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SPORTSFIELD AND FACILITIES

MANAGEMENT

October 2013

SportsTurf

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Wesleyan School, Norcross, GA
WINS FIELD OF THE YEAR

Also Inside:

KEEPING COOL-SEASON
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On the cover:

Head sports turf manager Josh Weigel, from the Field of the Year Award-winning Don Gaebelein Field, Wesleyan School, Norcross, GA handles the paint machine while his assistant, David Thrower, hand paints the stencil.



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From the Sidelines



Eric Schroder
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Work now for better fields next spring

DEPENDING ON WHERE YOU WORK, October is either a string of football and soccer games and spring sport fall workouts, with maybe some field hockey or lacrosse thrown in, or maybe a slowdown from summer baseball and softball leagues, with just a fall league or two still playing. So some turf managers have it easier in finding time to complete work this fall that will make their jobs easier come spring; if you are one of those, read on:

Mike Trigg, CSFM, superintendent of parks for the Waukegan (IL) Park District and former president of the Sports Turf Managers Association, responded to my request for some advice.

"Fall renovations are scheduled at season's end to repair worn turf areas, such as the front of pitcher's mound or goal mouths. Getting turfgrass segments of the field in the best possible condition in the fall gives a much better playing surface for the early spring use when turf may still be dormant.

"A fall renovation can be as simple as edging along the infield arc or base paths to give that crisp, clean finish look. A fall renovation may require the use of an outside contractor for a portion of the project. One such project we scheduled for the month of October is reducing a grass infield skinned area back to proper field dimensions with the installation of big roll sod. Reducing the skinned area back down to proper dimensions also reduces time required for the daily field prep during the season.

"Just as fall is prime time for turf cultural practices, so should it be for field renovations. Taking advantage of the fall months to prepare fields for spring use will be appreciated by many who will play safely because of your prior planning and prudent preparation."

Another idea is to be diligent with herbicide applications for weed control on skinned areas. Backpack applications of Roundup herbicide, with a color dye indicator, control miscellaneous weeds that appear on skinned areas, fence lines, and warning tracks. This is particularly beneficial to ball diamonds that go out of play in August, with no scheduled use until next spring.

No matter what level of turf maintenance now is a good time to identify and correct hazardous conditions that may exist on your facilities. The goal is to reduce frequency and possible severity of player injury and unnecessary accidents through proper field inspection and maintenance.

On a playing field there are many hazardous conditions that can be easily identified because they are visible and obvious. However, there can be problem areas that are not so obvious, and often only detected via a thorough inspection.

Here's an annual inspection checklist that Mike included in an article he wrote for us a few years back:

Maintenance of skinned areas: Inspect infield composition; level worn areas near bases/rubbers; cone build-up between turf and skinned area; check that base anchors are correctly installed; and inspect pitching rubbers.

Maintenance of fencing and backstops: Check exposed concrete footings. Make sure all chain link fencing is properly secured.

Additional safety considerations: Inspect bleachers and player benches, as well as all field lighting installations. ■

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SportsTurf (ISSN 1061-687X) (USPS 000-292) (Reg. U.S. Pat. & T.M. Off.) is published monthly by Specialty Information Media at 1030 W. Higgins Road, Suite 230, Park Ridge, IL 60068. **POSTMASTER: Send address changes to SportsTurf, PO Box 4290, Port Jervis, NY 12771.** For subscription information and requests, call Subscription Services at (845) 856-2229. Subscription rates: 1 year, \$40 US & Poss.; 2 years, \$65 US & Poss.; 1 year, \$65 Canada/Foreign Surface, 1 year, \$130 Airmail. All subscriptions are payable in advance in US funds. Send payments to SportsTurf, PO Box 4290, Port Jervis, NY 12771. Phone: (845) 856-2229. Fax: (845) 856-5822. Single copies or back issues, \$8 each US/Canada; \$12 Foreign. Periodicals postage paid at Park Ridge, IL and additional mailing offices. COPYRIGHT 2013, SportsTurf. Material may not be reproduced or photocopied in any form without the written permission of the publisher.

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All "treat" for STMA members

MANY ASSOCIATE THE MONTH OF OCTOBER with one day in particular, October 31. Halloween can be scary, somewhat like how a lot of heavily trafficked sports fields can look at this time of year. It also can be fun, and fortunately I see a lot more fun (that is great looking and safe) fields than scary fields, a testament to the expertise and abilities of sports field managers.

Any "holiday" is an event appropriate for decorating the Goatley house per the direction of Lisa Goatley. Halloween has quickly moved up in the AP holiday rankings at the Goatley house, coming in just behind Christmas but well ahead of Arbor Day and (yes, we are "that house" in the neighborhood). I enjoy the "trick" part of Halloween, because it provides a legitimate opportunity to wear a Scream mask, turn on the strobe light, and make all kinds of scary noises and strange body gyrations through the garage window when the kids walk by on their way for the "treat" that is to be provided at the front door by Mrs. Goatley.

STMA is very much in "treat" mode this fall and there are no "tricks" involved with members receiving the rewards. In particular, please be sure that you learn more about an exciting membership recruitment program developed by your Membership Committee that will not only recruit new members but will also reward current STMA members that recruit those new members. In brief, first-time members of STMA can attend the 2013 Conference and Exhibition for FREE (that is, the conference registration is waived), and if you as a member are responsible for signing up the new member, you receive \$100 per enrollee that can be applied to any specific STMA-related expense.

One of the major goals of our Strategic Plan is to increase membership and our Membership Committee felt strongly that this was an opportunity for STMA to spend some money to ultimately grow our association. The reason why? The membership retention rate for members who attend conference is so high—92%—that your Board felt strongly that one of the most effective ways to grow our membership was to get new members to conference. Please reach out to colleagues who you know would benefit and appreciate coming to conference and see if there is any way they can make it to San Antonio.

This issue also features information on our keynote speaker for San Antonio, Dr. Rick Rigsby (see p. 42). Take a look at some of Dr. Rigsby's messages on YouTube. I found his "It's not too late to be great" message to the national Future Farmers of America convention to be particularly good.

So, Happy Halloween. I'm wondering if the Goatley house will be decorated for October's National Mole Day. No, not the furry creature that tunnels on your fields. This celebration runs from 6:02 a.m. to 6:02 p.m. on 10/23. Break out your chemistry books if you need to. Take care! ■





FORM, FUNCTION, FIT: which nitrogen source is right for you?

IT'S TIME TO PICK A NITROGEN FERTILIZER SOURCE for your sports field. How do you make that decision? Advertisements frequently tout nitrogen (N) fertilizer as the “slowest release,” “the quickest green-up,” or “the most available.” Add technical terms such as methylene urea, ureaformaldehyde and controlled-release polymer, and the topic of nitrogen fertilizers starts to get com-

plicated indeed. But, it's really not. The basic chemistries and manufacturing processes behind most of our commonly available N sources fall into five to six major groups, and you can sort out the ones you should use (and when to use them) from there.

Let's discuss the groups:

Soluble sources of N that are manufactured from inorganic (no carbon in the source) N sources.

Sources of water-soluble N include potassium nitrate (13-0-44, this and all other analyses are always expressed as percent $N-P_2O_5-K_2O$), ammonium sulfate (21-0-0), and, if you can still find it, ammonium nitrate (34-0-0). [Note: Since people are used to buying the analysis '34-0-0', some fertilizer dealers now sell a product with a '34-0-0' analysis that is actually created from urea, or it may be a blend of ammonium sulfate and urea. This is not an issue, it is simply a way to provide an analysis (34-0-0) that people are familiar with without having to deal with the legal complexities now associated with the sale of ammonium nitrate.] Any time you need a rapid turfgrass response, be it greening or growth, a soluble material should be in your spreader or spray tank. Soluble fertilizers provide quick turf green-up, which may

be important when you need turf to grow and fill bare spots. Always apply water-soluble sources at lower rates (0.5 to 1 pound of N per 1,000 square feet per month of active growth) and water them in. This helps avoid the turf burn that can occur with heavier rates of soluble products. Care must be taken to not over-apply, especially if you are managing turf on sandy soils, and to not over-irrigate once the materials are out. Also, check your local and/or state regulations to make sure that you are applying your soluble N during months in which it is permitted.

Soluble sources of N that are manufactured from a synthetic organic N source. We have one such source: urea.

Urea gets a separate mention because it is, by the broadest definition, organic (there is carbon in its formula – $\text{NH}_2\text{-CO-NH}_2$). But in reality urea can be lumped in with the inorganic soluble N sources, because it behaves like those sources—rapid turfgrass response, immediately available to the plant; watch overapplication as it can cause turfgrass burn and possible negative environmental effects. Urea is often the choice for use in foliar N programs, and it works well for that, with ample research showing that foliarly applied N is readily taken up by the turf, much of it within 12 hours of application. Urea is often the background fertilizer used for many slow-release N sources (discussed below).

Slow-release N sources that are slow-release because there is a physical barrier around a prill of soluble N fertilizer. Often, these are called “coated” fertilizers.

The oldest coated N fertilizer is sulfur-coated urea, or SCU (~32-0-0). Introduced decades ago, it still is a common product, and there are also newer generation materials that are both sulfur and polymer-coated. Sulfur-coated urea is made by spraying molten sulfur onto urea granules. Release of N from the sulfur-coated urea granule depends on the time it takes water and microorganisms to break down the sulfur coating. The thicker the coating, the slower the release rate. Release will be faster in warm, wet soil conditions that favor microbial activity. One problem with some forms of SCU is that the coating process creates larger granules, which are easily crushed or picked up by mowers. Newer micro-prill technologies have helped solve this problem, and SCU products remain a viable slow-release N source for turf.

Polymer-coated-urea (PCU) products have fast become a major part of the slow-release N market. These products work by allowing urea to gradually diffuse through the polymer membrane at a rate that, depending on the exact technology, may vary according to temperature, moisture or coating thickness. These products provide a precise N-release rate, and some can even deliver N for an entire growing season. The release rates are widely variable, and products can have release times ranging from 45 to 270 days. Materials with longer release patterns (180 days or more) can be excellent for producing a long-term greening response without the fluctuations in turf growth that may occur with more frequent applications of soluble N. The science of polymer coating has gotten quite specialized,

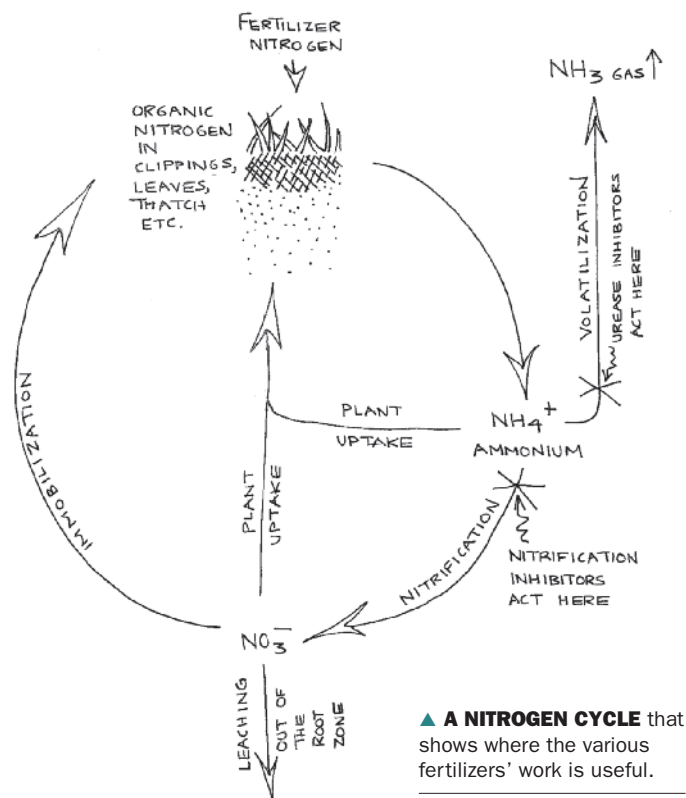
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and while urea used to be the product that was almost always coated, other fertilizer sources may now be coated (such as potassium sulfate).

Slow-release N sources that are slow-release because urea has been converted via chemical processes into a slow-release N source.

Slow-release fertilizers created by chemical reactions all start as urea. The most common product currently on the market in the turfgrass industry is ureaformaldehyde (UF), formed by reacting urea and formaldehyde to produce chain molecules of varying lengths. The length of the chains controls N release, with shorter chains having quicker N release for turfgrass use. Ureaformaldehyde reaction products are also often called Methylene ureas (MU) (as if it was a synonym with UF) but it is really not. Specifically, methylene-ureas tend to be the group of ureaformaldehyde reaction products that are intermediate in chain length, and have an N content of 39 to 41%. In comparison, a ureaformaldehyde that has long been on the market, Ureaform, has the longest chains, and is thus very slow in the release of N for plant use.

Regardless of the chain length, N release occurs as microorganisms break the chains, releasing N which is available for plant use. The release patterns of ureaformaldehyde products are controlled by the length of the chains; the shorter the chain, the quicker the release. Additionally, some short-chain UFs are frequently marketed as liquid slow-release materials, such as triazone. Ureaformaldehyde fertilizers are quite popular in the turfgrass market, and there is a wide variety of products available for your use. Before choosing a specific fertilizer you should consult the fertilizer label to determine the relative N percentages that are rapidly or slowly available for plant use.

