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many people do you
recognize? For a
complete key, see
page 22.



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Superintendent Paradise

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He's got a ticket to drive

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“Kasey’s 2,500 Twitter followers took him seriously, and the dog photos started pouring in. That’s when he decided to add the bite to the bark.”

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

Who let the dog (calendars) out?

It’s no secret that superintendents love their dogs. They also love their dog calendars, so much so that we’re now up to four dog calendars to choose from.

The two most popular dog calendars are available from two of my friendly competitors. But two more dog calendars caught my eye this year, one from Twitter and one from my local par 3 course.

The first of these dog-catching calendars is the brainchild of Kasey Kauff, director of grounds at Trinity Forest Golf Club in Dallas. Kasey’s calendar, appropriately titled “The Underdogs of Turf,” started with a sarcastic tweet. When his dog didn’t make the cut for one of the big calendars, he tweeted, “I’m making my own calendar.” His 2,500 Twitter followers took him seriously, and the dog photos started pouring in. That’s when he decided to add the bite to the bark.

“Everyone thinks their dog is better looking than the

dogs that get selected (for the calendar),” Kasey told me. “It’s like everyone thinks their kids are the best-looking kids.”

Rain Bird stepped up and sponsored the calendar. While promoting the calendar, the company also promised to donate \$1 to the Humane Society for every follow they got on Twitter (@RainBirdGolf). Within two days, they raised \$1,000.

Kasey says his underdog calendar isn’t meant to be a slight to the other calendars. His tongue-in-cheek tweet got legs, and he saw it as an opportunity to get more dogs in the hunt at being featured in a calendar.

There were two things Kasey knew for sure about his calendar: He knew his 3-year-old Vizsla mix, Dixie, would be the cover girl. And he knew

there would be no dog left behind — every mutt would make the cut.

“Every dog got in. Even a goat from Australia and a rabbit that rides in some guy’s golf cart made it,” Kasey says. “We just scrunched them up... there’s 15 dogs per page.”

Kasey says he’ll do the calendar again next year and hopes to get 500 dogs in that one. He encourages people to tweet photos of their pups to him (@kaseykauff) and he says it doesn’t matter if your dog (or goat or rabbit) was featured this year, he’ll run it again next year.

“I had a guy email me and tell me he had been submitting his dog for the last eight years and he was really frustrated with not getting selected each year,” Kasey says. “He said seeing his dog

in a calendar, finally, gave him a lot of pride each day he saw it.”

The other dog calendar was created by Jeff Burey, owner/operator of Twin Oaks Golf Complex in my hometown of Eudora, Kan. That calendar is called “Golf Course Dogs of the Heart” and features 12 dogs from the Heart of America GCSA. Sponsored by John Deere and Van Wall Equipment, this calendar also supports a good cause — the Wee One Foundation.

Jeff has delivered stacks of calendars to courses all around Kansas City and the surrounding area. The superintendents in KC might remain unseen, but their dogs will now be front and center in a lot of pro shops.

“I’d encourage anyone to try a project like this with your local chapter,” Jeff told me. “It was a great way to bring the Midwest Section of the PGA and the Heart of America GCSA together, and for a good cause.”

It wasn’t that hard, Jeff says. He and his wife, Cathy, selected the 12 dogs. Then Jeff organized photo shoots at three Kansas City golf courses. He hired his daughter Blair, owner of Elisabeth Blair Photography, to photograph the dogs... and their owners.

“I only had one job: I worked the squeaky toy,” Jeff laughs. “One thing that stuck out at me was that the dogs were comfortable in front of the camera, and the superintendents less so.”

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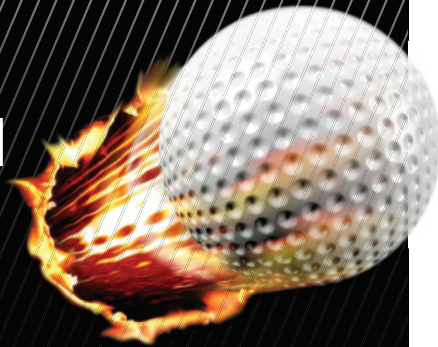
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NEWS, NOTES AND QUOTES




// A GOOD WALK SPOILED?

HAVING YOUR GOLF AND YOUR GOLF CHANNEL, TOO

NEW GOLF CAR TECHNOLOGY AIMS TO RECONNECT THE GOLFER TO THE OUTSIDE WORLD.

BY SETH JONES // Editor-in-Chief

 One Arizona golf course and a World Golf Hall of Fame golfer are taking a different approach to the whole “golf takes too long to play” conundrum.

The Westin Kierland Golf Club in Scottsdale has installed “Shark Experience,” a new technology that enhances the on-course experience, to its golf fleet of Club Cars.

These cars now include high-definition touchscreen displays and built-in speakers with Bluetooth connectivity. Golfers at Kierland Golf Club now will be able to enjoy streaming music via Slacker Radio, live sports, highlights, news and entertainment, in addition to tips from Greg Norman, dynamic yardage information and more.

“It has always been (our) contention that it’s not the length of time it takes to play, but instead the amount of time to play the game competing with other

golfer interests,” says Bruce Lange, managing director, The Westin Kierland Resort & Spa. “Bringing music, video and eventually televised sporting events to the course allows the player to multi-task so they won’t have to give up some of their favorite pastimes.”

Last November, the partnership between Greg Norman Co., Verizon, GPSi, and Club Car unveiled Shark Experience. Kierland GC is one of only a handful of clubs in the United States to have this new technology. In 2018, the Experience will add features such as hole-in-one technology, food and beverage ordering, Shot Tracer and more.

“The golf industry has been starved for real innovation that encourages real change for real growth, and we believe Shark Experience is the answer,” says Greg Norman.

For more information on the Shark Experience, visit sharkexperience.com.

// USA! USA!

WINGATE JOINS SOLU-CAL USA

Murray Wingate has joined Solu-Cal USA as a senior territory manager for the company’s line of enhanced calcium and humic acid soil amendments. He previously spent 25 years at Lebanon Seaboard Corp. in roles encompassing sales management, product development, marketing and international business. Wingate’s territory will include the southern United States, Asia, South America and the Caribbean.

Solu-Cal and Wingate have previously been connected through work with the national non-profit Project Evergreen, of which Wingate is a board member.

Solu-Cal provides lime and gypsum products to the industry, and is experiencing rapid growth in new distributors in international markets. Solu-Cal products are formulated with organic humic/fulvic acid technology, which enhances a plant’s ability to convert vital nutrients into an available form for plant uptake and soil pH adjustment.

For more information about Solu-Cal, visit solu-cal.com.

// BATTERY POWER

THOMAS SUCCEEDS ELDER AT TROJAN BATTERY

Trojan Battery Co. has announced the appointment of Neil Thomas as president and CEO for Trojan Battery, succeeding Jeff Elder, who will be retiring.

Thomas joins Trojan following a career with Wayne Fueling Systems, where he most recently served as CEO. In that role, Thomas was responsible for repositioning Wayne as a technology company focused on retail fueling equipment and services.

“This is an exciting time for Trojan Battery, particularly with the increased global demand for cost-effective and reliable energy storage solutions as many industries transition to new technologies to meet customer needs,” Thomas said. “I look forward to leveraging my experience to work alongside the talented and experienced team at Trojan to expand the company’s existing business and to position Trojan for future global growth.”

With more channels and better sound, the new Shark Experience screens can take golfers from the big game to Biggie Smalls.





Monarch Joint Venture, which aims to halt the decline of monarch butterflies, has teamed up with Audubon International to increase habitat for the insects.

// BEFRIENDING BUTTERFLIES

Monarchs in the rough

➔ Most everyone grumbles when searching for errant golf shots in the deep rough. Perhaps a new partnership between Audubon International and Monarch Joint Venture (MJV) will lighten that mood a little.

Monarch Joint Venture, the largest collaborative established to stop the decline of monarch butterflies, has partnered with Audubon International to help increase the amount of inhabitable monarch and pollinator habitat.

“Golf courses and other lands that dot the landscape have incredible potential to not only create additional monarch and pollinator habitat, but draw attention from the public eye to this important conservation issue,” says Wendy Caldwell, MJV coordinator. “Audubon International is a welcomed partner in our endeavor to increase habitat for monarchs on all landscapes, including golf courses.”

According to Audubon International, monarch population has declined by 90 percent over the last 20 years. To counteract this, the organization’s Monarchs in the Rough program works to establish monarch habitat on golf courses across the country and beyond. AI staff estimates that on United States golf courses, there are

100,000 acres of space to create monarch-friendly habitat. If those areas are improved to have 200 milkweed stems per acre, the group says, their program could offer 20 million milkweed stems toward the 1-to-1.5-billion goal.

“Managing properties for pollinators, like monarchs and other butterflies, is a great way to pull together best practices to protect water quality, diversify wildlife habitat, improve aesthetics of golf and more,” says Christine Kane, Audubon International’s executive director. “While you can’t promote everything on the same acre, we certainly can provide for multiple ecological services needed by communities by providing resources critical to monarch conservation.”

The MJV was established in 2009 and includes 70 partners from around the country, including the National Recreation and Park Association, the Association of Fish and Wildlife Agencies and the U.S. Geological Survey. For more information on MJV, visit monarchjointventure.org.

Audubon International offers a variety of programs to facilitate the sustainable management of land, water, wildlife and other natural resources. For more information, visit auduboninternational.org/programs.

// PASSINGS NOTED

ASGCA MEMBERS NUGENT, HARDIN PASS

The American Society of Golf Course Architects (ASGCA) lost two members on the same day. ASGCA Past President Dick Nugent and Jeff Hardin, ASGCA, both passed away on Jan. 1.

Nugent worked six years with ASGCA founding member Robert Bruce Harris. Nugent and future ASGCA President Ken Killian left Harris in 1964 to set up their own golf course architecture partnership. Nugent and Killian made their big splash with the creation of Kemper Lakes Golf, Long Grove, Ill., which played host to the Kemper Open and the 1989 PGA Championship. Other courses designed by Nugent include: Tuckaway CC, Milwaukee; The Dunes Club, New Buffalo, Mich.; Koolau GC, Oahu, Hawaii; and Harborside GC – Port and Starboard, Chicago.

