IN THIS ISSUE: Fate & impact of pesticides

THE OFFICIAL PUBLICATION OF THE **SPORTS TURF MANAGERS ASSOCIATION**

MARCH 2019

SportsTurf

SPORTS FIELD AND FACILITIES MANAGEMENT / www.sportsturfonline.com

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FOY winner in St. Paul, MN

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- STMA Conference news
- Dr. Grady Miller on soil testing
- Sustainable sport turf management
- Insecticide update

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On the cover: Pro baseball Field of the Year winner Marcus Campbell says, "Weather in Minnesota can be quite challenging. We have a 6-month growing season. Five of those months include an event every day. We have around 120 games (professional, college, high school, amateur), 12 on-field events and festivals, as well has 40+ practices between the Saints and Hamline University."

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FROM THE SIDELINES

Notes from Conference

Eric Schroder / Editorial Director / Eschroder@epgmediallc.com / 763-383-4458

IT WAS A FAST FEW DAYS in Phoenix at the STMA Conference:

In our January issue that was available at the show, Jeff Salmond, CSFM, director of athletic field management, University of Oklahoma, and a past president of the STMA, shared his experience with having unexpected major heart surgery. He wrote:

"I'm thinking, 'oh this will be a simple procedure and I will be back to work the next day, no problem . . . the cardiologist was just checking'. [Then] before I was awake post-surgery, the cardiologist told my wife that they had put three stents in my heart! I had 90% blockage and two other places of 80% blockage in my left coronary artery, better known as the widow maker. My cardiologist said most people with 90% blockage have already had a heart attack."

Jeff told me in Phoenix how many people there had mentioned his article, and that a number of them planned on scheduling a check-up when they got home.

WINNERS OF THE STUDENT CHALLENGE, based on proctored exams covering the sports turf industry, were 4-year program Iowa State University, and for 2-year programs, Penn State. Penn State's 2-year program victory this year was its third title in the past decade, which sounds impressive until you note that this year's 2nd and 3rd place teams were from the Mt. San Antonio College (Walnut, CA) program run by my friend Brian Scott. In that same decade, Mt. SAC has won five 2-year titles.

Props also must be given to my alma mater, Penn State, for its success in the 4-year program competition. One team finished 2nd this year and PSU also has three first place finishes over the past 10 years, including 2016 and 2017. Interestingly, this year's winner Iowa State also won last year, continuing a pattern of repeat winners that includes Maryland in 2013, 2014 and 2015, and Purdue in 2011 and 2012.

SPEAKING OF NITTANY NATION, Jeff Fowler of the Penn State Extension service was honored in AZ with the Harry C. Gill Memorial Award, STMA's highest honor. Other Founders Award winners were our own "Q & A" columnist, Ohio State's Pamela Sherratt, who was presented the Dr. William Daniel Award for the second time; Nicole Sherry of the Baltimore Orioles for the Dick Ericson Award; and long-time friend of the magazine, Abby McNeal, CSFM, CPRP, won the George Toma Golden Rake Award.

THE INDEFATIGABLE MIKE HEBRARD needs help August 7-14 in Portland, OR to manage the Little League Softball World Series. Mike said volunteers work along side other industry pros on his "Diamond Crew" and enjoy daily hospitality events. The semifinals and final game are broadcast on ESPN2. Call Mike at 503-705-6845 for more info.

TURFCO MANUFACTURING, Blaine, MN kicked off their 100th anniversary celebration. The Kinkead brothers, Scott and George, are the third generation to run the family business that began as the National Mower Company in 1919. "Turfco just wants to say 'thank you, turf industries,' for all the great time spent together working to solve challenges and grow these great industries," said the Kinkead brothers in a statement.

To help celebrate this milestone, the company has launched a "100 Years of Thanks" giveaway for customers featuring a Turfco WideSpin 1550 broadcast topdresser as the grand prize to be awarded this fall. Five GoPro HERO7 Silver cameras will also be awarded periodically this year; enter online at *www.turfco.com/100years*. **/ST/**

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PRESIDENT'S MESSAGE

THUNDERSLEET!

Jody Gill / CSFM / jgill@bluevalleyk12.org / @JodyGillTurf

I WROTE THIS COLUMN on another subject a month ago but considering the weather events of the past few weeks, I had to re-write it. Hopefully I grabbed your attention with the title. What do you think of when you hear the word "thundersleet"? A superhero, a rare weather event, a rock classic by AC/DC? If you are my age, "Thunderstruck" is now stuck in your head; if not, please grab your phone, find the famous classic rock song, and listen to it just once before you read on. It's okay; I'll wait . . .

In my story, Thundersleet is a villain, a storm that left more than an inch of solid ice on 60 acres of parking lots, interrupting learning for 23,000 students for 2 days. A dedicated crew of regular people came together to fight this villain. They fought through power loss, equipment failures, salt shortages, fatigue and seemingly endless freezing rain and sleet. They never complained, instead they asked "What next?" With liquid pre-treatments and granular post-treatments, they weakened the ice. The storm fought back with flashes of lightning, thunderous booms and hail. Low on salt from months of relentless winter storms, the ingenious crew brought out the heavy equipment. They ripped the ice from the asphalt using front loaders, backhoes and road graders.

istockphoto.com/ RichVintage

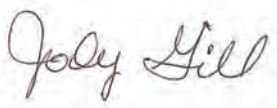
The effort paid off when normalcy returned for the weekend and beyond. When other entities remained closed, our facilities reopened for basketball games, debate tournaments, swim meets and musicals, thanks to this dedicated crew of regular people who are now SUPERHEROES!

This story is from just one of many storms we have endured this record-breaking winter. This is not just about my amazing Blue Valley crew, this is about all of you! Whether it's thundersleet or a game time thunderstorm, devastating disease or an insect swarm. All of you Sports Field Managing regular people truly are SUPERHEROES! Those of you in the South are already playing spring sports while those of you in the colder climes are being challenged to create manicured playing surfaces out of the frozen tundra in a short time. You do this so children, teenagers, college players and highly conditioned professional athletes can have a safe playing surface or maybe you just do it for the love of the game. Either way, you are amazing, ingenious, creative and driven SUPERHEROES!

From the raspy voice of Brian Johnson come the words of Angus and Malcolm Young, "It's alright, we're doin' fine, fine, fine, you've been Thunderstruck!" Next time you listen to that song, bob your head to the rhythm with confidence knowing that you are making a difference in many lives!

Here's to you, Sports Field Manager SUPERHEROES! ***/ST/***

Jody Gill, CSFM



@APRILNICHOL1

Qu'Appelle, Saskatchewan, Canada December 31, 2018

Got this sweet cup from my momma for Christmas! #truth

@UCRSAVINGTURF

Riverside, CA January 2, 2019

UCR 17-8 bermudagrass (bottom-right plot) is still dark green on Jan 3rd. Hey @MartaTP83 I think you have something going on here!

@UTTURFWEEDS

Knoxville, TN January 31, 2019

18 degree temps can't stop the @ResistPoa survey in TN. Be warned Poa, @gbreeden1 and I are coming for you #getsome #TNturf #PoaAnnua #4T

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Durham, North Carolina January 29, 2019

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News from STMA's 30th annual Conference and Exhibition

The Sports Turf Managers Association (STMA), the non-profit, professional association comprised of 2,700 men and women professionals overseeing sports fields worldwide and critical to athletes' safety, received outstanding participation at its 30th annual Conference and Exhibition in Phoenix this past January.

The Phoenix Convention Center housed more than 2,300 participants including 1,400 sports turf leaders and 900 exhibitors from 14 countries for 4 days of industry education, networking events, and product demonstrations. The event was highlighted by a volunteer rebuild of Lindo Park baseball field, two "Seminar On-Wheels" tours of Phoenix area sports complexes, SAFE fundraisers, and the STMA Awards Reception and Banquet.

Attendees enjoyed 50 learning sessions and panels given by commercial representatives and industry leaders. Sessions were split into eight tracks including turfgrass management, facility management, synthetic, pest control, water, industry developments, baseball, and professional development.

"Thousands of members traveled from around the world to share innovative ideas and best practices," said Jody Gill, CSFM, newly elected STMA President and Grounds Coordinator at Blue Valley (KS) School District in Overland Park. "Each member gained valuable knowledge in helping them better manage field surfaces to provide the safest conditions for athletes."

"To echo President Gill, this year's Conference provided a broad mix of in-depth education that they can take back and apply at their facilities. We received high marks for our networking events, too. These are especially important to the educational experience where best practices are shared by members one-on-one," said STMA CEO Kim Heck, CAE.

Visit Phoenix confirmed the community received more than $3 million from total estimated direct expenditures from Conference participants including event attendees, exhibitors, and organizers. The monetary impact is determined by direct spending on food and beverage consumption, business services expenses, and lodging costs.

Since 1989, STMA has hosted its annual convention in major cities across America. Next year's event will be held in West Palm Beach, FL January 14-17.

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Founders Awards

The prestigious Founders Awards, STMA's top honors for significant contributions to the profession, were announced at the Annual Awards Banquet January 25. The winners also exemplify the leadership traits of STMA founders Dick Ericson, George Toma, Dr. William H. Daniel (deceased), and Harry C. Gill (deceased); winners do not know they are being honored so there is a nice "surprise" factor in the presentations.

STMA's highest honor, the Harry C. Gill Award, was bestowed on **Jeff Fowler**, Penn State Extension. Jeff exemplifies the traits of founder Harry Gill. He has been instrumental in building and sustaining one of the longest operating STMA chapters, the Keystone Athletic Field Managers Organization. Jeff represents the sports turf industry around the US and is a sought-after speaker for local, regional and national conferences. He is extremely approachable and very collaborative. He is also a previous Founders Award winner (Daniels Award in 2005; his father, Don, was named the Ericson Award winner in 2007 after his retirement) and an extension educator, a position that Jeff has held for more than 30 years. He is well known for his volunteerism and gives much time each year to the Little League World Series, where he organizes a huge group of volunteers to help make it a spectacular and professional event.

Nicole Sherry, head groundskeeper for the Baltimore Orioles, received the Dick Ericson Award. The Ericson Award is given to someone who has an impact in raising the level of professionalism within the industry, and Nicole continues to do just that. From speaking at regional conferences and giving much time to her local chapter, Mid-Atlantic, she has also been a role model for many. Like other sports field managers in the industry, Nicole has loved sports since childhood and was exposed to the career of sports field management after a school field trip to a nearby stadium. Noted as the hardest working intern by the general manager who hired her, not only for the excellent work ethic exhibited but because of the thoughtful and insightful questions asked, her career path led Nicole to a head groundskeeper's position in Minor League Baseball. She even had a bobblehead created in her honor. Nicole then moved up to the Baltimore Orioles, where she became the second female head groundskeeper in Major League Baseball history.

The 2019 STMA Board of Directors: 2019 STMA Board of Directors: Front, L to R: Jimmy Simpson, CSFM, Jody Gill, CSFM, Sarah Martin, CSFM, Boyd Montgomery, CSFM, CSE, and Sun Roesslein, CSFM. Back, L to R: Nick McKenna, CSFM, Jeremy Bohonko, Stephen Lord, CSFM, Jeremy Driscoll, Clark Cox, CSFM, Jason Kruse, PhD, and James Bergdoll, CSFM. Not pictured: Joshua Koss, CSFM.

Abby McNeal, CSFM, CPRP, City and County of Denver Parks, was awarded the George Toma "Golden Rake" that is known for recognizing an individual for her "and then some" spirit of going above and beyond the call of duty. Abby embodies this principle. She has always been willing to give time and expertise to the industry. Abby has given and continues to give numerous presentations locally, regionally and nationally and host events at her facility. Volunteer service is definitely in her DNA. A current chapter leader, Abby also served on the STMA National Board of Directors including a stint as the first female elected President of the association. She continues to serve and currently chairs an important committee. She was awarded the first scholarship offered through the SAFE Foundation.

