

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

PLUS
2016 SUMMIT RECAP
NEFF'S LEAST FAVORITE THINGS
CONTROLLING POA IN CALIFORNIA

Golfdom

02.17



When faced with bermudagrass decline, Tim Cloninger discovered his fairways were too dry. So how did he reduce irrigation by 40 percent?

THE SHADOW (CREEK) SUPERINTENDENT KNOWS

Tests over a Two-Year Period Indicate Reduce Fungicide Applications

NEW SMITHCO ULTRA 10 AND ULTRA 15 FAIRWAY ROLLERS WITH MONEY- SAVING TOW-BEHIND DESIGN



Ultra 10 Fairway Roller

- The new 5 gang Ultra 15 Fairway Roller has a balanced hydraulic system to keep ground pressure even over its 15' swath. At 10 mph, the Ultra 15 will roll 18 acres an hour – three times as fast as mowing!
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- The Ultra 15 has a 150-gallon water ballast tank while the Ultra 10 uses a 100-gallon tank.
- Both units offer either tow vehicle remote hydraulics for wing roller fold/unfold and transport lift/lower or self-contained integrated electric/hydraulic system for use with a wider variety of towing options.
- And to provide even more versatility, optional spiker units can be fitted in as little as 15 minutes, giving a 3" X 3" pattern that can go as deep as 17/8".



Ultra 15 Fairway Roller

Increased Rolling of Fairways can an Average of 50%.

–University of Massachusetts, Stockbridge School of Agriculture

**For years, rolling
was just for greens.
Today you could be
in for a big surprise.**



Geunhwa Jung and Jay Popko
Stockbridge School of Agriculture

TEST SUMMARY

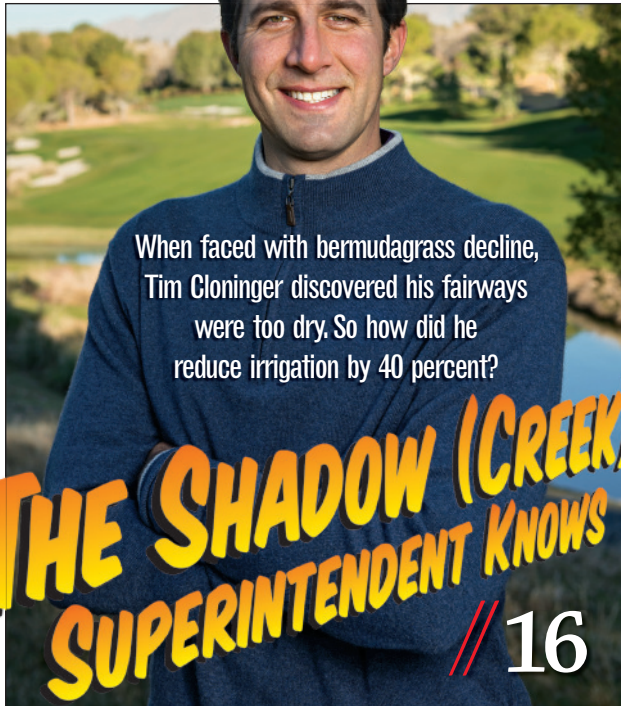
- Plots were unrolled.
- Rolled 3 times/week.
- Rolled 4 times/week (Double roll 2 days).
- Rolled 6 times/week (Double roll 3 days).

Different fungicide spray schedules were tested (Threshold vs Calendar at 21-day intervals) and initial results indicate rolling can reduce fungicide applications if threshold-based spray programs are used by 40 to 50%. This should be a major cost reduction if further test plots confirm this. Testing will continue next year on fungicide application as well as the effectiveness of rolling at reducing dollar spot, thatch and clipping yields.

More rollers with more features than anyone.

Smithco 50 YEARS
1967 ★ 2017





When faced with bermudagrass decline, Tim Cloninger discovered his fairways were too dry. So how did he reduce irrigation by 40 percent?

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ROBUST ROOTS, GREATER PLANT HEALTH.

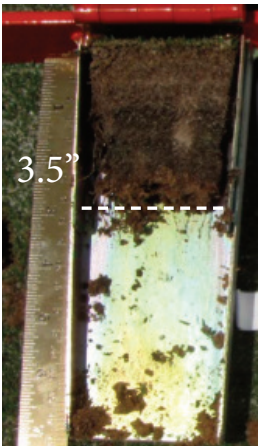
Before NIMITZ® Pro G Program

After NIMITZ® Pro G Program

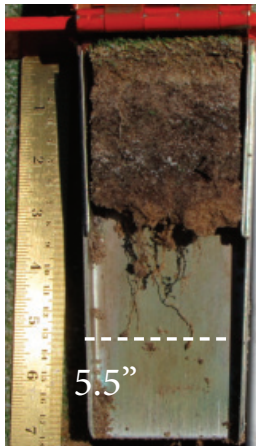
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Simply Better Nematode Control

1st
Application



2nd
Application



3rd
Application



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Kurt Beatty, Green Brook Country Club, North Caldwell, New Jersey

“...our greens have never been more consistent.”

Craig Haldane, Director of Golf Course Maintenance, Dubai Golf

“I’m now able to focus on other areas of improvement instead of dealing with member concerns regarding greens.”

John Blanch, General Manager, Thai Country Club, Bangkok, Thailand

“It gives me moisture and EC data I need so I can manage my greens better.”

Ken Lochridge, Glen Head Country Club, Long Island, NY

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Golfdom

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“...this St. Louis kid not only is well educated but also well traveled. He went to Australia, Mexico and the Cayman Islands to learn more about the fine art of growing turf.”

SETH JONES, *Editor-in-Chief*

Shedding light on The Shadow

Last year I needed to take a quick trip to Las Vegas. Before I went I reached out to my friend Troy Flanagan, one-time Las Vegas superintendent, now superintendent at Olympic Club in San Francisco. I asked if he had any suggestions for courses to visit while I was there.

“You need to go out to Shadow Creek,” Troy said. “Tim is doing some amazing things there.”

I contacted Shadow Creek Superintendent Tim Cloninger. He said he would be happy to show me around the course while I was in town. Tim asked me what I was looking for in my visit. Was I there to pursue a story? I told him I was in town for a different story, but at the same time I wanted to learn more about a local operation.

I didn't realize it at the time, but I was just getting to know *Golfdom's* 2017 Herb Graffis Businessperson of the Year Award winner. This was my first time having any good luck in Las Vegas, really.

While we drove the course, and with some prying, Tim told me more about himself and the work he'd accomplished in his five years there. I learned about the tagging of all the trees, then the drip irrigation project. Tim asked me if I was familiar with GIS mapping. That led to me asking about his education, which led to me learning about his graduate certificates in GIS and Water Policy, as well as his Masters from the University of Nebraska in Agronomy.

I'm good at being nosy and affable — it's my job.

Back home, I reached out to Bill Kreuser, Ph.D., at the University of Nebraska (we seem to be speaking at a lot of the

same chapter meetings lately) and asked him if he thought Tim was worthy of the Graffis Award. “He's impressive... his critical thinking, the ideas he has and the way he values his career,” Kreuser told me. “I think you have your Graffis Award winner.”

After some discussion back at *Golfdom* headquarters, I called Tim and asked if he would be willing to accept the award. He was flattered, and accepted. Then I got to work.

I learned that this St. Louis kid not only is well educated but also well traveled. He went to Australia, Mexico and the Cayman Islands to learn more about the fine art of growing turf. The gig in the Cayman Islands sounds most

interesting. He took a job as a superintendent at a course that was on death row. Management asked him to keep it looking good for as long as he could with the materials that were left.

It was there that Cloninger learned the art of doing more with less. But it was his collective experience — here, abroad, in a classroom — that led him to where he is today.

“I talk to some assistants and I say you have to be willing to take a risk younger in your career to get good experience,” Cloninger told me. “The days of just being a good assistant for three or four years then moving on to a superintendent job... It can happen, but you can also be an assistant for 15 years. My advice is don't be too picky, and do whatever you think improves your skill set and gives you more responsibility.”

It's clear to me that Cloninger — only 34 years old — has seen a lot, learned a lot and now has done a lot.

The title of the story is a reference to *The Shadow*, the classic crime fiction character. Part of the introduction to *The Shadow* radio program was, “*The Shadow* knows.” Yes, I'm a comic book geek at heart, and no, I don't think everyone will get the reference. But after getting to know Cloninger and seeing his operation, I'm happy to get his good work out of the shadows and into the limelight.

Email Jones at:
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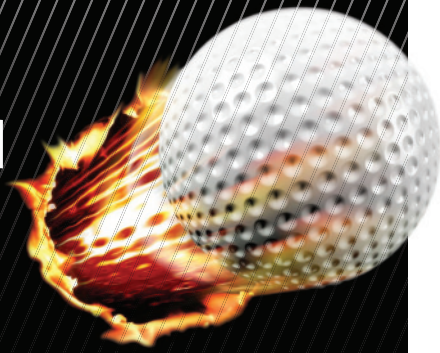


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Starter

NEWS, NOTES AND QUOTES



//Q&A



Kane takes the helm at an organization that has been helping superintendents for 30 years.

HELPING SUPERINTENDENTS 'DO GREAT THINGS'

CHRISTINE KANE RECENTLY WAS NAMED AUDUBON INTERNATIONAL'S EXECUTIVE DIRECTOR. *GOLFDOM* CAUGHT UP WITH KANE AT BETHPAGE STATE PARK FOR A CONVERSATION ABOUT HER PLANS FOR THE ENVIRONMENTAL ORGANIZATION, NOW CELEBRATING ITS 30TH ANNIVERSARY.

Golfdom: What is your background?

Christine Kane: My undergraduate degree is in forestry, that's where I learned about the balance of environmental issues and economic issues. We didn't call it sustainability back then because that wasn't the buzzword for it, but without realizing it, that's what set me up for this career.

Golfdom: What appealed to you about Audubon International?

Kane: I saw the organization's list of core principles, and there were two that resonated with me that are important to me and match with my personal beliefs. One is the belief that science should be the foundation for our work, and the other is understanding that there must be a balance between the environmental side of the sustainability question and the economic side of the same question.

Golfdom: When you meet a superintendent who isn't familiar with the Audu-

bon Cooperative Sanctuary Program for Golf, what do you tell them?

Kane: It brings many benefits to a golf course and its superintendent. There are economic benefits, and then there is the environmental side — how what you're doing is impacting your immediate neighbors. We're all part of one big network, we have to work together.

