popular choice. Almost 23 percent gave him a birdie or better.

Mike Keohan, superintendent at Brookville CC in Old Brookville, N.Y., was

HOW WOULD YOU RATE PRESIDENT TRUMP'S PERFORMANCE IN HIS FIRST 10 MONTHS IN OFFICE IF IT WERE A GOLF SCORE?



one of those who scored Trump with a double-bogey. One reason was personal — his son is training to be an Army Ranger, and he worries that the president is cavalier with threats to foreign countries. The other reason was professional — he believes Trump's election had a negative impact on his ability to fully staff his crew this year.

"The Latino workforce was petrified by the language Trump was using, the fear of deportation was huge," Keohan says. "We're still seeing the effects on labor. If anyone tells you that Trump didn't have a negative effect on our labor pool, they are kidding themselves."

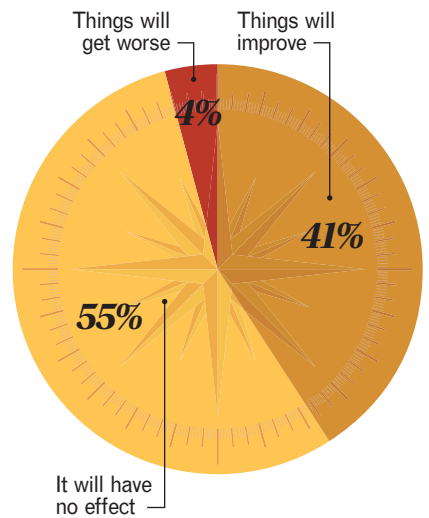
GCSAA CEO Rhett Evans summarizes Trump's first 10 months in one word: "Interesting."

"You never know where he's going with some of the things he says," Evans says. "He can be dynamic, then he can be polarizing. But I think he is a proponent of golf, he obviously understands that this is a business, and that has been beneficial."

Evans points to the new direction the Environmental Protection Agency has taken under administrator Scott Pruitt. "The EPA is taking a look at things holistically, not just the viewpoint of the environmentalists," Evans says. "That has been a refreshing change with this administration."

Keohan got creative in order to fill his crew this year. He created a laminated

FROM JANUARY 2017 DONALD TRUMP WILL BE OUR NEXT PRESIDENT. WHAT DOES THAT MEAN FOR THE GOLF INDUSTRY?



flier, written in Spanish, that he posted in delis and bodegas in the area. It's something he'll do again next spring, he says.

At first reluctant to talk about Trump, once he gets going, Keohan can't help but speak passionately on the topic. But he stresses one thing above all: He isn't rooting against Trump, and he wants the new president to succeed.

"I'm an American, I definitely don't want to see our president fail," Keohan says. "If our president fails, then we all fail."

— S.J.

“ HE CAN BE DYNAMIC, THEN HE CAN BE POLARIZING. BUT I THINK HE IS A PROPONENT OF GOLF, HE OBVIOUSLY UNDERSTANDS THAT THIS IS A BUSINESS, AND THAT HAS BEEN BENEFICIAL. ”

— Rhett Evans

A SLOW ROLL

Rolling fairways is still an alternative practice, but is gaining momentum in the industry.

When the membership at the Wykagyl Country Club, New Rochelle, N.Y., demanded firmer playing surfaces, Superintendent Dan Rogers decided to roll out a new idea.



Dan Rogers

“The whole fairway rolling thing came up around the time the U.S. Open was at Merion in 2013,” says Rogers. “I came up to Smithco’s booth at the next Golf Industry Show and eventually eased into it by using their smaller roller at first.

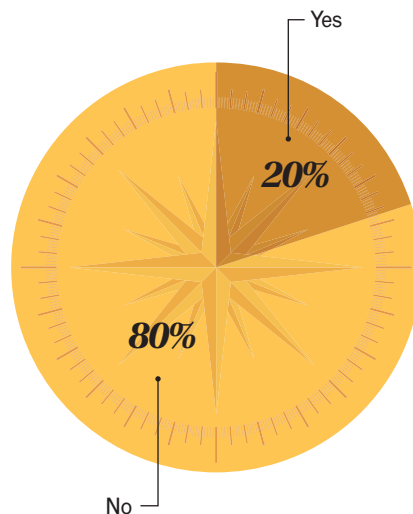
(After) about a month, I started to notice a difference agronomically.”

Rogers noticed the turf was tighter, disease pressure had reduced, and he was able to save on labor by reducing his fairway mowing from five days a week to three, depending on the season. He was so happy with the results that he purchased the first Smithco 15-foot roller off the production line.

“We can roll 27 acres of fairways in 3.5 hours. So, instead of having three or four guys mow fairways on a Sunday morning, I can transfer that labor to another

Continued on page 22

HAVE YOU TRIED OR CONSIDERED ROLLING YOUR FAIRWAYS FOR POSSIBLE AGRONOMIC BENEFITS?



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TEACH YOUR CHILDREN WELL

Most superintendents love their jobs, but not all want to see their kids follow in their footsteps.

Superintendents who also take on fatherhood have been passing on their love of golf and turf maintenance to their children for decades. In the 1960s, *Golfdom* even sponsored the Golf Course Superintendents Association's annual father-and-son luncheon at the annual convention.

There still are notable father-son duos in the industry, but with enrollment in collegiate turf programs falling and the number of assistant superintendent positions rising, will the sons and daughters of today's superintendents be part of the next generation of superintendents?

Patrick Reuteman took over as super-

intendent at Westmoor Country Club, Brookfield, Wis., in January 2017, after more than four years as the club's assistant superintendent. The 2013 University of Wisconsin graduate has not yet started a family, but says he would encourage his future son or daughter if they wanted to join the industry, with some stipulations.

"I would strongly encourage them to get a turf degree and tell them to be aware of

what they're getting themselves into," says Reuteman. "It's not the highest paying job, but what I get from it is much greater than any monetary gains that I receive."

Reuteman, who interned with the MLB's Milwaukee Brewers during the 2011 season, adds that he would suggest they try different experiences to find what part of the turf maintenance industry fits best for them.

Amos Stephens, superintendent of golf course operations and general manager at Wasilla, Alaska's Settlers Bay Golf Course, agrees with Reuteman that he would encourage his son or daughter if they wanted to enter the industry. The golf course superintendent of 12 years would support them



Patrick Reuteman



Amos Stephens

“IT'S NOT THE HIGHEST PAYING JOB, BUT WHAT I GET FROM IT IS MUCH GREATER THAN ANY MONETARY GAINS THAT I RECEIVE.”

— Patrick Reuteman

Continued from page 21
project," says Rogers. "What really sold me on the fairway rolling was when I started to get comments from the membership that the course was playing firmer or faster, and 'We don't know what you're doing, but we like it.'"

While fairway rolling has been a hit at Wykagyl CC, Superintendent Scott Anderson at Huntingdon Valley (Pa.) Country Club says that he doesn't think the newer practice fits in at his course.

He has discussed fairway rolling with Merion Golf Club's Matt Shaffer. While he acknowledges it probably has a place in the industry, he hasn't researched it enough to weigh the cost benefits.

