

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

Golfdom

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A SUPERINTENDENT

For the people

After his son's life was cut short in a tragic car accident, Carlos Arraya, CGCS, decided to make the most of his relationships.

Plus

LARGE PATCH IN ZOYSIAGRASS
THE PERFECT PLACE TO GROW GRASS?
MIKE DAVIS: U.S. OPEN "WENT TOO FAR"

The Experts Put Fairway Rolling to the Test

To better understand the benefits of rolling fairways and to build rollers which are more effective, Smithco has been working with the College of Agriculture at Michigan State University and Stockbridge School of Agriculture at the University

of Massachusetts . There are still more tests to run and the results to date are preliminary. But very encouraging. To find out more call your Smithco dealer and set up a demonstration. We think rolling fairways could become as normal as rolling greens.



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“What is most exciting is the data indicates longer ball roll will result from fairway rolling which will make golfers happy...



and that rolling fairways can lead to less fairway mowing which costs more than rolling.”

– Thomas A. Nikolai, Ph.D., College of Agriculture Michigan State University

Although the study is preliminary and far from complete, there are significant indications that:

- Mowing height may be increased, resulting in healthier grass plants
- Soil firmness is likely to be increased resulting in longer ball roll
- Moisture retention is maintained
- Less mowing is required which would result in labor savings and less wear on expensive equipment

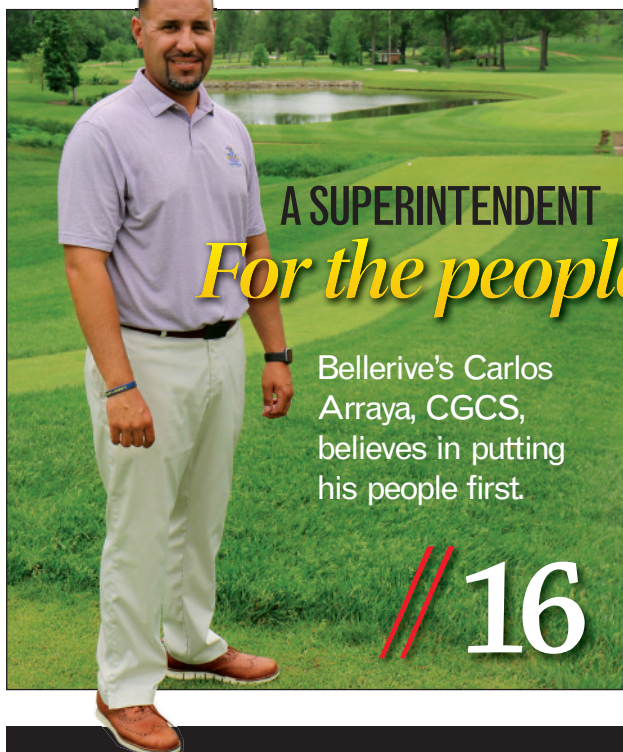
“Third year of testing indicates up to 65% reduction in dollar spot.”

*– Geunhwa Jung and Jay Popko;
Stockbridge School of Agriculture*

- 40-65% reduction in dollar spot
- 8 out of 9 rolling studies reduced dollar spot in 2017!
- Increased rolling frequency increased dollar spot control
- Threshold-based programs can reduce dollar spot apps with rolling (2-3 apps vs 5 apps)
- Rolling = better spring green-up/turf quality
- Does not provide complete control, but can extend fungicide-control intervals at golf courses with difficult-to-control dollar spot



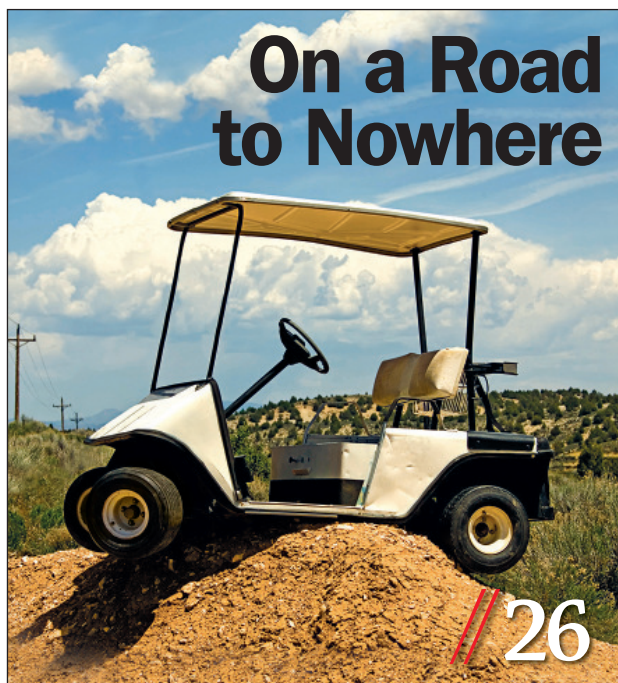
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A SUPERINTENDENT *For the people*

Bellerive's Carlos Arraya, CGCS, believes in putting his people first.

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"It started out modestly — a local TV news crew asked to interview Billy in his school library. Next thing Mark knew, Billy was being recognized on Golf Channel."

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

Not just another day at the beach

Fourteen-year-old Billy Reid was walking down Juno Beach in south Florida when he spotted a \$100 bill buried in the sand. ¶ Turns out it wasn't just a \$100 bill. It was a wad of \$100s, \$50s and \$20s — \$1,500 total. Not just another day at the beach.

Billy Reid wasn't there simply for the pleasant walk. It was an autism walk. Billy and his sister Quinn were representing the Teen Golfers Association of the First Tee of Palm Beaches. A charitable cause, an honorable organization... maybe it's no surprise that Billy immediately turned the money into the Juno police.

Billy's father is Mark Reid, the director of golf and grounds maintenance for the Breakers in Palm Beach, Fla. He's a second-generation superintendent from Australia and he can't believe how Billy's find, and his story, "grew legs."

It started out modestly — a local TV news crew asked to interview Billy in his school library. Next thing Mark knew, Billy was being recognized on



Golf Channel at the Players Championship. His son got to compete against PGA Tour Commissioner Jay Monahan in a golf simulator closest-to-the-pin contest. No. 17 at TPC Sawgrass was the hole of choice. And yes, young Billy hit it to 6 feet.

Billy is still shocked by how far his \$1,500 find took him.

"I was surprised the actual commissioner (of the PGA Tour) was there," Billy told me when I phoned him in Australia (he was with his grandpa in Point Lonsdale.) "I thought it would be the commissioner of something else."

The comic book guy in me hopes he's talking about Commissioner Gordon — which also would have been cool. But Billy's day at the Players Championship got even cooler.

"I got to meet Kevin Kisner, Shane Lowry and Tommy Fleetwood," Billy told me. "Tommy Fleetwood is one of my favorite golfers, so that was really cool."

This was before Fleetwood shot a 63 at the U.S. Open, but after he was caught on a hot mic saying, "I'd never have

turned that money in!" A lot of Billy's friends told him the same thing, that they would have pocketed the cash.

"I told them that in the heat of the moment, they wouldn't have," Billy says.

Billy mentions the nine core values of the First Tee and cites "respect." He says if he lost the money, he'd hope someone would have the respect to turn it in to the authorities. (If no one comes forward to claim the money in 90 days, the money is his.)

His dad, obviously, is proud. He told me he didn't even know about the whole ordeal until that evening when he got home from work.

"It's super cool to think that when he found himself in that situation he did the right thing, mate," Mark told me. "I'm very proud of him, and his sisters."

I asked Billy about his career goals, and he's hopeful baseball will lead him on to bigger and better things. He also admires his dad's and grandpa's line of work.

"I was playing golf with my grandpa and someone asked him what kind of grass that was, and he looked at him and said, 'That's a weed, mate!'" Billy laughs. "I love what my dad does — he doesn't understand how cool I think it is. He's the boss of the whole maintenance team! It would be cool to follow in his footsteps."

Sounds like wherever Billy's footsteps take him, it'll be pretty cool. **G**

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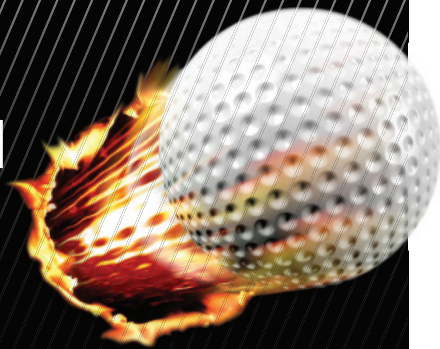
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Starter

NEWS, NOTES AND QUOTES



// 2018 U.S. OPEN

A NAIL-BITING SATURDAY AT SHINNECOCK

BY SETH JONES // Editor-in-Chief

➔ The ghost of 2004 hung over the 2018 U.S. Open. Now that the U.S. Open had returned to Shinnecock Hills, widely considered one of the finest golf courses in the world, would there be a repeat of the 2004 U.S. Open when No. 7 was watered during play?

Thursday and Friday went off without a hitch. Then the golf world collectively held its breath on Saturday when two-time major champion Zach Johnson said after his round on Fox, “They’ve lost the golf course.”

As players struggled down the stretch, USGA Executive Director Mike Davis appeared on Fox and seemed amenable.

“No doubt, we would admit there were aspects of this setup that went too far,” Davis said during the broadcast. “Well-executed shots were not only not rewarded, they were penal-

“We missed it with the wind. It blew harder than we thought it was going to blow.”

— USGA’S MIKE DAVIS



Charl Schwartzel (left) gets the scoop on Shinnecock Hills’ U.S. Open setup from USGA’s Mike Davis.

ized. ...We missed it with the wind. It blew harder than we thought it was going to blow.”

Calmer weather restored order on Sunday and for the second time in as many years, Brooks Koepka hoisted the U.S. Open trophy. Despite the turmoil Saturday, the Shinnecock Hills crew was lauded by players, pundits and even Zach Johnson, who later tweeted that the course was “tremendous.”

Shinnecock Hills Superintendent Jon Jennings, CGCS, was happy with the course and his crew following the tournament, according to *27 East*.

“I’ve worked a lot of events, and I’ve been more stressed at other events than this one,” Jennings told *27 East*. “The course didn’t get away from anybody. When you hear that, you need to look at how somebody played that day... (and) take it with a grain of salt.”

