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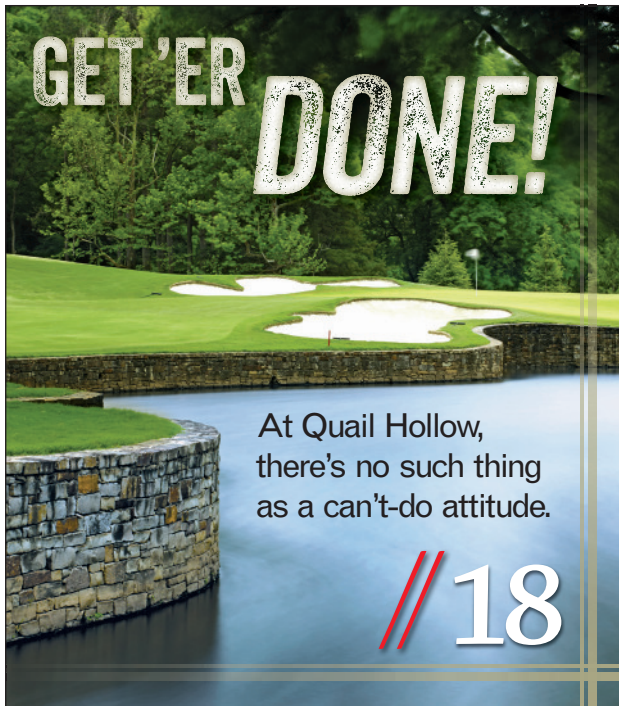
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YEARS



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“I don’t think the USGA was caving to Kevin Na’s complaints. I think they were fixing what they saw as a potential problem.”

SETH JONES, *Editor-in-Chief*

Fans of flying fescue

Only at the U.S. Open could cutting down a swath of tall grass be considered a major storyline. ¶ Here’s the scene: Big storms blew through Erin Hills on Monday night. It stormed hard all night and into the morning. I decided to sit out the storms that morning and arrived at the 117th U.S. Open at approximately 10 a.m. (Call me a slacker, but I did make the sunrise shift for photography the day before.)

I spotted a crew with string trimmers and blowers about to drive out on the course. I flagged them down and they were nice enough to offer up their empty seat. This was lucky, because the walk from the maintenance facility to the nearest hole (No. 10) is already a long haul... these guys told me they were headed to No. 4, just about the farthest point on the golf course.

I asked the guys what they were about to do, and Erin Hills intern Drew Monogue said, “We’ve got to take out some areas of damaged rough.” I nodded and sat back, enjoying the VIP ride across the course.

When we pulled up to our destination, I realized this was an “all hands on deck” project. Crews were arriving from multiple directions. Darin



Bevard, the USGA’s director of championship agronomy, was there waiting. Then Erin Hills Superintendent Zach Reineking rolled up on a Jacobsen HR600 rotary mower, like a Bruce Lee movie where the villain with the baddest weapon shows up last.

The crew got busy and fescue started flying. Reineking

on the street howitzer, six guys on Toro rotary push-mowers, a dozen guys with rakes, another six guys on blowers, even one guy nicknamed “Big Cat” wearing double blowers (see *Golf-dom Gallery*). It was, in a word, a spectacle.

I was documenting the whole scene with both my phone and my “good camera”

while posting the entire scene to Twitter (sorry, I’m not really down with Facebook). I posted a few videos as well.

I wasn’t the only one. Practice rounds had begun, so golfers walked by and craned their necks, trying to understand what was happening. A couple caddies took photos. Curtis Strange walked by and recorded the action.

I looked around and saw that golf fans also were watching. Keep in mind that PGA Tour player Kevin Na had posted a video the day before blasting the rough at Erin Hills. Up until a blimp caught fire and exploded near the course (seriously), the rough at Erin Hills was the biggest story before play began.

In case you’re wondering, I don’t think the USGA was caving to Kevin Na’s (or anyone’s) complaints. I think they were fixing what they saw as a potential problem, based on severe weather.

Frankly, the decision to chop down a couple areas of rough shouldn’t occupy that much consideration with golf fans. But it’s interesting that the course itself gets so much attention — it was arguably the biggest star of this U.S. Open.

In other words, I feel like more people know the name Erin Hills right now than Brooks Koepka.

Golfers and golf fans around the world are interested in how these courses are maintained, in how they achieve the look that they do. And that’s good for our business.

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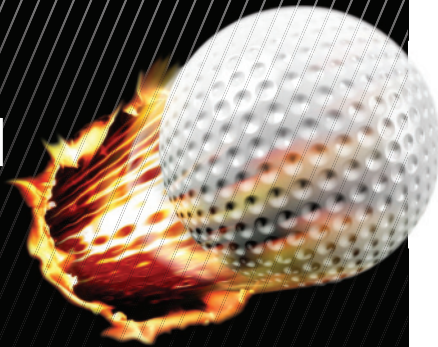
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NEWS, NOTES AND QUOTES



// IN THE LOOP



A new app will soon make it easier for caddies, caddy masters and golfers to communicate and save time and money.

CADDIE HACK

BY SETH JONES // Editor-in-Chief

➔ Ryan Bartels is hopeful his days of wasting away time at the caddie shack will soon come to an end.

That's because Bartels, a 20-year-old junior at Indiana University and part-time caddie, has created Circuit, a new app that will better connect him with the caddie master and the golfer. It'll also help him get paid faster and help the member with more payment options than cash.

"I showed up (to the golf course) today and found out there was an outing, so they're not taking any caddies," Bartels says. "For the caddies that's a huge pain, for the caddie masters that's a huge pain. Sometimes things get lost in translation. We want to fill that void so the caddie master can connect with the members and the caddies, so everyone is in the loop and everyone

saves a lot of time and hopefully a lot of money."

The app, which launches this month, allows golfers to request caddies for their specific tee time. The caddie master can then send that request on to his pool of caddies. Once a caddie accepts the loop, all he has to do is show up on time.

Along with simplifying the process of arranging for a caddie, another benefit is that golfers can upload as many credit cards as they like to the app. Once they walk off 18 green, they can click which card they want to use, add in a tip and rate the caddie.

"I've been a caddie for six years," Bartels says. "I see a lot of what goes on at your average caddie program. I kept seeing the same challenges. My goal is to fix these challenges with technology."

To learn more, visit Circuitapp.com.

// NEW SHERIFF IN TOWN

JOHNNY WALKER APPOINTED GCSAA SOUTH CENTRAL REP

Johnny Walker, a 30-year superintendent in Texas, was recently named the field staff representative for the Golf Course Superintendents Association of America's (GCSAA) South Central region. Walker is the GCSAA liaison for affiliated chapters in Arkansas, Oklahoma, New Mexico and Texas.



Johnny Walker

"I am thrilled to join the GCSAA staff and be able to share my knowledge and passion for the profession with other superintendents in the South Central region," said Walker, who joins the GCSAA staff following four years as director of golf course maintenance at Bentwater Yacht and Country Club in Montgomery, Texas. And despite his name, Walker told *Golfdom* in the May 2016 "19th Hole" interview that he is not a scotch drinker.

"I hate (Johnnie Walker). I've tried to like it, I just don't. It's like every great once in a while I try to eat liver and onions, and I still don't like it," said Walker.

// PROPANE IN CHIEF

PERC NAMES NEW PRESIDENT AND CEO

The Propane Education & Research Council (PERC) named Thomas "Tucker" Perkins as its next president and CEO.

Perkins, 60, joined PERC in 2012 and most recently served as chief operations officer. He previously was a member of the PERC Advisory Committee and chaired the panel on engine fuel.



Tucker Perkins

"I'm grateful to the Council for the opportunity to lead this exceptional organization of dedicated and talented professionals," said Perkins.

Perkins will take over his new role with PERC from Roy Willis, 67, who recently announced that he will retire on July 31 after serving almost 20 years as president and CEO. Willis will serve in a supporting role for a limited time to help with the transition.

// DIVERSIFYING THE BRAND

LANDSCAPES UNLIMITED LAUNCHES CONTRACT MAINTENANCE DIVISION

➔ Landscapes Unlimited, a golf course contractor, developer and third-party manager, recently formed Landscapes Golf Maintenance (LGM), a separate corporate division that will provide public and private golf course facilities with contract maintenance services.

“Contract maintenance is the logical outgrowth of these core businesses, which have always revolved around building, managing and developing golf properties smartly and efficiently, with a special eye for innovation and quality,” says Bill Kubly, Landscapes Unlimited’s founder and chairman.

Contract maintenance veteran Larry Hanks was hired in April to lead LGM, according to Landscapes Unlimited. Hanks owned and operated a course development/acquisition consulting business in the mid-1990s. He then spent seven years with Tampa, Fla.-

based OneSource Landscapes and Golf Services, and was eventually promoted to national sales director. In 2003, he joined Valley Crest Golf Course Maintenance, rebranded as BrightView in 2014, as national sales manager.

“Superintendents who partner with LGA will recognize all this very quickly — and that we’ll be there to support them, not to threaten their authority or autonomy,” Hanks says in a press release. “In fact, we’ve found that superintendents often appreciate the added support of a service provider like Landscapes Golf Maintenance.”

Landscapes Unlimited, formed in 1976, started by working on construction, renovation and irrigation installation. In the mid 1980s, it started developing golf projects. Landscapes Management Co., which today operates more than 40 properties on a third-party basis, was formed in 1988.

// ANIMATRONIC ACQUISITION

MTD Products acquires Robomow

➔ MTD Products, based in Valley View, Ohio, has recently acquired F. Robotics Acquisitions, makers of the robotic lawn mower Robomow. Financial details of the transaction, which is set to close in early July pending government and other approvals, were not disclosed, according to a press release.

“Both MTD and Robomow see tremendous opportunities to grow our brands through this merger of our products and talents,” said Rob Moll, CEO, MTD Products. “Initially, we will be looking to market



Robomow technology under our Cub Cadet and Wolf-Garten brands.”

Robomow’s operations will remain headquartered in Pardesiya, Israel, after the merger, and its current management team, supported by MTD’s European, North American and Asia-Pacific

divisions, will remain in place.