"We have a lot of straggly ryegrass on our fairway, and it never struck me," says Anderson. "I assume you could get away

with it with pure stands of bentgrass, but the hodgepodge that we have, it wouldn't work."

If Anderson eventually wants to learn more about fairway rolling, he can call recent adopter Ken Benoit, CGCS at Bedford Hills, N.Y.'s GlenArbor Golf Club.

Benoit purchased a pair of rollers and started using them last May. He admits he doesn't have a lot of data on their effect yet because he used them sporadically throughout the season as he developed a program around them.

At first, GlenArbor's fairways were mowed three times a week, with dew

sitting on them the other four days — not a great look for the morning golfers. Now Benoit sends out the rollers to knock off the morning dew, and according to him, "No one has a better-looking golf course for those early-morning golfers."

While it's nice to have the course looking great for the membership, Benoit's investment in fairway rolling has had environmental advantages, as well.

"I think it dovetails with the best management practice of reducing the amount of fungicides we're using on the fairways, and by rolling them, at least scientifically, we can reduce dollar spot," adds Benoit. "If I can reduce the incidents of dollar spot, I can reduce the amount of fungicide I'm putting on the fairway, which means I'm benefitting the environment."

— G.B.G.



Ken Benoit

because golf has given him opportunities he never dreamed of when he moved from his birth state of Kentucky to The Last Frontier in 2000.

"I would if they showed an interest," Stephens says. "You have to tell them that in their mind they have to believe that, 'No one is going to grow grass better than me.' There's not a better place, in my opinion, to meet the movers and the shakers of your community. I came to Alaska and didn't know a soul, and without a pot to piss in. Now, I'm pretty well known and understood up here, and it's all through hard work and golf."

None of Kevin Rotti's children ever expressed an interest in turf maintenance. The superintendent of Legacy Club at Alaqua Lakes in Longwood, Fla., says he wouldn't encourage it, and admits he has tried to talk some individuals out of becoming superintendents.

Though he loves his job and the indus-

try, he wouldn't recommend it as a career after years of watching his colleagues in Florida lose their superintendent jobs.

"There have been so many quality superintendents in our area that kind of got a raw deal and are now sales reps," says Rotti. "With this area in particular, it's bad because of how prevalent the management companies are.



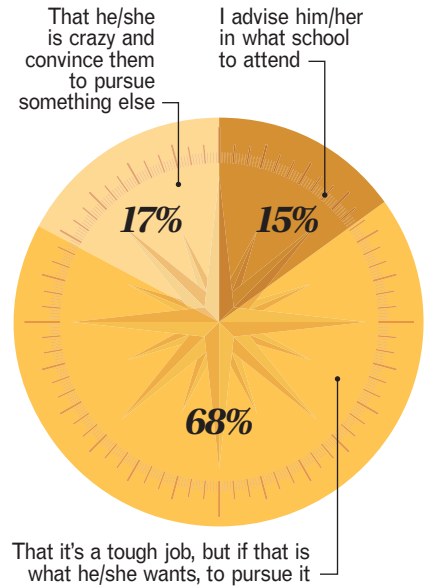
Kevin Rotti

"When someone tells me they want to pursue the business as a career, I lay out all of the negatives of the job for them," he notes. "I almost try to scare them away from the business starting out, and if they still want to pursue it after that, I know they are serious and they might be able to make it a career."

— G.B.G.

Continued on page 24

YOUR CHILD TELLS YOU HE/SHE WANTS TO GO TO TURF SCHOOL AND BE JUST LIKE YOU. WHAT DO YOU SAY?



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TAKING CREATIVE COURSES

Superintendents continue to look at practical places to lessen labor and inputs.

Because Sarasota's TPC Prestancia is located within a residential community, its course maintenance staff can't reduce turf as much as it would prefer, as homeowners would rather have maintained turf (there are homes on 30 of the club's 36 holes). Nonetheless, staff members have begun to reduce the 585-acre club's turf, mainly around trees and ornamental beds, prior to replacing it with crushed shells.

"We would love to reduce the usage of water, fertilizer and pesticides as well, along with the labor costs that are associated with maintaining these areas," says Mike McNamara, TPC Prestancia's director of agronomy. "In fact, we have already installed a new irrigation system on one of our courses, which helps us water more efficiently and effectively."

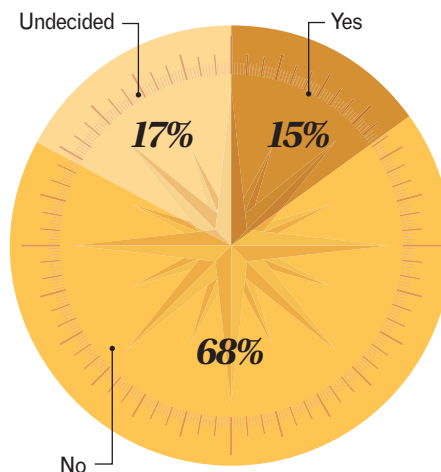


Mike McNamara

"Courses have to be more creative," he notes, "as they find ways to limit inputs and labor while maintaining standards for their members. I think Pinehurst is an example of the direction we should strive to take."

To limit inputs and labor, Lee Johnson's maintenance staff at Sioux Creek GC, Chetek, Wis., began to decrease rough areas more than 10 years ago, primarily by not mowing areas that were considered "out of the way" (with regard to distance from fairways), reducing mowing in general and raising the height of cut. However, slow play has forced the staff to mow some of these rough areas once again, particularly in recent months. Meanwhile, staff members at other courses, like Lawton Municipal Golf Course in Lawton, Okla., have considered downsizing some greens as well, but have yet to devise a proper plan to do so.

IS YOUR COURSE PLANNING A TURF REDUCTION PROJECT IN THE FUTURE?



"We have 18 greens and a practice green totaling five acres of Seaside Creeping Bentgrass," says Nicholas McConnell, Lawton Municipal's assistant superintendent. "Our customers love the sizes of the greens and take a lot of pride in the course, so we aren't quite sure how (or when) we're going to downsize yet."



Nicholas McConnell

To reduce weekly mowing, Ohio's Delphos CC converted some of its out-of-play areas to natural areas about 15 years ago. However, as is the case at other courses, staff members have not decreased turf areas at all since then, with the primary reason

being that there aren't any other large areas that can be converted. "We have three natural areas that total about eight acres," says Mike Fast, CGCS. "The conversion has led to two types of savings over the past few years — about two hours of mowing per week and around \$500 of labor annually."

In addition to not having enough large areas that can be converted, some courses simply aren't interested in reducing turf, as they would prefer to expand their properties.

"Since Oklahoma's economy is getting better, we're not considering any turf reduction whatsoever," says Twin Hills (Oklahoma City) G&CC's Jerry Broughton. "Everything is stabilizing around here," he says, "so, we would actually expand if we could. The future is looking brighter now than it has in a while."

— C.L.

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Putting the pH in pH-ungicide mixology

By Trevor Stacy and Rick Latin, Ph.D.