// BRINGING 30-PLUS YEARS

AQUATROLS ADDS AGRONOMIC SERVICES MANAGER

Aquatrols has named industry veteran Lee Schabar as its agronomic services manager.

Schabar has more than 30 years in the industry, most recently serving as senior director of global controls sourcing at Scotts Miracle-Gro, where he collaborated enterprise-wide with research and development and regulatory compliance. His leadership experience, most notably as a member of CropLife America’s Board of Directors, also will be an invaluable asset.

“Lee’s profound résumé speaks to his capabilities and passion for this market,” says Stacy Peters, Aquatrols director of sales. “He will play an important role in expanding technical field support for our customers, as well as linking our ongoing product development with our customers’ real-world needs.”



Lee Schabar

// CAREER CHANGE

WILLIAMSON TAKING TALENTS TO PBI-GORDON

The employee/owners of PBI-Gordon recently announced that Chris Williamson has joined the company’s research team.

Based in Defiance, Ohio, Williamson will be responsible for coordinating all research protocols, technical assistance to cooperators and product support for end-users in Ohio, Michigan, Kentucky, Indiana, Illinois, Wisconsin, Minnesota, South Dakota, North Dakota, Missouri, Kansas, Nebraska, Colorado, Utah and Idaho.

Williamson holds a Ph.D. in entomology from the University of Kentucky, where he developed novel and innovative strategies for management of the black cutworm on golf course putting greens. He earned his Bachelor of Science in agronomy/turfgrass science and a Master of Science from The Ohio State University.

Most recently, Williamson was a professor at the University of Wisconsin-Madison, a position he held for the past 20 years. Prior to that, he was an assistant golf course superintendent and a research scientist with TruGreen.

// A RECORD BREAKER

Rounds 4 Research rakes it in

➔ The 2018 Rounds 4 Research fundraising program to support turfgrass studies, administered by the Environmental Institute for Golf (EIFG), sold more than 1,330 rounds and yielded nearly \$313,000 in its May online auction, making it the most successful in the program's history. The EIFG is the philanthropic organization of the Golf Course Superintendents Association of America (GCSAA).

The Carolinas Golf Course Superintendents Association raised \$60,000 and was the leader among more than 70 GCSAA affiliated chapters and turfgrass organizations that received proceeds from the auction to support turfgrass research at the local level. The Florida GCSA was next with nearly \$26,700 raised for its chapter.

The top bid was \$3,320 for a round of

golf for four donated by Somerset Hills Country Club in Bernardsville, N.J.

"We are thrilled that Rounds 4 Research had its most successful year ever," said Rhett Evans, GCSAA chief executive officer. "This is a wonderful program that allows golfers to help support the future of the game

while playing the courses they love."

The national campaign is supported by a \$50,000 donation from The Toro Co. Golf Channel, Golf Advisor and GolfNow pro-

vided promotional support. More than 60 golf course management companies donated more than 350 rounds to the auction, including Billy Casper Golf, ClubCorp, Marriott Golf, the PGA Tour TPC Network and Troon Golf. The program has raised more than \$1,095,000 since launching in 2012.



THEY SAID IT

MATT CAVANAUGH

ASSISTANT SUPERINTENDENT, RUSH CREEK GC, MAPLE GROVE, MINN.

On how his attitude has changed toward golf cars over 15 years

"I drive a 300-gallon sprayer on greens. Have at it."

See **"On a Road to Nowhere,"** page 26

// QUALITY CONTROL

QUALI-PRO HIRES TWO AND REALIGNS

Control Solutions Inc., parent company of Quali-Pro, recently announced the addition of two new members to the Quali-Pro team: John Haguewood and Todd Deitz.



John Haguewood

Haguewood will support Quali-Pro in the newly realigned Gulf Coast Territory (Alabama, Georgia, Kentucky, Louisiana, Mississippi and Tennessee). Most recently, Haguewood was technical manager with Macro-Sorb Technologies. Prior to that, he was a turfgrass research specialist for the University of Missouri, where he received his Master of Science in Plant, Insect and Microbial Sciences (Turf-Weed Science).

Deitz will support Quali-Pro in the newly realigned Midwest Territory (Indiana, Illinois, Michigan and Wisconsin). Deitz comes to Quali-Pro with a strong product background with his experience as a Class A superintendent. Most recently, Deitz was the superintendent at Northmoor CC, Highland Park, Ill. Deitz received his Bachelor of Science in Plant and Soil Science at Southern Illinois University and an Associates Degree in Horticulture from Danville Area Community College.



Todd Deitz

// GOLFDOM WISDOM

Ducking a DQ for putting a moving ball is nothing... ducking a federal indictment for insider trading?

That's something. #golfdomwisdom

ABOUT THE COVER

Golfdom Editor-in-Chief Seth Jones took this photo of Carlos Arraya, CGCS, Director of Grounds and Agronomy at Bellerive CC, in May. Arraya is standing on the tee of one of his favorite holes, the 411-yard par four No. 2.





"It's almost like there is this inflated sense of pride, paired with a tendency to disregard any turf manager who isn't growing grass in this region. In other words: We're a bunch of turf snobs."

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

Move, or grow where you're planted

I used to have this pretty beat sentence on my cover letter, boasting about how dope I was as a turf manager. Obviously I mentioned my penchant for delivering championship conditions on the regs and the obligatory meticulous eye for detail, along with boastful references to my resplendent skills as a leader. But there was one attribute setting me apart from the trash heap of cover letters strewn across the desks of hiring managers everywhere.

This carefully crafted sentence stated I was accomplishing these Herculean tasks of greenkeeping in what I perceived to be the toughest place in the world to grow grass. And those of you managing turf in the Mid-Atlantic or anywhere in the Transition Zone, I assume you might agree with this sentiment.

Thomas Jefferson referred to Delaware as "The Diamond State," but obviously this revolutionary never had to grow grass here. If he had, our state slogan probably would be "The Armpit State," because attempting to grow grass in Delaware is like trying to manage turf in an armpit.

Spring can be pleasant or hellaciously cold and wet.

Picturesque summers aren't out of the ordinary, but you're just as likely to experience long stretches of sweltering temperatures coupled with unbearable bouts of humidity. September, which used to be the harbinger of chill mode, has turned into one of our toughest months. And winters are about as predictable as getting your palm read at a local carnival.

Most greenkeepers working in this small window from Philadelphia to Washington, D.C. truly believe we are managing turf in the most tenebrific (look it up) spot ever. It's almost like there is this inflated sense of pride, paired with a tendency to disregard any turf manager who

isn't growing grass in this region. In other words: We're a bunch of turf snobs.

You would assume this mindset would be a locals-only deal, but more than once I've had a random greenkeeper from Florida or California tell me straight up they would not want to grow grass where I am growing it.

The young and cocky me would have totally agreed, but as I've aged and acquired some knowledge, I realize that things are tough all over.

Florida has no appeal to me as a turf manager. The reality of a 12-month season makes me squirm, as do alligators, hurricanes and do I even have to mention the summer months?

Colorado has some alluring qualities, but after seeing countless photos on social media of greenkeepers using sprayers to water because it didn't snow last winter certainly was an eye-opener. I learned that desiccation is real, plus I despise snow and watering with a sprayer.

California? Too foggy, smoggy and kooky for my liking. The Bay area seems rad, but I'm not moving more than 3,000 miles to continue as a *Poa annua* manager.

Canada is intriguing, particularly because there are a bunch of interesting turf managers crushing it up there. But I prefer ice in my lemonade, not my greens, so cross Canada off my preferred destinations to manage turf.

Globally, I assume that places like Japan or South Korea would be incredible places to work, but from what I understand they don't believe in the concept of the "frost delay." Blasphemy! How does their turf survive?

Basically I've concluded there's no such thing as a perfect destination for growing grass, and upon realizing this I totally deleted that bragadocious sentence from my cover letter. All turf managers have their issues, and I promise to be less of a snob about it.

And in reality it's not location, but the name of where you work getting you that coveted position, isn't it? **G**

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



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Golfdom Gallery



1 Pretty in pink We've tried wearing pink (and orange, yellow, fuchsia... you name it) on the golf course and it still doesn't look as cool as anything Tiger Woods sports. Here's what we saw the Big Cat wearing during the Memorial at Muirfield Village GC, Dublin, Ohio, alongside 2018 Masters champ Patrick Reed.

2 Shuffleboard ringers *Golfdom* EIC Seth Jones (far left, somehow always with a beer in hand) got Mitch Savage, superintendent, Broken Tee GC, Denver; Cam Copley, Nufarm; and Philip Fischer, assistant superintendent, Brickyard Crossing GC, Indianapolis, out for a game of shuffleboard at Rick's in Lawrence, Kan. Strangely, the photo of the scoreboard after the game was lost...



3 Hey Josie Thanks to Minikahda Club Superintendent Jeff Johnson (and his dog Josie) for hosting the *Golfdom* team during a recent trip to Minneapolis.

4 The Gambler and Billy the Kid We may have just made those nicknames up for Chad Gamble, DryJect Tennessee, and Bill Irving, Wolf Creek GC, Olathe, Kan., but we hope they stick.

5 Panoramic beauty This panoramic shot of Muirfield Village GC shows how dialed in Chad Mark and his crew had the course for the Memorial.



PHOTOS BY: CHRIS HART (1, 5); ALEXA HAAS (2); SETH JONES (3, 4)



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The right call for the PGA Championship



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CARLOS ARRAYA, CGCS
Bellerive Superintendent

The staff at Bellerive CC puts their trust in John Deere for the 2018 PGA Championship and beyond

"It hit 90 today, and I think it will be 90 or hotter every day until the tournament," says Bellerive Country Club assistant superintendent Jared Brewster.

Brewster understands the heat is on in St. Louis — for the weather and for major championship pressure. After all, the 100th PGA Championship only happens once. 2017 PGA Championship winner Justin Thomas' visit the day before — a full eight weeks before the 2018 edition even tees off — just makes the crew even more aware that their time in the spotlight is steadily drawing nearer.

Bellerive Superintendent Carlos Arraya, CGCS, is being pulled in all directions. His voicemail count is up to 22. He can't help but worry about how many more it takes before his voicemail mailbox is full.