MTD acquired Precise Path Robotics in 2015 — a move designed to speed up its technological advancements, according to the company. That acquisition led to the company releasing the Cub Cadet RG3, a robotic mower for golf greens.

// BEST OF THE U.S. OPEN

EVEN THE DOG NEEDS A STINKIN’ BADGE.

Security was tight at Erin Hills for the 2017 U.S. Open. So tight that even Dozer, Equipment Manager Tim Roddy’s dog, was seen sporting a badge to avoid any hassle.

For a roundup of our best photos from the event, check out *Golfdom* Gallery on pages 14-15. And for additional photos, visit Golfdom.com.



// NOW ACCEPTING SUBMISSIONS

SYNGENTA UNVEILS CONDITION. PERFORM. RECOVER. CONTEST

Now through Sept. 5, golf course professionals can submit a photo to ConditionPerformRecover.com to show how they condition themselves or their turf to perform well and recover from stress, for a chance to win a cash prize.

Two entrants will win the \$2,500 grand prizes in either the Personal Fitness or Turf Fitness categories, as voted on by attendees of the 2018 Golf Industry Show, visitors to ConditionPerformRecover.com and via Twitter. Voting will take place from Feb. 1 through Feb. 9, 2018. Turf professionals can submit to either category with photos that include:

- **Personal Fitness:** Turf professionals, their teams or customers working hard, exercising together or recovering from a stressful day.
- **Turf Fitness:** Turf professionals keeping their turf game ready, including maintenance, tournament preparation and recovery.

They can also submit photos via social media by using [#ConditionPerformRecover](https://twitter.com/ConditionPerformRecover) and [#contest](https://twitter.com/ConditionPerformRecover) for a weekly chance to win a box of Titleist Pro V1 golf balls. For complete contest rules, visit ConditionPerformRecover.com.

Maketewah Country Club is a short drive from downtown Cincinnati, Ohio. Built in 1910, Tom Bendelow originally designed the course, and then in 1929 it was given an update by Donald Ross. It's hard to compete with architectural minds like that, and the course has pretty much stayed the same for more than 100 years.

According to Superintendent Ted White, the course's finishing hole stands out among the rest, and goes as far as calling it "incredible." Four bunkers surround the par 3's green. The front right hazard was recently added during a course-wide bunker renovation, and provides an extra challenge for golfers.

"We normally put the pin in the back right so that really protects that hole now if you come up short," says White. "Previously, if you came up short there was no penalty and you just came up short in the rough."

After nine seasons at Maketewah, White says that he has dialed in his spray program, and relies on Syngenta's fungicides Daconil Action and Secure to keep his turf healthy, even when turf stress is high.

"I'm applying those products on my fairways and greens pretty much every two weeks," says White. "I'm able to push things farther and do more practices like double cutting and rolling. It's helped and I'm able to push the greens."

There have been two renovations during White's tenure, and the club has plans to complete one more phase in the near future. During those renovations, White says that the plant growth regulators Primo and Trimmit really helped him keep his course in peak condition when he had to focus on construction.

"I've been using Primo and Trimmit in combination on my greens and fairways, and they definitely help with the stress," says White. "That combination gave me more flexibility to take care of odds and ends on the back end of the construction process."



Ted White
SUPERINTENDENT

Hole

Hole No. 18

Maketewah Country Club

CINCINNATI, OHIO

▶ 170 YARDS, PAR 3

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“To whom it may concern’ was the start of a cover letter I received recently... My contact info was on the listing more than once... It’s never too early to make a bad impression.”

STEVEN WRIGHT, CGCS, Pine Tree GC, Boynton Beach, Fla.

Uncover the right cover letter

“**T**o whom it may concern” is not the proper way to introduce yourself in a cover letter. Unless, of course, you want it to go to the bottom of the stack, or worse, the circular file.

This is a trying time in our industry. Everyone is trying to hire an assistant! Nationally, one site lists more than 80 assistant and 23 second assistant positions. The GCSAA job board reflects similar numbers.

Obviously, some are the same jobs posted on different boards. In the south Florida area, eight open assistant positions at good clubs are advertised right now. Starting salaries are better now than last year. To say it is a highly competitive market is accurate. Competitive in one way: clubs trying to fill open positions. Unfortunately, most of the few résumés we get won't get an interview because of simple mistakes.

“To whom it may concern” was the start of a cover letter I received recently. I know I put my contact info in the job listing, but I re-checked anyway. “To the hiring manager” was

another opener. My contact info was on the listing more than once. It's never too early to make a bad impression.

I also received another cover letter and résumé that was so vague, I wasn't sure for what job this applicant was applying. (BTW, I was only advertising one position). I've received several that were too long, and some that were too short. Cover letters still are important, especially in management positions. Cover letters are read by someone who will decide whether to talk to you further. Does your cover letter represent you well enough that the decision maker considers it worth his/her time to interview you?

Some obvious tips come to mind:

1 Check the job posting to make sure you address your cover letter to the right person. Then, make sure you address it to the right person.

Redundant, yes, important, yes. Wrong name or wrong company is a major mistake that I see every time I advertise a position.

2 Cover letters are not “one size fits all.” Do not use the same cover letter for different jobs.

3 Grammar is still important. Don't think you can get by on spell check and your own ability to spell check. Have someone double check you.

4 No more than one page, please. No matter the position and your qualifications, a wordy cover letter goes nowhere.

5 Qualifications. Simple examples directly related to open position are fine. Avoid using superior, exemplary, outstanding or other ridiculous descriptions of your qualifications. It's OK to tell your story. Make it about why you are the right person

for the job. Try not to rehash your résumé. No unsupported claims, either. It all comes out in the end.

6 Research the company or club to which you are applying. A little bit goes a long way here. Again, don't get carried away. Maybe you will find a great idea while researching. Maybe you'll decide it's not the right fit based on your research.

7 Follow the instructions on the job posting. Twitter is good for getting the word out, but a little too casual for official job search. Follow-up with cover letter and résumé.

Cover letters are the first document regarding you that a potential employer reads. In our profession, it's still widely recommended to send cover letters for every job for which you apply. Résumés have structure and guidelines that you should follow strictly. There are plenty of online resources, and GCSAA has a great team dedicated to help with résumés/cover letters.

I'm not sure how many assistants (30 plus) that I have had the pleasure of working with through the years, but each one began their career with me by attaching an acceptable cover letter with their résumé.

Job hunting is all about finding the right match for both parties. Give yourself the best chance with a good cover letter. #justsaying.

Steven Wright, CGCS, is golf course superintendent at Pine Tree GC in Boynton Beach, Fla. He can be reached at steven_wrightcgcs@pinetreegolfclub.net or followed at [@wrightsteve19](https://twitter.com/wrightsteve19).

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

Golfdom Gallery



1 Shoppers anonymous *Golfdom* EIC Seth Jones ran into Justin Apel, executive director of the Golf Course Builders Association of America, at the merchandise tent at the U.S. Open. (If you ever see the two in matching U.S. Open golf shirts, now you know why.)



2 Game room (L to R) Steve Ablor of Reinders Inc. and Jeff Vannoy and Eileen Sarro of BASF were diamond sponsors of the Erin Hills maintenance team. No, that's not the local sports bar in the background — that's the volunteers' game room!



3 Walk the line It took the crew only about 30 minutes to mow down a swath of fescue rough that was knocked down by storms on No. 14 at Erin Hills. And it took Twitter only about 30 seconds to accuse the USGA of capitulating to player complaints.



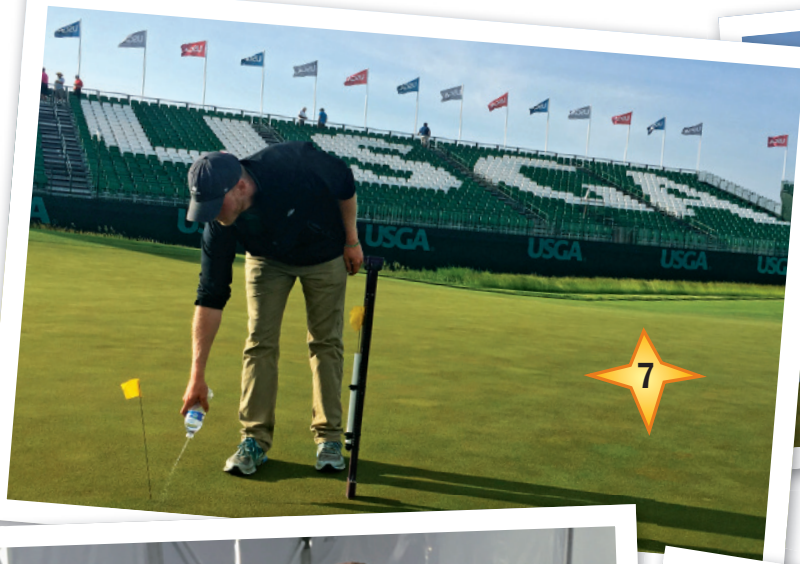
4 Big Cat on the doolies Brandon "Big Cat" LaMarche doesn't mess around. Not only does he "roll doolie" with the double-blowers, he also wears a weighted vest when he caddies at Erin Hills. #BeastMode.



5 Dialing in 18 fairway No. 18 at Erin Hills measures 663 yards from the black tee. That's a pleasant ride for these 13 Toro fairway mowers.



6 U.S. Open house party The party at Jason Straka of Fry/Straka Global Golf Course Design included good food, good conversation and of course, good beer. Left to right: Don Habenicht, VP of field operations, Professional Golf Services; Jarrod Dunlap, Business Development Officer, Samet Corp.; Straka; Derek Dirksen, shaper, Derek Dirksen Golf Shaping; Jones and Ashley Hoye, manager, Darby Dan Management Co.



7



8

7 A drink of Dasani When it comes to the U.S. Open, it's all about the fine details. Erin Hills Spray Technician Kevin Hartenberger hits a single dry spot with a splash of bottled water.



9



10

8 No shaking Kershasky There was no distracting Jerry Kershasky of Reinders Inc., who was on the fairway mowing crew. That's a Toro Reelmaster 3550-D he's masterfully operating.

9 Loyal readers "Guys, what's your favorite magazine in the industry?" Erin Hills crew members Tommy Adair (center) and Avery Mansueto knew their answer right away. (Too bad we're losing Adair to the finance industry — best of luck Tommy!)