Golfdom: Are you excited to start making course visits?

Kane: We have so many fabulous courses out there I'm excited to visit... golf courses are preserving beauty and at the same time they're looking to improve the environmental aspects of that beauty. You know, golf courses are a lot of times the biggest open naturalistic landscape people are going to see. There are a lot of great organizations working to preserve habitat, (but) many of us may never have a chance to take advantage of that.

For the complete interview, visit Golfdom.com.

//GREAT GRANTS

NINE GCSAA CHAPTERS TO RECEIVE BPM GRANTS

Nine affiliated chapters of the Golf Course Superintendents Association of America (GCSAA) will receive a total of \$67,000 toward establishing comprehensive golf course best management practices (BMPs) at the state level. The BMP grant program is funded by the Environmental Institute for Golf, the philanthropic arm of GCSAA, through a donation from the PGA Tour.

The Connecticut Association of Golf Course Superintendents, the California GCSA, the Carolinas GCSA and the Tennessee GCSA will each receive \$10,000 in grant money. Receiving \$7,500 are the Eastern Shore (Md.) Association of GCS and the Mid-Atlantic Association of GCS. The Georgia GCSA and the Metropolitan (N.Y. and N.J.) GCSA will receive \$5,000.

"Best management practices are key to successful golf course operations, and they also provide a solid foundation for advocating on behalf of superintendents and the golf industry," said GCSAA CEO Rhett Evans.

//ADDITIONAL READINGS

USGA'S TAKE ON SHADOW CREEK

The drip irrigation project at Shadow Creek Golf Course, North Las Vegas, Nev., was one of the reasons why Tim Cloninger was selected as the 2017 Herb Graffis Businessperson of the Year, but *Golfdom* wasn't the only one to take notice of the project.

The USGA Greens Section recently published a best management practice case study concerning Shadow Creek's project to save money on irrigating just less than 7,000 pine trees on the property. The case study, titled "Drip Irrigation Improves Water Management," provides the Green Section's view on the project, which cost \$90,000 to install equipment but saved the course \$300,000 in the first year. To read the USGA's case study visit: usga.org/course-care/water-resource-center/bmp-case-studies/2017/drip-irrigation-improves-water-management.html. Find out more about Cloninger and Shadow Creek on page 16.

// PENDING FURTHER ACTION

ClubCorp to review possible sale

ClubCorp Holdings, Inc.'s Board of Directors recently announced the creation of a strategic review committee that, with the assistance of financial advisers, will "review and evaluate alternatives to further enhance shareholder value," according to a press release.

Prior to release of the announcement, Reuters broke the story with a report that ClubCorp was in the early stages of an auction process that had interested multiple potential buyers, including private equity firms.

Private equity firm KSL Capital purchased ClubCorp in October 2006 for \$1.8 billion and took it public in 2013. Last September, Connecticut-based FourFront Capital Group, an active investor soon after it became publically traded, published a letter urging the board to consider selling the company because of falling stock prices.

According to ClubCorp, the committee is a collection of independent directors who will oversee the review process and will report its findings to the full board of directors by an undisclosed time. Jefferies, LLC and Wells Fargo Securities, LLC have been tapped as financial advisors to help the committee.

ClubCorp operates more than 200 golf and country clubs, business clubs and sports clubs across the United States, Mexico and Canada. Some of their properties include Firestone Country Club, Akron, Ohio; Mission Hills Country Club, Rancho Mirage, Calif.; The Woodlands (Texas) Country Club; and Metropolitan Club, Chicago.

// CHA-CHING!

THAT'S A LOTTA DOUGH

If sports were family members, you'd send your Girl Scout to Uncle Golf's house first when it came time to sell some shortbread.

A recent study from the National Golf Foundation (NGF) and GOLF 20/20 shows the industry's charitable impact. According to the study, 12,700 golf facilities — 84 percent of the total in the U.S. — hosted 12 million guests at a total of 143,000 events, which collected a total of \$3.9 billion. The most common charitable golf event beneficiaries include health,

youth, education and cultural groups nationally, regionally and locally.

Additionally, golf's charitable impact is greater than Major League Baseball, National Football League, National Basketball Association and National Hockey League combined.

"Charity is at the heart of the U.S. golf industry," says Steve Mona, CEO of the World Golf Foundation, administrator of GOLF 20/20. "Golf is a key driver for charitable giving and takes pride in hosting charitable events to improve millions of lives through causes that are mostly unrelated to golf."



// IS THIS HOLE 1 OR 10?

REVERSE YOUR COURSE

The Retreat at Silvies Valley (Ore.) Ranch could have any number of golf courses built on the 140,000 acres it sits on. Ultimately two courses were built, but golfers will have many more layouts to play because the resort will open two reversible 18-hole courses in July 2017.

The courses, the Hankins course and Craddock course, are named after pioneer families who homesteaded the site. Dan Hixson, who also designed Bandon (Ore.) Crossing, designed both of the layouts.

The courses feature expansive views of the area and dramatic elevation changes. There are more than 100 bunkers but no water hazards (a design directive from the owner, who has hit one too many balls in the drink). The direction on each course will be reversed every day to create a different layout with a variety of pin placements and tee box options.

"Our goal was to create the most unique golf design in the world, providing dozens of golf rounds that are fun, challenging and picturesque," says Hixson. "We were inspired by the purity of Scottish links, allowing for true personal connections as you play, and I think we achieved that."

// MULLIGAN

ONE STROKE PENALTY

In *Golfdom's* December 2016 "Clark Talks Turf" column, MatchPoint insecticide from Dow AgroSciences was mistakenly identified as a nematocide. MatchPoint insecticide, Spinosad combined with a new lignin technology, is the latest innovation in annual bluegrass weevil (ABW) larvae control.

ABOUT THE COVER

Shadow Creek Superintendent Tim Cloninger was photographed last month by Las Vegas-based photographer Jacob Kepler. An award-winning photographer, Kepler has shot for publications like *Sports Illustrated*, *Rolling Stone* and *Wired*. Kepler knows a good angle when he sees one — check out the moon faintly shining above Cloninger's head...



Golfdom Gallery



1 Jigger Ale The Horse & Plow in Kohler, Wis., is one of the few places you can buy a Jigger Ale.

2 Milwaukee's best Hanging with us were (left to right) Seth Brogren, Grand Geneva Resort, Lake Geneva, Wis., Jon Canavan, Milwaukee (Wis.) County Parks, Jim VanHerwynen, CGCS, South Hills G&CC, Fond du Lac, Wis., and Patrick Reuteman, Westmoor CC, Milwaukee.



3 Miller time Mike Stein, Dretzka Park GC, Milwaukee, Wis., and Tim Wegner, Brown Deer Park GC, Milwaukee, Wis., know what time it is.

4 U.S. Open hosts John Jaques and Zach Reineking of Erin Hills CC, Erin, Wis., and Randy Lusher, BASF, are amped up for the 2017 U.S. Open to arrive.

5 The Godfather booth Bryan Bergner, Westmoor CC, Steve Abler, Reinders Inc. and Cubby O'Brien, Reinders, were holding down a booth at Horse & Plow.

6 Stay cool Tyler Kutz, West Bend (Wis.) CC, and Rick Weiterman, West Bend CC, with Bill Kreuser, Ph.D., University of Nebraska-Lincoln.

7 Host with the most John Spiwak, Eastpointe CC, Palm Beach Gardens, Fla., host superintendent Mark Reid, The Breakers Rees Jones Course, West Palm Beach, Fla., and John Zimmers, Oakmont (Pa.) CC.

8 Big hitters Steve Wright, CGCS, Pine Tree GC, Boynton Beach, Fla., and Eric Swenson, Floridian National GC, Palm City, Fla.

9 Nationwide is by your side Ted Bokern, Nationwide Insurance, Olathe, Kan., Brian Birney, The Club at Admirals Cove, Jupiter, Fla., Seth Jones, *Golfdom*, and Jim Rattigan, The Plant Food Co., are on a boat.



PHOTOS BY: SETH JONES (1-8); CAPTAIN JACK (9)

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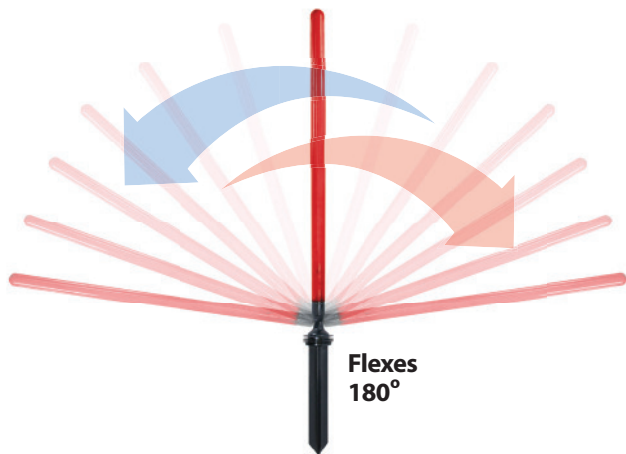
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- ▶ Priced individually, sold in sets of 12.



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<input type="checkbox"/> Red	15800
<input type="checkbox"/> Blue	15900

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- ▶ Set of three.

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<input type="checkbox"/> Pink Aluminum ST2000 Cup	-	18333P	-
<input type="checkbox"/> Plastic ST2000 Cup	-	-	18222

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<input checked="" type="checkbox"/> Green	01660	18910	12810	01661
<input checked="" type="checkbox"/> Brown	01670	18920	12820	01671
<input checked="" type="checkbox"/> Black	01680	18980	12830	01681
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When mediocrity isn't an option and only perfection will do, turn to Standard Golf's Tour Pro Bunker Rake. No other bunker rake can make smooth, level, playable surfaces like the Tour Pro.

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- ▶ A single self-tapping screw (included) is all you need for assembly.

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	ALUMINUM HANDLE 54" (137 cm) 7/8" D (2.2 cm)	COMPOSITE HANDLE 54" (137 cm) 7/8" D (2.2 cm)	GATOR GRIP HANDLE 60" (152 cm) 7/8" D (2.2 cm)	ALUMINUM CURVED HANDLE 64" (163 cm) 7/8" D (2.2 cm)
Green	11760	11700	11720	11750
Brown	-	-	11730	-
	\$18.75	\$18.00	\$19.50	\$24.00

Priced individually. Gator Grip, aluminum and composite handles sold in multiples of twelve. Curved handles sold in multiples of six. Add \$0.50 per rake for individual quantities.

