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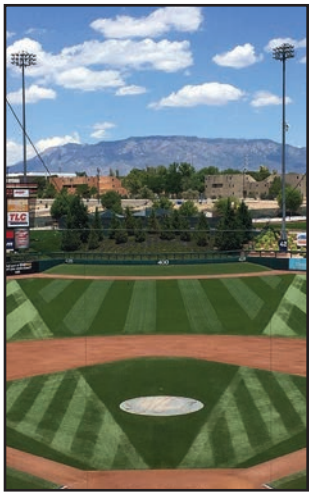
FEATURES

DEPARTMENTS

ON THE COVER:

Sun Roesslein, CSFM, and Christina Clay are the stadium managers at Jeffco Stadium, Jefferson County Public Schools, Lakewood, CO where they have eschewed the trend toward synthetic and keep the natural turf playing very well despite serving multiple high schools. Their STMA Field of the Year win is the second in a row, having won for soccer in 2014.

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I WON'T MISS TRAVEL BASEBALL

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Last month my son walked off the baseball field at the University of Maryland-Baltimore County campus as a member of his "travel" team for the last time. Though on the drive home I was sad because for the past four summers he and I have had some wonderful father-son bonding knocking around the Mid-Atlantic region for tournaments, a part of me was elated that we'd no longer be subjected to the idiocy that is too often on display by youth sports coaches and parents.

I've seen two dads squaring off in the parking lot after a game in a confrontation that ended when one of them pulled a gun out of his truck; a mom screaming at her son to "hit him in the face" as her son prepared to pitch to a kid with whom he'd just had an encounter on the base paths; a coach saying "F--- you" to a 14-year-old in the post-game handshake line; another coach yelling at his own player "you're a [sissy]" in front of both teams and 75 or so parents and siblings; a player being high-fived by his coach after being tossed from a game for sliding into second base and spiking an opponent in the thigh; and numerous dads, standing behind home plate, giving detailed instructions to their sons while the kids are batting and then berating them as they return to the dugout after striking out.

Perhaps worst of all I've seen plenty of kids playing the game without any signs of joy, before, during or after games. They might as well have just gotten off a double-shift of shoveling pig poop.

At the turn of the century travel baseball meant a few regional teams would meet for several national tournaments; these teams were stocked with teenagers for whom the term "prospect" was legitimate, whether it be for college or professional baseball. But now there are tens of thousands of "travel" teams competing in tournaments year-round, most of them with rosters filled by players whose ceiling is high school ball. And from what I've witnessed even that might be a stretch for some of these kids. Of course, since there are plenty of tournaments for boys who are only 9 or 10 years old, who can be sure!

The upside of course is a lot more boys are playing baseball, and all these tournaments have resulted in more facilities being built, like the new Ripken facility in Myrtle Beach, SC, or the new facility now being constructed near the Cedar Point amusement park in Sandusky, OH, which reportedly will cost $24 million. This means more sports turf management jobs and economic benefits for communities; the downside is more boys (and their parents) being subjected to pressure, unsportsmanlike behavior, as well as injury risk. Should a 16-year-old really be undergoing Tommy John surgery?

The horse has left the barn on this topic though; once folks start making money and many organizations certainly are, the question of "Why?" is gone and replaced with "How much?" And our family was happy to contribute; I estimate we spent about $12,000 to cover all the costs associated with our son's playing travel ball. When we started I was as guilty as the next dad who thought maybe his son was talented enough to earn a scholarship; I told my wife it was "an investment in his future." That $12K sure would look good in his 529 account about now!

Because of the quality time I spent with my son, especially in view of his going off to college in a year, I don't regret his playing travel ball. But I sure won't miss it, either.

SportsTurf
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WHAT'S IN THE NAME?

Jeff Salmond, CSFM
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The word "turf" has evolved. It originally meant "natural turf" or "grass."' Then Monsanto introduced ChemGrass, which became branded as "AstroTurf." The general public in recent generations has been educated to use "turf" to mean artificial turf. "AstroTurf" and "turf" have consistently been used as generic terms for synthetic surfaces. Many in the industry believe "turf" means one thing — artificial. Others would rather be considered dinosaurs and call real grass "turf" than call a synthetic carpet "turf."

In the sports turf industry, how are we supposed to use the word "turf"? What immediately comes to mind when you hear "turf"? What is the correct vocabulary when talking about natural grass? Do we use turf, "grass," "turfgrass," "sports turf," or even "pitch"? Does "turf" mean natural or synthetic? Or, is it slang for either? We may use the word turf within industry circles, but use grass when talking with others, just to help them understand the type that we are talking about. We have all heard sports announcers say, "The player slipped on the turf." Was it natural turf or was it artificial that was being played on? Now natural turf and artificial turf have been defined within the same word, even by the most trusted sources.

Do an Internet search for "turf" and a typical result will be "grass and the surface layer of earth held together by its roots." Turf in this context does not suggest artificial. Thefreedictionary.com gives the definition as both: "A surface layer of earth containing a dense growth of grass and its matted roots; an artificial substitute for such a grassy layer, as on a playing field." Even the Merriam-Webster dictionary states: "The upper layer of ground that is made up of grass and plant roots; a square piece of turf cut out of the ground that is used for making lawns; a material that looks like grass and is used specially to cover athletic fields." Two parts of M-W's definition suggest natural, the other artificial. Images of turf will show both natural grass and synthetic. What about turf burn? Most associate it with an artificial surface. Maybe medical professionals should help change this terminology to "synthetic field burn" or "artificial surface burn." It is not very often that we hear "natural turf burn."

However, when you do a search for the word "turfgrass" or "grass," the results are all natural grass definitions and images. There is no mistaking what turfgrass or grass is supposed to mean. Turfgrass holds the original meaning and intent of the word "turf" by indicating that it is grass and it is real.

Maybe terminology should be re-defined in our books to create a common understanding. Then it can be verbalized properly. Should "grass" always be natural, and "turf" always be artificial? Or, maybe it should have clearer descriptions, such as "natural turf" and "synthetic (or artificial) turf."

So, which word do you use?

Be aware of the Pokémon Go craze right now. Make sure you are protecting your TURF…

PHOTO COURTESY OF STEVE BUSH, CSFM.

STMA COMPENSATION SURVEY

COMPENSATION AND BENEFITS ARE ON THE RISE FOR SPORTS TURF MANAGERS

Editor's note: *This information was provided by the Sports Turf Managers Association's headquarters staff. STMA members who participated in this summer's survey will receive an electronic copy of the full results this month. This was the first such survey by STMA since 2012.*

SALARIES BY THE NUMBERS

The results are in from the STMA 2016 Compensation and Benefits Survey. Salaries have substantially increased since the 2012 survey was conducted, and benefits overall seem to be maintaining or are slightly up.

Sports Turf Managers saw a median increase in compensation of $7,000. The median is now $62,000, up from $55,000 in 2012. The average salary saw almost the same increase to $65,295 from $58,854 in 2012. This is a slightly more than 3% increase annually.

The results were cross-tabbed to reveal the average salary by membership category. Leading this group is the Parks and Recreation segment at $69,318, which saw an increase of nearly $6,400. Next are those who represent Schools K-12, with an average salary of $65,363 and Semi-Pro/Professional at $64,489. This professional category also saw the largest increase from the 2012 results. Their salaries increased $10,253 from $64,489. The Semi Pro/Professional reported the lowest average salaries in 2012 at $54,236. The average salary of a sports turf managers who works for a college or university is $59,482, up from $56,818.

Twenty-nine percent of sports turf managers make $75,000 or more annually with 79% earning $50,000 or more.

Assistant sports turf managers also saw slight increases. First assistant's median salary rose from $39,500 to $44,000 and the average salary is now $44,790 compared to $41,458 in 2012.

METHODOLOGY

The response rate was 35% with a confidence level of 99% and a confidence interval of 4.64%. This means we are 99% certain that all of the information reported is accurate within plus or minus 5%.

The report will be distributed electronically in early

PHOTO COURTESY OF WEST COAST TURF.

PHOTO BY ERIC SCHRODER.

September to those who filled out the survey. The full report contains many more tables and cross-tabbed salary information. You can find out the average salary of a certified sports field manager, how education levels impact salary, salaries by region of the country, salary by the number of years of experience and by number the of acres managed.

BENEFITS ARE HEALTHY

In addition to salary data, there is a wealth of information about the benefits sports turf managers receive. Benefits are strong and steady.

Bonuses for members are up. In 2012, 22% of members received a bonus. Today, 28% are awarded one, and the top reason for that award is job performance. Thirty-four percent of those receiving a bonus are awarded $5,000 or more. Retirement benefits remain unchanged from 2012; 93% receive a retirement or pension plan.

Fewer employers are paying for all of single health insurance premiums (24% in 2016 compared to 29% in 2012). However, there is a shift to the employer paying partial costs of the single premium. Seventy-two percent report that their employer sixty-six percent of employers paid partial health insurance premiums in 2012.

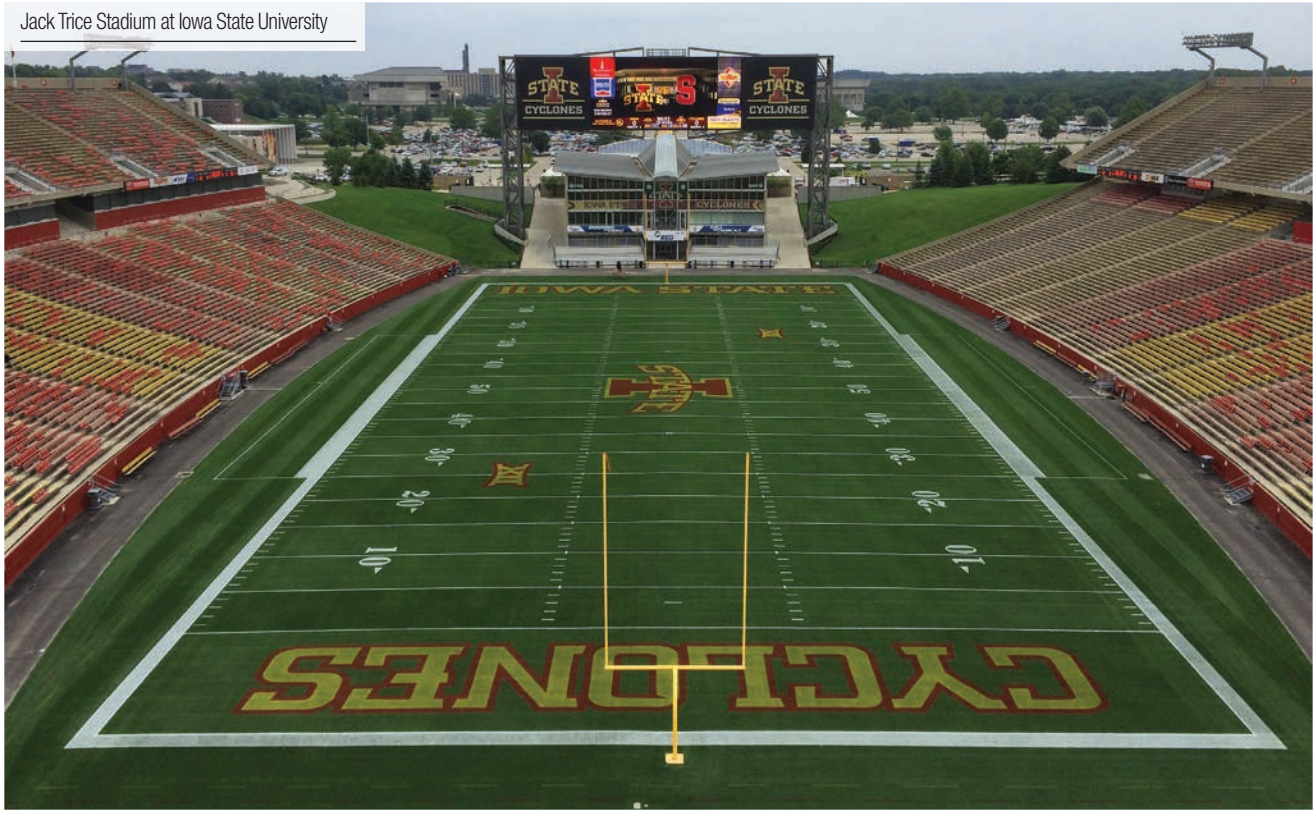
The vacation benefit is virtually unchanged — 98% of our members receive this benefit. One of the biggest changes is in the number of days. In 2012, 20% of our members received 16-20 days annually; now 27% qualify for that number, most likely due to increased years of service. However, members are not using all of the vacation time that they have earned. Only 26% of our members who receive 21+ days annually actually take the full 21+ days. Sixty-seven percent of members can carry over unused vacation days to the next year.

The one benefit that shows a significant increase is in employers paying for all costs for their sports turf manager to attend the annual STMA Conference and Exhibition. That percentage rose by 12%. Sixty-four percent of employers pay all of the expenses for their sports turf manager to attend. Correspondingly, the percentage of sports turf managers who have had to pay their own way to the conference has dropped by 10%. Now, 26% do not have any costs paid by their employer compared to 36% in 2012.

The benefits section also includes information on the percentage that employers pay for other insurances for their sports turf manager: dental, vision, life, short term disability and long term disability. Sick leave, paid holidays, vehicle allowances, performance reviews and employment contracts data rounds out the benefits section.

OPERATIONAL DATA

Some operational and demographic data was collected. The report shows the number employees managed, both full time and seasonal, average number of hours worked by sports turf managers, and the months that they are employed. Facility acreage is reported, the sports played on the fields and a breakdown between synthetic and natural grass field types is detailed. Chapter information is also included. STMA has 33 affiliated chapters, and 19% of members do not belong to any chapter. The average age of a sports turf manager is 44 with the median age 42, down from 44 in 2012. For the first time STMA asked about race and repeated gender questions to help us know where we are today with diversity in the profession. ST



Jack Trice Stadium at Iowa State University

DEGRADATION OF PAINT IN A SAND-BASED SPORTS TURF MEDIA

BY **JOSH LENZ AND DR. NICK CHRISTIANS**

Athletic field paint is used worldwide in the sports turf industry to mark boundaries and/or create logos on athletic fields; however, the more it is used the more problems it can cause. Over a period of time, this paint can accumulate in the soil and cause problems with plant growth, sometimes to the point of total turf loss.