10 Juan to remember The Erin Hills staff and volunteer crew all wore these wristbands in remembrance of former Erin Hills Assistant Mechanic Juan Cruz-Reyes, who tragically passed away just months ago.

11 Knew I forgot something As Jordan Spieth lined up his drive on No. 10 during his solo Wednesday practice round, a young fan asked if he needed a practice partner. Without taking his eye off the ball, Spieth asked, "Bring your clubs?" and then grooved this drive down the fairway.



11



12

12 Act natural Darin Bevard, the USGA's Director of Championship Agronomy, and Zach Reineking, Erin Hills superintendent, do a good job pretending not to be busy. This was possibly the one moment the two both stood still during the U.S. Open. Glad we were there!

PHOTOS BY: SETH JONES (1-56912); GRANT B. GANNON (71011)

The Golfdom



FROM THE ARCHIVE

Keith Wood's staff at Quail Hollow, Charlotte, N.C., is a group of well educated, experienced assistant superintendents (see PGA Championship preview, page 18). The importance of a strong staff is not always easy to convey to a membership.

In the May 1973 edition of *Golfdom*, Warren Bidwell, manager of golf course grounds at Congressional CC, Bethesda, Md., told the story of Wayside Country Club Superintendent Bill Jones and the time a new board member, Harry Sommers, questioned the importance of having on staff two turf students and an assistant superintendent, Ron Hilger. Bidwell used the article to show how superintendents can defend themselves in a similar situation. To read the full article visit golfdom.com/exclusive.

The undefined role of assistant superintendent

BY WARREN BIDWELL

THE ANSWER

Bill Jones, a turf management graduate of James State 12 years ago, had anticipated a few questions and was prepared to provide the answers. The last time this challenge came up concerning turf students "living in" at the club was seven years ago, when he wasn't as well fortified as today. Without hesitation, Jones reached into his attaché case and pulled out a folder containing copies of information relating to the turf management students who had worked on the golf course in previous years — how long they had worked at Wayside, their performance record, Jones' letter of achievement to their respective schools, where they went to work after graduating and where they are presently located as golf superintendents. Obviously, because they were his "boys," Jones' interest in them continues. The last folder he pulled from the case was reached for by Sommers, who opened it immediately.

The first item Sommers found in the file was Hilger's resume, an impressive bit of background information, indeed. Seeing the attached picture of Hilger

brought an immediate response from Sommers. "Yes, I remember this man. He does your chemical application work. We had quite a chat last summer while the spray tank was being filled just off the fourth fairway. The impression I received was that he certainly knew why he was out there and the exact nature of the disease he was treating on a preventive basis. But I didn't know at the time he was your assistant. This throws a little different light on the subject."

THE INVOLVEMENT

The turf management trainee students at Wayside, who are fortunate in having a room-and-board situation, really don't cost the club "extra money," as Sommers thought. Actually, the student/club relationship is more of a mutual benefit arrangement than it appears on the surface. Most of them get "hooked" on a golf-oriented relationship as a result of their love for the game and the intrinsic ingredients that entice them to become involved in a golf environment.

Who, then, Mr. Sommers, is in a better position to offer a helping hand to such

young men than the golfer himself, his club and the great golf associations that are present in every metropolitan community in the country? A mutual responsibility with your superintendent, Bill Jones, who is interested in the future generations (providing) greater quality? Yes, indeed. Even an obligation to share this great opportunity.

THE FUTURE: AN OBSERVATION

Adequate provisions for an interested and reliable maintenance staff must remain a high priority if the quality of golf course maintenance is to survive the decades. Proper encouragement to both turf management trainees and qualified assistant golf course superintendents are a necessary part of this picture, a mutual responsibility to be shared by progressive superintendents and clubs. To those club officials who are looking to apply Ben Franklin's adage, "A penny saved is a penny earned," there is this rejoinder: Penny-pinching has never proved to be the true road to turf quality. Quality is a highly desirable facet in all things in life. The satisfaction and justifiable pride of the golfer and the professional image of the superintendent is totally dependent on quality. Let us continue this quest together.

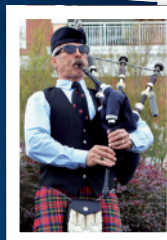


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2016 Highlights

“What a great event! I really believe y’all have found a ‘sweet spot’ in the superintendent community, in that we have generally been limited to big conferences where we have no time or really inclination to meet one-on-one, or a very haphazard meeting with a local sales rep. The *Golfdom Summit* really let me dig a little deeper and think about options/products in a more rigorous and detailed fashion. It goes without saying, the chance to interface with such talented superintendents was icing on the cake.”

—SCOTT EBERS, CGCS, COLONIAL CC, FORT WORTH, TEXAS



“The *Golfdom Summit* was a fantastic experience and like no other event, meeting, seminar or gathering of superintendents that I’ve ever experienced. From learning to networking, from fellowship to bonding, it could not have been better.”

—THAD THOMPSON, TERRY HILLS GC, BATAVIA, NY

“Wow, what a great event! I was thoroughly impressed with all aspects of the Summit and came away educated, energized and full of new ideas I can use to make my course better!”

—JEFF ELDRIDGE, CGCS, LAKE QUIVIRA (KAN.) CC

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GET 'ER DONE!


BY SETH JONES

Q

uail Hollow Superintendent Keith Wood remembers one of his first experiences with celebrated architect Tom Fazio. It was during the 2015 Wells Fargo Championship, and the two were driving around the course during the Wednesday Pro-Am. They pulled up to No. 16 tee, a 506-yard par 4, the beginning of the famed “Green Mile” at the course, in time to see 2013 Masters champ Adam Scott saunter up.

“Scott is pretty big and he’s standing there gripping his driver and *wha-bow!* He just smokes this drive,” Wood recalls. “Mr. Fazio and I look at each other and then back to Scott. Fazio tells me, ‘Let’s go find out where he hit that ball.’ So we drive down and we get to his ball... he’s only 150 yards out. Mr. Fazio looks at me and says, ‘I just can’t do anything about that.’”

But that doesn’t mean they can’t try. Because at Charlotte, N.C.’s Quail Hollow, host course of the 2017 PGA Championship, the words “can’t do” are meaningless.



In only 89 days, the crew at Quail Hollow converted 18 greens, grated 20 acres of land, laid 43 acres of sod and moved 50,000 cubic yards of material. The 2017 PGA Championship is the reward.

"When you spend one year at Quail Hollow you're going to get three years of experience," says Keith Wood. "You're going to see an overseed, a transition on the bermudagrass growing back in... and some kind of construction."

"The one thing I have learned here at Quail Hollow is there's no such thing as 'scope.' Everything is within grasp," Wood says. "Because what started as just a greens conversion ended up turning into a world of work."

A greens renovation was set to begin upon the conclusion of the 2016 Wells Fargo Championship. When Fazio heard the course was going to close for 10 weeks, he saw an opportunity to complete a master plan that had been kicking around since the 1990s. Course President Johnny Harris asked Fazio if he thought he could get the project finished in 13 weeks, and he said he could. Then Harris asked Wood what he thought.

"My response," Wood says, "was, 'We will do whatever you ask us to do.'"

Fazio had no doubt in his mind that he, his team and the Quail Hollow maintenance team had the right stuff.

"You set high, high goals and you meet them and you exceed them — that's the all-American ideal," Fazio tells *Golfdom*. "Keith knows what his job is and he knows how to get the job done. That's the way it's supposed to be — it's not an accident, it's not a surprise. It's our job."

Continued on page 20

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NO GREENS FOR OLD MEN

The job of overseeing the project from the maintenance side would belong to Wood, who has been superintendent at Quail Hollow since May 2015. A highly educated turf pro (bachelors of science in biology from the University of South Carolina, associates of science degree in turf management from Rutgers), Wood didn't come to the profession because his father was a superintendent, or because he lived on a golf course, or because he had a passion for playing the game.

He came to the profession because he didn't have a ride.

"My college roommate was a bag boy at the local country club, and I didn't have a vehicle at the time," Wood recalls. "I needed a job where I could get a ride to

work, and the superintendent was hiring. I got a job mowing greens and I loved it."

Wood looks back at his career path now and calls it "a little bit of luck, a lot of hard work." He followed his superintendent, Kevin Redfern, to Grandover Resort in



Keith Wood

Greensboro, N.C., working for him for five years until he got his first job as a superintendent, at Florence (S.C.) CC, which hosts a Qualifying School event. "That's how I got hooked on tournament golf and working for a private membership," he says. After five years at Florence, he took the superintendent job at Sedgefield CC back in Greensboro, which hosts the Wyndham Championship.

The staff at Quail Hollow is usually 38 people strong. With volunteer support, it will beef up to 125 people for the PGA Championship.