25" (64 CM) TOUR PRO

	GATOR GRIP HANDLE 60" (152 cm) 7/8" D (2.2 cm)	GATOR GRIP HANDLE 72" (183 cm) 7/8" D (2.2 cm)
Green	11790	11770
Brown	-	11780
	\$21.50	\$25.00

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- ▶ More options! Our popular 22" Tour Smooth II now can be made with a 60" Gator Grip Handle

15" (38 CM) TOUR SMOOTH II

	ALUMINUM HANDLE 54" (137 cm) 7/8" D (2.2 cm)	COMPOSITE HANDLE 54" (137 cm) 7/8" D (2.2 cm)	GATOR GRIP HANDLE 60" (152 cm) 7/8" D (2.2 cm)	ALUMINUM CURVED HANDLE 64" (163 cm) 7/8" D (2.2 cm)
Green	11860	11800	11820	11850
Brown	-	-	11830	-
	\$17.25	\$16.50	\$18.00	\$22.50

Priced individually. Gator Grip, aluminum and composite handles sold in multiples of twelve. Curved handles sold in multiples of six. Add \$0.50 per rake for individual quantities.

22" (56 CM) TOUR SMOOTH II

	GATOR GRIP HANDLE 60" (152 cm) 7/8" D (2.2 cm)	GATOR GRIP HANDLE 72" (183 cm) 7/8" D (2.2 cm)
Green	12210	12220
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"I've heard that by sharing things that annoy you with others, you might begin to understand how ridiculous it is to let them bother you. With that in mind, I'll go first."

MATT NEFF, *assistant superintendent, Wedgewood G&CC, Powell, Ohio*

A few of my least favorite things

It really is hard to complain about our jobs. Sure, this profession has moments that might make you think you'd rather be doing anything else at that particular time, but that's always a fleeting feeling. After the dust settles from a difficult situation, you remember how awesome this job is and, even with the occasional bumps in the road, having a golf course for an office is hard, if not impossible, to beat.

A lot of times it's not the big problems that get under your skin, because in those situations you immediately shift into problem-solving mode and get it resolved without wasting the time to get fired up about it. It's the little pet peeves that can drive you crazy.

I've heard that by sharing things that annoy you with others, you might begin to understand how ridiculous it is to let them bother you. With that in mind, I'll go first. Think of it as group therapy for turf guys.

Kinked hoses

As we all know, this only happens for one of two reasons. Either the universe hates you or someone messed with your hose while you were eat-

ing lunch. It has absolutely nothing to do with the fact that you basically threw the whole thing into the back of your cart in one shot so you could move out of the way of the foursome getting ready to tee off.

Broken equipment put away without notifying mechanic

Who cares if, by telling the mechanic about it, you risk him firing a few wrenches in your general direction. He doesn't mean anything by it, and if you've seen the movie *Dodgeball* you know all it's going to do is improve your game.

Equipment not fueled

It's happened to everybody. You jump on a piece of equipment first thing in the morn-

ing all charged up to get after it, only to look down at the fuel gauge and see it's almost empty. Apparently, staying until 3:01 to fuel it up the day before was just not in the cards for the previous operator.

Stuck dew whips

How is this even possible? Seriously.

The Mafia effect

You know how in Mafia movies no one knows anything about the 5-minute shoot-out in the middle of the street in broad daylight? It's amazing how the same type of thing can happen when a tractor comes in with a hole in the radiator.

Cottonwood trees

It's like God let one of his

buddies make a tree, and this is what happened. Since he's God, he had to be cool about it, but I think we all know He'd probably like to have that one back. Needless to say, that guy has been on snowflake design duty ever since. If you don't have cottonwoods on your course, feel free to substitute the messiest junk tree you deal with.

Geese

I hesitate to even mention them because I don't want to give them any more publicity than is necessary. Is it ridiculous to actually be concerned about giving geese pub? Maybe, but I absolutely loathe them.

Leaving something you need in the shop

If you're anything like me, this only happens when you're heading to the farthest point on the course from the shop. I have almost superhuman memory when I'm heading somewhere within 30 seconds of the shop, but if I'm heading out to the back 40 to replace a sprinkler solenoid, even odds I'm heading out without the wire strippers.

Wow — that was cathartic. I feel like a weight has been lifted off my chest. And for the record, I was only kidding about God needing a do-over on cottonwoods. But just in case, I will be nowhere near one the next time there's a storm approaching.

Matt Neff (mneff4@yahoo.com) is assistant superintendent at Wedgewood G&CC in Powell, Ohio.



Through diligent mapping and research,
Shadow Creek Superintendent
Tim Cloninger discovered that
a bermudagrass decline problem
was caused by insufficient irrigation.
So how did he then reduce
his water usage by 40 percent?

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Now in its sixth year, it is with all due respect that we present this award in Mr. Graffis' honor.





STORY BY SETH JONES

PHOTO BY JACOB KEPLER

The City of North Las Vegas has changed out the water meter at Shadow Creek Golf Course the last four years in a row. They think something is wrong. Shadow Creek General Manager Monte Montgomery knows it's the opposite: something is right.

"For the five years Timmy has been out here, he has just turned the place around, night and day," says Montgomery, beaming with pride upon learning that his colleague, who he says is like a brother, is *Golfdom's* 2017 Herb Graffis Businessperson of the Year award winner. "It's scary what you can do when you have a good leader like Tim."

In the six years of the Graffis award, Shadow Creek — designed by Tom Fazio in 1990 and owned by MGM Resorts International — is the highest profile course to employ the Graffis winner. But the award is not for its ranking among golf courses (currently No. 26 in *Golf Digest's* top 100 courses), rather for the business savvy of its superintendent, 34-year-old Tim Cloninger.

"(Cloninger) has done things I've never seen before," says Brian Whitlark, USGA Green Section agronomist for the West. "His work is phenomenal. He manages the

Continued on page 18

SHADOW (CREEK) SUPERINTENDENT KNOWS



Owned by MGM International, Shadow Creek hosts high-roller golfers from around the world. That's why General Manager Monte Montgomery says expectations for conditions are so high. "For Tim's job we expect the best, and he outshines every superintendent I have ever been around."

Continued from page 17

course with the mindset that he wants to provide as good of playing conditions as possible year-round while minimizing inputs. People are under the impression that Shadow Creek has an unlimited budget... I think people would be surprised to hear that Tim has managed his resources very sparingly."

Good advice

Born and raised in St. Louis, Mo., Cloninger had no interest in golf until he tore his ACL playing baseball as an 8th grader. Too young to have the ligament repaired, he decided to try out for the golf team because it was one sport he could still play.

He made the team. The ACL tear led him to a passion for the game, and eventually a career in the golf course industry.

A high school guidance counselor (and friend of his mom's) introduced him to Missouri-based golf course architect Keith Foster. Foster got him his first job on a golf course, working maintenance for Forest

Hills CC in Chesterfield, Mo. Foster later recommended Cloninger go to the University of Arizona to study under David Kopec, Ph.D.

"(Foster) was the one who told me about the golf industry and explained the different jobs," Cloninger recalls. "He started out as a superintendent. I told him the greenskeeping side is what interested me. I didn't know him that well — I only talked to him a couple times — but I always followed his advice."

Cloninger says he was fortunate to work for good superintendents throughout his career, guys like Dave Nichols and Scott Reynolds. While at Arizona he did a three-month internship in Australia. He also worked with Kopec at U of A's Karsten Turfgrass Research Facility.

"(Cloninger) was a student who always wanted to know the 'why' on top of the 'how,'" says Kopec today. "He's always impressed me with his computer skills and his ability to keep up with technologies. He doesn't use them just because it's

there... he uses it because he knows he can get a benefit. He's at the top of his game."

Long haul in a U-Haul

Upon graduation from Arizona in 2004, Cloninger began working as an assistant superintendent in Las Vegas, first at Red Rock CC, then Shadow Creek. After four years, he decided it was time to try something else — a golf course had been his main place of employment since age 16. He went to graduate school at Arizona and earned two graduate certificates: one in Geographic Information Science (GIS) mapping and the other in Water Policy.

"I felt stagnant, I needed to learn something new," Cloninger says. "The longer I was in school, the more I missed golf. But I'm glad I focused in precision agriculture-type applications, because it all came full circle. I was able to turn that into golf course management use."

With an advanced education and a longing to get back into golf, he moved to

Continued on page 20

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“In the fall of 2015 our course was flooded 3 times — 10” of rain in October, 14” in November, and another 12” in December. Our Klingstone bunkers performed GREAT throughout these floods!”

Jorge M. Croda, CGCS
(2015 FINALIST, TURFNET SUPT OF THE YEAR)
SOUTHERN OAKS GOLF CLUB, BURLESON, TX

“My members AND crew loved our bunkers this year. Given it was the wettest year ever, that’s saying something.”

Bob McCurdy
GOLF COURSE SUPERINTENDENT
COUNTRY CLUB OF DETROIT, GROSSE POINTE FARMS, MI

“When I took over the maintenance operation at Country Club of Detroit, I’ll admit I was skeptical of the Klingstone which had been installed a few years prior — but it really performs, I’m a believer!”

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Before and after, hole No. 6. On the left, an example of the bermudagrass decline that plagued Shadow Creek for years. On the right, the same hole after Cloninger mapped, analyzed and properly diagnosed the root of the problem.

Continued from page 18

Mexico to work for a management company as a construction superintendent. The next job took him to the Cayman Islands. After a few years, he took a job with a management company in Los Angeles to be close to his then girlfriend, now wife, Andrea.

It was the summer of 2011. Cloninger had just accepted a superintendent position in northern California when Shadow Creek called.

“The superintendent job had opened up, and they wanted to know if I would like to throw my hat in. I said yes, but I told them I just took a job that started soon and asked if I could interview right away,” Cloninger says. “They said, ‘Yeah, come over tomorrow.’ I got in the car and drove from Los Angeles to Las Vegas the next day and thought, ‘who knows?’”