Hardin’s golf course architecture career included work with fellow prominent



Jeff Hardin

architects George Fazio, ASGCA, and ASGCA Past President Robert F. “Red” Lawrence. Courses designed by Hardin include: Los Caballeros GC, Wickenburg, Ariz.; Dobson Ranch GC, Mesa, Ariz.; El Conquistador CC, Tucson, Ariz.; Wigwam – West Golf Course, Litchfield Park, Ariz.; and Sky Mountain GC, Hurricane, Utah.



Dick Nugent

// EVERYONE SAY GOLFDOM!

ABOUT THE COVER

Ever try getting 70 people to all smile and look at the camera at the same time? It’s not easy, but Orlando-based photographer Lou Ferraro, owner of Park South Photography, nailed it with this month’s cover, shot on the back steps at the Reunion Resort. For a complete rundown of who everyone is in the photo, see page 22.



Golfdom Gallery



1

1 Always marketing Publisher Craig MacGregor (far right) makes sure the *Golfdom* Summit flag is easily seen while Joe Gulotti, Newark (Del.) CC (left) and Chris Dalhamer, CGCS, Pebble Beach (Calif.) Golf Links stand by.



2

2 Recalling the 2014 U.S. Open Pinehurst Resort's Bob Farren, CGCS (left), and John Jeffreys (right) catch up with their old pal from Golf Channel, Rich Lerner.



3

3 Happy hour Michael Kropp of Wilbur-Ellis (left) is based in Sacramento and Rick Hathaway, Rock Creek Cattle Co., is based in Deer Lodge, Mont. At the Summit they met halfway — the Reunion Resort bar.



4

4 Captain's chair It was announced at the Summit that Craig MacGregor (seated) is *Golfdom*'s new publisher. This crew pondered picking him up in his chair in celebration, but cooler heads prevailed. From left to right: Brandon Richey, Lake Nona GC, Orlando; Dalhamer; Wally Gresham, Sunset Hills CC, Carrollton, Ga.; Ron Kerley, Los Robles Greens GC, Thousand Oaks, Calif.; Gulotti; Eric Dusa, CGCS, The Traces GC, Florence, S.C.; and Rick Grant, Quali-Pro.



5

5 Rounds is a ringer If you're ever challenged to a game of bags by Greg Rounds, Sunset Ridge CC, Northfield, Ill., do yourself a favor: fake a hamstring injury and limp away.



6

6 Chillin' at the pool (Left to right) Cam Schafer, Frost Inc.; Michelle Mitchell, *Golfdom*; John Gold, Valley of the Eagles GC, Elyria, Ohio; and Ken Rost, Frost Inc., relax poolside.



7

7 Land of Lincoln Illinois represents at the Summit. Left to right, Dan Marco, Ruth Lake CC, Hinsdale; Rounds; Connor Healy, Conway Farms GC, Lake Forest; and Scott Witte, CGCS, Cantigny Golf, Wheaton.

PHOTOS BY: ABBY HART (1, 3, 6, 7), DAN HANNAN (2), SETH JONES (4), LOU FERRARO (5)

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“But what I truly found most interesting, besides the fact that stewed pig leg costs 40 baht in Thailand, was this acronym they kept talking about: MLSN.”

JOE GULOTTI, *superintendent, Newark (Del.) CC*

Farewell to input Armageddon

Throughout my career as a head greenkeeper, I slayed phosphorus to drive roots and applied potassium, hoping to suppress the gnarliest turfgrass pest of all time, anthracnose. And you better believe I was placing a target on pounds per thousand of nitrogen throughout any given growing season.

I approached balancing soils the industry-standard way for years, and honestly thought I was doing a decent job. Surfaces seemed adequate, with the occasional hiccup, but man, it was tough trying to nail the recommended targets on those informative soil reports.

It all seems fairly simple while sitting in the comfortable confines of your office, poring over the data before the season begins. However, the next thing you know it's Memorial Day, and those 10 pallets of gypsum are staring you in the face just longing to get those below-optimum calcium percentages into the optimal range.

It was input Armageddon every spring and fall, and along with getting everything out in a timely fashion, the cost associated with balanc-

ing soils was pretty hefty. Something had to give. Luckily, I stumbled upon a podcast that offered an alternative approach to managing soils.

The host was a guy referring to himself as “The Turfgrass Zealot,” and his guest was Micah Woods, Ph.D., an intriguing dude whom I instantly liked. He was soft spoken but confident, with a backstory so interesting I could've sat on a tractor all day listening to him talk about growing grass.

I was fascinated by his delivery, intelligence, sense of humor and love of travel. But what I truly found most interesting, besides the fact that stewed pig leg costs 40 baht in Thailand, was this acronym they kept talking about: MLSN. It stands for Minimal Levels of Sustainable Nutrition, and to put it lightly, my mind was blown

by this alternative approach to soil management.

MLSN was created in 2012 by Woods and Larry Stowell, Ph.D., and Wendy Gelernter, Ph.D., of Pace Turf. It was developed in an effort to reduce inputs and costs while also reducing the impact these plant nutrient applications have on our environment.

Basically, MLSN demonstrates that as long as soil is supplied with the minimal amount of any one nutrient, and you didn't allow this nutrient to dip below the proposed guidelines, turf performance will not suffer.

Here are the MLSN guidelines.

PH: >5.5
Potassium (K ppm) 37
Phosphorus (P ppm) 21
Calcium (Ca ppm) 331
Magnesium (Mg ppm) 47
Sulfur as sulfate (S ppm) 7

No longer is it necessary to sweat whether magnesium levels are excessive or if potassium percentages are deemed extremely low, therefore affecting overall crop yield. Because in essence, are we attempting to produce high yields of turf?

I used to think yes, that growing succulent turf is required to produce healthy surfaces. But when I read Woods' definition of greenkeeping, which is, “Managing the growth rate of the grass to create the desired playing surface for golf,” I recognized the awful job I was doing for so many years as a greenkeeper.

When it comes to managing my soils, all I need to do is add any element that falls below the MLSN Guidelines. This simple concept changed my entire approach to greenkeeping, and the results have been remarkable.

For 11 seasons as a head greenkeeper, I've been the one making every decision affecting turf health. Some choices have admittedly been bad, while others proved to be right. But the best decision I've made has been implementing the MLSN guidelines into my greenkeeping repertoire.

By doing so, surfaces have never been better and fertilizer costs have plummeted. If you don't know about MLSN, you should definitely check it out. It's pretty amazing how going minimal can maximize the performance of your turf.

Joe Gulotti (hardg43@gmail.com) is the superintendent at Newark (Del.) CC. To read his blog, visit thewalkinggreenkeeper.com.

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The Golfdom



FROM THE ARCHIVE

Each month we print research results in our Super Science section from studies taking place across the country and from some of the top minds in turfgrass research. An article from the April 1945 edition of *Golfdom* told the story of some of the top soil scientists from Herts, England's Rothamsted Experimental Station, and their role in preparing the Allied Forces for the invasion of Normandy, France, in what is now known as D-Day. Today, we get to cover some of the biggest events in the world of golf, but it's remarkable to look back at articles like this, which focus on an event that shaped world history. To read the full article, visit golfdom.com/exclusive.

Soil scientists set stage for D-day

The science of soil physics played a part in the invasion of Europe.

Ever since it became evident that the effect of fertilizers upon crops depended to a large extent upon the physical structure of the soil in which the crops are grown, agricultural chemists have given much attention to the problem. For some time past, the physical and chemical departments of Rothamsted Experimental Station in Herts have been engaged on the examination of soil structure, (with particular attention being paid to the clay fraction of the soil.

Little did the workers on this piece of pure agricultural research imagine that the data and experience they were accumulating would provide valuable information for that epic invasion of Europe on "D" day.

It all began with air reconnaissance photographs of a Normandy beach, taken as part of an investigation to ascertain how the beach would stand up to the heavy traffic of a landing in strength.



With the information provided by this and other methods, geologists selected in England a beach that corresponded as closely as possible with the one in Normandy. To this beach went allied military authorities and scientists, including a soil physicist from Rothamsted.

There they watched the movements

of tanks and other vehicles and mapped the clayey patches in which the vehicles got stuck. At the same time, the soil physicist was making a soil survey and comparing vehicle performance with the characteristics of his soil samples. The military authorities then decided that a similar soil survey must be made on the Normandy beach.

An officer was then selected to make the dangerous trip to Normandy. He was shown how to make a rapid survey, how to take the soil samples and how to distinguish areas suitable for vehicles from those that might be unsafe, the point being that samples need only be brought back from what seemed to be unsafe areas.

To make quite certain that he knew his "part," a rehearsal was arranged on the English coast. Patrols were put out in the same way as the enemy would on the Channel coast, and on a starlit night, a figure clad in a rubber suit slipped quietly overboard from a boat out in the bay. It was the reconnoitering officer. Silently, he made his way through the water and came cautiously ashore. Unseen, he took his samples and got clear away.

In due course, his report, together with his samples of clay, reached the military authorities. The information he gave tallied with that already known. The rehearsal had been a success.

Here, as far as the soil scientists were concerned, the story ended. When the real trip was to be made they did not know. But one day a two-word telephone message was received — "No samples." And they knew the beach was safe.



“... I don't think it's solely the superintendent's responsibility to find a bunch of ways to keep assistants engaged.”

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

Do it yourself

Certainly, everyone is by now aware of the number of assistant superintendents who have left the business over the last four or five years. Reasons given usually involve some combination of reduced advancement opportunities since the Great Recession, low pay and lack of work/life balance. No surprise there — the last two probably have been common complaints since David Honeyman got shot down when he asked Old Tom for the weekend off and a raise.

It seems this defection has hit the ranks of experienced assistants especially hard. As the average tenure of assistants has increased over the last 10 years, many have decided that the long hours and low compensation that often come with the job are no longer worth it, given the less-than-optimistic chances for advancement to a superintendent position.

The realities of golf course maintenance are what they are. Fewer golf courses mean fewer jobs, fixed budgets lead to fixed salaries, and expectation levels that need to be met and ideally surpassed frequently translate to overtime and weekends.