The other slow-release N fertilizer that is chemically slow release is isobutylidene diurea (IBDU). A combination of urea and isobutyraldehyde, IBDU does not depend on soil microorganisms for release but is broken down by water (hydrolysis) into urea. The rate of urea release from IBDU varies with particle size, temperature and moisture. The smaller the particle, the faster the release. The higher the temperature, the faster the release. Recent discussions with turfgrass managers reveal that few use IBDU, often because it is difficult to obtain. If available, it is an excellent material for cool-season use for long-term N supply because it does not require microbial activity for N release.

Slow-release N sources that are slow-release because they are a 'true' natural organic material in which the N must be released via the biological process of mineralization.

These natural organic slow-release N sources are generally manufactured from some type of waste material. Sometimes the material is composted to help reduce odors, or the material may be dried and granulated to improve handling and spreading characteristics. Common organic fertilizer waste materials include sewage sludge, poultry litter, meat-processing waste and other animal by-products such as fish or feather meal. Much of the N in such fertilizers is organic N in the form of relatively complex chemical compounds, and is not available for plant uptake until microbes have converted it into nitrate and ammonium.

Soil temperature greatly influences microbial activity and the rate at which N is mineralized from these organic fertilizers. In cold soils, little activity will occur; an organic N fertilizer applied during winter in the northern US will just sit there with little N available for plant use until the soil warms. By contrast, fresh poultry litter applied to turf during hot weather is relatively quickly available, as most of the organic N is rapidly converted to nitrate and ammonium.

Some relatively new N fertilizers on the market are blends of organic wastes, such as fish meal, feather meal or poultry litter, and a water-soluble inorganic N such as ammonium sulfate. Such a product would produce a rapid greening response from the inorganic N and an extended response from the organic N. These "hybrid" materials can still burn turf if you apply them at high rates, and the labels usually have a warning to that effect. Read the guaranteed



▲ **RESEARCH TRIALS** are often conducted to evaluate N release of various fertilizers over time. In this study, different N sources are applied to hybrid bermudagrass, and each week color, quality and clipping yield data is collected from each plot.

analysis on the back of the bag to determine the source of the N, and how much of it is soluble and/or slow-release.

Urea to which nitrification inhibitors and/or ammonia volatilization inhibitors have been added.

The majority of nitrogen must be taken up by the plant as nitrate-N or ammonium-N. Soluble N sources already have the N in that form, and slow-release sources either have that N “trickle” out via a physical barrier that degrades over time, or by being released from a chemical formula via hydrolysis or microbial breakdown. Sometimes, however, the plant available forms (nitrate or ammonium) can be converted into other N forms that are less desirable for the plant or surrounding environment. In one case, ammonium-N gets converted to nitrate-N by the microbial process called nitrification. The nitrate-N is still plant available, but because it is an anion it can be prone to leaching from the plant’s rootzone. In the second case, another loss path is when N is lost as ammonia gas, out of the plant canopy to the atmosphere (this is volatilization, which is caused by the urease enzyme).

To slow down these processes of nitrification and volatilization inhibitors are added to the urea fertilizer. There is a separate nitrification inhibitor and urease inhibitor, but some fertilizers may contain both. Additionally, there are several different nitrification inhibitors on the market and thus you should carefully read the label to see what your fertilizer may contain. The most common nitrification inhibitor in turfgrass fertilizers is dicyandiamide (DCD),

while the most common urease inhibitor is N-(n-butyl) thiophosphoric triamide, (NBPT). Use of a fertilizer with a nitrification inhibitor may help to limit N leaching, and use of a fertilizer with a urease inhibitor may help reduce N loss to the atmosphere.

So, those are six basic groups of N fertilizers. Things get more complicated when other nutrients are added and blends are created. With variations in nutrient ratios, coating types, type and proportion of slow-release N and other characteristics, you can see how the number of possible (and actual) products can become so large.

So how do you pull all this information into a coherent plan for selecting a fertilizer? First, think about what you want your N to do. Do you need to heal worn spots and grow turf? In that case, use a soluble and readily available source to promote growth. Or, do you simply need a background green color with minimal growth? A long-chain MU or polymer coat with a long release pattern might work well. Do you have an environmentally sensitive area, one with a high sand content, in an area with intense rainfall? Consider adding slow-release or materials with inhibitors to protect the environment. Last, calculate your cost per pound of nutrient. Comparing N sources on a price per pound basis removes the percent N content from the equation, helping you make a cost effective decision. ■

Dr. Elizabeth Guertal is a professor of turfgrass management at Auburn University in Alabama.



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Keeping cool-season turf through the playoffs

The number of events, shorter days, and inclement weather can make it challenging to keep turf cover through the middle of a football field through the playoffs. Though challenging, 100% cover can be achieved with careful planning and execution throughout the growing season, not just in season.

Regardless of the turf of choice, there are five key aspects that must work in concert to achieve a safe, playable surface that will maintain acceptable cover through the playoffs:

Proper grade/drainage. A proper laser-graded crown, minimum 1% - maximum 2%, based on soil type, etc. Proper drainage based on soil type.

Mowing. Maintaining the turf at the correct height throughout the growing season.

Fertilization and pesticide program. En-

suring the turf is maintained at a level to lessen stress throughout the growing season by applying the proper products at the proper rates and the proper times.

Aerification/overseeding/topdressing. Core aerification with a PTO-driven aerifier, maintaining 100% cover though seed banking and topdressing to manage thatch, create a seedbed and maintain a smooth surface.

Irrigation. Necessary to maintain proper soil moisture to maintain turf cover, germi-

nate seed and provide a forgiving surface to the athletes.

Achieve three or four of the five aspects above and the turf has a chance to be good, but not great. Complete all five, the turf will be strong and able to withstand a tremendous amount of traffic.

PRE-SEASON/EARLY SEASON MAINTENANCE:

To achieve 100% cover through the playoffs begins in the off-season much like the athletes who play on the field begin with off-season workouts. Starting in the early spring, core aerification along with topdressing and overseeding with a minimum of 50/50 Kentucky bluegrass/perennial ryegrass at a relatively high rate (6-8 lbs per 1,000 sq ft) begins the season. Seed heavier through the hashmarks and along the sideline/bench areas. Seeding early allows for a late spring liquid application of pre-emergent products that will control the majority of crabgrass and goosegrass. To learn more about topdressing athletic fields and creating a sand cap, look up the re-

To achieve 100% cover through the playoffs begins in the off-season much like the athletes who play on the field begin with off-season workouts.



search from Drs. Alec Kowaleski and Trey Rogers at Michigan State University.

SUMMER MAINTENANCE

During the summer maintain the turf at the in-season cutting height and work to keep the turf as stress free as possible. Irrigate on an as-needed basis to ensure that the turf is not too dry. Fertilize with organic fertilizer or a synthetic fertilizer that contains at least 50% slow release nitrogen in late-May and again in early August. Consider applying fungicides as needed to keep disease pressure at a minimum and apply grub control in July. Furthermore, deep tine aerification and/or another core aerification should be considered in early June followed by a light topdressing. Overall, the goal of the summer season is to keep the turf as healthy as possible.

IN-SEASON MAINTENANCE

The games begin, where will the wear take place? The same places that wear took place in previous seasons. With that said, create a seed bank across the playing sur-

face, with the concentration taking place in the anticipated wear areas. I have a saying, "If you wait until you see wear in wear areas, it is too late!" Seed early and seed often. As far as type of seed used, I prefer using a seed blend that consists of bluegrass and perennial ryegrass. Why? The ryegrass is necessary to take immediate traffic. At the end of the day, these plants will probably be removed by traffic each week. The time to establish straight bluegrass is in a dormant seed situation or in the early spring. A general rule of thumb is applying one 50 lb bag of ryegrass through the hashmarks every week during the playing season. This equates to a seed rate of 3.14 lbs of ryegrass per 1,000 sq ft per week. Along with overseeding, a light topdressing can follow or simply let the athletes "clear the seed in." Consider reading a research project from Dr Dave Minner at Iowa State to learn more about seed bank research.

A simple pre-game and post game plan: Thursday, overseed hashmarks with one 50 lb bag of perennial ryegrass (optional light

topdressing); Friday (or game day), blow off/sweep surface using a pull behind blower or pull behind sweeper. Mow field and fill divots and lightly roll field to push in any plants that may have been slightly pulled from the soil. Irrigate playing surface to alleviate plant stress

POST-SEASON MAINTENANCE

After the games are completed, core aerify and topdress the playing surface. Consider using 3/4 inch coring tines and tight spacing. This is the one time to aggressively cultivate the field and topdress. Fertilize with a product containing 100% water soluble fertilizer at a rate of 1.5 lbs/1,000 sq ft. When weather demands, winterize the irrigation system and get ready for next year. ■

Jamie Mehringer is president of J & D Turf, Fishers, IN and a member of the STMA Editorial Committee. Check out his blog, Smart Turf, at janddturf.blogspot.com

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Which Kentucky bluegrass cultivars perform better with less water?

▲ **FIGURE 5.** Well-watered plots at beginning of dry-down study (4 June, 2007) (left). Plots at two months into the study (4 Aug., 2007), in which drought stress is evident in plots of Kentucky bluegrass (right). Plots were sheltered from precipitation by the rainout shelter (upper left in each photo), which automatically moved on the tracks to cover the plots during rainfall. Photos by Jason Lewis.

Field research at Kansas State University indicates that water requirements may differ significantly among cultivars of Kentucky bluegrass (KBG), depending upon desired turfgrass quality. Given the certainty of periodic drought, limited water availability, and increasing irrigation costs, having choices of KBG cultivars that may maintain better quality with less water is an attractive option. Ideally it would be helpful to select a turfgrass that can perform well with less water.

A helpful concept when discussing KBGs is their classification into phenotypic groups. Individual cultivars of KBG are classified into phenotypic groups based on common growth and stress performance characteristics gathered from field trials. Previous research has indicated that such groupings may be useful in predicting drought tolerance. Because cultivar turnover is rapid in the turfgrass industry, determining the relative irrigation requirements of phenotypic groups may enable researchers to predict irrigation requirements of cultivars not included in any particular study.

Using a rainout shelter (Fig. 5), we compared seasonal irrigation amounts among 28 KBG cultivars for two growing seasons. By shielding plots from rainfall, water could be withheld until wilt symptoms were evident. Our objectives were to identify KBG cultivars and phenotypic groups that main-

tain better visual quality with less irrigation, using wilt-based irrigation. We hypothesized that if visual quality was good at the beginning of the season, we could maintain minimally acceptable quality in KBG (for example, for a moderately-maintained lawn or golf course rough with in-ground sprinklers) by irrigating when at least 50% of a given cultivar showed signs of wilt. Two hybrid bluegrasses were also included in the study.

METHODS

This study was conducted at the Rocky Ford Turfgrass Research Center near Manhattan, KS. Data were collected for 105 days in 2007 (June 19 - Oct. 1) and 108 days in 2009 (June 22 - Oct. 7). Turfgrasses included 28 KBG cultivars and two hybrid bluegrasses (Table 1). Commercially available cultivars of KBG were selected to in-

clude representatives from major KBG phenotypic groups (Note: In the results section, only groups with three or more cultivars were used when comparing groups.) Also, because visual quality was of interest, cultivars were selected based on performance in National Turfgrass Evaluation Program (NTEP) trials.

The plots were maintained well watered until the study began each year. Thereafter, water was withheld until 50% or more of a plot displayed drought stress. Water (2.54 cm) was then applied by hand to the individual plots. Turfgrass quality and drought stress symptoms were evaluated daily. This process continued until the end of the study, after which all plots were re-watered and allowed to recover. Plots were mown weekly at 7.6 cm.

Turfgrass quality evaluations, based on color, density, and uniformity of the canopies, were made using a visual rating scale of 1 to 9, with 1 = brown turf, 6 = minimally acceptable for a home lawn or golf course rough, and 9 = optimum turf. Drought stress was defined as the turf displaying wilting, failure of the canopy to remain upright after foot traffic, and a general darkening color of the turf. Because changes in drought stress were sometimes rapid from

day to day, particularly under conditions of high temperatures, it was not unusual for irrigation to be applied when greater than 50% of a plot (for example, up to 70 or 80%) displayed drought stress.

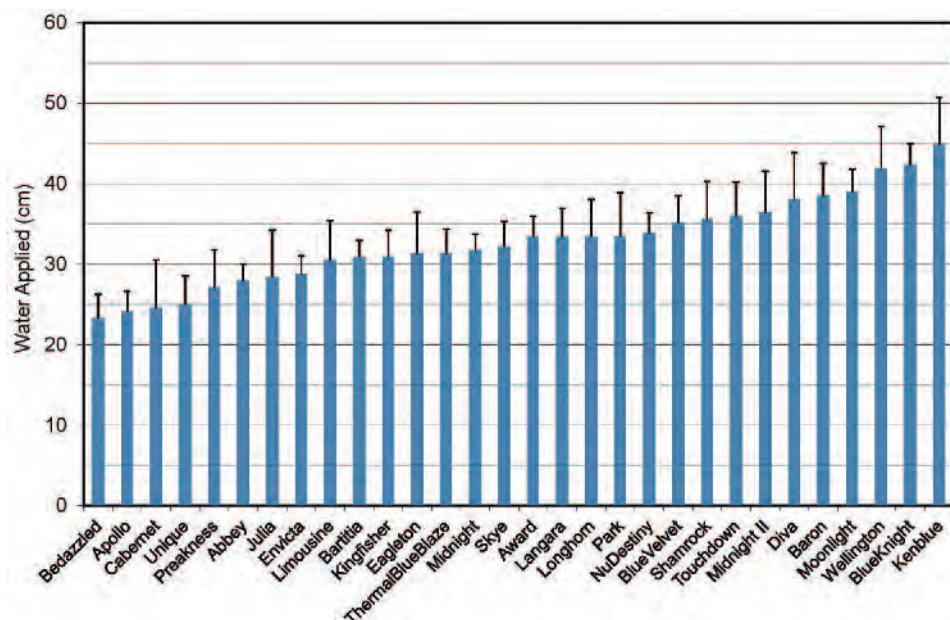
RESULTS

Total Water Applied and Days to Wilt between Irrigation Cycles.