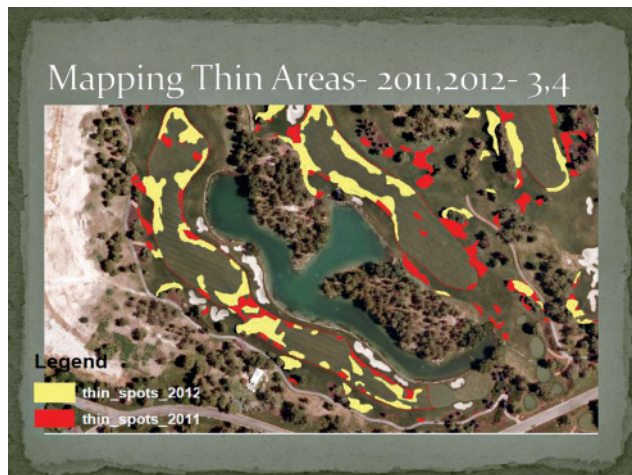
Two days later he and Andrea were packed up and driving north toward Redding, Calif., when his cell phone rang. The caller ID read Shadow Creek. He gave Andrea a knowing look as he pulled the U-Haul over. They were six-and-a-half hours into an eight-hour trip. And just like that, a new eight-hour trip began. They turned around and went back the way they had just come, to Las Vegas, Shadow Creek and the beginning of a new chapter.

Shadow Creek’s concern

Shadow Creek underwent a complete renovation in 2008 to lengthen the course and rebuild the greens. The fairways were sand capped at the time to help battle bermudagrass decline on fairways, which had been a consistent struggle. Consultants suggested it was high salinity causing the problem and advised the fairways be capped with 6 inches of coarse sand and sodded. That fall, the fairways were allowed to go dormant to establish a strong rhizome base without the influence of a perennial ryegrass overseed.

Only three years later and after only one season of overseeding, it was clear the bermudagrass decline problem wasn’t

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Cloninger used his education in GIS mapping to create aerial maps of where bermudagrass decline was hitting each year. “What happened over the years, what the data showed, was the bermuda was declining in the dry areas, not the wet areas,” Cloninger says. “This showed a trend of the opposite of what agronomically you would think. The hypothesis was wrong.”

PHOTOS COURTESY OF: TIM CLONINGER

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improving. But now it was Cloninger's problem. To solve this mystery, he went back to his academic training.

"The first time I went there he was very concerned with the lack of the bermudagrass in the fairways, so he mapped all the bermudagrass areas very accurately," recalls the USGA's Whitlark. "He had identified where there was good bermudagrass and where there was weak bermudagrass — even though it was buried under ryegrass — because he had mapped it with GIS."

After taking numerous soil probes, Cloninger's initial hypothesis was that thatch and blacklayer were causing the turf to hold too much water. The ryegrass was hanging on and keeping nearly 10 acres of bermudagrass from thriving in the summer.

"He started mapping the course's soil

moisture using a handheld TDR," Whitlark says. "Most courses are using those today, but on greens. Tim brought it out to the fairways."



Brian Whitlark

was in the dry areas where bermudagrass decline was prevalent. The data pinpointed not black layer, but part-circle irrigation heads that run along the fairway/rough border — they weren't throwing sufficient water on fairway edges.

Now that Cloninger had a cause, it was time to find a solution. He knew he needed a clean slate, so he developed a plan to sod three to four fairways a year, then let them go dormant. He convinced the GM to close

the course during the four hottest weeks of the summer to get the job done. And he also started using a topmaker to aggressively remove the top layer of turf and thatch each summer. He found a sod from West Coast Turf in northern California that more closely matched the sand cap. And, of course, he adjusted the irrigation run rates along the edges of the fairways.

The results are now easily seen from every tee, and Shadow Creek's high-roller clientele is as happy with the results as they would be hitting 21 at the blackjack table.

"We have high-end golfers from all over the world play here," Montgomery says. "Tim's job is one where we expect the best; perfect bunkers, cart paths trimmed, you name it. He's a perfectionist."

For Cloninger, it wasn't about perfection, but survival.



Cloninger with Brad Harper, who did much of the fieldwork mapping fairways using a Trimble Geo Explorer XH 6000 (in hands) and Carlos Duran, who navigated the drip irrigation project.



“Any superintendent who looks at that plug, they’d say bermudagrass isn’t going to live in that,” Cloninger says. “You’ve got low oxygen, high moisture, all kinds of issues.” But solving a long-standing mystery, GIS mapping proved bermudagrass was actually doing fine in these areas.

“Before, the goal was simply to have fairways that were alive and playable. You had to sod them and do all this patchwork,” Cloninger says. “We’re sustainable now with the bermuda on the fairways. We were

replacing the fairways every five years on average — we never had good fairways because we were replacing them, losing them, replacing them again. Plus, we were using so much of our labor hours on it, it was eating up our staff. Now that we’re not doing any sodding, we’ve got time to do other projects — like the irrigation on trees.”

Save the trees

So, if Cloninger increased his irrigation on fairways edges, how then has he reduced the water usage by 40 percent?

It started out as another GIS mapping project and grew into something much bigger. Cloninger wanted to create a tree management program for the course. He wanted to know the exact number of trees on the course and determine why 200 to 300 were dying every year. He also wanted to create a formal tree replacement program.

“We have just under 7,000 trees and we were losing between 200 and 300 a year,” Cloninger says. “Do the math on that — 10 years from now, if we don’t have a replacement program, what’s the course going to look like?”

Longtime Shadow Creek employee Brad Harper took on the Herculean task of mapping and tagging every tree on the property. A consulting arborist helped determine that 200 to 300 lost trees a season was to be expected because many were not properly planted at the time of construction, and some were just showing their age.

Brian Vinchesi, design engineer for Massachusetts-based Irrigation

Continued on page 24

Observant golfers who hit into the trees at Shadow Creek might notice that every tree — almost 7,000 in all — has been tagged.



PHOTO BY: JACOB KEPLER (OPPOSITE), TIM CLONINGER (TOP), SEITH JONES (RIGHT)



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It took a crew of three about two years to install all the drip irrigation at Shadow Creek, but for every \$1 invested, it has paid back \$3 in water savings.

schedule that was good for whatever was under the tree,” Vinchesi says, “instead of what was good for the tree.”

Cloninger, Vinchesi and the arborist put their heads together and came up with a plan: install drip irrigation on all 7,000 trees, do the entire project in-house and save the trees while saving a bunch of water and money along the way.

In April of 2016, after chipping away at the project for two years, they installed the final drip irrigation line. And while the course invested significant money in the project, it paid for itself and then some. For every \$1 invested in the project, the course saved more than \$3 in water costs. Plus, fewer trees are dying: fewer than 150 trees lost in 2016, with the number continuing to trending down.

“MGM International has gone green, everything we do now, they have us saving water, reducing our garbage, using less paper,” says Montgomery. “We know the water costs in this town are only going up. So, what can we do? Tim and his team came up with this plan and did every tree themselves. When you work with someone like this, and you get these results? It makes my job so much easier.”

Continued from page 23

Consulting Inc., has been consulting with Shadow Creek for 15 years. He says the system that was in place for irrigating the trees — a traditional above-ground rotor system — was not ideal.

“(Trees) were getting a lot of overspray and being watered on a

Continued on page 26

PHOTOS BY: SETH JONES, JACOB KEPLER (INSET)

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Brian Whitlark of the USGA says fraze mowing is growing in popularity in the Southwest. “It is really aggressive — you essentially need to be closed for three or four weeks in the summer to re-establish the bermudagrass — but man, it works well.”

Continued from page 24

Vinchesi visited Shadow Creek in December to check on the results of the drip irrigation project. He jokes that he is about out of improvements he can help make for the course, and he’s fine with that.

“Tim’s a little different than most — he’s highly educated, especially on the water side. Between his drip irrigation and his soil-moisture measuring program, he has been able to fine-tune his watering schedule very specifically,” Vinchesi says. “Plus, Carlos (Duran), their irrigation manager, is really sharp. They’re saving a huge amount in water savings, both the water costs and also electrical pumping savings.”

When asked about the work of Duran, Cloninger lights up. He says his irrigation manager and his crew deserve all the credit for the success of the drip irrigation project.

“Carlos deserves so much credit — he runs the central control and came up with all the plans to install the drip,” Cloninger says. “We finished the project in April, just chipped away at it, three or four guys dedicated to it, not full-time but as we could get to it. They

worked long and hard on the project, for not a lot of recognition.”

A very good year

In time, Cloninger may look back and consider 2016 the best year of his life. There was virtually no dead bermudagrass at Shadow Creek last season, something no one would have imagined a few years ago. The drip irrigation project was finished. He went back to school, this time to the University of Nebraska, and earned a Masters in Agronomy. And most exciting, he and Andrea became parents when son Owen was born Nov. 5.

Mild-mannered is a good way to describe Cloninger — he isn’t likely to get too worked up about anything outside of an Arizona Wildcats Final Four appearance — but his colleagues recognize the good work he’s done.

“More and more superintendents are using the technologies he’s utilizing,” Arizona’s Kopec says, “but he’s one of the top superintendents in the nation in the way he understands the benefits and what you can and can’t get out of it.”

Bill Kreuser, Ph.D., University of Nebraska-Lincoln, agrees with Kopec, and says that while more superintendents are going high-tech, Cloninger takes it to another level.

“Tim is able to step back from the problem and assess it from different angles and test out if his thoughts and conclusions are correct,” Kreuser says. “He had these issues on his golf course, he thought, ‘How can I use this technology with moisture meters and quantitatively monitor how things are changing over time?’ He changed his irrigation with the tools he was given. It wasn’t just living in the moment. He was collecting data, analyzing data and then changing his management as a result.”

For Cloninger, it’s simply doing the right thing.

“Environmentally it’s the right thing to do, and financially it’s a huge savings,” Cloninger says. “I give credit to the staff. They’ve been there a long time. I’ve taken a lot of their ideas. They know what works and what doesn’t work.”



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BEHIND THE SCENES AT THE 2016 Goldfdom Summit

BY GRANT B. GANNON

In its sixth year, the 2016 *Goldfdom* Summit, held at Reunion Resort in Orlando, Fla., featured a first: a superintendent as keynote speaker.

Of course, maintaining the golf course at the Legends Club in Franklin, Ind., isn't the thing for which this superintendent/general manager is most known.

Keynoter Ted Bishop treated the 2016 *Goldfdom* Summit attendees (thanks to keynote speaker sponsor Cushman) to stories involving some of the game's legendary figures from his time as the 38th president of the PGA of America — along with a lesson he learned the hard way.