Research has been conducted at North Carolina State University evaluating the impacts of athletic field paint on the amount of light a plant receives and the overall effects on photosynthesis. It has been concluded that when a turfgrass canopy is covered by field paint, it alters the amount of light that is available for photosynthesis. Other work has shown that darker paint colors can absorb over 90% of light, reducing the photosynthetically active radiation (PAR) at the leaf surfaces. While the effect paint has on PAR is well understood, there is little information on the accumulation of paint in the soil profile and how it affects the chemical and physical characteristics of the soil.


Cores show paint build-up in soil

Paints are made up of four basic elements: pigment, binder, solvent, and additives. Pigments and binders are of particular concern. Pigments are used in paint to ensure a surface is completely coated, and give paint its color by absorbing specific wavelengths of light while reflecting others. Titanium dioxide is the choice pigment when it comes to white paint because it has the highest level of brightness of any pigment. Higher concentrations of titanium dioxide will result in brighter paint, but it will also raise the cost. To keep costs lower, a filler pigment needs to be used.

Calcium carbonate is often used as a filler pigment. It can be used in mixing

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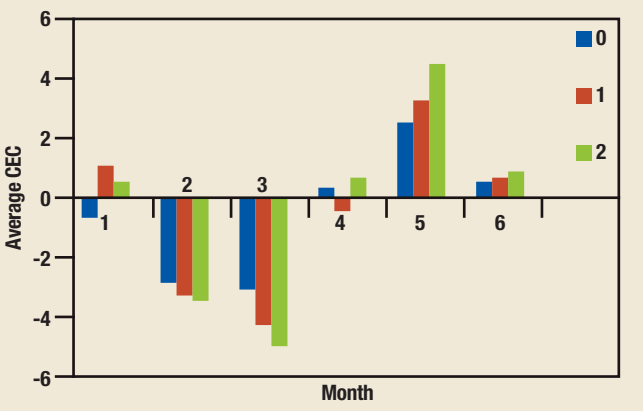
certain types of cement, so its presence in high concentrations in turf paint can damage grass. Paint is often mixed with water before use. If that occurs and then the paint sits for a long time, the calcium carbonate will separate and harden. This is similar to how it works in the soil. If applied often enough to the same area, it will eventually migrate several inches into the soil and harden; choking off grass plants at their roots, and potentially affecting the chemistry of the soil as well as water infiltration.

Figure 1. CEC in the soil adjusted for the control. 0=acrylic, 1=PSR#1, 2=PSR#2.



Additionally, paints contain a binder or polymer that acts as the adhesion component for bonding to the surface. This level of the binder (resin) will determine how long the paint persists. Common binders used in turf paints are acrylic and latex.

This study began by comparing different rates of a white, water-based acrylic paint from a major supplier of athletic field paint. The objective was to determine the amount of paint that would remain in the soil after a long period of time. Tests were then conducted using three different green-pigmented paints from Sensient Technologies. These paints include acrylic, polysaccharide resin number one (PSR #1) and polysaccharide resin number two (PSR #2). The acrylic paint from Sensient has similarities to water-based acrylic athletic field paints available from other companies with regard to the four basic elements; however, the Sensient product uses less acrylic binder.

The objectives of this study were to determine the effects of green acrylic polymer paint and two green paints with polysaccharide resin technology on the chemical and physical parameters of a sand-based sports field media, and to see if one of the three paints broke down quicker than the other two.

MATERIALS AND METHODS

The study was performed over 6 months in the horticulture greenhouse at Iowa State University. Large trays of sand were placed on greenhouse benches. Trays were arranged in order on the bench and measurements were taken monthly. The soil and paint mixtures in the trays were watered regularly to encourage microbial activity.

The amount of paint mixed with soil was determined from preliminary chemical tests. Several different rates of water-based acrylic paint were uniformly mixed with sand and chemically tested along with a sample containing accumulated paint over the past 8 years from Jack Trice Stadium at Iowa State. The results were used to compare and estimate how much paint should be used in the study. After determining similar results between the mixed samples and the Jack Trice Stadium sample, additional chemical tests were performed on test batches of soil with the Sensient paints to determine the best rate for this study.

Chemical tests were performed monthly on subsamples from each tray, and the samples were submitted to the soil-testing laboratory for soil chemical testing. Samples were collected in small plastic bags and immediately driven to the testing lab so there was no variability among treatments over the 6 months. The lab performed tests for phosphorus (P), sulfur (S), potassium (K), zinc (Zn), sodium (Na), magnesium (Mg), calcium (Ca), pH, buffered pH, cation exchange capacity (CEC), base saturation potassium (K_BSat), base saturation magnesium (Mg_BSat), base saturation calcium (Ca_BSat), base saturation sodium (Na_BSat), and organic matter (OM).

A saturated hydraulic conductivity (Ks) test was completed on additional subsamples taken from the trays monthly. Samples were collected in metal cylinders. The metal cylinders were sealed across the bottom with cheesecloth and taped with electrical tape around the sides. The soil and paint mixture was added to each cylinder by spooning small amounts of sand at a time, leaving about two to three centimeters on top for water to pond. Samples were carefully packed the same way to avoid circumstances that would skew results.

Once all cylinders were filled, the 12 samples were put in a large tub of water and left for 10 minutes until completely saturated. When samples were saturated, they were removed one at a time and placed on a ring and clamp stand. Water was ponded in the top of the cylinder using a Mariotte bottle. The outflow rate was measured with a graduated cylinder and a stopwatch at three different time increments for each replication. Once those measurements were taken, each measurement was recorded along with the ponded depth and the length of the soil sample. These data were used to solve for the Ks in Darcy's equation. All measurements were taken in centimeters/second. The study was conducted as a split plot in time.

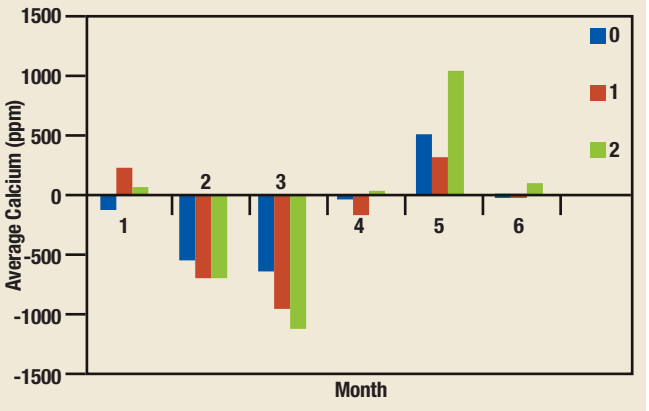
RESULTS

Levels of CEC, K, Zn, Na, Ca, P, and S were affected by the presence of paint in the media.

Cation Exchange Capacity. There were no differences in CEC among paint treatments at any time during the study. However, there were differences in CEC of the media among dates (Figure 1). There was a decrease in CEC as compared to the untreated control in months two and three. By month five,

the CEC in all paint treatments exceeded that of the sand in the control. This is likely due to the paint coating individual sand particles in the first few months after initiation of the paint treatments, to the extent that the soil test procedure was not able to properly measure CEC. It is assumed that the paint degraded by the fifth month and then the procedure was able to properly measure this variable. This will be further substantiated by the next few sections on the measurement of cations found in the treated samples. In every case, there was an increase in cation release in the fifth month.

Figure 2. Calcium concentrations in the soil adjusted for the control. 0=acrylic, 1=PSR#1, 2=PSR#2.



Potassium. There were no differences in extracted K among paint treatments for five of the six months of the experiment. In the fifth month, sand treated with acrylic paint and with PSR #2 were both much lower than the sand treated with PSR #1 (data not shown). The K level found in sand treated with PSR #1 was 313.5 ppm while the acrylic and PSR #2 measurements were 92.3 and 22.6 ppm respectively.

Potassium levels did vary by month. During the first three months, the release of K from all treatments was similar to the untreated control. It was in the fourth, fifth, and sixth months that K levels were higher in the paint containing treatments than in the control. This was likely a result of the degradation of paint that was coating the CEC sites up to the fourth month.

Zinc. There were differences among dates and paint treatments in extracted Zn throughout the duration of the study. In months one, two, and three, all treatments were lower compared to the untreated control. In month three, there was a difference among paint treatments. The sands treated with PSR #1 and PSR #2 were lower than the sands treated with the acrylic paint, but the two polysaccharide treatments did not vary from one another. In the fifth month, sand treated with acrylic paint released more Zn than the untreated control. At that time, the sand treated with acrylic paint tested at 0.7 ppm, which was higher than the PSR #1 at 0.2 ppm. The PSR #1 was lower than PSR #2 at that date (data not shown).

The greatest release of Zn occurred in the fifth month. This was consistent with the increase in CEC during that month and again is likely due to the degradation of paints by month five.

Sodium. There were no differences in extracted Na among paint treatments for five of the six months of the experiment. In the fifth month, sand treated with acrylic paint and with PSR #2 were both much lower than the sand treated with PSR #1. The PSR #1 treatment had a value of 149.6 ppm, which was much higher than the other two paint treatments. It is assumed that the PSR #1 contains Na.

Sodium levels did vary by month. In the first month, the release of Na from all treatments was similar to the untreated control. In the second and third months, all treatments were lower than the untreated control. It was in the fourth, fifth, and sixth months that Na levels in painted treatments had exceeded the control. This was likely caused by the paint coating the CEC sites during the first few months and by the fourth month it had started to degrade (data not shown).

Calcium. There were no differences in Ca among paint treatments at any time during the experiment (figure 2). The Ca levels found in the paint treatments in month one were not different than the untreated control. In month two and three, all Ca levels were lower than the control. As was the case with the other cations, there was a release of Ca in the fifth month.

Phosphorus. Similar to the cations, P availability in the sands treated with paint was comparable to the control for the first three months. However, in months four and five, P levels generally exceeded those in the untreated control. The P level found in sand treated with PSR #2 in month four was higher than the other two treatments. In month five, the acrylic and PSR #2 measurements were 12.6 ppm and 14.8 ppm and the PSR #1 was 0.7 ppm (data not shown).

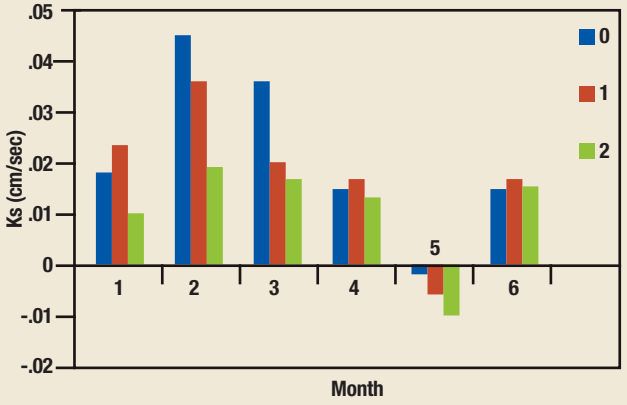
Sulfur. Like P, the release of S from the treated sands began in month four. There were no differences in extracted S among paint treatments for four out of the six months of the experiment. There was a difference in the S levels in the fourth month between sand treated with PSR #2 measuring 374.2 ppm compared to sand treated with PSR #1 and acrylic with 209.6 ppm and 167.8 ppm respectively. In the sixth month, PSR #2 was also higher than PSR #1 and acrylic (data not shown).

Saturated Hydraulic Conductivity. The Ks results are measured in centimeters per second (cm/sec). Each treatment was adjusted for the control by corresponding dates. The values show a range from -0.01 to 0.04 cm/sec. When a value is negative, the movement of water through the profile is slower in the paint treatment than it was in the untreated control. When a value is positive, the movement of water through the profile is faster in the paint treatment than it was in the untreated control.

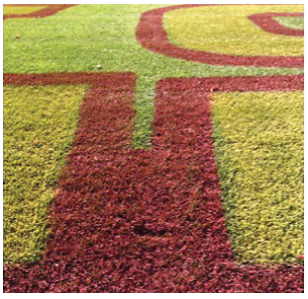
The Ks values (Figure 3) demonstrate a trend just opposite of the chemical variables. There were no differences in Ks among paint treatments for five of the six months of the experiment. In the second month, sand treated with acrylic paint and with PSR #1 were both faster than the sand treated with PSR #2. The average Ks in sand treated with acrylic paint and PSR #1 was 0.04 cm/sec and 0.04 cm/sec respectively compared to PSR #2 at 0.02 cm/sec.

Saturated hydraulic conductivity levels did vary by month. Rates were accelerated in months one and two. By month three and four, the Ks began to decrease but it was still faster than the untreated control. This is the opposite result of what was expected. It was anticipated that the presence of paint would slow infiltration. It is likely that the paint coated the sand particles and this coating repelled water resulting in an increased Ks. By the fifth month, the paint had degraded to the point where Ks was similar to the untreated control.

Figure 3. Saturated hydraulic conductivity rates in the soil adjusted for the control 0=acrylic, 1=PSR#1, 2=PSR#2.




Soil profile showing paint build-up


Painted area at Jack Trice Stadium

CONCLUSIONS

The paint evidently coated the sand particles, thereby reducing CEC and the release of cations for the first four months of the experiment. By the fifth month, the paint had degraded to the extent that CEC sites were exposed and cations were released into the soil solution. The anions, P and S, showed an increase by month four, thirty days before the cations were released. The reason for this is unclear, although it may be due to other unknown components in the paints.

This is also the case for Ks. The acrylic paint does appear to speed up water movement, followed by PSR #1 and then PSR #2. In all paint treatments, the first three months the Ks is quicker than the untreated control. By the fourth month, the paint begins to degrade and as a result the Ks gets slower. Then in the fifth month, all treatments are slower than the untreated control. This substantiates the hypothesis that the paint was coating the sand particles and degraded over a four to five month period.

It cannot be determined from the chemical or physical results that one of the paints broke down quicker than the other two. The paints did affect each treatment, but it took six months for each of them to break down chemically. The same is true for the Ks results. Although the PSR #2 had less of an effect on the Ks over the first four months, the difference between the three treatments is very minimal. Then by month five, all three treatments show no differences compared to the control.