Assistant retention has been a hot topic on social

media and in the trade publications lately, especially since the proposed changes to the Fair Labor Standards Act fell apart last winter. Most of these conversations revolve around increasing wages and prioritizing work/life balance, but several have included other, more outside-the-box ideas, ranging from creative scheduling to increased fringe benefits. There even was a Twitter discussion about giving assistants “sexier” titles.

I think most of us would agree that it's the superintendent's responsibility to develop and mentor assistants and to compensate them as fairly as possible. Beyond that, I don't think it's solely the superintendent's responsibility to find a bunch

of ways to keep assistants engaged.

Looking at it from a superintendent's perspective, I certainly understand the need to do whatever you can to attract and retain the best possible candidates from a dwindling labor pool. The efforts that have been made in this area certainly are appreciated and are beginning to make a difference, especially regarding compensation. However, it's a two-way street. Ultimately, we are responsible as assistants to keep ourselves motivated, regardless of the other issues.

Doing the same thing day after day, week after week, season after season, can wear down even the most hardcore turf guy. Finding ways to keep things fresh makes a huge dif-

ference in your perspective.

Ask for new responsibilities. It might help shake up your routine a little, and it also could free up the boss to do something that would provide a welcome change for him or her, too. I know somebody is thinking, “Is this guy serious right now? Did he not, like two paragraphs ago, mention that we make crap money, and now he's suggesting we ask for more work?” Take it or leave it, I'm just throwing it out there.

Continuing education through GCSAA, local chapters or universities is another great way to stay engaged. I even would consider social media as a means of continuing education. The main reason I have a Twitter account — if not the only reason — is for the turf discussions.

As cliché as it sounds, networking also can increase career satisfaction. Involvement in GCSAA, local chapters, tournament volunteering and social media are great ways to meet people or reconnect with old friends. I've heard it said countless times that one of the best things about this business is the great people. I couldn't agree more.

This profession can be a grind at times. Finding ways to stay interested and engaged is a necessity. Figuring out ways to do it will not only make you better at your job in the present, but will also prepare you for opportunities in the future.

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

507 1-on-1 meetings
40 superintendents
18 holes of golf
15 boardroom presentations
... and 1 hot air balloon flyover

Just another day in *Superintendent Paradise*

BY THE GOLFDOM STAFF

Now going into its eighth year, the *Golfdom* Summit annually brings roughly 40 superintendents from around the country to meet with 15 vendors. The format allows vendors to make a single boardroom presentation to the group, then follow up with one-on-one meetings with superintendents over the following two days. (Of course, there's always golf, a barbecue, a keynote speaker and a little education thrown in for good measure.)

"The *Golfdom* Summit is second to none, a can't-miss opportunity. Anyone who gets the opportunity to attend, I couldn't imagine them passing it up," said Jared Milner, superintendent at Meadowbrook CC, Northville, Mich. "I'm a little upset I can't attend it next year."

And there's the rub. While attendees love the meeting (this year, 92 percent of superintendent attendees rated the event "excellent"), the one knock on the event is that we can't bring every reader to experience this one-of-a-kind opportunity for themselves. So, we try our best to bring the *Golfdom* Summit to readers via this feature, outlining the key ideas and takeaways presented to superintendents.

To learn more about the *Golfdom* Summit and to apply to attend a future Summit, visit GolfdomSummit.com.

Turfco

"Topdressing is kind of an art form-slash-science experiment," said Scott Kinkead, executive vice president of Turfco. "We've got to make sure we're not giving something to these superintendents and saying, 'Good luck, go figure it out.'" Turfco's WideSpin 1550 topdresser and Torrent 2 debris blower include features that aim to minimize guessing and make quick work of maintenance.

Turfco Regional Sales Manager Chris Francis spent the better part of two days on Reunion Resort's driving range showing off the WideSpin 1550. Francis explained that the major advantage of the topdresser is being able to preset your applications and change them on the fly to get an even, consistent spread, without having to get off the machine and do mechanical changes.

In the boardroom presentations, Kinkead compared using the topdresser controls to using your car stereo, hitting a button for your approaches, or another for your greens.

When it comes to blowing debris, Kinkead described observing operators on courses with the blower at full blast with the nozzle angled up between jobs. "You got them beatin' the band, blowing birds out of the sky!" he said with a laugh. The Torrent 2 blower includes an

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Couldn't
be there in
person?
Join us for
a ride
through
what was a
magical 2017
Golfdom
Summit.

Golfdom *Summit*



With the Summit outdoor demo areas directly below, the final day of the 2017 *Golfdom Summit* included a hot air balloon flying low over the Reunion Resort driving range.



// SUPERINTENDENT PARADISE



One of the highlights of the outdoor demo area, Turfco's Torrent 2 debris blower includes time- and energy-saving features such as an idle resume button.

Pogo Turf Pro

For companies such as Pogo Turf Pro, the Summit was an opportunity to dispel some misconceptions about their product.

"A lot of people assumed it was just a moisture meter," said Carmen Magro of Pogo Turf Pro. He explained that once the Pogo Pro sensor is stuck in the turf, it provides much more information than a moisture reading — it measures salinity and canopy temperature, integrates weather information and includes precision GPS to pinpoint problem areas in the soil. The sensor and its accompanying cloud-based app allow users to map and analyze the soil conditions all over their courses.

Magro admitted that some superintendents were overwhelmed by the brief boardroom presentation that introduced them to the product, but once they received a rundown of Pogo's capabilities in their one-on-one meetings and were able to ask questions about using it on their courses, the superintendents realized the system's simplicity.

Though Pogo has been on the market for a few years, the company recently integrated drone imagery as an added supplement to the data. The Pogo app allows the user to layer a drone image over an existing data map of soil conditions for a complete picture of the course's turf quality.

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idle resume button that prevents wasted time and gas, allowing the blower to idle down and resume power immediately.

The Torrent 2's MagnaPoint feature allows superintendents to set the optimal angle on blowers for various types of debris. Kinkead explained that the angle being off by 15 degrees or more could add two hours or more to the workday. Luckily for Summit attendees, Turfco offered two solutions to help crews get that time back.

Frost Inc.

Accuracy also was on the minds of Summit attendees, and a guided spray control system was one of several products at the event that incorporate GPS technology to help superintendents. Frost Inc.'s Seletron spray control system offers individual nozzle controls and variable speeds and rates, and aims to prevent overspraying and conserve chemicals.

"Superintendents are recognizing that accuracy in spray applications is very important, especially with their plant growth regulants," said Ken Rost, president and CEO of Frost Inc. "If they're getting overspray with their traditional sprayers, they're burning out collars and the intermediate areas between applications."

Between demonstrating the sprayer and the Ultimix, a powerful chemical pre-

mix station, the Frost representatives saw plenty of traffic during the Summit. In the demo area, superintendents had a chance to check out the GPS user interface and see for themselves how GPS can help them apply chemicals more accurately.

Rost hoped that GPS technology can help with another turf industry concern: labor. "Golf courses now are getting younger, more inexperienced help, and they don't have a lot of confidence that everything's getting done the way it should be," said Rost. "This really helps (superintendents) to dummy-proof a little bit and offer a way to train those spray operators."



Frost Inc.'s Seletron spray control system offers GPS technology to help superintendents spray accurately, saving time and chemicals.

PHOTOS BY ABBY HART

►19.7854122°N -155.9640222°W◄

Nanea Golf Club is on the island of Hawaii. But they're never on an island with John Deere.



In terms of service and support, a golf course superintendent can, at times, feel like they're on an island. And yet, Billy "Biggie" Quirit, equipment manager of Nanea Golf Club, Island of Hawaii, never feels that way, thanks to his John Deere Golf dealer. Says Biggie "They've done really well at supporting us with our equipment, our parts, even our financing." Sitting on over 1,000 acres, Nanea is breathtaking in both its conditioning and size. "The 8000A is one of the best fairway mowers we've seen. And the greens mowers are pretty much bulletproof."

No matter where you are, John Deere Golf has a solution for you. Call your John Deere Golf dealer today to see what can be done for your course.



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// SUPERINTENDENT PARADISE

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“I think it’s important that superintendents know I walked in their shoes for 15 years,” Magro said. “This is not meant to be a data tool, it’s meant to be a solutions system. It’s about making decisions with this information.”

Lebanon Turf

Several turf and ornamental companies saw the event as an opportunity to roll out new programs. The *Golfdom* Summit was proud to host the debut of Lebanon Turf’s True Performance fertilizer program, which features a combination of the company’s Country Club MD granular fertilizer and its Emerald Isle liquid fertilizer, intended for use on putting greens.

Chris Gray, golf marketing manager for Lebanon Turf, explained that based on two years of studies at the University of Arkansas and Purdue University, the combination of these two products has provided great results.

“We’re trying to build a fertilizer program that’s not based on our marketing, but one that’s based on what university scientists have identified as very effective, so superintendents can provide the best putting surface all season long,” said Gray. Lebanon offered 15-pound sample bags of Country Club MD so attendees could try the product for themselves. Superintendents who complete at least 10 out of 15 scheduled applications also qualify for a



Superintendents check out a line of battery-powered tools from Oregon Outdoor Power Equipment.

10-percent rebate on the products for the entire program.

Gray enjoyed meeting with superintendents from all over the country and learning about their challenges. “It’s a very good cross section of superintendents,” he said. “It was a neat experience to find out who uses our products.”

Nufarm

The 2017 event marked the fifth time that Cam Copley, golf national account manager, has represented Nufarm at the Summit.

Between the plant growth regulator Anuew, Pinpoint fungicide and Celero herbicide, this was the first year that Copley could offer a solution for all superintendents, regardless of their course’s location.

“My No. 1 conversation topic right now is about Anuew, that’s the product that people have the most questions about,” says Copley. “That’s probably 80 percent of our conversations now.” Copley said that Anuew contains prohexadione calcium, a new active ingredient with a novel mode of action. It reduces turf growth and mowing frequency and improves turf quality, density and appearance.

Also popular topics for Copley were Pinpoint fungicide and Celero herbicide.

“It’s nice to essentially have three new products to talk about,” Copley said. “I go through the checklist, and if they’re from Montana, then we have a solution for them, and we have something for somebody in Florida. Before, we might not have something that worked for them. We have such a good offering now that we can find something to talk about with everyone.”