Bishop, author of the recent book "Unfriended," started his career in golf at a course in his hometown, Logansport, Ind., the summer before his senior year of high school. It was simply "a job," he said, and he got paid \$40 a week for 44 hours of work.

The 17-year-old Bishop at that time probably never imagined that he would eventually be working alongside golf legend Tom Watson.

Bishop will forever be linked to Watson because he was the PGA of America's president when the multi-major winner was named 2014 U.S. Ryder Cup team captain. He called the announcement a highlight of his career and lauded Watson's preparation for the match. For example, during the two-year lead-up to the Ryder Cup, Watson decided the team was going to have three different levels of Gore-Tex outerwear, depending on the weather. He didn't want a repeat of the 2010 Ryder Cup, when the team's rain suits leaked.

"He had Polo send (the rain suits) to his house, and Tom put them on, and he would literally stand in the shower for extended periods of time to make sure these things didn't leak," Bishop said.

On another topic, Bishop was not at all shy about the elephant in the room; that he was impeached as president of the PGA in 2014 for calling Ian Poulter a "lil girl" on social media. He noted that along with his position, he also lost his right to be an honorary president of the association and that he still pays dues



Ted Bishop

Continued on page 30

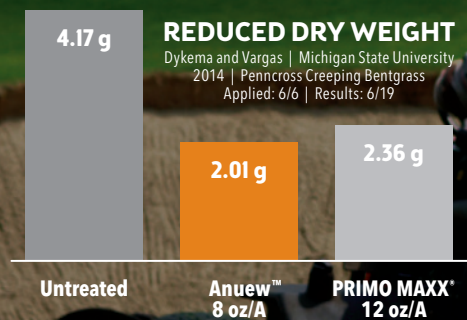
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// 2016 GOLFDOM SUMMIT

Continued from page 29

and earns his recertification points but can't vote or hold elected office. He said he probably cost himself \$100,000.

"There's a lot of lessons that you can learn from what happened to me," Bishop said. "I know a lot of superintendents like to think that they fly under the radar. No one flies under the radar on social media."

At the end of the night, an attendee asked Bishop, "Would you do it again?"

"Oh, absolutely," Bishop said. "I made tremendous friends and had the privilege to travel and meet people and play courses I never would have dreamed. I wouldn't change anything except for that 60 seconds of poor judgment on my part."

Interesting ideas with Dr. Throssell

Each month, *Golfdom* Research Editor Clark Throssell, Ph.D., collects valuable university research and prepares it for publication. At the *Golfdom* Summit, Throssell reviews some of his favorite topics from the

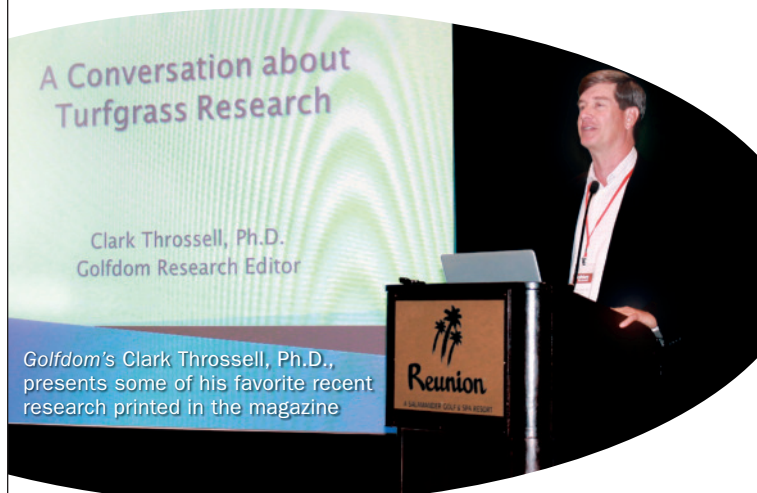
past year's magazines and discusses the research and why it is relevant to superintendents.

The research results sometimes are obvious, but that doesn't mean they shouldn't be explored. That's the case Throssell made about research conducted at the University of Arkansas and led by Dan Strunk, Ph.D., on the correlation between golf ball lie, mowing height and player shot execution.

The research involved a low-handicap golfer and a high-handicap golfer hitting shots from various turf species and turf heights. They used the latest technology to track their shots, and the study found what one might expect — that the smaller the area of the ball exposed to the club face, the worse the shots.

But Throssell finds the research fascinating because the golfers lost only 0.3 of a yard on their shots between the balls being exposed 95.7 percent versus 94 percent, perhaps, he suggested, the difference between mowing every day or every other day.

"It's really cool for me to



Golfdom's Clark Throssell, Ph.D., presents some of his favorite recent research printed in the magazine

PHOTOS BY GRANT B. GANNON

(L to R) Kevin Blanton, Cushman, Cam Copley, Nufarm, Ralph Kepple, CGCS at East Lake GC, and Paul B. Latshaw, CGCS at Muirfield Village GC teamed up to win the event's golf scramble.



Throssell mentioned to attendees that he is responsible for about six pages of content in *Golfdom* each month and that he always is looking for suggestions from readers.

look at these images and think of golfers who are complaining that fairways aren't being mowed seven days a week," Throssell said. "Now we have data saying that (with) not mowing every day, you're losing less than a yard."

Golfdom's research editor also talked about fraze mowing, a newer cultivation technique that removes the turf canopy, thatch and 1/10 of an inch to 1/4 of an inch of soil. He admitted that he's still not

entirely sure about the process.

"I can't decide if it's the latest and greatest or if it's just a passing fad, but probably like other things, we'll figure out the situations where it fits and where it should be used," he said.

Opening the conversation to Summit attendees, Throssell asked if they had experience with fraze mowing. Four superintendents raised their hands, and one superintendent said he used a turf-planing machine — the same

concept as fraze mowing but more aggressive — to level his Celebration bermudagrass practice tee. It took six to eight weeks for the turf to grow back, but he plans on doing it again this summer and then repeating fraze mowing every other year. He is also looking into using it on the greens collars to lessen the damming effect that happens after years of consistent topdressing.

Another superintendent

added that because it's much faster, he fraze mows six to seven acres of rough around the fairways instead of using a sod cutter to remove to turf.

Throssell mentioned to the attendees that he is responsible for about six pages of content in *Golfdom* each month and that he always is looking for interesting topic sugges-

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Continued from page 31
 tions from readers.

“It’s a lot of fun for me and it keeps me current on what’s going on,” he said, “but if there’s something you would like to see in the magazine on the technical side, please let me know.”

Vendor appreciation

Sixteen companies sponsored the 2016 *Golfdom* Summit (see sidebar), including a few new up-and-comers in the business.

Ken Rost, CEO of Frost Inc., heads up one of those new companies looking to reap the benefits of being surrounded by a select group of superintendents for four days. Rost was showing superintendents a technology that

turns a normal sprayer into a GPS-enabled sprayer.

“Overall, I enjoyed the format. It was a good way to talk to a bunch of guys who were there to listen,” Rost says. “As far as if it pays back, we’ll have to see yet — sometimes the sales cycle takes a while.”

Rich Behan, president of Nordic Plow, also threw his hat in to the *Golfdom* Summit ring to showcase his innovative core collector. He says the event was “first class all the way,” and got off to a good start with a laid-back mixer, allowing him to meet potential customers in a relaxed environment.

“The first night I ended up sitting next to Dean Graves (Chevy Chase Club), and I

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Thanks to the following companies who supported the 2016 *Golfdom* Summit and helped make it successful.

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didn’t know him from Adam,” Behan laughs. “But we hit it off and the next thing you know, there’s 10 of us sitting around a fire pit smoking cigars and telling stories. That set the tone for the whole event.”

Rost agreed that the Summit’s environment allowed him to have more time to get to know people who could even-

tually become customers.

“I think (sponsors) have a more focused opportunity with people to actually talk about things,” Rost said. “At trade shows you’re talking to one person in your booth and five others walk by that would be willing to talk, but because you’re busy it’s hard to have that conversation.” **G**

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// KEEPING WATER CLEAN

HOW A WETLAND CAN CLEAN EQUIPMENT-WASHING WATER

By Mickey Spokas, Ph.D., Michelle DaCosta, Ph.D., and Scott Ebdon, Ph.D.

During the summer of 2011, researchers at the University of Massachusetts Turfgrass Research Center constructed a small artificial wetland (vegetated sand bed) to treat water used to wash the facility's mowers and spraying equipment following use. The system consists of two parallel trains of wetland cells. The first bed in each cell is coarse gravel with reed canary grass (*Phalaris*



Artificial wetland treatment system at the Joseph Troll Turfgrass Research Center, Deerfield, Mass.

arundinacea). The second bed is coarse sand with a mixture of plants, harlequin blue flag (*Iris versicolor*), woolgrass (*Scirpus cyperinus*) and soft rush (*Juncus effusus*). The beds have vertical flow, with the first bed having down flow and the second bed having up flow. During normal operation, nitrate from equipment washing and clipping degradation entered the system at 2.9 mg/L NO₃-N, which dropped to 0.4 mg/L at the outlet to the system — an 86-percent removal.

The system was spiked twice in the fall of 2015 with a 5-10-5 fertilizer (0.15 lb. N/1,000 sq. ft.). Measured influent nitrogen concentrations were 72.8 and 20.5 mg/L of ammonia-N and nitrate-N, respectively. Using the first beds with no addition of water, these concentrations had dropped to less than 5 mg/L within 96 hours of application. A second, larger spike of fertilizer (0.66 lb. N/1,000 sq. ft.) was made later in the fall to allow the calculation of microbial rate constants for both ammonia and nitrate removal.

Fertilizer applications in September 2016 were to measure the levels of nitrate, ammonium and phosphorous through the system following a simulated 'tank dump' of fertilizer (application rate 0.15 lb./N/1,000 sq. ft. in a 170-gallon sprayer to cover two acres). Water was added each day to ensure that flow was leaving all four wetland units. Addition of this much water shortened the detention time within the wetland and affected treatment performance. The maximum nutrient level leaving the system never exceeded 8 mg/L ammonia-N, <9 mg/L nitrate-N and 6 mg/L total phosphorous, respectively.

This research highlights the effectiveness of artificial wetlands to treat wash water to levels that allow its reuse as irrigation water and/or groundwater return.

Mickey Spokas, Ph.D., is a soil scientist, Michelle DaCosta, Ph.D., is a turfgrass scientist and Scott Ebdon, Ph.D., is a turfgrass scientist at the University of Massachusetts Amherst.