Further research on the effects of paint on the chemical and physical properties of the soil should include an expanded number of paints, including those commonly used on sports fields. The number of physical tests performed on the samples should also include particle size analysis (PSA) and physical performance evaluation (PE), which would include information about infiltration rate, porosity, bulk density, particle density, and organic matter. ST

Josh Lenz is a graduate student at Iowa State University; Nick Christians, PhD is a professor in the Department of Horticulture at Iowa State.

John Mascaro's Photo Quiz

Answer on page 34

John Mascaro is President of Turf-Tec International

Can you identify this sports turf problem?

Problem: Strange marks leading away from warning track

Turfgrass area: Baseball Stadium

Location: Melbourne, Florida

Grass variety: Bermudagrass overseeded with perennial ryegrass

BACKGROUND ILLUSTRATION COURTESY OF ISTOCKPHOTO.COM

REPLACING SYNTHETIC TURF: A CASE STUDY

BY **TAB BUCKNER**

Editor's note: *This article was originally published by Sports Turf Canada's* Sports Turf Manager, *Vol. 28, No. 4, Winter 2015, edition. Our thanks to Lee Huether of Sports Turf Canada and author Tab Buckner for allowing us to reprint.*

In 2003 the first synthetic turf field in the Township of Langley was installed at McLeod Athletic Park. The synthetic turf replaced an existing natural turf sand-based field inside an eight-lane track.

After the synthetic turf field was constructed drainage issues on the field became problematic following heavy rainfall events. Even after minor rainfall there was ponding water on sections of the field. The Township of Langley is located 30 km east of the City of Vancouver in the rain forest of British Columbia. It was determined that the over compaction of the base gravels, infiltration rates of the synthetic turf below manufactures specifications, and no perimeter trench drain between the field and the track were the causes of the field not draining at the 250 mm/hour as specified in the original construction tender documents. To mitigate some of these drainage issues an internal perimeter drain line was installed under the synthetic turf to intercept the track water runoff and a surfactant was applied twice a year to the synthetic turf to improve infiltration.

The Township decided in 2012 that the synthetic turf field at McLeod Athletic Park would be replaced between March 18 and June 7, 2013. The reason this time period was selected was to minimize disruption to field users and have the project completed before provincial and national track events at the park in the months of June and July. Generally this type of work occurs in the summer when rainfall accumulation is very small and does not delay the project. For the project to be completed on time the Township was hoping for a dry spring and, luckily, it happened.

As previously mentioned, this field had a drainage issue. With the replacement of the synthetic turf eliminating one of the contributing factors, two still remained. In discussions with the consultants it was decided to scarify the existing base gravels to lessen compaction thereby improving their drainage. Second, was to build a crown on the field. Third, was to install a drainage pad under the synthetic turf to take advantage of the new crown on the field. Last, was to install a channel drain between the track and the edge of the field to pick up the water draining from the track and not allowing it to disperse onto the field.

An additional part of the project scope was to install a 4-foot high ball control fence in sections around the majority of the field to minimize conflict between field and track users.

On March 18, 2013, the contractor started removing the existing synthetic turf field by cutting it width-wise into 3 m sections, rolling it up with the fill still intact and placing the rolls on a tractor/trailer unit for transportation to a recycling plant in Washington State.

Next was the process of scarifying the gravel base with the synthetic turf removed and the installation of perimeter drain between the track and the edge of the synthetic turf. After scarification of the base gravels was completed water was still ponding, especially in the southern portion of the field after rainfall. It was decided to camera the existing drainage system and it was determined that 520 m was compromised and needed

to be replaced. It was also decided to add an additional 200 m of lateral drain lines in the southern portion of the field to increase the chances the base gravels would drain effectively.

Once all the civil works were completed on the field, the turf contractor installed the drainage pad in sections followed by the synthetic turf. When installing the drainage pad it is like putting a giant puzzle together. The synthetic turf is rolled out width-way across the field in sections and then those sections are sewn together. Field lines that were not sewn into the synthetic turf at the factory were inlayed into the field, including lettering, numbers and a logo. After the synthetic turf field was completed the Gmax was 73.7 and the HCI was 182.45. The field was tested again in June 2014, resulting in a Gmax of 81.9 and 192.8 HCI; and in June 2015 the numbers were Gmax 90 and HCI 260 (tested by an independent third party).

There have been significant rainfall events since the project was completed and the synthetic turf field has drained without any issues. ST

Tab Buckner is manager of parks operations, Township of Langley, British Columbia, Canada.

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INFIELD HEATING SYSTEM: 1ST SEASON AT MICHIGAN STATE

BY **AMY J. FOUTY, CSFM**

In the spring of 2016 the Michigan State softball and baseball programs had a new option for spring practices in February — taking the field, rather than the normal northern climate indoor hitting/pitching facility or field houses. Having the ability to go outside, take ground balls and see the ball come off the mound or out of the pitching circle was unheard of in February here in East Lansing. On January 29, 2016, the first day of spring practice for baseball, I was standing with the coaches watching batting practice, seeing just that.

HOW DID WE GET TO THIS POINT?

In 2014, it all began with a conversation standing on the field talking about the future of natural grass playing surfaces. Lots of "wouldn't it be cool if … or wouldn't it be neat if we could … " and then one day I was fortunate enough to have that conversation with a couple people who shared the same vision and the ability to make that vision a reality.

For many people who know me, they know this: I am very conservative when it comes to managing and maintaining grass. We perform tried and true practices and use products that have demonstrated that same consistency over the years. However, as a Land Grant University and agriculturally grounded institution, we do explore technology, and from time to time we push the realm of what is considered normal. This was one of those times and is what keeps me excited about being a turf grass professional at MSU.

As in many situations, we had more questions than answers to start the process of researching the idea and feasibility of the electric field heating system in our climate. We came across an option that is readily used in Europe: electric ribbons as the heating source. Electric technology has come a long way from the heat coils of the 70's. A series of metal ribbons, placed 9 inches apart, delivers all the heat necessary to keep the field playable. We set it up so that all the controls are remotely accessible and the video feed option allows me and our manufacturer the opportunity to see what we are seeing and experiencing via a secure link. We did some research on the electrical capacity and found that with the electrical install prepped for future field lighting we had enough electricity to handle the two systems.

So there the process began; we designed and estimated the project, fundraised enough to cover the cost of the construction, and addressed all the concerns and issues we could within the University and the Athletic Department. I remember the cold drizzly spring day in 2015, when I sat at my desk with the purchase order in my hand, smiling, a little amazed we were finally here and doing it.

GETTING IT DONE

The end of July came quickly; we were dismantling and prepping our [Sports Turf Managers Association 2014 College Baseball Field of the Year] baseball field, and saying a few prayers that all would transpire in the next few months,

as we had diligently planned. As with all projects, it had a few challenges, especially since we were installing the first electric ribbon field heating system in North America. Things electrically work a little different in Europe than the US but we persevered and worked through the issues as the team completed fall practices. January 11, 2016, arrived and we turned the heat on for the first time. We worked through a few bugs with the manufacturer's assistance and 10 days later had the field thawed out and playable.

So you will probably ask, so were you planning to grow grass? The answer is no, we do not use the system to grow grass at that time of year; we use the system to thaw and keep the ground thawed so that the surface is safe and playable for student-athletes to practice. I will admit Mother Nature reminded us that she was in charge of the weather a few times through the process. We learned what was feasible and what was not. By early March we finally reached a point where we saw some consistency in the weather conditions. During this time we were able to use the system to keep quality playable conditions during freezing and thawing periods in the weather, which often in the past would have caused unplayable conditions.

Overall I believe it was a successful experiment and one that will continue to provide us with opportunity to play and practice earlier so our programs can be more competitive earlier in the season. From the field operations staff perspective we learned a great deal monitoring weather, soil temperatures, and moisture content. As technology advances so does the role and need for understanding of sports field managers. Professional development and continued education is a must for today's athletic field manager to be successful given the rapidly changing technology. We must evolve with the times to be a valued professional in our organizations.

Professional development and continued education is a must for today's athletic field manager to be successful given the rapidly changing technology

If you have questions please feel free to e-mail me at fouty@ath.msu.edu. ST

Amy Fouty, CSFM, is athletic turf manager for Michigan State Athletics.

THE STMA HISTORICAL COMMITTEE WONDERS if any readers know the gentlemen working on the mound in this photo, taken at Chicago's Wrigley Field in the late 1960s or early 70s. If you can identify him, contact STMA HQ or editor Eric Schroder.

TURF PEST MANAGEMENT FAQS

Readers sent us their turf pest management questions, and we posed the most frequently asked questions (FAQs) to a couple of industry experts — Barry Troutman, Ph.D., National Association of Landscape Professionals technical advisor; and Benjamin McGraw, Ph.D., Pennsylvania State University associate professor, turfgrass science. Their feedback is as follows:

FAQ: What recommendations do you have for managing pesticides in rotation to reduce the possibility of resistance being built up in the pest to certain chemicals?

Troutman: Rotation of pesticide modes of action is important, particularly on insects that have multiple generations in one season. We are currently limited to only a few mode of action alternatives. The most frequently used are pyrethoids and neonicotinoids, which have replaced the much more toxic organo-phosphates and carbamate insecticides.

McGraw: Pesticide resistance is not a major concern for the vast majority of product plus insect combinations in sports turf. The two species of insects where insecticide resistance is an issue are either golf course (annual bluegrass weevil) or home lawn (southern chinch bug on St. Augustine grass) problems. So, not a huge concern with the insects we have, given the products used and the number of generations per year. That is not to say that it will never be an issue.

FAQ: Do insects have a turf species preference? If so, what insects prefer what grass species?

Troutman: Insects are absolutely preferential feeders, and insect problems also vary by geography. There are nearly a dozen different species of white grubs each with slightly different life cycles that feed on root systems of turfgrasses. The southern chinchbug feeds on St. Augustine but not on other turf species, while the northern chinchbug feeds only on Bluegrasses. Tropical sod webworm is really particular, it will eat crabgrass first, then move to Bermudagrass before eating St. Augustine or Bahiagrass. The interactions are extremely complex, and knowing them is what makes us professionals.

McGraw: That is a pretty big and general question. Some sports turf insects may have a narrow diet (e.g. Black turfgrass ataenius might be found in Poa annua patches in an outfield), whereas others do not care about species as much as they would site conditions (e.g. irrigated turf vs. droughty turf). To speak generally, the major insect pest issues on sports turf (white grubs, mole crickets) are likely to be generalists and not be too finicky on which turf they feed.

FAQ: What tips do you have regarding application timing? What is too early? What is too late?

Troutman: Timing is critical for most applications to control pests. Weeds are easiest to control in the seedling stage. Often it is easier to prevent problems by controlling overwinter adult insects before they breed in early summer. With caterpillars, in most cases control must be delayed until the problem occurs. Research and recommendations from land grant universities are the best guide for control timing in each region of the country and professionals watch them closely.

McGraw: That all depends on what you are finding by actively scouting the turf. Sampling is required to answer that question.

FAQ: What impact would neonicotinoid bans on pesticides have on the ability to control insects?

Troutman: Banning of neonicotinoids would create potentially huge control problems. It would eliminate one of landscape and agriculture's most critical resistant management alternatives. In an urban environment, neonics are the only effective control for tree-killing pests like the emerald ash borer. They are much less toxic than other products used to control white grubs.

McGraw: The potential ban of neonicotinoids would have a major impact on a sports turf manager's operation. White grubs are likely to be the major insect pest that they are dealing with (independent of region within North America). That being said, white grubs have been, and continue to be, effectively managed with one insecticide application per year. Between the 1990s and today, neonicotinoids have been the number one product for that control. Since these products have been around since the 1990s, many active ingredients are "off-patent," allowing generics to enter the market and reduce the cost of an application. Although there are newer products on the market (e.g. anthranilic diamides like Acelepryn), the neonicotinoids remain much cheaper. A ban of neonicotinoids would cause the cost of controls to increase dramatically.

FAQ:Is the current pollinator issue and "bee-friendly" movement legitimate?

Troutman: Bee populations are indeed threatened, but it's not just about insecticide use. The honeybee is intensively

Bluegrass billbug damage often is mistaken for summer drought or disease. If not controlled, these spots will eventually die.

Northern masked chafers exposed by pulling damaged turf back.

Bluegrass billbug larvae burrow down the seedhead stem to the crown. When they devour the crown, the plant will be killed.

PHOTOS BY DAVID J. SHETLAR, PH.D., THE OHIO STATE UNIVERSITY

managed and stressed by a lot of travel from crop to crop. It is a fairly "inbred" species, so it is susceptible to a lot of pests — the most important is the varroa mite. These factors are often overlooked by those interested in banning pesticides. The turf use of insect controls is a very small part of the problem since turfgrasses and most landscape plants are not bee pollinated. The greatest risk to honeybees occurs in agricultural areas where bees and insect control are both critical to crop and food production.

McGraw: Concerns over pollinator health are legitimate. Insecticides affect insects, and we have to be aware that our turfgrass insecticide applications may have unintended consequences. Part of that is understanding how pollinators may be harmed, and what can be done to minimize any potential risks. There has been a great deal of work from Dr. Dan Potter's lab (University of Kentucky) showing that the risk can be minimized with the proper selection of products, choosing different formulations (granules vs. liquids), and how we take care of the product after application. It's not rocket science. So, yes the concern is legitimate, but the risks may be minimal (if not negligible) with the right application procedures.

FAQ: With stricter pesticide restrictions, what are some of the non-chemical means of control (or alternative insecticides or management practices) that can be used?

Troutman: Most products designed to control insects will also control honeybees if misapplied. Even so called non-chemical controls will kill bees if improperly used. The best course of action is to avoid treating plants in flower with any control product. With lawns, the best practice may be as simple as mowing the flowering weeds before making an application of insect control, or to use a granular product that will not damage bees. EPA has added bee protection language instructions to all control products that threaten bees. Following these instructions is the most effective way to protect bees and our urban environment.

McGraw: I was just in Ireland and Scotland and witnessed what the loss of neonicotinoids could look like. They do not have the option to use anthranilic diamides and have, more often than not, resorted to not taking action. The only other option that I presently see is the use of entomopathogenic or insect parasitic nematodes. The cost of using EPNs is high, though it may come down if more people adopt the technology. There is quite a lot that goes into the proper use of EPNs, since they are living organisms and need to be handled with care.