One thing he isn't worried about is the equipment the crew is using to prepare for the best players in the game. Bellerive is a John Deere course. Greens mowers, fairway mowers, rough mowers... even the tables in the break room are adorned with John Deere logos.

"Our partnership goes beyond the PGA Championship," Arraya says. "It's a relationship, a partnership. Their actions mirror their words. It made it an easy decision to partner with John Deere."

Arraya loves the way the John Deere 9009A TerrainCut rough mowers have given Bellerive's rough — something PGA Championship players will hope to avoid — a uniform density. Assistant Superintendent Nick White's favorite green iron on the course is the 180 E-Cut Hybrid walking greens mowers. He says they're ideal for the course's undulating A-4 bentgrass greens.

"They're lightweight and they're 18 inches — a little narrower than the 21-inch, the 22-inch greens mowers a lot of courses use," White says. "We need a narrow mower that can be flexible on these undulations."

Brewster loves the 7700A PrecisionCut fairway mowers. Bellerive has Meyer zoysia fairways, which can get spongy and thatchy unless the right regimen is utilized.

"When you aggressively cultivate it, it gives fast and firm championship conditions," Brewster says. "The 7700A allows us to keep the zoysia dense and firm."

"John Deere machines produce championship conditions," Arraya says while checking voicemails and returning important calls in order of priority. "We can set them up for championship conditions, or for everyday, modern golf."

One call Arraya doesn't need to make, because he made it a long time ago: the call to partner with John Deere.



20 18
100TH
PGA
CHAMPIONSHIP
BELLERIVE



A SUPERINTENDENT *For the people*

WORDS AND PHOTOS
BY SETH JONES

After his son's life was cut short two years ago in a tragic car accident, Carlos Arraya, CGCS, decided to make the most of his relationships.

Some superintendents love their work because they get to be outdoors, or for the pleasure of seeing the sunrise each morning.

Sunrises are nice, but they aren't what get Carlos Arraya, CGCS at Bellerive CC in St. Louis, out of bed early every morning. He loves his job for one reason: the people.

It's not that he specifically loves his crew (though he does). Arraya is like Rod Tidwell at the end of *Jerry Maguire*... he loves *everybody*. Even if he weren't preparing for the 100th PGA Championship — put him in a blue vest greeting customers at Walmart, he says — it would still be about *people*.

Arraya's always been a people person. That's why it was so hard when he lost one of the most important people in his life.

Significant date

The 100th PGA Championship opens play on Monday, Aug. 6. It's a significant date for everyone at Bellerive and at the PGA of America, but for Arraya, that date has a larger meaning than any golf tournament, even the major playing at his course.

Aug. 6 would have been the 21st birthday of his son Isaih — whose life was cut short two years ago in a tragic car accident in Florida.

Isaih, called "Zeke," followed his dad into the business. Arraya had just recently been promoted at Bellerive when the accident happened.

"He was in the golf business, following behind me," Arraya says. "A year ago, this was a no-fly zone for me, I couldn't talk about it. I'm spiritual... going through that allowed me to really invest more in people."

Arraya is happy to talk about turf types and major championship pressures in a hot and humid St. Louis climate (more on these topics

Continued on page 18

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shortly), but the tragedy of losing his son redirected his energy into people. He'd rather talk about culture, about helping people succeed, than getting Bellerive's Meyer zoysiagrass fairways perfectly firm for the best players in the world.

Sarah Worley, arborist for the club, has been working at Bellerive for 36 years. She's on her sixth superintendent and eighth general manager. This will be her sixth professional tournament there. Her experience at Bellerive is so rich that she jokes the 100th PGA Championship is "exciting," but "another opportunity for people to trample everything."

She sets her cynicism aside when it comes to the culture at Bellerive. Like the rest of the crew, she's bought in.

"(Arraya's) a good listener, he always consults the management team and doesn't act as the sole decision maker... and yet everything falls on his shoulders,"



Arraya illustrates his management style with an inverted pyramid. His team is at the bottom, not top.

Worley says. "He's very reasonable, very respectful of everyone and of what their needs are. This is truly the closest to a solid team, a solid working environment, that I've experienced here."

The word: culture

Arraya worked at Bellerive for a year under his friend and mentor John Cunningham, CGCS, director of agronomy. When Cunningham accepted the general manager/COO position at Aronimink GC in Philadelphia, it opened the door for Arraya.

Cunningham and Arraya first worked together 15 years ago in Florida at Black Diamond Ranch in Lecanto.

"He was young back then but I guess I was young then too," Cunningham laughs. "I was morphing into a general manager role at Bellerive and I needed someone like-minded with strong leadership skills. The first person I thought of was Carlos."

Cunningham became certified while at Black Diamond, and Arraya, then an assistant, approached him about wanting to achieve the title of superintendent.

"I didn't want to hand him the title, I wanted him to earn it," Cunningham recalls. "I put together a program and he

devoured it. His thirst for knowledge sets him apart. He wants to get better every-day. It's a cliché, but he's not satisfied with the status quo."

The first thing Arraya did after Cunningham left for Aronimink was assemble the leadership team around the dry-erase board in his new office. He wrote the word "culture" and asked his team to define it. The answers varied, but a common theme was family, communication and being trustworthy.

"I knew we would struggle with the recruitment of labor. I knew we were going to struggle with the weather," Arraya says. "But we will not struggle with each other, period. All of them connected to being open and having honest conversations."

"I was a general manager over eight departments, 80 people (at Hawk's Nest GC, Vero Beach, Fla.), so I had four years of understanding that you have a lot of different challenges," Arraya continues. "But one thing was constant: Understanding what makes people tick helps them maximize themselves in the workplace."

Arraya also believes that a good culture necessitates a proper work/life balance. He

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CONDITION. PERFORM. RECOVER.

How one New Jersey superintendent monitors and maintains his hometown course to stay free of annual bluegrass weevil and dollar spot.

**Doug Larson**

Doug Larson has a unique perspective on the course at The Shore Club in Cape May Court House, N.J. After learning golf at the course in 1975, Larson went on to work there and become an assistant after college.

When Larson returned to the course as superintendent in 2012, it was experiencing problems with annual bluegrass weevil (ABW), a problematic insect common to the northeastern U.S.

"ABW is the biggest issue we have been contending with here for the last 10 to 15 years," Larson says.

Larson says constant onsite monitoring is key to combatting the insect and ensuring peak conditions. Utilizing Syngenta's ABW management website, WeevilTrak.com, Larson has been able to eliminate ABW at The Shore Club.

"Since we started following WeevilTrak protocols, we've eradicated the issue of ABW at the course," Larson says.

Using those protocols and guidelines, and depending on times and stages, Larson has implemented a rotation of insecticides to fight ABW: Ference, Acelepryn, Provaunt and Scimitar.

"We're always visually scouting, but if we find out that that ABW is in the area based on research from WeevilTrak, we know it's probably time to make a treatment," Larson says.

The Shore Club, situated alongside the Atlantic Ocean, is a hotbed for dollar spot disease.

Because of past resistance issues, Larson has switched to rotating Secure and Daconil Action for his ongoing fairway fungicide program.

"There are restrictions on what you can use and how many applications you can make, so we generally use up to our restricted amount."

With a seasonal membership at the club, it's important for Larson to implement a preventative program that gives

members turf that always performs at its best.

"The only time the course might see dollar spot is if

we're getting a few days of rain in a row and can't make the next application," he says.

Larson says either Daconil Action or Secure is usually in the mix with a systemic fungicide for season-long protection against dollar spot.

"We generally stay dollar spot free by using those two products as the base of our spraying program," he says.

Larson notes that one thing he doesn't worry about any more is the fight against fairy ring. The course was able to recover from the disease once the fairy ring program became preventative, with applications of Velistar generally performed in the spring.

"It's certainly working, and fairy ring has not been an issue here at all," Larson says. "These Syngenta products are the cornerstone of our program."

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// 2018 PGA CHAMPIONSHIP PREVIEW

Continued from page 18

wants his crew members to spend more time with their families than with Bellerive's fairways. He wants the same for the entire industry.

"Culture is about having a balance. If you're always here, that's a problem," Arraya says. "The time will come when we have to ramp up for the championship. But you can always find something to do on the golf course. You could get a mobile home and live out here, be here all the time. That's not balanced. We're moving into



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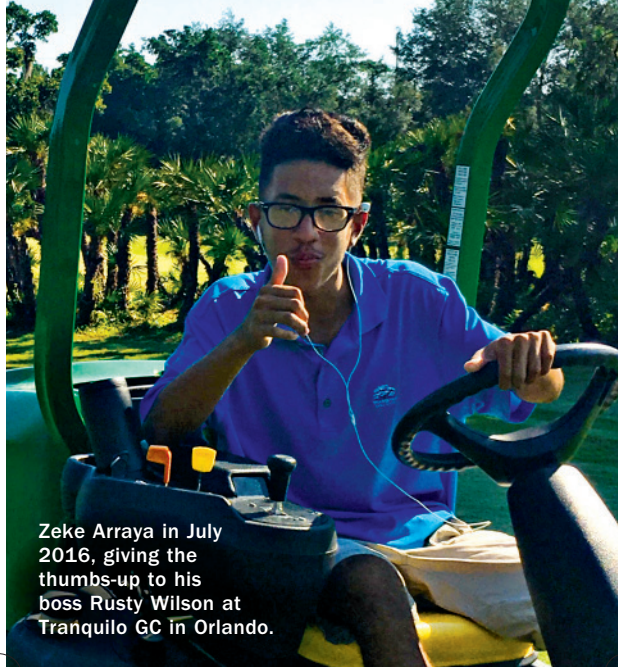
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Zeke Arraya in July 2016, giving the thumbs-up to his boss Rusty Wilson at Tranquilo GC in Orlando.

a progressive world. Young kids are coming into the industry and the industry needs to change. If you really want to promote culture you can't be working 90-hour workweeks. I'll do everything I can in my time in the industry to change that, whether I'm at Bellerive or somewhere else."

"Led by legacy"

Bellerive CC has a proud history, and was first established as a club in 1897, with the golf course, a Robert Trent Jones design, constructed 63 years later in 1960. The course underwent a renovation in 2005, led by RTJ's son Rees Jones. Previous tournaments include the 1965 U.S. Open (won by Gary Player); the 1992 PGA Championship (won by Nick Price); the 2001 WGC-American Express Championship (cancelled in the wake of Sept. 11); the 2004 U.S. Senior Open (won by Peter Jacobsen); the 2008 BMW Championship (won by Camilo Villegas); and the 2013 Senior PGA Championship (won by Koki Idoki.)