Acknowledgements: Support for this study was provided by the New England Regional Turfgrass Foundation and New England Waste Systems (NEWS-USA).

NEWS UPDATES

STRI GROUP ESTABLISHES PARTNERSHIP WITH AUBURN UNIVERSITY TURF RESEARCH

The STRI Group, a sports turf consulting firm, is partnering with Auburn (Ala.) University to initiate research and development programs in the United States.

The agreement with the university will focus primarily on expanding the U.S. soccer industry, as well as conducting surfaces research in other sports, including golf.

The collaboration aims to further enhance Auburn's existing turfgrass and sports turf research facility. Auburn will showcase cutting edge techniques and technologies, according to a press release.

"Working with STRI is a great opportunity to not only grow our research program at Auburn, but to also greatly enhance the educational content, internship experiences and job opportunities for our students," said Scott McElroy, professor in the College of Agriculture's Crop, Soil and Environmental Sciences Department.

With its collaboration with Auburn, STRI secures a permanent presence on four continents, with facilities in Australia, the United Kingdom and Qatar.

Lee Penrose, STRI Group Director, said, "STRI is thrilled to collaborate with such a forward thinking and well-respected university. Together, our organizations will create the leading sports turf facility in the U.S., demonstrating the latest in international thinking."

THE CHALLENGE FACING SUPERINTENDENTS IN CALIFORNIA IS KEEPING ANNUAL BLUEGRASS FROM RE-INFESTING NEW CREEPING BENTGRASS GREENS."

Jim Baird, Ph.D.

(see story on page 34)

//A FORMIDABLE FOE

Annual bluegrass control in California

By Jim Baird, Ph.D.

California's Mediterranean climate is ideal for annual bluegrass (*Poa annua*). Under intensive management, however, this species is highly susceptible to several abiotic and biotic stresses, including heat/drought/cold, disease (e.g., anthracnose and rapid blight) and nematodes (e.g., *Anguina* in coastal northern California). Because of this, a growing number of golf courses are converting to creeping bentgrass (*Agrostis stolonifera*), which has better stress tolerance and putting traits (e.g., no seedheads under low mowing).

The challenge facing superintendents in California is keeping annual bluegrass from re-infesting new creeping bentgrass greens. There are no herbicides currently registered in the United States for selective annual bluegrass control in creeping bentgrass putting greens.

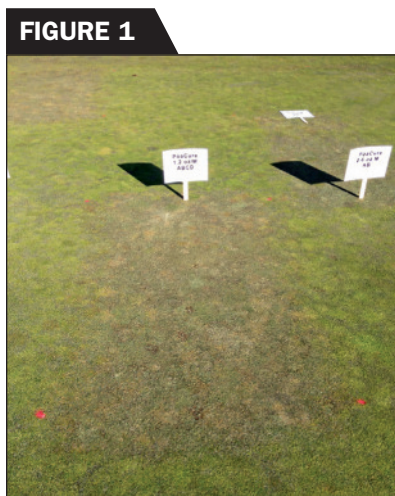


FIGURE 1
Poa annua control from PoaCure herbicide. Callippe Preserve Golf Course, Pleasanton, Calif. Photo taken Dec. 19, 2013.



Another scenario involving annual bluegrass eradication is on golf courses that overseed warm-season turf with cool-season grasses for winter color and playability. In California's Coachella Valley around the Palm Springs area, ethofumesate (e.g., Prograss) has been the go-to herbicide for selective annual bluegrass control in bermudagrass turf overseeded with perennial ryegrass. Typically, two applications between Thanksgiving and Christmas provide effective *Poa annua* control throughout the winter golf season. However, an increasing number of courses have seen annual bluegrass resistance to repeated use of ethofumesate and other herbicide active ingredients.

One of my responsibilities as a cooperative Extension specialist and turfgrass researcher is to test products to help golf course superintendents and turf managers make informed agronomic and economic decisions. Whenever there's a difficult challenge facing turf managers, whether it's a formidable foe like *Poa annua* or severe drought and resultant water use restrictions, a surplus of products and remedies arise to save the day. But as the adage goes, "If it sounds too good to be true, it usually is." Too many products sell based upon hearsay and testimonials rather than scientific

research. This phenomenon forms the basis of future sales if by chance the product causes a positive response. However, without an untreated control, replication and elimination of other products in use at the time, how can we know with any certainty that product X resulted in Y response?

U.S. federal and state pesticide registration is an example of product testing at the other end of the spectrum from testimonials. Pesticides undergo extensive lab and field testing to establish efficacy and safety to organisms and the environment.

One product nearing completion of the U.S. federal registration process is PoaCure (methiozolin) herbicide from Moghu Research Center in South Korea. PoaCure is a novel product among *Poa annua* control herbicides, providing selective pre- and post-emergence control of annual bluegrass in creeping bentgrass putting greens and nearly all other turfgrass species and turf areas. The University of California, Riverside has conducted extensive testing of PoaCure on golf courses throughout California and the western U.S. since 2010. It was tested in 2013 and 2014 alongside ReeVerse Poa, a product from ReeCourse Golf, LLC. According to ReeCourse Golf, this product contains SumaGrow, a microbial blend selected for its ability to improve the health of the soil, reduce fertilizer inputs and improve water efficiency. Another description claims: "ReeVerse Poa works to impair the immune system of the *Poa* so that it gradually dies off and the healthy grass grows in around it. The ReeVerse Poa does

this without leaving brown spots!” More information is available at earthcarewithsumagrow.com/test-results/golf-courses.

RESULTS

Data from the two experiments presented in this article are representative of results from multiple experiments. For clarity, I’m presenting only a single year’s data for each experiment.

POA ANNUA CONTROL IN PUTTING GREENS

A study was conducted from October 2013 to January 2014 on a 9-year-old practice green at Callippe Preserve Golf Course in Pleasanton, Calif., a suburb of the San Francisco Bay area. The composition of the green was about 50/50 Dominant Plus creeping bentgrass and *Poa annua*. Soil was a 90/10 sand/peat mix conforming to USGA recommendations. Mowing height was 0.125 inches. A CO₂-powered backpack sprayer was calibrated to deliver an output of 2 gal/1,000 sq. ft. All chemical treatments received 5 minutes of irrigation following application, and standard irrigation practices thereafter. Plot size was 4 ft. x 6 ft., with four replications of each treatment. Percent *Poa annua* control was calculated based on *Poa annua* cover (0 to 100 percent) determined at the start of the experiment and every two weeks thereafter.

Chemical treatment effect was significant on three rating dates (Table 1). In general, higher rates — and more important, higher total amounts of PoaCure — resulted in the best *Poa annua* control. These results corroborated other findings that at least 4.8 oz/M of PoaCure applied over a period of 10 to 16 weeks is required for optimum *Poa annua* control on putting greens in California. ReeVerse Poa was not effective in reducing *Poa annua* populations. In fact, *Poa annua* increased rather than decreased following applications of this product.

FIGURE 2



Effects of products on *Poa annua* control in bermudagrass turf overseeded with perennial ryegrass. Note PoaCure plot designated by the arrow. Toscana Country Club, Indian Wells, Calif. Photo taken March 11, 2014.

TABLE 1

Treatment	Rate (oz/M)	Timing	Total (oz/M)	11/21/13	12/5/13	1/16/14
Control	—	—	—	-36 D	-79 E	-100 E
PoaCure	0.6	ABCDEF	3.6	21 A	8 ABC	83 A
PoaCure	1.2	ABCD	4.8	25 A	30 AB	91 A
PoaCure	0.6	A	0.6	8 ABC	-27 CD	-40 CD
PoaCure	1.2	A	1.2	11 ABC	-7 CD	-29 CD
PoaCure	0.6	AB	1.2	16 AB	6 BC	-4 BC
PoaCure	1.2	AB	2.4	27 A	9 ABC	14 B
PoaCure	0.6	ABC	1.8	-9 BCD	-1 BC	-10 BC
PoaCure	1.2	ABC	3.6	31 A	44 A	69 A
ReeVerse Poa	6.0	B				
ReeVerse Poa	3.0	CDEFG	21	-13 CD	-38 D	-55 D

Application Timing:
 A = Oct. 10, 2013
 B = Oct. 24, 2013
 C = Nov. 7, 2013
 D = Nov. 21, 2013
 E = Dec. 5, 2013
 F = Dec. 19, 2013
 G = Jan. 2, 2014

Percent *Poa annua* control based on initial *Poa annua* cover ratings and following sequential applications of PoaCure (methiozolin) herbicide and ReeVerse Poa in 2013-14. Callippe Preserve Golf Course, Pleasanton, Calif. A negative number indicates an increase in *Poa annua* population and a positive number indicates a decrease in *Poa annua* population. Percent *Poa annua* control means followed by the same letter in a column are not significantly different ($\alpha = 0.05$).

CONTROL IN OVERSEEDED TURF

A study was conducted from August 2013 to March 2014 at Toscana Country Club in Indian Wells, Calif. The bermudagrass fairway was overseeded with perennial ryegrass on Oct. 15. A CO₂-powered backpack sprayer was

calibrated to deliver an output of 2 gal/1,000 sq. ft. Chemical treatments were applied from eight weeks before to 16 weeks after overseeding to evaluate *Poa annua* control (Table 2). Plot size was 4 ft. x 6 ft., with four replications