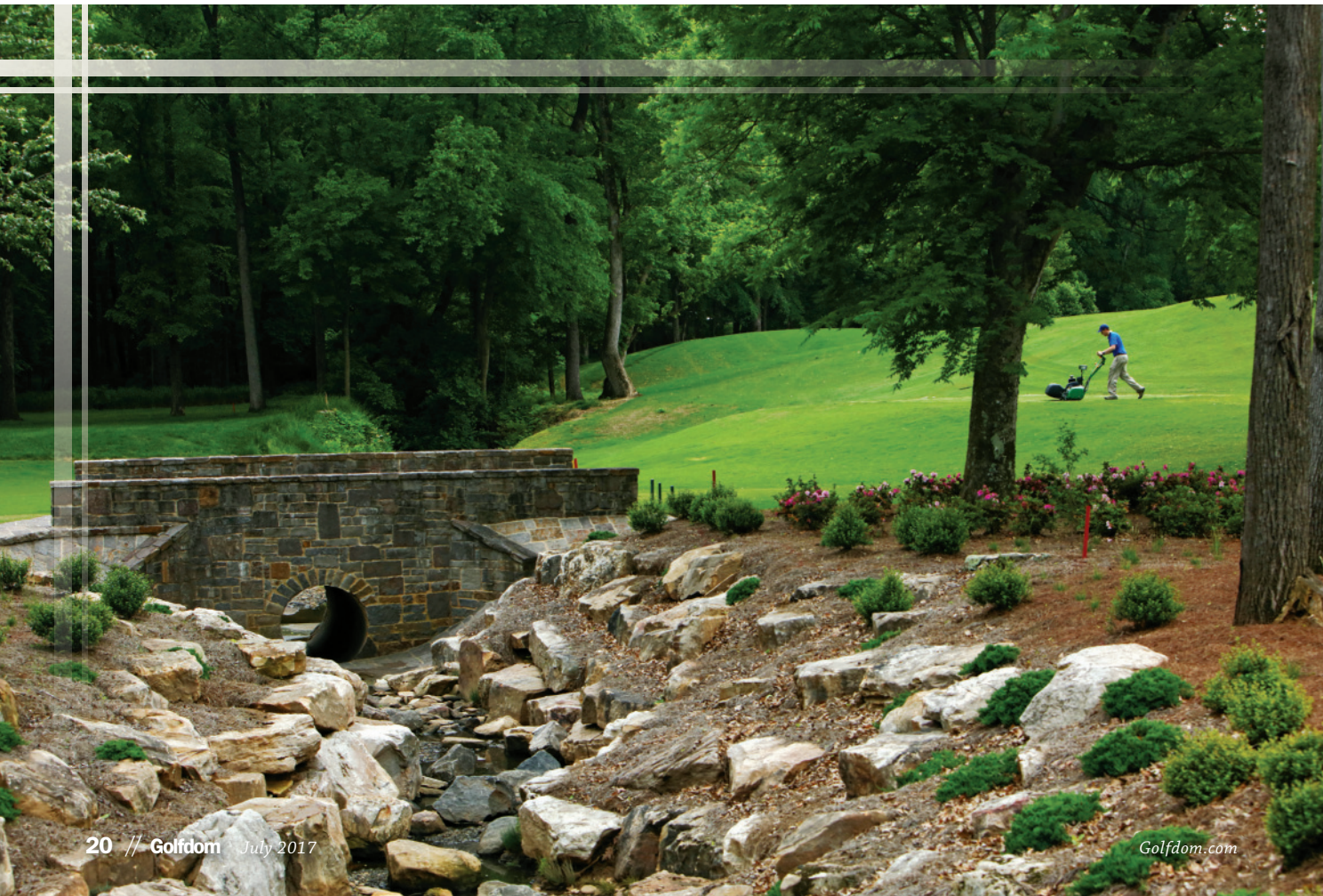
At Sedgefield, Wood oversaw a greens renovation, converting the greens to Champion bermudagrass. The success of that project drew some attention from the industry. When the job at Quail opened — which was staring down the same conversion on their greens — Wood was the person who got the call.

"I guess I interviewed well," Wood says, denying the idea that he is some Champion bermudagrass whisperer.

"I wouldn't say I'm an expert (on the grass), but I'll say that Champion suits me as a superintendent because I'm a hands-on superintendent," Wood says. "I like to think that I have a good grass intuition. I know what I'm looking at with grass. I know what I feel when I walk out the door

Continued on page 22

PHOTOS: HERE AND PREVIOUS PAGE BY TRAVIS DOVE





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Continued from page 20

with the weather. I know what to expect when I look at the forecast. Putting all three of those things together adds up to a good management program, which lends you to have good Champion greens.

“One of my best friends has Champion as well,” Wood continues. “We always joke that Champion is not an old-timer’s turfgrass because it changes throughout the day. You’re always managing it. If you take your eye off the ball, then you’re going

to swing and miss and your greens aren’t going to look so good.”

89-DAY GRIND

Imagine this: Sunday at the 2016 Wells Fargo Championship. Then-leader Rickie Fowler and Roberto Castro are the final pairing of the day. They finish up on No. 9, and the gallery follows them to No. 10.

While all eyes were on Fowler and Castro (James Hahn would eventually win in a playoff) the crew was lurking on

the front nine, prepared to start making changes while the tournament was still being played on the back.

“We started shutting down irrigation on the front nine as soon as play moved to the back nine,” says Brandon Hicks, one of the three assistant superintendents at Quail. “To start that grind right then and come out clean on the other side, it’s pretty neat to sit back with your peers and say, ‘Look what we did.’”

Among the work completed was a conversion of all 18 greens. Hole 1 was lengthened and Hole 2 was eliminated; a new No. 4, a par 3, was created where the old No. 5 tee was; and No. 5 was adjusted to fit in with its new neighbor. More than 80,000 man hours were worked over the 89 days. They laid more than 43 acres of sod, cleared and grated more than 20 acres of land and moved around 50,000 cubic yards of material.

Construction began May 9 and wrapped up Aug. 6 — a total of 89 days. It was an 89-day grind, but one not unfamiliar to the experienced crew at Quail Hollow, Wood says.

“A lot has gone on over the past five years. They’ve seen the Green Mile get rebuilt. They’ve seen changes on No. 13. They’ve been through a couple of renovations from bentgrass to bermudagrass. Now they’ve seen the completion of Mr. Fazio’s master plan,” Wood says. “These guys really embody what it takes to hunker down and do what it takes to get it done. I can’t say enough about them.”

So, Wood clearly gave everyone the day off on day 90, right? Anyone who works in this business knows that is never the case.

“Day 90 was the most stressful, because

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PHOTOS BY: KEITH WOOD



Once play from the 2016 Wells Fargo Championship moved to the back nine on Sunday, the crew started shutting down irrigation on the front. "To start that grind right then and come out clean on the other side, it's pretty neat," says Brandon Hicks.

now everyone was coming out to play the course that had been closed for so long," says Assistant Superintendent Shane Omann, laughing. "But it was a sense of relief across the staff. You work so hard, you get instant gratification to see the outcome. That's a lot of blood, sweat and tears — the team was very excited."

Assistant Superintendent Basil Lowell

has been at the course since 2012 and has worked at such courses as Jupiter Hills, Nantucket Golf Club and MacArthur prior to his time at Quail Hollow. A golf nut, he was concerned with how the changes would affect what he believed was a perfect test of golf. Now, seeing the end result, he's a believer.

"The new No. 1 is spot-on, it came out

perfect," he says. "It fits the rest of the course. It's a nice dogleg par 5 for the members, a par 4 for the Tour. It's amazing how these architects can see this — move X amount of dirt and it comes out like this."

"Not everybody gets the opportunity to be involved with something like (the PGA Championship), and especially what we did last summer," Omann says. "I'm especially grateful for it, because now I know what great is."

Continued on page 24



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TIME ON THEIR SIDE

The crew at Quail Hollow is used to having a PGA Tour event in May. The PGA Championship arrives in early August (Aug. 7-13.)

That means different weather, different grass and different preparations. With no tournament in May, the course wasn't overseeded this year, so it's fully growing in June. The crew sees the later calendar date as nothing but a positive.

"The great thing about Mr. Harris and the Fazios, they are so focused on making this property the best it can be that they're going to tweak and tweak and tweak until they're happy with something," says Wood.

"It's a breath of fresh air, we have a little more time to make sure everything is better," says Lowell. "The timing is better for bermudagrass. Everything has actually been more relaxed at Quail."

"The grass is licked, we've got that under control," Omann says. "Staying organized is the challenge, day in, day out. Overachieving is the goal."

It's rare to find a course that gets more relaxed when a major comes to town, but Quail Hollow seems to be that relaxed. Hicks says it's not because the crew is overconfident, but instead, they get their confidence from Wood, whom he calls "one of the smartest, most passionate, driven individuals" he has been around. Another part is experience. He and Lowell have worked together on four Wells Fargo Championships, Omann has done three. Plus, Wood has two under his belt, along with his years hosting the Wyndham Championship. And there are 13 turf degrees from seven different colleges on staff.

"A lot of our (crew) has a real practical understanding and knowledge of what we're trying to do," Hicks says. "We spend a lot of time discussing why we're doing what we're doing. It's challenging but rewarding. The cool thing is there are a thousand ways to do it right, and a guy who just graduated turf school might have a

Continued on page 26

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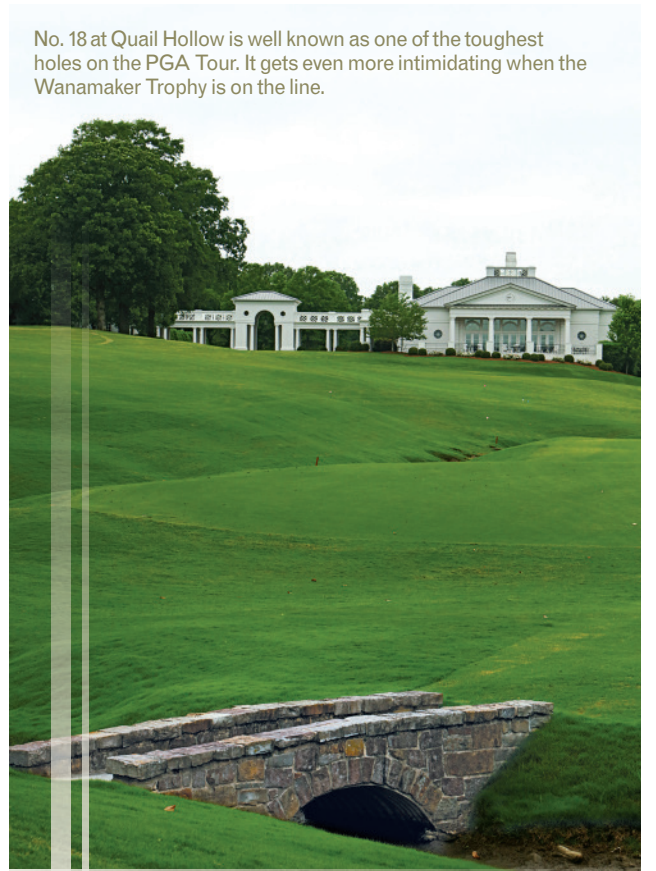
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No. 18 at Quail Hollow is well known as one of the toughest holes on the PGA Tour. It gets even more intimidating when the Wanamaker Trophy is on the line.

PHOTOS BY: TRAVIS DOVE (ABOVE), KEITH WOOD (PAGE 25)



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THE LEADER. SINCE 1961.

Continued from page 24

different idea or perspective. It's great that I can have a guy 15 years younger than me open my eyes to a different way of doing something."