Water applications, averaged over the ~3.5 month period in each year of the study, ranged widely from 23.3 cm (mean=2.2 mm/day) in Bedazzled to 44.9 cm (4.2 mm/day) in Kenblue (Fig. 1). In Bedazzled, Apollo, Cabernet, and Unique, 25.0 cm (2.3 mm/day) or less of water was applied, which was significantly less than Kenblue, Blue Knight, Wellington, Moonlight, Baron, Diva, Midnight II, Touchdown, Shamrock, and Blue Velvet; in the latter 10 cultivars, 35.1 cm (3.3 mm/day) or more of water was applied. However, there were no statistical differences among the 15 cultivars that received the least amount of water (Fig. 1, Bedazzled through Skye).

Days to wilt between irrigations, which was roughly inverse the amount of water applied ($r=0.91$), ranged from 6.4 d in Kenblue to 13.1 d in Cabernet, a difference of nearly one week (Fig. 2). Days to wilt was greater in Cabernet, Bedazzled, Unique, and Apollo (11.9 to 13.1 d) than in the 18 bluegrasses with the least days to wilt (6.4 to 9.0 d; Kenblue through Park in Fig. 2). These intervals provide the practitioner with an estimate of irrigation frequency required to maintain the various KBGs at a performance level similar to this study, at least in the transition zone of the US. In addition to less frequent irrigation, cultivars with more days to wilt have a greater likelihood of receiving rainfall between irrigations; this could result in further water conservation and reduced irrigation costs.

Notably, all cultivars in the phenotypic group Mid-Atlantic (Cabernet, Eagleton, and Preakness) and four of five in the Compact America group (Apollo, Bedazzled, Kingfisher, and Unique) were among the 15 cultivars that received the least amount of water (Table 1; Fig. 1). When averaged over all cultivars within each phenotypic group, 27.3 cm of water was applied to Compact America types and 27.7 cm to Mid-Atlantic



▲ **Figure 1. WATER APPLIED TO KENTUCKY BLUEGRASS CULTIVARS AND HYBRID BLUE-GRASSES**, averaged over the periods 19 June to 1 Oct. 2007 (105 days) and 22 June to 7 Oct. 2009 (108 days), at Manhattan, KS. Error bars denote standard error.

types (both about 2.6 mm/day), which was less than the Common, Compact, and Compact Midnight groups (Fig. 3). The

Common types received more water (40.1 cm, 3.8 mm/day) than all other groups except Compact. Days to wilt was also greater

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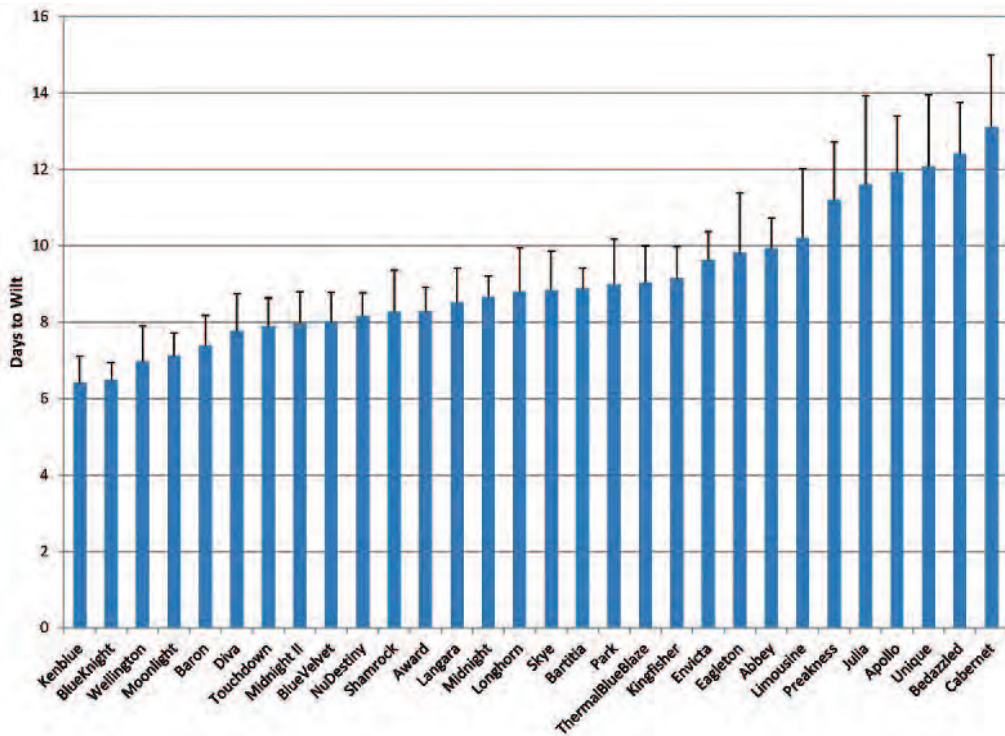
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▲ **Figure 2. DAYS TO WILT BETWEEN IRRIGATIONS** among Kentucky bluegrass cultivars and hybrid bluegrasses, averaged over the periods June 19 - Oct. 1, 2007 (105 days) and June 22 - Oct. 7, 2009 (108 days), at Manhattan, KS.

in Mid-Atlantic and Compact America than in all other groups (Fig. 4), indicating cultivars in Mid-Atlantic and Compact America could generally go longer without irrigation.

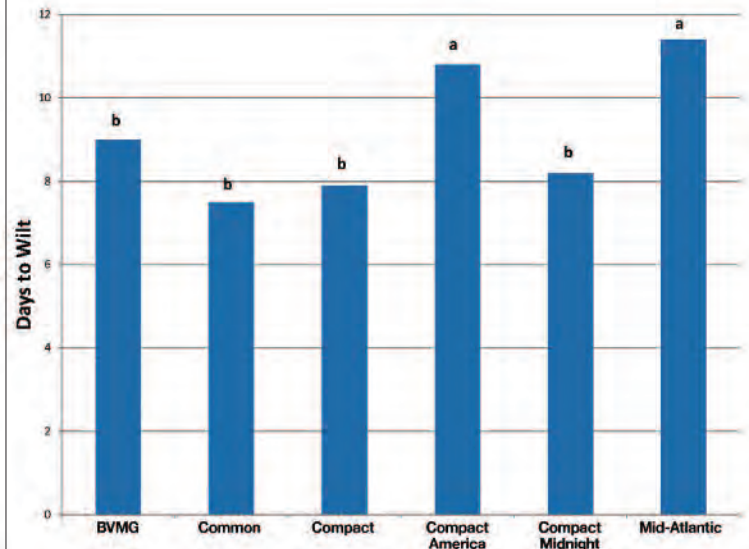
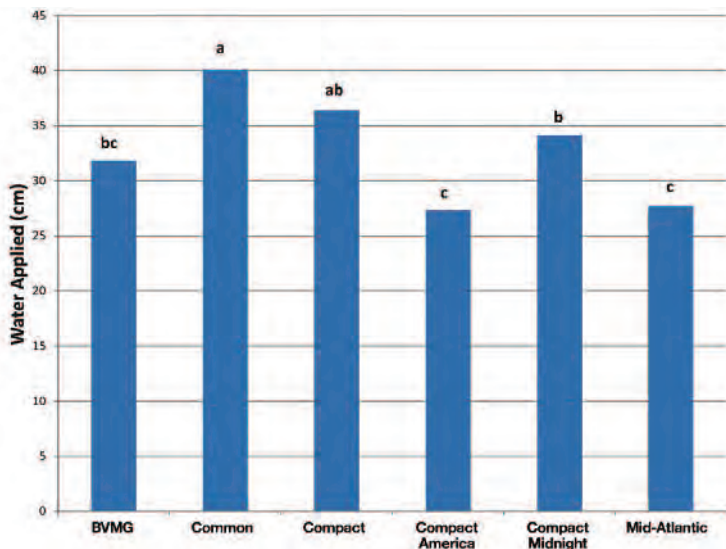
VISUAL QUALITY

With the exception of the Common types in 2007, the visual quality of all bluegrasses was acceptable (>6) at the beginning

of the study in each year (Fig. 5, top). In all bluegrasses and in both years, however, visual quality declined to below what was considered minimally acceptable (Fig. 5, bottom). This indicates waiting until 50% wilt to apply irrigation was insufficient to maintain acceptable visual quality in KBG, at least for turf managers who desire a moderate standard of quality in the stressful climate of the transition zone. Perhaps visual quality could have been maintained at acceptable levels by applying water when only 25% of the plot exhibited symptoms of drought stress; further research is required. Our method may be appropriate, however, where the primary concern is water conservation and some dormancy is acceptable. Visual quality in all bluegrasses generally remained above four and recovery was rapid in the fall after resuming irrigation.

Although visual quality declined to less than six in all cultivars, the time required to do so ranged widely from 8.1 d in Kenblue to 44.8 d in Blue Velvet. The decline was slower in Blue Velvet, Award, Midnight, Cabernet, Unique, and Nu Destiny (36 to 44.8 days) than in Park, Baron, Wellington, and Kenblue (8.1 to 14.2 days). Thus, four of five cultivars in the Compact Midnight group maintained quality longer than all cultivars in the Common group (Table 1).

Continued on page 44



▲ **Left: Figure 3. WATER APPLIED TO KENTUCKY BLUEGRASS PHENOTYPIC GROUPS**, averaged over the periods 19 June to 1 Oct. 2007 (105 days) and 22 June to 7 Oct. 2009 (108 days), at Manhattan, KS. The same letter above bars denoting different phenotypic groups indicates no significant difference. **Right: Figure 4. DAYS TO WILT BETWEEN IRRIGATIONS AMONG KENTUCKY BLUEGRASS PHENOTYPIC GROUPS**, averaged over the periods 19 June to 1 Oct. 2007 (105 days) and 22 June to 7 Oct. 2009 (108 days), at Manhattan, KS. The same letter above bars denoting different phenotypic groups indicates no significant difference.

JOHN MASCARO'S PHOTO QUIZ

John Mascaro is President of Turf-Tec International

Can you identify this sports turf problem?

Problem: Irregular dark green areas in leftfield

Turfgrass area: Baseball stadium field

Location: San Cristobal, Dominican Republic

Grass Variety: zoysiagrass

Answer to John Mascaro's Photo Quiz on Page 33



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Irrigation water quality guidelines for sports turf

IRRIGATION WATER QUALITY is becoming more important for managers of sports turf and grounds. With the demand for potable water increasing, users of irrigation water are considering alternative sources, such as recycled or effluent water. Because water quality can influence soil quality and turfgrass performance, it's advisable to test irrigation water periodically.

Recently, Penn State's Agricultural Analytical Services Lab began an irrigation and drinking water testing program, with a special program just for turfgrass irrigation water. Below are guidelines used in our test program; these can be followed when interpreting results of irrigation water analyses.

pH

The pH of irrigation water should be determined in a laboratory and listed in your test report. Water with a pH in the range of 6.0 to 7.0 is most desirable for use on turfgrasses. Water with a pH value outside of this range may not directly influence turfgrass performance, but indicates a need to evaluate other chemical components of the water.

BICARBONATES AND CARBONATES

Bicarbonate (HCO_3^-) and carbonate (CO_3^{2-}) are common constituents of irrigation water, and can influence soil properties and turfgrass performance. If bicarbonate and/or carbonate levels are high (>120 and 15 ppm, respectively), these ions can react with calcium and magnesium in the soil to form insoluble calcium carbonate and magnesium carbonate (lime). This reaction reduces the amount of free calcium and magnesium in soil, allowing sodium to compete for and occupy negatively-charged sites on clay particles. Excess sodium in clay results in destruction of soil structure and reduced water percolation through the soil profile. This effect is referred to as the sodium permeability hazard.

RESIDUAL SODIUM CARBONATE (RSC)

The sodium permeability hazard for irrigation water is usually assessed when bicarbonate and carbonate levels are >120 and 15 ppm, respectively. Residual sodium carbonate (RSC) is a common means of assessing the sodium permeability hazard, and takes into account the bicarbonate/carbonate "and" calcium/magnesium concentrations in irrigation water. RSC is important because it's not the absolute bicarbonate and carbonate concentrations that are important, but instead, the relative concentrations of bicarbonate and carbonate compared to concentrations of calcium, magnesium, and sodium.

RSC is calculated as follows: $\text{RSC (meq/L)} = (\text{HCO}_3^- + \text{CO}_3^{2-}) - (\text{Ca} + \text{Mg})$

Note that for this equation, all concentrations are expressed in meq/L. Typically, water with a RSC value of 1.25 meq/L or lower is safe for irrigating turf. RSC values between 1.25 and 2.5 meq/L is marginal, and above 2.5 meq/L is considered excessive.

ELECTRICAL CONDUCTIVITY (EC) AND TOTAL DISSOLVED SOLIDS (TDS)

EC is a measure of the degree in which water conducts electricity. It is determined by passing an electrical current through a water sample and recording the resistance in mmhos/cm or dS/m. EC is used to estimate the concentration of TDS in water, using the following equation:

$\text{TDS (ppm or mg/L)} = \text{EC (mmhos/cm or dS/m)} \times 640$

TDS is occasionally referred to as total dissolved salts (also abbreviated TDS), or total soluble salts (TSS), and both are determined using the same equation.