The course's motto is "Led by legacy," and that legacy has brought an all-star crew of up-and-comers to the course, including assistant superintendents Jared Brewster (previously at Augusta National and Victoria National), Nick White (previously at Alotian Club and the National Golf Club of Kansas City) and the young Matthew Lennon, returning to the site of his internship after graduating from Michigan State University last spring.

St. Louis is well known for its hot, humid summers. The greens at Bellerive are A-4 bentgrass and the fairways are Meyer zoysia-grass, which can thrive in the heat with aggressive management. It's all hands on deck when temperatures surpass 90 and humidity rises, says Assistant Superintendent Jared Brewster.

"We were one of the hottest cities in America last year — we had a day when it got up to 116 degrees in July," says Brewster. "We're trying to get the greens prepared for the tournament, because the goal isn't just to have the best possible conditions for the tournament, but also to still have a course left when they leave."

"It's a team mentality here, that's really a big thing for us," says fellow Assistant Nick White. "I wanted a job where I felt like I

could provide input where I could be an assistant to the superintendent. Carlos sees it the same way. He wants to help us improve our careers and help us, eventually, become superintendents.”

That “newborn feeling”

Arraya loves what he calls the “newborn feeling” of seeing the course getting freshly manicured each morning. But it’s all secondary to seeing his crew each morning rolling in to punch the clock.

“So many times, you talk to people in our industry and they love golf, or they love being outside. I love grass and the golf course, but the people are just so important to me,” Arraya says. “I love people. I want to connect to people. I want to know what makes them motivated, what makes them frustrated, what makes them maximize who they are.”

Arraya rarely has a bad day anymore. His perspective has changed since the death of his son.

“What’s a bad day? The members are upset because we didn’t hit a standard?” Arraya shakes his head. “When you go through a tragic loss like I did with my son, that pales in comparison. When we moved here, (Isaih) decided to stay in Florida working at a golf course, and he didn’t know what he wanted to do. He called me, and he said, ‘Dad, I know now that I love it.’ And I’m thinking to myself, ‘Boy, I did all this work... I don’t want you to get into this business.’ But we connected. And then God called, and he had a responsibility to honor that call.”

There is good news, he says: Six people on the Bellerive staff are expecting babies. One of those babies is due on Isaih’s birthday.

“It’s all interconnected. You and I live like tomorrow is guaranteed. We talk, we make plans, and then...” Arraya snaps his fingers. “It allows you to put things in perspective.”

The 2018 PGA Championship tees off Aug. 6.

Happy birthday, Isaih. **G**

Continued on page 22

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Volunteer stories

Arraya expects some 150 volunteers to help his crew for the 100th PGA Championship. These four profiles demonstrate their diverse backgrounds and passion for their profession.

JOSE BALLESTERO

Superintendent, Four Seasons Resort Costa Rica, Guanacaste, Costa Rica

When Jose Ballestero became an agronomist in his native Costa Rica in 1999, he didn't know where his career would go. He just knew he wanted to work outside, under the sun.

Ballestero, now the superintendent at the Four Seasons Resort Costa Rica, started out as an agronomist, selling or-

ganic products to farms, and then began selling to golf courses. "That's how I got hooked," he says.

Superintendent positions were few and far between, so Ballestero began working in golf course construction in 2002 at Peninsula Papagayo in Guanacaste, on the northern coast of Costa Rica. Four Seasons took over management of the property, and the superintendent, Steve Watkins, offered him his first job in golf course management as an assistant.



Jose Ballestero

Ballestero's next superintendent stints at Four Seasons Punta Mita in Mexico and Lucero CC in Panama taught him how to manage bermudagrass on the Mexican

coast and bentgrass in the tropical Panamanian mountains before he and his wife, Margarita, returned to Costa Rica in 2017.

While at Four Seasons Punta Mita, he consulted with John Cunningham, who was then the director of agronomy at Four Seasons Las Colinas in Dallas. A few years later, Ballestero and Carlos Arraya, CGCS, both volunteered at the AT&T Byron Nelson tournaments that Cunningham hosted at Four Seasons Las Colinas.

"After that we'd see each other every year (at the Golf Industry Show), and we

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built a nice friendship,” Ballestero says.

It will be his fourth tournament volunteering, and it won't be his last.

“It's important for me just to keep learning — it never ends,” he says. “It's an honor for us to be part of it, the 100th (PGA Championship). After all the hard work, you're able to go and see these guys playing what you just worked on and you see it on TV, you feel like it's the best place in the world for people who work in the golf industry. There's nothing else I can ask for.”

— Abby Hart, managing editor

LEASHA SCHWAB

Superintendent, Pheasant Run GC,
Ontario, Canada

There'll be a breath of fresh air blowing in from the North for the PGA Championship this year. Her name is Leasha Schwab.

Schwab is the superintendent at Pheasant Run GC in Ontario, Canada, and she is making the trip to the Show-Me State to not only take in the experience, but also to highlight the fact that there are many different faces in the turf industry.

The beginning of Schwab's career was surrounded with questions and doubt. With a lack of female peers in the industry and countless stories of assistants getting stuck in their positions, she wasn't sure she could make it a feasible, long-term career. These doubts led her to turn down an assistant superintendent position early in her career. It wasn't until a year later, when she was in the final stretch of her schooling, that she decided to accept the position.

Not too long after, the superintendent left. The rest is history.

For her first time volunteering at a professional tournament, Schwab hopes her

presence encourages everyone, regardless of background, to give the golf course industry a shot.

“I need to go because a lot of women have not been offered this and I want girls



Leasha Schwab

to see that this is something they can do,” Schwab says.

It will also be a learning experience. A key part for Schwab is to see how Carlos Arraya interacts with his staff.

“From what I can see, he has created such a great atmosphere and encourages his staff,” Schwab says of Arraya. “Being there will give me more of an idea of how I can be better as a leader.”

— Kelly Limpert, digital editor

Continued on page 24

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THE LEADER. SINCE 1961.

Continued from page 23

NICOLAS GARIBAY

Assistant superintendent,
Venice G&CC, Venice, Fla.

Nicolas Garibay started his career in golf course management out of necessity. Recently married and looking for a way to support himself and his wife, he began searching for a job. He reached out to Carlos Arraya, then the director of golf course operations and the general manager of Hawk's Nest GC in Vero Beach, Fla.

All Arraya could offer him was a part-time job as an operator. Even though Garibay had no true goals or passion for the trade,



Nicolas Garibay

he accepted the position. Working at Hawk's Nest with Arraya as his boss, Garibay began to develop a passion for the craft and desire to climb the ladder.

He went on to earn a certification from the University of Georgia in the principles of turf and turfgrass management. From there, he was promoted to second assistant at Hawk's Nest, then assistant superintendent. Garibay credits much of what he has learned to Carlos Arraya. "Everything that I have learned is from Carlos. He was my mentor and guided me."

With hopes of one day becoming a superintendent, Garibay looks to once again learn from his mentor and others like him



Venice G&CC is laid out to meander through 26 lakes on the property.

at this year's PGA Championship.

"Most important to me is to help develop my skills to become a superintendent," he says. "I want to see what it takes to be a high-level superintendent and the work that it takes."

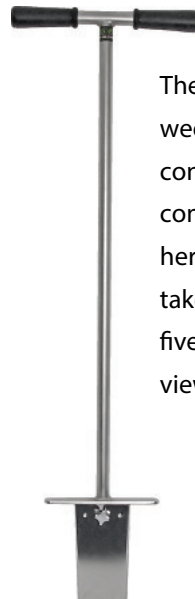
— Dillan Kanya, contributing editor

PHOTO COURTESY: NICOLAS GARIBAY

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JOHN "ROBBY" ROBERTSON
Superintendent, Bird Bay GC,
Venice, Fla.

Golf is a family business for John "Robby" Robertson. His father, Tom, was a golf pro in Ohio before he headed south and purchased Bird Bay GC, an 18-hole executive course in Venice, Fla.

"I started working at (Bird Bay) when I was 11," explains Robertson. "My first job was pulling goosegrass out of greens with a pocketknife.

"Later I found out there's chemicals that actually kill that instead of a pocketknife," he laughs.

Luckily, Robertson's turf care skills have improved since 1983. After working at Bird Bay through middle school and high school and taking a hiatus while studying at Kentucky Wesleyan College, he returned in 1995 to run the maintenance operation.

Robertson refers to his father and himself as "seat-of-the-pants" superintendents, since neither of them have any formal education in golf course maintenance.

"My turf education is day-to-day experience and asking a lot of questions. I ask my fellow superintendents for help and information," he says.

By chance, one of those superintendents was Carlos Arraya, CGCS, when he

was superintendent of Venice G&CC, six miles from Bird Bay.

"I went over one day because they were redoing the golf course and I wanted to see what it actually looked like," Robertson recalls. "I met Carlos, and somehow we created a relationship that we're like brothers."

Robertson has visited Bellerive twice since Arraya took the reins there two years ago, and he's looking forward to his first time volunteering at a professional event.

"To be able to work side-by-side with other top superintendents in the country and possibly learn new techniques to try to bring back to my course... you can't pass it up," he says. **G**

— Abby Hart, managing editor



John "Robby" Robertson



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⚡ “Chinch bugs,
manganese...
a lot of people
don't even
know what
that is...”



ON A ROAD TO NOWHERE

BY MATT
CAVANAUGH

Taking a look back 15 years, I realize that though the place hasn't changed, the way I do the job has.

STOCKCOM / GREGG

50 Cent's "In Da Club" was the top song, "Chicago" won best picture (gross), Saturn sold 271,000 cars. Johnny Depp was super dreamy, and no one really seemed to care about bees. It all happened in 2003.

I entered the 2003 golf season with one year of full-time employment under my belt at Rush Creek Golf Club in Maple Grove, Minn. I was the second assistant/spray tech/irrigation tech. The title didn't matter (and still doesn't). I graduated from Kansas State University the previous spring and was excited to be in the field I spent four years studying in school.