Fazio sees Quail Hollow as a golf course that has evolved with time, and he's excited to see the new-and-improved course host its first major. But he agrees: In the end, it's about people.

"This is a case study on how to put a whole program together. Whether it's a member operations or a regular PGA Tour event or a major championship, this course has gone through multiple stages of testing," Fazio says. "It used to be that (projects) took a long time, but that's not the case now with the technology that's available and with sod and with the many intricate pieces that can be done with the talented people working at a property. It's all about supervision, good leadership and direction." 



"It was a really a fun experience working with the group at Quail Hollow — (Club President) Johnny Harris and Keith (Wood) and the crew," says Tom Fazio. "We've had a great association and it's going to pay off this August."

GOLFDOM AT THE PGA CHAMPIONSHIP

Golfdom will be at the PGA Championship at Quail Hollow beginning Sunday Aug. 6, covering all the action behind the scenes with Keith Wood and his crew as they prepare to host the final major of 2017. Visit Golfdom.com and follow Golfdom on Twitter (@Golfdom) for the latest news, photos of the crew in action, video interviews and of course... giveaways! Golfdom's coverage of the 2017 majors is sponsored by BASF.



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FIELD OF DREAMS

Smithco celebrates 50 years
of improving turf maintenance

BY KATY IBSEN

For Ted Smith, founder of Pennsylvania-based Smithco, his greatest ideas came from the field.

Of course, Ted's proverbial "field" could be defined as many locales, but none more important than along the fairway. Here he would envision machinery that would ultimately change the way superintendents care for a course.

Following World War II, Ted became a wool broker; a trade that offered skills that he would later use at Smithco. As the world changed after the war, Ted began to see the introduction of synthetic fabrics and anticipated a large decline in the need for

wool — he decided to make a change.

At the time, Ted went to work for Tom Mascaro, of the turf business, as his sales manager. While at Turf-Tec International he expanded his own knowledge of the industry and developed valuable relationships in the business and at the distribution level.

"(Ted) eventually decided to start his own company after working with Tom for a number of years," says Emil Miller, Smithco marketing manager. "He ventured out on his own with the one idea he started the company with — the Red Ryder."

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As Miller suggests, Ted's entrepreneurial start was a quintessential American story, but for those in the business, it was more about a man who loved golf and was driven to make the game's courses easier to maintain.

Smithco was founded in 1967 with the Red Ryder, but well before the product was introduced, Smith was on the course visiting with superintendents.

"Most of Ted's really good ideas came from the field, from talking to superintendents," says Miller. "Ted spent time learning what they needed and thought about what would ultimately make their jobs better. He learned from them and imagined more efficient tools for the tasks of maintaining a golf course."

Fifty years later, the Red Ryder remains a symbol of Ted's curiosity and accomplishments rooted in one common theme — appreciation for maintaining the field.

A family affair

A family man, Ted raised three children in Wayne, Pa.; he played countless rounds at St. Davids Golf Club, and loved to have a good time.

"Ted was a great guy, great guy to work for, good sense of humor. I never heard him play the piano, but I hear he was a hell of a piano player," says Miller, a 25-year veteran of the company. "I can't say enough good things about Ted. He'd tell stories about the old days ... I'd sit around and listen."

Before long, the family man's company became a family affair; in 1971 Ted's youngest son, Don Smith, joined the company after returning home from the Vietnam War.

"I think the most interesting thing about Smithco is that my father was 54 when he started the company," says Don, Smithco

★★★ Today Smithco sells its Sand Star line of bunker rakes, but it all started with The Easy Rider. This bunker rake was the first model the company offered.



★★★ (Center) Ted Smith founded Smithco in 1976 and his son (left) Don Smith now serves as president. The father-son duo are pictured with Plant Manager Larry Johnson.

president. "The uniqueness of him being at that age was in itself something special."

It was special — it illustrated a certain drive that was likely ever-present in Ted. It created a visionary who didn't cave easily.

Don, along with Bill Kenney, vice president, credit the hard-working employees of Smithco for the company's positive reputation in the turf industry.

Ted was a good judge of character, aiding in building the right team. "He chose the right people and he told them that if everyone does the job they are supposed to do, we will succeed — everyone did what they were supposed to do," says Don.

For Don, the employees are one of the major factors of Smithco's 50-year success.

During Smithco's growth, Ted acquired manufacturing factories in Kansas, Wisconsin and Texas — today two are still in operation. With each acquisition came the employees, many of whom still work for the company.

"The core employees are very dedicated, and on the manufacturing side of the business, because of the length of time that everybody's been there — it certainly runs itself," says Miller of the well-oiled machine currently employing 70 people.

The little machine that could

Serendipitous to the Smithco story is that the Red Ryder was actually born at its Kansas factory in the 1960s.

Ted saw the machine at the Kansas City superintendent's trade show, where a small manufacturing company was showcasing a small utility vehicle built in a factory located in Humboldt, Kan.

"It was the plant manager that had this idea for a vehicle that ... literally he wanted to give to missionaries in third world countries. It was a little machine that was very low to the ground, you could load a lot of stuff into it, easy to operate," says Miller.

"Ted realized what it could do for the turf industry in those days. There was literally no riding greens mowers until 1967 when Smithco started, so the walking greens mower was a perfect fit."

Once developed, the three-wheel motorized vehicle with a small tow trailer revolutionized golf course maintenance. Previ-

PHOTOS COURTESY OF SMITHCO



★★★ The international company manufactures products in five different categories. While they don't mow, they provide about every other function needed to keep a course looking pristine.

ous to its invention, greenskeepers put tires on the greens mowers and walked from hole to hole. When they got to the green they'd remove the tires and mow the green, then re-attach the tires and go on to the next green.

"It was kind of tedious to get around the golf course," says Miller.

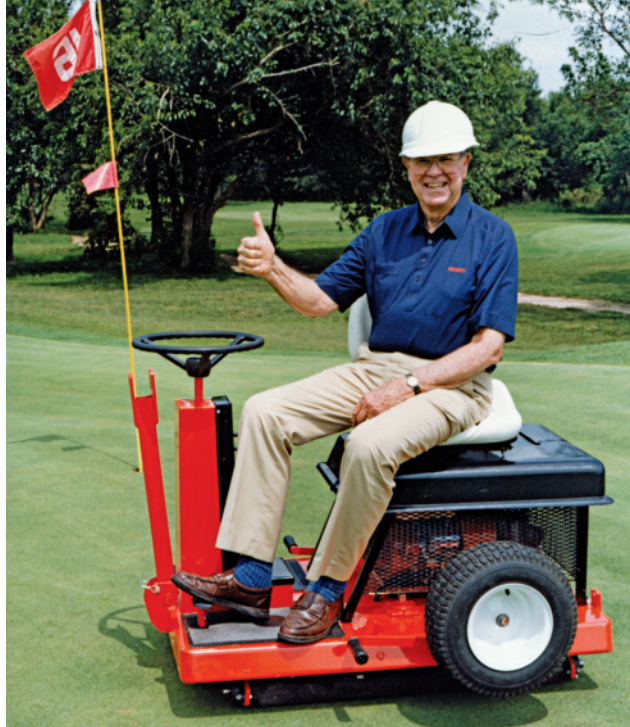
The Red Ryder solved that very inefficient chore. The design allowed greenskeepers to put at least two mowers in the back of the Red Ryder, now riding from to hole to hole.

"Instead of walking, they could transport, obviously at higher speeds and become a little bit more productive," says Miller.

"It's the one product that everyone remembers," says Don. "We sold a lot of them for about five or six years, then he expanded the company in the '70s and '80s to the bunker rakes, sprayers and all the things we have now." All told, Smithco has sold more than 10,000 Red Ryders in its 50-year existence.

Today the international company manufactures a number of golf course and turf maintenance products among five categories. The specialized equipment does not mow, but provides just about every other function to keep a course or field looking pristine and in good health.

"When we design a product to do a job, it does that job better



★★★ Smithco Founder Ted Smith sits on an early model of the Tournament Greens Rollers. They introduced their first greens rollers in 1992 when the cultural practice was just a "fad."

than anything else," says Miller. "Our application is what makes Smithco successful. The range of tools and implements that make the job easier is really what sets us apart."

Smithco grew from the Red Ryder to powered bunker rakes, sprayers and riding sprayers, riding sweepers (which took the company into the baseball market), greens and fairway rollers.

Miller recalls a 1992 trade show in which the company introduced the greens rollers.

"It was a fad back then. When it first started, I told the story many times of being in the booth in New Orleans in '92 and having superintendents come in and look at it and laugh and go 'Yeah, I'll never do that for my greens.' Now everybody does it," says Miller.

Smithco, while born out of golf, began to diversify amid the 2008 recession. As the game of golf began to see a decline in participation, communities began to see an increase in youth sports.

Continued on page 30



"Ted Smith made golf course management more efficient."

EMIL MILLER

Smithco innovates with data

As Smithco continues to develop new products, they have done so with select research programs. For Emil Miller, marketing manager, the collection of data not only improves the products they develop, it provides a compelling story for marketing.

"We talked to some people

out in the field; talked to some Ph.D.s who wanted to do research to reduce disease reduction when using the roller," says Miller. "We thought it would be a good idea and it's been very successful for us."

Smithco's current research programs include:

University of Massachusetts

- Fairway Rolling, the Fairway Ultra 10, to reduce Dollar Spot. Beginning year three of program with Geunhwa Jung, Ph.D., associate professor, and James Popko, research assistant.
- Fairway Rolling, the Fairway Ultra 10 & 15, to reduce thatch levels. Year one of program with Geunhwa Jung, Ph.D., and James Popko.

Michigan State University

- Fairway Rolling, the Fairway Ultra 10, to assess golfers' perception of ball roll and turf quality. Working with Thomas Nikolai, Ph.D.

University of Georgia

- Precision Sprayers, the Spray Star 2000 Star Command, to compare turf needs and prescription application of chemistry. Working with Henry Schaefer, Ph.D.

Continued from page 29

"The municipal business has really grown as youth sports have become more organized and professional," says Miller. "Title IX was a great thing for those who make sports turf machinery. You added girls to the picture and we literally doubled the business."