FAQ: What do you believe to be the biggest issue in terms of insecticide misuse that, if resolved, would help place turf insecticide use in better light?

Troutman: Not all bugs are bad bugs, and healthy landscapes can tolerate low populations of damaging pests, so be certain that treatment is necessary and then read and follow label instructions. Just as important is to create and protect pollinator habitat. Pollinator gardens attract and feed butterflies, solitary bees and even hummingbirds. Like turfgrass, they have important environmental functions with the added bonus of being downright beautiful.

McGraw: I would say that the biggest misuse is improper timing of application or making an application to when a pest is not present. Both issues can be avoided with a little scouting. It is a pretty simple thing to do, but many don't take the extra step to do the work that is involved with scouting for insect pests. I think that the effectiveness and the lengthy residual control of some of our insecticides has made some lazy when it comes to monitoring for insects. ST


The baseball field at the Salesianum School in Wilmington, DE

THINGS I HAVE LEARNED FROM THE MISTAKES I HAVE MADE

The politics of sports turf management

BY **DON SAVARD, CSFM, CGM**

"Experience is merely the name men gave to their mistakes."
—Oscar Wilde

There is a truth most sports turf managers recognize—that grass is more forgiving than people. Grass can be neglected, suffer wear and abuse, even mismanagement, and in most cases will recover nicely once it receives the care it requires. People, on the other hand, remember how they felt when they perceive that they were not treated well or did not receive what they wanted. Like it or not, getting along with people might be the major part of our job because successful sports turf management depends upon effective people skills. And whenever people come together, whether it is on the playground as children or in organizations as adults, some form of politics will result when they begin to interact. Politics (in the context of this article) can be described as forming alliances, protecting and advancing particular ideas or goals, and exercising power when and where necessary.

As sports turf managers, we interact with a variety people from the field users to the owners to the many other interested parties. Typically, we are support staff that works for organizations whose primary businesses are something other than grass and dirt, such as education, government, or entertainment. The financial guys usually see us as overhead. Within the organizations where we work, other departments compete with us for money, resources, recognition, and approvals. External to our organization are people such as the users of our facilities, donors, and the public at large, who have perceptions about us or our facilities, which may be correct or not. For our job security and peace of mind, we need to get along with everyone. Our stakeholders have diverse interests and agendas. Some of these agendas serve the common good; others serve someone's individual self-interest. To fully understand the politics of the organization, we must become acquainted with all of the participants and their agendas. And within every organization, some stakeholders' agendas seem to have more clout than others, including yours and mine.

Most of us want to be in control of our jobs and not be

controlled by external forces. At the same time, the politics of sports turf management is not about manipulating others to serve our own ends. Politics is a means of recognizing and, ultimately, reconciling competing interests within the organization. While we cannot control the thoughts and behaviors of other people, we can moderate our words and actions and thus increase our effectiveness. Here are some of the lessons I have learned (the hard way):

Self-care. This is very important. We are in the care business. We could not be successful if we neglected the care of the assets we are responsible for. The same goes for us, too. Just like on an airplane where you place the oxygen mask on yourself first before your child, your needs (food, sleep, exercise, family obligations, etc.) must be satisfied first. I used to work for weeks during the season without a day off. I would shortchange my sleep and eat poorly. Like a frog in the pot of water gradually coming to a boil, I couldn't see how miserable and ineffective I was becoming. Now when I practice self-care, I feel better, am less stressed, and my attitude is improved. I am more open-minded and easier to get along with. As a result, when someone asks me to do something for him or her, it is more likely that my focus will be how to make it happen rather than why it can't be done.

Leverage. It used to be that whenever I proposed an idea to my school's administration, I would often get shot down. Now, when I want to lobby for a site improvement on my campus, I have found it simpler to get approvals, funding and acceptance if I can get someone else on board with it. Selling the idea first to my boss, a coach or an athletic director makes it easier sell the idea to the decision makers. There is strength in numbers. Of course I have to do my homework first and have a well thought out plan and thoroughly know the costs and benefits. Allowing others to share the vision, participate in the process and share the glory helps to make an idea a reality.

Learning how to say no. We're the "go to" guys and gals when it comes to our sports turf facilities. From being the "10th man" on the baseball team to the coordinator for a non-sporting event, we are the hub of the wheel. People at all levels come to us when they need something or want something done. (Sometimes, it seems the more arcane the request, the higher up on the food chain the requester comes from.) Most of the time, we are in the business of saying "yes." Occasionally, there is a collision of limited time and resources, weather and the unexpected. I hate to disappoint people but I have learned that if I take on too much, there is a good chance there will be a bad outcome. Even if I do all the big things right, mishandling the

small details will cost me. We have to carefully discern what, when, and to whom we can say "no" to. Sometimes we can negotiate a compromise but we have to be realistic (and polite yet firm) about what is and is not possible.

Seek to understand rather than to be understood. "Oh, poor misunderstood me! If **THEY** only knew!" That line of thinking never got me good results. Over time I learned to step back and detach myself; only then could I begin to examine the big picture of why decisions were being made, or why things were the way they were. By accepting things as they are at that moment, I can move toward living in the positive and having a better outcome. However, just because I can learn to understand and accept something doesn't mean that I have to like it. It only means that I can let go of it and not waste time living in the negative.

Change and Flexibility. I love change, but only if I am driving it, and I have found that if I try to inflict change upon other people, they will probably resist it. If I want to influence someone, a well thought out plan that is transparent, easy to understand and shows the benefits to him or her seems to work best. Most of the time, though, I am trying to manage change that is being inflicted upon me. Change is inevitable. You either adapt to change or fall behind. For me, trying to be flexible and positive has made me a better sports turf manager because ultimately, I am going to have to find a way to make the change work. If I keep my attitude positive, I will have more influence with others. But remember this: when the winds of change blow hard enough, the most trivial of things can become deadly projectiles.

Culture. Every organization develops its unique personality or culture, often influenced by its leadership, but culture can also be shaped by powerful internal or external forces. Cultural change usually happens slowly (think of glacial movement). Most cultures likely have formalized policies for its community to follow, but also have unwritten customs that its constituency is expected to abide by. For example, where I work, making a donation to the Annual Giving Program shows my support of my school's mission and gets my name on the donor list in the annual report. Attending work-related social events (even just making an appearance) helps build goodwill. People notice your participation. If you want others to support your program, it definitely helps to support theirs.

Discretion. I love transparency, but I understand and respect the importance of confidentiality. The easiest way to be cut out of the loop is to divulge privileged information. I am careful about what I disclose in public about other people or their ideas, especially if it is negative. Even in private, it's smart to be cautious; some things can be misinterpreted. In meetings, I have learned to stay composed when something is presented that I do not agree with. Remember, you are a professional; no pouting, no whining; think before you reply or hit send. I have found that unless I am specifically asked, my opinion is probably irrelevant. Need to vent? Seek a mentor, or someone you can trust. (And, for domestic harmony, try to avoid frequent venting to your significant other!)

Don Savard, CSFM, CGM, at work.

Credit where credit is due. Do you hate it when someone takes the credit for your work? The success of our school's sports turf and grounds management program is as a result of **all** of the people with whom I collaborate. I have found that personal relationships with coworkers, contractors, and vendors based on fairness and honesty breeds respect, loyalty, and trust. When we receive compliments about our grounds or sports fields, I say thanks but give the credit to the person or group responsible because I am grateful for and proud of our collective results.

While I have honed many of my skills by learning the hard way, you can improve your skills the easier way by becoming active in the Sports Turf Managers Association and its local chapters. When I talk with other sports turf managers, I learn from their experience and gain valuable insight. There is no better way to learn how to manage a situation before it becomes political quicksand than from someone who has experienced it firsthand.

ST

Don Savard, CSFM, CGM, is the athletic facilities and grounds manager at the Salesianum School in Wilmington, DE. He is a Past President of the Sports Field Managers Association of New Jersey and currently serves the SFMANJ Board of Directors as an advisor.

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Dave Mellor and Drago.

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DAVID MELLOR OF THE BOSTON RED SOX: THE LUCKIEST MAN IN THE WORLD

BY **STACIE ZINN ROBERTS**

David Mellor says he's the luckiest man in the world. And if all you knew about this lifelong Boston Red Sox fan was that he works as the Senior Director of Grounds at Fenway Park and is responsible for the sports field for the BoSox, you'd probably very quickly agree.

But the Green Monster, the breaking of the Curse of the Bambino, and the fated World Championship that resulted are not the reasons why Mellor says he's the luckiest man in the world—and his reasons may surprise you.

As a young man in 1981, Mellor's prospects were good. He was a star athlete. A scouted pitcher in high school with scholarship offers, he set his sights on the pitcher's mound at Fenway Park. Then, one night, he was crossing a parking lot heading into a McDonald's restaurant. He heard a car rev its engine. He stopped to let the car pass. The driver waved him on, then the car lunged forward and hit him straight on, throwing him 20 feet across the parking lot, landing him in a crumped heap against the wall of the McDonald's building. He heard the engine rev again and the car lunged forward for a second time, pinning his leg. In that moment he knew his dreams of pitching at Fenway were over.

Mellor had to find a new dream.

"When I got hit by the car and realized I couldn't play anymore after my third surgery, my family urged me to find a career that I would love to do because so many people don't like their job. I thought, 'What do I like? I love being outside. I grew up taking care of people's lawns. Science was a subject that I enjoyed in school. And I loved baseball.' I thought, 'Somebody has to take care of the field.' My brother Terry lived in Milwaukee at the time and he told me that if I could get a job with the Brewers, I could live with him to save money to make ends meet," Mellor says.

But how do you get a job on Major League Baseball crew

From Fenway Park

with no experience?

"I wrote the Brewers many letters, followed with more letters and phone calls, to express my sincere interest to be an intern on the crew. I was thrilled when they hired me and gave me the opportunity," Mellor says.

After he graduated from Ohio State with a dual major in horticulture and sports turf management, the Brewers created a full-time position for him. He had finally earned a job in baseball.

In 1995, Mellor and the crew were resodding the Brewers field at the old County Stadium (the facility was replaced by Miller Park in 2000). As he stood with a rake in his hand on the warning track, he heard the sound of a car engine. He knew the gates of the stadium were open to allow for sod trucks and equipment to move freely. But the sound got louder. He looked up and saw a car coming right at him. He put his hands up and yelled for the lady driving the car to stop. She stepped on the gas and came straight at him. His body hit the windshield, bounced to the ground. The driver lapped the field and came at him again, swerved and missed him by inches. He later learned she'd had a history of mental illness and was under the delusion that she was a stunt driver in a movie.

One more trauma would hit Mellor hard. His brother Terry and his wife lived on a lake south of Milwaukee, and Mellor and his family would often go to visit. In July 1998, Mellor and his family spent the weekend with Terry and his family at the lake. "We went fishing and had a wonderful weekend. On that Sunday, we said our normal goodbyes, saying hey, I'll see you later. He gave me a hug."

On Tuesday evening, his sister-in-law called to say that Terry had died suddenly. He was 43 years old.

More than a decade later, Mellor received a service dog to help him with the nagging injuries following the car accidents. Born in Slovakia, the dog is named Drago. He goes everywhere with Mellor and is a constant fixture at Fenway. Terry often joked that if he died, he'd come back as the family dog. The day after Drago arrived, Mellor took him to the vet and he learned that Drago was born on Terry's birthday.

How is it possible that Mellor could endure not one but two horrific episodes of being hit purposefully by someone driving a car, recover from his brother's sudden passing, and heal through more than 40 surgeries to repair the damage to his body? Not very well, it turns out. For 29 years, he suffered nightmares every single night. Even the smell McDonald's French fries could trigger a flashback.

Still, he suffered alone, never expressing his physical pain or sharing his mental strain because he didn't want to burden his family. To deal with the nightmares and the pain, he often isolated himself. Through it all his wife, Denise, and their two daughters, Cacky and Tori, stood by him through every surgery,

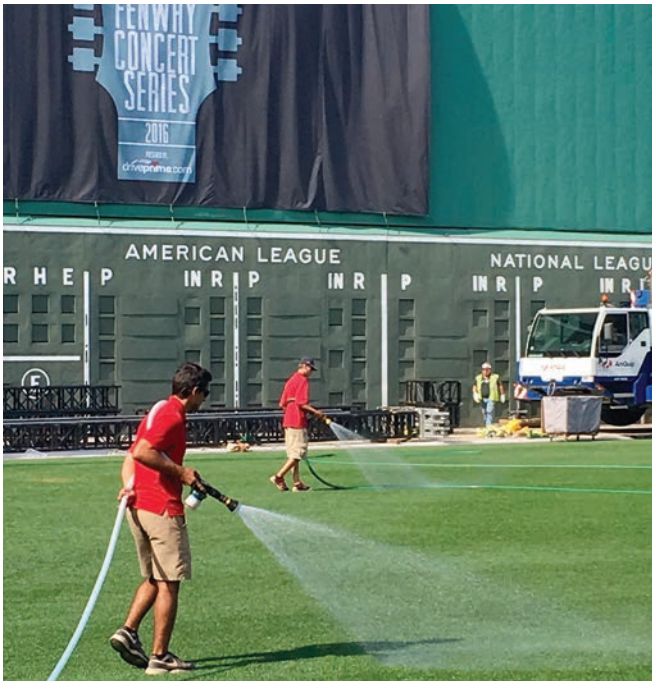
every ordeal. He focused on work, grew his resume and developed a winning reputation. He earned jobs with the Angels, the Giants, the Packers. In 2000, Mellor was negotiating for a groundskeeper position with the Cincinnati Reds organization when he received a call from Joe Mooney, the legendary groundskeeper who managed Fenway Park for 31 years. Mooney told Mellor he was ready to retire but he'd only do so if Mellor would succeed him. In January 2001, Mellor became Director of Grounds for the Boston Red Sox.

Then in September 2010, Mellor was reading an article in *Smithsonian* magazine during an acupuncture session. In the article about a new treatment facility for post traumatic stress disorder, Mellor read the list of 12 symptoms associated with PTSD. He checked them off, one by one. He had 10 of them.