SipcamAdvan

SipcamAdvan services the golf industry by producing, distributing and marketing plant protection products. The Italian-owned company had a unique mission at the Summit: Rather than selling product, they used the event as a focus group to find out superintendents’ impression of Sipcam to assist with marketing efforts.

“We’re trying to reintroduce ourselves to superintendents,” said Michael Maravich,

Continued on page 24



Pogo Turf Pro’s Carmen Magro (right) discusses the features of the soil sensor’s cloud-based app.



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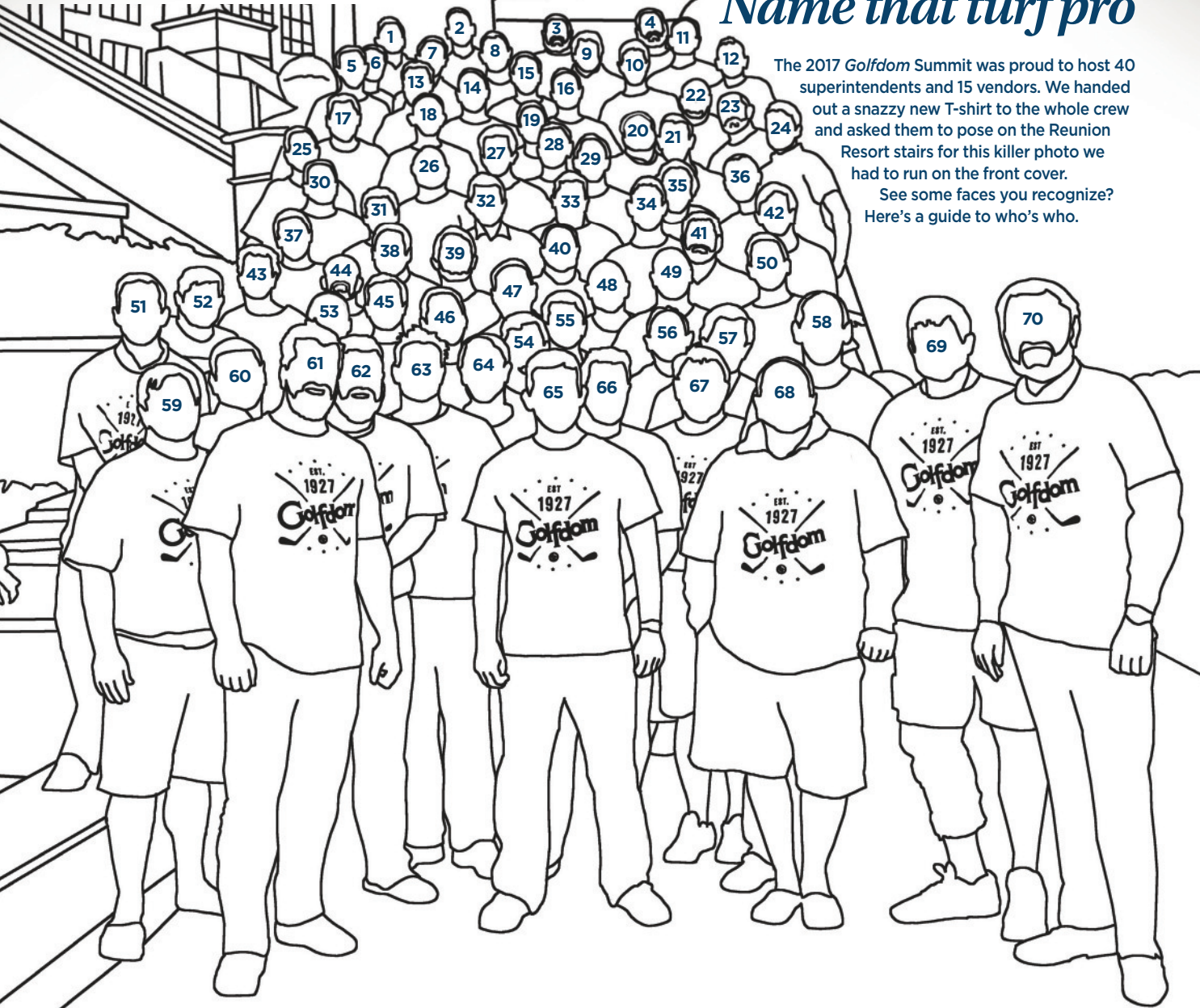
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Name that turf pro

The 2017 *Golfdom* Summit was proud to host 40 superintendents and 15 vendors. We handed out a snazzy new T-shirt to the whole crew and asked them to pose on the Reunion Resort stairs for this killer photo we had to run on the front cover. See some faces you recognize? Here's a guide to who's who.



1. **Michael Maravich**, vice president of specialty business, SipcamAdvan
2. **Jay Young**, product manager, PBI-Gordon
3. **Brian Bonlender**, superintendent, West Bend (Wis.) CC
4. **Drew Thompson**, CGCS, East Aurora (N.Y.) CC
5. **Nick Kearns**, superintendent, The Oaks Club, Osprey, Fla.
6. **Paul Carter**, CGCS, The Bear Trace at Harrison (Tenn.) Bay
7. **Jim Goodrich**, product manager, PBI-Gordon
8. **Rick Hathaway**, superintendent, Rock Creek Cattle Co., Deer Lodge, Mont.
9. **Jim VanHerwynen**, CGCS, South Hills G&CC, Fond du Lac, Wis.
10. **Mike McCormick**, superintendent, The Apawamis Club, Rye, N.Y.
11. **Chip Lewison**, CGCS, Saddlebrook Resort, Wesley Chapel, Fla.
12. **Jackson Reiswig**, superintendent, Coral Creek Club, Placida, Fla.
13. **Ted Fist**, product manager, Capillary Concrete
14. **John Jeffreys**, superintendent, Pinehurst (N.C.) No. 1-5
15. **Greg Wade**, sales and marketing specialist, Blount International (Oregon Outdoor Power Equipment)
16. **Justin Sudo**, superintendent, The Kahkwa Club, Erie, Pa.
17. **Rocky Dreibrodt**, director, Corbin Turf (Primera)
18. **Eric Dusa**, CGCS, Traces GC, Florence, S.C.
19. **Jared Milner**, superintendent, Meadowbrook CC, Northville, Mich.
20. **Jason Bradley**, superintendent, Memphis (Tenn.) CC
21. **Eric Swensen**, superintendent, Floridian National GC, Palm City, Fla.
22. **Chris Francis**, (formerly of Turfco) territory manager, Turf Products
23. **Joe Amalfitano**, business development manager, Blount International (Oregon Outdoor Power Equipment)
24. **Martin Sternberg**, CGCS, founder and inventor, Capillary Concrete
25. **Rick Grant**, business director - T&O, Control Solutions Inc. (Quali-Pro)
26. **Michael Kropp**, national director - professional markets, Wilbur-Ellis (Primera)
27. **Robert Hertzling**, superintendent, Lakeside GC, Toluca Lake, Calif.
28. **Pat Gradoville**, CGCS, Palos Verdes (Calif.) GC
29. **Aaron Johnsen**, director of regional sales, WinField United
30. **Mark Boyd**, president, Control Solutions Inc. (Quali-Pro)
31. **Cam Schafer**, application specialist, Frost Inc.
32. **John Gold**, superintendent, Valley of the Eagles, Elyria, Ohio
33. **Jeff White**, CGCS, Indian Hills CC, Mission Hills, Kan.
34. **Joe Stribley**, superintendent, Yellowstone CC, Billings, Mont.
35. **Carmen Magro**, CGCS, chief agronomist, Pogo Turf Pro
36. **Jeff Chan**, senior engineer, Pogo Turf Pro
37. **Eric Gifford**, superintendent, Riverside CC, Provo, Utah
38. **Ken Rost**, president and CEO, Frost Inc.
39. **Justin VanLanduit**, superintendent, Briarwood CC, Deerfield, Ill.
40. **John Smith**, marketing director, WinField United
41. **Steven Johnson**, regional sales manager, Smithco
42. **Clark Throssell**, Ph.D., research editor, *Golfdom*
43. **Scott Witte**, CGCS, Cantigny Golf, Wheaton, Ill.
44. **Greg Rounds**, superintendent, Sunset Ridge CC, Northfield, Ill.
45. **Connor Healy**, superintendent, Conway Farms GC, Lake Forest, Ill.
46. **Sam Wineinger**, manager, T&O marketing & formulator business, SipcamAdvan
47. **Steve Jedrzek**, marketing manager, Nufarm
48. **Ryan Baldwin**, CGCS, Highland G&CC, Indianapolis
49. **Chris Dalhamer**, CGCS, Pebble Beach (Calif.) Golf Links
50. **Ron Kerley**, superintendent, Los Robles Greens GC, Thousand Oaks, Calif.
51. **Rusty McLendon**, product expert - Northeast, Capillary Concrete
52. **Dan Marco**, superintendent, Ruth Lake CC, Hinsdale, Ill.
53. **Brandon Richey**, superintendent, Lake Nona G&CC, Orlando, Fla.
54. **Scott Kinkead**, executive vice president, Turfco
55. **Paul Fox**, Gulf Coast area manager, Quali-Pro
56. **Mike Keohan**, superintendent, Brookville CC, Old Brookville, N.Y.
57. **Dave Hendricksen**, consultant, Soilworks Consulting (Healthy Grow)
58. **Mike Lytle**, general manager - sales and grass seed teams, LebanonTurf
59. **Augie Young**, Northeast territory manager, SipcamAdvan
60. **Robert Guerra**, superintendent, Reunion Resort, Kissimmee, Fla.
61. **Joe Gulotti**, superintendent, Newark (Del.) CC
62. **David "Wally" Gresham**, superintendent, Sunset Hills CC, Carrollton, Ga.
63. **Zach Bauer**, superintendent, The Broadmore (West Course), Colorado Springs, Colo.
64. **Don Smith**, president, Smithco
65. **Brian Birney**, superintendent, The Club at Admirals Cove, Jupiter, Fla.
66. **Chris Gray**, golf marketing manager, LebanonTurf
67. **John Moore**, regional sales manager, Smithco & Turfco
68. **Jeff Churchill**, domestic and international sales, Smithco
69. **Cam Copley**, golf national account manager, Nufarm
70. **Bob Farren**, CGCS, Director of Grounds and Golf Course Maintenance, Pinehurst (N.C.) Resort & Turf's Most Interesting Man

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0-0-5 + 0.103% Dithiopyr	100	50 lbs.
0-0-20 + 0.164% Dithiopyr	100	50 lbs.
10-3-10 + 0.164% Dithiopyr	100	50 lbs.
18-6-15 + 0.164% Dithiopyr	100	50 lbs.