Smithco defined this sector as the sports market and once again began looking at what inefficiencies could be corrected. Simultaneously the company saw international interest in the growth market as golf was growing overseas, especially in southeast Asia. "Also, in less developed areas of the world," says Miller.

"Labor was mostly manually accomplished and there is a slow shift to machinery. It's still cheaper to use labor, but machinery saves them a lot of time."

As for the next 50 years of Smithco, Don assures, they won't sell the company. "(Smithco's) created quite a bottom line for profit. As long as the company is successful and making money there is no reason to sell it."

For now, they honor Ted's legacy and the success he initiated.

"It has grown from a single man with a single product, to a 50-year old company that makes a range of products," says Miller. **G**



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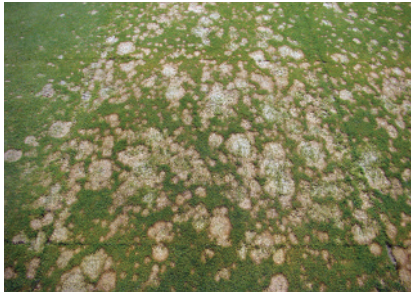
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Non-treated plot (left) compared with a plot that received an experimental bio-control product (consisting of the fungi *Trichoderma harzianum* and *Trichoderma virens*) every two weeks in combination with rolling five days a week (right) in Corvallis, Ore. on Feb. 16, 2015.

// **BIG WHEEL KEEPS ON, WELL YOU KNOW...**

ROLLING PLUS BIOLOGICAL CONTROL OF MICRODOCHIUM PATCH

By Clint Mattox, Alec Kowalewski, Ph.D., and Brian McDonald

Microdochium patch (*Microdochium nivale*) is a major turfgrass disease in cool, humid regions that causes extensive damage to annual bluegrass (*Poa annua* L.) putting greens in the absence of fungicides. Increasing restrictions on fungicide use and fungicide resistance has sparked interest in finding alternatives to fungicides for managing Microdochium patch. The objectives of this trial were to evaluate the effects of rolling and biological control products on Microdochium patch on an annual bluegrass putting green in the absence of traditional fungicides.

We applied several biological control products at label rates every two weeks from September to June for two consecutive years at the Oregon State University Lewis-Brown Horticulture Farm in Corvallis, Ore. We applied treatments with a backpack sprayer at a rate of 2 gallons of spray solution per 1,000 sq. ft. at 40 psi, and the annual bluegrass putting green was maintained at a 0.150-inch height of cut. In addition to the biological control products, we rolled half of the plots five days a week. We did not apply traditional fungicides from September to June in both years of the study.

Microdochium patch was suppressed by rolling five days a week, and also was suppressed with applications of the biological control products BW136N (consisting of the fungi *Trichoderma harzianum* Rifai strain T-22 and *Trichoderma virens* Arx strain G-41) or Rhapsody (consisting of the bacteria *Bacillus subtilis* strain WST-713). Because of the lack of complete control of Microdochium patch, turf quality was considered unacceptable for putting greens, with rolled treatments in combination with either BW136N or Rhapsody having the highest turf quality rating in both years of the study.

While no treatments provided control comparable to traditional fungicides, future research evaluating rolling or biological control products in rotation or combination with other products such as sulfur or mineral oil may yield more favorable results.

NEWS UPDATES

GCSAA FUNDS \$115,680 FOR NEW TURFGRASS RESEARCH

Research grants from the Golf Course Superintendents Association of America (GCSAA) are supporting seven new research projects this year at six universities across the country (two projects are being carried out at Texas A&M).

The projects, which were selected by a committee comprised of two members of the GCSAA board of directors, superintendents, university researchers and the research director of the USGA Green Section, will receive a total of \$115,680 from a block grant to GCSAA by the Environmental Institute for Golf, GCSAA's philanthropic organization.

The new research projects topics are; Developing programs for annual bluegrass control in creeping bentgrass fairways using annual bluegrass weevil, plant growth regulators, and interseeding; Soil physical effects of using the DryJect or Air2G2 on creeping bentgrass putting greens; Fungicide alternative management practices for *microdochium* patch; Tailoring water use to warm-season grasses in golf courses using low-cost drone technology mounted with a multispectral camera; Mapping spring dead spot using unmanned aerial vehicles for site-specific management; Turfgrass colorants: A look inside using scanning electron microscopy; Influence of nitrogen source and water quality on foliar and root nitrogen uptake efficiency.

“IF STUNT NEMATODES ARE RECORDED AT 40,000 NEMATODES PER 100CC OF SOIL, NEMATODES ARE A MAJOR PROBLEM.”

Nathaniel A. Mitkowski, Ph.D.
(see story on page 32)

//THE FOUR TO WATCH FOR

Nematodes on northern turfgrasses

By Nathaniel A. Mitkowski, Ph.D.

Nematodes are everywhere. They're found in all but the most extreme environmental conditions, in soils, oceans, rivers, streams, on plants, in plants and even in animals and humans. Fortunately, most nematodes are innocuous, eating bacteria and occasionally each other. Of the thousands of nematode species, few are pathogens. But despite the small proportion that is pathogenic, all plants grown in natural soils are attacked by nematodes, no matter where they are grown.

Nematodes are most severe in tropical and subtropical climates. Because winter temperatures in these areas usually are above freezing, nematodes can remain active in the soil for extended periods and do not freeze.

In areas where the ground does freeze, such as the northern United States, nematodes have some protection against sub-zero temperatures, and eggs often can remain in soil unaffected for months by temperature. In addition to winter conditions, the growing season in areas like the southern United States

is longer than in the North, which translates into more nematode generations and more plant damage. One significant exception is the soybean cyst nematode, which is widely prevalent and causes substantial devastation from Minnesota to Florida.

Turfgrass parasitic nematodes are similarly more destructive in southern regions than in northern areas, but northern nematodes still cause substantial damage when population numbers are high.

NEMATODES OF THE NORTH

Four plant-parasitic nematodes in the northern U.S. regularly cause noticeable damage to turf: the stunt nematode (*Tylenchorynchus spp.*), the lance nematode (*Hoplolaimus galeatus*), the barley root-knot nematode (*Meloidogyne naasi*) and the spiral nematode (*Helicotylenchus spp.*). Frequently, plant-parasitic nematodes are not identified as to species. There currently are 111 identified species of *Tylenchorynchus*, and species identification can be extremely difficult and time consuming.

Other nematodes are found parasitizing northern turfgrasses, but they tend to be less common and it's unclear how much damage they cause. These include the ring nematode (*Criconeema spp.*, Figure 1), the needle nematode (*Longidorus spp.*), the cyst nematode (*Heterodera iri*), the lesion nematode (*Pratylenchus pentrans*), the pin nematode (*Paratylenchus spp.*) and the sheath nematode (*Hemicycliophora spp.*). And still others regularly attack roots but have not been cited as causing economic damage.

This demonstrates a major point when addressing turf-parasitic nematodes: Their mere presence doesn't mean they are causing symptoms or that damage levels are of concern. Stunt and spiral nematodes nearly are universal on northern courses; however, levels of these nematodes must be relatively high before we observe damage symptoms. Lance and root-knot nematodes tend to be more sporadic in appearance, but lance causes severe damage at lower levels than the other nematodes. Lance nematodes spend some of their time outside of the root, but also burrow through roots throughout the year (Figure 2). This can cause catastrophic damage and makes it difficult to count their true population levels simply by soil extractions.

DAMAGE DETERMINATION

To determine if a nematode population is causing damage to turf, we extract them from the soil and count their numbers. If the number exceeds a set threshold, they may be a problem. Use caution when interpreting thresholds, however, because thresholds are just estimates usually derived using specific environmental conditions (type of grass, season, rooting depth, height of cut, etc.).

FIGURE 1



The ring nematode (*Criconeema spp.*) gets its name from the pattern of distinct rings that comprise the nematodes cuticle, or outside layer similar to a pressurized skin. While relatively common, this microscopic nematode rarely reaches high levels in turfgrass stands, and it is unclear how high nematode levels need to be to observe economic damage.

ALL PHOTOS BY NATHANIEL MITKOWSKI

While 3,000 stunt nematodes per 100cc of soil likely place significant stress on *Poa annua* plants growing in a push-up soil with only one-half inch of root in the middle of July, the same number of nematodes is unlikely to have any effect on a sand-based creeping bentgrass (*Agrostis stolonifera* L.) green with a rooting depth of 5 inches in the fall. Consider nematode population numbers and nematode thresholds in the context in which they were developed. As previously mentioned, there are 111 species of stunt nematode. Do they all cause the same amount of damage at the same population levels? It's unlikely, but despite this, we're stuck with the generic term "stunt nematode."

A superintendent once asked me, "Aren't thresholds just guesses?" The answer isn't simple. In one respect a threshold is an educated guess as to when nematodes are likely to be a problem. But again, every course is different and so is every green. Thresholds stop being educated guesses when they coincide with visual damage.

Unfortunately, symptoms of nematode damage are difficult to identify and are non-discrete. Every superintendent can identify a disease like dollar spot, brown patch or pink snow mold. But nematode damage can dramatically vary in appearance. Turf-parasitic nematodes attack plant roots (with few exceptions), so it stands to reason that symptoms will appear as root damage. But root rots generally are not associated with nematode injury. Shallow, weak rooting is a common nematode symptom. Damage from lance nematodes frequently results in wilted patches, while stunt nematode damage can mimic nutrient deficiencies (Figure 3). Root-knot nematodes also produce patch symptoms.

Nematode damage frequently is most severe in areas with the most traffic, damage or poor conditions. Damage that may appear to be solely walk-on/walk-off injury can be exacerbated by high nematode populations.

FIGURE 2



Lance nematodes are particularly destructive because they enter and swim through the root cortex. In this image, three nematodes can be observed buried in a creeping bentgrass root. In the middle of the micrograph, the head and stylet of a lance nematode is clearly visible with the tails of two other lance nematodes above and below it.

FIGURE 3



Severe damage to a mixed annual bluegrass/creeping bentgrass green caused by high levels of lance nematodes. Damage had been observed repeatedly for a number of years in the same location, typically during mid-summer, but had gone undiagnosed. The superintendent increased levels of aeration and seeding to damaged areas, but nothing less than chemical application would solve the issue.