I've had three other positions in the turfgrass industry since 2003 — head of grounds for a school district, sales rep for PBI-Gordon and research scientist at the University of Minnesota. Now I'm back at Rush Creek as assistant superintendent.

It's interesting to look back 15 years and evaluate how I manage grass now versus then. Many things have changed in 15 years: products, equipment, research, education and, of course, social media. All of this has shaped and will continue to shape how I manage grass.

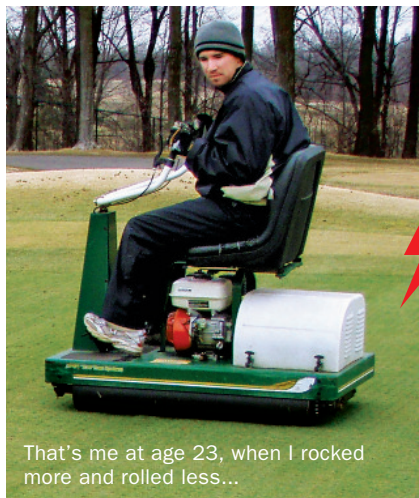
I'm not saying the management practices in this article are correct. This is just my story of change over 15 years — in my way of thinking and management style.

So let's interview my 23-year-old self (only three years away from being a superintendent, I'm sure) and my 38-year-old self (only three years away from being a superintendent, I'm sure) to illustrate the differences between the two.

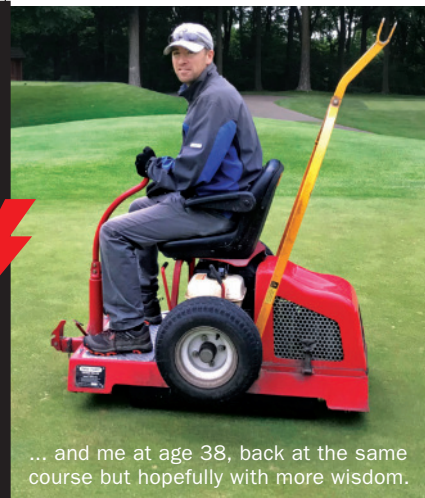
The specs at Rush Creek GC are these: It's a public golf course with annual rounds of 28,000-32,000, 32 acres of Providence bentgrass fairways, 3.5 acres of A1/A4 bentgrass greens and 3 acres of Penncross bentgrass tees.

WHAT IS YOUR GREENS FERTILITY PROGRAM?

23-YEAR-OLD MATT: Oh, lots of granular on the shoulder seasons, with 16-4-8, some 10-18-22 at aerification in September and



That's me at age 23, when I rocked more and rolled less...



... and me at age 38, back at the same course but hopefully with more wisdom.

two applications of 12-40-0 in October before snow mold applications. Bi-weekly summer applications of three different liquid nitrogen sources at 0.10 lbs. N/M. Total nitrogen of 4.5 lbs. N/M, with 3.5 lbs. from a granular source.

38-YEAR-OLD MATT: Sprayable ammonium sulfate in April and the first part of May. Middle of May through September with a single foliar nitrogen source at 0.10 lbs. N/M. Back to ammonium sulfate in October. Total nitrogen between 1.40 to 1.60 lbs. N/M.

YOUR THOUGHTS ON GOLFERS AND CARTS?

23-YEAR-OLD MATT: I don't think a golfer understands the function of reverse. They drive all over and you can't control them.

38-YEAR-OLD MATT: I drive a 300-gallon sprayer on the greens. Have at it.

HOW MANY TIMES A WEEK DO YOU ROLL GREENS?

23-YEAR-OLD MATT: Maybe once. We usually just do it on the day of an event.

38-YEAR-OLD MATT: Six days a week. We don't roll on Monday.

WHERE DO YOU USE WETTING AGENTS?

23-YEAR-OLD MATT: What?

38-YEAR-OLD MATT: Greens and tees. Nothing on the fairways.

WHAT IS YOUR AERIFICATION APPROACH ON GREENS?

23-YEAR-OLD MATT: Pull 5/8-inch cores on 2-inch by 2-inch spacing in April and Labor Day. Fill with sand.

38-YEAR-OLD MATT: Five mil needle tines every three weeks throughout the season, with a triple roll following to prevent any issues with play. Fall deep tine with half-inch solids at 8 inches depth just before first snow. No roll after.

WHAT IS YOUR FERTILITY PROGRAM ON YOUR FAIRWAYS?

23-YEAR-OLD MATT: Four applications of a granular 16-4-8 at 0.60 lbs. N/M and one application of a granular 23-0-23 at 1.0 lbs./M. Total nitrogen application of 3.4 lbs. N/M/year.

38-YEAR-OLD MATT: Sprayable 46-0-0 at rates of 0.10 to 0.20 lbs. N/M roughly 14 to 21 days apart from May to September. Use sprayable ammonium sulfate on the shoulder seasons of April/early May and October at 0.10 to 0.15 lbs. N/M. Total nitrogen application of 1.20 to 1.40 lbs. N/M/year.

WHAT IS YOUR SOIL TESTING APPROACH FOR THE GREENS?

23-YEAR-OLD MATT: Full workup with the BCSR approach. Follow recommendations from the soil test. Soil testing has indicated that we need to add magnesium,

Continued on page 28

METALLICA WAS THEN, THIS IS NOW

Continued from page 27

potassium, iron, manganese and boron. My copper levels are right where they need to be. (38-year-old Matt: Oh, goodie).

38-YEAR-OLD MATT: Check a few greens each year to get a baseline for the MLSN method. Don't worry about the rest of it.

HOW DO YOU MONITOR SOIL MOISTURE IN THE GREENS?

23-YEAR-OLD MATT: We use soil probes every morning during setup to determine if we need to do any hand watering.

38-YEAR-OLD MATT: We use the TDR 300 during setup each morning to determine if we need to hand water. I sometimes use the soil probe to see if I still have the touch.

YOUR THOUGHTS ON HOURS YOU PUT IN ON THE GOLF COURSE?

23-YEAR-OLD MATT: I'll stay until the job gets done.

38-YEAR-OLD MATT: I work very hard, but when I have my eight-hour day in, I'm heading home.

AND NOW A WORD FROM STEVE JOBS

Steve Jobs said, "A lot of people in our industry haven't had very diverse experiences. So, they don't have enough dots to connect, and they end up with very linear solutions without a broad perspective on the problem."

Wow, I can relate to that. For many of us, being on the golf course is the only job we've had in our adult life. It's easy to lose perspective on something we've never changed.

I made the best decision of my life when I took a sales role within the industry. It provided the opportunity to see what others were doing (good and bad) from a turfgrass management standpoint and allowed me to talk with professionals who

are a lot smarter than me.

Regarding the questions above, my changes didn't come from technology or other industry innovations. My changes came from different perspectives I've gained over the years. I'm not saying a change of positions is required, but it made me look at things differently.

Metallica is my band of choice, and I went to one of their concerts in 2016. During the song "Creeping Death," I looked around to see 60,000 people with their fists in the air yelling "Die, die, die, die!" Right then, I went through another perspective change in my life. I still like Metallica, but I don't need to go to a concert and scream "Die!" again.

Guess I've aged out. Speaking of age, like 50 Cent, say, "We can party like it's your birthday" 15 more times and I'll be back for an update. 

Matt Cavanaugh is assistant superintendent at Rush Creek Golf Club in Maple Grove, Minn.

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Super Science

// ANOTHER DAY, ANOTHER DOLLAR

ALTERNATIVE MANAGEMENT STRATEGIES FOR DOLLAR SPOT ON FAIRWAYS

By Cody Beckley and Joseph Roberts, Ph.D.

Dollar spot (*Sclerotinia homoeocarpa* F.T. Bennett) is a common disease of turfgrass worldwide. Even with adequate fertility and deployment of cultural controls, multiple fungicide applications typically are required for control. While organic amendments are considered promising alternative management tools, we need to understand the impact of these products when used alone or when combined with fungicides.


Fertility and fungicide source were evaluated for impact on dollar spot on a newly established creeping bentgrass (*Agrostis stolonifera* L. cv. 007) fairway.



Creeping bentgrass cv. 007, amended with municipal waste compost at establishment (left) and biochar at establishment (right). We observed no difference between the fertility treatments for seasonal dollar spot suppression.

We applied main-plot treatments as a compost (Orgro, Baltimore City Composting Facility, Md.) and a biochar (CarbonizPN Soil Enhancer, Mirimichi Green, Castle Hayne, N.C.) applied at establishment or as a bi-annual topdressing, a vermicompost (MicroBac, Southern Organics & Supply, Monroe, N.C. plus Vermaplex, Monroe Works, Archer, Fla.) plus conventional fertility (sulfur-coated urea, triple superphosphate and

potash), conventional fertility and none. We standardized nitrogen fertility levels for all treatments at approximately 3.75 lbs. of nitrogen per 1,000 sq. ft. annually. We applied sub-plot treatments as a 14-day contact Secure (fluazinam, Syngenta Crop Protection), or penetrant Xzemplar (fluxapyroxad, BASF), threshold contact or penetrant and none. Threshold treatments were made when more than two infection centers were counted on two of four replicates.

In year one of the study we observed no difference between fertility-source impact on seasonal dollar spot suppression, as all fertility sources were significantly better at controlling dollar spot than our non-fertilized check. All fungicide treatments effectively reduced dollar spot when applied at designated 14-day intervals. When considering threshold-based fungicide applications, the vermicompost plus conventional fertility treatment provided the longest duration of control for both contact and penetrant fungicides. 

Cody Beckley and Joseph Roberts, Ph.D., are at the University of Maryland. You may reach Cody Beckley at cbeckley@umd.edu for more information.

NEWS UPDATES

KANSAS STATE UNIVERSITY TO CLOSE HORTICULTURAL RESEARCH CENTER

Kansas State University will be closing the 120-acre John C. Pair Horticultural Center in Haysville, Kan. Reductions in base support from the state and recent enrollment declines have led to the decision.

The John C. Pair Horticultural Center opened in 1970 as the Kansas State University Horticulture Research Center, with a focus on research and Extension activities related to woody ornamental crop production and utilization.

Over the next several months, Kansas State Research and Extension will develop a plan to close the center and address land ownership. The center is staffed by five full-time professionals, as well as four to five students hired to work each summer.