Pamela Sherratt, Ohio State Sports Turf Extension, once again received the Dr. William H. Daniel Award; she also was named in 2003. Pamela truly embodies the character and spirit of the Dr. Daniel Award. She is involved with Extension and research at her university, where she visits 25 to 30 athletic fields in her state each year. Pam speaks at local, regional and national conferences and is very involved in setting the educational content for the Ohio Turfgrass Foundation's successful annual conference. She also is an innovator in exposing students to the industry. In a first for the industry, Pam developed and implemented a turfgrass science summer camp for middle schoolers, and it was a huge success. She also has served on the STMA Board of Directors, and is one of *SportsTurf*'s "Q and A" columnists.

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New Board of Directors

The 2019 Board of Directors officially took office during the Annual Meeting January 24.

Jody Gill, CSFM, Blue Valley (KS) School District, Overland Park, was elected President. Ascending to Immediate Past President is **Sarah Martin, CSFM**, City of Phoenix Parks and Rec. **Jimmy Simpson, CSFM**, Town of Cary, NC fills the President-Elect office and the Secretary/Treasurer is **Nick McKenna, CSFM**, Texas A&M Athletics, College Station. Serving a second term as the Commercial Vice President is **Boyd Montgomery, CSFM, CSE**, The Toro Company, Minneapolis.

The STMA Bylaws require that the Board have Directors from each segment of its voting members. Directors elected include:

Stephen Lord, CSFM, Cincinnati Reds, representing facilities used by Professional Athletes

Jeremy Bohonko, Ewing, North Charlotte, NC, Commercial Director

Clark Cox, CSFM, University of South Carolina, Columbia, S.C, At Large Elected Director.

Returning for their second year of 2-year terms are:

Director for Parks and Rec **James Bergdoll, CSFM**, City of Chattanooga (TN) Public Works

Jason Kruse, PhD, Academic Director, University of Florida, Gainesville.

Two open positions were filled by appointment of the President. Gill appointed **Sun Roesslein, CSFM**, North Area Athletic Complex, Golden, CO to the Appointed At-Large Director. Roesslein served on the Board in 2017 and 2018 as K-12 Director. He also appointed **Joshua Koss, CSFM**, San Diego State University, as the Director for Higher Education.

Jeremy Driscoll, St. Mark's High School, Wilmington, DE was appointed by President Gill to represent the K-12 segment after the elected member, Will Rogers, CSFM, Clover School District, Clover, SC, chose to retire.

*STMA's highest honor, the Harry C. Gill Award, was bestowed on **Jeff Fowler**, Penn State Extension, left, and presented by last year's recipient, Tim Moore, CSFM, GCA Services.*

__Nicole Sherry__, center, head groundskeeper for the Baltimore Orioles, received the Dick Ericson Award from Paul Burgess, CSFM, Real Madrid, who last year was presented this award by Dick Ericson himself, right.

The elections were conducted electronically by an independent audit firm. The Board's official first meeting will be March 22-23.

News from Annual Meeting

At its Annual Meeting, STMA announced the launch of a new micro-credentialing program, also called digital badging, that will validate more in-depth learning about a particular topic. The association will be piloting a unit on drainage that will combine readings, viewing a webinar and taking a quiz. Those interested in helping to test this concept and be the first to receive the credential, contact

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***Abby McNeal, CSFM, CPRP**, City and County of Denver Parks, was awarded the George Toma "Golden Rake" Award that recognized her "and then some" spirit. Last year's recipient, Dan Bergstrom, CSFM, BBVA Compass Stadium, left, joined Toma, right, in presenting to Abby.*

***Pamela Sherratt**, Ohio State Sports Turf Extension, once again received the Dr. William H. Daniel Award. Here is James Brosnan, PhD, University of Tennessee and last year's winner, presenting Pamela's 2nd Daniel Award.*

Education Manager, Kristen Althouse, kalthouse@STMA.org.

A major announcement about timing changes to the National Conference was also made. Starting in 2020 in West Palm Beach, the Conference schedule will shift back one day to officially start with pre-conference education on Monday and conclude on Thursday with the Annual Awards Banquet. The change was driven by attendee comments; there was strong interest to travel to Conferences Mondays and return home Fridays. Because of how far in advance STMA must plan its Conferences to secure convention center space and hotel rooms, this model will also be in effect for the 2021 (Palm Springs, CA), and 2022 (Savannah, GA) conferences. There may be an opportunity to shift again for 2023 (Salt Lake City, UT) Conference, if necessary.

Student Challenge

In the "Student Challenge," teams of four were tested on their knowledge and skills in several key disciplines within the sports turf industry for a chance of winning one of two $5,000 grants. Winners from 4-year programs include:

- 1st place, Iowa State, Team #424: Alex Polnow, Thomas Gould, Kylah Crooks, Marcus O'Brien
- 2nd place, Penn State, Team #404: Ian Patterson, David Hendler, Nicholas Chamberlin, Seth Re
- 3rd place, Maryland, Team #417: Brendan Keane, Benjamin Word, Maxwell Sturges, Clayton Young

Two-year program winners are as follows:

- 1st place, Penn State, Team #203: Raul Iurk, Aaron Cabahaw, Marcus Lounello, Alexander Panzenhagen
- 2nd place, Mt. San Antonio College, Team #204: Blake Bernstein, George Figueroa, Maria Rivas, Daniel Akers
- 3rd place, Mt. San Antonio College, Team #212: Kel Henderson, Miriam Carmona, Ryan Costello, Jose Gutierrez

SAFE

The Foundation for Safer Athletic Fields for Everyone (SAFE) is STMA's charity. As a 501c3 corporation, it raises money that is usually tax deductible to the donator, which provides scholarships, research and educational outreach within the profession. Donations to SAFE help it to achieve its mission: To enrich communities through championing safe, sustainable sports and recreation fields for all athletes.

Formed in 2000, SAFE has grown to providing more than $40,000 annually for scholarships, grants, and Conference travel. In addition, it has funded educational videos, educational bulletins, and the Student Challenge awards, and has partnered with STMA

JOHN MASCARO'S PHOTO QUIZ

JOHN MASCARO IS PRESIDENT OF TURF-TEC INTERNATIONAL

////////

ANSWER ON PAGE 33

CAN YOU IDENTIFY THIS SPORTS TURF PROBLEM?

PROBLEM:
Weeds down center of field

TURFGRASS AREA:
Multi-purpose field

LOCATION:
Northern United States

GRASS VARIETY:
Bluegrass/ryegrass mix

GRANTS AND SCHOLARSHIPS

Leo Goertz Membership Grants
Brett Moyer, Georgetown High School
Adam Vogle, SUNY Geneseo

Gary Vanden Berg Internship Grant
Conlan Burbrink, University of Tennessee

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Darian Daily Legacy Scholarships
Tucker Douglas, Penn State, (son of Dan Douglas)
Jacob Kershaw, Louisiana State, (son of Jeff Kershaw)

Dr. James Watson Graduate Scholarships
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Taylor Williams, University of Tennessee
Drew Pinnix, North Carolina State

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(sponsored by Toro)
Tyler Morris, Virginia Tech
Alex Polnow, Iowa State
Caleb Paullus, Mississippi State
Phillip Mahr, Penn State

Fred Grau Scholarship
Raul Iurk, Penn State

SAFE Undergraduate Scholarship
Ian Patterson, Penn State

and Project Evergreen to fund an annual green space project.

In 2018, SAFE funded its first research project on field safety and its correlation to field management measurements at three universities. The results will be ready later this year and reported during the 2020 STMA Conference.

To fund its initiatives, a large majority of SAFE's fundraising occurs at the STMA annual Conference. SAFE raised nearly $41,000 this year through a bowling competition, live and silent auctions, raffles and a golf tournament.

Seventy-two golfers maneuvered their way around the challenging Grand Canyon University Golf Course to compete for a grand prize as well as smaller prizes and raffles. The winning team was Kevin Grieder, Joseph Lobb, Sean Connell and Neil Casale.

"Each year at the STMA National Conference the SAFE Foundation sponsors a golf tournament with two very important goals in mind. The first goal is to provide those that support the SAFE Foundation by attending and participating in the tournament with a fun and enjoyable time playing golf and enjoying the company of friends that many haven't seen in a year or more. The second goal of the tournament goes hand-in-hand with the first, which is to generate money for the SAFE Foundation for the purpose of funding research, educational programs and scholarships geared to the sports turf profession," said Steve Wightman, Golf Committee.

The event was made possible by the help of volunteers and support from its sponsors. Many thanks to the tournament's two title sponsors, Diamond Pro and Tri-Tex Grass, as well as to drink sponsor Carolina Green and tee sponsors Ewing, Little League International and Sunbelt Rentals.

On that same day, the SAFE Foundation hosted a Night of Bowling for more than 100 participants. One of the most anticipated events of the Conference every year, competitors gathered for a night of beverages, dinner and fun. The tournament was filled with various small challenges and ended the night with awards given out to Derek Hollanitsch (individual winner) and the winning team, Mike McDonald, Gregg Brodd, Mark Sullivan and Ben Boeding. The event was supported by drink sponsor, Beacon Athletics.

"I thought this year's bowling extravaganza was a wonderful success for the attendees and the SAFE Foundation! I thought everyone did a wonderful job organizing the outing and greatly appreciate all of their efforts," said Brad Jakubowski, Bowling Committee.

This year at Conference, SAFE Chairman of the Board of Trustees, Chad Price, CSFM, CFB threw down the gauntlet. He vouched to match dollar-for-dollar every contribution to SAFE's research initiative. DuraEdge volunteered to get in on the fun and match every dollar as well. With their help, SAFE raised almost $8,000 for Chad's Challenge.

For the 2019 year, SAFE will be using monies raised specifically from the Silent Auction and Chad's Challenge to fund research. A research subcommittee has been appointed and is formulating criteria for how SAFE will award funding, and it is soliciting research topics from colleges and universities. Other monies raised will continue to fund scholarships and grants and a new field safety initiative to educate field owners, coaches and users.

SAFE is governed by a Board of Trustees, which is chaired by Price. The Foundation continues to seek qualified board members to serve. If you are interested in Board service, please contact *staff@SAFEFields.org* **/ST/**


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MISCONCEPTIONS, UNDERSTANDING FATE, AND OPTIMIZING PESTICIDE APPS

// By TRAVIS W. GANNON, PHD

While there is currently much scrutiny around pesticides and their use, synthetic pesticides are an integral component of comprehensive pest management programs in all facets of agriculture including sports fields. While this is not a new interest or concern, it is currently heightened, likely for a number of reasons including the International Agency for Research on Cancer (IARC) classification of glyphosate as a Class 2A probable carcinogen to humans in 2015 and subsequent events. While pesticides are an integral component, they must be used judiciously and its imperative facility managers understand various aspects of their utilization so environmental and human health aren't adversely affected.

Let's start with a partial list of common misconceptions about pesticide use and we'll address a few in (limited) detail:

- Pesticides offer little (or no) benefit in today's society
- Pesticides persist a very long time (some believe forever)
- Pesticides adversely affect human and environmental health, cause various diseases and illnesses
- Pesticides move off-target and contaminate streams, surface water bodies, etc.
- Pesticides aren't adequately evaluated prior to commercialization and aren't regulated after commercialization
- Facilities maintained with organic products are safer than those maintained with synthetic pesticides
- Pesticides are to blame for bee colony collapse disorder

Pesticides offer little (or no) benefit in today's society. In major agronomic crops, the primary benefit of pesticides is to increase or maximize yield. While yield isn't of concern on sports fields, pesticides offer various environmental, human, social and economic benefits. Specifically, pesticides are a component of comprehensive pest management programs which enable sports field managers to maintain an aesthetically pleasing, functional, and safe playing surface.

Photo courtesy of Patrick Maxwell

Pesticides aren't adequately evaluated prior to commercialization. In the US, the Environmental Protection Agency (EPA) is responsible for regulation and oversight at the federal level. The EPA has a very rigorous set of guidelines and laws for evaluation before a pesticide is registered as well as when it's reregistered. Further, a comprehensive battery of biology, environmental fate, and toxicological studies are required prior to registration. While it's not within the scope of this article, those interested can refer to the following federal laws to learn more about the agency's oversight: The Federal Insecticide, Fungicide, and Rodenticide Act, The Federal Food, Drug and Cosmetic Act, The Food Quality Protection Act and The Endangered Species Act of 1973. Further, pesticides must be registered at the state level, which may require additional tests for registration. Finally, some local governments, municipalities, etc., may require additional tests or impose additional regulations for registration and/or use.