"I only thought you could have PTSD from the horrors of war. Now I know anyone can have PTSD from a life-threatening trauma. While it scared me, it also gave me hope that if I did have this, I could get treatment, and hopefully I would be a better dad and husband. If counseling helped me, it was a bonus," Mellor says.

He went home that afternoon and talked to his wife. They went to the hospital the next day and he began counseling.

"On February 23, 2011, I slept through the night for 7 hours for the first time in 29 years without a nightmare. I'm superstitious, didn't tell anyone. I slept through the night 3 nights in a row. After that, I realized it was time to share with my wife and my doctor the incredible news that the counseling was helping. I went over 4 years—1,719 days to be exact—without another nightmare. I knew that a nightmare triggered by an old trauma, or a new trauma may happen again someday, so instead of letting the newest night terror pain fester, I called my doctor the next morning to work through the nightmare to desensitize it and not let it influence my life as (it would have) before," Mellor says.



Interns Case South and Jeremy Langlois using wetting agent near Green Monster.

Throughout his career, Mellor has shared his professional experiences. As a sports turf professional, he's authored two books on lawn care ("The Lawn Bible: How to Keep it Green, Groomed and Growing Every Season of the Year") and on athletic field striping ("Picture Perfect: Mowing Techniques for Lawns, Landscapes and Sports"). He's also co-authored or contributed to 12 additional books on landscaping, including books with the Scotts Company.

In 2013, ESPN did an E:60 feature on Mellor that revealed the physical and mental traumas he's overcome in his life.

"I was very humbled and moved hearing from so many people who thanked me for having the courage to share my journey. Many people shared their own powerful challenges with me. They said they were now going to start counseling and/or stop drinking as a result of seeing the E:60 piece," Mellor says.

The documentary drew the attention of television personality Glenn Beck, whose publishing company is now helping Mellor to write his memoir. The book deals as much with how he has learned, through counseling, to manage and overcome PTSD, as it does with his career in baseball. He says he's writing the book to "give people hope and let people know they are not alone, and that help is available. Whether you are dealing with physical or emotional pain, I want to encourage people to not give up. I want to help others release the stigma of PTSD and seek treatment. My family and myself feel if sharing our journey helps one person it is worth sharing," he says. "Everyone has their own challenges. I don't want anyone to suffer in silence like I did."

At Fenway Park, Mellor manages a crew of three full-time staff, with up to 40 seasonal workers who rotate shifts. Along with more than 80 home games in the 2016 schedule, he and his crew prepare the field for concerts, events and fan tours. He says he's fortunate to have great communication with and support from the front office, which is critical to coordinate enough downtime to keep the field in top shape at all times.

Fenway Park is grassed with Kentucky bluegrass sod grown by Tuckahoe Sod Farm in New Jersey. The sod is laid over a soil mix of 90% sand and 10% Profile Porous Ceramic soil amendment. "Adding Profile to our rootzone is an investment that has certainly paid off, greatly enhancing rooting and quicker recovery from wear combined with improved drainage to have a better playing surface," he says.

Mellor says Fenway is unique in that it has three microclimates. Most ballparks have two; the upper deck shade and the sunny part of the field. Fenway's Green Monster creates a third microclimate. The 30-foot-tall green wall creates a heat island, driving temps up as high as 150 degrees, stressing turf. The outfield can have as much as a 40-degree temperature difference as compared to behind home plate in the upper deck shade. Mellor uses wetting agents and moisture meters to monitor soil

temperatures. The heat created by the Green Monster can "also be our friend" to melt snow plowed from the field and piled high against to the big green wall.

For the past 4 years, he's also added a new machine to his equipment rotation called the Air2G2 from GT AirInject (winner of the 2015 STMA Innovative Award) to help ease compaction and reduce stress near the Green Monster, and other areas of the field. The Air2G2 fractures the soil by inserting three probes up to a foot deep into the soil and injecting air (oxygen) at 6 to 7 inches deep, and again at 10 to 12 inches deep, with each drop. Injecting air laterally through the soil profile creates pore space for water to drain and increases the gas exchange in the soil.

"I think the machine is literally one of the most unique and innovative machines in my 32-year career," Mellor says. "We use it before and after concerts, we use it around our tarp before we dump our tarp (to allow water to quickly drain), we use it for general maintenance, and as a part of our turf management program of regular aerification. It truly aerates the soil versus poking a hole in the ground and hoping air goes down in that hole. It relieves compaction and improves pore space. It helps with drainage. You know, roots grow in the pores of the soil. If you think of marbles in a jar, if there are little marbles and they're too tight, there's no pore space. I think of it kind of like fracking in the gas or oil industry, how it laterally creates pore space. This helps the grass breathe, it helps flush out gasses, reduce compaction, improve drainage and helps you have healthier turf. And what's great is, you can do it today and play today."

Although Mellor still aerifies in the spring and fall by pulling cores, with the Air2G2 "you don't have the labor and manpower issue of cleaning up cores or maybe being too aggressive on the turf in the heat of the day. We just had 7 consecutive days in the 90s and we used the Air2G2 and didn't have to worry about localized dry spots or stressing on turf. It's an important tool in our rotation of equipment."

Mellor says his wife Denise knew when Joe Mooney called that they would move to Boston. The Mellors were Boston natives. His two older brothers, Chip and Terry, spent many summers at Fenway with their parents watching the Red Sox. Before he was born, the family moved to Ohio. When he was 3 years old, his father died, and Terry, 7 years older, and Chip, 12 years older, became his father figures. They encouraged him to grow up a rabid Red Sox fan. Now, with his job at Fenway Park, Mellor walks past the row of seats his family shared all those long summer nights ago. It's a visceral connection to his family, to this place. The gravity of it all is not lost on him.

"It's an honor to be behind the scenes. It was certainly my dream to stand on the pitcher's mound at Fenway with a stadium full of people. I do that in a different way now," Mellor says.

If he had never been hit by a car after high school and had made it as a pitcher in the Majors, Mellor says he probably would not have met his wife, had two beautiful daughters, spent more than 30 years as a sports turf manager achieving the highest level of his profession. When he looks back, he is grateful for all he's experienced, both good and bad.

"I am thankful, blessed and lucky to have my wife and daughters in my life. Their love and support means more than words can describe. I also appreciate my friends and colleagues for their help and support, too. I'm extremely fortunate to have an incredible support network." Mellor says, "I think I am one of the luckiest people in the world." ST

Stacie Zinn Roberts is president of the What's Your Avocado? Marketing Agency, Mount Vernon WA, WhatsYourAvocado.com.

John Mascaro's Photo Quiz

Answers from page 15

John Mascaro is President of Turf-Tec International

These strange marks leading away from the warning track are footprints, but what's interesting is how they got here. Before 2016 Spring Training, a third-party was hired to pressure wash the entire seating bowl of the stadium with a solution containing chlorine and other cleaning agents. The cleaning was done from a specially outfitted truck containing a 500-gallon tank that maneuvered around the stadium on the warning track. As the crew was working, the Sports Turf Manager noticed that the tank and pump fittings were leaking profusely and large puddles were forming under the truck. He halted their work until he was given assurance that the product would not harm the turf. After the cleaning was finished, there was no apparent damage to the turf and all through Spring Training the areas looked fine. Coincidentally, the very last home game of Spring Training was rained out before the first pitch and the crew was on and off the field several times during the rain. Within a few days, the Sports Turf Manager began noticing areas of declining perennial ryegrass, conspicuously shaped and patterned to resemble foot traffic. Apparently 6 weeks after the cleaning, the rain reactivated the chemicals in the puddles on the warning track, causing the burning of the ryegrass in the shapes of the footprints. Unfortunately, the ryegrass was damaged beyond repair and the semi-dormant bermuda underneath struggled to green up, which further enhanced the footprints.

Photo submitted by David Nowakowski, CSFM, sales rep for Harrell's Fertilizer. Paul Lopez, CSFM, is Head Groundskeeper, Florida Operations for the Washington Nationals Baseball Club in Melbourne, FL.

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.*

BACKGROUND ILLUSTRATION COURTESY OF ISTOCKPHOTO.COM

FOOTBALL DRAINAGE: IT'S WHAT'S INSIDE THAT COUNTS

BY **MARY HELEN SPRECHER**

When a football field needs improvement and there's money to sink into it, it's likely that the owner is going to be faced with the choice of how this money gets used.

Deciding between one improvement and another isn't easy at all. After all, some improvements are highly visible and make a field look like a showpiece. An improved entryway, a new scoreboard, upgraded lighting, Wi-Fi throughout, a press box — those are some great examples of physical improvements that add a lot to a football stadium's aesthetic. They're additionally valuable because they allow for recognition of sponsors, donors, alumni and other benefactors, and they look good when sportswriters see them.

But on the other end of the scale is what can be classified as largely invisible investments. They add to the playing experience, make the field work better overall but they're just not sexy. Examples might include new irrigation equipment, better fencing and better storage buildings for maintenance equipment.

Most people would agree that it's not as easy to put a donor's name on a storage shed as it is to put it on a scoreboard. And let's face it; those kinds of improvements are right up there on the excitement scale with household insulation and basement waterproofing. They're not glamorous, but they are totally necessary.

At the top of the list of what really makes a field great (and isn't the least attractive as an expenditure) is this: drainage. After all, even the best Wi-Fi and the coolest scoreboard won't count for much if the field can't be used because it's a muddy mess. The usefulness of the field and its long-term performance, as well as the satisfaction of athletes and ultimately of the field owner, is all tied to having an effective drainage system.

ALL IMAGES COURTESY OF GRAND PARK, WESTFIELD, IN COURTESY OF AMERICAN SPORTS BUILDERS ASSOCIATION AWARDS PROGRAM, 2014.

BENEATH THE SURFACE

Grass fields are some of the most popular, best loved facilities nationwide. But not all fields are equal. And looking at it from the surface, the average person may not be able to see what causes one field to drain well and another to be wet and unusable. That's because in most cases, the secret is actually underneath the grass, in the soil. Here's a quick synopsis (which, by the way, is not meant to replace the knowledge or input of a knowledgeable professional.)

There are two basic types of natural grass fields: native soil and sand-based. A native soil field may be a true native field, in which only the soil found at the site is present, or a modified native soil field, or a sand-cap field.

A sand-based system, meanwhile, is one in which the native soil is completely removed, and replaced with an under-drain system and a drainage media layer (principally stone and rootzone material that is largely sand) to improve drainage.

None of these fields is "better," per se; however, one may be better than another in any situation. According to the book, *Sports Fields: A Construction and Maintenance Manu*al, "The main problem with native soil fields is drainage. Most native soils absorb water quite slowly and cannot handle large amounts; therefore, without additional provision for drainage, these fields can easily become muddy, worn and/or unusable."

So the question becomes this: do you have good drainage, or does it need some help? If you would like to see your field drain a bit better, ask the right people for advice. A knowledgeable professional can help you examine your options and decide, for example, whether you should consider amending the soil in the field. Depending upon your budget, your priorities, your weather conditions and your usage, this may (or may not) be the best option.

Amending your soil can be looked at as an investment; while it might not be the aesthetic improvement you've dreamed of (as would be the case with lights, scoreboards and so forth), it can pay dividends down the road in making the field drain better and thus, be playable sooner after a rain. However, it is only one part of the drainage equation.

The amount of slope your field has will also play into how well it sheds water. Fields may be crowned in the center (so that water runs to both sides) or they may be tilted to one side. Different governing bodies, such as the NCAA or the NFHS, will require varying degrees of slope for each sport. The most current version of the rules for the correct governing body should always be available.

This next tip may sound self-evident, but it's often forgotten: The only water that gets onto the field (no matter what type of field) should be either rainwater or planned irrigation. In other words, water that comes off the bleachers or the dugout roof, drips down hillsides or comes off any other structure or slope should be intercepted and collected by perimeter drainage before it gets the chance to hit the field.

TYPES OF DRAINAGE

It's time to venture into a brief description of various drainage systems. The following are some popular options; however, any facility owner is advised to consult with a field builder or manager who can help evaluate the site conditions and make recommendations.

A subsurface drainage system, which takes its name from its positioning, meaning it manages water that makes its way underground) can help fields dry more quickly.

The traditional type of drainage system for a sports field has been the pipe drain which uses perforated pipe placed in the subgrade. These pipes are laid in trenches, surrounded by coarse sand or clean stone to within 4 inches of the surface of the subgrade and capped with sand. Water then drains downward through the rootzone and stops in the trench where it enters the pipe from the bottom. Drains are typically placed 3 to 10 feet apart for native soil, and 10 to 30 feet apart for sand-based fields. They are surrounded by clean stone or coarse sand.

Another type of system exists: flat drains, sometimes called strip drains, 6 to 18 inches wide and 1 to 2 inches thick, without a wrapping of filter fabric, which are placed horizontally on the subgrade during construction. They also may be trenched in and placed vertically after installation of the rootzone in either native or sand-cap fields.

In addition, say builders, there's the least expensive (and still highly effective) sand vein system, sometimes called a sand silt system. This in particular works well in a native soil field.

The type of drainage chosen and all, or any combination of the factors listed above, including soil modification, slope and drainage installation may be considered, will depend on a variety of factors; these include:

- Owner budget
- Weather conditions
- Existing slope
- The type of soil
- Local regulations
- Amount of use the field receives

(and whether there are other facilities that can handle games if the field needs to be rested after a heavy rain, for example)

It's easy to spend money on visible improvements. What's oftentimes more important, though, is knowing that even the best flagship facility isn't going to play well if it doesn't drain correctly. It's an investment, rather than an expenditure, and it will pay you back for years to come. ST

Mary Helen Sprecher is a freelance writer associated with the American Sports Builders Association, which sponsors meetings and publishes newsletters, books and technical construction guidelines for athletic facilities. 866-501-2722 or www.sportsbuilders.org

MEMBER SPOTLIGHT

STMA COMMERCIAL MEMBER SPOTLIGHT: TURFCO MANUFACTURING

Editor's note: *Another installment in our occasional series highlighting Sports Turf Managers Association commercial members. This month we hear from Scott Kinkead, executive vice president of Turfco Manufacturing, Blaine, MN.*

SportsTurf: How do you develop relationships with turf managers?