Acceptable TDS concentrations for turfgrass irrigation range from 200 to 500 ppm ($\text{EC} = 0.31$ to 0.78 mmhos/cm). TDS concentrations higher than 2,000 mg/L ($\text{EC} = 3.1$ mmhos/cm) can damage turfgrasses. If using irrigation water with a TDS concentration higher than 500 mg/L, attention should focus on irrigation duration and frequency, drainage, and turfgrass species selection.

SODIUM

Sodium exists in nearly all irrigation water and is not necessarily a cause for concern unless high concentrations are present. High concentrations (> 70 ppm) can be

Table 1. Guidelines for nutrient concentrations in irrigation water (mg/L).

Macronutrient	Low	Normal	High	Very High
Nitrogen (N)	<1.1	1.1 - 11.3	11.3 - 22.6	>22.6
Nitrate (NO_3^-)	<5	5 - 50	50 - 100	>100
Ammonium (NH_4^+)	<2	2 - 75	75 - 100	>100
Phosphorus (P)	<0.01	0.1 - 0.4	0.4 - 0.8	>0.8
Potassium (K)	<5	5 - 20	20 - 30	>30
Calcium (Ca)	<20	20 - 60	60 - 80	>80
Magnesium (Mg)	<10	10 - 25	25 - 35	>35
Sulfur	<10	10 - 30	30 - 60	>60
Micronutrient	Acceptable range	Suggested maximum concentration		
Iron (Fe)	2.4 - 4.0	5.0		
Manganese (Mn)	<0.2	0.2		
Copper (Cu)	<0.2	0.2		
Molybdenum (Mo)	<0.1	0.1		
Zinc	<0.3	2.0		
Boron	<2.0	2.0		

Guidelines based on the suggestions of Duncan, R.R., R.N. Carrow, and M. Huck. 2000. Understanding Water Quality and Guidelines to Management. USGA Green Section Record. September-October, pp. 14-24.

detrimental to both turf and soils. Sodium in irrigation water can be absorbed by roots and foliage, and foliar burning can occur if sufficient amounts accumulate in leaf tissue.

SODIUM ABSORPTION RATIO (SAR)

The relative concentrations of sodium, calcium, and magnesium are important determinants of irrigation water quality. Calcium and magnesium play a major role in maintaining structure of clay-containing soils. If water with excess sodium and low calcium and magnesium is applied frequently to clay soils, the sodium will tend to displace calcium and magnesium on clay particles, resulting in breakdown of structure and reduced permeability.

SAR is used to assess the relative concentrations of sodium, calcium, and magnesium in irrigation water and provide a useful indicator of its potential damaging effects on soil structure and permeability.

Typically a SAR value below 3.0 is considered very safe for turfgrasses. Over time, water with a SAR of 9.0 or above can cause significant structural damage to clay soils. Sandy soils are not as susceptible to structure and permeability problems, and can tolerate higher SAR values (up to 10 in most cases).

CHLORIDE

Chloride contributes to salinity of irrigation water, and when concentrations are high enough, can be toxic to plants. Turfgrasses are not particularly sensitive to chloride, and can tolerate levels up to 100 ppm. Turfgrasses can sustain injury when irrigated with water containing >355 ppm of chloride. Grounds managers should be aware that some ornamental plants are sensitive to chloride concentrations above 70 ppm.

BORON

Boron is essential for plant growth at very low concentrations. However, it can be quite toxic to some ornamental plants at concentrations as low as 1 to 2 ppm in irrigation water; with symptoms appearing as necrosis on margins of older leaves. Turfgrasses are more tolerant of boron, but to be safe, it's best to use irrigation water with boron concentrations < 2 ppm for watering sports turf.

NUTRIENTS IN IRRIGATION WATER

Irrigation water contains plant nutrients in varying concentrations. Depending on concentrations, nutrients can influence fertility programs and have an environmental impact on ground and surface water. Nitrogen has a significant influence on plant growth, and may present a hazard for drinking water sources if nitrate levels are 10 ppm or more. Phosphorus

concentrations should be as low as possible (lower than 1.0 ppm) to avoid causing algal blooms in holding ponds and phosphorus loading in surface streams and lakes. Guidelines for nutrient concentrations are provided in Table 1. ■

Dr. Peter Landschoot is a professor of turfgrass science at Penn State. He is the resident extension turfgrass management specialist in Pennsylvania.



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Tips to take the terror out of giving presentations

WHAT'S SCARIER to most Americans than spiders, heights, or even death? There hasn't been a horror movie made about it yet, but more than 75% of Americans surveyed report that they suffer from "glossophobia," a debilitating fear of public speaking. Statistically, far more of us claim that we would prefer death to giving a speech; even comedian Jerry Seinfeld used to joke that at a funeral, most people would rather be lying in the casket than delivering the eulogy.

Why is the prospect of trying to communicate information in front of even one person so horrifying? Most glossophobes fear looking bad, being criticized, suffering rejection, and losing business or friends, all because they are

certain they will forget what they'd planned to say. Maybe you have had the experience of forgetting a speech or presentation, or you've seen it happen to someone else, and you don't want it to happen to you. Ever.

WHAT'S WRONG WITH ROTE?

Most people memorize speeches by rote-or

As a real estate professional, for example, when you're discussing listing or selling a prospect's home, an effective presentation is one in which you are clearly the expert and know more about selling a home than the person who wants the home sold.

word-for-word repetition-and try to deliver it exactly as they've written it. You probably don't realize that this method of learning is actually setting you up to forget what you're supposed to say because it creates tremendous stress, which is in turn the number one killer of memory.

Or if you do manage to remember every single word you'd planned to say, the effort requires so much mental energy that you come off as a terrible communicator. You're not really there while you're speaking because all of your efforts go into remembering what comes next. If, heaven forbid, something distracts you, or someone interrupts you with a question during a memorized presentation, thinking about anything other than "What comes next?" can throw you completely off-track. Your mind may literally go blank, just as you feared.

And there's one more problem with word-for-word learning: 93% of our communication happens non-verbally. The majority of the message your audience receives has very little to do with the actual words you say but with body language, tone of voice, gestures, and facial expressions. So you can't expect to convey ease and expertise non-verbally if your mental and physical energies are completely preoccupied with delivering a verbatim speech. You'll simply be too tense, and it will show.

WHAT'S WRONG WITH NOTES?

What about the security blanket of an outline or notes? You may feel you need notes to stay on track when giving a presentation, but if you're tied to those notes, you aren't free to make eye contact, a key element of non-verbal communication. You'll also be stuck behind a podium, and if people can't see two-thirds of your body, that has a serious impact on the 93% non-verbal communication aspect of your presentation. Notes may make you feel a little better, but they also take away a crucial tool for your effectiveness.

As a real estate professional, for example, when you're discussing listing or selling a prospect's home, an effective presentation is one in which you are clearly the expert and know more about selling a home than the person who wants the home sold. Likewise, an American who is fluent in French doesn't need to reference a French translation guide while vacationing in Paris. So if you're fluent in your topic, you shouldn't need to consult your notes, and your audience of one or many will sense this on a subconscious level. However, if you feel you must use notes, consult them very little or not at all, and you'll gain huge credibility as an expert.

FOUR TIPS TO RELIEVE PRESENTATION TERROR

Regardless of how deeply rooted your fear of public speaking is, with a few simple adjustments to your method of preparation, you can grow more confident about your abilities so that much of your fear disappears. When you know what you're going to say and that your presentation is strong, public-speaking may still be a little nerve-wracking, but it's exciting, too. Try these tips to help turn that stomach-turning anxiety into the rush of great communication.

1. Know what you're talking about. When you prepare an organized presentation of any kind, you must be knowledgeable about the company, product, or situation. Talk about things you actually know well. If you're not confident that you know all that you need to, commit to doing thorough research and learn what you need to know to feel and look expert. If you truly don't know what you're talking about, it will show, and all the tricks and techniques in the world won't help.

2. Decide on a few key points. Good keynote speakers typically don't have more than three or four key things for the audience to take away from their presentations. The classic presentation formula is a story that makes the audience laugh in the beginning, a few key points for them to take away (usually illustrated with stories), followed by an emotionally moving story at the end.

Another basic formula for effective communication is: Tell your audience what you're going to tell them; tell them; then tell them what you told them.

3. Create visual triggers. Invent pictures in your mind and "store" them in various places around the room where you'll deliver the presentation. The pictures then become your speech. For example, if one of your points is about achieving goals, you can envision a set of goal posts as a visual representation of that concept. If you want to make a point about freedom, envision an American flag somewhere in the room, or a huge stack of money if you want to talk about increasing profits.

4. Relax, have fun and be yourself. People respond best to a message when the person delivering it is genuine. With sufficient preparation of the right type, you'll feel comfortable enough to be yourself in front of a group. You can then demonstrate how much you believe in what you're saying. When you can relax and be an authentic human being, you tap into powerful communication.

FROM FEARFUL TO FEARLESS

You've undoubtedly heard a few presentations—both good and bad—in your day, so you know it's a fact: you listen to and respect those speakers who talk to you, not at you. A conversation is always better than a lecture, isn't it? When you are preparing to make a presentation, know that people don't mind if you stumble over a couple of words; in most cases they don't even notice. What they will notice, though, and mind a great deal, is being read to or BS'd. If your audience feels as if you're insincere or unknowledgeable, they may give you real reason to be a glossophobe! But if you're prepared, knowledgeable, and relaxed, you can expect to get the results you want, whether that's more sales, promotions, or thunderous applause from your devoted audience. ■

Roger Seip's company, Freedom Speakers and Trainers, specializes in memory training and workshops, www.deliverfreedom.com.

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Making peace with the rules:

a guide to getting along with HR

IF YOU THINK THAT GETTING ALONG WITH YOUR HUMAN RESOURCES AREA AT WORK IS DIFFICULT, try living with one full-time! My husband informs me all the time how an HR wife is no picnic. HR is all about paperwork, consistency, rules and policies. Many managers are not big fans of HR as they feel it can be interfering, intrusive and legalistic when trying to manage their department the way they want. However, HR can be your best friend when you are faced with a “sticky” employment dilemma and can help keep you and your company out of potential litigation issues.

Think of this scenario: You are a turf manager whose job success is based on having safe, multi-functional, aesthetically pleasing playing fields. And while you have all the experience, knowledge and training in this area, you may be forced to rely on employees who have probably never received training in turf management, probably have little interest in turf management, and whose primary focus for success in their job is something completely different than managing turf. You could write up strict instructions on how to

carefully maintain the turf, but the reality is most of these same employees will not read your instructions or instead feel like they have a better way to maintain your turf than you. How successful do you predict you would be with this workforce? How nervous would you be regarding the success of your field? Welcome to the world of Human Resources!

LIMITING LIABILITIES

Human Resource departments are charged with “limiting liabilities” in the workplace, from safety concerns, to legal personnel issues, to compliance with government standards. HR people are usually trained/certified in legal personnel issues, but often are not the ones directly supervising the majority of company employees. That responsibility falls upon managers who are trained in completely different areas, have a multitude of other activities besides personnel management, and whose job performance is primarily based on productivity (i.e., producing top notch athletic surfaces)—something completely different than adhering to personnel policies.

To assist in limiting the liabilities of potential personnel lawsuits and pitfalls, HR establishes rules and writes policies/handbooks to help managers avoid legal trouble. But rules and policies are only as good as the managers who a) *know the rules/policies*; i.e., actually read a handbook; and b) are willing to carry rules and policies out as written and established.

Let's take a look at a common “pitfall” area: lunch breaks. There are very specific federal laws, and sometimes even more stringent, state-specific Wage and Hour standards that must be complied with. Usually it consists of a 30-minute, unpaid rest break that must occur somewhere within a shift of 5 or more hours worked (make sure to check on what applies to your area) for all hourly non-exempt employees. Your handbook almost certainly has provisions to comply with work time breaks. Here's where this policy is sometimes “fudged” by managers/supervisors: hourly employees wanting to “work-through” lunch so they can go home early; game day events/schedules where it's hard for you or anyone else to take a scheduled break; employees that grab a quick bite and head back out to work early just because they want to. Each of these is an area for a possible Wage and Hour violation.

Wage and Hour does not care whether or not an employee was “willing” or “wanting” to shorten/not take their break, it's a violation all the same. When Wage and Hour investigates this type of scenario they don't stop with one employee or for a 1-week time period; they will pull records (usually time sheets/electronic payroll data) and will assign fines for *every* occurrence for *every* employee. Additional fines will be levied if it is perceived that company/management willingly participated in the neglect of Wage and Hour laws. Your HR department almost assuredly has established a policy to *limit this liability* but again the policy only works if it is enforced by managers/supervisors properly.

But how do you change things up when you've always had an understanding in your department that you could “get around” a specific rule/policy? Whenever in doubt, BLAME HR. HR is a great scapegoat for any rule or policy because they would rather be labeled the “bad guy” and limit potential liabilities than have lawsuits on their hands.

Statements like, "HR/management is really cracking down on lunch breaks, accurate time sheets, (insert your favorite scenario here). Even though we've done something different in the past, HR wants it done by the book from now on." Provide copies of the policy from the employee handbook for backup; yes, your employees were given a copy of their handbook/have access online, but the chances that they've read it or even know where it's located are slim at best.

The secret to getting along with HR? Follow the rules that have been set. Easier said than done and irritating no doubt when trying to manage your department the way you want. But rules and policies are not established to give HR something to do (although I'm sure many of you suspect this to be true); they are established because somewhere, at sometime, there has been a problem with employees in this area (employees working through lunch breaks, falsifying time cards, etc.) or because there is a state or federal law that will cause big problems for the company if they are not followed correctly.