Pesticides adversely affect human and environmental health. First and foremost, pesticides should always be used in accordance with label directions and it is a violation of federal law to use a pesticide in a manner inconsistent with its label. One doesn't have to search hard to find reports of glyphosate in various foods (Cheerios, oatmeal, granola and snack bars, etc.) there have even been reports of detection in beer. Obviously, no one wants to intentionally consume glyphosate (or any other pesticide for that matter) but what are the implications of this? Combining toxicity and exposure is an area many lay people do not think about or do not understand.

Let's take the highest amount of glyphosate detected in oats and combine that with California's very conservative limit for glyphosate, how much would a person have to eat to reach an adverse effect level? Answer: > 12 servings each day.

Similarly, let's take the highest amount of glyphosate detected in beer and combine that with allowable intake, how many beers would a person have to drink to reach an adverse effect level (from glyphosate)? Answer: > 2,800-12 ounce beers in a day.

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Pesticides are to blame for bee colony collapse disorder. While scientists acknowledge pesticides contribute to colony collapse disorder, many other factors play a significant role including: varroa mite, various diseases and parasites, stress due to management practices (transporting hives to various locations to provide pollination services), changes in habitat, and loss of forage/poor nutrition, among others. Further, associated pesticide exposure is due to agricultural applications as well as applications directly to hives.

Understanding pesticide fate after application

Understanding pesticide fate after application is important in all agronomic systems including sports fields. After a pesticide is applied, various processes ensue and its fate depends on many chemical, biological and physical properties. After application, pesticides are subject to various transfer and transformation processes. Fundamentally, transfer processes involve the movement of a pesticide from one compartment to another while transformation processes involve degradation or alteration of the pesticide.

Key transfer processes include:

- Adsorption – binding to soil colloids
- Absorption – uptake by plants and/or microorganisms
- Volatilization – conversion from liquid or solid to gas or vapor
- Runoff – lateral movement across a soil surface
- Leaching – downward distribution within a soil profile

Key transformation processes include:

- Photodecomposition (photolysis) – degradation by sunlight
- Hydrolysis – degradation by water
- Microbial decomposition – degradation by microorganisms (fungi, bacteria, etc.)
- Chemical decomposition – degradation by various chemical reactions in soil

Specifically, in turfgrass systems, if a pesticide is not incorporated and remains on the foliage, major routes include foliar absorption, photolysis, and volatilization, among others. If a pesticide is incorporated (most commonly with irrigation on sports fields), varying amounts move into the turfgrass canopy, thatch layer, or soil where it is subject to root absorption, adsorption to soil colloids or organic matter, leaching, and biological and chemical degradation, among others. Understanding biology of the target pest as well as behavior of the pesticide enables sports field managers to optimize pesticide applications resulting in fiscal savings and reduced pesticide inputs.

Photo courtesy of Patrick Maxwell

Photo courtesy of Daniel Freund

Optimizing pesticide applications

General practices:

- Measure accurately
- Calibrate often
- Thoroughly read and follow label directions
- If there's a question, contact a reputable, trusted resource
- Consider weather conditions, both before and at application, as well as after application
- Use split applications when appropriate (ex. preemergence herbicides)
- Be mindful of edaphic properties; pesticides behave much differently in sand medium versus soil containing clay. Be aware of the amount of organic matter in your system and make necessary adjustments
- Develop comprehensive pest management plans

Pesticide selection:

- Select pesticide based on use site, turf species, positive pest identification, etc.
- Understand biology of the pest and schedule application according to maximum susceptibility or efficacy
- Use minimum, effective application rates

Timing

Schedule pesticide applications to minimize pesticide exposure.

Dermal contact with treated surfaces is a major route of exposure for nonworkers. A common question that arises from athletes or parents is "how long after a pesticide is it safe for us to use the area." Recent research from our program at

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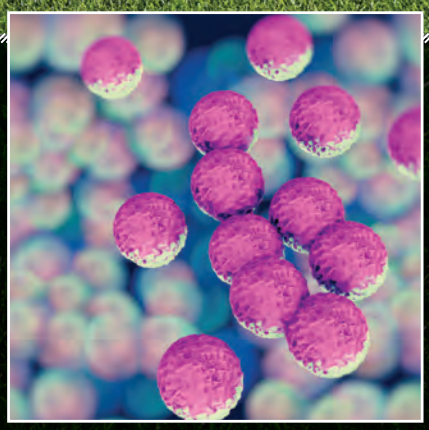

The dangerous MRSA bacteria found on surfaces like athletic facilities and locker rooms.

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NC State has investigated factors that affect dislodgeable pesticide residues from treated athletic field surfaces. While there are many factors that influence this, time between application and activity is the most influential factor.

Specifically, for compounds with short persistence, dislodgeability declined as days from application increased with limited or no detection beyond ~10 days. Further, dislodgeablity declined as time progressed within a day with limited or no detection during the afternoon hours which is likely due to turfgrass canopy moisture varying throughout the day.

Other factors such as turfgrass species, pesticide, time of day, irrigation inputs, and pesticide formulation, among others, also influence the amount of a pesticide that may be transferred from the athletic field surface to users. Pesticides may dislodge from treated surfaces after application; however, through appropriate management practices and scheduling, dermal exposure can be managed below adverse thresholds.

Schedule pesticide applications accordingly with cultural practices to maximize efficacy. It is important for field managers schedule pesticide applications appropriately with other cultural and management practices to maximize efficacy. Many cultural and management practices including mowing and irrigation inputs can influence pesticide fate and behavior and have been the focus of much research recently. Specifically, a single mowing event one day after a pesticide application can remove up to 35% of the applied pesticide from a managed bermudagrass, zoysiagrass or tall fescue system which has significant implications on efficacy. Further, if clippings are returned to the turfgrass canopy, most pesticides will not be bioavailable as they must be released from the clippings at which point most will be sorbed to soil or organic matter. To maximize foliar absorption and efficacy, mowing should be delayed after pesticide applications.

If targeting soil-borne pests, application carrier volume, irrigation timing and amount and other tools such as wetting agents may aide in moving the pesticide to the target. This is also an area of ongoing research but preliminary data suggest irrigating immediately after application enhances pesticide distribution in the soil profile compared to delaying irrigation for as few as 4 hours. Increasing carrier volume and irrigation amount as well as the inclusion of a wetting agent can also aide in pesticide placement when targeting soil-borne pests.

As previously stated, all pesticides registered in the US are subject to a rigorous battery of tests that combine toxicity and exposure to ensure risks doesn't outweigh benefits (i.e. they don't adversely affect human or environmental health). Specifically, with glyphosate, the IARC stands alone with their assessment, as no other pesticide regulatory authority in the world has concluded glyphosate is a cancer risk to humans. While scrutiny around pesticides and their use is currently heightened, it's not a new phenomenon and will most likely increase in the future in most parts of the US. **/ST/**

Travis W. Gannon, PhD, is an associate professor in the Department of Crop and Soil Sciences at North Carolina State University, @TravisWGannon.

WHAT CAN SPORTS TURF MANAGERS DO IF QUESTIONED ABOUT PESTICIDE USE:

- Be professional
- Don't dismiss or ignore concerned individuals
- Educate yourself on pesticide related topics
- Communicate factual information, don't spread misinformation
- Try to understand why individuals have their beliefs, empathize if appropriate
- Discuss alternatives and associated problems (cost, toxicity, efficacy, etc.)

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NEIL HOSICK

This month in "The *SportsTurf* Interview," we meet Neil Hosick, Facilities Coordinator for the City of Hermitage in Pennsylvania, which is north of Pittsburgh, close to the Ohio border. For someone with a job title of "coordinator" he sure has a lot on his plate:

Neil Hosick, City of Hermitage (PA)

SportsTurf: What are your current responsibilities?

HOSICK: My official title is Facilities Coordinator for the City of Hermitage. I am responsible for all building and grounds maintenance for our Municipal Building, eCenter (which is our business incubator), Training and Workforce Development Building, Linden Pointe Innovative Business Campus, Hermitage Athletic Complex and all other park buildings and structures. These responsibilities include all HVAC, electrical, plumbing, painting, phone and building access related items. The grounds responsibilities include all maintenance-related items for our parks and sports fields. The sports fields located at our Hermitage Athletic Complex include one minor league baseball field, two softball fields, one multi-purpose field (soccer/football) and we broke ground on another multi-purpose field in the fall of 2018. Additionally, we assist our neighbors, the Hermitage Little League, with weekly mowing and infield maintenance.

Another field I manage is the Rodney White multi-purpose field. This is located near our local high school and our municipal building. There are other, smaller practice facilities and parks located throughout our city as well. I manage the fertility programs for all sports fields along with scheduled mowing, infield maintenance, trash and all other field-related items.

I oversee capital projects that include upgrades to our phone systems, A.V., software upgrades, electrical and HVAC at various city facilities, storm water basin maintenance projects across the city, new field construction and annual fall renovation projects on all of our athletic playing field facilities.

I also oversee a full time staff of four and a part-time staff of four.

ST: How did you first become involved in sports turf management?

HOSICK: I began my turf career in the golf industry when I was 16 years old. I always enjoyed working outside and was offered the opportunity work on a local public golf course. After a few summers of working there, I moved up to a more exclusive private club. Then, while pursuing a turfgrass science degree at Penn State, I interned at another exclusive country club in Cleveland. Though a great opportunity, I decided I wanted to move on from the golf industry and give landscape construction a try. Several years after, while I really enjoyed working in landscape construction, I accepted an opportunity to work for a stream and wetland construction company. After 10 years in landscaping, I was offered the opportunity to oversee the facilities, parks and sports fields in my community. This afforded me the opportunity to get back to my roots and begin working again in the sports turf industry. Managing the different sports fields at all of my facilities is enjoyable because each field comes with its own unique challenges.

ST: How did you first become involved with STMA?

HOSICK: I became a member of the STMA in the spring of 2012. That was when I began to take over all building and grounds responsibilities for the city. Our sports fields at the time needed some serious attention. I began doing research on what products I needed for infield maintenance and other turf maintenance; and after discussing with colleagues and sales persons, they suggested I become a member of the STMA. I researched it and decided it would be a great opportunity to connect with peers in the turf industry who have similar positions as mine. I always like to run projects by people who have been in similar situations in the past. It is nice to get a second opinion prior to jumping into a larger project. Being a member of the STMA has helped with recognizing on what our community has to offer and why we feel so strongly in investing in the upkeep of our facilities.

ST: You are preparing for the CSFM exam: why did you decide to seek certification and how have you found the preparation?

HOSICK: I believe becoming a Certified Sports Field Manager sets

managers apart from the rest in this line of work. I always strive to push my staff and myself to a higher level, setting high standards that most would never think possible. One should never stop striving to improve. The process of becoming certified is ultimately the point of desiring the certification; honing the necessary skills to ensure excellent results.

ST: What specific challenges do turf managers at the Parks and Rec level face that differ from your peers in other STMA membership categories?

HOSICK: Many of the challenges I deal with that differ from those in other disciplines is the input from the public, be it community members, coaches, or parents from the various sports groups. Many people do not fully understand why managers value turf the way we do. Therefore, I make sure I take the time to explain why I make the decisions I do regarding field usage. While in season, I do my best to keep the league presidents informed of field conditions, both infield and outfield. It is important to me that I communicate why a certain section of a field is closed or why the infield is playable and not the outfield. Once I communicate this in a professional manner they better understand my position as I protect the field. They see the difference between our local fields that are well cared for, compared to others that are not. Working with the community in such a way requires a level of public relations that I wasn't used to in previous positions. However, now that I take the time to educate interested parties, I see the benefits through the positive feedback from the community.

Of course, some will always believe that what we do in our profession is just "grass cutting." In the parks and rec world, we may not have the budget of a professional facility, but we do value the knowledge and effort it takes to keep the fields in top shape. When you do it well, turfgrass management is a profession carried out through science-based practices. Our efforts are proactive, not reactive.