Kinkead: Fundamentally it comes down to having quality products and answering turf managers' needs. For us, it's a lot about spending time out in the field with our customers, getting their feedback on equipment and new development, and listening to their concerns or issues. They know they're investing in quality products, too, because we offer our 3-year warranty. We do a lot of work with the STMA both nationally and in our home state of Minnesota, so we get to meet a lot of managers that way. It also helps that we can talk with managers about anything; we've been living and breathing turf care since the beginning. A lot of our employees have experience in turf care.

SportsTurf: Do you have any recommendations for customers on how to get the most out of their supplier relationships?

Kinkead: Being a part of the STMA has been great in helping us stay in contact with customers and their needs. Being a part of the association gives you access to a network of industry professionals for questions or for feedback on product development. It's important for us as suppliers to hear from customers when they have recommendations for improvements on a product. Continuous product development and improvement is what we commit to each and every day, and a lot of the innovations we have come directly from customers.

SportsTurf: How do you typically research and develop new products?

Kinkead: We work with turf managers on a daily basis and listen to their issues and challenges, or if we see an area where changing something on a machine could make their job more efficient and faster. We'll say, "This is an issue and we can solve this issue." A great example of this is the Torrent 2 debris blower, where we heard from golf course superintendents that they couldn't get enough control over air speed and air direction with existing blowers. We developed the patent-pending MagnaPoint technology so that getting optimal blower angle is as easy as sliding the MagnaPoint's magnetic stops to the setting for specific debris, whether it's fallen leaves on a cart path or grass clippings in an end zone. With each product, too, we run them through customer focus groups and bring prototypes out for their input.

SportsTurf: Are there any new technologies/machines you are developing that you can share with us, or any new products that will soon be available?

Kinkead: We released the TriWave 45-inch overseeder this year, a great development on our existing WaveBlade technology, which creates clean, square slits for the best germination with minimal turf disruption. The TriWave 45 has a 50% higher capacity hopper for longer use and more ground coverage, and it's easy for turf managers to use because it attaches to most turf vehicles instead of tractors. The Torrent 2 debris blower is also a recent addition to our product lineup, and has an adjustable hitch for different turf vehicles. The development of both these products came directly from customer input, too.

SportsTurf: Are there any new markets that you are entering; or what other markets are you in now?

Kinkead: We've been in the golf course, commercial landscaping and sports turf markets for a while, but what we're seeing now is that products developed for one market can benefit another. Specifically, the Mete-R-Matic topdressers that we debuted on the market back in 1961 are now becoming widely used for sports fields because of the versatility of the patented Chevron belt. It's still the industry standard for providing uniform application of all types of materials with varying moisture content. The T3100 spreader/sprayer applicator is another product that has crossed between markets. We developed it for commercial landscaping use, but it's also applicable for sports turf because it can cover up to 72,000 square feet per fill, operate on uneven terrain and utilizes a steering wheel for operator ease.

Scott Kinkead, executive vice president, Turfco Manufacturing

NEW TOP DROP BRUSH DRESSER FROM STEC EQUIPMENT

STEC Equipment, an industry leader in specialized turf equipment distribution introduces the new Top Drop brush dresser from GKB Machines.

"The new Top Drop really is the ideal machine for top dressing," says Randy Cole, Sales Manager at STEC Equipment. "It can be used anywhere with a variety of different material, making it the most versatile topdresser on the market."

The Top Drop is available in three model sizes to provide the perfect machine for any sized job. The brush dresser can distribute all kinds of loose material such as sand, gravel, or rubber with a hydraulically adjustable spreading brush that can spread up to 4.5 ft. And the four pivoting turf tires ensure optimum ground pressure so that the burden on the surface is kept to a minimum.

STEC Equipment

BILLY GOAT'S HYDRO AERATOR & HYDRO-DRIVE OVERSEEDER

When doing standard renovating to improve turf health, the option to aerate and overseed with significantly less labor, fatigue and time is offered with Billy Goat's pair of innovative hydro system machines. Combined 30" wide aeration and speed up to 4.3 mph, the AE1300H completes quarter-acre aerations in as little as 15 minutes (59% faster than 26" drum units). The unit creates 2 – 10x more holes than fixed drum models in a single pass, so patch repair and seedbed prep can be done in just one pass. Patent Pending FLEXTECH arms with flexible reciprocating action drive plug depths up to 2x that of drum units, even in dry conditions. In-ground steering provides unmatched maneuverability – no lifting to make turns – plus reverse aerating, both affording maximized productivity and minimized operator fatigue. The hydro-drive OS901 overseeder allows verticutting and overseeding all in one pass.

Billy Goat

PURE PLAY SYNTHETIC TURF

INBOUNDS Athletic Performance, recently founded by Baltimore native Andrew Bounds, has entered into an agreement that gives them the exclusive rights to market, sell, distribute, resell, and install a new, non-infill synthetic turf for multi-purpose sports fields. What makes this turf, called Pure Play, different are two unique features: it requires NO INFILL, most notably crumb rubber, and it is 100% recyclable. Following a year of research, product testing, and negotiations with ACT Sports, INBOUNDS Athletic Performance is excited to announce that it has entered into a 15 + year agreement with ACT Sports to be the exclusive distributor & reseller of ACT's non-infill synthetic sports turf in the United States.

INBOUNDS Athletic Performance

PRODUCT NEWS

TURF PUSHER FOR BOBCAT AND POLARIS UTVS

Pro-Tech announced that its Turf Pusher product line is now available for use on Bobcat and Polaris UTVs. The Turf Pusher, the first containment plow designed for clearing snow from turf sports fields was launched several years ago and immediately became very popular with high schools, colleges, and professional sports teams. While offering the Turf Pusher with a variety of connection types such as Toro, John Deere, and universal quick attach, a coupler for UTV's was not available until today. The Turf Pusher's UTV coupler has an easy pin-on design that automatically finds level plow position when the unit is lowered to the ground. This design also allows the coupler to be removed from the plow for cleaning or other maintenance if required. The Turf Pusher currently comes in 6' and 8' sizes.

Pro-Tech Manufacturing and Distribution, Inc.

COVERSPORTS LAUNCHES REDESIGNED WEBSITE

Humphrys-CoverSports, the source of the widest range of product options for covers for athletic surfaces, has launched a completely redesigned mobile-friendly website, www.coversports.com, allowing visitors to more easily browse the complete product line by type, sport, venue or branding needs. "We have re-organized our product categories so that navigation is more precise and user-friendly," said Shana Brenner, CoverSports' Director of Marketing, "as well as making the product information easier to follow so users understand the product's benefits and can visualize it in their own facility Branding is so emphasized in our culture, so our new site reflects how our products not only protect players and surfaces but also provide branding opportunity for the team or organization." In addition, the resources section that includes information regarding warranties, tech specifications, terms and conditions, is more visible and robust. The site now makes it much easier for users to request samples, a current catalog and an accurate price quote.

Humphrys-CoverSports

NEW BOB-CAT PROFESSIONAL MOWER

Adding to an already versatile zero-turn mower, BOB-CAT has announced new 48" and 61" decks available on the XRZ Pro mower. These deck sizes join the original 52" deck, which the company released when they introduced the XRZ Pro in 2015. The XRZ Pro brings pro specs, pro warranty, and pro cut to both commercial and residential applications. It features commercial quality and durability in a size and price point that homeowners also desire. These new decks add to that broad appeal. The 48" deck is ideal for smaller properties while the productive 61" deck helps to mow large-acreage properties quickly. "We want our customers to have exactly what they need to get their lawn care jobs done," said BOB-CAT Brand Director Matt Donohue. "These new decks give them more options on the XRZ Pro, with the same great cut quality and performance." All three models feature the TufDeck Pro professional mowing system, highlighted by a patented Double-Wave Baffle System, which stands grass up with maximum vacuum and lift. An oversized polymer discharge chute also provides efficient dispersal of clippings for a clean finish.

BOB-CAT

MULTIFUNCTIONAL ZERO-TURN MOWER ATTACHMENT

TurfEx introduces the Thatch, Groom 'N' Sweep Package, an attachment system designed specially for zero-turn mowers. Providing unmatched versatility, the attachment can be converted from a sweeper to a dethatcher without having to purchase additional equipment. Available in both 48- and 60-inch widths, the package uses a universal mount that easily fits the form of most major manufacturers' zero-turn mowers. The attachment includes two rows of brush sections, which can be replaced with spring-mounted tines to turn the sweeper into a dethatcher in just a matter of minutes. To switch between the two, the operator simply removes a containment plate, and then slides the brush or tine sections in and out of the housing. To minimize turf damage and eliminate gouging, the attachment package features TurfEx's exclusive Flex Hitch design. This system allows the attachment to automatically pivot on the hitch as the ground elevation changes from one end of the unit to the other.

TurfEx

CARRYCAT TOOL CARRIER FROM EARTH & TURF PRODUCTS

Earth & Turf Products, LLC, is pleased to announce its CarryCat tool carrier to fit 3-point hitches of compact tractors. This very useful attachment is designed to carry conveniently and securely most commonly used landscaping hand tools. Features include stand-alone storage with adjustable stand-off feet to suit a variety of tractor sizes, adjustable gasoline-can holder, soft-lined chain-saw mount, and receiver for drawbar. Fabricated with a heavy-duty powder-coated finish. List price is $598.

Earth & Turf Products, LLC

SNOWEX TAILGATE PRO SPREADERS

The new SnowEx Tailgate Pro spreaders feature more compact controls with fewer wires for enhanced functionality and simpler installation. Offering hopper capacities of 5.75 and 10.75 cubic feet, respectively, the SP-575X and SP-1075X single-stage spreaders can apply salt and de-icing materials to roads, driveways, parking lots and recreational paths.

Allowing material spread width adjustment up to 40 feet, the new enhanced spreader control is more compact compared with previous models. A redesigned electrical system, using fewer wires, makes the control less obtrusive in the cab and gives users more flexibility when mounting. Featuring intuitive LED indicator lights and a digital diagnostic display, the control also has auxiliary functionality that allows any accessories plugged into the spreader to be easily controlled from the cab. The SP-575X comes with a standard 2-inch receiver hitch.

SnowEx

DRY-JECT AERATION SYSTEM

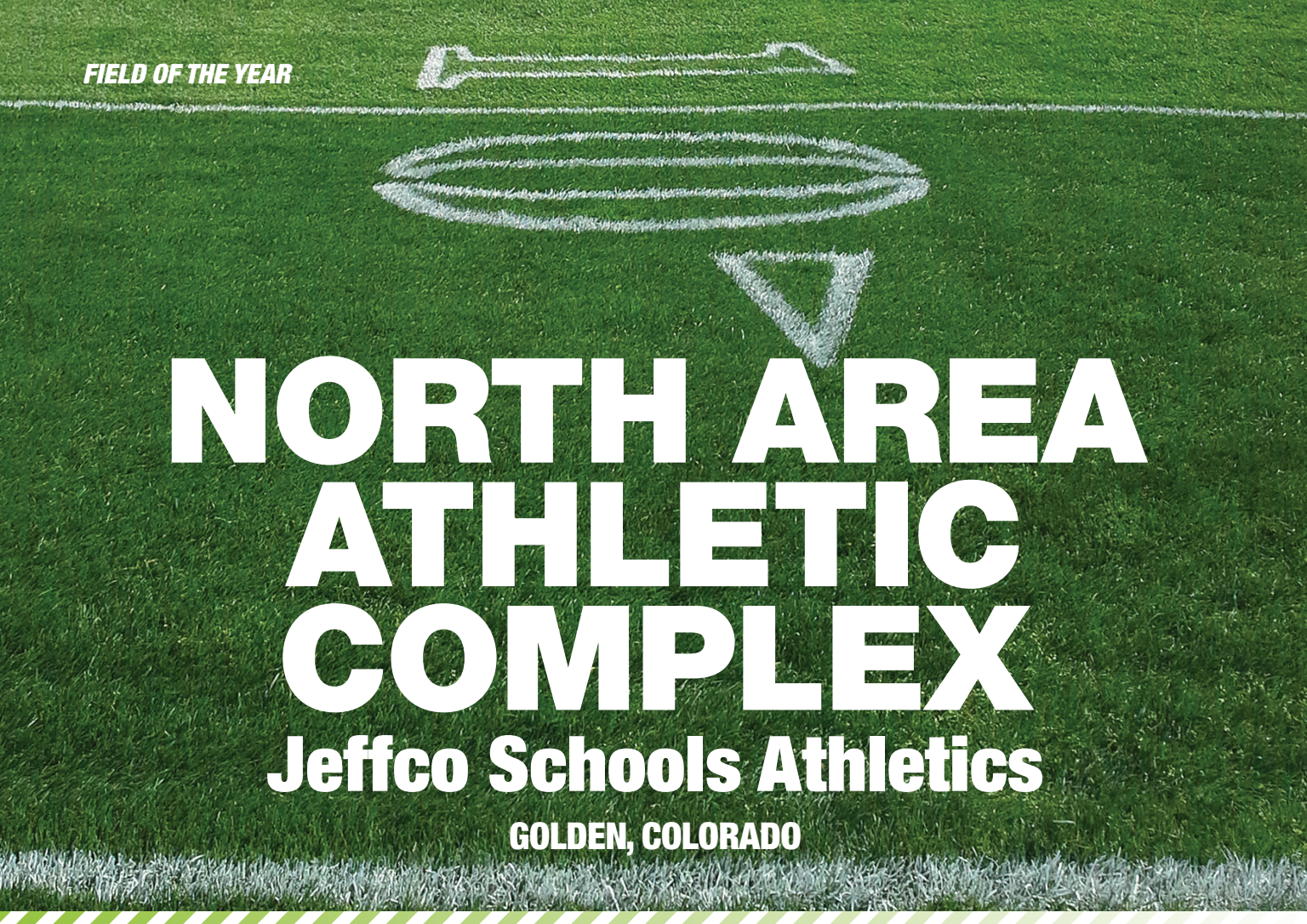
Dry-Ject uses high-pressure water to fracture the rootzone and simultaneously inject dry soil amendments into these aeration holes. Dry amendments include sand, calcined clays, DE and many custom blends. The process is VERY customizable and has nearly no surface disruption. We normally aerate at a 3x3" or 3x2" spacing at a depth of 3-6" deep. The nature of DryJect allows us to quickly access many areas that most turf managers cannot normally address. The water blast of our machine does not damage tree roots, irrigation lines/heads, conduit, etc. DryJect is a franchise network that has service contractors throughout the world. All contractor information is available on our website.