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// SUPERINTENDENT PARADISE

Continued from page 20

vice president of specialty business for Sipcam Agro USA. “This is the perfect opportunity for us to meet with 40 of them face to face who we would never get at other trade shows. Most of these superintendents don’t recognize the Sipcam name, but they recognize a product they’ve been buying forever. It’s brought us a lot of credibility in these conversations. It’s really about introducing them to who we are, what we’re doing and how we can help them and be more a part of their business moving forward.”



Jeff White, CGCS, Indian Hills CC, Mission Hills, Kan., takes a spin on a Smithco roller.

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Maravich said the feedback he got was “98 percent favorable,” and that he and his team were narrowing the strategic vision of the company based on those results.

“Our strategy is to open ourselves up to the industry a bit more,” Maravich told *Golfdom*. “We’ve always been kind of behind the curtain, and we’re trying to come out from behind that to show people who we are and what we’ve done for a long time.”

Smithco

The *Golfdom* TV cameras were rolling all week at Reunion Resort, and a common topic in those interviews was how impressed the attendees were with the sprayers at the Summit.

“Everyone that came to our booth, that was their No. 1 priority,” says Emil Miller, Smithco’s marketing manager. “They were there talking about their current purchases or their future purchases and about GPS technology.”

The Star Command 2.0 features technology from TeeJet Technologies. The GPS sprayer can control droplet size for greater efficacy, independent of rate or speed, and can spray from 2 mph up to 10 mph.

But the Star Command wasn’t the only star of Smithco’s show. Attendees also were eager to see the company’s fairway rollers.

“This isn’t a passing fad by any means, they’re seeing the value about fairway rolling,” Miller said. “They can see the value in their day-to-day processes on their greens, and it’s being replicated on our fairways. It’s already becoming a part of their weekly routine. Whether it be a couple of times a week or once a week. Fairway rolling and spraying go hand in hand because of the disease suppression you get from rolling the fairways. I think that’s why those were the two hottest items we had.” **G**

Coming next issue

Conversations with the remainder of the *Golfdom* Summit vendors and their key messages for superintendents, including:

- Capillary Concrete
- PBI/Gordon
- Healthy Grow
- Primera
- Textron Golf
- Quali-Pro
- Oregon Outdoor Power Equipment
- Winfield United



He's got a ticket to **drive**

Two new utility vehicles for superintendents get the EIC back on (and off) the road.

BY SETH JONES

Continued on page 26

PHOTO COURTESY OF YAMAHA

Continued from page 25

I love cars. Whenever I get a chance, I like to sneak a little *Car and Driver*-like content into this magazine.

Name one turf magazine that has had a classic car on its cover. Yep, in 2014 we put a superintendent (Mike Combs, CGCS) and his 1970 Camaro on the cover. I snuck my 2002 Z28 Camaro (which I sold a few years ago) into the magazine a few times (most recently last month). I also did a promotion a few months ago where I proudly posed with my 1964 Chevy Impala (alongside a keg of beer that we're giving away to the Rocky Mountain GCSA).

So, it's no surprise that I get excited to test drive cars... and yes, even golf utility vehicles. Sometimes a manufacturer calls and says, "Seth, want to take our new utility vehicle for a drive, and tour the factory where we make it?" It's not the same as leaning into turns at

100 mph, but it's enough to get me out of my garage and on an airplane.

I recently had the chance to visit two utility vehicle manufacturing plants, Yamaha in Georgia and Hustler in Kansas. Here's a recap of what I saw. For more on these vehicles, visit Golfdom.com.

Yamaha UMAX

Just last month, I got a sneak preview of the new Yamaha UMAX at the Yamaha plant outside Atlanta. Along with taking a test drive at a local golf course, I also got a tour of the factory where these vehicles are assembled.

Tom McDonald, president of Yamaha Golf-Car Co., talked to me about their interest in the superintendent market. Yamaha's business in the front

Tom McDonald, president of Yamaha Golf-Car Co., (left) took Seth Jones out to test drive the new UMAX.



The Yamaha UMAX Range Picker maintains a steel cage and impact-resistant windshield, but now includes a 402cc engine.

of the house (golf cars for golfers) is doing quite well, he told me. It's the back of the house (superintendents) who have been unimpressed with their products, because previously, in his words, "We just put a box on the back of a golf car and tried calling it a utility vehicle."

The Yamaha UMAX is a

totally new design using feedback from superintendents.

"We went to the courses. We obviously have a lot of customers already. We went to who we thought were the most influential (superintendents) with the best backgrounds, and we gave them a clean slate of paper and said, 'What would



My favorite cool car moments

WHILE I LIKE DRIVING UTILITY VEHICLES, I PREFER CHEVYS WITH BIG ENGINES. HERE'S A RUNDOWN OF SOME OF MY CAREER CAR HIGHLIGHTS.

July 1984 After moving to a small town in Kansas, my dad can't hide his excitement that legendary car designer Darryl Starbird keeps a garage in our new town. We walk in unannounced and get a brief tour from Mr. Starbird himself.

August 1995 After saving up enough money from a summer job waiting tables in Wichita, I plunk down the down payment and drive away in a new 1996 Chevy Camaro at the youthful age of 17. (Yes, I eventually would total this car.)

July 2002 On the verge of paying off my second Camaro, I get the bug again and trade it in for a new 2002 Z28. Insurance was a nightmare.

April 2005 On my birthday, my dad calls and tells me, "If you can take care of it, come get it, it's yours." He hands me the keys to the 1964 Chevy Impala he bought in the mid-80s.

December 2011 On assignment for *Golfdom* in San Jose, Calif., the car rental desk gives me a free upgrade... to a brand-new Corvette.

July 2012 As a gift, I'm given a ticket to drive on the Kansas Speedway. My friend Eric and I get on the big track in the Z28 for a real adrenaline rush.

PHOTO COURTESY OF YAMAHA (TOP); BY CRAIG MACGREGOR (LEFT)



engine is 12 percent larger, and features noise suppression with Yamaha's Drive2 system

- A lockable under-hood storage area safe for keeping laptops or tablets

- Bucket seats borrowed from Yamaha's Viking off-road vehicles

"The rest of the details they're not going to notice much until they drive it for two weeks, a month," McDonald said, "but before long they'll notice there are a lot of the creature comforts on this vehicle."

For more information, visit yamahagolfcar.com.

Hustler MDV

It was a much shorter trip for me to visit the folks at Hustler

— their factory is located a few hours south of me in Hesston, Kan.

The MDV is Hustler's first ride into the utility vehicle market. Paul Mullet, the recently retired former CEO of Excel Industries (which manufactures both Hustler and Big-Dog Mowers), told me it wasn't that they were eyeing any one market (superintendents, landscapers, sports groundskeepers), but that they found a problem and built a solution to fix that problem.

In this case, the problem is a shortage of labor. What do people do when they have that heavy load but no one around to help them unload it? Hus-

Continued on page 28

you do differently? What are you looking for?" McDonald told me. "What came back was durability. They wanted to have a car that would be able to ride on the course and absorb bumps whether it's loaded or unloaded."

McDonald says the utility vehicle has gotten a great reception from superintendents so far. The vehicle goes into full production in April, with its official unveiling coming at the PGA Merchandise Show and the Golf Industry Show. While we were together, McDonald insisted I take the vehicle for a ride over tree roots in the rough to experience the UMAX's suspension.

"When the superintendents saw it, they said, 'Finally, you made a utility car that doesn't look like a golf car with a box on it!'" McDonald said. "The second comment the guys said was, 'I cannot believe your suspension is that good.' One of the gentlemen said, 'I've had a back injury for years. When I'm done on my current product, my back hurts. I really don't think I'll have that issue with this car.'"

Some of the other features of the Yamaha UMAX include:

- A larger cargo bed (33 inches long by 46 inches wide) bearing loads up to 1,000 pounds
- A side-filled fuel tank, a first for a Yamaha utility vehicle
- The gas-powered 402cc



For easy loading and unloading, the Hustler MDV features "LeverLift," allowing the driver to maneuver the box to flat on the ground.

Continued from page 27

tlar's answer: Their LevelLift cargo box, which can lower all the way flat to the ground with the flip of a switch.

"It really started not that we were looking to get into more markets, but we identified a need," Mullet said. "We started looking at the utility vehicle and the way they're designed... most of the focus is on the vehicle. We wanted to put the focus on the bed. So, we designed it around the bed, instead of the other way around. We think there's a need there."

Some of the other features of the Hustler MDV include:

- A top speed of 37 miles per hour and a load capacity of 1,685 pounds
- A 1028cc Kohler diesel



Recently retired Excel Industries CEO Paul Mullet unveils the new Hustler MDV at the company plant in Hesston, Kan.

engine, fed by a 14-gallon fuel tank

- Floating rear axle maintains a constant ground clearance, even at maximum load

• A front storage area with removable tool box

Brad Unruh, director of product strategies for Hustler, talked to me about his experience

showing the vehicle — which went into full production just a few months ago — to superintendents.

"What our customers told us is, as their day goes on they can think of more and more ways to use this bed," Unruh said. "This vehicle can prevent damage by getting into tight areas... one application is dumping material, say sand, into bunkers. You don't have to get right up next to the edge of the bunker, you can back up, extend it before you dump the sand. You can drop this bed to the ground, roll a tree ball in there. When equipment is down, they can bring this and get equipment (back to the shop)."

For more information, visit hustlerturf.com.

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Super Science



Tifway bermudagrass growing on renovated soil (left) and existing topsoil (right). The greater quantity of nutrients in the existing topsoil resulted in acceptable turfgrass, whereas the newly renovated turfgrass growing on poor soil on the left required more nitrogen.

// THE SOIL'S THE THING

DETERMINING FUNGICIDE RATES FOR SOILS OLD AND NEW

By Kaiyuan Tang and Travis Shaddox, Ph.D.