ST: How has social media impacted your work?

HOSICK: Social media has forced me, more than ever, to pay close attention to the details both inside and outside of my facilities. Many people today use social media as a means to point out something wrong, something out of place, or about staff working on a project and they quickly jump to conclusions. If someone notices an alleged problem, they take a quick photo and will post it, telling a one-sided story. One of the areas I would like to work on is using social media to inform the community of projects or field closures due to wet conditions. I feel a social media platform, if used responsibly, can be an effective tool in building communication between myself, coaches, league presidents and the community.

ST: What are your passions and interests outside of work?

HOSICK: My first passion outside of work is spending time with my family. I have a son who is 11 and a 9-year-old daughter. My wife and I really enjoy being a part of their extracurricular activities, which include golf and flag football for our son, and cheerleading for our daughter. We also enjoy swimming in our pool. I am a hands-on type of person so I always have a home project. I really enjoy working on restoring my home and pool house. Landscaping and woodworking are a great way for me to de-stress because I don't get to do many hands-on tasks at work. Other interests include 60's and 70's muscle cars, and most recently, riding my BMX bike at indoor and outdoor pump tracks and bike parks. Yet another great way to de-stress. I used to ride BMX bikes as a kid and now getting back into it as an adult brings back a lot of great memories…and it's a good workout, too. ***/ST/***

The first collegiate varsity bermudagrass field in Ohio (Latitude 36).

Playing left field

// By KEVIN MERCER, CGM, CSFM, LICM

There is no "one size fits all" approach when it comes to leadership. I have learned over the years that there are three things you need in order to accomplish your goals: belief in yourself, a vision, and appreciation for your current and past successes. Trends are always changing, and right now there is a high demand for safer fields. We all deal with the difficulties that come with managing overused fields, often with insufficient staffing and funding. We are always looking for new ways to manage effectively and efficiently and sometimes those ways can only be found by thinking outside the box. Getting out of your comfort zone can be difficult, and according to Dr. Andy Molinsky, these five challenges can prevent us from doing so:

- **The Authenticity Challenge:** This is the idea that acting outside your comfort zone can feel fake, foreign, and false. For example, imagine a young entrepreneur stepping into a Shark Tank-like situation to pitch his ideas to a much older and experienced group of VC's, and perhaps putting on his "grown up voice" when doing so.
- **The Competence Challenge:** In addition to feeling inauthentic, you also may feel incompetent - whether it's speaking up at a meeting, giving a speech, or pitching your ideas. This fear might end up making you think you don't belong.
- **The Resentment Challenge:** Feeling frustrated or annoyed that you have to do this task outside of your comfort zone in the first place. For example, an introvert might resent the fact that networking and small talk seem to matter as much - or even more - than the quality of their work.
- **The Likability Challenge:** Here, we worry people won't like us when we step outside our comfort zones. A poignant example from my research comes from a frustrated employee who desperately wanted to confront a condescending jerk who was making her life miserable, but just couldn't shake the worry that he wouldn't like her if she stood up for herself (of course, he was clearly the unlikable one).
- **The Morality Challenge:** Sometimes people have legitimate concerns about the ethical nature of what they need to say or do in difficult situations - like delivering bad news or laying off an employee.

In our day-to-day operations of sports turf management, we sometimes have to make quick decisions, and those that come "straight out of left field" might force you to step outside of your comfort zone. In

Screening yard waste compost.

the words of Robert F. Kennedy, "Only those who dare to fail greatly can ever achieve greatly." You might make a wrong decision or two along the way, but failure is learning, and learning is powerful. In today's age we are dealing with the importance of community, economics, and sustainability, and at times we might have to pull things right out of left field

Communication is the key to any resolution, and if we skip this important step, it could have serious consequences. Today we live in a world full of smart phones, so preparing your department to be professional at all times will keep you and your staff in a positive light. Here are some things we practice to stay ahead of any potential negativity:

Paying attention. As workplaces become more collaborative with the public, I have learned it is increasingly important that we listen to other people's ideas, not only from coworkers but even suggestions from the general public. Being persistent in regard to listening more carefully increases productivity, gives you faster progress toward goals, and builds better relationships with colleagues and the community. The practice of saying "yes" instead of "no" is a productive path to progress, because it creates an environment where there are no right or wrong answers. Saying no is easy, but sends the wrong message; save your "no's" for times you really need them. When you feel hesitant saying "yes," try saying "and" instead to learn more about the idea by using creativity in place of negativity.

Connection: If your boss fundamentally disagrees with your ideas, it is important to make sure that you are both on the same page. Ask questions to help educate yourself on their perspective, rather than coming into a situation close-minded, which prevents both sides from listening. No matter how great you think your idea may be, you have to connect with your leadership's vision and outcome objectives.

Social media: Using social media can be a great way to promote your fields. Here are four things we follow for our grounds and landscaping Facebook page.

- One in seven rule: Only use one post out of seven to promote anything you might selling, such as athletic field rentals or tickets for a game or event. The other six posts can be about your crew, sustainability, exciting new projects, etc.
- Get a conversation started: The community enjoys giving feedback whether it's good or bad. The good comments might

make us feel good, but the bad comments can be used to improve the things we might not see in our day-to-day operations. You could even create polls so the community can vote on things like natural grass vs. synthetic, mowing heights, etc.

- Mentorship: You could share your expertise by training local governmental agencies to make local sports fields' safe and play great, or post ideas and solutions for t lawn care to educate homeowners to understand the function or needs of their for their lawns. We all can be mentors; Denison University President Dr. Weinberg encourages staff and faculty to be mentors for the college students outside the classroom. This process allows students to connect with college employees that can show a deeper respect and help them accelerate their education with in-depth knowledge from good management training and life skillsets they can use on day one when they start working.
- The campus faculty and staff can work together through many programs to help shape and provide professional experience that the students could use after post-graduation from mentoring.

Provide significance: One idea is posting the different types of fields you have from premier fields to low budget practice fields, and explain the maintenance and inputs that goes into them to justify varying costs to the community.

Economics

Ideas from left field are readily coming about to the turf market; the turf grass industry is advancing rapidly with geographic information system (GIS) capabilities for spraying applications, plant assessments, and soil monitoring. We have a very small staff that manages a little over 20 acres of sports turf, so we do things a little differently. Here are a few of our practices:

- We only use super sacks of grass seed and fertilizers, and apply them with a four-yard top-dresser to be efficient with our time.
- We also set up an arrangement with our local K-12 school administration to offer sports turf training for their custodians in exchange for volunteer labor. This out of the box thinking was a collaboration within our community that benefits everyone and saves money and time, which are two factors that have to be considered from a budget standpoint.
- We have a contract with a non-profit organization that supports individuals with developmental disabilities. These young men and woman help us greatly with trash, litter and recycling, and are a tremendous asset to our grounds operation. They do provide us a sufficient savings for outside contractual cost, but that takes a backseat from watching them learn, laugh, and work with our staff.
- We use a tool call POGO that measures moisture, electrical conductivity, salinity and temperature. All these factors help us to get the biggest bang for our buck when applying fertilizers and pesticides. We also use a Clegg Hammer that provides resources for gauging and monitoring soil strength and confirm uniform compaction over wide areas of ground and poorly compacted areas.

Four-yard topdresser broadcasting compost, fertilizer and seed.

Environmental

The ball is more in the right field then the left field within our workplace sustainability programs; however, there might be some inventive ideas you can implement that have yet to go mainstream. Remember when it comes to sustainability, if you can save green by going green, it usually means a green light for you to proceed with your idea. Think about the return on investment (ROI) time-period your organizations finance department has put in place - it could be from anywhere from 2-5 years. Some of the green initiatives we do that also save green include making our own compost from lawn and food waste; using organic fertilizer to improve our campus lawns and sport field's soil structure with mycorrhizae fungi, with the goal of reducing it by 3% annually by improving the carbon availability in the soil profile; and expanding our naturalized areas to showcase our ecological systems and encourage

No mow areas with wildflowers.

pollinators in our wildflower areas. This allowed us to save a lot of labor hours by not needing to mow as many areas.

I want to leave you with one more idea out of left field. A market reporter for CNBC, Fred Imbert, published an article called "Private payrolls miss expectations as companies can't find enough people to hire." This article raises concerns about where we might be heading in regard to labor shortages for trades and manufacturing jobs. It might seem like an idea out of left field, but we should start to plan ahead and take a serious look at robotic mowers, paint machines, etc. I would predict that in the next 15 years GIS training for grounds management is going to be a requirement. I also think in the near future soil management technology probes and undergrounds sensors will advance with Bluetooth, utilizing web based data reports to know the optimal times to apply pesticides and fertilizers for the cost efficiency and superior plant heath as part of an individualized IPM program for all five climatically zones. Plan now to expect the unexpected. **/ST/**

Kevin Mercer, CGM, CSFM, LICM, is grounds and landscape manager for Denison University, Granville, OH.

USE INSECTICIDES SAFELY AND EFFECTIVELY

// By ERIC J. REBEK, PHD

Insect pests present a unique set of challenges to sports turf managers, especially when it comes to chemical control. Frequent contact with the playing surface by athletes increases the risk of human exposure to pesticides. Often, management of sports turf falls under the jurisdiction of school districts that regulate pesticide use in accordance with local and state laws. Sports turf managers may face the dilemma of having to balance restrictions on pesticide use with the need to apply pesticides, based on presence of pests and/or damage. Thus, it is wise to know how insecticides can be used safely and effectively within restricted treatment windows. In this article, I discuss insecticides that are currently available for managing insect pests of sports turf within the context of using these tools safely and effectively.

Insecticide effectiveness depends on correct identification of the target pest and knowledge of its life cycle, required resources, and seasonal occurrence. Your county Extension office and state extension service are prime sources of information about the biology and management of pests, including non-chemical tactics that are part of an integrated pest management (IPM) program.

Annual training is essential (and legally required for commercial applicators) to retaining this information and staying current with important changes regarding pesticide registration, use, and safety. With respect to chemical control, the choice of insecticide will depend on several characteristics of the chemical including residual activity, mode of action (i.e., how it kills), and spectrum of activity. Other factors to consider include where and how the pest feeds, when susceptible life stages are present, and likelihood of insecticide resistance developing in the pest population.

With respect to resistance, the Insecticide Resistance Action Committee (IRAC) assigns insecticides and miticides to specific categories, designated as group numbers, according to mode of action. To delay or prevent the onset of insecticide resistance, it is best to frequently rotate among products belonging to different group numbers. More information about insecticide modes of action can be found at the IRAC website (https://www.irac-online.org/modes-of-action/).

Damage from bluegrass billbugs. Photo courtesy of Dr. David Shetlar, Ohio State, www.bugwood.org

Choices

There are two main categories of insecticides based on delivery method and target site. Contact insecticides must come into contact with the insect cuticle, or exoskeleton, in order to be effective. These products work best against pests that are exposed to the environment and feed externally on turfgrass. In contrast, systemic insecticides are absorbed by the plant and moved systemically to all plant tissues. Thus, systemic insecticides work best against insect life stages that live and feed within the plant.

Contact insecticides are widely available for turfgrass pests and often provide quick "knockdown"; therefore, the effect on pests is noticed immediately. Routes of exposure to the active ingredient involve ingestion or penetration through the insect cuticle. These insecticides are largely broad-spectrum compounds, so they kill a wide variety of pests. However, contact insecticides also kill beneficial insects, so they must be applied carefully to minimize risk of harming pollinators and natural enemies (i.e., predators and parasitoids). Contact insecticides labeled for turfgrass include active ingredients belonging to several chemical classes, mainly carbamates (Group 1A), organophosphates (Group 1B), and pyrethroids (Group 3A). Other contact insecticides labeled for use on turfgrass include spinosyns (Group 5) and oxadiazines (Group 22A). Most of these insecticides affect the nerves and muscles of insects. The nervous system of humans and other mammals is similar to that of insects and other arthropods, so these compounds can be toxic to people and pets if not applied properly. Common examples of commercially available contact insecticides are provided in Table 1.