DryJect

WRIGHT MFG'S COMPACT STANDER INTENSITY

Wright Manufacturing's compact Stander Intensity, known as the Stander I, is equipped with the first 36" deck to incorporate Wright's revolutionary AERO CORE technology. Operators will appreciate the deck's improved airflow, cut quality and anti-blow out features. The floating deck on the Stander I tilts side-to-side and front-to-back, allowing the mower deck to better follow the terrain contours. It also improves the weight distribution for better handling on hills. The deck height can be adjusted "on the fly" in quarter-inch increments, and anti-scalp rollers automatically adjust the deck height to changes in terrain. The rugged Stander I is also built for operator comfort and easy step-off to pick up debris or in case of an emergency. The floating stand-on platform absorbs rough terrain through elastopolymer bumpers that provide a dampened feel similar to a car.

Wright Manufacturing



NORTH AREA ATHLETIC COMPLEX

Jeffco Schools Athletics

GOLDEN, COLORADO

Why STMA should consider your field a winner?

The NAAC football field is a 5,000-seat stadium that is home to five area high schools. Those schools play all their home varsity games on this field. Three are 5A, the largest classification in Colorado and the other two are 4A. We host 2-4 games per week, for 10 solid weeks of regular season. There are no bye weeks. We are no strangers to football doubleheaders! A typical week allows us only 3 days to get the stadium cleaned, the field mowed, fertilized and painted before we get ready to host games that weekend. Then we re-clean the stadium, mow and do anything else needed in the 14-acre stadium for the turn-around from Thursday night to Friday night to Saturday games. If any of our schools make the post season, we would also host their home playoff game. For the fall of 2014, we hosted our first ever NCAA team, the Colorado School of Mines. Mines went on to win their 2014 Conference title, and we hosted their first round NCAA playoff game. In order to convert from high school to a college field, Friday night we would repaint the field, add the college hashes and clean the stadium after the high school game, then convert the goal posts on Saturday morning before the game.

In addition to our football schedule, we host the Annual Pomona Marching Band Festival.

This year, there were 19 bands that performed in the preliminary competition, with the top 12 performers returning for the finals that evening. We had a lightning and rain delay, which eventually cancelled the remainder of the competition, half way through the finals so we ended with 26 total performances that day. Each May, we host Golden High School's graduation ceremony. There is a 400-square foot elevated stage on the field for 2 days, roughly 350 seniors seated on the field and celebrations after the ceremony always spill down on to the field.

There are two full time staff members and together we manage a 14 acre sports complex, which includes the football stadium for which this application is intended, as well as a 2500 seat soccer stadium, a rubberized track and roughly 9 acres of other turf grass. We are responsible for managing everything that happens at the stadium, including all aspects of the turf, the stadium, every event and staff member. Cultural practices including mowing, aerating, seeding, topdressing, and fertilizer applications get scheduled and performed by Christi and I. We also do snow removal as needed during our seasons.

Outside of our heavy schedule of games and events, irrigation is one of our biggest challenges. We use reclaimed water, which is high in bicarbonates. We have to adjust our fertilizer approach to account for the high sodium also. The pump house from the irrigation pond is completely controlled by the City of Arvada. They regulate our system pressure, as well as give us a water budget of total gallons to use for the year. We are located just a few miles south of the National Wind Technology Research center so ET rates affect us exponentially.

We hear from Sun & Christi

SportsTurf: How many people do you have to work on how many fields? How do you determine who should do what and when?

Sun & Christi: As stadium managers, we work year round at the North Area Athletic Complex (NAAC). During the summer, we have 2-3 seasonal employees and one of those guys stays on to help us through the fall season. We have a 5,000-seat football stadium and a 2,500-seat soccer stadium that are side by side along with roughly 9 additional acres of turf that comprise the NAAC. We are the home stadium for six of the local high schools, and they play their home varsity football and soccer games here.

As far as who does what and when, we have a general maintenance calendar to keep us organized and on the same page. Each morning we discuss what needs to be accomplished for the day or week on the fields as well as extra projects. As stadium managers, we are both responsible for every aspect of managing the turf, maintaining the stadium, as well as scheduling game workers and supervising events held at the NAAC. Jeffco Schools has a great support staff of plumbers, electricians, HVAC and building maintenance crews so they help us with the more technical repairs. During the spring soccer season we compare our maintenance calendar to our games schedule to find a day with no games slated so we can squeeze in some sort of cultural practice. The soccer field gets mowed daily or as needed dependent on growth. Divot repairs are a daily occurrence after every game, and seed is broadcast in the goalmouths regularly. We host between 8 and 10 girls' soccer games per week (typically double headers) starting the first week of March through May, so the off days are crucial! Spring break is our chance to pull cores, seed and topdress. This is also usually when we get our irrigation turned on.

Fall soccer is very similar for the boys' season, beginning in late August and running through mid-October. The football field is a bit more regimented in the fall. Football games are scheduled every Thursday and Friday night, which is often a double header, and an occasional Saturday. We know that Wednesday is football field paint day, which takes all three of us, so that day is dedicated to the football field. A typical week for the football side during the Fall consists of: Monday, mow or power flow, clean up the stadium, divot repair, repair other areas as needed (PAT spots mainly); Tuesday, slice or cross tine aerate or liquid fertilizer application; Wednesday, mow and paint; Thursday, bi-weekly broadcast seed between the hashes, mow the additional 9 acres of turf and game prep; and Friday, mow the field, clean up, blow down the stands and game prep. All this happens in addition to keeping up with the ongoing and fluid soccer field needs. Summer and winter are our chances to do extra projects or improvements that we decide on throughout the year. We work together very well, sometimes as a team, sometimes taking on a project independently but all with the same end product in mind. With all of our responsibilities, we each have our individual likes

Category of Submission: Schools/Parks Football

Sports Turf Managers: Sun Roesslein, CSFM, and Christina Clay

Original construction: 2000

Rootzone: 90% Sand, 10% organic matter from alfalfa

Turfgrass variety: Kentucky bluegrass, (Barrari, Full Moon, Barduke, Moonlight, Midnight, Fullback, Hampton and Noble); Perennial Rye (Sox fan, Barbeta, and Barlennium); Annual Rye

Overseed: Overseeding is a large part of our maintenance schedule, especially in 2014 with the Colorado School of Mines NCAA DII football schedule. Typically, we use Kentucky bluegrass in the spring, summer and early fall, then once our fall season begins we mainly use ryegrass. The fall of 2014, I was broadcast seeding weekly between the hashes with rye just to try to keep some grass growing out there.

Drainage: Four-inch corrugated drainpipe on 20-foot centers that run the length of the field and connect to a main catch basin.

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

MAINTENANCE PLAN

January
- ✔ Monitor field moisture, hand water with hoses if necessary.
- ✔ Stadium projects, such as equipment maintenance cleaning and organizing garage/workshop area,
- ✔ Attend National STMA conference
- ✔ Research new products
- ✔ Consider changes to annual maintenance program
- ✔ Snow removal as necessary (stadium, not fields)
- ✔ Take equipment to shop for heavier maintenance, reels ground, etc.

February
- ✔ Continue stadium projects and clean up
- ✔ Continue to monitor moisture and water as necessary
- ✔ Begin to prepare for track practice beginning, including rope off the football field, put out hurdles, track repairs, clean restrooms.
- ✔ Soccer field prep for spring season; lay out and paint field, put together soccer goals, check field and building lights
- ✔ Order supplies for season.

March
- ✔ Soccer season begins; track practice begins
- ✔ Continue watering by hand until irrigation is turned on
- ✔ Once irrigation is turned on, check fields for fixes and adjustments as necessary, and then move on to ornamental clocks to check those zones.
- ✔ Aerate ornamental with drum aerator
- ✔ Spring break renovations—heavily aerate football field, using hollow tines and 2 x 2-inch spacing, seed with Kentucky bluegrass at 4 lbs./1,000 sq. ft., topdress with 100% sand. 100 lbs. Andersons NS-54 43-0-0 @0.6 lbs. N/M. (Slow feed as grass comes out of dormancy.)
- ✔ Pull soil tests before applying any fertilizer; submit for analysis.

April
- ✔ Continue irrigation fixes and adjustments
- ✔ Begin mowing as necessary
- ✔ Ensure reel mower is back lapped and clean

May
- ✔ Mow fields as needed (Football height is 2 inches)
- ✔ Graduation prep, clean football stadium, pressure wash stands and restrooms
- ✔ Liquid fertilizer application the week before graduation, 18-3-6 @ 4.7 oz./M of product, and Organic Iron @ 3.7 oz./M of product
- ✔ Ornamental fertilizer spread, 35-0-10, SIFI slow release @ 1lb N/M
- ✔ After graduation, recycle dress football field in two directions, drag and hand rake, recycle dressing as needed.
- ✔ Irrigate as needed
- ✔ End of the month, spray broadleaf herbicide, Q4 @ 2.5 oz./M of product.

June
- ✔ Recycle dress football field in two directions, drag and hand rake recycle dressing as needed.
- ✔ Begin Poa suppression program, using Legacy @ 15oz/A, two week intervals
- ✔ Mow fields as needed (daily)
- ✔ Irrigate as needed (deep and infrequent)
- ✔ Apply granular wetting agent, PBS150 @4lbs/M of product
- ✔ Spot spray herbicide as needed.

July
- ✔ Mow as needed (daily)
- ✔ Irrigate as needed (deep and infrequent)
- ✔ Check field irrigation weekly for leaks or breaks, valve checks
- ✔ Spray liquid fertilizer, Per 4 Max @ 3oz/M of product
- ✔ Solid tine aeration, during a cool week with rain in the forecast. 2 x 3-inch spacing
- ✔ Spot spray herbicide as needed

August
- ✔ Begin prepping for football season; goal posts repainted and put up, clean stadium and buildings, order supplies, lay out and paint football field two weeks before first game, mow daily, continue to monitor irrigation, clean up fence lines, edge entire stadium, check field set up supplies (yard markers, pylons, goal post pads, flags)
- ✔ Early August, seed 300 lbs. (4.4lbs/M) of KY blue with Turfco seeder, spread SIFI 35-0-10 @ 1.12 lbs. of N/M, topdress with 100% sand
- ✔ Week 1 (1 game) of football season, spray liquid fertilizer, Adam's Earth biostimulant @3oz/M of product, Radicular @ 4oz/M of product and Quelant CA@ 2oz/M of product
- ✔ Field is mowed daily, paint the field every week

September
- ✔ Continue mowing daily flipping the pattern every 2 weeks, and painting the field weekly.
- ✔ Week 2 (4 games), spray liquid, CPR @ 3.5oz/M of product, PanaSea @ 3oz/M of product and SeaQuential @ 3oz/M of product
- ✔ Week 3 (2 games), aerate with super cross tines, broadcast seed 200 lbs. of HD 2.0
- ✔ Blue/Rye seed mix between the numbers (approx. 32,400 sq. ft.) @ 6 lbs./M, topdress with 100% sand. Apply 6-24-24 XB @ 0.5lbs N/M.
- ✔ Apply granular wetting agent, PBS150 @ 3.8lbs/M of product
- ✔ Week 4 (2 homecoming games), spray Adam's Earth biostimulant @ 3oz/M,
- ✔ Radicular @ 4oz/M, Quelant CA @ 2oz/M, and 12 Iron @ 4oz/M
- ✔ Week 5 (1 homecoming game and marching band festival), spread Nitrex 19-3-5 granular fertilizer, @ 1 lb. N/M. Spray Turgor 2 3.4 oz./M in preparation for Marching
- ✔ Band Festival.

October
- ✔ Continue mowing daily, flipping the direction every 2 weeks, and painting the field weekly. Re-paint the field the night before college games, and the night before the marching band festival. The field also gets re-painted during the band festival between preliminary performances and finals
- ✔ Week 6 (3 games), broadcast 200 lbs. RPR between the numbers @ approx. 6 lbs./M, topdress lightly (1/8 inch) with 80/20 sand/organic mix
- ✔ Spray Turgor @ 3.5 oz./M the week of Band Fest
- ✔ Prep for Marching Band festival, first Saturday in October
- ✔ Week 7 (3 games), aerate field with super cross tines, 2 x 4-inch spacing, broadcast 300 lbs. of RPR seed between the numbers @ approx. 9lbs/M, topdress lightly (1/8 inch) with 80/20 sand/organic mix. Spray Per 4 Max @ 3oz/M
- ✔ Pull soil tests
- ✔ Week 8 (3 games), spray Radicular @ 4oz/M and Foliar @ 2oz/M
- ✔ Week 9 (4 games), spray 18-3-6 @ 4.7oz/M and organic iron @ 3.7oz/M
- ✔ Nitrex 19-3-5 granular fertilizer, @ 0.83 lbs. N/M, broadcast seed 200 lbs. RPR between the numbers @ approx. 6lbs/M, lightly topdress (1/8 inch) with 100% sand
- ✔ Week 10 (1 game scheduled with 2 playoff games probable), spray CPR @ 6oz/M, Seaquential @ 3oz/M, Pana Sea Plus @ 3oz/M
- ✔ Snow removal if necessary.

November
- ✔ Game schedules change, this month begins the playoffs
- ✔ Week 11 or 12, depending on playoff games, spray 18-3-6 @ 4.7 oz./M and Organic iron @3.7 oz./M
- ✔ Snow removal as necessary during season
- ✔ Begin winterizing the stadium, buildings and equipment

December
- ✔ Continue winterizing stadium, buildings and equipment
- ✔ Winter stadium projects
- ✔ Review the year/ season and maintenance program
- ✔ Begin researching new/alternate products and tweak maintenance program
- ✔ Attend RMRTA Regional conference.

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and dislikes of certain projects; luckily none of our dislikes are the same!

SportsTurf: How do you communicate with coaches or user groups? Is there a set channel of communication?