Fungicides are mixed with water and applied as a dilute spray to control diseases on golf course turf. Although published reports show that water quality can influence the performance of certain herbicides, evidence of similar effects on fungicide efficacy is weak and largely anecdotal.

The objective of this research was to investigate the influence of water pH on the efficacy of fungicides commonly used against dollar spot (*Sclerotinia homoeocarpa*), a problematic disease of creeping bentgrass (*Agrostis stolonifera* L.). We considered three fungicides (metconazole, thiophanate-methyl and iprodione) mixed with water stabilized at three pH levels (pH = 5.0, 7.0 and 9.0) *in vitro* and field experiments. We also considered a time factor, i.e., the time between mixing and application, where time = 0 indicated that fungicides were applied immediately after mixing, and time = 24 indicated that fungicides were applied 24 hours after mixing.



Four runs of the experiment were conducted in field plots on creeping bentgrass maintained at greens height.

Results from field experiments revealed no difference in fungicide performance when mixed in acidic (pH = 5.0), neutral (pH = 7.0) and alkaline (pH = 9.0) water. In addition, the time factor revealed little or no difference for all fungicides and water pH levels.

Results from *in vitro* work supported field observations — we observed few differences in pathogen growth for pH and time factors. Therefore, water pH is not likely to influence

performance of these three fungicides, even when time between mixing and application is 24 hours.

Although tank mixing products to neutralize water pH may be important for other reasons, such as compatibility with other tank-mixing products, results reported here support that water pH does not influence fungicide efficacy for control of dollar spot on creeping bentgrass.

Trevor Stacy and Rick Latin, Ph.D., Purdue University. You may reach Trevor Stacy at tstacy@purdue.edu for more information.

NEWS UPDATES

EPA APPROVES PBI-GORDON'S TEKKEN FUNGICIDE

The U.S. Environmental Protection Agency (EPA) recently approved federal registration for PBI-Gordon Corp.'s Tekken broad-spectrum fungicide. It will be available for sale in early 2018.

Tekken is formulated to control dollar spot, anthracnose, brown patch and 18 more diseases for cool- and warm-season turf, according to the company.

Tekken's dual mode of action — through its blend of active ingredients isofetamid and tebuconazole — provides preventative, systemic control for up to 28 days per application. Appropriate for use on greens, tees and fairways, it features one rate for all diseases.

According to PBI-Gordon, the product can be used year round. Testing by universities and end users has shown that Tekken is effective at controlling summer stress diseases like brown patch and anthracnose.

Jim Goodrich, fungicide product manager for PBI-Gordon, says, "It's convenient to use and offers protection from the diseases that blemish — or worse yet, kill — a course's aesthetics and hamper playability."

A FRAC Group 7 + 3 flowable suspension concentrate, Tekken should be used in a regularly scheduled preventative spray program and rotated with products that have different modes of action.

LIVING BIOSTIMULANTS COLONIZE AND PERSIST IN PLANTS OR SOIL, YIELDING GROWTH BENEFITS, AND IN SOME CASES, NEGATIVE IMPACTS ON INSECT PESTS AND NEMATODES."

Murphey Coy

(see story on page 26)

// INTO THE BIO-DOME

Manipulating microbial ecology

By Murphey Coy and David Held, Ph.D.

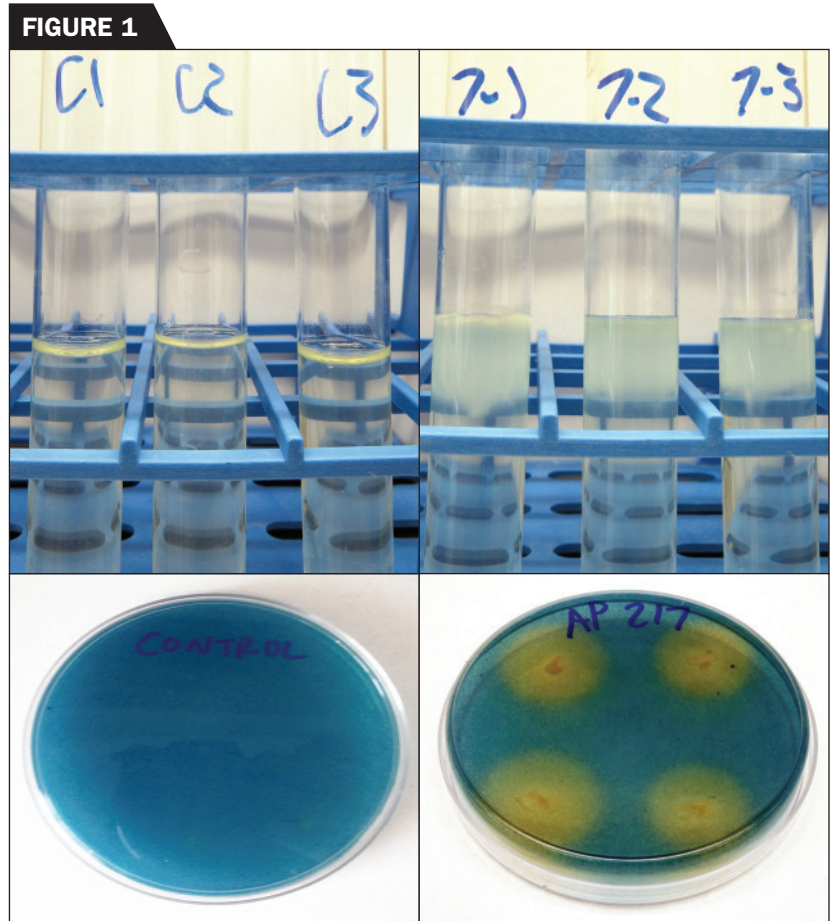
Water and fertilizer use for turfgrass and horticultural commodities is a local, state and national concern for these industries. Water availability for irrigation has decreased in recent years because of greater demands from agriculture, industry, domestic uses and climate variability. Additionally, increasingly stringent state and federal regulations often limit water or chemical inputs for managing amenity crops, including turfgrass.

These catalysts are driving the need for and adoption of management strategies to conserve water or increase water-use efficiency. However, new biological technologies in development may further advance reduced inputs in turfgrass. Development and integration of these biologicals can positively change the ability of grasses to tolerate abiotic and biotic stresses while reducing chemical and water needs. Coupling these biological innovations with environment stewardship goals could allow for the maintenance of high-quality turfgrasses under adverse conditions with limited resource input.

Incorporation of plant biostimulants or biofertilizers into management practices are possible methods of maintaining high-quality turfgrasses. European and North American definitions of biostimulants vary because of the wide array of substances classified as biostimulants. For regulatory purposes, distinctions typically are made between biostimulants and biopesticides based on their agricultural use.