Frequently, nematodes are implicated after greens have been thoroughly drenched with fungicides but turf quality continues to decline and quality no longer responds to fertilizer and water applications.

Determining that a green does not have a nematode issue is straightforward if numbers are low. If fewer than 100 stunt nematodes per 100cc soil are detected, they are not of concern. Conversely, it's easy to determine that a green has a

nematode issue when numbers are high. If stunt nematodes are recorded at 40,000 nematodes per 100cc of soil, nematodes are a major problem, and most of the turf probably is dead. In 2010, I counted a population this high from a putting green. The guesswork comes in when numbers are between 1,000 to perhaps 4,000 stunt nematodes.

If we use a threshold of 800 stunt nematodes per 100cc of soil, a value of

Continued on page 34

Continued from page 33

1,000 stunt nematodes per 100cc of soil should be a problem. But it may not be, depending upon the inherent health of the turf, the depth of roots and management practices. For this reason, having a single number often is insufficient to determine if a green has a bona fide nematode problem (Table 1).

SAMPLING AND ALTERNATIVE PRODUCTS

In a recent conversation, a superintendent described how he once applied Nematicur (fenamiphos) on the approach side of a green based on nematode counts I forwarded to him from a declining area (approximately 15,000 stunt nematodes per 100cc of soil, which is well over any established threshold). The treated turf quickly perked up and looked better than it ever had. The treated area looked so good, he noted, that members wondered if something was wrong with the untreated area. The untreated area looked acceptable but had moderate nematode numbers that the superintendent decided not to treat because of the scarcity of Nematicur. If both sides had been treated, the green likely would have been in the best condition members had ever seen.

Prior to 2009, few superintendents undertook regular and repeated

nematode sampling. If nematodes were suspected and nematode counts were above threshold, superintendents used Nematicur because it was widely available, inexpensive and usually provided season-long control.

In addition, organophosphates like Nematicur work quickly when turf experiences genuine nematode-induced symptoms. A superintendent generally sees a dramatic improvement in turf quality three to five days after an organophosphate application if nematodes are a legitimate problem, resulting in empirical evidence that's easy to demonstrate to members. Although not labeled for turf nematodes, superintendents who apply chlorpyrifos (an organophosphate insecticide previously known as Dursban) for annual bluegrass weevil also have managed to suppress nematode populations as a non-target effect. When an organophosphate application for nematodes has no effect on turf quality, nematodes probably are below threshold.

The production of Nematicur was halted in 2009. Existing stocks were distributed, and with the help of the Golf Course Superintendents Association of America, superintendents have until Oct. 6, 2017 to use it up or legally dispose of it. As an organophosphate, Nematicur is extremely toxic

and affects just about anything with a nervous system. Approximately 200 mg of fenamiphos, perhaps equivalent to a small ibuprofen pill, would kill a 200-pound adult. But it is an important and effective tool when used carefully and cautiously. Its most significant drawback was its ability to migrate into sandy soils, with the potential to contaminate drinking water in locations with shallow water tables. Even careful use could not prevent it from migrating into these types of sensitive areas.

With the final cancellation of Nematicur, superintendents battling nematodes need to find alternate nematicides. Fortunately, new products have been developed and show promising results, but none are as effective as Nematicur. They are, however, generally far safer to the environment and applicators than organophosphates and carbamates.

The new products are not without drawbacks, and three primary issues have arisen with newer materials.

First, some of them have a limited control spectrum. A nematicide may work on one genus of nematode but not another. Secondly, the product may bind to thatch or get locked up in soils with high organic matter. Finally, the amount of nematicide required to achieve control may exceed what can practically be applied, or it may cause damage to the turf when applied at high rates or inappropriately. Before using any product, superintendents should gather as much information as possible about their specific nematode problem.

SAMPLE ANALYSIS

Superintendent usually count nematodes after extraction from the soil. They sometimes are counted in the roots, but our common thresholds are not calibrated for those types of counts, and only lance or root-knot enter the roots.

The soil extraction procedure typically uses a sugar solution to float nematodes out of soil. The nematodes are lighter than the sugar solution while soil

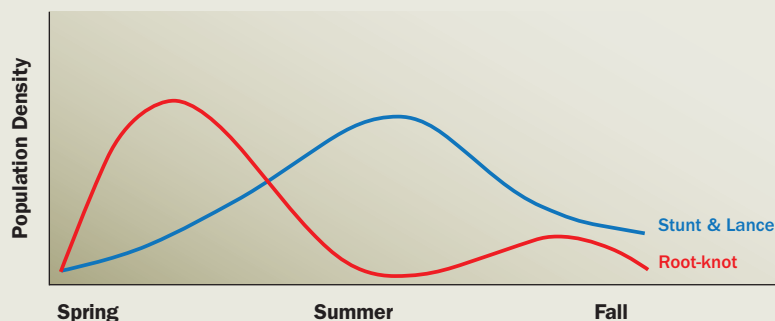
TABLE 1

Nematode	Spring Threshold	Severe Stress
Stunt	800-1000	2,000-3,000
Lance	400-500	1,000-2,000
Spiral	2,000-2,500	4,000
Ring	2,000-3,000	> 4,000
Root-knot	500-700	>1,000
Needle	100-200	> 500

Nematode thresholds vary considerably based on the species of grass being grown, the time of the year, management practices and soil composition. The numbers presented below are typical guidelines we use to determine when nematode populations could be considered problematic, based on a composite sample. It should be noted that nematode populations increase throughout the season, so a population at threshold in April will definitely be much higher in July if no attempt is made to control the nematodes.

FIGURE 4

Turf parasitic nematode life cycles



Nematode populations increase and decrease throughout the season. Most turf-parasitic nematode populations peak in the height of the summer or early fall. However, root-knot nematodes peak in early spring and can only be controlled when the nematodes are present and countable in the soil. Once they enter plant roots, little can be done to manage them.

is heavier than the solution, so separation is relatively easy. However, every lab uses different equipment for extraction and often uses slightly different techniques. This can result in different nematode counts from different labs. Consequently, it may be difficult to compare thresholds from one lab to another. If labs use substantially similar techniques, nematode counts will be relatively close, but never the same.

Superintendents frequently ask how to send a nematode sample for analysis. The best answer: Ask the lab. Labs can determine nematode counts from a cup-cutter plug of soil. Unfortunately, most damage thresholds are determined using composite samples, so cup cutter-sized soil plugs may be misleading.

If a superintendent suspects nematodes in turf decline, a cup-cutter soil plug from a damaged area is a good way to start, but if there's an indication of a potential problem, it needs a follow-up with a composite sample. Composite samples are averages across a green. In this process, the superintendent takes 20 to 30 cores from a green and combines them into a single composite sample. A composite sample allows for a more consistent count and reduces the variability involved if a sample comes from a nematode hotspot.

Take composite sample cores only 2

inches to 3 inches deep. Nematodes only survive where roots are present, so core depths of deeper than 4 inches aren't useful.

Obviously, the depth of the core can change nematode counts by diluting dense populations of nematodes at the surfaces, with empty soil deeper down. Also, composite samples should not be random. Conduct the sampling systematically, using either a grid or zig-zag pattern.

It's important to sample for nematodes at the appropriate time of year. The best time to look for most nematodes is spring through early summer. However, you can detect root-knot nematodes only in the early spring, while juveniles are present in the soil (Figure 4). Once root-knot nematodes migrate into roots, they cannot be extracted with soil and cannot be controlled by chemical means.

Nematodes continue to be a serious issue for turfgrass managers, and while southern regions tend to be the hardest hit, high nematode populations also cause significant damage on northern golf courses. Fortunately, a new set of modern nematicides have been developed to help turfgrass managers deal with these intractable pests.

Nathaniel Mitkowski, Ph.D., is a turfgrass pathologist at the University of Rhode Island. You may reach him at mitkowski@uri.edu for more information.

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“We tend to group all weeds together and say a 'weed is a weed.' But this oversimplification does not lend itself to precision control strategies.”

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

Weeds have no family

Weeds by nature are extremely competitive, especially in disturbed areas. In ecology, disturbed areas are changes in environmental conditions that cause pronounced changes in the ecosystem. Disturbances often occur quickly and are caused by biotic and abiotic factors, including human activity. It's no surprise that many weeds on golf courses are native to Europe, where disturbances, primarily farming, were initiated long before North America was settled and subjected to intensive human disturbances.

The Weed Science Society of America has identified more than 2,000 species of weeds. Yet, the term “weed” has no taxonomical meaning because it doesn't refer to a genus or family. Since no taxonomic base exists for characterizing them, we use other descriptions of weeds, including, “a plant growing where it is not wanted.”

The one I like is from Ralph Waldo Emerson, who described a weed as “a plant whose virtues have not been discovered.” Spoken like an optimistic golf course superintendent.

To help bring greater clarity to weeds and their competitive nature, University of Georgia researchers in 1969 proposed that plant/weed competition could be based on photosynthetic efficiency. Photosynthesis is the process where a plant captures the energy from the sun and stores it in a usable form.

A critical step in photosynthesis

is the fixation of carbon. Carbon is derived from carbon dioxide and is used to construct organic molecules that contain energy acquired from the sun. In the process of carbon fixation, plants use one of three reactions. The reactions are termed the Calvin-Benson cycle (C_3), Hatch/Slack, or dicarboxylic acid cycle (C_4) and Crassulacean Acid Metabolism pathway (CAM). Turfgrasses that have a C_3 pathway often are referred to as cool-season turfgrasses, while C_4 species are referred to as warm-season turfgrasses. The CAM pathway does not occur in turfgrasses and is confined to plants such as cacti found in arid climates.

Given the diversity in weed species, we see all three pathways. Most weed species found in turfgrass areas are either C_3 or C_4 except purslane, which expresses CAM characteristics, and carpetweed, which has been reported to be a C_3 - C_4 intermediate.

In general, C_4 plants are more efficient than C_3 plants at capturing carbon dioxide (CO_2) under increasing temperature and light intensity. Based on the efficiency of capturing CO_2 , the competitive outcome between a C_3 and a C_4 plant usually results in the C_4 plant winning. Thus, the more efficient capture of CO_2 provides a competitive advantage over the less efficient C_3 plants. Although the competitive outcome between C_3 and C_4 plants does not always result in a C_4 advantage, this generalization holds true for turf under many high-light and temperature situations.