Sun & Christi: Every game day, after our daily tasks are completed, we change roles to become event managers. Whichever stadium manager is scheduled to work the event will greet each coach as they arrive at the stadium and go over the district-wide stadium policies. We do not allow warm-ups on the field to begin more than 1 hour before game time. This is consistent at all the Jeffco District Stadiums. We get all the logistics organized, and let the coaches know if there is anything other than their game to worry about. Football double headers are tough since we only have one set of locker rooms, so the first team has to clear their belongings out after their halftime so the next teams can get prepared when they arrive. The first teams also have to move their post-game talk to the track or other area so the second teams can begin their warm ups. We do not allow spectators on the field level at any time.

Each school has at least one administrator (principal, athletic director, or assistant principal) to cover every game. They check in with one of us, and help with crowd control or any student issues that might arise. We touch base with athletic trainers and give them a radio so they can contact us if they need assistance with any situation. We carry a second, emergency radio that connects us directly to district security if we need an ambulance, and our staff will help coordinate the paramedics and fire upon arrival.

Officials are another group we touch base with, mainly in case of weather. Our district policy states that leading up to the start of the game, stadium managers are responsible for lightening safety. Once the game begins, that decision is up to the officials on the field. They are focused on the game at that point, so we continue to inform the officials of weather conditions and most of them rely upon our information to make their call. In the case of inclement weather during the day or overnight, we communicate about field conditions with the district AD who makes the official cancellation decision. He then contacts the schools' ADs scheduled to play that evening, so all the official communication originates from one place. At this point, we do not use any social media to communicate. However, the Athletics department did just hire a communications specialist for Athletics and Activities so that may be in our near future. Having all the information originate from one place avoids most miscommunication, so it is imperative. We do rent our stadiums to outside groups, and require an in depth and on site meeting prior to the event. This way we can learn exactly what the user group needs from us and what we all can expect during the event. ST

FEATURED CHAPTER: GATEWAY STMA

In cooperation with the St. Louis Metropolitan Police Athletic League (PAL), the Gateway Chapter of the Sports Turf Managers Association is renovating the baseball and softball fields at Dellwood Park in north St. Louis County. This event will take place Wednesday, September 14. The chapter is in need of donated materials or funds.

HOW CAN YOU HELP?

- RSVP to attend the event and assist with the renovation. Contact Jason Mueller, jason.mueller@kirkwoodschools.org
- Provide assistance with prep work prior to the field day. Contact Brian Winka, bwinka@chesterfield.mo.us
- Donate funding for materials or specific materials; contact Jason Mueller, jason.mueller@kirkwood schools.org

Materials needed include: four sets of base anchors and two sets of bases (Safety 1st brand); seed for 2 acres of outfield; infield conditioner or improved infield mix; drag mat; base anchor tool; starter and fall fertilizer for 2 acres; chalk and field paint; portable outfield fencing; backstop mats; rakes; and tampers.

Prep work needed includes applying glysophate to infields; laser-grading infields; and possibly irrigation.

Casey Griffin, Albuquerque Isotopes, wins online contest & 2017 Conference comp

Casey Griffin, Director of Field Operations for the Albuquerque Isotopes, the Triple-A affiliate of the Colorado Rockies, won the STMA's inaugural "Stars and Stripes" online contest. With his elegant field design, he has won a complimentary pass to the 28th annual STMA Conference & Exhibition, to be held at Disney's Coronado Springs Resort in Lake Buena Vista, FL January 24-27, 2017.

In its first year, more than 20 contest entries were received via social media. The winner was selected through Facebook's voting platform and Griffin's intricate design at Isotopes Park generated nearly 500 "likes."

The winner was selected through Facebook's voting platform and Griffin's intricate design at Isotopes Park generated nearly 500 "likes."

"Casey is an industry trailblazer and is a great representation of the creativity by sports turf managers using natural grass athletic fields as their canvas," says Kim Heck, CEO of STMA. "His expertise at Isotopes Park is visually appealing, while also providing a safe, playable surface for the professional athletes who utilize it."

A native of Salem, OR Griffin has won several industry accolades including STMA's 2013 "Field of the Year" award for professional baseball and Pacific Coast League's 2014 "Sports Turf Manager of the Year."

"STMA's inaugural 'Stars and Stripes' contest is a unique opportunity to support our country through patriotic field designs," says Griffin, now in his seventh season with the Isotopes. "We consider ourselves the 'Directors of First Impressions' for millions of sports fans across the U.S. and hope this contest inspires other industry colleagues to express themselves through unique paint and mowing patterns."

New Mid-Atlantic Chapter gains momentum

A group of national members is working to re-establish an affiliated chapter of STMA in the Mid-Atlantic region. Originally established in 1991 as the Chesapeake Chapter of the STMA, it went through several name changes and periods of activity and inactivity, before officially closing in 2011.

Led by an eight-person steering committee, the newly forming Mid-Atlantic Sports Turf Managers Association (MASTMA) has created a mission, scheduled an inaugural field day, and established a website. Those leading the chapter's formation are: Nicole Andrews, Matrax, Inc.; Patrick Coakley, CSFM, Ripken Baseball; Don Follett, Baltimore Ravens; Heather Johannes, Howard County Parks Operations Division; Jason Kopp, Turf Equipment Supply Company; Dr. Ken Mathias, University of Maryland; Nicole McFadyen, Baltimore Orioles; Jerad Minnick, Growing Innovations; Michael Stachowicz, National Park Service; and Dr. Thomas Turner, University of Maryland. The committee has been also working with STMA to spread the word about MASTMA to national and former chapter members located in Maryland, Washington DC, Delaware, and West Virginia.

MISSION STATEMENT

This mission statement was officially adopted during the steering committee's second meeting: "The STMA Mid-Atlantic Chapter promotes the profession of sports field management via a nurturing environment consisting of education, innovation, mentoring, and networking."

The first meeting of the Chapter will take place Tuesday, October 25, at M&T Bank Stadium in Baltimore. Those interested in finding out more information about the chapter and the event, please contact Nicole Andrews, nandrews@matraxinc.com, visit the website, www.mastma.org and follow them on Twitter, @MidAtlanticSTMA. ST

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.

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 Association of 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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C ❑ GOVERNMENT OFFICIAL — Government Commissioner, Agent, Other Government Official
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SEPTEMBER 2016
***SportsTurf* magazine**
ADVERTISERS' INDEX

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

Not your average garden

Q: ***I have been buying garden fertilizer (10-10-10) for our school's bermudagrass fields and they have been looking pretty good the past couple of years. Is that bad? Someone told me I should have a soil test run so I could buy a different fertilizer. Can you explain what they meant?*** — North Carolina

A: I would be hard pressed to be too critical of your fertilizer practices if your fields have looked good and performed well the past 2 years. The issue of picking the best fertilizer and how it is applied may be more an issue of efficiency. From a nutritional perspective you want to maximize turfgrass quality while minimizing your fertilizer inputs. You also need to stay within your budget. The suggestion to use a soil test to change your fertilizer source was an insinuation that additional information may allow you to get similar results with fewer inputs. But there is more to this story.

Somewhere in the history of gardening it must have been stated that garden plants need balanced fertility to be productive. In response, the fertilizer industry has been marketing and selling "triple-8", "triple-10", and "triple-13" fertilizer to gardeners for decades. Modern plant nutrition research has dispelled this myth surrounding balanced fertilizer use for gardening, but the demand for the products remains. Since many people buy fertilizers from garden centers and these products are comparatively inexpensive, they will invariably be used to fertilize turfgrasses.

In the past few years there has been a new chapter written in this story. A number of states have put regulations in place that limit the sale of lawn fertilizers with phosphorus (middle number on a bag of fertilizer). This is because the primary nutrient polluters of water are nitrogen and phosphorus. Since pollution of water can occur with small amounts of phosphorus, the industry has largely decided to dramatically reduce or remove phosphorus from fertilizers that are intended to be put on turfgrasses. The most commonly found fertilizer designed for turfgrass use has low/no phosphorus and a high percentage of slow-released nitrogen. This is considered environmentally good.

Knowledge of soil/plant nutrient status can guide fertility practices that may help you manage stresses.

On the other hand, a fertilizer that contains N, P, and K is often recommended in extension publications if no soil test data is available. Using a complete fertilizer is viewed as a preventative application. In other terms, applying a complete fertilizer prevents one of the three most common fertilizer nutrients (N-P-K) from being a limiting nutrient for growth and performance.

In many cases the only place that one can still find phosphorus-containing fertilizer in a retail outlet is in the gardening section. Remember that just because phosphorus is not sold in turfgrass fertilizer in some regions does not mean that it has become unnecessary for plant health. Your turfgrass may or may not need phosphorus, but how do you know?

A soil test can determine the levels of major plant nutrients, including phosphorus, potassium, calcium, magnesium, etc., available to the plant from the soil. The tests then provide site-specific fertilizer recommendations (optimum levels) based on the amount of the nutrients in the soil. This improves efficiency and can reduce the total expenses spent on fertilizers (it can also increase fertility cost if there are significant deficiencies). For example, if phosphorus levels in the soil are found to be sufficient, the recommendation will indicate that no phosphorus is needed. This conserves natural resources and helps protect water and the environment.

There are a few other points related to soil testing to keep in mind. First, many plant responses to stresses (drought, disease, cold, traffic, etc.) may be related to plant available nutrient supply. Knowledge of soil/plant nutrient status can guide fertility practices that may help you manage stresses. Second, soil tests can often be used in the diagnosis of problems when there are nutritional influences. Third, a soil testing fee is a nominal cost compared to potential fertilizer savings.

There are a number of different soil test philosophies and test methods that are used today. My suggestion is to find a reputable service lab (state or private) and discuss with them your results in detail so you understand what the numbers mean. Use this data along with your experience on site as a basis for fertilizer selection and application.

So I would also encourage you to not treat your turfgrass like your average garden. Get some soil test information and treat it like a sports turf surface. ST

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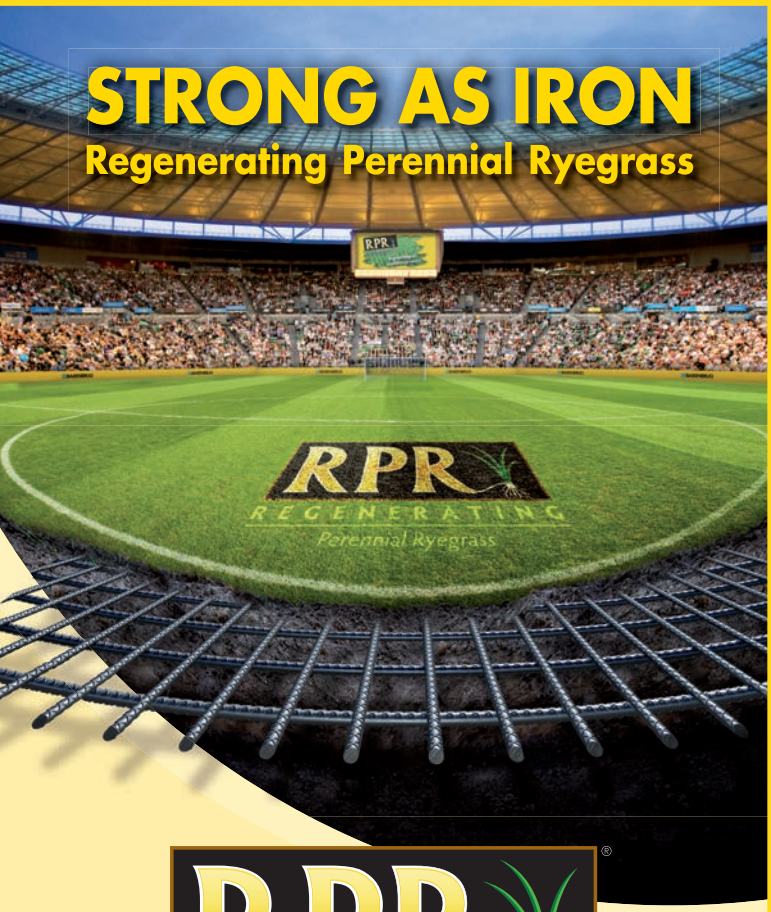

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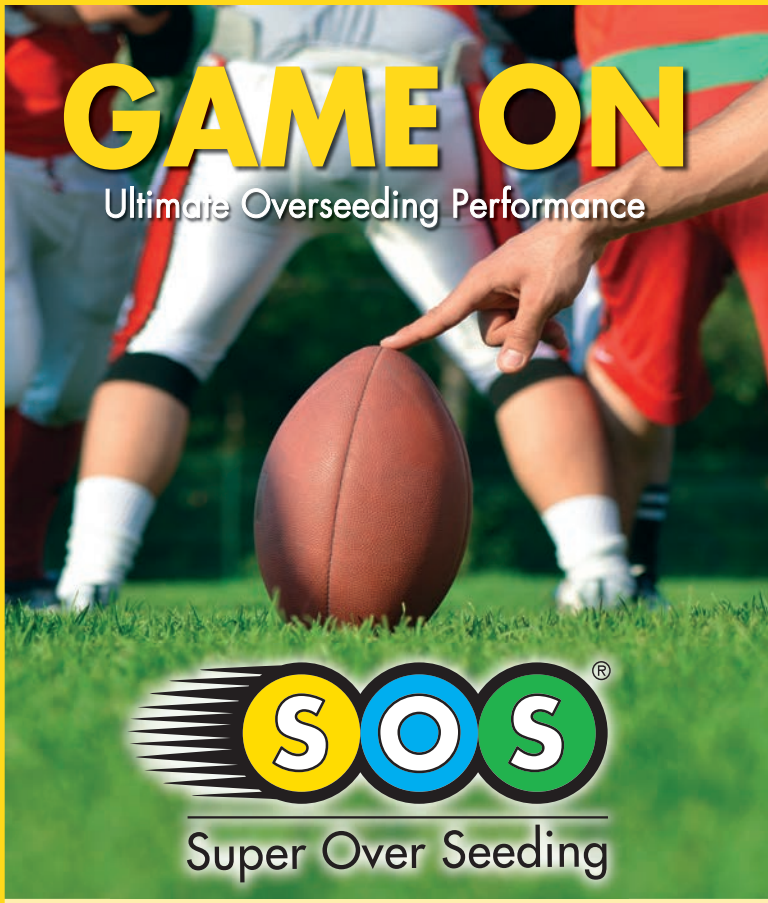

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