Systemic insecticides are translocated (i.e., moved) throughout the plant after being absorbed through leaf or root tissues.

A

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ANSWERS FROM PAGE 17

The predominant weed on the wear areas of this bluegrass/ryegrass mix, multi-purpose field in the northern US is Prostrate knotweed, as shown in the close-up photo. It is the earliest germinating of all the summer annual weeds. Due to its early germination timing, knotweed invades damaged and bare areas on natural grass fields before other desirable grasses begin to grow. Prostrate knotweed is commonly associated with soil compaction and can usually be seen in high-traffic areas, such as centers of football fields and in front of soccer goals. When knotweed germinates in March, it often resembles grass and can offer some false hope that those damaged areas are spontaneously repairing themselves. The root system of Prostrate knotweed is extremely fine and can penetrate even the most compacted soils; once established it is very difficult to remove with most herbicides. However, this can be prevented with the application of a preemergence herbicide prior to seedling emergence. A cultural approach to Prostrate knotweed control would be to perform regular aerification to relieve compaction and to aggressively overseed, sprig or, in worst-case situations, re-sod.

Photos submitted by Pamela Sherratt, Turfgrass Specialist at The Ohio State University.

If you would like to submit a photograph for John Mascaro's Photo Quiz please send it to John Mascaro, 1471 Capital Circle NW, Ste #13, Tallahassee, FL 32303 call (850) 580-4026 or email to john@turf-tec.com. If your photograph is selected, you will receive full credit. All photos submitted will become property of *SportsTurf* magazine and the Sports Turf Managers Association.

Systemic products provide protection from insect feeding throughout the plant, and are effective against both chewing and sucking pests. These insecticides offer an additional advantage over contact insecticides in that they are effective against life stages that feed internally in plant stems, within crowns, or underground on roots. In other words, systemic products work where contact insecticides can't reach.

Additionally, systemic insecticides have much longer residual activity than contact insecticides, and some products even provide season-long control of perennial pests such as white grubs. Systemic materials are generally broad spectrum but tend to be somewhat selective, exhibiting effectiveness on a narrower range of pests than contact insecticides. Several chemical classes contain systemic active ingredients, including organophosphates (Group 1B), neonicotinoids (Group 4A), and anthranilic diamides (Group 28). Common examples of commercially available systemic insecticides are provided in Table 2.

Several insecticide products are labeled for turfgrass use that contain two or more active ingredients. Typically, these products are a combination of contact and systemic compounds. These products offer several advantages over those containing only one insecticide, including an increased range of target pests controlled, quick knockdown and long-term control, and time saved by not having to measure and tank mix multiple insecticides when warranted. However, the percentage of active ingredient contained within combination products is often much less than those products containing only one insecticide. Also, combination products are used prophylactically, targeting pests that may or may not be there. This increases the likelihood of a pest population developing resistance to more than one active ingredient. Therefore, decisions about when and how to treat should always be based on the presence of pests as determined through monitoring (i.e., scouting) and IPM.

Enhancing safety, protecting environment

Most insecticide labels prohibit re-entry into treated areas of turfgrass until after sprays have dried. While this requirement allows greater flexibility in timing applications, dried

Table 1. Commercially available contact insecticides labeled for insect pests of turfgrass.

Chemical Class	IRAC Number*	Active Ingredient	Common Trade Name(s)
Carbamates	1A	Carbaryl	Sevin
Organophosphates	1B	Trichlorfon	Dylox
Pyrethroids, Pyrethrins	3A	Bifenthrin	Talstar, Onyx
		Cyfluthrin	Tempo
		Deltamethrin	Deltagard
		Lambda-cyhalothrin	Demand, Scimitar
		Permethrin	Astro, Perm-up
Spinosyns	5	Spinosad	Conserve T&O
Oxadiazines	22A	Indoxacarb	Provaunt

**IRAC number refers to mode of action for managing insecticide resistance through a rotation program.*

White grub. Photo courtesy of Alton N. Sparks, Jr., University of Georgia, www.bugwood.org

Table 2. Commercially available systemic insecticides labeled for insect pests of turfgrass.

Chemical Class	IRAC Number*	Active Ingredient	Common Trade Name(s)
Organophosphates	1B	Acephate	Orthene
Neonicotinoids	4A	Clothianidin	Arena
		Imidacloprid	Merit
		Thiamethoxam	Meridian
Anthranilic diamides	28	Chlorantraniliprole	Acelepryn
		Cyantraniliprole	Ference

**IRAC number refers to mode of action for managing insecticide resistance through a rotation program.*

Mole crickets. Photo courtesy of University of Georgia, www.bugwood.org

residues still pose a risk to athletes, especially children and others with sensitivity to chemicals. Dried residues can transfer to skin, while mist, dew, or sweat can rehydrate dried particles, increasing risk of absorption through the skin. To reduce exposure risk to athletes, especially those most sensitive to chemicals, it is best to wait 24 to 48 hours before allowing re-entry on a playing surface following a spray application. As noted above, this may present a challenge for scheduling applications on fields or pitches that are in high demand.

In addition to leaves, stems, and roots, systemic materials can move into flowers, creating a potential risk to pollinators. In particular, neonicotinoid insecticides can move into nectar and pollen and have been shown to harm honey bees, bumble bees, and other flower foragers. Many of these products have a warning on the label restricting their use to plants that are not in bloom at the time of application. This restriction also applies to flowering weeds, so turfgrass managers cannot use neonicotinoids in weedy areas. This shouldn't be a problem for highly maintained playing surfaces that are free of weeds, but it will be of concern to managers of many practice fields, parks, and other recreational areas. Importantly, risk to pollinators can be reduced by making all pesticide applications when activity of beneficial insects is at a minimum – typically early morning, later in the evening, and on cloudy days.

Finally, IPM does not exclude the use of insecticides, especially when there are no other management options available for a particular pest. However, you don't always have to choose the most toxic product when opting for chemical control. There are many reduced-risk insecticides that can be used just as effectively as their broad-spectrum counterparts. Examples of reduced-risk insecticides include botanicals like neem oil, which are plant derived, insect growth regulators (IGRs), and microbials. The latter include bacteria, fungi, and other microorganisms that cause disease in insect pests and do not harm non-target organisms. An example is the bacterium, *Bacillus thuringiensis* var. *kurstaki* (Btk), which produces an insecticidal protein that only works against caterpillar pests such as black cutworm and fall armyworm. Reduced-risk insecticides like Btk are safe for people and pose little risk to beneficial insects.

No matter which insecticide you use, be sure to use caution and follow all label directions. The label provides detailed information about proper mixing and application to maximize effectiveness, safety, and environmental protection. **/ST/**

Eric J. Rebek, PhD, is professor and state Extension specialist for horticultural insects, Department of Entomology and Plant Pathology, Oklahoma State University.

Troubleshooting electrical issues in irrigation systems

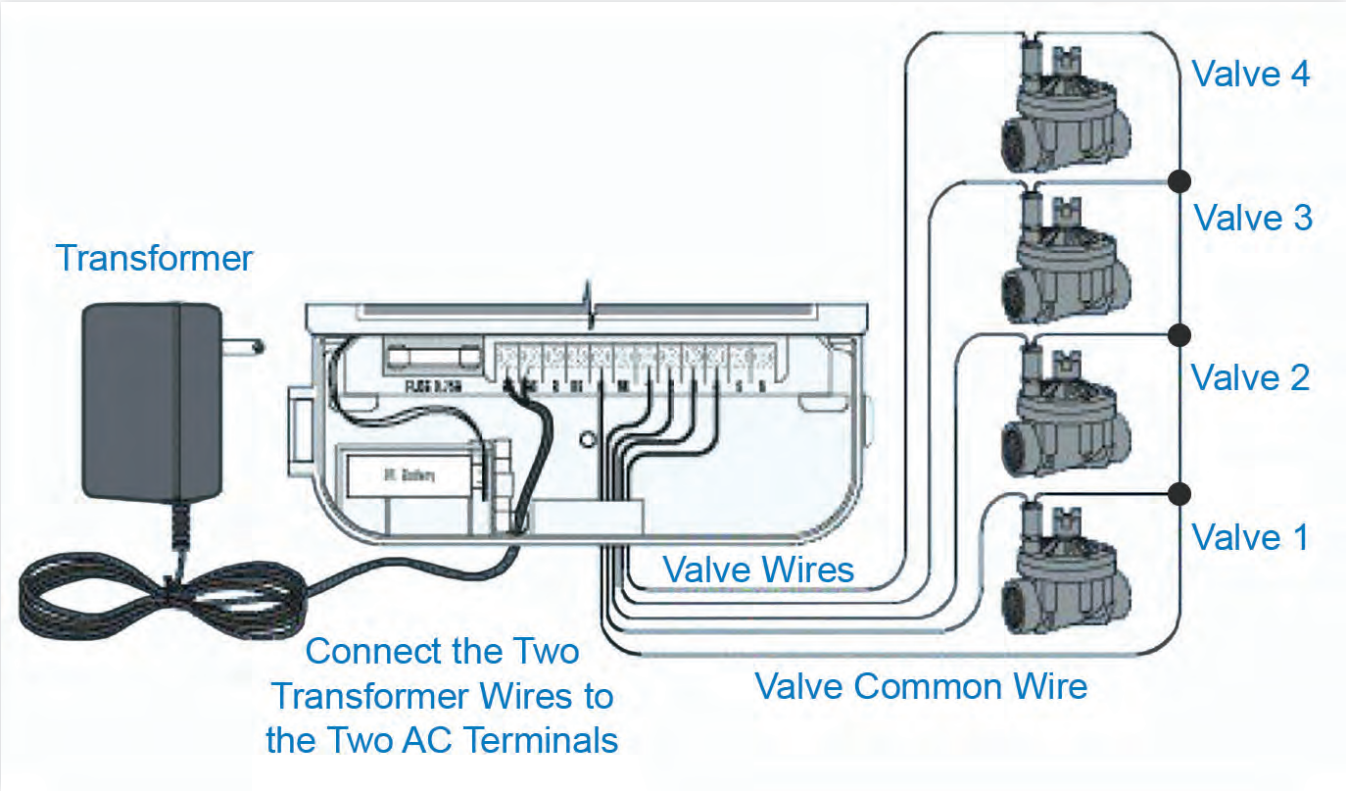
// By HEATH TRAVER, CIC, CLIA

Most sports turf managers have the know-how to replace a broken head, and in most cases can repair a ruptured pipe when needed. However, when it comes to electrical troubleshooting of a system, most will elect to call in an experienced irrigation contractor to diagnose and repair the issue. Obviously there will be a cost associated with this approach. Even if there is plenty of money allocated for irrigation maintenance, there is a good chance that a solid irrigation contractor has a backlog of work, and will not be able to get there right away. Therefore, the ability to diagnose and repair electrical issues within a system can be a valuable skill to have in your toolbox. In this article, we will explore basic troubleshooting in an attempt to shed light on the mysteries associated with this topic.

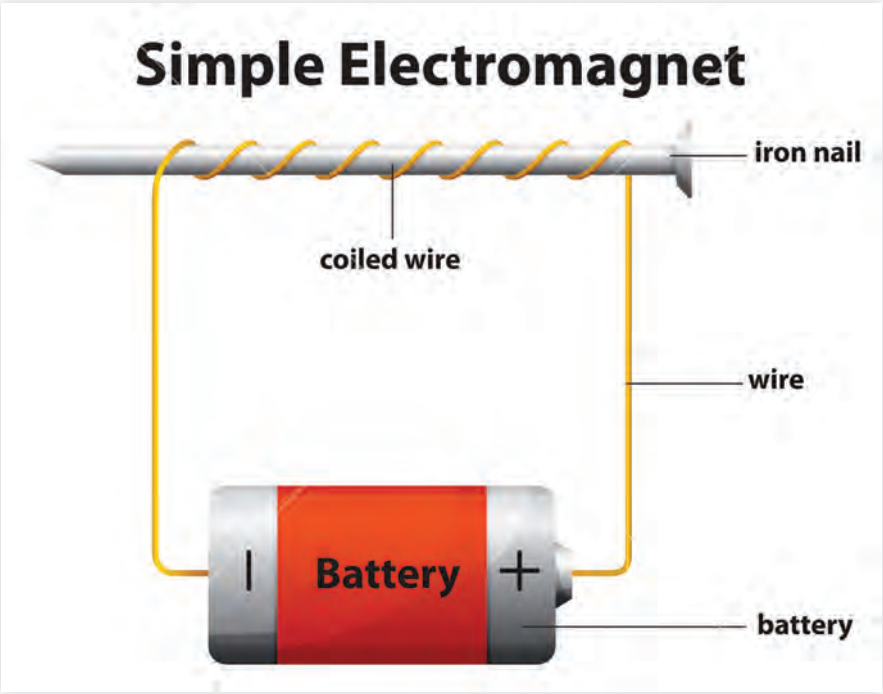
Typically, electrical troubleshooting is very logical. In order to best understand the process, it is very important to understand the electrical anatomy of a system. Of course, all systems are different, but if we can understand what is happening electrically with the system, we can adapt our methods to troubleshoot any system.