BIOSTIMULANTS AND BIOPESTICIDES

Biostimulants in North America are defined as substances, including microorganisms, that when applied



Top: Ability for nitrogen fixation by rhizobacteria is indicated by pellicle (white membrane) formation on NFB media (left) by *Bacillus pumilus* AP 7 compared to control (uninoculated) media (right). **Bottom:** Ability of siderophore production by bacteria is indicated by the orange halo from single colonies of *Brevibacillus brevis* AP 217 plated on CAS media (right) compared to control (uninoculated) (left).

to plants, seeds and soil may integrate applied nutrients or provide benefits to plant development. They are not considered plant nutrients and so cannot make nutritional claims or guarantees. Do not misinterpret this lack of claims or guarantees as a lack of research. Reported impacts of biostimulants on plants include enhanced growth and development, improved nutrient uptake and efficiency or reduced nutrient losses and improvement in

soil structure, function or performance. Previous work with biostimulants in turfgrass focused on seaweed extracts, plant hormones and humic acid, however, living biostimulants that manipulate or augment soil microbes are gaining popularity.

Living biostimulants colonize and persist in plants or soil, yielding growth benefits, and in some cases, negative impacts on insect pests and nematodes. For example, *Bacillus*

FIGURE 2



Drought recovery of LaPaloma bermudagrass in 100 percent sand after 21 days without water under greenhouse conditions. Top left: Blend 20 plus 50 percent nitrogen after one-week recovery. Top right: Blend 20 plus 50 percent nitrogen after three weeks of recovery. Top (eight) pots in each container were retreated post drought, bottom (eight) plants were not retreated. Bottom: All LaPaloma treatments during drought recovery. Front left to right: Blend 20, control, nitrogen; Back left to right: Blend 20 plus 50 percent nitrogen, 50 percent nitrogen.

sphaericus induces growth promotion and stress mitigation in many crops, including turfgrasses (hybrid bermudagrasses and tall fescue). It also is a larvicide against mosquitoes and an ovipositional deterrent against the fall armyworm, which complicates the distinction between a biostimulant and a biopesticide.

The most studied have been living biostimulants, including arbuscular mycorrhizal fungi (AMF) and bacteria

called plant growth-promoting rhizobacteria (PGPR). These living biostimulants are epiphytic (capable of living on plant surfaces), endophytic (capable of living within the plant tissue) or both.

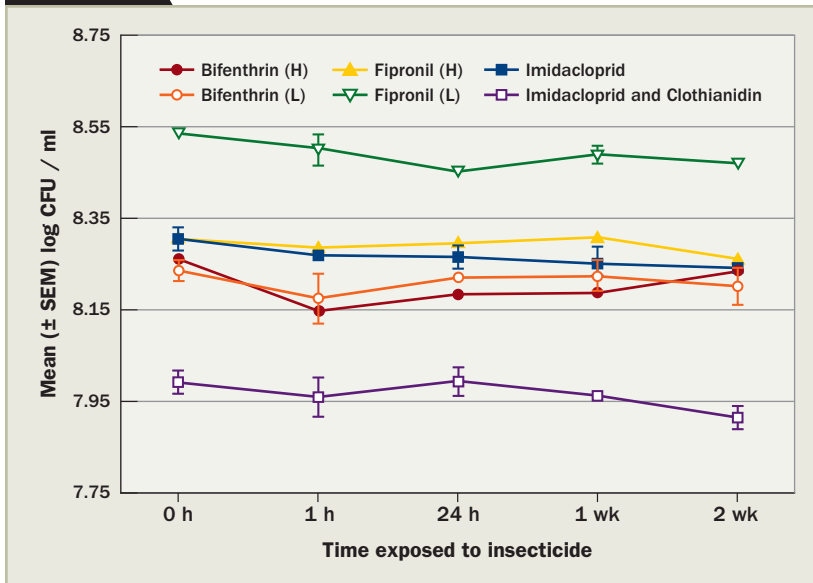
Researchers isolate and culture these non-pathogenic microbes from soil, plants, plant residues, water and composted manures. Once isolated, we can inoculate soil, whole plants or seeds with these microorganisms to observe plant responses. Soil microbial communities

are intimately associated with plants, influencing health, biomass accumulation, soil quality and nutrient availability and acquisition. The microbial communities in the rhizosphere (the layer of soil that is influenced by the plant root) are highly specialized and influenced by climate, soil type and characteristics and ground cover.

Certain microbes, when present or dominant, can induce changes in

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FIGURE 3



Mean (\pm SEM) log populations of *Bacillus pumilus* AP 7 mixed with bifenthrin, (high and low label rate), fipronil (high and low label rate), imidacloprid and imidacloprid and clothianidin over two weeks showed the population remained stable in the presence of the insecticides.

Continued from page 27

plants and influence plant/microbe interactions. Changes in plant growth resulting from inoculation with PGPR may result from nitrogen fixation, phosphate solubilization, siderophore production or upregulation of signal pathways in plants (Figure 1). PGPR have been linked to drought mitigation through priming plant-signaling defenses that alter plant-water regulation, use and efficiency; production of larger, more explorative root systems; synthesis of phytohormones (cytokinins, auxins, gibberellins, ethylene, etc.), or by the production of secondary metabolites.

IN ITS INFANCY

While neither the bacteria nor its effects on plants is new, research with PGPR as a living biostimulant in turfgrass is in its infancy. Interactions of bacteria with plants may lay the groundwork for novel solutions to several different issues in turfgrass management. PGPR are non-pathogenic, beneficial, free-living soil- and root-inhabiting bacteria that colonize seeds and roots in

the rhizosphere. The rhizosphere has a greater density of organic carbon and bacteria than the rest of the bulk soil, which influences the composition of root exudates and metabolites that can be used as plant nutrients.

Because the rhizosphere bacterial community is richer than bulk soil, competition exists between microbes for limited soil nutrients and space for colonization on the root. To have a positive impact on the plant, inoculants must have high bacterial concentrations and be formulated for the stability of these bacteria to compete and augment the soil microbial community once they are applied. Successful rhizobacterial inoculants must survive through formulation and inoculation, then multiply and colonize the developing root system once applied. In our turfgrass work so far, rhizobacterial inoculants have been shown to consistently increase root biomass in several bermudagrasses (Coastal, Tifway, LaPaloma, Yukon) and endophyte-free tall fescue (KY 32). They also may mediate plant/microbe/insect interactions with several turfgrass pests (fall

armyworms, grubs and mole crickets) while altering water regulations during drought stress, compared to untreated and fertilized grasses.

Abiotic and biotic conditions can change frequently, presenting challenges that plants must overcome. To deal with this, plants engage sophisticated physiological, cellular, biochemical and molecular responses to maintain homeostasis under harsh conditions.

Turfgrass exposure to abiotic stress decreases aesthetic quality, functionality and playability. Environmental stress in grasses often results from temperature, water and light stress, or from poor soil quality. Drought, salinity and temperature stresses alter plant responses, limiting growth, productivity and survival.

Turfgrass response to stress at the whole plant or cellular level is vital for the development of new grass cultivars and for the incorporation of novel technologies into management practices. Living biostimulants like PGPR have an advantage over traditional breeding in that they can be applied responsively to stress. Drought, for example, is unpredictable and temporary. Application of PGPR can provide benefits in the same season regardless of cultivar.