As part of university-wide budget reductions, the College of Agriculture and Kansas State Research and Extension 2019 budget was cut by \$3.5 million.

"Naturally, with budget reductions there are difficult decisions," said John Floros, dean of the College of Agriculture and director of Kansas State Research and Extension. "We value the history and contributions of our faculty at the center."

In addition to the Pair Center closure, The Pecan Experimental Field, an 80-acre stand of native pecan trees in Chetopa, Kan., also will be closed.

BROWN PATCH OF COOL-SEASON TURFGRASSES IS CAUSED BY *R. SOLANI* AND LARGE PATCH IS CAUSED BY *R. SOLANI*. WHAT'S THE DIFFERENCE?"

Megan Kennelly, Ph.D.

(see story on page 30)

//WHAT IT IS AND HOW TO COPE

Don't get overmatched: Dispatch that large patch

By Megan Kennelly, Ph.D., and Jack Fry, Ph.D.

Large patch is a fungal disease of zoysiagrass (*Zoysia japonica*, *Z. matrella*, *Z. pacifica* and various *Zoysia* hybrids) and several other warm-season grasses. This article focuses on the disease in zoysiagrass, which is becoming more popular in warm and transitional climates such as Kansas.

Zoysiagrass requires less water and is more tolerant of summer conditions than cool-season turf. Even better, zoysiagrass is not susceptible to some of the nasty diseases that can wipe out certain cool-season turfgrasses overnight, like gray leaf spot, which can decimate perennial ryegrass (*Lolium perenne* L.). It is much less susceptible to dollar spot and foliar Pythium than our cool-season grasses. Overall,

zoysiagrass requires fewer inputs than cool-season grasses. Zoysiagrass is not susceptible to brown patch, caused by *Rhizoctonia solani*. But, it is susceptible to large patch, caused by... *Rhizoctonia solani*?

You read that right, brown patch of cool-season turfgrasses is caused by *R. solani*, and large patch is caused by *R. solani*. What's the difference? They are caused by different subgroups of the species, called "anastomosis groups," or AGs for short. Anastomosis group 2-2 IIIB is the main culprit for brown patch, and AG 2-2 LP is the culprit for large patch (sometimes called zoysia patch). Other subgroups of *R. solani* cause serious, yield-limiting diseases across the globe in important food crops such as wheat, potato, rice, sugar beets and many more.

SYMPTOMS AND TIMING

As noted above, large patch causes... large patches! More specifically, the disease leads to areas of tan to brown, thin turf that can be just a few feet across or up to 25 or more feet in diameter (Figure 2A). When disease is actively spreading, the patches often exhibit a distinctive bright orange margin (Figure 2B). Up close, you'll see orange or tan leaf blades with rotten leaf sheaths (Figure 2C), and the sheaths easily pull off the plant. In our area, symptoms occur in fall (September-October) and spring (April-early June) when the weather is cool and wet, right when zoysia is either going into or coming out of dormancy.

Researchers have been studying large patch for decades, with important findings by U.S. and Japanese groups in the 1990s, including some work here at KSU. With increasing interest in zoysiagrass, several research groups have been working for five to 10 years to find solutions to this disease. Following are a few recent highlights, and there are other efforts as well.

BREEDING

Resistant varieties are the best long-term solution to any disease, whether in turf, grapes, apples or wheat. That's why plant pathologists and plant breeders work hand in hand on so many projects. For example, Ambika Chandra, Ph.D., and Dennis Genovesi, Ph.D. at Texas A&M are leading efforts to breed new zoysiagrass varieties with resistance to large patch. Our K-State group is working closely with our A&M colleagues, Aaron Patton, Ph.D., at Purdue, Mike

FIGURE 1



Large patch in a zoysiagrass fairway.

PHOTOS COURTESY OF MEGAN KENNELLY AND JACK FRY (FIGURE 3B)

Richardson, Ph.D., at the University of Arkansas, as well as others to screen breeding lines in a project funded by the USGA. It takes a long time to bring a new variety to market from the first cross.

FUNGICIDES: THE WHAT, WHEN, WHERE, HOW

Currently, fungicides are a key element to large patch management. Each year, researchers test materials at various sites, and many of those studies are published. For example, in a quick search this week using the keyword “zoysiagrass” in *Plant Disease Management Reports (PDMR)*, a peer-reviewed, academic publication, 26 studies popped up for large patch. Other studies have been published as longer articles in other academic journals, and some studies are not published but are still important preliminary data in the product development phase. University Extension faculty use published studies to help provide guidance for turfgrass managers. One example we use here in Kansas is the *Chemical Control of Turfgrass Diseases* publication, authored by Paul Vincelli, Ph.D., and Gregg Munshaw, Ph.D., at the University of Kentucky, along with Bruce Clarke, Ph.D., at Rutgers University. You can find that guide online at: <http://www2.ca.uky.edu/agcomm/pubs/ppa/ppa1/ppa1.pdf>.

As noted in that publication, there are several mode of action groups (FRAC code groups) listed as effective for large patch with scores of 3 or 4 on their 4-point scale. Breaking it down into active ingredients, flutolanil, PCNB and triadimefon are listed as “consistently good to excellent control in published experiments,” while azoxystrobin, penhiopyrad, pyraclostrobin and triticonazole are listed as “good to excellent control in most experiments,” with tebuconazole intermediate between those two categories.

We at KSU like to do fungicide tests on inoculated plots using our buried-oats method because large patch

FIGURE 2A



Large patch in a zoysiagrass fairway with areas of tan to brown, thin turf.

FIGURE 2B



When disease is actively spreading, the patches often exhibit a distinctive bright orange margin.

is, well... patchy! However, we also conduct tests by mapping out known hot spots on golf courses. In Arkansas, researchers formally documented that patches often occur in the same area from season to season.

With such a strong seasonal component to the large patch life cycle, fungicide application timing is another key factor, getting at the “when” factor. At KSU, former Ph.D. student Ken Obasa examined the efficacy of three

Continued on page 32

FIGURE 2C



Up close, leaf blades are orange or tan with rotten leaf sheaths and the sheaths easily pull off the plant.

FIGURE 3A



Growing large patch pathogen on oats in the laboratory for inoculation in the field.

FIGURE 3B



Burying the oats in thatch.

FIGURE 3C



The next day, the fungus already is producing mycelium.

FIGURE 3D



Large patch on the left side of a breeding plot. The right side of the plot is protected by a fungicide.

Continued from page 31

fungicides from three different mode of action groups (azoxystrobin, flutolanil and trifloxystrobin) using fall and spring timings and taking thatch temperatures averaged over the seven previous days. Our plots were fairway-height Meyer.

Prior Extension publications list a general guideline of applying when thatch temperatures decline to 70 to 75 degrees F. In our study, we generally observed reduced spring disease when prior fall fungicides were applied in a similar range of thatch temperatures from 64.0 degrees to 73.8 degrees F. However, there were a few exceptions. In two years, single fall applications of

flutolanil, with thatch temperature 69.3 degrees or 70.9 degrees F, did not reduce disease. The same study looked at two sequential fall applications at two-week intervals. The sequential applications did not enhance control compared to single applications for our timings. While fall applications have performed well in Kansas, we wanted to look at spring application timings as well.

For this experiment, we initiated our earliest applications at an early curative stage, when the zoysiagrass was starting to green up and symptoms were visible, which was in mid-April (thatch temperature 61 degrees F) in one year and early May

(thatch temperature of 61.5 degrees F) in another year. We used the same three fungicides (azoxystrobin, flutolanil and trifloxystrobin) applied as single or sequential (two applications at a two-week interval). The two sequential spring applications did not enhance control compared to one application, but other intervals may perform differently. In general, spring applications were more effective when applied earlier in the season. Though the study was not set up to directly compare spring and fall applications, the spring applications generally were not as effective as the fall applications. However, because they were initiated at an early curative stage, we may have

been too late to see the full potential of spring applications.

To explore the potential of early spring applications and to optimize timings, Lee Miller, Ph.D., at the University of Missouri, currently is looking at five-day average, 2-inch soil temperature thresholds of 50 degrees or 60 degrees F as possible triggers to initiate spring applications for large patch, with updates on his blog. We are looking forward to those results, which will be extremely helpful for fine-tuning the “when” of large patch applications.

Evaluating active ingredients is important, but it also is helpful to dive deeper and get into the nitty gritty of application methods. This is what we mean when we put the “where” and “how” into the *what, when, where, how* of fungicides. Detailed studies about nozzles, water rates and other “application technology” factors have been examined in other turf diseases, especially dollar spot, which is the “lab rat” of turf pathology. However, such studies for large patch were lacking until recently.

A group of researchers at University of Tennessee started to tackle this issue in detail, with results published in a scientific journal just a few months ago. They conducted growth chamber studies where four different fungicides from four mode of action groups (azoxystrobin, flutolanil, tebuconazole and chlorothalonil) were applied by the droplet onto leaves, leaf sheaths or stems in growth chamber plants. Stem and sheath applications were more effective than leaf applications, providing further impetus to develop field application studies that precisely target the infection site. More work is needed in the field, but this study was an insightful peek into fungicide behavior at the droplet level.

FERTILITY: THE WHO, WHAT, WHEN

Fertility is a key factor for many

FIGURE 4A



Large patch inoculated research plots for a fungicide control experiment.

FIGURE 4B



Large patch control with a fungicide treatment in the lower left plots versus large patch present in a non-treated plot lower right.

turfgrass diseases. Brown patch in cool-season grasses caused by that other group of *R. solani* is known to be triggered by high nitrogen. With that in mind, our former KSU Ph.D. student Ken Obasa looked at the influence of cultivation and fertilization timing in fairway-height Meyer zoysiagrass, with the help of funding from USGA, the Kansas Turf Foundation, the Heart of America Golf Course Superintendents Association and the Kansas Golf Course Association. Contrary to our expectations, spring and fall fertilization did not increase disease

compared to summer, and in some cases the zoysiagrass was greener with the spring and fall applications. That study didn't see increased or decreased disease with summer aerification plus topdressing, which occurred when disease symptoms were not apparent. However, there are reports of disease spreading if aerification is done while the disease is active.