Continued on page 36

TABLE 2

Number	Treatment	Rate	Timing	Poa Cover (%) 3/11/14
1	Control	—	—	53 BCD
2	PoaCure	2.4 oz/M	8 WBOS	50 BCDEF
3	PoaCure	1.2 oz/M	8 WBOS	66 A
4	PoaCure	2.4 oz/M	6 WBOS	55 ABCD
5	PoaCure	1.2 oz/M	6 WBOS	59 ABC
6	PoaCure	2.4 oz/M	8 WBOS	33 HIJKL
6	PoaCure	1.2 oz/M	10 WAOS	
7	PoaCure	1.2 oz/M	8 WBOS	26 IJKLMNO
7	PoaCure	1.2 oz/M	10 WAOS	
8	PoaCure	2.4 oz/M	6 WBOS	31 HIJKLM
8	PoaCure	1.2 oz/M	10 WAOS	
9	PoaCure	1.2 oz/M	6 WBOS	35 GHIJK
9	PoaCure	1.2 oz/M	10 WAOS	
10	PoaCure	1.2 oz/M	8 WBOS	23 KLMNOPQ
10	PoaCure	1.2 oz/M	10 WAOS	
10	PoaCure	1.2 oz/M	12 WAOS	
11	PoaCure	1.2 oz/M	6 WBOS	19 MNOPQRST
11	PoaCure	1.2 oz/M	10 WAOS	
11	PoaCure	1.2 oz/M	12 WAOS	
12	PoaCure	0.6 oz/M	6 WAOS	51 BCDE
13	PoaCure	0.6 oz/M	8 WAOS	46 CDEFG
14	PoaCure	0.6 oz/M	10 WAOS	46 CDEFG
15	PoaCure	0.6 oz/M	6 WAOS	21 LMNOPQR
15	PoaCure	0.6 oz/M	8 WAOS	
15	PoaCure	1.2 oz/M	10 WAOS	
16	PoaCure	0.6 oz/M	8 WAOS	18 NOPQRSTU
16	PoaCure	0.6 oz/M	10 WAOS	
16	PoaCure	1.2 oz/M	12 WAOS	
17	PoaCure	1.2 oz/M	8 WAOS	31 HIJKLM
18	PoaCure	1.2 oz/M	10 WAOS	38 FGHJI
19	PoaCure	1.2 oz/M	12 WAOS	39 EFGHI
20	PoaCure	1.2 oz/M	10 WAOS	18 NOPQRSTU
20	PoaCure	1.2 oz/M	12 WAOS	
21	PoaCure	1.2 oz/M	10 WAOS	19 MNOPQRST
21	PoaCure	2.4 oz/M	12 WAOS	
22	PoaCure	2.4 oz/M	10 WAOS	25 JKLMNOP
23	PoaCure	2.4 oz/M	12 WAOS	31 HIJKLM
24	PoaCure	2.4 oz/M	10 WAOS	16 NOPQRSTU
24	PoaCure	2.4 oz/M	12 WAOS	
25	Barricade	0.5 lb ai/A	8 WBOS	35 GHIJK
26	Trimmit 2 SC	6 oz/A	8, 12, 16 WAOS	28 IJKLMN
26	Primo 1 MEC	6 oz/A		
27	Trimmit 2SC	8 oz/A	8, 12, 16 WAOS	20 LMNOPQRS
28	Trimmit 2 SC	6 oz/A	8, 12, 16 WAOS	28 IJKLMN
28	Primo 1 MEC	6 oz/A		
28	Tenacity 4 SC	5 oz/A		
29	Trimmit 2 SC	6 oz/A	6, 9 WAOS	10 QRSTUWV
29	Primo 1 MEC	6 oz/A		
29	Prograss EC	64 oz/A		
30	Tenacity 4 SC	5 oz/A	6, 9 WAOS	15 NOPQRSTUV
30	Prograss EC	64 oz/A		
31	Prograss EC	64 oz/A	6, 9 WAOS	13 PQRSTUWV
32	Prograss SC	36 oz/A	6, 9 WAOS	18 NOPQRSTU
32	MSO	0.5% v/v		
33	Prograss SC	36 oz/A	6, 9 WAOS	11 QRSTUWV
34	ReeVerse Poa	6 oz/M	4 WAOS 6, 8, 10, 12, 14, 16 WAOS	56 ABCD
34	ReeVerse Poa	3 oz/M		

WBOS = weeks before overseeding
 WAOS = weeks after overseeding
 MSO = methylated seed oil

Percent *Poa annua* cover (0 to 100 percent) on March 11, 2014 following chemical applications before and after overseeding on Oct. 15, 2013. Toscana Country Club, Indian Wells, Calif. Percent *Poa annua* cover means followed by the same letter are not significantly different ($\alpha = 0.05$).

Continued from page 35

of each treatment. *Poa annua* cover (0 to 100 percent), perennial ryegrass thinning and turf stand quality were evaluated throughout the study.

ReeVerse Poa did not reduce *Poa annua* populations (Table 2) or improve stand quality (data not shown) in comparison to the untreated control. Overall, we saw no reduction in *Poa annua* or improvement of turf quality from ReeVerse Poa in this and the putting green trial. Results of this study suggested that PoaCure has greater post-emergence than pre-emergence activity on *Poa annua*. Although a total of 2.4 to 4.8 oz./1,000 sq. ft. of product applied eight to 12 weeks after overseeding provided among the best *Poa annua* control, PoaCure caused objectionable thinning to the young stand of perennial ryegrass. Results of this and subsequent research suggests that superintendents should delay PoaCure applications until at least 12 weeks after overseeding perennial ryegrass. In the Coachella Valley, this may be too late to eradicate annual bluegrass before it forms objectionable seedheads.

Barricade (prodiamine) herbicide applied eight weeks before overseeding also caused perennial ryegrass stand thinning, however, the effect was observed at the time of emergence (data not shown). In time, enough perennial ryegrass seedlings survived to form an acceptable stand of cool-season turf. Unlike other golf courses in the area, Prograss (ethofumesate) herbicide continued to be active on *Poa annua* at Toscana Country Club, and no differences were found between the emulsifiable and soluble concentrate formulations, although they were applied at different rates.

If Prograss is losing activity against *Poa annua*, these results suggested that tank mixing with Trimmit (paclobutrazol) and Primo (trinexapacetyl) plant growth regulators could help boost *Poa annua* control. Use of PGRs beyond Christmas caused

Are you patient enough for PoaCure?

As PoaCure registration approaches in the United States, Jim Baird, Ph.D., provides some useful tips and facts about this game-changing herbicide.

- Like Heinz Ketchup, PoaCure is “slow good.” Especially on greens, the herbicide is applied sequentially over an extended period, usually three to six applications every two weeks. Label recommendations are based on providing the ideal scenario for this product; seamless transition from *Poa annua*-creeping bentgrass to creeping bentgrass (or other desired) turf.
- Increasing the rate, shortening the application interval or applying close to wet and/or freezing weather can accelerate PoaCure activity. In most cases, doing so results in sudden loss of *Poa annua* (you always have more than you think), injury or loss of creeping bentgrass/desired turf or both. This not what your ownership or golfers desire.
- When applied according to label recommendations, PoaCure is safe on creeping bentgrass and most turfgrass species maintained at putting green or at higher heights of cut. The herbicide severely injures Colonial and velvet bentgrasses. That said, certain creeping bentgrass cultivars like L-93 and Providence, which are no longer in production, appear to be more sensitive to PoaCure, as are various segregates of other cultivars. On the other hand, we know that Pure Distinction, Tye and likely several other creeping bentgrass cultivars are extremely tolerant to PoaCure at exaggerated application rates. This is not surprising given that there also is a range of tolerance to PoaCure among annual bluegrass biotypes. I advise the patient approach when dealing with tolerant *Poa annua* biotypes. For example, you may wish to use spot applications with a dauber or a repeat sequence of applications according to label recommendations.
- PoaCure is a root-active herbicide, so irrigation following application is essential to achieve desired results. This is especially important for higher-cut turf to help deliver the herbicide through the canopy and organic matter into the underlying root zone. On the other hand, heavy precipitation following applications speeds up activity, often beyond desired expectations. It also may cause injury or loss of desired turf.
- PoaCure has both pre- and postemergence activity, so allow at least two to six weeks after final sequential application before seeding, depending on use rate. Once again, proper use of this herbicide will provide seamless transition without the need for interseeding to fill in voids left by *Poa annua* eradication. In the case of overseeding bermudagrass turf with perennial ryegrass, our research found that initial application of PoaCure should be delayed at least 12 weeks after seeding.
- Have patience with PoaCure!!!

considerable turf growth regulation effects because of cold temperatures, which later subsided with warmer weather (data not shown). Tank mixing Tenacity (mesotrione) herbicide with Prograss resulted in turf bleaching for one to two weeks after each application (data not shown).

Jim Baird, Ph.D., is a turfgrass specialist at the University of California, Riverside. You may reach him at jbaird@ucr.edu for more information.

Acknowledgments

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“She said ballerinas and golfers share many things, including long hours of practice often done in solitude.”

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

Winter road trip

The first of the year is hectic for me, with a new semester and teaching, traveling, speaking and never-ending writing. Finding time to talk turf often doesn't even cross my mind.

This year, however, started off a little different.

In early January I received an invitation from Christine Merchant to attend an art show at Purgatory Golf Club in Noblesville, Ind. Besides being a professional photographer, Christine is co-developer and co-owner along with her husband, Mike, of Purgatory. I decided what the heck, I would go, and that late January would work for both of us.

Christine and I had never met in person. Our conversations over the years had been through email or social media. Our exchanges focused on how to develop and improve our eBooks, with her focus on the golf course and mine on turfgrass management.

Traveling in Ohio in January is an iffy thing, with the potential for snow, ice and obligatory cold. The day I set out was dreary but nice for the time of year. If you've ever traveled from Columbus, Ohio, to Indianapolis, Ind. (Noblesville is just north of Indianapolis) along Interstate 70, you know how boring the drive is. I would describe it — maybe not entirely correctly — as taking a hole shot in drag racing. The goal is to

get off to a quick start and get there as quickly as possible. Actually, the drive is a lot like drag racing — 180 miles in a straight line. Truck traffic and state workers filling pot holes are the only things that slow you down.

The scenery consists of mile after mile of farmland, which during the summer is mainly corn, but at this time of year lies fallow. There are a few landmarks along the way, including Wright Patterson Air Force Base, where the National Museum of the U.S. Air Force is located, Wilbur Wright's birthplace and museum, and the Indiana Basketball Hall of Fame. You do cross a couple of bodies of water with names like Mud Creek and the Big Blue River, which was neither big nor blue on my trip. And if you like milkshakes, there are an inordinate number of Steak 'n Shakes along the way.

Indianapolis has many superb up-scale public golf course facilities, and Purgatory Golf Club is one of them. Arriving at the club, I was greeted by Christine and Mike, along with Jon

Schriner, the golf course superintendent, and the professional staff. Mike and Christine purchased the land on which the course is built in 1997. Purgatory opened in 2000 and was managed by Mike and Christine until recently, when they hired Billy Casper Golf to manage the day-to-day operations. Jon Schriner, the young and up-and-coming superintendent, has been there a little more than a year.

Before lunch, Christine provided a personal tour of her art show, which consisted of more than 60 amazing photographs. The title of the show was “Ballerinas on the Green.” She said ballerinas and golfers share many things, including long hours of practice often done in solitude. The photographs were taken at Purgatory and the models were ballerinas from two local academies and high school golfers from her son's team. See the photographs at christinemerchantart.com.