The basic electrical anatomy of a system involves three main components: the controller, the field wiring and the electric solenoid valves. Basically, when the controller sends a 24-volt signal through the field wiring to the valve, the 24 volts causes the valve to open, and water to pass through the valve to the heads. Since everything is initiated from the controller, we should begin our diagnostics at that point. The controller is plugged into a traditional 120-volt outlet. First, we need to make sure this is working. The controller's transformer immediately converts the 120 volts to 24 volts before entering the electronics in the controller. When a zone turns on, 24 volts is sent to the solenoid on the valve through the field wiring.

When the 24 volts travels through the wiring around the solenoid, it creates



As you can see in the diagram above, each valve has two wires going into it. The common wire is connected to every valve, and is typically (but not always) a white wire. The other wire going into the valve is wired into one of the numbered terminals in the controller.



If you were to crack open the solenoid, you would notice that it is wrapped with extremely fine copper wire, similar to the electromagnet you might have made in 6th grade science class.

an electromagnetic field that pulls up a metal plunger inside of the solenoid. This allows water past the solenoid and into the chamber below the valve's diaphragm. Once the water pressure above and below the diaphragm equalizes, the diaphragm lifts and water passes through the valve and downstream to the heads.

Now that we better understand the basics of how electricity flows through a system, we can begin the process of troubleshooting. The most important diagnostics tool is a multimeter, which can test the voltage being sent from the controller, and the resistance (measured in ohms) throughout the field wiring. A decent multimeter can be purchased for less than $20 and is critical to the troubleshooting process.

At the controller we will begin by testing the resistance throughout the wiring in the field and the valves. This will give us a quick snapshot of the overall electrical "health" of the system. We do this by turning our multimeter to the "ohms" setting (Ω). With the controller **not** running, take one probe and touch the common wire terminal and the other probe to each of the numbered terminals. We should get readings of between 20 and 60 ohms depending on which type of valve we are testing. If we get a very high reading, there may be a nick in the wire, or a poor connection. If we get an infinity reading (∞), we have an open circuit, which may be a break in the wire.

These types of issues can be difficult to locate, as they may be buried underground. Checking connections is a good place to start. If the issue is underground, you may be able to employ the use of a wire tracer to locate the issue. If the resistance reading to the valve is very low, the wiring in the solenoid has probably gone bad. The solenoid will need to be replaced, which is a fairly easy repair. First, shut off the water to the valve. Then cut the two wires going into the bad solenoid. Unscrew the bad solenoid, and screw in the new one. Then reattach the two wires with waterproof wire nuts. [Note: It doesn't matter which wire goes to the common wire, and which goes to the valve wire.]

The health of the solenoid can also be checked at the valve. Simply detach the two wires going into the solenoid, and test the resistance (ohms). You should get the same reading here as you did at the controller. If the readings are different, the issue is somewhere in the field wiring.

Typical multimeter.

Next, use the controller to turn on the zone that is having the issue. Set the multimeter to read voltage and touch one probe to the common terminal, and the other to the zone terminal that is running. The controller should be sending out a signal of 24 volts (plus or minus 2). If the controller is sending out less than 22 volts, the issue is with the controller. It the controller is sending out zero volts, first check for a blown fuse. If the controller has a blown fuse, if will appear to be running, but no voltage will be going to the field. You can also check the voltage at the valve by touching one probe to each of the wires going into the valve. You should have the same reading here as you did at the controller. If the readings are different, the issue is somewhere in the field wires.

Electrical troubleshooting can be intimidating due to the fact that it is usually cloaked in mystery. However, the process is very logical. By understanding the basic electrical anatomy of a system, and utilizing the simple diagnostic techniques that we have explored, I am hoping this topic becomes less intimidating and more approachable. **/ST/**

Heath Traver, CIC, CLIA, is a specification manager for Rain Bird in the Northeast US, and is licensed to practice irrigation in New Jersey. He can be reached at htraver@rainbird.com.

INFINICUT

The Cub Cadet Infinicut sets the standard for what playing surfaces can be. Now offering a fixed head for unmatched value and uniform quality of cut and appearance every time. The unique design and flexible set-up allows for precise operator tuning, providing height-of-cut adjustments within .10mm increments.

The all-electric lithium powered drive reduces noise and vibration without sacrificing power and eliminates fuel cost and potential for fluid leaks.

Coupled with a wide-range of TMSystem cassettes, usage extends well beyond simply cutting turf. The versatile and cost-effective Infinicut is designed to improve overall turf health and aesthetics of any playing surface.

THE ANDERSONS' NEW TURF NUTRITION TOOL

The Andersons, Inc. Plant Nutrient Group announces the launch of its new and improved Turf Nutrition Tool (TNT), a web-based platform that allows turf managers to create customized, season-long nutrition programs and model the nitrogen release of granular and foliar products. Initially launched more than 10 years ago, the TNT has been used to build thousands of nutrition programs for turf managers across the US. This latest version has been completely reimagined to be mobile-friendly and accessible from any device. It offers the ability to create, save and share custom turf nutrition programs, and includes new product listings.

"The art of the TNT is its ability to model the nitrogen release rate of our products while considering multiple variables, including climate zone, rate, nitrogen source and timing. The TNT is not a glorified spreadsheet. It is a sophisticated tool for nutrition planning," says Bob Eichenberg, with The Andersons Plant Nutrient Group. www.turfnutritiontool.com

TRIMAX SNAKE SERIES 2

Trimax Mowing Systems is a family owned company that designs, develops, manufactures and distributes tractor-powered mowing equipment around the world. The Snake Series 2 was recently released bringing the sports turf industry world class cut quality and articulation capabilities like no other. With the unique ability to transform a variety of conditions into an even carpet of green, the Snake S2 does not disappoint. New features on the Snake S2 include auto-belt tension, a LocTEK roller retention system, two cutting widths to choose from and much more. Trimax Snake owners benefit from a 3-year warranty and genuine Trimax support. Learn more about the easy height adjustment, LazerBlades and zero turn capabilities of the Snake S2 by scheduling a demo through www.trimaxmowers.com.

BRANDT PARTNERS WITH THE ROSE BOWL STADIUM

After supplying fertilizer to the Rose Bowl Stadium for nearly two decades, BRANDT has entered into a marketing agreement with The Rose Bowl Stadium as its official

fertilizer partner. BRANDT's premier fertilizer brand, GRIGG, has been used on the Rose Bowl Stadium field for more than 18 years. The field has been named the Best Looking Field in All of College Football and some of the key nutritional products used on the field include GRIGG's Proven Foliar nutrient line and GreenSpec granular nutrient line. "It's my job to give athletes and fans the very best playing field and experience possible. My number one priority is player safety and performance," said Will Schnell, the Rose Bowl's turf superintendent. "I need high quality products that I know will perform consistently and help me achieve the turf playing surface I'm after. The reason I chose GRIGG is because the products are the most proven and tested."

TURF PRIDE NOW PRODUCING SWEEPERS

Turf Pride LLC has begun production of commercial Lawn Sweepers. Sweep-Rite is a robust tow behind sweeper. Sweep-Rite can handle clean-up of leaves, debris, grass clippings. Sweep Rite is the preferred sweeper in artificial turf maintenance. "Along with the proven performance, durability and a great history, we are in a position to provide service parts for the now discontinued *Parker Sweeper" said Don Cotton, President of Turf Pride. Replacement parts are now available for *Suburbanite and *Estate Master, that were manufactured by *Parker and *Gravely.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*OEM names and models are used for descriptive purposes only, Turf Pride claims no association with them. Turf Pride LLC manufactures products for the turfgrass professional. Products include deep tine aerators, Trion Equipment Lifts, Ultra-Thin rotary blades for sports turf.

ENHANCEMENTS TO TORO PROSTRIPE 560

Toro enhanced the ProStripe 560 walk-behind mower and striping unit, including a commercial-grade Kawasaki four-cycle engine, the incorporation of a trim side for trimming around edges, and a larger capacity 0.45 gallon fuel tank for longer mowing sessions. The ProStripe 560 is ideal for achieving a premium, striped finish in prominent areas. Productivity is maximized with additional enhancements to the ProStripe 560, such as the 21-gallon bagger, which optimizes airflow and collection capability. Other features include a ribbed, two-piece roller, which significantly improves maneuverability and minimizes turf marking when compared to single-piece roller configurations, and a groomer brush attachment that can be mounted to the front of the unit to promote healthier turf and a cleaner cut by reducing lateral blade growth and loosening surface debris. Additionally, the integrated MatchCut functionality is beneficial when needing to mow at a consistent height using multiple machines across the same area.

SEEGROW AND AQUA-AID SOLUTIONS PARTNER

SeeGrow and AQUA-AID Solutions are pleased to announce a partnership offering the US turfgrass markets mobile, all season,

patented growing systems. The SeeGrow Lighting Systems utilize LED technology along with a CO2 process to create a healthy microclimate for turfgrass systems throughout the world. SeeGrow's LED grow systems are the world's only dedicated system that permits the turf manager to create specific recipes for grass growth, enabling the turf manager to choose if you want to push the leaf, the root or both together. The US turfgrass markets will have several grow system options. SeeGrow's covered systems are a combination of light, heat, C02, H20 and acoustic booster enabling growth 24/7. "Open" units for larger areas combine LED lights, acoustic booster, and unique infrared heaters. The simplicity of these units is part of the innovation with all units PLC controlled. Turf managers prepare their surface and set the parameters of light, heat, C02, and H20.

AIRTER EQUIPMENT FROM STEC EQUIPMENT

STEC Equipment Inc. takes great pride being able to import European equipment that we feel would be valuable to the American consumer. We are proud to bring the airter line of turf equipment to the North America. airter specializes in pneumatic turf aeration by injecting blasts of air down to the roots that provides them with fresh oxygen and loosens compacted soil. The scientifically proven relaxation of the turf root zone is well over 30%. The airter is currently the only PTO Powered Unit that is towed by a lightweight tractor (30-45HP). The airter loosens the turf surface evenly to a depth of 8.5 inches using compressed air. Each of the 14 injection lances is preceded by a compressed air reservoir, which allows the air to be controlled and fired at high pressure through triple nozzles into the ground.

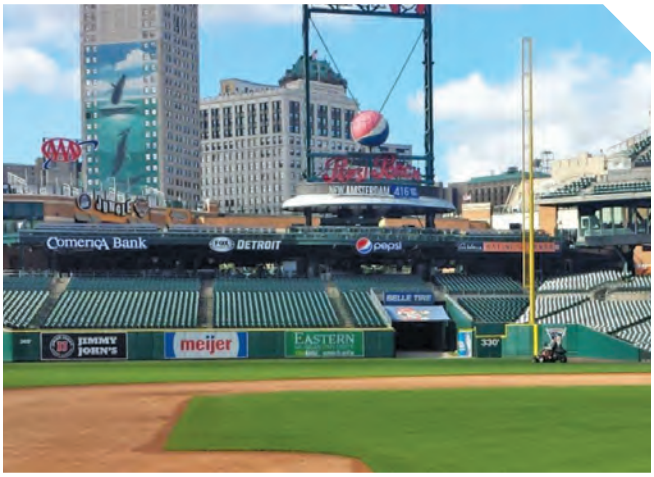
PRECISION LABS' IN-FLOW FOR INFIELD SKINS

Precision Laboratories launches In-Flow, a granular soil conditioner and surfactant that helps maintain the moisture levels of infield skins. In-Flow influences water's ability to flow into and throughout the profile of infield skins to find the desired balance between water retention and movement. In-Flow's infiltration surfactant allows water to move into the infield skin more quickly and more uniformly, reducing the migration of infield material into the turf. The hydration surfactant attaches to soil particles to maintain moisture levels longer. Finally, the multi-functional carrier is readily biodegradable and improves profile structure. In-Flow is environmentally safe, economical and easy to use. Less water needed to get optimal playing conditions. Enhanced performance of calcined clay conditioners.