Think of the multitude of laws/policies established for our society on paying/filing taxes, traffic/driving, and "playing nicely with others." Laws weren't established for something for lawmakers to do (although again it's easy to sometimes think so), they were established because someone didn't pay their taxes; didn't stop for a red light, or didn't respect someone's boundaries by punching him in the nose. HR policies and societal laws are established because at sometime, somewhere, someone "wasn't playing nicely in the sandbox."

USE THE HANDBOOK!

Get familiar with your company policies/handbook. If you've already read it, read it again. If you don't understand a specific policy, get with HR or management for clarification on why this policy exists and how it applies to your situation. HR is always more willing and appreciative to working with a manager/supervisor *before* a problem exists than after a violation/lawsuit has occurred. The truth is managers and supervisors

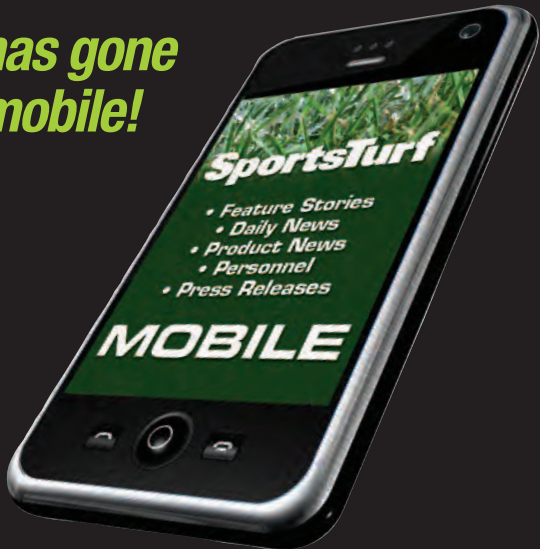
are always held to a different standard than employees. A manager violating a company policy is always more visible simply because employees are watching their every move. And while an employee may be all in favor of one rule bent on their behalf, don't ever underestimate how quickly they'll turn on you if they feel they have been "jilted" on another rule not strictly followed. Treating employees consistently by company rules and policies not only allows you to stay at peace with HR, but limits liabilities for you and your organization in the future. ■

Carole Daily is the wife of Darian Daily, head groundskeeper for the Cincinnati Bengals. They have two children, Peyton, and Will, and live in Independence, KY. Carole graduated from Harding University with a BS in Human Resource Management. She has more than 15 years in the Human Resource industry in factions such as retail, corporate, manufacturing, and consulting. She enjoys all aspects of writing and specializes in business communications.

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Identifying and managing petroleum spills and leaks on turf

AT TIMES, petroleum products may spill or leak onto sports fields maintained with motorized power equipment. Fuel, oil, hydraulic and brake fluids, and grease can injure turfgrasses and have the potential to pollute soil, surface water bodies and groundwater. Turf injury symptoms often vary depending on the type of leak or spill. For example, hydraulic fluid leaks tend to damage turf in a straight line pattern, while a gasoline spill often causes an irregularly shaped, circular dead area of turf with a very distinct edge or margin. The amount of time turfgrasses require to recover after contacting petroleum often depends on a number of factors including the product type, volume, temperature and ingredients, and soil and climatic conditions.

Petroleum products contain carbon - 83 to 87%; hydrogen - 10 to 14%; nitrogen - 0.1 to 2%; oxygen - 0.05 to 1.5%; sulfur - 0.05 to 6.0%; and metals - < 0.1%. Petroleum-contaminated soil and water may prevent turfgrass seeds from germinating, restrict photosynthesis or kill plants.

Products are categorized based on their composition and intended use.

Gasoline is a mix of hydrocarbons with a chemical formula of C_4 to C_{12} . Other substances including anti-rust and anti-icing agents and detergents may be added to improve performance. Gasoline often contains more than 500 individual compounds, is insoluble in water at a temperature of 68°F, has a boiling temperature of 80 to 437°F and has a flash point of -45°F. Depending on the refinement process, gasoline contains 85-88% carbon, 12-15% hydrogen and no oxygen.

Ethanol, with a chemical formula of CH_3CH_2OH , can be produced by fermenting sugars from corn, and distilling the fermented solution. This fuel can also be produced from the cellulose of several plants including switchgrass. Almost all of the ethanol used for industrial purposes contains 5% water. Ethanol has a boiling temperature of 172°F, a freezing temperature of -142.5°F and a flash point of 55°F. Ten percent ethanol is often mixed with 90% gasoline to create gasohol. Ethanol is also available as a high-level blend known as E85 for use in flexible fuel vehicles.

Diesel Fuel, like gasoline, contains hydrocarbons and additives. Additives may reduce wear and oxidation, deactivate metals or improve ignition and stability. Number 2 diesel fuels have a chemical formula of C_8 to C_{25} , a flash point of 165°F, and contain 84-87% carbon, 13-16 % hydrogen and no oxygen.

Motor oil is classified according to viscosity standards developed by the Society of Automotive Engineers (SAE). In general, high-viscosity oils are “thick” compared to low-viscosity oils, which are considered to be “thin.” Each standard grade of motor oil is defined by viscosity in accordance with SAE J300 specifications. Multi-grade or multi-viscous oils (for example SAE 5W-30 and 10W-30) are formulated to lubricate engine parts at both low and high temperatures. The cold-temperature standard (W or “winter” grade) specifies the maximum cold temperature viscosity, and the warm-temperature standard specifies the minimum high-temperature viscosity.

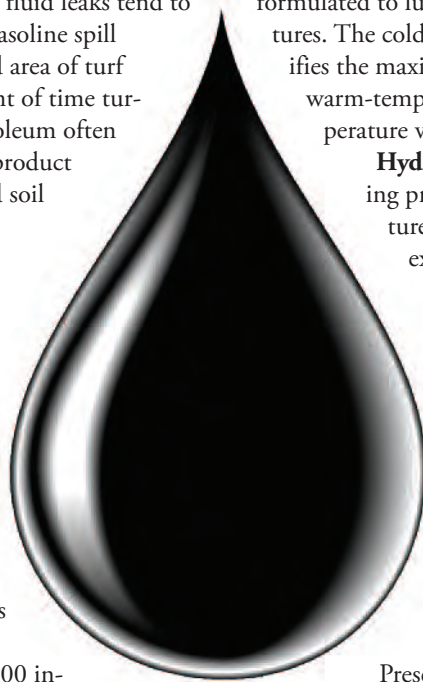
Hydraulic fluid, a very versatile hydrocarbon-containing product, is capable of performing at high temperatures (for example, 110 to 130°F) and pressures (for example, 3000 psi or greater). The base fluid may be a refined mineral oil, synthetically produced or bio-based, and may have fire-retardant properties. Typical additives include: corrosion (0.05-1.0%) and oxidation (0.2-1.5%) inhibitors, de-foaming (2-20ppm), anti-wear (0.5-2.0%) and anti-friction (0.1-0.75%) agents, and detergents (0.02-0.2%). Hydraulic fluid usually has a flashpoint at least 68°F higher than the maximum fluid “working” temperature. Atomized hydraulic fluid leaking from a hose may catch fire if exposed to an ignition source.

Brake Fluid is a type of hydraulic fluid.

Presently, three material groups: mineral oil, silicon or polyglycon ether (glycol), are used as brake fluids. Brake fluids with a glycol base are most widely used commercially. The boiling point varies among the brake fluid grades established by the Department of Transportation (DOT). For example, the dry boiling point of DOT Grades 3, 4, 5 and 5.1 is 401°F, 446°F, 500°F and 500°F, respectively. With the exception of DOT 5 (silicon base), the pH of these fluids must be no lower than 7.0 and no higher than 11.5.

Grease used for lubrication is recognized by the American Society of Testing and Materials (ASTM D 288, Standard Definitions of Terms Relating to Petroleum) as “A solid to semifluid product of dispersion of a thickening agent in liquid lubricant. Other ingredients imparting special properties may be included.” The combination of base oil, thickener and additives affect the viscosity and intended function. Grease is usually classified according to thickness on a 0 (soft) to 6 (firm) scale.

Turfgrasses are capable of removing pollutants from soil and water. For example, researchers at Kansas State University deter-



mined that the breakdown of total petroleum hydrocarbons (TPH) in soil with an initial concentration of 0.05 lb. TPH per lb. of dry soil in which bermudagrass and tall fescue was maintained was reduced by 68% and 62%, respectively, after 1 year. Similarly, the concentration of TPH of refinery wastewater steadily decreased when perennial ryegrasses were introduced into an aquatic environment remediation system for 35 days. This research demonstrated that, in addition to appropriate plant species, the activity of microorganisms in soil and water is a critically important part of a bioremediation or purification project.

Soils can support huge populations of beneficial microorganisms most of which live in very thin water films surrounding the soil particles. It has been estimated that one spoonful of soil may contain as many as 8,000,000 species of bacteria. In sports turfs, many microorganisms gain energy as they break down carbon-rich compounds including grass clippings, roots, root exudates and certain fertilizers (for example, methylene urea, Milorganite, urea formaldehyde...). Under favorable conditions, microbial activity in the area surrounding turfgrass roots known as the rhizosphere is most often intense, and populations of microorganisms may be as much as 10 to 100 times greater than those in adjacent soils in which there are no roots.

Research regarding the direct effects of petroleum on turfgrasses and recommended treatments after a spill or leak is very limited.

Research conducted on TifEagle and Tifdwarf bermudagrass, and Sea Isle seashore paspalum greens at Edison College in Fort Myers, FL demonstrated that a spill of either a biodegradable vegetable/ester-based hydraulic fluid or a petroleum/mineral-based hydraulic fluid resulted in larger areas of damaged turf and a more intense foliar burn compared to a synthetic hydraulic fluid. Two-

thirds ounce of hydraulic fluid was applied in a straight line through the center of each appropriate plot from a height of about ½ inch. The greens' soil was a 90:10 sand:peat mixture, and each of the three hydraulic fluids was at ambient air temperature when applied. At 15 days after treatment, bermudagrasses and seashore paspalum in plots treated with synthetic hydraulic fluid were completely healed.

A second study was conducted to investigate the effects of both spill volume (0.03 oz., 0.1 oz. and 0.17 oz.) and hydraulic fluid temperature (122°F, 140°F, 158°F and 176°F) on Tifdwarf bermudagrass maintained at greens height. By day 7, bermudagrass receiving the vegetable/ester-based hydraulic fluid or the petroleum/mineral-based hydraulic fluid was severely damaged. By day 28, bermudagrass receiving the synthetic hydraulic fluid treatments showed minimal damage compared to bermudagrass receiving the other two hydraulic fluids. The area of damaged turf and the intensity of foliar burn increased with rising fluid spill volume. While the temperature of the fluid at the time of treatment did not seem to affect the amount of damage caused by the vegetable/ester-based or the petroleum/mineral-based hydraulic fluids, the intensity of burn following the synthetic hydraulic oil treatment did increase with rising fluid temperature.

Researchers at Texas A&M University studied the effects of spray applications of gasoline (low octane, leaded), motor oil (30 SAE), and hydraulic (Ford Loader and Backhoe) and brake (Johnson's Supreme Heavy Duty) fluids, and a direct application of grease (Pennzoil 705) at ambient air temperature on Tifgreen bermudagrass growing in a sandy loam soil and mowed twice each week at a 1-inch cutting height with clippings returned before the petroleum products were applied. The researchers also evaluated the perform-

figure 1

A Comparison of Several Fuels^a

Property

Fuel	Chemical Structure	Fuel Material	Flash Point	ignition Temperature	Comments
BIODIESEL	C ₁₂ – C ₂₂	Fats and oils- animal fats, waste cooking oil, rapeseed, soybean	212 °F to 338 °F	-300 °F	Higher percentage blends may affect seals and hoses; improved lubrication compared to that of conventional diesel fuel
DIESEL #2	C ₈ – C ₂₅	Crude oil	165 °F	-600 °F	
ETHANOL	CH ₃ CH ₂ OH	Corn, small grains, cellulose	55 °F	793 °F	Lubricants may have to be added
GASOLINE	C ₄ – C ₁₂	Crude oil	-45 °F	495 °F	

^a From: Fuel Properties. U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Alternative Fuels Data Center; <http://www.afdc.energy.gov/afdc/fuels/properties.html>.

figure 2

Summary of Recommended Corrective Treatments and Recovery Times for Bermudagrass after Five Intentional Petroleum Spills (Texas A&M University).^a

Petroleum Product	Recommended Treatment	----- Recovery Time in Weeks -----	
		Treated	Untreated
GASOLINE	None	4	4
MOTOR OIL	Detergent	4	8 to 10
HYDRAULIC FLUID	Detergent	4	8 to 10
BRAKE FLUID	Detergent	2 to 3	8
GREASE	None	8 to 10	8 to 10

^a From: Johns, D. and J.B. Beard. 1979. Effects and treatments of petroleum spills on bermudagrass turf. Agron. Journ. Vol. 71. Pp. 945-947. Nov.-Dec.

ance of calcined clay fines (0.2 mm.), activated charcoal and detergent (anionic and non-ionic granules) as corrective treatments. Gasoline, motor oil, hydraulic fluid and brake fluid were applied to the bermudagrass at a rate of 4 oz./sq.ft. Grease was uniformly and directly spread on the turf. Activated charcoal, calcined clay or detergent was applied within 20 minutes later at the rate of 0.2 oz./sq.ft., 2.1 oz./sq.ft. and 0.7 oz./sq.ft., respectively. An untreated check receiving a water drench immediately after petroleum treatment was also included for comparison purposes. During the study, bermudagrass was irrigated daily with 0.25 inch of water and received 1 pound of nitrogen per 1,000 sq.ft. throughout the growing season. Mowing was resumed 2 weeks after all treatments were applied.