Soon after the above work was completed, Lee Miller at the University of Missouri invited us to collaborate with him on a follow-up study,

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Continued from page 33

with some funding from the USGA and local GCSAA chapters (Heart of America and Mississippi Valley). We looked at nitrogen source (ammonium sulfate, calcium nitrate and urea) and timing (spring/summer/fall). It was a great way to tag-team, train some new students with experience in turf diseases, and get data from multiple sites. Those results were summarized in *Golfdom* (<http://www.golfdom.com/debunking-a-large-patch-myth/>) after publishing the study in a peer-reviewed journal.

In brief, the study found that spring and fall applications of nitrogen did not increase large patch severity, which means superintendents have some flexibility in their timing to reach other agronomic goals. In fact, spring nitrogen applications decreased large patch compared to summer applications at some of the sites. On the source factor, ammonium sulfate in spring led to lower large patch in some years, but this result was not consistent across our sites and years.

BEYOND CONVENTIONAL FUNGICIDES AND FERTILIZERS

With increasing interest in alternative disease controls and increasing regulations in some places, a team of researchers recently explored the potential of animal manure, sewage-based organic fertilizer and mustard seed meal in reducing large patch. The animal-waste product reduced disease by about half compared to non-treated controls. The researchers also examined effects of the treatments on microbial communities. In recent years, plant pathologists have used mass microbial DNA sequencing techniques to explore how the whole community of soil microbes (the “microbiome”) affects the dynamics of another *R. solani* that causes a root disease of wheat.

Have you ever seen large patches disappear on their own? Ever wonder if

“good microbes” might be suppressing the bad ones? That could be the case, and future research might tell us more. You might have heard of studies looking at all the microbes in humans, called the “human microbiome.” Plant pathologists are now examining the “phytobiome” to learn how all microbes associated with plants are interconnected.

MAKING YOUR PLAN WITH TODAY'S TOOLS

Though research on large patch in zoysiagrass is ongoing, superintendents right now have several fungicide active ingredients to choose from that have performed consistently. Fungicide timing will, of course, depend on your weather, so be sure to check with your local/regional experts. Recent work on fertilization has highlighted flexibility in nitrogen source and timing, and ammonium sulfate may be worth a look. Contrary to prior belief, spring and fall nitrogen has not increased large patch. Integrate fungicides and good fertility decisions with improved drainage, and avoid spreading disease by cultivating when disease is active.

There's no perfect solution, but multiple effective practices can be combined. With ongoing breeding work, the hope is that someday, resistant cultivars will be a piece of your integrated disease management toolbox. ☺

Acknowledgements

Thank you to the USGA, GCSAA and state/local chapters, groups and companies that support university research.

Megan Kennelly, Ph.D., is a turfgrass pathologist and Jack Fry, Ph.D., is a turfgrass scientist at Kansas State University. You may reach Kennelly at kennelly@ksu.edu for more information.

References

Benelli, J.J., B.J. Horvath, A.R. Womac, B.H. Ownley, A.S. Windham, and J.C. Sorooshan. 2017. Large patch (*Rhizoctonia solani* AG 2-2LP) severity on Japanese lawngrass (*Zoysia japonica*) influenced by fungicide and application target site. *Crop Protection* 106:23-28.

Corwin, B., N. Tisserat, and B. Fresenburg. 2007. Identification and management of turfgrass diseases. Univ. of Missouri Extension and Agric. Info. Publ. IPM1029. Extension Publications, Columbia, MO.

Fry, J., M. Kennelly, and R. St. John. 2008. Zoysiagrass: economic and environmental sense in the transition zone. *Golf Course Management*, May 2008.

Koehler, J., L. Miller, R. Braun, and M. Kennelly. 2017. Debunking a large patch myth. <http://www.golfdom.com/debunking-a-large-patch-myth/>

Miller, G.L., D.T. Earlywine, R. Braun, J.D. Fry, and M.M. Kennelly. 2016. Influence of Nitrogen Source and Application Timing on Large Patch of Zoysiagrass. *Crop, Forage & Turfgrass Management* 2.

Obasa, K., J. Fry, D. Bremer, R.S. John, and M. Kennelly. 2013. Effect of cultivation and timing of nitrogen fertilization on large patch disease of zoysiagrass. *Plant Disease* 97: 1075-1081

Obasa, K., J. Fry, D. Bremer, R. St. John, and M. Kennelly. 2014. Effects of summer cultivation and fertilization timing on large patch in zoysiagrass. *Golf Course Management*, April 2014.

Obasa, K., J. Fry, D. Bremer, and M. Kennelly. 2017. Evaluation of spring and fall fungicide applications for large patch management in zoysiagrass. *International Turfgrass Society Research Journal*. Vol. 13 No. 1, p. 191-197. doi:10.2134/itsj2016.04.0274

Pan, X., M.D. Richardson, S. Deng, R.J. Kremer, J.T. English, J.D. Mihail, C.E. Sams, P.C. Scharf, K.S. Veum, and X. Xiong. 2017. Effect of organic amendment and cultural practice on large patch occurrence and soil microbial community. *Crop Science*: 57:2263-2272.

Spurlock, T.N. and E.A. Milus. 2009. Spatial and temporal occurrence of large patch disease in Northwest Arkansas. (Abstr.) *Phytopathology* 99:S123.

Vincelli, P.B. Clarke, and G. Munshaw. Chemical Control of Turfgrass Diseases 2017, University of Kentucky College of Agriculture, Food and Environment, Cooperative Extension Service, Rutgers University/ New Jersey Agricultural Experiment Station.

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“Often overlooked in developing a plant health program are the internal workings of the turfgrass plant itself.”

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

Internal workings

The goal of plant health is to provide healthy, vigorous turfgrass by managing resources like radiant energy, moisture, air and nutrients. These resources consumed by the plant are managed primarily through cultural practices with the goal of correcting excessive amounts. We look at specific products — some would say supplements — to provide increased plant health.

Although we focus on providing a healthy turf environment, our objective is to survive an unhealthy summer environment that includes both abiotic and biotic stresses along with human activity or stress (traffic). If the plant survives the summer stress — including elevated temperatures — as a relatively green and dense turf, we judge our turf health care program a success.

Often overlooked in developing a plant health program are the internal workings of the turfgrass plant itself. For example, plant metabolic processes occur within a narrow range of 50 degrees to 104 degrees F. As temperatures approach and exceed the upper level of 104 degrees F, degradation of proteins and membrane disruption occur, resulting in overall shutdown of cellular functions. As cellular functions are disrupted or destroyed, cell death occurs, leading to plant death.

At 104 degrees F, proteins normally in a folded position begin to unfold or unwind, resulting in loss of functionality. Proteins are involved in numerous functions within the plant, like disease

resistance, fighting insect attacks, wear tolerance, etc. When you think about it, 104 degrees F is not a remarkable temperature given that turf canopies often rise well above that during summer. I've been curious about how a turfgrass plant protects itself from a lethal temperature.

Internally, a major protection mechanism against high temperatures is production of a group of proteins called heat shock proteins (HSP). During elevated temperatures, normal protein synthesis slows or stops. At the same time, the production of these HSP occurs. HSP are synthesized when supra-optimal temperatures are reached (approximately 98 to 104 degrees F), but below lethal temperatures. The hypothesis is that the accumulation of HSP increases the thermal tolerance of plants.

HSP work as “molecular chaperones” by binding to partially folded proteins and working like matrices to prevent the unfolding of normal proteins during periods of high temperature. Once the elevated heat stress or “shock” passes, the HSP degrade and normal protein func-

tion resumes. HSP reform once temperatures begin to rise again toward a supra-optimal range. This can be a daily event during summer stress periods.

It's reported that heat-tolerant turfgrass cultivars produce specific (or more) HSP than non-heat tolerant cultivars. It's also believed that heat-tolerant turfgrass cultivars can resume normal protein synthesis more quickly than non-tolerant cultivars following the heat-shock period.

What does this mean from a management perspective? Proactively embracing plant health principles to develop programs helps us decide what to do. However, some of the things we might embrace could make things worse.

Turfgrass survival at high temperatures is dependent on proceeding through the acclimation phase triggering HSP formation. If this phase is disrupted by a rapid rise in temperature, HSP are negated and thermal tolerance isn't achieved. So, avoid management practices that disrupt the acclimation phase. Specifically, we shouldn't use practices that act as a “turf cover” prior to the acclimation phase. These covers would include a relatively heavy sand topdressing that is left on the surface during midday or grass clippings that are left on the turf during a hot day. Topdressing and grass clippings can result in a rapid canopy temperature increase that negates any acclimation phase. As another example, intensive mechanical practices that disrupt the turf canopy can result in an excessive temperature increase.

Recognize this summer that all those billions of small turfgrass shoots have evolved protective mechanisms like HSP to help them survive the summer stresses. Given that, try to work in harmony with those plants, not against them. **G**

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

Nitrogen mineralization

Kevin Frank, Ph.D., is a turfgrass scientist at Michigan State University. He conducts research on soil fertility, turf nutrition and soil physical and chemical processes in addition to publishing and speaking on these topics. You may reach Frank at frankk@msu.edu for more information.

Q Briefly describe the process of nitrogen mineralization.

Mineralization, along with immobilization, are soil biological processes that give and take nitrogen, so mineralization of organic matter by microorganisms gives nitrogen/makes it available for turf uptake, whereas immobilization takes or ties up nitrogen in soil microorganisms. More technically, mineralization is the process of converting organic forms of nitrogen to inorganic forms of nitrogen via microbial activity.

Q What conditions favor mineralization and what conditions slow mineralization?

Conditions that favor microbial activity are going to favor mineralization; temperature probably is the most important factor. Cool temperatures in the early spring and late fall (especially in the North) slow mineralization, while it is at a peak during the warm summer, assuming adequate soil moisture.

Q Can the amount of nitrogen made available to turf via mineralization be tested or predicted?

I don't believe there are tests commonly used to estimate nitrogen mineralization potential in turf systems. The Illinois Soil Nitrogen (N)

RETURNING CLIPPINGS ADDS ORGANIC MATTER TO SOIL THAT CAN BE REMINERALIZED, SO IT STANDS TO REASON MORE NITROGEN WOULD BE MADE AVAILABLE TO TURF THROUGH MINERALIZATION ON SITES WHERE CLIPPINGS ARE RETURNED.