Superintendents often follow best management practices (BMPs) for establishing turfgrass, which provide a range of nutrient applications that have been determined to be sufficient. However, many BMPs do not account for differences that may exist due to soils or nutrient sources. Two superintendents may follow the same nitrogen recommendation; one develops high-quality fairways, the other does not. To address this problem, we are determining if current nutrient recommendations are sufficient for both existing and newly renovated soils.

The study began by simulating the same methods of fairway construction. In half of the research plots, topsoil was removed and replaced with the underlying subsoil. In the remaining plots, the topsoil remained intact. We applied nitrogen to each of these soils, either soluble urea or as polymer-coated urea. First-year results indicate bermudagrass grown on newly renovated soils requires an amount of nitrogen greater than the highest recommended rate of 7 lbs. of nitrogen per 1,000 sq. ft. per year. Bermudagrass grown on the existing topsoil was acceptable using nitrogen below the lowest recommended nitrogen rate of 5 lbs. of nitrogen per 1,000 sq. ft. per year. Nitrogen source had little influence on turfgrass quality.

Based upon this research, superintendents will have evidence to support applying different rates of nitrogen based upon their soil type. BMPs would be amended to allow greater quantities of nitrogen to be applied to poor-quality soils, leading to higher quality turfgrass and better playing conditions, even when soils are not ideal.

Kaiyuan Tang and Travis Shaddox, Ph.D., University of Florida-Ft. Lauderdale. You may reach Travis Shaddox at shaddox@ufl.edu for more information.

NEWS UPDATES

TEXAS A&M TURFGRASS BREEDERS DEVELOP DROUGHT-TOLERANT GRASS

The Turfgrass Producers of Texas have launched a new website dedicated to TamStar. The website serves as a resource for industry professionals regarding TamStar St. Augustine, a new drought-tolerant, low-water-use grass developed by turfgrass breeders at Texas A&M University. The website offers research and information about TamStar, including its benefits, installation, maintenance and where to purchase this sod.

TamStar St. Augustine is the result of more than a decade of research at Texas A&M AgriLife Research and Extension Center in Dallas. It was bred to stand up to drought and specifically meet the demands of commercial and residential lawns and landscapes in Texas. The grass is now on the market and ready for harvest at more than a dozen farms and nursery centers throughout the state.

Along with drought tolerance and low-water use, studies show TamStar demonstrates pest and disease tolerance, specifically to southern chinch bugs and tropical sod webworms. TamStar has a deep root system that allows it to tolerate stressful drought periods, with a rapid recovery response once irrigation resumes.



“IN FAVORABLE CONDITIONS FOR DISEASE, THE SPOTS CAN EXPAND AT AN ALARMING RATE INTO AN OVERALL IRREGULAR STAND SYMPTOM.”

Jim Kerns, Ph.D.

(see story on page 30)

//BLIGHT VERSUS ROOT ROT

Demystifying *Pythium* diseases of golf course turfgrasses

By Jim Kerns, Ph.D., and Lee Butler

P*ythium* diseases are exceptionally important in turfgrass management. Yet, these diseases are oversimplified in how they are presented in the literature and commonly confused with one another. For example, in the “Compendium of Turfgrass Diseases,” *Pythium* diseases are lumped together in a single chapter. Yet, these diseases are some of the most important that golf course superintendents manage. Although there are five distinct diseases of turf caused by various *Pythium* species, this article will focus on *Pythium* blight, *Pythium* root rot and *Pythium* root dysfunction.

Pythium blight (*Pythium* spp.) is a well-known disease, especially on cool-season turfgrass. However, it’s also a major problem on warm-season turfgrass, particularly on bermudagrass (*Cynodon dactylon* x *C. transvaalensis*) putting greens in the southeast U.S. This disease is associated with a foliar blight. Blight refers to the sudden, severe and extensive spotting, discoloration, wilting or destruction of leaves. Stand symptoms on cool-season turf initially develop as small, circular spots ranging in size from 3/4 inch to 2 inches in diameter, and in favorable conditions for disease, the spots can expand at an alarming rate into an overall irregular stand symptom (Figure 1A). Plants in affected areas are water-soaked, dark, and may feel oily when rubbed between the fingers. Symptoms on cool-season turfgrass develop rapidly during hot, humid weather and when soil moisture is abundant. *Pythium* blight develops on cool-season turfgrasses when nighttime temperatures are above 65 degrees F and

soil moisture is saturated and/or relative humidity remains high for two or three consecutive days.

Conversely, on bermudagrass putting greens, symptoms develop as small brown or black spots ranging in size from 1/2 inch to 2 inches (Figure 1B). These spots can coalesce into large blighted areas quickly if conditions are conducive. *Pythium* blight develops on bermudagrass putting greens during the fall, winter and spring, but can develop during the summer months under periods of extended cloud cover and/or prolonged moisture. The disease is most severe after major rainfall events that saturate soils.

PYTHIUM BLIGHT CONTROL

Fortunately, control of *Pythium* blight is similar between cool- and warm-season turfgrasses, except for the timing of fungicides and cultural practices. Fungicides that are most effective for *Pythium* blight include Alude (potassium phosphite, Nufarm), Appear (potassium phosphite, Syngenta), Banol (propamocarb, Bayer), Segway (cyazofamid, PBI-Gordon), Chipco Signature (fosetyl-AL, Bayer), Stellar (propamocarb plus fluopicolide, Nufarm) and Subdue MAXX (mefenoxam, Syngenta).

Superintendents should base timing of these products on weather conditions. If applications are made preventatively, the low label rates are highly efficacious. Because conditions remain conducive throughout the spring, winter and fall on bermudagrass putting greens, we advise superintendents to consider a periodic application (every two weeks) of a phosphonate fungicide or phosphite to provide a base of *Pythium* protection.

If a major rain event is in the forecast, an application of Banol, Segway, Stellar or Subdue MAXX would be warranted. Again, if the application is made prior to symptom development, a low label rate should be effective. However, if symptoms are present and the pathogen appears active, it’s best to apply the highest label rate.

Any cultural practice that minimizes leaf wetness and ensures good drainage aids in *Pythium* blight control. Therefore, regular topdressing and aeration are important. Wetting agents to move water into the soil are important to slow the progression of *Pythium* blight. Other procedures such as dew removal or rolling, particularly on bermudagrass putting greens when the turf is not actively growing, is important for reducing the impact *Pythium* blight may have.

OTHER PYTHIUM DISEASES

Pythium blight is a problematic disease of all turfgrasses in all sectors of the turfgrass industry, yet *Pythium* root rot and *Pythium* root dysfunction are most problematic on golf course putting greens. *Pythium* root rot is a destructive disease of creeping bentgrass (*Agrostis stolonifera* L.) and annual bluegrass (*Poa annua* L.) putting greens that are subjected to intense stress of frequent, low mowing.

Unlike other diseases such as dollar spot, there are numerous species that cause *Pythium* root rot. Thirty species are aggressive pathogens of creeping bentgrass, and research has shown they respond differently *in vitro* (in laboratory experiments) to fungicides. Research also has demonstrated that these organisms cause disease at

varied temperature ranges. This likely explains variability of product efficacy among golf courses and emphasizes the need for a programmatic approach to managing *Pythium* root rot. The disease initially develops as small spots of water-soaked turfgrass. As the disease progresses, the symptoms coalesce rapidly and may severely affect large areas of turfgrass (Figure 2A). Stand symptoms may appear as distinct patches or may develop in large irregular areas. Roots normally are stunted and necrotic, and may even smell rotten. The disease is difficult to diagnose based on symptoms alone, and we suggest getting a laboratory diagnosis before pursuing a management strategy for *Pythium* root rot. On that note, there is still confusion — even among turfgrass pathologists — on the difference between *Pythium* root rot and *Pythium* root dysfunction.

DISTINGUISHING BETWEEN ROOT ROT AND ROOT DYSFUNCTION

Pythium root rot develops on cool-season putting greens during the summer months, when soils are warm and wet. The symptoms develop in areas where water collects, but the disease can affect higher areas after rainfall. The disease is most severe on putting greens in enclosed environments and/or shaded for long periods throughout the day. Symptoms appear in late May or early June, but can continue to develop new spots or continue to expand as long as soils are warm and wet.

On warm-season grass putting greens, the disease is most severe under low-light conditions, especially during the fall, winter and spring. Symptoms develop as small tan or whitish patches that may appear to run with water (Figure 2B). The symptoms are hard to distinguish from other bermudagrass diseases such as take-all root rot. As with cool-season grass, the disease is prevalent when soils are wet.

Continued on page 32

FIGURE 1A



FIGURE 1B



Pythium blight of creeping bentgrass (A) and bermudagrass (B) putting greens.

FIGURE 2A



FIGURE 2B



Pythium root rot stand symptoms. (A) Stand symptoms of *Pythium* root rot on a creeping bentgrass putting green. **(B)** Stand symptoms of *Pythium* root rot on ultradwarf bermudagrass putting green.

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Cultural control of *Pythium* root rot revolves around limiting stress to protect rooting. Increasing mowing height can help alleviate symptoms, as can small increases in foliar nitrogen rates. Frequent topdressing and venting also improve infiltration and percolation of water, which should ultimately limit root rot development.

A number of chemicals control *Pythium* root rot. In our research, Segway has provided the best control of the disease, followed by Signature Xtra (fosetyl-AL, Bayer) and Appear, Subdue MAXX, Stellar and Banol. Terrazole (etridiazole, OHP) is effective, but the residual control lasted three to four days in our trials. For cool-season grass putting greens, we suggest starting with Segway at 0.45 fl. oz./1,000 sq. ft. when soil temperatures reach 65 degrees F at a 2-inch depth for four to five consecutive days in the spring. In North Carolina, this typically occurs around the middle of May. Timing in your area may vary, of course, but using a 65-degree F soil temperature is a good starting point. A rotation of Segway, Subdue MAXX and Banol on two-week intervals worked well in a program trial we conducted in 2016. We suggest watering all *Pythium* root rot applications in with 1/8 inch of water immediately after application. If Signature Xtra or Appear are applied in foliar sprays, control of *Pythium* root rot should be quite good as well.