NEW VEXIS HERBICIDE GRANULAR

PBI-Gordon Corporation announces that the EPA recently approved Federal registration for Vexis Herbicide Granular. It will be available for sale in mid-2019. Based on a new proprietary active ingredient, Pyrimisulfan, Vexis is the result of an exclusive partnership between PBI-Gordon, Kumiai Chemical Industry Co. and their US subsidiary K-I Chemical USA Inc. Vexis is formulated for use on residential and commercial sites, sports facilities, and golf course tees, fairways, and roughs. Primary features include:

Excellent post-emergent control of sedges and kyllinga species, including purple and yellow nutsedge, cockscomb, and false green kyllinga. And a low-rate, non-phenoxy product, Vexis has exhibited activity against weeds that have developed resistance to ALS-inhibiting herbicides. Retreatment after 30 days is allowed.



INSIDE AND OUTSIDE PADDING

With more than 50 years of industry experience, Sports Venue Padding installs and maintains padding in private, district, collegiate, and professional ballparks all over the country. If you need something padded for player or spectator protection, we can do it. We offer standard and custom solutions. That includes beams, gates, doors, floors, lifts, rotational signs, props, bike racks, and pretty much anything else in any size. Beautifully display your team brand, logo, sponsors, or advertising with big, bold digitally printed graphics on almost any color of vinyl banner or vinyl covered padding. We take padding along the rails, down the slopes, into the corners, over the gates and up the foul lines. Ask about our superior OUTFIELD WALL padding, sponsorship GRAPHICS, permanent aluminum-structured square Perma-Rail DUG-OUT padding systems, circular printable RAIL padding, folding or mounted BACKSTOP padding, and more!

STMA COMMERCIAL MEMBER SPOTLIGHT:

Rene Asprion, Diamond Pro

Editor's note: Another installment in our continuing series highlighting STMA commercial members. This month we hear from Rene Asprion, general manager, Diamond Pro, Arlington, TX:

***SportsTurf:* How did you get started in the groundskeeping products business?**

Asprion: Playing baseball at the University of Texas-Arlington provided me with an opportunity to help out with field maintenance, which eventually led to that becoming my part-time job. While taking care of the field during the summer, I got to know the guys from the ballpark. One thing lead to another, and Jim Anglea, the man who started Diamond Pro along with Texas Industries (TXI), interviewed and hired me in the fall of 1994, once I was finished with school and baseball.

***ST:* What are the challenges in providing consistent, quality products that are sold and distributed nationally?**

Asprion: Well…that is a very long list, but I will try to keep it brief. Lightweight aggregates, also known as expanded shale or clay, have been around since the Roman Empire. In the US around 1917 lightweight aggregates were used to make structural lightweight concrete for shipbuilding. Texas Industries began manufacturing lightweight aggregates in the 1950's, upon realizing there were multiple uses and markets in which it could participate. We started using our lightweight vitrified product on a ball field in the Houston area in 1989. At that time, the product was more of a byproduct of the construction market, whereas now, it is specifically made for baseball and softball fields. Accordingly, some of the challenges to providing a consistent, quality product are the competition for kiln time, bagging time, and logistics time, all of which are independently important in assuring the product is above par, thus meeting the higher standards we demand of ourselves.

Rene Asprion, center, demonstrates how to apply his product at a field day event. At right is former Diamond Pro sales rep, Tom Burns.

Once those hurdles are tackled, the distribution phase presents a whole separate set of challenges, including but not limited to, competing for shelf space against other players in our industry such as paint, seed and fertilizers, to name a few. Bulk distribution is slightly less difficult, but it still has its challenges. Between trucking issues (shortages, drivers' logs, break-downs) to dealing with the railroad, it can be time and cost consuming. So yes, there are many challenges of which our customers are not aware that go into that 50-lb. bag or that truckload of bags or bulk they receive.

***ST:* How do you typically research and develop new products?**

Asprion: We listen to our customers and work toward addressing any specific needs and concerns. Furthermore, being current and/or former groundskeepers ourselves, gives us valuable insight into the

> **"WE PRIDE OURSELVES ON EDUCATION IN THE FIELD. WE TRY TO DO AS MANY DEMONSTRATIONS AND EDUCATIONAL EVENTS AS POSSIBLE."**
>
> *– Rene Asprion*

changing demands, requirements and ideas that arise in this area of business. Not a whole lot has changed in our specific segment of the industry, but there have been some new products and ideas that have come to fruition. When we do introduce something new, it is first thoroughly tested by us personally, as well as being fully field tested, before we introduce it into the market.

ST: How much consulting on how to install and maintain your infield products do you provide customers at the K-12 and Parks (or other) levels?

Asprion: We pride ourselves on education in the field. We try to do as many demonstrations and educational events as possible. We enjoy helping anyone that has questions, and we encourage those who might not be as familiar with our products to reach out to us for assistance. We offer consulting for all levels, including those Little League moms and dads who are maintaining their local fields.

ST: Tell us about your MiLB sports field manager of the year award program or other ways you recognize customers.

Asprion: We sponsor the Eastern League Sports Field Manager of the Year Award, something we've done for the past 11 seasons. We are fortunate to have an outstanding relationship with the various grounds crews, so it has really become a rewarding experience for both them and us. Aside from that, we also partner with specific MiLB groundskeepers and/or their organizations in multiple other ways. The goal for us is to create a favorable situation that each groundskeeper, his organization and Diamond Pro can enjoy!

ST: What are Diamond Pro's strategies for staying competitive in your extremely competitive segment of the industry?

Asprion: Extremely competitive is an understatement! It seems like in the past few years alone, there are more folks trying to get into the conditioner business. Unfortunately, that's the nature of business, and I guess it says something about the companies that have been around for the long haul. We strive on being honest with customers and providing help to everyone in need. If we don't have the answer, we will do our best to find it for our customers or potential customers. ***/ST/***

FIELD OF THE Year

FIELD

CHS FIELD

ST. PAUL SAINTS

LOCATION

St. Paul, MN

- **Category of Submission:** Professional Baseball
- **Sports Turf Manager:** Marcus Campbell
- **Education:** BS, golf and turf management, University of Minnesota
- **Title:** Head Groundskeeper
- **Experience:** Began my sports turf career with the St. Paul Saints in 2015 as an intern. After finishing up with school in the spring of 2016, I moved to Sarasota, Florida to join the turf staff at the Baltimore Orioles Spring Training facility. In March of 2017 I moved back to St. Paul as the Assistant Groundskeeper. In 2018 I took over the role as Head Groundskeeper at CHS Field.
- **Students/interns, part-time and seasonal staff:** Tim Mans, Grady Mackey, Cody Pamperin, Brian Hronski, and Brett Nelson
- **Original construction:** 2015
- **Turfgrass:** 90% Kentucky bluegrass varieties/10% perennial ryegrass; our bullpens are 80% turf type tall fescue and 20% Kentucky bluegrass. This started as a trial in 2017 and with its success in traffic tolerance and limited water usage; we have continued to maintain this ratio.
- **Rootzone:** 90% sand, 10% other
- **Overseed:** We constantly overseed wear areas with perennial ryegrass and Kentucky bluegrass throughout the season to create a seedbank. We rotate KBG varieties between Bewitched, Right, and Midnight. We also use a mixed blend of PRG that has Dasher 3, Replicator, and Blazer 4 varieties. At the end of each season we overseed the whole field with Kentucky bluegrass.
- **Drainage:** Drain tile

Why should STMA consider your field a winner?

CHS Field should be considered for 2018 STMA Field of the Year for multiple reasons as described below. Staff turnover rate is typically very high, with at least half of our staff being

The Field of the Year Awards program is made possible by the support of sponsors Carolina Green Corp., Hunter Industries, Precision Laboratories, and World Class Athletic Services.

new each season. With our staffing relying heavily on summer workers (high school/college workers), fully training a staff member can sometimes take up almost half of the season. Most new staff enter our ballpark with little to no field maintenance experience, so I try to work side by side with each new member for the first week to ensure that they receive proper instruction on day-to-day tasks. Besides myself, our turf staff consists of two seasonal employees as well as two part-time game day staff members.

Weather in Minnesota can also be quite challenging. With a growing season right around 6 months, most of those months are consumed by events or games. Of those 6 months, roughly 5 of those months include an event every day. We have around 120 games (professional, college, high school, amateur), 12 on field events and festivals, as well has 40+ practices between the Saints and Hamline University. With most of our growing season being taken up by events, being able to precisely schedule maintenance techniques such as overseeding and fertilizing poses a challenge for us. Implementing a foliar fertilizer program this season has immensely increased our flexibility to be able to apply fertilizers to our turf during our busy event schedule.

With an emphasis on be a sustainable ballpark, we strive to use as many organic and eco-friendly products on our playing surface. Although this provides a challenge at times, we are proud to be an STMA Certified Environmentally Responsible Facility.

With a limited budget, most of our big projects are done in house to save money. This past season we renovated our bullpen mounds and tore out 30 tons of clay. We also renovated all infield edges and re-sodded them mid-season due to inconsistent lip transitions. The amount of hours our staff has put into keeping this field properly maintained, as well as updating the field with special projects, show the dedication and pride of our turf staff here at CHS Field. With all that is listed above, we believe that CHS Field should be considered for the 2018 STMA Field of the Year.

SportsTurf: What attracted you to a career in sports turf management?

CAMPBELL: The opportunity to be around sports attracted me to the career. I grew up around baseball, and was able to play through college. Baseball is unique because most coaches and players take care of your field before/after games and practices. The everyday field work was a part of me starting at age 5 or 6 when I was a batboy for the high school team that my dad coached. It wasn't until I was in high school when I came to realize that there was a degree that would specifically prepare you to maintain high level sports fields.

ST: What are your biggest challenges in providing excellent playing surfaces? How do you approach these challenges?

CAMPBELL: We have roughly 150 events (games, practices, events) on the field a year. Trying to maintain a professional playing surface can often times be a challenge with that number of events. Creating an understanding of my expectations on the field between coaches, players, and staff members was one of my main goals last season. I believe having a good relationship between all of those people helped me keep our playing surface at a high standard all season long. Staff turnover is also a big challenge. I also made it a goal of mine to keep at least half of our staff the same going into the next year to help maintain consistency.

ST: What changes, if any, are you considering implementing for the winning field in 2019?

CAMPBELL: This is an industry that is always changing. Our main products will stay the same, but I'm always open to trying new fertilizer products that hit that market to see if the results on the field will get better. Last season I began implementing a foliar fertilization program, and I plan to increase the amount of applications in 2019 to be able to constantly keep feeding the grass in small doses.

ST: What's the greatest pleasure you derive from your job?

CAMPBELL: One of the most common questions I get asked is "How do you do this job with the amount of hours and games?" Coming to work every day is fun. I believe that if you don't love the game of baseball, the job can be more challenging. Baseball has always been a part of my life, and being able to walk into a professional baseball stadium every day for work makes me appreciate the position I'm in even more. I'm thankful to be able to have my career revolve around a game that has been such a big part of my life.

ST: What's the best piece of turf management advice you have ever received?

CAMPBELL: Learn to trust your employees. You can't be in three places at once. Being able to trust your employees to manage certain tasks without your being there will increase the efficiency and performance of your operation.

ST: How has your career benefited from being a member of the STMA?