Our lab recently has evaluated PGPR for drought interactions, mitigation and recovery with three bermudagrass cultivars (Tifway, LaPaloma and Yukon). Differences between rhizobacterial inoculants (blends) as well as differences between bacteria play vital roles in stress mitigation in bermudagrass (Figure 2).

Furthermore, we are exploring the soil microbial community for new bacteria. In the summer of 2016, an extreme drought occurred in Alabama, providing the opportunity to sample amenity turfgrasses, native grasses and weeds that maintained desirable physiological characteristics. The sampling of the plants led to the isolation of 604 bacterial strains that may be associated

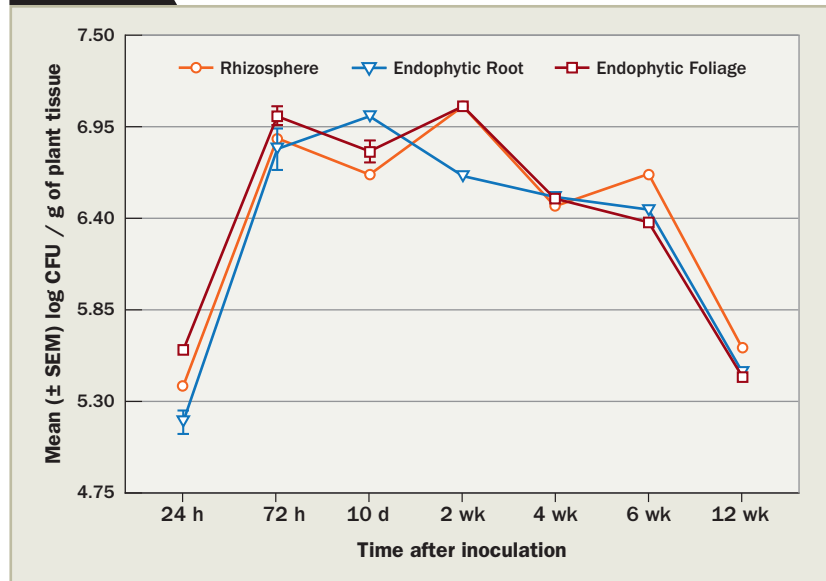
with drought tolerance and mitigation in grasses.

Products marketed with PGPR are formulated as single species of bacteria or as blends of multiple species or strains. The products may be available as a liquid or granule and are compatible with most chemicals already used. Studies monitored the stability of the bacterial populations mixed with neonicotinoids, phenylpyrazole and pyrethroid insecticides over two weeks (Figure 3) and showed the population remained stable in the presence of the insecticides.

The bacteria often are formulated with a complement of plant nutrients that aid in bacterial growth and population longevity. For example, Bayer Environmental Sciences introduced Nortica, *Bacillus firmus*, a single species biofertilizer (0.1 lb. N/1,000 sq. ft.; 14-0-21) and biopesticide granular product for enhanced growth and nematode control in turfgrass. Recent research tracked the epiphytic and endophytic colonization and populations of non-commercial rhizobacteria under field conditions applied to common bermudagrass in a loamy sand over a 12-week period (Figure 4) and showed rhizobacteria colonization for 12 weeks. Beyond the compatibility with fertilizers and insecticides, PGPR (*Bacillus subtilis*) have been linked to a 38 percent to 65 percent increase in root biomass and increased uptake and efficiency of a neonicotinoid (thiamethoxam) in corn seedlings. The increase in use efficiency could lead to lower use rates of systemic pesticides.

While research with PGPR is relatively new in turfgrass, the biostimulant market is growing, with an expected market value of \$2.2 billion in 2018. On Sept. 14, 2017, Bayer announced a \$100-million partnership with Ginkgo Bioworks, a microbe genetic engineering company that markets endophytic bacteria for nitrogen fixation. The compatibility of microbes with current technology and recent insights

FIGURE 4



Bacillus pumilus AP 7 rifampicin mutant mean (\pm SEM) log populations CFU/g (0.035 oz.) of tissue in common bermudagrass (*Cynodon dactylon*) grown under field conditions in a Marvyn loamy sand soil (pH 7.3). Grasses were treated with bacterial populations of 1.98×10^8 CFU/oz. at a rate of 16.9 oz. of bacteria per 10.76ft². Applications were followed by 0.5 inch of water. Populations sampled the rhizosphere (external roots and soil) and endophytic (internal roots and shoots) colonization for 12 weeks and showed rhizobacteria colonization for 12 weeks.

into benefits for crops and grasses demonstrates the ability and need to incorporate these technologies into turf management practices.

PGPR, N FIXATION AND SIDEROPHORE PRODUCTION

Bacteria that fix nitrogen can increase plant growth, nutrient efficiency and uptake. The increase in uptake can lead to lower fertilizer needs. Further, endophytic bacteria that fix nitrogen *in planta* could be incorporated into future grass germplasms. Qualitative nitrogen fixation activity of bacteria was evaluated in a nitrogen-free semisolid media (Nfb) in the laboratory. Single bacterial colonies were introduced to the Nfb semisolid media and monitored for 48 hours to 72 hours. This allows us to determine if bacteria can fix nitrogen in an oxygen gradient that is comparable to internal plant environments. Growth characteristics of a pellicle (a thin membrane or film) in the media indicate nitrogen fixation.

Siderophores bind iron and other

nutrients for plant use. They have been linked to plant growth promotion, increased chlorophyll content, disease suppression and bioremediation of heavy metal soils. Qualitative siderophore production of bacteria was evaluated with Chrome azurol S (CAS) agar in the laboratory. Bacteria were grown on growth media for 24 hours, and single colonies were transferred to quadrants on the CAS media. Orange halos growing around the bacteria colonies confirmed siderophore production by the bacteria after 48 hours to 72 hours.

PGPR AND INSECTICIDE COMPATIBILITY

Bacteria that increase plant growth and pesticide efficiency could allow lower use rates. For commercial development, bacteria that are not negatively affected by exposure to pesticides in product or soil must be identified. Bacterial strains from multiple genera with known populations (minimum of

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1 x 10⁸ colony forming units (CFU)/ml (0.03 oz.) were evaluated individually for their compatibility with commonly used turfgrass insecticides. Bacteria were individually mixed in 50 ml (1.69 oz.) centrifuge tubes with three different insecticide classes (neonicotinoids, phenylpyrazole, pyrethroid) based on label rates (high and low, when applicable). Samples were taken from each solution after one hour, 24 hours, one week and two weeks. Samples were then transferred to glass tubes with sterile water and serially diluted. Samples were transferred to growth media for 24 hours before populations were estimated based on bacterial colony counts.

Results show the bacterial populations from the *Bacillus pumilus* AP 7 samples demonstrating compatibility with common insecticides. These data trends in population stability were typical of all bacteria tested. Bacterial populations are graphed as their log CFU/ml, for example a log value of 8 is equal to 1 x 10⁸.

PGPR AND DROUGHT TOLERANCE

Traditional turfgrass breeding alone has not solved the challenges and unpredictability of drought. Grasses are selected for their aesthetics and playability. The incorporation of microbes that improve stress tolerances and that can be selectively applied when needed offers advantages for management.