These same chemicals will be effective for *Pythium* root rot on bermudagrass putting greens, but unfortunately, we do not know the precise timing of applications. *Pythium* root rot has been relatively rare on bermudagrass greens, and those who have had it have been successful with curative applications. Research at the University of Florida conducted by Billy Crow, Ph.D., observed increased infection by *Pythium* species when in the presence of sting or root-knot nematode. Based on these data and our observations, we

PHOTOS BY: BRUCE MARTIN (A), LEE BUTLER (B)

always suggest conducting a nematode assay when submitting a diagnostic sample. Controlling *Pythium* root rot may start with management of plant parasitic nematodes.

Pythium root dysfunction is a different disease when compared to *Pythium* root rot. The symptoms initially develop on putting greens that are out in the open and predisposed to drought stress. The disease develops on high areas first and may resemble hot spots or drought stress. Yet hand watering these areas does not result in improvement. The disease is only formally documented on creeping bentgrass and is most severe on newly constructed putting greens, specifically those with rootzones of 85 percent sand or more. Symptoms are most prevalent during the summer months, but can develop in fall, winter and spring during warm, windy and/or dry spells.

Symptoms start as small, tan patches that range in size from 6 inches to 12 inches in diameter (Figure 3A). If conditions remain hot and dry, the patches will expand and may eventually reach 24 inches in diameter. Stand symptoms may resemble take-all patch of creeping bentgrass, in that the margin could have a yellow or an orangish border (Figures 3A & 3B). Unlike with *Pythium* root rot, the roots may not be stunted and are not necrotic or black. The roots will be a slight tan color or may have a buff appearance. They lack root hairs and the root tips are bulbous. In the field, sand will not cling to the roots because of the lack of root hairs (Figure 3B). The majority of the sand easily will fall off with a gentle shake of an infected plug.

Species associated with disease are *Pythium arrhenomanes*, *P. aristosporum* and *P. volutum*. We observed that *P. volutum* infects creeping bentgrass roots when soil temperatures are between 55 degrees F and 75 degrees F, but symptoms do not develop until the turf is subjected to heat stress. Thus, the best time to control the disease is

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FIGURE 3A

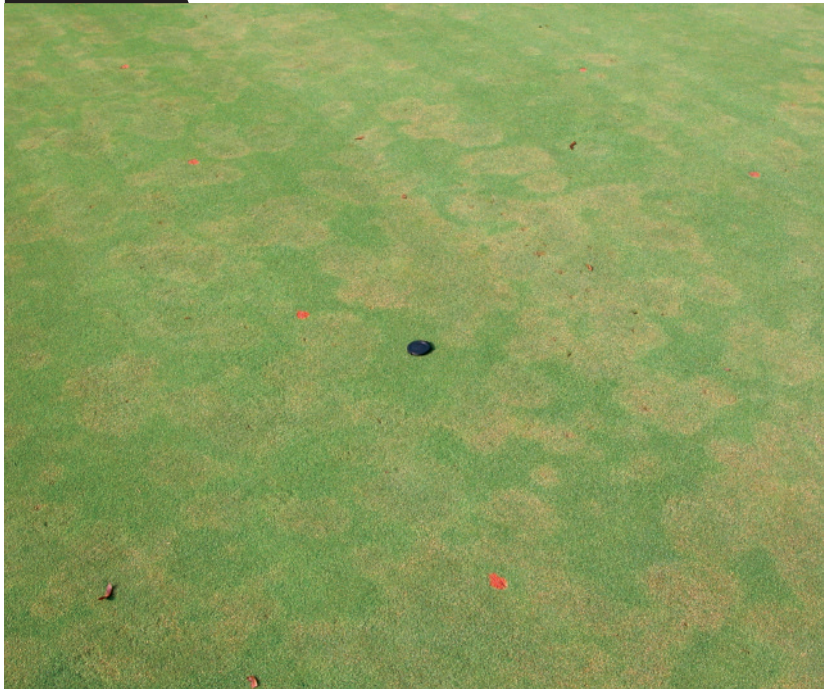


FIGURE 3B



Stand symptoms of *Pythium* root dysfunction. (A) Symptoms of *Pythium* root dysfunction on a creeping bentgrass putting green in North Carolina. Notice the orange margin around some of the patches. (B) Up close image of the typical patch symptom observed with *Pythium* root dysfunction. Also note the affected profile has little sand clinging to the root system, which is another diagnostic feature of *Pythium* root dysfunction.

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during the infection window described above. Products that successfully control the disease are Insignia Intrinsic (pyraclostrobin, BASF), Lexicon (fluxapyroxad plus pyraclostrobin, BASF), Heritage (azoxystrobin, Syngenta), Fame (fluoxastrobin, FMC), Segway and a Chipco Signature/Banol tank mixture. When this disease was plentiful (2002 to 2008), three fungicide applications in spring starting when soil temperature at a 2-inch depth reached 55 degrees F sufficiently suppressed *Pythium* root dysfunction. We normally suggested starting with Insignia (0.7 fl. oz./1,000 sq. ft.), followed by Insignia again 28 days later, and a final application of Segway at 0.45 fl. oz./1,000 sq. ft. 28 days after the second application. This is an excellent strategy because the Segway application should be timed perfectly for preventative *Pythium* root rot control.

CULTURAL CONTROL

Cultural control of *Pythium* root dysfunction involves increasing mowing heights slightly prior to heat stress, keeping the soils as dry as possible during the infection period (55-degrees F to 70-degrees F soil temperatures), and slightly increasing foliar nitrogen amounts. Certain cultivars of creeping bentgrass were more resistant to *Pythium volutum*, but that work was conducted in 2008. We do not know the relative resistance of newer-generation creeping bentgrass cultivars.

Pythium diseases of turfgrasses are more complicated than most people think. They can be destructive and also difficult to diagnose. It's important to understand the subtleties of these diseases in order to manage them appropriately.

Finally, it is imperative to rotate the chemistries discussed in the article to reduce the risk of fungicide resistance. There are few new *Pythium* products in testing right now, so we must protect the efficacy of the products we currently



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have. For more information on these diseases and options for control, please visit NC State TurfFiles at turf.ces.ncsu.edu/diseases-n-turf/.

Jim Kerns, Ph.D., turfgrass pathologist, and Lee Butler, director of the NCSU Turf Diagnostic Lab, are at North Carolina State University. Kerns can be reached at jkerns@ncsu.edu for more information.

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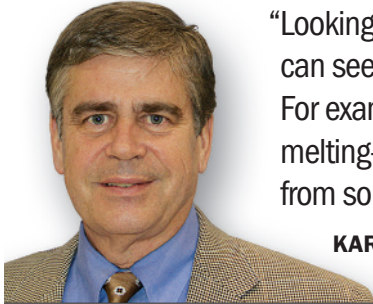
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“Looking in a more global context, you can see the traits of the wave in turf. For example, the turf disease leaf spot/melting-out occurs in a wave as it occurs from south to north in the United States.”

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

The turf wave

The audience “wave” has been common at sporting events in the United States for decades. It’s believed the wave was first done at National Hockey League games in the late 1970s/early 1980s, but the first video evidence occurred at an Oakland A’s home baseball game in 1981. The wave occurs as one stadium section rises and then sits while the fans in the adjacent section rise. In a closed stadium, the wave starts in one section and ends up back where it started, and the process repeats itself.

The wave also occurs in turf. It’s not that turfgrass plants start a wave on your course. Looking in a more global context, you can see the traits of the wave in turf. For example, the turf disease leaf spot/melting-out occurs in a wave as it occurs from south to north in the United States.

Beginning in January and starting in south Florida, leaf spot of bermudagrass commonly occurs on greens. Not limited to bermudagrass, the disease can occur on seashore paspalum and other warm-season turfgrasses. Informally, the disease was named *Heminthosporium* leaf, crown and root disease. However, with the pathogen being classified in the genus *Bipolaris*, *Heminthosporium* has been dropped. Specifically for bermudagrass, the pathogen associated with leaf spot disease is *Bipolaris cynodontis*.

The leaf spotting occurs under cool, wet or humid conditions. As winter progresses, the disease appears further north as temperatures become favor-

able for pathogen infection. As spring arrives and cool-season turfgrasses emerge from winter dormancy and begin active growth, the melting-out disease occurs. The melting-out pathogen on Kentucky bluegrass is *Drechslera poae*. The lesions appear initially as small purple-colored dots. These lesions turn a gray-to-tan color with a dark purple-to-brown border. In the leaf spotting stage, these diseases don’t normally cause significant injury to the plant.

As temperatures increase, infection can occur in the crown, stems and roots, eventually causing the plants to turn a straw color and die. A similar event occurs in warm-season turfgrasses when temperatures increase; *Bipolaris* infects crown, stem and roots.

As summertime temperatures arrive and the leaf/crown/root disease progresses on cool-season turfgrasses, conditions favorable for the warm-season version decreases. Like the wave, the *Bipolaris cynodontis* is sitting down while the *Drechslera* species and similar

species (ex. *Bipolaris sorokiniana*) are standing up. With the arrival of cold temperatures in the North, *Drechslera* species “sit down” while temperatures and humidity levels in south Florida during late December are favorable to initiate leaf spot once again.

So, how to stop the wave? With the human wave, many professional players, especially at baseball games, have tried to stop it by telling fans it’s just not cool anymore. Turfgrass pests don’t listen well. So, how do we break the chain of leaf-spotting diseases?

We do it through genetic, cultural and chemical programs. The biggest improvement in Kentucky bluegrass occurred when leaf-spot resistance was found and incorporated into Kentucky bluegrass. These resistant cultivars were the basis for the term “improved” Kentucky bluegrass cultivars. Cultural practices for both cool- and warm-season turfgrasses that help reduce the disease severity include moderate nitrogen fertilization (which promotes growth but doesn’t overstimulate); thatch control; being careful or aware that herbicide applications during active disease times may enhance disease; and enhancing sunlight to the turf. Chemically, there are several fungicides to control melting-out/leaf spot diseases. The most effective applications are applied at the initiation of pathogen infection.

Although I focused on leaf spot, a number of examples could fit the wave pattern. Crabgrass germination is one. Crabgrass germination follows the line of warming soil temperatures (~57 degrees F) moving north in the spring. Another is dollar spot.

I have found one of the coolest things about being in the golf course business and managing turfgrasses is the symmetry and rhythm of living organisms, which you find only if you look.