Turf injury symptoms varied among the petroleum products:

Gasoline. Turf was shiny, slightly oily and had a pungent smell immediately after treatment. Within 30 minutes, bermudagrass plants were drying rapidly, had rolled leaves and were darker than plants in the untreated check. Leaf rolling was considered severe after 1 hour and the turf was completely brown after 16 hours.

Motor oil. For the first 16 hours after treatment, turf was oily and appeared shiny. A few leaves were rolled. Leaf browning occurred after 20 hours and after 48 hours, 50% of the aerial shoots were killed and the turf still appeared to be oily.

Hydraulic fluid. Although leaves did not die as rapidly, the initial injury symptoms following the hydraulic oil application were very similar to those of gasoline. Turf developed a dark brown color after 16 hours; however several leaves and stems remained green.

Brake fluid. Initially, turf treated with brake fluid had a characteristic odor, and leaves appeared shiny for about 30 minutes before beginning to roll, darken and dry. Leaf roll was considered extensive after 16 hours and turf was pale grayish-green. All aerial shoots were dead after 48 hours.

Grease. Although no distinct injury symptoms appeared during the first 16 hours after treatment, grease remained visible on the surface of leaves. After 48 hours, about 30% of the aerial shoots had died and grease was still visible on many leaves.

The rate of recovery of bermudagrass following corrective treatments also varied.

Gasoline. None of the corrective treatments following the intentional gasoline "spill" improved the rate of recovery of bermudagrass which was totally recovered within 4 weeks.

Motor oil. Detergent proved to be the most effective corrective treatment following the motor oil application. Bermudagrass treated with detergent reached 85% recovery by 4 weeks and 95% by 8 weeks after spill. Bermudagrass treated with either activated charcoal or calcined clay had achieved only 30% recovery by 8 weeks after spill.

Hydraulic fluid. Detergent was an effective treatment following the hydraulic fluid spill, with bermudagrass recovery reaching 90% within 4 weeks. Activated charcoal and calcined clay were much less effective post-spill treatments. Bermudagrass recovery after 4 weeks was 25% following the activated charcoal treatment and 15% following the application of calcined clay. After 8 weeks, bermudagrass recovery following the application of either activated charcoal or calcined clay was only 50%, just slightly better than the 45% recovery rate of untreated, water-drenched bermudagrass.

Brake fluid. Since the brake fluid was relatively water soluble, bermudagrass in the untreated, water-drenched plots totally recovered within 4 weeks. Bermudagrass in plots treated with detergent totally recovered within 3 weeks.

Grease. Bermudagrass required 10 weeks to fully recover following the grease application regardless of the corrective treatment.

By knowing what injury symptoms look and perhaps, smell like, and what corrective action to take immediately following a petroleum leak or spill will help protect the environment and may speed turfgrass recovery. ■

Tom Samples, John Sorochoan and Adam Thoms, Plant Sciences Department, and William Hart, Biosystems Engineering and Soil Science Department.

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REALITY TURF: one veteran's take on safety

I REMEMBER SITTING IN DR. CHING-WAY SUN'S WOOD TECH LAB in front of a pile of wood blocks. The task was to learn how to identify them, along with 100 more yet to come. I probably looked like a monkey working on a trig problem. Then Professor Steinhilb walked in; no sweater vest and polished shoes and khaki's for "the Hammer." It was flannel, jeans and logging boots. He picked up my utility knife and with the second effort he had a piece whittled off. He took a sniff, then bit the block of wood. Handed me the block and said it "smelled like oat straw, tasted like the oats when the horse got done and don't cut [. . .] either. Must be chestnut." To this day I can pick out chestnut furniture across a room. His language was simple and direct and extremely effective communication.

Good communication is important for workplace safety, especially when giving di-

rections for safe operation of a piece of equipment, a phone call to emergency services, or simple day to day things. The key to communication is giving information to your target audience in a manner they will understand and (hopefully) retain.

A good start would be to rehearse making an emergency call so that emergency services will learn the who, what, where, when, and other pieces of important data from your facility. Make a practice call to

▲ **IF THERE IS WATER NEARBY**, be aware. This is a poisonous cottonmouth!

your services and ask them what they will need from you in an emergency.

Safety is a pretty nebulous term that means different things to different people. Here are some of the oddball situations I've encountered; these things either did happen or easily could have; I had never thought of any of them though until they happened.

HOW FAST DOES A PADLOCK FLY?

We all pretty much know how far and fast a baseball will travel. But what about a padlock from an equipment bag lying on

The American Red Cross and the American Heart Association

These two organizations are great resources for information on emergency situations. The Red Cross offers classes in first aid and water safety. The Heart Association is good for the CPR and AED. Does your facility have one? Do your fellow employees know how to use it on you?

If you have never taken a first aid course or CPR course you should. There is no end to the uses that arise in every day living that come up both at work and home. The water safety courses will give you ideas on how to prevent accidents. You will take away a new sense of awareness. Safety should be grown and nurtured into your everyday life. It should become part of your work culture.

the grass? Wonder how far it'll fly? Do your operators understand their safety responsibilities and procedures when they turn on the key? It's simple but most safety is simple.

When you are being "innovative" and come up with a contraption to move soccer goals, think twice and then ask the manufacturer. Sure a cradle makes life simple and easy and a tractor can do the heavy lifting. But do you realize that a goal's crossbar wasn't engineered to hold up the side posts? The posts were made to hold up the crossbar. The bouncing of moving a suspended goal is likely to stress the joints that could cause failure, which can lead to real tragedy. Treat the equipment properly and be very careful if you alter the intended use or disregard manufacturers' recommendations.

Lightning is one we all have to deal with. My advice is, don't manually sound the all clear! Like pilots are taught, trust your instruments. If the sensors are still sensing the ion differential that is conducive to lightening, believe it. The term "out of the blue" ring a bell? The genius who asks you to manually override obviously has never been struck on a sunny day 30 minutes after the storm appeared to have passed.

SERVICE ANIMAL TEST

Considering allowing pets at your facility? An "only service animals" policy is a good idea. There is a series available of proper questions to ask of an owner of a qualifying service animal. The

owners usually are trained for these questions. If they aren't, I say it's a pet. When contracting for use, detail penalties for groups that don't abide the no-pet policy. Be creative and forceful. If a violation of pets occurs and the parents are aware that their actions may cause a forfeit they usually respond in a proper fashion.

The state of Illinois recently passed a concealed carry gun law. Be aware of what your state allows. I took a concealed carry class several years ago and I don't even own a hand gun. But I learned that if a facility is posted, you can't carry in that location. Remember, by law you have to post if you spray pesticides. I suggest that you post your facility for guns. You may ask, "Really?" and I'd reply you bet. We have all seen the news reports of sporting events ending violently. Check your local laws and consider going gun-free.

ROAD OF GOOD INTENTIONS

The road of good intentions, which we all know doesn't always go where we intended it to point it. There is a term "false knowledge." We may think we know what we are doing but if we are honest with ourselves we probably will recognize we really don't. That is when we should look to professionals in the area that we are considering treading.

Fencing is a good example. One facility I know had an appealing split rail fence when built and the board decided to add more, even after they had been asked to put a cable through the fence to

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1. There is more than checking to see if your equipment is secure so it won't tip. A bolt falling out from the bouncing on a cradle can have the same result as tipping. **2.** This was found 100 feet away up a hill next to the drive through. **3.** Was a crew member well trained or just handed the keys? **4.** A not-so-average cat track compared to a penny. **5.** When doing routine maintenance, are they aware of why this is potentially lethal when practice starts?

keep balls from rolling under it. Balls continued to bounce through as they always had.

Here's another fencing story: Dad has just finished with Little Billy on field 3. Big sister Sally has a game starting in 10 minutes on field 10. If they take the straight route after picking up a latte at the concession stand, they will be there before kickoff. Little Billy grabs the top rail and is up and over the fence. Dad, no longer at his high school playing weight, grabs the top rail with one hand right in the middle between the posts. When he pushes down on the lower rail and throws that leg up, augmenting the downward force, it's only to be expected the weakest part fails. That would be the middle. Dad goes down, planting his chin on his latte; luckily he only lost the latte and no teeth.

So don't get caught up with false knowledge. You might create more issues than you solve unless you know what you are doing.

Natural areas attract natural things. For example, coyotes are extremely adaptable, to the point they moved into Wrigleyville, on the North Side of Chicago and home to the Cubs. Several years ago a

mountain lion was shot across the street from a Chicago school; it had migrated from South Dakota. And natural areas can also attract poisonous weeds, snakes and other undesirables.

Safety means focusing every day about how things are done in and around your facility. Find the unusual situation before it becomes an accident. And remember that developing a safe work culture and environment takes everyone's work and focus. Be ready for the possibility that something unusual might happen.

Good management will recognize good safety practices need to constantly change. Good safety practices also easily translate to good risk management policy. If you ignore safety issues it's a matter of time before some costly event occurs. ■

David Schwandt, former superintendent of a 115-acre soccer complex, currently resides in Libertyville, IL and is a member of the STMA Editorial Committee.

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Mark Twain said, “Climate is what we expect, weather is what we get.” This statement stills holds true today. Weather affects sports turf managers livelihood weekly, daily and sometimes hourly. How many times have you thought over and over about the weather? Is global warming alive and well? Could it be true? Who knows? Let the meteorologists and environmentalists argue that point and case. This is what we do know, with the recent tornado events from May and June 2013 in Oklahoma, about 40 people have lost their lives; that’s worrisome enough. However, looking back at 2012, I was taken back on how much the weather has impacted our livelihood in such big ways. From California and the Dakotas and east to Indiana and Illinois, at least 123 deaths were associated with excess heat and \$35 billion primarily in crop losses were a result from record drought.

The western wildfires that burned over 9 million acres across the United States resulted in eight deaths and cost over \$908 million in damages. Super Storm Sandy and Hurricane Isaac contributed to 182 deaths and cost more than \$64 billion.

The term Derecho refers to fast moving storms that are long-lived and wide-spread wind storms that can exceed hurricane force winds typical of most hurricanes. Last year when this type of weather system went through the Midwest to

the Mid-Atlantic, it was responsible for more than 20 deaths and millions of dollars in property damage.

Last but not least, there were 939 tornadoes last year which cause 70 deaths and over 1.6 billion dollars in property and crop loss.

These facts are stunning and a little bit scary, but how can we prepare ourselves from such mayhem. Being prepared is only half the battle; predicting the unpredictable is the second half. To start you need to develop a plan, a checklist, for every department of your facility. You also need to conduct round-table discussions with appropriate representation from critical areas such as: the general manager, security, the sports turf manager, the housekeeping manager, public relations, human resources, IT, local fire and police departments etc.

Planning: (Before the Storm-Checklist)

- Resource management: Make sure you have enough staffing and contractors to maintain all shifts with places for them to rest in case long hours are needed.

- Fleet Management: Make sure your vehicle fleet is gassed up with extra gas and properly stored in case of power failure that could put your gas tanks out of service.

- Back up Power: Make sure all generators are filled with fuel and are working properly.

- Flying Debris: Make sure all tables and chairs or any other loose items are put away or tied down.

[HTTP://WWW.READY.GOV/BUSINESS](http://www.ready.gov/business)

Your headquarters for a storm event or also known as an Incident Command System (ICS) is used by public agencies all the time.



JOHN MASCARO'S PHOTO QUIZ

Answers from page 17

THESE PHOTOS are from the San Diego Padres' Dominican Republic Baseball Park that houses the club's international baseball academy. The irregular dark green areas in leftfield are actually the result of good fertilization; well sort of. What actually happened is that the field was fertilized with a 17-3-17 fertilizer at a low rate. After the operator was finished with his application, he parked the fertilizer spreader on the turf and washed it off. The areas where the fertilizer was more concentrated by the washing operation turned green. These green areas showed what the turf would look like if the correct amount of fertilizer had been applied to it. If you look closely at the photograph, you will also notice green lines running toward the infield. This was the direction of travel during the fertilizer application. These green stripes are actually areas where the spreader was overlapping, also delivering the correct amount of fertilizer. This situation made for a very teachable moment and since there was no damage done, additional amounts of fertilizer were applied at the correct spacing and rate and the entire area greened up.

Photo submitted by Luke Yoder, director, field operations, San Diego Padres. ■



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.

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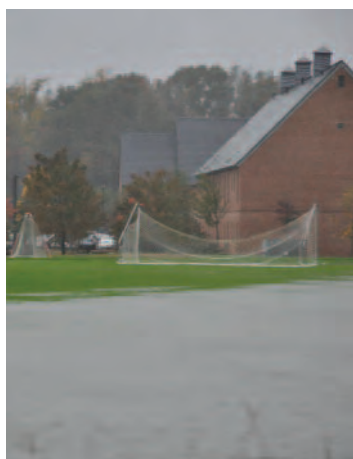
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- **Emergency Response:** Have a safety program in place during and after the storm for trafficking pedestrian sidewalks and roadways blocked from debris and falling trees.
- **Trafficking:** Develop outbound evacuation routes and emergency vehicles routes inbound and outbound. Have areas for air-lifts, if necessary and/or feasible.
- **Crisis Communications:** Have a form of communication like cell phones or UHF or VHF two-way radios etc.
- **Conduct a Business Impact Analysis (BIA):** Areas to consider are payroll, equipment rentals, food, water, etc.
- **Information Technology:** One of the most important people to have at your round table discussion is IT. Having a plan in place in case of power loss and know what areas are critical for fully operational systems in case servers go down are crucial to your storm readiness plan.
- **Incident Management Training:** Like anything, practice makes perfect, but it is hard to plan for the unknown, so use all types of scenarios with your plan and grade them on effectiveness and failures to make your team better prepared. Use exercise results to evaluate the overall effectiveness of your plan.