For example, let's examine a cool-season turfgrass rough like Kentucky bluegrass. If that rough is exposed to sunny, warm and somewhat droughty conditions, it will be susceptible to a warm-season weed invasion (C_4) like crabgrass. Conversely, if the Kentucky bluegrass rough is shaded by trees, the turf density is high (another shading effect) and the likelihood of crabgrass being a serious problem is low because the lack of light. If we switch the situation to a bermudagrass rough (C_4 plant) that is growing in a shaded condition, the potential for invasion by C_3 weeds is high.

We tend to group all weeds together and say a “weed is a weed.” But this oversimplification does not lend itself to precision control strategies. Simply classifying a weed based on its photosynthetic apparatus can give insight on controlling measures. If a cool-season turfgrass is dense during the summer and is in a partially shaded area, the need for herbicide treatments to control C_4 weeds like crabgrass are less likely or important than if the turf is in full sun and/or has low density.

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

Battling goosegrass

Scott McElroy, Ph.D., is a turfgrass weed scientist at Auburn University. Scott conducts numerous field and laboratory experiments each year to develop weed control strategies for golf courses. You may reach Scott at jsm0010@auburn.edu for more information.

Q How widespread is goosegrass on golf courses in your region?

You'll find it on nearly all golf courses, regardless of budget. Once goosegrass is present on a green it quickly spreads to all greens. It usually gets a foothold in the green surround and spreads to the greens from there because it can tolerate close mowing heights without a problem.

Goosegrass is becoming more widely distributed throughout the country, possibly because summers are becoming hotter and longer.

Q What do you recommend for postemergent goosegrass control on a bermudagrass green?

Currently, Revolver (foramsulfuron, Bayer) is the only herbicide labelled for postemergent goosegrass (*Elusine indica*) control on bermudagrass putting greens. Research has shown that application at 0.4 fl. oz. per 1,000 sq. ft. every two to three weeks — with a total of three applications — works well to control goosegrass. The key is to make the first application early in the season while the goosegrass is small.

It's important that the

golf industry find additional herbicides for postemergent goosegrass control, because in my opinion the probability of goosegrass developing resistance to Revolver is high. Combinations of Revolver plus Dismiss (sulfentrazone, FMC) in field research are effective, but Dismiss is not labeled for use on bermudagrass putting greens.

Iloxan (diclofop-methyl, Bayer) is no longer offered for sale, but superintendents can use existing stocks for postemergent goosegrass control on putting greens.

For season-long control of goosegrass on bermudagrass putting greens, I recommend split applications of Andersons Goosegrass and Crabgrass Control (bensulide and oxadiazon, Andersons) according to label directions, followed by Revolver applied for postemergent control as described above.

Q What do you recommend for postemergent goosegrass control in bermudagrass green surrounds?

A tank mix of Revolver plus Dismiss is effective. I have seen excellent goosegrass control in bermudagrass green surrounds with Pylex

(topramezone, BASF). Pylex functions as an early postemergent herbicide with some preemergent activity, so apply when the goosegrass is small. Be aware that Pylex causes whitening of the bermudagrass that lasts two to three weeks, so use lower rates. You can reduce the whitening by adding a chelated iron product to the Pylex. One application of Pylex won't damage bermudagrass permanently, but more than one application can reduce bermudagrass density.

For preemergent goosegrass control in bermudagrass surrounds, Ronstar (oxadiazon, Bayer) and Specticle (indaziflam, Bayer) are effective. Don't let any of the Specticle reach the green because damage will occur.

Q What do you recommend for postemergent goosegrass control on creeping bentgrass greens?

To my knowledge there are no postemergent herbicides labelled for goosegrass control on creeping bentgrass greens.

The best option for creeping bentgrass greens is to split applications of Andersons Goosegrass and Crabgrass Control (bensulide and oxadiazon, Andersons) according to label directions.

My observation is that the more thatch that is pres-

ent, the more goosegrass that is present. Cultural practices that lead to a firm putting surface and controlling thatch lead to less goosegrass.

Q What do you recommend for postemergent goosegrass control on bermudagrass tees and fairways?

Dismiss or Revolver are good options on tees. In spring, an application of Ronstar as a preemergent reduces problems later in the season.

Goosegrass on fairways is not as big a problem because there is a wide range of preemergent herbicides available to control goosegrass. So, scout on a regular basis and control goosegrass postemergently as it is observed.

Q Is there anything else you would like to add?

Herbicide-resistant goosegrass has been documented on several golf courses. To reduce the chances of herbicide-resistant goosegrass developing, use both preemergent and postemergent herbicides to control goosegrass. Use multiple modes of action when selecting both preemergent and postemergent herbicides.



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

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1 ProCore 648

With its rear-wheel placement within the coring path, to the 48-inch aeration swath, to its variable hole spacing ranging from 1.5 inches to 3 inches, the ProCore 648 aerator's features are inspired from years of research, customer input and testing, according to **TORO**. The product has an operating weight of 1,590 lbs., and features an aeration depth of up to 4 inches. The unit is equipped with a 23-hp Kohler gasoline engine and can reach speeds of up to 3.5 mph.

Toro.com

2 FieldScout TDR 350

The FieldScout TDR 350 is the most recent TDR 300 series soil moisture meter from **SPECTRUM TECHNOLOGIES**. Its newest features include the ability to record EC (Electrical Conductivity) measurements and turf-surface temperature measurements. With its integrated Bluetooth and internal GPS, no additional components are necessary for GPS and Bluetooth connectivity. The data logger can record approximately 50,000 measurements with GPS coordinates. You can save those data records to a USB stick or via Bluetooth connection to smartphones or tablets with SpecConnect FieldScout Pro.

Specmeters.com

3 F-15 Air Force Hover Mower

Coming in at 22 lbs. with an empty tank and less than 25 pounds full of fuel, the F-15 Air Force Hover Mower will run for 45 minutes on a single tank. Its two-stroke, 60cc engine is EPA approved and has no angle limitations when it comes to slope mowing. This mower from **SEAGO** has a 15-inch cut width and a height of cut of 1 inch to 2.75 inches. The 50-inch handle allows for extra reach for the user.

Seagousa.com



4 | RT-120 Compact Track Loader

The RT-120 Compact Track Loader from **ASV** comes standard with 18-inch-wide tracks, resulting in a ground pressure of only 4.4 psi. Buyers also can choose optional 20-inch tracks. The unit features a rated operating capacity of 3,535 pounds and a tipping load of 10,100 pounds. It's 71 inches wide and has a 125-inch lift height. Users operate the unit with a joystick control. The RT-120 works with standard attachments such as backhoes, buckets, snow blades, brush cutters and pallet forks.

Asvllc.com



5 | Gator SpeedLoad Cutting System

OREGON's patented Gator SpeedLoad is a two-piece cutting system that consists of a trimmer head and pre-wound disks of trimmer line. The trimmer head comes in three sizes, with a 4.25-inch head for straight- and curved-shaft trimmers, and a 5-inch head for commercial straight-shaft trimmers. The heads are designed to fit more than 95 percent of gas-powered trimmers on the market. The system's trimmer line prevents the user from having to wind, spool or cut a new line because it comes as self-contained disks. Oregon calls it the company's most durable line yet, and it pops into place inside of the head.

Oregonproducts.com

6 | VP30 Vibratory Plow

DITCH WITCH recently released its VP30 Vibratory Plow to help operators complete jobs in tight spaces with minimal surface disruption, according to the company. The plow is powered by a 31-hp Briggs and Stratton engine and features a variable flow control — a first to the underground construction industry — that helps users to precisely control the flow to the shaker box. The VP30 has a maximum 12-inch plow depth and a 4.1-psi ground pressure for minimal turf disruptions and reduced restoration work.

Ditchwitch.com

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The 19th Hole



Adam Hahn

SUPERINTENDENT // Woodside Golf Course, Lansing, Mich.



What would you like? I'll stick with Miller Lite. Want a shot of Fireball?



Sure. So, tell me about yourself. I'm from Williamston, Mich., it's in the Lansing area. I got married three years

ago. I have a daughter, almost 3, Charlotte, and a step-daughter, almost 11, Kalyan.



What drew you to the business? I had a friend who worked on the grounds crew, he got me in there at a young age. I just loved it. My mom was an academic advisor at Michigan State, she set up a meeting for me. I decided then to pursue it. I didn't even see any other options.

Any equipment you want to brag about, or maintenance practices you're proud of? Unfortunately, we're one of the little-guy courses. We get a lot of hand-me-down equipment. But I try to needle-tine the greens once a month and do it right before topdressing. We have a little bit of a thatch issue. I think that's a great way to get the sand down into your profile.

What can you tell me about Woodside? It's a unique place. I was a

What's the craziest thing you've seen on a golf course? I was 16, I roll out with my boss, we're

looking for this party animal we work with. We go out to the third green. He's laying there, on the green, three empty glasses next to him. My boss kicks him to wake him up, "Hey, you good to mow greens?" "Oh yeah, I'm good." He gets up, and there's a dew pattern outline of his body on the green.



How about the coolest thing you've ever seen? Of course, the birth of my child. I saw my buddy get a hole-in-one, but that really wasn't that cool because I lost the skin. Two years ago, I saw a red-tailed hawk swoop down and snatch a snake out of the tall grass. The snake was all squirming around I just thought to myself: 'Merica.

Make a prediction for me. What can you guarantee will happen this summer when the course is at its busiest?



Oh, I can guarantee that one of our old, rundown mowers is going to the equipment graveyard before the end of the season. We've got a lot of band-aided equipment. That's a solid guarantee. As interviewed by Seth Jones, June 8, 2017.



Hahn with course dog Molson, a 10-year-old Golden retriever.

"YOU HAVE TO PRIORITIZE. THAT'S THE NAME OF THE GAME. THERE'S ALWAYS GOING TO BE STUFF TO GET DONE. AS HARD AS IT IS TO DO, YOU HAVE TO LEAVE WORK AT WORK. WHEN I GO HOME, I'M A FATHER AND A HUSBAND."

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