Test (ISNT) developed by Richard Mulvaney, Ph.D., at the University of Illinois, is a chemical test to estimate mineralization potential to guide N fertilization. It quantifies soil amino-sugar N fractions (these are the main N components of microbial cell walls). Dave Gardner, Ph.D., at The Ohio State University did some research on this, but from my recollection it seemed that results were inconclusive as to the test's ability to predict turf response based on an ISNT value.

Q What is the practical significance to superintendents of nitrogen mineralization?

Mineralization from organic

fractions in soil always are occurring and contributing some N to the N cycle that is available for turf uptake. It could be considered as Mother Nature's base of a superintendent's fertilizer program. All the practices superintendents undertake to produce the healthiest growing environment and

afraid to adjust your fertilizer program as the season progresses. Superintendents aren't chasing yield. If it looks lean, go fertilize, if it's growing like mad, hold off or reduce the amount of nitrogen you apply. Quick example: We had a cold April in Michigan — grass wasn't growing, I doubt there was much mineralization going on. May came and it was one of the warmest and wettest ever, and now the grass is growing like crazy. This is part of the normal spring push growth cycle of cool-season grasses in the North, but I also think those hot May temperatures resulted in more N mineralization than normal, something you can't control but can recognize and do your best to adjust to.

Q Is there anything else you would like to add?

My putting is really sketchy right now, I'm not sure what's going on... how's the fishing?

Editor's note: This column was written in early June. When you read this column in July, we hope Kevin's putting has come around and Clark is out fishing. ☺



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

soil for turfgrass maintains the N cycle and within it, mineralization. Returning clippings adds organic matter to soil that can be mineralized, so it stands to reason more N would be made available to turf through mineralization on sites where clippings are returned.

Q What adjustments to nitrogen fertility programs should superintendents consider to account for nitrogen from mineralization?

I don't know that you can really account or count on it, but I think this is part of the art of being a golf course superintendent, to be an observer and not be

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3 | Stressgard fungicides

Fairy ring is caused by any of 60 or more soilborne basidiomycete fungi. The most effective preventive fairy ring programs begin with two spring applications of a demethylation inhibitor (DMI) fungicide spaced 28 days apart. DMI fungicides — like **BAYER**'s Tartan Stressgard and Mirage Stressgard — offer preventive control of fairy ring, plus the added plant health benefits of Stressgard Formulation Technology. Tartan Stressgard does more than fight disease, the company says. It also helps manage turf health and turf stress, such as mid-day wilt caused by fairy ring and localized dry spot.

Backedbybayer.com/fairy-ring



3



4



5



6

4 Lawnaire ZTS stand-on aerator

The **RYAN** Lawnaire ZTS stand-on aerator delivers a new level of efficiency to golf course superintendents. It features a compact, agile design with intuitive controls, making quick work of aeration projects around the clubhouse, pool or recreational areas. The Lawnaire ZTS features legendary Ryan quality and performance, with a shock-absorbing operator platform, aeration depth stop and ergonomic, rapid hydraulic tine lift. It all comes together in a low-maintenance, hardworking machine, designed to master those clubhouse-area projects, leaving more time to dedicate to the course itself.

Ryanturf.com

5 TFM GPS technology

Introducing new Shield screenless technology from **TEXTRON FLEET MANAGEMENT** (TFM). An innovative solution, Shield technology arms golf course owners and managers with extensive, real-time information to help monitor, maintain and protect their golf car fleet. The system features geofencing capabilities with remote vehicle shutdown that allows courses to keep vehicles within specified boundaries for added safety and security. The TFM Shield and other TFM screen-based systems offer unique features to enhance the golfer's experience, including real-time tournament scoring and integrated advertising and video messages.

Textronfleetmgmt.com

6 Velista fungicide

Velista fungicide from **SYNGENTA** is the broadest spectrum SDHI for turf and works well to control fairy ring both preventively and curatively, while also controlling anthracnose, summer patch, dollar spot and more. In addition to providing innovative products to fight fairy ring, Syngenta recently launched a Fairy Ring Solutions website featuring educational tools, including a webinar and details about fairy ring symptoms. It also provides recommendations for using Velista as part of a preventive agronomic program for season-long fairy ring control.

GreenCastOnline.com/FairyRing

The 19th Hole



Jared Brewster

ASSISTANT SUPERINTENDENT // Bellerive CC, St. Louis, Mo.



What can I get you to drink? I'll have a Bud Select or a Mich Ultra — just a light beer.

So, Avery is two months old... how was your first Father's Day? I don't know if she knew it was Father's Day because she kept me up all night, all morning and into Monday! I had a great Father's Day, my wife (Jessica) got me a nice gift, but Avery didn't like me very much that evening.

What's your favorite tool in the shop? I love the sawzall, there's always a use. Sun-up to sundown I'm doing something with it, whether it's irrigation, drainage, you name it.

Tell me somewhere I need to check out when I'm back for the PGA Championship. There's a ton of places, but my favorite for a cold beer and good food is Syberg's. Try their wings — they have these "trashed wings," they're double-fried, they're great.

Any unexpected challenges with the build for the PGA Championship? We've had this extreme heat. You get all these carts, generators, forklifts out here... we've had to ask them to cover their mufflers because they were burning fescue. We thought it might be a gas leak or an oil leak. It's the mufflers and the extreme heat.

How hot is it there? The heat here is unlike anywhere else I've ever been. I worked in south Naples and I thought that was hot... then I came here. We set a record

in May, every day was above average, and June came firing right out of the gate.

Who do you like to win the PGA Championship? Jordan Spieth, because I want him to get the career grand slam at the course where I'm working. And my other pick is Tiger. Eldrick needs another major! He's the whole reason I do what I do; he's the player who got me into this great game.



What's the best prank you've seen on the course? Our old director of grounds, John Cunningham, was the prank master. I lived in the intern house when I first got here. I got to my room and there's a bunch of stuffed animals in my closet. One day he comes over and gets all the stuffed animals and he stuffs them in the project manager's truck, stuffed full. Another time, we had an event for the members here, and we put all these rubber ducky on the pond on No. 3. The next day I came to work, every inch of my desk was covered with rubber ducky, even the drawers were stuffed full.

As interviewed by Seth Jones, June 20, 2018.

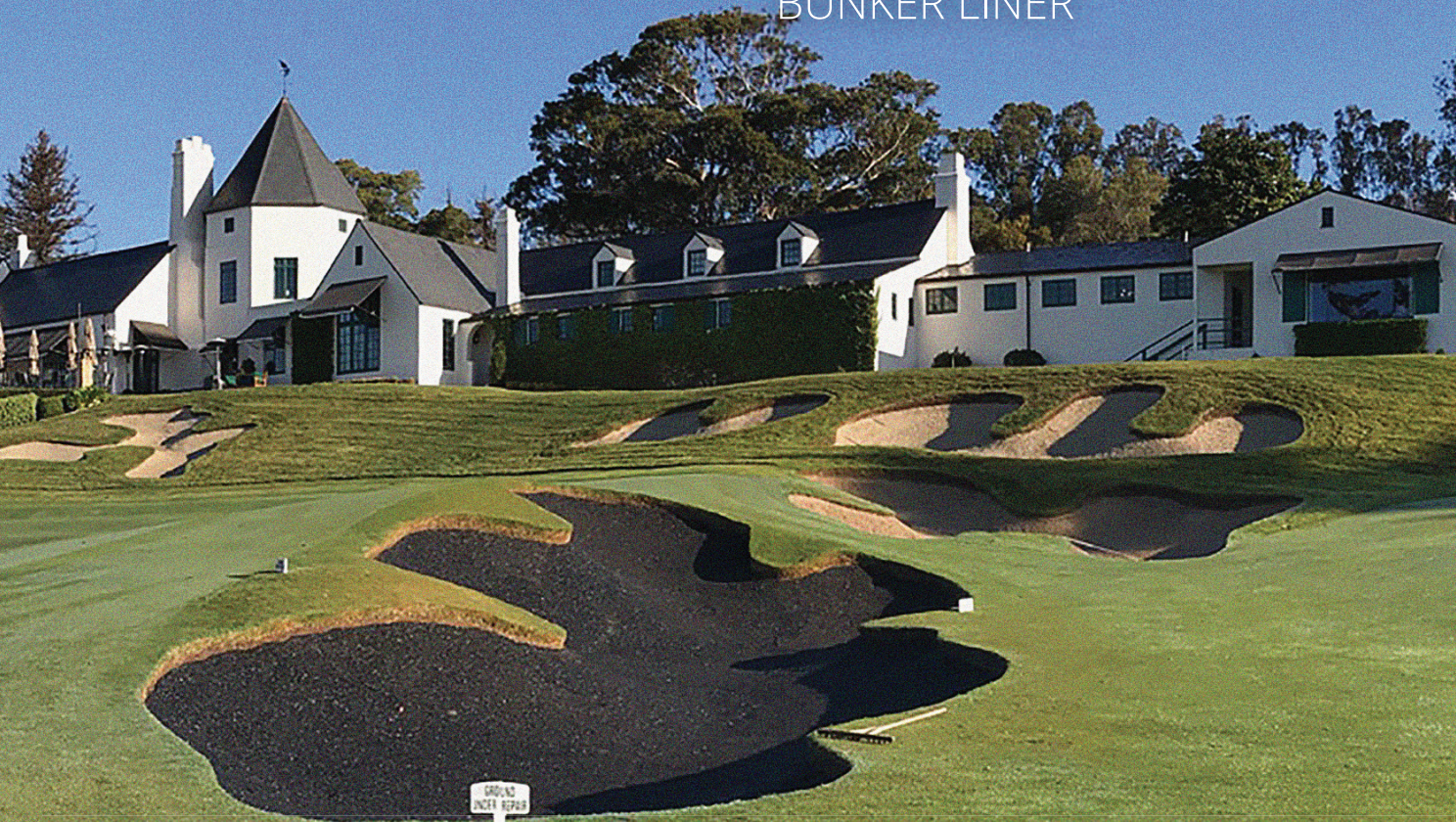


// **BEST ADVICE**

"DON'T LEAD BY AUTHORITY, LEAD BY EXAMPLE. EMPLOYEES NEED SOMEONE TO LEAD, BUT ALSO SOMEONE WHO IS WILLING TO GRIND IT OUT IN THE TRENCHES WITH THEM."



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