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

Turfgrass research is always on my mind

I think of research as a logical, systematic approach to solving problems. Research takes many forms, and for the purposes of this column I'm going to focus on turfgrass field research. There are many variations of field research, but consider research done outside at turfgrass research centers — either university or industry — or on golf courses.

The growing season hasn't started in most of the country, meaning most field research projects haven't started, either. This means there still is time for you to have a conversation with the turfgrass scientists in your area about the agronomic problems you face. If you ask turfgrass scientists about their role in their organization, they may say it's to serve the turfgrass industry by helping solve problems. How do turfgrass scientists know about the problems superintendents face? Simple — superintendents need to tell them. Or better yet, invite turfgrass scientists to visit the golf course when the problem is obvious, so they can see the problem for themselves.

To get university and industry scientists to work on the problems you think are most important, tell them exactly what the problem is and the consequences of coping with the problem. You may do this in one-on-one conversations, small group discussions, written correspondence from a chapter, visits by scientists to courses to see the problem firsthand, or a formal request for proposals (RFP) in which the RFP clearly defines the problem. The point is that turfgrass scientists need to know about the agronomic problem you are facing before any meaningful research can take place.

A question I'm asked by superintendents on occasion concerns duplicating current research. Chapters work hard to raise money to fund turfgrass research, and they want to get the most value for their dollars. This is understandable. That said, I see no problem with duplicating research at a reasonable level if the research is targeting a specific problem that has been identified as a priority by a chapter.

“.. there still is time for you to have a conversation with the turfgrass scientists in your area about the agronomic problems you face.”

To illustrate the value of duplicating research, consider a new pesticide introduced into the turf market. Before that pesticide is introduced it has been in research experiments at multiple locations across the region of intended use and evaluated by many different

scientists over several years. In addition, the new pesticide likely has undergone small- and large-scale testing on many golf courses through cooperation between the superintendent and the company to determine how it performs under actual conditions. We should all agree this level of duplication in research is a good thing and a benefit to our industry.

This concept of conducting duplicative research on new products and/or new management strategies under different growing conditions and on different grasses strikes me as a sound approach. It would be ideal if much of the research that is conducted could be repeated at a different location under different growing conditions. The worst that could happen is the original research findings are confirmed. If the results from two separate projects are inconsistent, perhaps it's time to rethink implementation of those findings. The more we know about a product or management strategy, the better off we are. The reality is that limited research funding and other pressing problems often prevent a research project from being duplicated, even when it might make sense to do so.

Because outdoor responsibilities are a little less pressing this time of year, take time to think of your most pressing agronomic problems. Compare your list of agronomic problems with the lists of colleagues in your area. Decide which one or two problems require research to address, then reach out to a turfgrass scientist to get the research process started.

It is time to have turfgrass research on your mind.



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

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"The Golfdom Summit is the best event I have ever attended. Everything about it felt right, from the one-on-one's to the number of attendees to the organization of the event."

— CONNOR HEALY, CONWAY FARMS GOLF CLUB, LAKE FOREST, IL



"The Golfdom Summit was first class and run flawlessly. You have created the perfect way to meet and discuss products with vendors one on one without the pressure."

— JASON BRADLEY, MEMPHIS COUNTRY CLUB, MEMPHIS, TN

Superintendents can apply to attend the 2018 Golfdom Summit at:
GolfdomSummit.com

The Shop

// MUST-HAVE NEW EQUIPMENT



1 PondHawk aeration system

Nearly all ponds need management to help keep the habitat, water quality and clarity in a healthy balance. From Linne Industries, the **PONDHAWK** is a solar powered subsurface aeration system that works without the need for grid electricity. The construction is durable and reliable, working year-round to aerate the water, even under partly cloudy or freezing conditions. Proper aeration minimizes algae and pond scum and reduces or eliminates the need for repeated chemical treatments.

Linneindustries.com

2 Exteris Stressgard

An innovation for stress mitigation and foliar disease management on fairways with Leaf-Cote technology, Exteris Stressgard from **BAYER** offers improved product retention on the leaf surface, sticking where it's needed most — at the site of fungal activity. It is capable of both preventative and curative activity in controlling most turfgrass diseases across a range of spray volumes. It has excellent tank-mix compatibility, making it simple to integrate into the current disease management program. For the first time ever, Exteris Stressgard is available for purchase through the Bayer Fall Solutions early order program.

Backedbybayer.com

3 Greensmaster Flex greensmowers

The Greensmaster Flex 1820 and 2120 greensmower models include a user-friendly multi-disk wet clutch for easy drive engagement and feathering for ease of operation. As a result, operators now can 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 now is connected to the suspension cross-arm as opposed to the traction unit frame.

Toro.com



4



5



6

CHECK OUT MORE NEW EQUIPMENT ONLINE

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

4 | 2500E Greens Mower

According to **JOHN DEERE**, the 2500E hybrid mower puts power in all the right places. Available with a gas or diesel engine, the 2500E powers reels using a belt-driven alternator. By removing hydraulics from the cutting units, 102 potential leak points have been eliminated. The 2500E is unique because it uses electrical power to minimize hydraulic leak opportunities in the reel circuit, but uses an engine to ensure optimal performance throughout the day. The product provides reduced sound levels and improved fuel savings by running the machine at less than full throttle when mowing greens.

Deere.com

5 | Headway fungicide

Headway fungicide from **SYNGENTA** combines the power of the two active ingredients found in Heritage and Banner Maxx II fungicides to deliver broad-spectrum disease control. Proven, effective applications of Headway after initial green-up can provide spring clean-up and delay the onset of dollar spot. It features dual modes of action that help ward off disease resistance, and also can reduce the severity of anthracnose, brown patch and other diseases that might appear throughout the season. Headway is available in both granular and liquid formulations for added convenience.

Greencastonline.com

6 | Kwik-Trench 200B and 2400B

LITTLE BEAVER's Kwik-Trench mini-trencher is offered in two models, the KT 200B and KT 2400B, both able to trench up to 30 feet per minute. A compact design and durable construction and components allow the Kwik-Trench to tackle projects such as installations of plumbing and drainage lines, silt fences and sprinkler systems. Carbide-tipped teeth and a powerful drive system help the mini-trencher cut through tough surfaces such as compacted clay, asphalt and tree roots up to 10 inches thick. Each Kwik-Trench model is mounted on semi-pneumatic tires, making it safe to use on delicate turfs.

Littlebeaver.com

The 19th Hole

Bauer took this photo north of Moab, Utah (The La Sal Mountains are in the distance).



Zach Bauer

SUPERINTENDENT // The Broadmoor (West Course), Colorado Springs, Colo.



Once we're done out here, where's the best spot for a beer? We'll go to Fossil Craft Brewing, I'm a member there. I've got my own mug there.

You've got to try their Smash IPA or their Oreo Cookie Stout.

They don't bottle it, they don't can it, the only place you can get it is here in the Springs.



How did you and Karen meet? We met here at the Broadmoor. My former superintendent was dating her boss. They ended up getting married, and we ended up getting married, too.

I usually like to ask about sports teams, but I know you're a Boston sports nut. It's Patriots everything in my house. Both my parents were in the Air Force, and I grew up in Atlanta, but they were both from New England. So, I'm Boston everything, and the Braves.

How often do you get out skiing? About 30 to 40 times a year. I'm 50/50 — 50 percent resorts, 50 percent back country. I've got the Epic Pass, so places like Breckenridge and Vail? I know them like the back of my hand. It's a fun hobby. It's an expensive hobby.



So, what do you recommend visitors do when they're in Colorado Springs? Visit Garden of the Gods in the morning, at sunrise. It gets crowded, but it's worth it to see the red rocks at sunrise. If you're not from Colorado, visit

"SOME OF THE BEST ADVICE I GOT WAS TO ALWAYS TREAT THE CREW WELL, THAT THEY'RE THE BACKBONE OF YOUR COURSE. FIGHT FOR THEM AND GIVE THEM WHAT THEY NEED TO SUCCEED."



Pike's Peak and experience 14,000 feet. And check out our craft beer scene, check out our food scene.

What's your favorite tool in the shop? The chainsaw. I like cutting down trees. When the course was built, there were no trees out here. In the '40s and '50s they planted a bunch and took out the sightlines. And I also like the Hula-Ho in the bunkers, it makes edging so much easier.



You've got a great Instagram page featuring your photos. What do you shoot with? A Nikon. I like shooting landscape photography. I like to show the size of things. And I like shooting old things — old houses, farm equipment, old buildings, old cemeteries. And it's all black and white, no color.

What will you and Karen do for Valentine's Day? Absolutely nothing. My wife's birthday is Feb. 23rd, so we don't do anything for Valentine's Day, and instead take a full-fledged vacation around her birthday. We're not big on going to the beach. We like seeing national parks. This year we're going on a road trip to New Mexico, see the White Sands National Monument, see Carlsbad Caverns.

As interviewed by Seth Jones, Jan. 29, 2018.

After using POGO for just under a year, Angel Park Golf Club in Las Vegas:

- increased time between aerification (despite using effluent water)
- reduced hand watering by 70%
- improved playing conditions for guests

“There have been two significant revolutions in golf course management... Primo® and POGO®.”

Jeremy Adkins
Regional Superintendent,
OB Sports Golf Management
Angel Park Golf Club



Watch the video at
pogoturfpro.com/golfdom

POGO®

Superior insight | Better decisions | Healthier turf

Introducing **Tekken™** Broad Spectrum Fungicide

**ANTHRACNOSE
DOLLAR SPOT
BROWN PATCH**

KNOCK 'EM ALL OUT
With One Punch *And* One Rate.

New Tekken™ Broad Spectrum Fungicide from PBI-Gordon uses two modes of action to deliver dependable control of 21 diseases, including anthracnose, dollar spot, and brown patch. The patent-pending formulation increases turf quality while reducing the risk of turf damage compared to stand-alone DMI applications, and Tekken controls listed diseases for up to 28 days with the same rate, eliminating the guesswork.

28 Days | 21 Diseases | 1 Rate

Check to see if this product is registered for sale in your state.

PBIGordonTurf.com

Always read and follow label directions. Tekken™ is a trademark of PBI-Gordon Corp. 12/17 04907