Green studies were designed to evaluate drought responses of bacteria-treated, bacteria-treated with 50 percent nitrogen, 50 percent nitrogen, fully fertilized and untreated bermudagrasses with varying drought tolerances LaPaloma (moderately tolerant) and Yukon (susceptible). In this study, we used Blend 20, a mixture of three bacterial strains (*Bacillus pumilus* AP 7, *Bacillus pumilus* AP 18 and *Bacillus sphaericus* AP 282). Grasses were established for a month, and then treated for

five weeks before drought exposure for three weeks.

Experiments assessed changes in chlorophyll, relative water content, electrolyte leakage (pre, during and post-drought) and root biomass, length, surface area and volume. After the drought period, grasses recovered for three weeks. During recovery, half of the potted grasses had treatments reapplied and the other half only recovered with water to determine if reapplication was necessary. Differences in drought responses were related to treatment and cultivar. The reapplication of treatments was necessary to aid in recovery. Grasses treated with PGPR plus 50 percent nitrogen suffered less damage during drought stress, recovered more quickly and had the largest roots.

Work in our lab suggests that PGPR may positively influence turfgrass management by inducing changes and increasing tolerance to abiotic and biotic stress. There are fewer PGPR products available for use in amenity grasses than for food or fiber crops. However, as this and previous work demonstrates the utility of PGPR for plant growth promotion and IPM, we anticipate products containing these beneficial microbes to become more widely available.

Murphey Coy is a Ph.D. candidate, and David Held, Ph.D., is an entomologist in Entomology and Plant Pathology at Auburn University. You may reach Murphey at rnc0023@tigermail.auburn.edu for more information.

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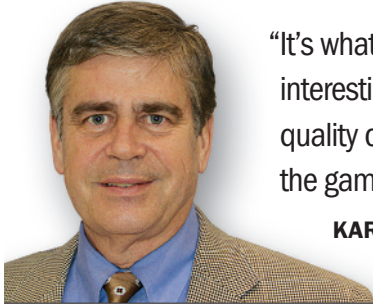
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"It's what the creed does not say that I find interesting. There is no mention of the quality of turf needed and no mention that the game has to be played on grass."

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

The Golfer's Creed

Simply stated, golf is defined as a game where a small, hard ball is struck with instruments known as clubs into a set of small holes in the ground that are spread across an expanse of land. The rules of golf were first written in 1744 by the gentlemen golfers of Edinburgh, Scotland, and totaled 13. The sterile definition of the pastime and the rules of golf do not capture the essence of the game. More than 100 years ago, David Robert Forgan spoke about golf in a fashion that became known as the Golfer's Creed.

Forgan's father, Robert Forgan, was a master golf club maker in St. Andrews and the nephew and apprentice of Hugh Philip, the official club maker in St. Andrews. As an apprentice, he was the first, or one of the first, to import hickory to make golf club shafts. Forgan went on to establish a highly successful club-making company.

David Robert Forgan developed an interest in banking and rose rapidly in that industry. In 1896, he became vice president of the Union National Bank in Chicago. Throughout his banking career, Forgan remained an accomplished golfer, winning the inaugural 1899 Western Amateur Golf Championship at Glenview Country Club.

David Robert Forgan was a popular dinner speaker, often providing insight into banking. It was in 1899, while giv-

ing an awards speech at the Chicago Golf Club, that he spoke of the Golfer's Creed, which to this day has not been forgotten.

The creed begins, "Golf is a science, the study of a lifetime, in which you may exhaust yourself, but never your subject." It also describes golf as a "test of temper, a trial of honor, a revealer of character," a game for social intercourse and an opportunity to show kindness and generosity to an opponent... and a moral force.

It's what the creed does not say that I find interesting. There is no mention of the quality of turf needed and no mention that the game must be played on grass. Nor is there any mention of the type of golf clubs or how long a golf course needs to be. More importantly, it does not mention how good a player

needs to be; no mention of handicap, or gender, race or social status of a golfer.

The Golfer's Creed is the definition of what golf is, and why over the generations it has remained the game it is. You need look no further than the amateur/professional players who have represented the game, from Bobby Jones, Arnold Palmer and Jack Nicklaus, to the newest of the stars who honor the game in the spirit of the Golfer's Creed.

Currently gaining popularity in university communities is contemplation of the role of citizenship among faculty and students — another sort of creed. This discussion focuses on classroom interaction and conduct on campus. And expectations are not a one-way street; a professor also must demonstrate good professional and personal citizenship.

My efforts to highlight citizenship in the classroom have focused on the Golfer's Creed. For example, one section of my class syllabus states the university student code of conduct. I speak to how the Golfer's Creed relates to the code and how students should handle themselves in my class, and in turn how I should interact with students.

We are fortunate to work in the golf industry and around a game whose definition is grounded in this creed. In visiting golf courses and in playing the game, I rarely have seen the Golfer's Creed posted where grounds or clubhouse staff would see it — but it should be. It's a nice reminder of why we are fortunate to be associated with the game, and in a broader sense, how we should act as human beings.

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

Rolling off the greens to save on dollar spot

Jay Popko is a research associate in the turfgrass pathology lab at the University of Massachusetts, where he leads field and laboratory research on rolling, fungicide efficacy and dollar-spot resistance to fungicides. You may reach Jay at jpopko@umass.edu for more information.

Q Describe some of the research projects you have undertaken concerning rolling creeping bentgrass fairways.

Our fairway-rolling research started with a focus on disease suppression, primarily dollar spot in our region of the country. Our initial research was to determine the frequency of rolling needed to suppress dollar spot. We have branched out to examine how spoon feeding (0.25 lbs. nitrogen/1,000 sq. ft.) with different nitrogen sources, biological control products for disease suppression, and PGRs (trinexapac-ethyl and paclobutrazol) work in conjunction with rolling to suppress dollar spot.

We found that rolling three days per week and making two passes (double roll) each day of rolling — for

a total of six rolls per week — reduces dollar spot by about 50 percent compared to a non-rolled control. We mowed creeping bentgrass turf three times per week on days when the fairway was not rolled, and rolling was done from May/June through early October. We currently are conducting an experiment to determine how early in the spring to begin rolling.

Rolling fairways suppresses dollar spot and is a beneficial practice when fungicides are applied according to a dollar-spot threshold, and it increases the interval between fungicide applications. Rolling also is beneficial when superintendents follow a set-calendar fungicide spray schedule. It does this by providing dollar spot suppression under high-dollar pressure conditions at the end of a spray interval.

We have measured soil-bulk density after two seasons of rolling and found only a slight increase in soil-bulk density. We also have observed an increase in turf quality after three years of rolling.

Q What are the mechanisms of disease control from rolling?

We do not know the control mechanism, but speculate that rolling may suppress dollar spot through some of the following:

- 1) Stimulating the plant's natural defense response system because of the slight stress created by rolling
- 2) Removal of dew and reduced leaf-wetness period
- 3) A change in the physical properties and/or microbial community of thatch

Q What feedback have you received from golf course superintendents who roll fairways?