DURING THE STORM

[HTTP://WWW.READY.GOV/BUSINESS](http://www.ready.gov/business)

Your headquarters for a storm event or also known as an Incident Command System (ICS) is used by public agencies all the time. This system is also effective in these instances and is starting to be used widely in the private sector. At the very least it may not be a bad idea to be familiarizing yourself and your team with its protocols. Not all weather events require activating the ICS; just those that meet the guidelines established by your administration. ICS Checklist:

- Point of Contact (POC) or person in charge of operation.
- Assess the situation and let POC know if first responders are needed.
- In case of emergency, the appointed internal emergency team is in charge of areas until first responders show up.
- Notify or verify internal teams, departments, public agencies, regulators, contractors and suppliers have been notified and are on standby.
- Appoint others to incident command positions as needed.
- Brief staff on current organization protocol and on events as they unfold.
- Terminate the response and demobilize resources when the situation has been stabilized and safe for reentry.
- Identify and assess hazardous situations and high risk areas until all areas have been cleared internally and/or externally.

AFTER THE STORM (ASSESSMENT-CHECKLIST)

After the storm passes, assess your damages and log all your property and equipment damages with your facility. Also, log all the man hours it takes to clean up the debris and water damage from the storm. If your governor declares a state of emergency and it is signed by the President, then you may be considered for some relief from FEMA; however, you need to have your ducks in row.

- Manage all financial aspects of the incident.
- Provide financial and cost analysis information, as requested.
- Create accounts for claims and costs; coordinate with logistics.
- Track worker time and costs for materials and supplies.
- Document claims for damage, liability and injuries.
- Notify risk management/insurance to initiate claims reporting.
- Provide incurred and forecasted costs at planning meetings.
- Provide oversight of financial expenditures, new leases, contracts and assistance agreements to comply with corporate governance.

Public Relations checklist: Only state facts that are cleared through upper management and ISC. Develop brief information for use in media briefings. Monitor and forward useful information to the media.

FINANCIAL AID STEPS (CHECKLIST)

Your sports complex could be reimbursed by FEMA for labor, equipment rental, property damage etc. Here are the ten protocol

steps by FEMA for you to follow to help increase the chances of eligibility for financial aid reimbursement.

(http://www.fema.gov/pdf/government/grant/pa/fema323_app_ha_ndbk.pdf)

1. The governor of your state requests federal assistance.
2. Federal and state governments collect information on the extent of damages and put together a damage assessment report.
3. The President signs off for state of emergency or disaster relief funding.
4. Your local state will brief all applicants and work closely with you once approved.
5. FEMA and your local state representative will meet with meet with you and your administration for a kick off meeting.
6. The FEMA staff will work with you on projects and estimating cost.
7. Your local and state appointees and FEMA will evaluate all damage assessment cost.
8. FEMA will transfer funding to the state and you will work with state official to obtain funding.
9. After you obtain funding on any project, FEMA and your state will work with you until work is complete.
10. The final step is closing out your project along with FEMA and your local state official.

Precautions for Weather Patterns: The National Weather Service has learned over the past few years the predictability of certain types of weather patterns that could help you to forecast. This forecasting could help you to prepare for what items you may need or to add more contingences in your budget for events such as an extreme drought year or vice versa an extreme rainy year and snowy winter. I have looked up a lot of facts from the National Weather Service <http://www.weather.gov/> and put together a list that might be a useful tool when forecasting your budget for your next fiscal year.

La- Niña is unusually drier conditions in the southwest of the United States that starts in late summer and actually continues through the winter. The Central Plains will have drier than normal conditions in the fall and in the Southeast, theirs will be start in the winter with warmer temperature than normal. On the opposite end of this spectrum the Pacific Northwest will encounter wetter conditions and cooler temperatures then normal and also with a well establish La-Niña you will have fewer costal storms in the northeast, but more Alberta Clippers with more milder and warmer temperature then normal. I would caution; however, La Niña typically brings more hurricanes to the Atlantic coast and less to the Pacific coast.

EL-Niño typically brings drought conditions through the northwest to the northeast of the United States. The winters are very mild and above normal temperatures; however, extreme flooding could hit the Gulf States in the winter months.

Pineapple Express typically causes wide-spread flooding, strong winds to the Pacific coast and heavy snow accumulations to northwest.

Siberian Express typically brings polar air from the Siberian

and across Western Canada in a southward trend to the central, northeastern and sometimes the southeastern part of the United States. This weather front will bring extreme cold weather temperatures that could linger for days and even weeks.

Mother Nature will always be unpredictable and will always have the last word. All of us who have been in the business long enough already knows this; however, planning for severe weather events to saves lives, property and equipment should be on everyone's radar. Having a plan in place and the resources ready in case of a catastrophic weather event happens at your sports field complex can heighten your readiness and professionalism for your employer and even more importantly to your community. I hope you will never have to go through any severe weather event. I know our jobs can be difficult enough without Mother Nature barring down her wrath on us. No matter if you have a simple plan or a complex plan, it still boils down to one thing, it's a plan and planning is always good. Sometimes a community event as simple as a ball game could bring back a sense of normalcy and help in the healing process to your community. I think at times we can do more for our community then we may even realize. ■

Kevin Mercer, CSFM, works at Vassar College, Poughkeepsie, NY.



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F.O.Y.

Field of the Year



● **Level of Submission:** Schools/Parks

● **Category of Submission:** Baseball

● **Head Sports Turf Manager:** Josh Weigel

● **Title:** Director of Grounds

● **Education:** Bachelor's degree in Turf Management

● **Experience:** Bachelors degree in Turf from University of Tennessee (2007). Intern, Indianapolis Indians in 2006. Assistant Director of Grounds at Wesleyan School in 2009, now Director of Grounds at Wesleyan School (2009-present).

● **Full-time staff:** David Thro-wer, Zach Lindner, Jose Flores

● **Other crew to recognize:** Grant Frerking

● **Original construction:** 2004

● **Turfgrass variety:** Bermuda Tif-sport from June-September; overseeded with Pennington's Sunrise Primo perennial ryegrass

● **Overseed:** We overseeded Pennington Sunrise Primo at 16 lbs per 1,000 square feet on October 7. We touched it up with another application in early march but not as aggressive (8 lbs per 1,000).

● **Drainage:** Lines along the skirts in foul territory. Everything is sloped to the warning track where we have drainage lines. This field does not drain well.

By the third day of practice it was almost like we needed to add water to the skin it was so hard. After each day of aerifying, we would roll the skin with a double drum roller to try and smooth out any rough areas we had left.

DON GAEBELEIN FIELD, Wesleyan School, Norcross, GA

CHALLENGES

Because 70% of the game is played on the dirt in baseball, this was a serious problem. I know we all love the green grass and the dynamic patterns but the skin is the most important part. We bring in clay every year and then follow it up by having our skin laser graded. I decided to skip last season due to budget reasons. So this past November we brought in two tandem truck loads of "wet" clay. It was then spread out, tilled into the existing clay, and laser graded. Since it was late November/early December, we did not have much sun and had plenty of rain. Because there are no activities on the field this time of year and the ryegrass wasn't growing often, I would send someone down to mow the field maybe once a week and that was all we would do to the field. By mid-January we started getting dugouts cleaned, repairing the warning track, and continued mowing/fertilizing the field. I noticed the skin was very soft but figured it was due to all the rain we had gotten the last few months.

One week before the first practice the skin was still soft and we had been dry for almost a full week. I took a shovel and dug into a soft pocket and hit a puddle of water. I started walking the entire skin, digging, and hitting water. Due to the weather, the condition of the clay when we put it out, and sealing it back up, there was water trapped 1 foot under the surface. The

biggest problem was that the first practice was in 3 days. I decided to hand till the worst areas and let them sit for 3 days. After 3 days, the top layer was crusted but the stuff underneath was still wet.

The ideal solution would be to till the entire infield and let it sit a day, till it again, and let it sit, and then put a final grade on it. The problem was we didn't have that kind of time. I came up with an idea where we used our Toro aerifier and used 3/4 inch needle tines and aerified the skin. We let the holes sit open all day letting them air out. An hour before practice, we drug the skin and the holes were filled in with Turface. The first day, the field was still soft but playable and level. The second day, firmer, and level. By the third day of practice it was almost like we needed to add water to the skin it was so hard. After each day of aerifying, we would roll the skin with a double drum roller to try and smooth out any rough areas we had left. Once the weekend hit, we tilled the skin and regraded it making the skin almost perfect!

SportsTurf: What channels of communication do you use to reach coaches, administrators and users of your facility? Any tips on communicating well?

Weigel: Communication is probably one of the most important elements of this or any job. I use various forms of communication including e-mail, text, phone, and



▲ **Left: ONE OF MY FAVORITE PATTERNS** (we call it the plaid pattern). **Right:** Saturday afternoon game. This was taken from the left field berm.

face to face. If it is something quick, I either text or e-mail. If it is a scheduling situation, I prefer e-mail so that I have a paper trail. Face to face is best when it is something that needs to be explained more in depth. I try to communicate daily with the coaches/athletic director on our field conditions and also in regard to any changes to their schedules. I have learned that the more often you communicate, the more trust and respect you gain from them. For example, if we have had a lot of rain, they respect my decision to call or postpone a game rather than questioning it because I have been upfront and proactive with them in the past.

ST: What are your specific job responsibilities? What do find most enjoyable? What task is your least favorite and why?

Weigel: I am the Director of Grounds which means that every growing thing outdoors is my staff's responsibility. We now have just over 20 acres of athletic fields to maintain as we just added 5 more this past summer. We also have 65 acres of ornamental grass and landscape that we maintain, totaling 85 acres of ground. Included in these 85 acres is a playground as well as a walking/running trail on which our cross country team competes in the fall. All the set-up for games, meets, and matches falls under our watch. Football, softball, cross country, baseball, soccer, lacrosse, tennis, and track make up our athletic schedule. As of this coming spring when we will add a middle school lacrosse program; every varsity sport we have will be replicated in middle school. We also maintain areas for band practice during the fall by doing things such as lining the baseball field for their practices during the week. Our graduation ceremony in May is held outdoors, and preparing for it is also our responsibility.

Seeing the student athletes compete on the fields is the most enjoyable part of my job. The end result of all our hard work and dedication is put to use at the end of the day when a team takes the field. My crew and I enjoy seeing the visiting teams use our facilities, especially when they compliment the way the fields look and play. Even our student athletes compliment us on a daily basis, which is always nice to hear.

My least favorite task is the office work and budgeting. It is a necessary part of my job, but I much prefer the actual hands on work on the grounds.

ST: How did you get started in turf management?

Weigel: While growing up, I mowed several yards around town, and always enjoyed it. At the time, I didn't realize you could actually go to college and study turf. I started my freshman year at Indiana University where I studied Sports Marketing/Management. The following year, I transferred to the University of Tennessee where my girlfriend (now wife) was enrolled, with intentions of continuing the same major. There I met Dr. John Sorochan, associate turf professor, who persuaded me to go into the turf field instead. The following year, I interned with the Indianapolis Indians and realized this was something I had a real passion for. After spending 3 years and a summer with Dr. Sorochan at UT, together with a baseball season under Jamie Mehringer, the then-head groundskeeper for the Indy Indians, I knew my future was in sports turf.



▲ **ONE OF MY FAVORITES.** This was preparing for our summer tournament that takes place at the end of May and goes into June (travel team baseball). This is the only travel team tournament we host at the school.

ST: How do you balance your work and personal time?

Weigel: A lot of people think that because we work at a school, our hours are short and we only work when classes are in session. As most readers know, this is not true. We deal with living things and much of what we do is dependent on weather conditions beyond our control. Just when you think

everything IS under control, a new plant disease springs up or a main water line breaks and floods a field. When I first started as the director, I spent a lot of time at work and felt like I needed to do everything. I would work on weekends and sometimes bring my wife in with me just so we could spend some time together, even if it was just driving around campus and checking the fields. A year ago, we had our first child, and I have since tried to slow down and spend more time at home. A real plus is that our son is in daycare here at Wesleyan so I can drop in and see him whenever I want. Another positive is having a great staff I can rely on. David Thrower, Jose Flores, and Zack Lindner make it a lot easier to get away and trust that the job is taken care of. I try not to work much on the weekends anymore but that doesn't always work out as planned. Another challenge is visiting our families in Indiana. We usually like to go for a week around Christmas and a week in the summer. Obviously, the winter is a good time to get away, but the summer trip can sometimes be hard to coordinate with my work schedule.

ST: What changes are you planning to make or have you made to your maintenance plan for 2013, if any?