There for lunch were Christine and Mike, Jon Schriner, the general manager and the golf professionals. Conversation ranged from turf schools and their status to agronomic and business issues facing golf. Heading home, I thought about how rejuvenating and enjoyable it was to talk about turf and golf with individuals who share the same passion.

It's not uncommon in the northern regions of the United States for superintendents to gather during the winter months for coffee or lunch and just talk. I'm envious. Don't fall into a routine where you think you are too busy to meet with a few colleagues. It's those gatherings that remind you why you chose this profession.

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

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Shedding light on growing turfgrass in shade

Dave Gardner, Ph.D., is a turfgrass scientist at The Ohio State University. Gardner has conducted several shade-related research projects to help superintendents better understand what is happening to turf plants in shade and how to help turf in the shade perform better. Dave can be reached at gardner.254@osu.edu for more information.

Q Describe the shade used in your research.

We were concerned in our research about both the quantity and quality of light reaching the turf. Light quantity was measured using photosynthetic photon flux and light quality was measured by the ratio of red: far red (R:FR) light reaching the turf.

We used three types of shade. The first was full, natural sunlight, the second was uniform shade created by a stand of deciduous trees, and the third was shade created from using a heavy, aged plastic cover over a hoop house. The quantity and quality of sunlight received in the natural sun plots was used as our reference point for comparisons. Plots under the deciduous trees received about 9 percent to 10 percent of the quantity of light and low R:FR light ratio compared with plots in natural sun. Plots under the hoop house received about 9 percent to 10 percent of the quantity of light and a similar R:FR light ratio compared with plots in full sun.

This gave us the opportunity to compare tall fescue turf in full sunlight with tall fescue grown under reduced quantity and quality of light in the deciduous shade and with tall fescue grown under reduced quantity but the same quality of light under the hoop house.

BASED ON OUR RESEARCH, SELECTIVE REMOVAL OF BRANCHES MAY NOT HAVE AS MUCH POSITIVE IMPACT ON TURF PERFORMANCE AS WE HAD HOPED.

Q How did the tall fescue respond to these three light environments?

Compared with tall fescue in full natural sunlight, turf under deciduous tree shade had approximately 50 percent less leaf area, tiller density decreased about 60 percent, chlorophyll content remained about the same, epidermal cells were thin, misshapen or absent and root density declined about 80 percent. Again, compared with tall fescue in full natural sunlight, turf under hoop

house shade grew taller, had about the same leaf area, tiller density decreased about 30 percent, chlorophyll content was higher, epidermal cells remained the same and root density declined about 80 percent.

We concluded from these results that light quality has a major impact on turfgrass response to shade, and that when we think about shade stress we need to think about both light quantity and quality. The reduction in root density is a good

reminder that turfgrass plants growing in shade will prioritize leaf growth over root growth. This makes sense from a survival point of view.

devices that measure sunlight quantity. Based on our research, selective removal of branches may not have as much positive impact on turf performance as we had hoped. While removing some branches may increase light quantity reaching the turf, the light is still being filtered by the remaining tree canopy, and light quality declines. It is the changes caused by altered light quality that are more damaging to the turf compared with just reduced light quantity.

To make a positive impact on turf performance, keep in mind that direct, unfiltered sunlight must reach the turf. The more hours of direct, unfiltered sunlight that reaches the turf the better.

Our research confirms that turf growing in shade is less tolerant to all stresses, particularly traffic stress. The increased disease susceptibility to turf growing under deciduous tree shade may be due to changes in the epidermal cell layer making it easier for fungal hyphae to penetrate the leaves.

Q What are the practical implications of your results?

One of the practical things we considered was tree removal or tree thinning on golf courses. Most decisions regarding which trees to remove or branches to cut off are based on mobile



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



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1 | RT-120F Compact Track Loader

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asvllc.com

2 | Lucid benches

PARIS SITE FURNISHINGS introduces the Lucid series backless bench. The 5-foot steel, powder-coated bench includes an area to accommodate a logo or messaging along the bench seat, which can be wrapped along the side. The message on Lucid benches is laser cut and integral to the bench. It will not chip, peel, fade or become discolored. These one-piece, ready-to-install benches are available in standard and custom colors.

pemi.com

3 | Greensmaster Flex walk greensmowers

The new Greensmaster Flex 1820 and 2120 walk greensmower models include a user-friendly multi-disk wet clutch for easy drive engagement and feathering for ease of operation. As a result, operators can now engage at lower RPMs for turnarounds in tight areas. Both units incorporate **TORO's** new EdgeSeries reels into the Dual Point Adjustment (DPA) cutting units. The clippings basket is now connected to the suspension cross-arm as opposed to the traction unit frame.

toro.com



4



5



6

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4 | HardCore hose reels

Available in manual and electric drive units, **VALLEY INDUSTRIES** recently released its HardCore line of hose reels. By using schedule 40 316 stainless steel, the company was able to thread in a riser and eliminate a need for a weld. The frame is made of lightweight aircraft-grade aluminum. Chains and sprockets on the electric drive units have been replaced by an ultra-heavy duty gearbox system that can be disengaged for easy unspooling. valleyind.com

5 | EFI engine blower

BUFFALO TURBINE has developed the industry's first blower with an electronic fuel-injected (EFI) engine option, according to the company. The 26.5-HP Kohler closed-loop engine is designed to reduce fuel consumption and maximize power. The engine contains no carburetor, which allows operators to utilize a wireless start/stop function without having to choke the engine on a cold start. The EFI model runs the turbine at 3,900 RPM and includes a 3-year, unlimited hour, commercial warranty. buffaloturbine.com

6 | Sand Guard bunker liner

Launched at the recent Golf Industry Show, Sand Guard by **POROUS PAVE** is designed for bunker liner application. It's installed with Porous Pave XLB, a permeable paving material consisting of 50 percent recycled rubber chips and 50 percent dried granite aggregate, delivered in bags and mixed on site. According to the company, Sand Guard has the capacity to infiltrate 5,800 gallons of water per hour per square foot and is guaranteed for a decade. porouspaveinc.com

The 19th Hole with...



R. Sean Reehoorn

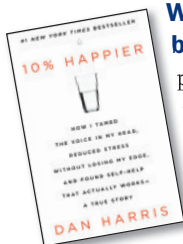
SUPERINTENDENT // Aldarra Golf Club, Sammamish, Wash.



Sean, what are you drinking?
Pendleton on the rocks.

Who do you think will win the 2017 PGA Tour Player of the Year award? Henrik Stenson or Jordan Spieth. I'm rooting for Spieth. I like the way he plays. He's emotional, and he's OK with that.

So, you and Danica are getting married this year? How's wedding planning going? Yes, in September. We're getting married in Bend, (Ore.). It's not local for either of us, we just love the venue and the town. The planning is going well — she's organized. Whenever she wants my opinion she asks me, and when she doesn't, she doesn't ask me.



What was the last good book you read? "10% Happier" by Dan Harris, about mindfulness and meditation. You don't have to be happy all the time, you can be upset... but things are what they are, and you have to learn to live with them.

So, what teams do you root for? Seattle Seahawks, Seattle Mariners and anything Michigan State.

Is Michigan State an NIT team this year? I'm not ready to pack it in on (Coach) Izzo yet. Maybe he deserves a break for one year, but I think he'll find a way.



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Best thing about living in the Pacific Northwest?

Summers with no humidity and fresh Dungeness crab.



What's your favorite piece of equipment? We got a new GPS sprayer. The technology allows us to do so much, it's my favorite. The individual nozzle control, the savings in fungicides and fertilizer. I can use prescription mapping. For example, I can spray one-half of my fairway at one rate and one-half of my fairway at another rate out of the same tank. I can spray in a circle and achieve uniform coverage due to variable rate control.

Who has the best nickname on your crew? We have a guy named El Toro, "The Bull." He's

strong and hard-headed. When we need something done that's really hard, he's the guy. He's a great guy.

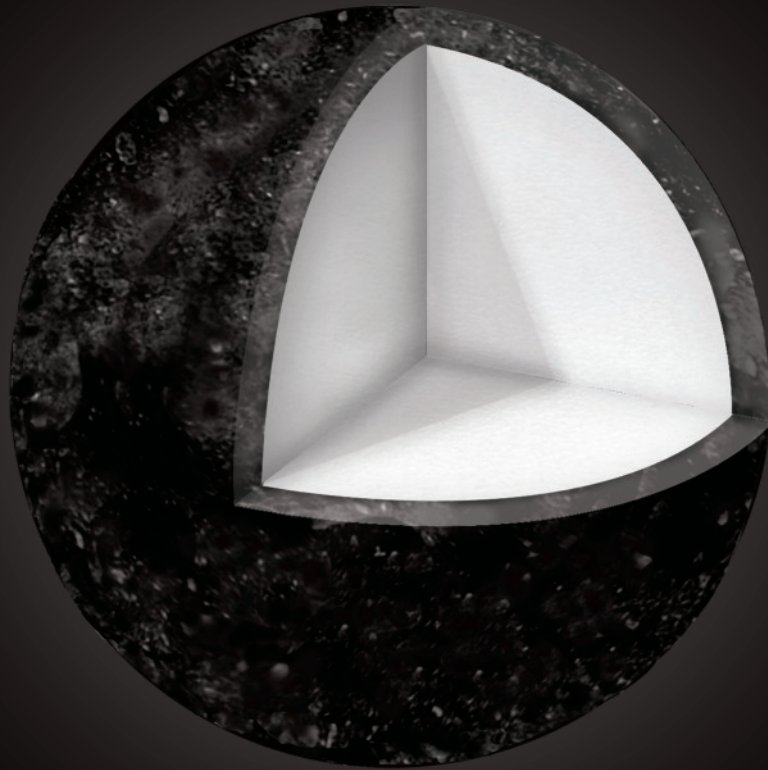
Speaking of names, where does Reehoorn come from and does it have a meaning? It's Dutch. My grandparents immigrated in the early '50s. My dad was born in Holland. To my knowledge it does not have a meaning, but if you ever meet somebody named Reehoorn in the United States, I'm related to them.

I've always subscribed to the thought that if your name doesn't have a meaning that you know of, you can make up your own. I like that — next time we talk I'll have one by then.

As interviewed by Seth Jones, Jan. 27, 2017.

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