Most superintendents who roll fairways roll on days when they do not mow. In years of low dollar-spot pressure, they are finding they can reduce fungicide applications. Superintendents also note a better cut on the grass, and perhaps could reduce mowing frequency. In addition, golfers report

improved ball roll on drives in the fairway. It would be worth considering rolling dormant warm-season grass fairways in winter to improve playability and aesthetics.

A couple of downsides superintendents report are figuring out a way to fit rolling into their normal maintenance regimes and grass clippings that clump or collect on the rollers.

Q Is there anything you would like to add?

Rolling is not a silver bullet for dollar-spot control, but it offers another practice to help manage the disease on those courses that struggle with dollar spot. Overall, we have observed dollar-spot reductions of 25 percent to 50 percent on untreated plots. While these reductions are not acceptable as a stand-alone, they do reduce the burden fungicides carry, and can help extend or provide better control at the end of spray intervals. Lastly, we have observed improved turf quality with rolling and reduced puffiness in creeping bentgrass.

ROLLING IS NOT A SILVER BULLET FOR DOLLAR-SPOT CONTROL, BUT IT OFFERS ANOTHER PRACTICE TO HELP MANAGE THE DISEASE ON THOSE COURSES THAT STRUGGLE WITH DOLLAR SPOT.



Clark Throssell, Ph.D., loves to talk turf. Contact him at clarkthrossell@bresnan.net.

Defending Our Turf

Congratulations to the *Golfdom* editorial and design teams on another haul of TOCA Awards!

Golfdom

The *Golfdom* team once again led all golf market publications with 16 total Turf & Ornamental Communicators Association (TOCA) awards — matching the number won by *GCI*, *GCM* and *Superintendent* combined!



TOCA First Place Awards

- » **Design**
Printed magazine/two-plus page design, advertising: “Hole of the month”
Grant B. Gannon, Pete Seltzer
- » **Photography, Video And Multimedia**
Best single photo – Use of stock art “The sky is the limit” Pete Seltzer
- » **Photography, Video And Multimedia**
Best single photo – created by a TOCA member or freelancer commissioned by a TOCA member “Pay up or go home,”
Seth Jones
- » **Photography, Video And Multimedia**
Best print magazine cover (stock photos, commissioned art, illustrations, typography, etc.) “So you’re considering the dark side,” James Bennett, Seth Jones, Pete Seltzer
- » **Special Projects**
Writing for special projects “A tribute to the king” Seth Jones, Pete Seltzer, Grant B. Gannon, Mark Woodward, Joel Jackson, Steve Wright, Karl Danneberger
- » **Special Projects**
Miscellaneous special publishing project “The Fall Classic, Early Order Program special” Seth Jones, Pete Seltzer, Grant B. Gannon, Jared Nemitz
- » **Special Projects**
Special Event – Publishing “The Golfdom Summit” Kevin Stoltman, Pat Roberts, Seth Jones, Bill Roddy, Craig MacGregor
- » **Writing**
Turf feature article – commercial publications “The admiral of ultradwarf,”
Seth Jones
- » **Writing**
Product information article – commercial publications “Hidden beneath the GIS waves,” Ed Hiscock, Grant B. Gannon
- » **Writing**
Headline writing – commercial publications “In-tents course management,” Curt Harler



TOCA Merit Awards

- » **Design**
Cover page design – printed magazines
Page 15 – “The sky is the limit,” Pete Seltzer
- » **Photography, Video And Multimedia**
Portrait/Personality (photo of individual or group of individuals) “Game on!,” Pete Seltzer, Matt Hawthorne
- » **Writing**
Series of columns by regular department columnist – commercial publications
“Keeping up with the Jones,” Seth Jones
- » **Writing**
Product information article – commercial publications “What’s new at GIE+Expo,”
Seth Jones
- » **Writing**
Operations profile – commercial publications
“Reverse the Course,” Chris Lewis



Gardner Award – “Best of Show”

Photography, Video and Multimedia – Publishing
“So You’re Considering the Dark Side” *Golfdom*, North Coast Media, James Bennett, Seth Jones, Pete Seltzer

The Shop

// MUST-HAVE NEW EQUIPMENT



1 500/550 Series rotors

RAIN BIRD's recently released 500/550 Series rotors offer "IC" models compatible with Rain Bird's Integrated Control. The 500 Series models offer a radius of 28 to 47 feet and a full-circle, 360-degree arc. The 550 Series covers a radius of 28 to 49 feet, with an arc that's adjustable from 30 to 345 degrees. Both the 500 and 550 Series offer a new low-angle nozzle for 28-foot coverage. Flow rates range from 7.25 gpm to 13.20 gpm for the 500 Series and 7.25 to 13.60 gpm for the 550 Series.

rainbird.com/golf

2 MTT 3600 chain saw

Now available from **EFCO** outdoor power equipment is the MTT 3600 top-handle chain saw. This top-handle saw has a 2-stroke engine that delivers 2 hp, and an on-board clutch for quick fitting of bar and chain. It also includes the "Always On" ignition switch that returns to "on" position after each stop, and an adjustable aluminum oil pump for lubrication. The product is available in bar sizes of 12 inches, 14 inches and 16 inches.

efcopower.com

3 Storage Fuel Stabilizer

Storage Fuel Stabilizer from **STA-BIL** is designed to keep fuel fresh for quick, easy starts after storage. It keeps fuel fresh for up to 24 months during storage, removes water to prevent corrosion and cleanses carburetors and fuel injectors, according to the company. STA-BIL also protects engines from gum, varnish, rust and corrosion and prolongs the life of any engine. STA-BIL eliminates the need to drain the fuel of your 2- or 4-cycle engines by treating the fuel with STA-BIL before storing.

goldeagle.com/sta-bil

4



5



CHECK OUT MORE NEW EQUIPMENT ONLINE

To stay up to date on all the latest products and services, visit golfdom.com/category/products



6

4 Standard Golf

STANDARD GOLF's Recycled Bag Stand with Cup Holder is a welcome addition to the driving range. Constructed of recycled material, the fold-up bag stand is resilient and economically responsible, according to the company. The bag stand is 28 inches tall and 19 inches wide and allows any golf bag to rest comfortably in the stand, and even has room for a drink with the built-in cup holder. The bag stand is available in green, black and brown. standardgolf.com

5 Club washer

The **MILTONA** recycled plastic club washer offers maintenance-free housing for golfers to clean their clubs. The product includes durable brushes that are gentle on clubs, while offering quick and efficient cleaning, according to the company. It's available in black, brown and green and is a part of Miltona's new line of products manufactured from recycled plastics. miltona.com

6 Tarp Devil

A brand-new cover management system, the **TARP DEVIL** was designed to reduce the labor burden of deploying and collecting covers, and to increase their lifespan through proper handling and storage. This tractor-mounted, hydraulically driven tool can reel in covers up to 300 lbs. with an even pull, creating a more compact roll and eliminating any standing water that might be on the cover, according to the company. This patent-pending technology was developed by Jordan Kitchen, assistant superintendent at Hamilton Golf & Country Club, Ancaster, Ontario, Canada, after years of hand rolling and unrolling covers on the course. tarpdevil.com

The 19th Hole



Dean Graves

CGCS // Chevy Chase (Md.) Club



Dean, what can I get you? What's the hoppy local IPA?