CAMPBELL: Being a member of the STMA has introduced me to many outstanding members of our industry. Being able to network, and communicate with other members has allowed me to constantly be learning about new techniques, products, and challenges in our industry.

ST: How do you think the profession and industry will change in 10 years?

CAMPBELL: Technology is constantly advancing. Our ability to be able to use new technology to read compaction, moisture levels, and irrigation efficiency has greatly advanced our industry. Some of these technologies used to only be available in research labs, and now we are able to use them in our everyday management practices.

ST: How are you using social media at work?

CAMPBELL: I mainly spend time on social media to share pictures and information about our field and to keep up with other industry information. Social networking has become an excellent informative and marketing tool for our industry.

ST: What are your passions and interests outside of work?

CAMPBELL: I enjoy being outside when I have free time. Growing up in Wisconsin, I have always had access to lots of recreational outdoor spaces. Whether its walking through the woods, hunting, fishing or sitting out on the patio around a fire with friends and family, I have always found the outdoors to be peaceful, relaxing, and a way to get my mind off of things happening at work. ***/ST/***

Maintenance plan

JANUARY
N/A

FEBRUARY
N/A

MARCH
N/A

APRIL
- Winfield Gravity 38 Special 5-0-15 5 Gal. Marvel Bent Special 28-8-18 50 lbs.
- 16oz Qualipro Foursome Pigment 0.21N/0.054P/0.18K
- The Andersons Smart Phos 4-22-0 222lbs 0.1N/0.5P/0K

MAY
- GriggBros Carboplex 6-4-4 8.625 Gal. GriggBros BioBlend 10-0-0
- Winfield L-Amp 8-27-2 2.5 Gal. Winfield PGS 0.1oz/1000
- MikroPak 2 Scoops 0.116N/0.06P/0.046K
- UMAXX 46-0-0 1.0N/0P/0K
- Andersons 0-0-44 0N/0P/1.0K
- Pillar G 4 Bags

JUNE
- GriggBros BioBlend 10-0-0 2.15 Gal. GriggBros
- Carboplex 6-4-4 5.39 Gal. MikroPak 2 Scoops 0.066N/0.01P/0.02K
- GriggBros Endurance 8-4-16 287.5 lbs. 0.25N/0.06P/0.43K
- Winfield 38 Special 5-0-15 2.5 Gal. Winfield Gravity 12-0-0 +Fe 2.5 Gal. Marvel Bent Special 28-8-18 25lbs 0.14N/0.01P/0.08K
- Sustane Bolster 4-4-4 6.5 Bags 0.14N/0.06P/0.12K

JULY
- GriggBros BioBlend 10-0-0 2.15 Gal. GriggBros
- Carboplex 6-4-4 5.39 Gal. MikroPak 2 Scoops 0.066N/0.01P/0.02K
- Andersons 12-3-12 DG 320 lbs. 0.42N/0.04P/0.35K
- Sustane Bolster 4-4-4 6.5 Bags 0.14N/0.06P/0.12K
- Winfield 12-0-0 +Fe 3.75 Gal. Winfield 38 Special 5-0-15 3.75 Gal. MikroPak 2 Scoops 0.08N/0P/0.06K
- Pillar G 4 Bags

AUGUST
- GriggBros BioBlend 10-0-0 2.15 Gal. GriggBros
- Carboplex 6-4-4 5.39 Gal. MikroPak 2 Scoops 0.066N/0.01P/0.02K
- Grigg Bros Endurance 8-4-16 5.5 Bags 0.24N/0.05K/0.4K
- Winfield Gravity 12-0-0 +Fe 2.5 Gal. Winfield 38 Special 5-0-15 5 Gal. UMAXX 25lbs
- MikroPak 2 scoops 0.185N/0P/0.04K
- Sustane Bolster 4-4-4 6.5 Bags 0.14N/0.06P/0.12K

SEPTEMBER
- GriggBros BioBlend 10-0-0 2.15 Gal. GriggBros
- Carboplex 6-4-4 5.39 Gal. MikroPak 2 Scoops 0.066N/0.01P/0.02K
- Winfield Gravity L-Amp 8-27-2 2.5 Gal. UMAXX 46-0-0 25lbs
- Winfield PGS 0.155N/0.037P/0.005K
- Andersons Smart Phos 4-22-0 10.5 Bags Andersons 0-0-44 6 Bags 0.18N/0.44P/1.0K
- Pillar G 6 Bags
- Winfield Gravity 12-0-0 +Fe 6 Gal. 0.08N/0P/0K
- UMAXX 46-0-0 3 Bags 0.75N/0P/0K
- Andersons Smart Phos 4-22-0 6 Bags
- Grigg Bros Endurance 8-4-16 6 Bags 0.36N/0.31P/0.43K

OCTOBER
- GriggBros BioBlend 10-0-0 2.15 Gal. GriggBros
- Carboplex 6-4-4 5.39 Gal. MikroPak 2 Scoops 0.066N/0.01P/0.02K
- Andersons 12-3-12 6 Bags 0.31N/0.03P/0.26K
- Civitas + Harmonizer UMAXX 46-0-0 0.125N/0P/0K
- Grigg Bros 7-7-7 Iron 6 Bags 0.22N/0.01P/0.19K
- Andersons 0-0-25 4 Bags 0N/0P/0.36K
- Andersons Smart Phos 4-22-0 10.5 Bags 0.18N/0.44P/0K

NOVEMBER
- Civitas + Harmonizer Enclave Fungicide 5 Gal.

DECEMBER
N/A

STMA Affiliated Chapters Contact Information

Sports Turf Managers Association of Arizona: www.azstma.org

Colorado Sports Turf Managers Association: www.cstma.org

Florida #1 Chapter (South): 305-235-5101 (Bruce Bates) or Tom Curran CTomSell@aol.com

Florida #2 Chapter (North): 850-580-4026, John Mascaro, john@turf-tec.com

Florida #3 Chapter (Central): 407-518-2347, Dale Croft, dale.croft@ocps.net

Gateway Chapter Sports Turf Managers Association: www.gatewaystma.org

Georgia Sports Turf Managers Association: www.gstma.org

Greater L.A. Basin Chapter of the Sports Turf Managers Association: www.stmalabasin.com

Illinois Chapter STMA: www.ILSTMA.org

Intermountain Chapter of the Sports Turf Managers Association: http://imstma.blogspot.com

Indiana: Contact Clayton Dame, Claytondame@hotmail.com or Brian Bornino, bornino@purdue.edu or Contact Joey Stevenson, jstevenson@indyindians.com

Iowa Sports Turf Managers Association: www.iowaturfgrass.org

Kentucky Sports Turf Managers Association: www.kystma.org

Keystone Athletic Field Managers Org. (KAFMO/STMA): www.kafmo.org

Mid-Atlantic STMA: www.mastma.org

Michigan Sports Turf Managers Association (MiSTMA): www.mistma.org

Minnesota Park and Sports Turf Managers Association: www.mpstma.org

MO-KAN Sports Turf Managers Association: www.mokanstma.com

New England STMA (NESTMA): www.nestma.org

Sports Field Managers Associationof New Jersey: www.sfmanj.org

Sports Turf Managers of New York: www.stmony.org

North Carolina Chapter of STMA: www.ncsportsturf.org

Northern California STMA: www.norcalstma.org

Ohio Sports Turf Managers Association (OSTMA): www.ostma.org

Oklahoma Chapter STMA: 405-744-5729; Contact: Dr. Justin Moss okstma@gmail.com

Oregon STMA Chapter: www.oregonsportsturfmanagers.org oregonstma@gmail.com

Ozarks STMA: www.ozarksstma.org

Pacific Northwest Sports Turf Managers Association: www.pnwstma.org

Southern California Chapter: www.socalstma.com

South Carolina Chapter of STMA: www.scstma.org.

Tennessee Valley Sports Turf Managers Association (TVSTMA): www.tvstma.com

Texas Sports Turf Managers Association: www.txstma.org

Virginia Sports Turf Managers Association: www.vstma.org

Wisconsin Sports Turf Managers Association: www.wstma.org

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Q&A *with* DR. GRADY MILLER

Professor, North Carolina State University

Questions?
Send them to Grady Miller at North Carolina State University, Box 7620, Raleigh, NC 27695-7620, or email grady_miller@ncsu.edu

Or, send your question to Pamela Sherratt at 202 Kottman Hall, 2001 Coffey Road, Columbus, OH 43210 or sherratt.1@osu.edu

A fresh look at soil testing

Q: This is the time I normally turn in soil samples for my fields. It seems like every year I get about the same results back so I have been wondering if I can take a year off of testing. I have also read about a minimalistic approach to applying fertilizers based on soil testing is becoming more common with golf turf. Maybe I have been putting out more fertilizer than needed. Can you tell me more of what that is all about?

A: If you have been getting similar test results and are comfortable with your fertility programs, I see no harm in taking off a year. You are also correct that a group recently introduced a new approach to calculate fertilizer needs based on soil testing results. This new way of using soil testing results may be a real positive as most of our current soil testing theories were based on agronomic systems rather than calibrating results with turfgrass systems. So even if this approach is not used, it may encourage agronomists to give a second look at soil tests and fertilizer recommendations.

Since research on soil fertility for agronomic crops started back in the late 1800s, one may think we know all there is to know when it comes to soil fertility. In reality there has not been a great deal of research related to interpretation of turfgrass responses to soil nutrient additions based on soil testing. This is one of the reasons why you may get a wide range of recommendations by different laboratories on the same sample.

Soil analysis is largely based on the concept of how much nutrient will be available to a plant from a soil. Since in many cases elements are found within and/or attached to various soil particles, soil testing uses solutions to extract those elements from the soil particles so that their relative availability can be estimated. Extracting solutions may be something as simple as water but more commonly it is a weak acid solution. Probably the most common solution used is Mehlich III extractant, which is often noted on soil testing reports.

The amount of the element measured after extraction should then be interpreted so that it can be related to a plant response. As soil test level of a nutrient increases, the chance of getting a plant response to adding that nutrient decreases. In most cases soil nutrient levels are categorized as low, medium, high, etc. Therefore the amount of fertilizer recommended usually decreases with increases in soil test levels.

Interpretation of the numbers (i.e., fertilizer recommendations) can vary depending on philosophies of laboratories or individuals making recommendations. The most common approach is the sufficiency level concept in which the amount of available nutrient reported from the soil extract analysis is used to determine the need for fertilization. This philosophy is referred to as "sufficiency level of available nutrients" or SLAN. If the soil test indicates the nutrient level found in the soil is below a sufficiency level, then additions are recommended. Or in some cases higher recommendations may be suggested as a way to build up soil levels of particular nutrients.

A second philosophy is to evaluate the percentage saturation of base cations (K, Mg, and Ca) as a total of the cation exchange capacity. These percentages are used to determine if nutrients are in balance. Desired ranges could be 2-5% K, 5 to 15% Mg, and 60-80% Ca. A recommendation may also be related to their ratio of Mg to K and Ca to Mg. This philosophy is referred to as the "basic cation saturation ratio" or BCSR. Some salespeople used the BCSR concept to encourage fertilizer applications even though a soil test report indicated there were sufficient levels already in the soil.

This new philosophy is called the "minimum levels for sustainable nutrition" or MLSN. This method is based on the concept of managing nutrient levels by reducing fertilizer inputs to a minimal level while still maintaining desired turfgrass quality. It is a little more difficult to explain in a few words, but the general concept is to use the turfgrasses' uptake for each nutrient in relation to its nitrogen uptake. The uptake values are obtained from expected leaf nutrient content. Nitrogen is used since it is the nutrient that primarily drives growth of the plant. Growth is a driving factor of uptake for all the nutrients. Minimum levels of each nutrient have been established through extensive sampling of turfgrasses. By using soil test values, considering the minimal levels needed, a bit of math is used to estimate how much of a nutrient needs to be added to account for depletion by the turfgrass while ensuring adequate amounts remain in the soil. In many cases, the amount needed is likely to be lower than would be recommended using the SLAN method.

That was a quick summary of the MLSN method, but if interested I would encourage you to investigate further. My best advice is to use your soil testing data along with your experience on site as a basis for developing your fertility program. **/ST/**

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