How did your fly-fishing trip go? In a word: Awesome. We were way out in the boonies in Idaho and Wyoming, on the Snake and Green Rivers. They're world-class trout streams. We saw more golden eagles than people, by far.



If the Queen of England were coming to your house, what would you cook? I would sous-vide a cowboy ribeye with a port and shallot reduction.

You would sous-what? Sous-vide. It's a French technique... put the steak in a Cryovac bag, then you cook it in water under pressure. It cooks the steak evenly all the way through, at the perfect temperature... then you throw it on the grill at the end just to give it the marks. Come visit, I'll make it for you.

That's a deal. What was your first car? A 1972 Toyota Celica ST, lime green. I was in high school. I was hot stuff with that car! I used the money I made working in the golf pro shop and paid cash, \$3,100. If you saw that car today you'd say, "Who in the hell would buy that thing?" But they're all rusting away in heaps somewhere now.

What's the oldest thing you own? I have a 1954 Chevrolet



"A CHARACTERISTIC THAT MAKES ME GOOD AT MY JOB IS APPRECIATION — APPRECIATION FOR MY RESOURCES, MY STAFF, MY MEMBERSHIP. CAN IT BE TAUGHT? WELL, I LEARNED IT."



3100 pickup, fully restored, 943 miles on it. I got it two years ago. With the internet, everything is at your fingertips. I looked around until I found it in Tennessee. I keep it in the garage, every once in a while I'll get it out on a Sunday.

Where's your favorite vacation spot? Any place with my wife and children. It could be Antarctica or a Caribbean island.

When you're sitting around the campfire, cigars in hand, what story do you like to tell? When

I was 14, I was working in the pro shop at Rehoboth Beach Country Club and talking to two members. I

looked down and I saw a \$100 bill on the ground. I put my foot over it. I had a decision to make — wait for them to walk away and keep it, or ask if it belonged to one of them. I asked, "Is this anyone's?" and one of the guys said, "Yeah Dean, that's mine." He pulled out a roll of hundreds and added it to the stack.

He and I kept in touch over the years. One day, he called me and

said, "Dean, the superintendent here has resigned... how would you like to come to Chevy Chase Club?" You just never know. When I tell that story to interns, I tell them — your integrity is everything.

As interviewed by Seth Jones, Nov. 16, 2017.

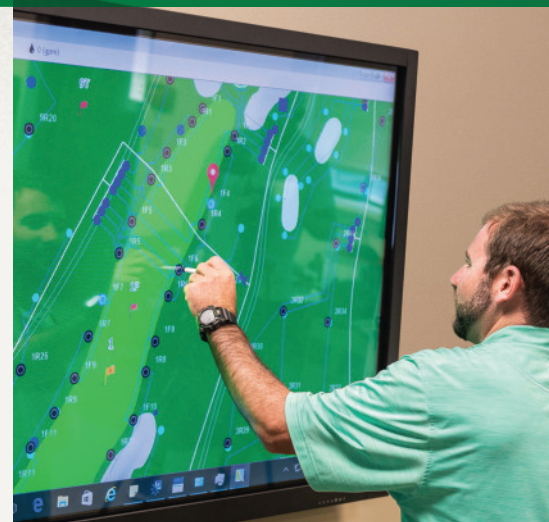


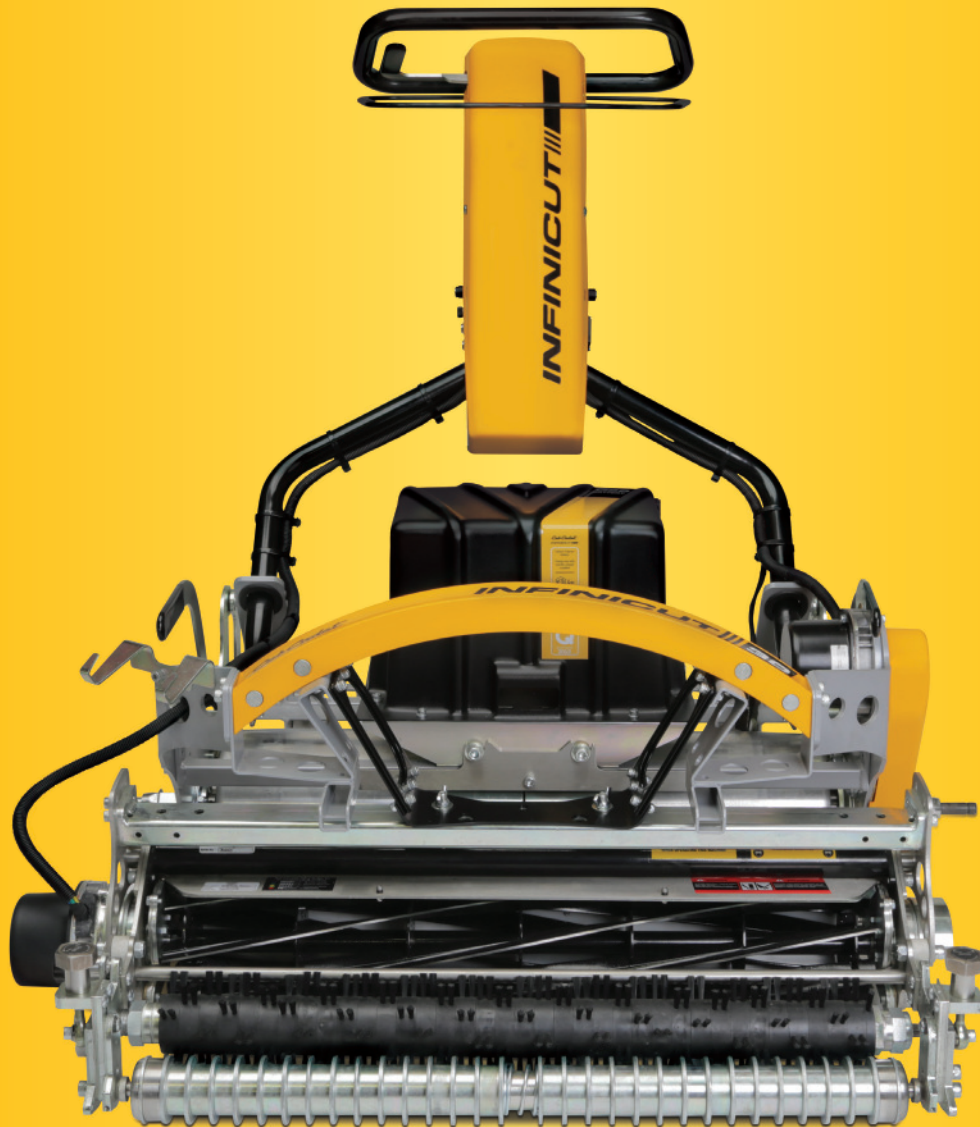


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