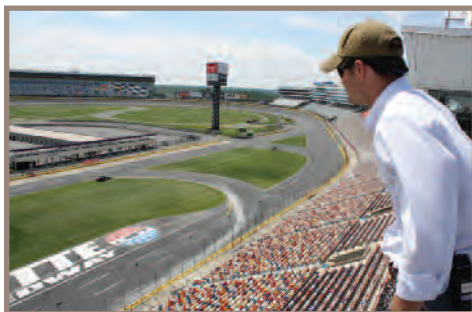
Weigel: I tend to believe in "if it isn't broke, don't fix it." After tinkering with our plan for 4 years, the last two have been very successful. Adding deep tine aerification to our football and baseball fields has been the most beneficial process that we have implemented. Steve Mitchell from Mitchell Reel Works comes in over the summer to pull plugs on our fields. These plugs can be as deep as 10 inches in length. This has helped tremendously with our drainage and transition. We have not had to sod any of the fields since we initiated the deep tine process. The only change I could foresee is deep tining the baseball field twice next summer instead of just once.

ST: Are you yet involved in sustainable management practices? If so, what are you doing?

Weigel: Currently I am researching soil moisture monitors that will be hooked up to our irrigation software to help us conserve water on our fields. As yet we have not selected a particular product.

ST: How do you see your job changing in the future?

Weigel: Each day at Wesleyan can present a new challenge. The addition of 5 acres of soccer fields and a middle school lacrosse program is just one example of the constant change in my position. More grounds mean more maintenance, painting, and other responsibilities. Wesleyan always strives for perfection and is constantly adding or improving something on campus to attain that goal. My job is to do whatever I can to insure that the grounds live up to the high standard that our staff and students deserve and have come to expect. ■



▲ **Left:** After each race, John Pitts will survey the field damage from atop the grandstands. **Middle:** Before mowing, Pitts and his crew must pick up one hundred or more of the lug nuts that are cast off by pit crews during tire changes. **Right:** John Pitts uses a Jacobsen LF570 five-gang reel mower to maintain the field at Charlotte Motor Speedway.

RIGHT ON TRACK:

John Pitts draws from a unique background to manage grounds at Charlotte Motor Speedway

Editor's note: This article was written by Adam Slick, the public relations and communications manager for Jacobsen.

MOTORSPORTS is one of the last places you would expect to find a turf manager. But even a sport that lives and breathes on asphalt has a critical need for professional turfgrass.

One nearly every major track around the country, a beautiful section of maintained turfgrass serves as the canvas for sponsor logos and separates pit road from the track—providing a picturesque background for fans in the stands and watching at home.

At Charlotte Motor Speedway (CMS), one of NASCAR's most storied tracks, John Pitts heads up the turf management team. For Pitts, the hardest part of maintaining the "ball field," as it's called, is getting track time.

"It's imperative that I coordinate with our track service guys to ensure the track will be free, and only then can we perform the maintenance we need to," said Pitts. "Anything that will make the speedway money takes priority over what we do, which means sometimes our only option is early morning or late at night."

Although the ball field is just 3.7 acres, timing and logistics makes every mowing session a production.

"With weather and the schedule playing a factor in our ability to mow, there is often two dump trucks worth of clippings to be cleaned up before the track can be used," said Pitts. "When you add in collecting the grass and other details, it takes us about three to four hours to get everything done."



▲ **JOHN PITTS (RIGHT)**, Director of Grounds for Charlotte Motor Speedway and his Foreman Armando Sosa (left) stand on the speedway's "ball field" after a mowing session.



▲ **Left:** A grounds crew member repairs tire ruts left by school buses – yes, school buses. Charlotte Motor Speedway will race buses as part of its regular event schedule. **Right:** To help smooth out tire ruts and other irregularities, Pitts' crew uses a Cushman Turf-Truckster with a roller attachment.



One of the more tedious tasks is picking up the hundreds of lug nuts that tire changers throw into the grass during pit stops.

"Lug nuts and reel mowers don't mix very well, so we have to try and get as many out as we can, but due to large amount the reel mower always finds a few," said Pitts.

Although lug nuts can cause equipment damage, race vehicles that veer into the grass cause the most problems for Pitts.

"Believe it or not, we race full-sized school buses and it's no surprise they leave the biggest ruts of any vehicle out here," said Pitts. "U.S. Legends Cars cars leave the least amount of damage because of how light they are and how their front bumpers are designed. Thankfully, NASCAR drivers stopped doing victory burnouts on the field after Kasey Kane destroyed his car on a manhole cover."

After each race, Pitts assesses the damage atop the grandstands overlooking the field. "From up there, I can quickly get a good idea of how much repair work we have to do that night so the turf still looks good for the next day's race."

Pitts and his crew use a Jacobsen LF570 five-gang reel mower and a Cushman Turf-Truckster with a blower attachment in tandem to get everything done.

"We couldn't do the job we do without the Jacobsen machines," said Pitts. "We went to a lower height-of-cut this year and the LF570 has given us great results. After the recent Coca-Cola 500 event, I was told by several fans that the ball field looks the best it has in 15 years."

Pitts also depends on Armando Sosa, his foreman and nine-year veteran at CMS.

"Armando is my right-hand man," said Pitts. "He works incredibly hard and knows every inch of this massive property. It's really nice to have someone with his work ethic and experience on staff."

In addition to mowing, Pitts will use a roller to smooth out ruts when the soil is moist. He's in the process of overseeding his 419 bermudagrass with Princess 77 in the hopes it will eventually take over.

"I like the Princess 77 because it likes the shorter growth height and very uniform,

we've had great success with the blending of the Princess 77 and 419 for a uniform and vibrant look."

Although Pitts manages just under four acres inside CMS, an additional 2,400 acres outside the speedway also falls under his responsibility.

"A lot of the exterior grass is on the campgrounds, where wet conditions and vehicles produce large pockets of mud," said Pitts. "In the past, we've just dumped gravel or straw on problem areas, but gravel isn't mower-friendly and the straw clogs up our drains. We just recently started to use Turface, a quick-dry material that is made of very fine clay and absorbs water and evaporates quickly."

Pitts draws from a very unique background that includes a horticulture degree from Auburn and time working as an officer in the Army National Guard in Alabama during the Deepwater Horizon oil spill.

"The horticulture education gives me the landscape design and plant knowledge I need and the military experience helps me create systems and processes to get things done," said Pitts.

Charlotte Motor Speedway is famous for its long-distance races, which fits perfectly with Pitts' philosophy on turf management.

"Before I got here, I think due to time and focus, there was a Band-Aid approach to turf issues. Where it makes sense, I want to look at long-term improvements instead of short-term fixes," said Pitts. "We make the immediate repairs we need to make but also develop a plan to improve conditions each year." ■

HOW TURF BLANKETS WORK

THE FUNCTION OF A TURF BLANKET is to allow for the increase in soil temperature due to the increase in the sun's radiation. The blanket minimizes temperature losses caused by lower nighttime temperatures and maximizes the positive temperature gains provided by the annual or yearly cycle; and minimizing the temperature losses caused by the diurnal or daily cycle. The soil temperature increases and maintains relative warmth. This principle allows for earlier warming of the soil and therefore earlier turf growth response. You can gain 2-3 weeks of early turf development by using turf blankets in this manner.

When covering the turf you increase the risk of snow mold similar to the increased risk involved with prolonged snow cover. Turf

maintained at a higher level of fertility, e.g., receiving late season fertilization, is more susceptible to snow mold. A preventive fungicide application may be warranted. Previous problems with snow mold should be considered when making this decision. If you have never had snow mold, a preventive fungicide application may not be justified. Blankets should be removed periodically to inspect for snow mold.

Blankets are best put down in November or December in cool climates—too early and the soil will overheat—and should be removed 2-3 weeks before traffic returns to the field. After removing the blankets, mow the turf several times to harden it before the field is used. ■

CoverSports FieldSaver winter turf blankets/growth covers

FieldSaver covers protect turf from harsh winter conditions and promote faster spring growth and green-up. FieldSaver is a also a budget-saver. Josh Slayback, athletic fields technician for the City of Clayton, MO calculated the savings impact of FieldSaver:

"Winter turf blankets are an excellent investment, especially considering that sodding two 60'x60' soccer goal mouths each spring, over 8 years would cost over \$16,000. To purchase two 60'x60' winter turf covers, seed and preventative fungicide over 8 years (the life expectancy of CoverSports Winter Turf Blankets) costs an estimated \$2,500."

Shaw Park 2010 winter renovation plan: Core aerated 6 directions; seed with a turf type tall fescue/Kentucky bluegrass mix at 15# per 1000 ft²; apply granular preventative fungicide; cover goal mouths with winter turf blankets; run last irrigation cycle of the season. (See photo of before/after at Shaw Park, Clayton, MO, 2010.)

CoverSports USA

EVERGREEN turf blanket by COVERMASTER

Environmentally friendly, the EVERGREEN turf blanket is ideal to grow and maintain healthy grass. Made of recyclable material, it's the greenhouse effect of the special weave that greens up grass earlier in spring and maintains it longer in the fall. It also keeps fertilizer in place and reduces energy costs by retaining heat, especially on heated soil. EVERGREEN's unique coating process maintains the cover's integrity when using anchor pegs to hold the cover in place, thereby eliminating the need for hems and grommets. Yet it can easily be cut or shaped to fit any configuration. No wonder more than 90% of NFL and MLB teams rely on EVERGREEN.

COVERMASTER Inc.

New GreenJacket AFS insulation

We have been listening. While our foam insulation will still be available, we are answering the call for a better method to insulate and allow passive airflow under the GreenJacket. Visit www.greenjacket.com for more information. With sales associates across the United States, Canada from Winnipeg west and Europe, GreenJacket winter turf protection products have moved to the forefront of winter turf protection. You can "FIND A REP" in the menu bar or contact us directly at anytime. We invite you to look around the GreenJacket website to learn more about our impermeable and permeable covers, turf protection product(s), the tests that have been done, and trials that have utilized the GreenJacket as their winter protection method.

GreenJacket Turf Protection Systems

New shear strength tester from Turf-Tec

The new Turf-Tec Shear Strength Tester also known as a shear vane apparatus in scientific literature is a specially designed tool to test the stability of natural grass athletic field turfgrass root systems. In addition, the Turf-Tec Shear Strength Tester can also test the types and depth of cleats that will perform best in your particular turfgrass root system and environment. Knowing the correct cleat to play in will not only insure proper footing during play, but will also reduce slipping and may also create a safer playing environment for athletes.

The unique design of the new Turf-Tec Shear Strength Tester with the shear vane foot allows the turf stability to be tested to insure the health of the root system directly on athletic fields. The Turf-Tec Shear Strength Tester can also test different cleat designs and cleat depths to insure proper footing during play.

Turf-Tec International

I-Core 3.0 with built-in solar sync

Hunter Industries announced a major enhancement to the popular I-Core advanced irrigation controller, with the release of its 3.0 operating system. The controller now has built-in compatibility with the Hunter Solar-Sync climate sensor, allowing automatic self-adjustment for changing weather conditions. The new version of the I-Core controller features a Solar Sync dial position, and allows all sensor setup functions from the main control panel. The controller also permits a Solar Sync Delay feature, allowing the installer to specify a number of days before the controller switches to automatic adjustment mode. Version 3 I-Core controllers need only add a Solar Sync Sensor, or the increasingly popular wireless version of the sensor, to take full advantage of automated water saving technology. Each of the controller's 4 irrigation programs may be set to use the weather adjustment, or to run individually without automatic adjustment for special applications.

Hunter Industries

PBI-Gordon's Katana turf herbicide gets California registration

PBI-Gordon Corporation announced that its Katana Turf Herbicide received registration with the State of California Department of Pesticide Regulation, allowing its use as a spot treatment on residential lawns. Additionally, there are expanded use directions on professionally managed sports turf; previously, it had been approved only for "professionally managed college and professional sports fields". The herbicide had previously received EPA registration and been available in most southern and transition zone states. The labeling permits Katana to be used on professionally managed sports fields. Katana Turf Herbicide is part of PBI-Gordon's ProForm product line of fast-acting herbicides. Like other products in this line, Katana continues to work in cooler weather, and is not as temperature-dependent as competitive products. The herbicide is labeled for control of 58 weeds including sedges, grasses and broadleaf weeds with post-emergence and some pre-emergence activity.

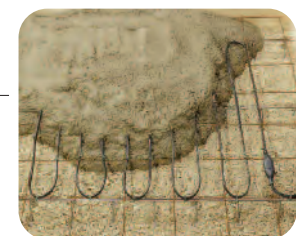
PBI-Gordon

Sno*Melter cable kit keeps walkways clear of ice and snow

New Sno*Melter Cable Kits from EasyHeat are simple to install, energy-efficient and environmentally-friendly, offering safe, reliable snow melting throughout the winter months. In stock and available for immediate shipment, the dual-element, fixed-resistance cables are UL Listed and CSA Certified, and provide the simplest and safest method of winter protection for your home or business. When combined with an EasyHeat controller (sold separately), Sno*Melter Cable Kits are extremely cost effective and eliminate the expensive, labor-intensive hassles of snow removal by automatically maintaining a surface temperature above freezing.

Cable selection is easy, all you need to know is the amount of surface area that is to be cleared of snow. EasyHeat Sno*Melter Cable Kits are available in sizes that cover from 10 to 100 square feet with just a single cable.

Emerson



STMA introduces new membership incentives, referral rewards

STMA IS NOW OFFERING A NUMBER OF INCENTIVES to new members and a referral bonus program, both designed to help the association build on its continued growth.

New member benefits

New members, those individuals who have not been an STMA national member since 2000, are now eligible to receive a free conference registration (valued at \$375, to be used within 3 years) when they purchase an STMA membership. This new member offer is valid for the association's sports turf manager and commercial

categories, including individuals at the associate level (sports turf manager and commercial associates). Unfortunately, new affiliate and student members are not eligible for the free conference registration benefit.

Those members who joined in 2013, especially those individuals who signed up during the association's recent prorated dues promotion, are eligible for the free conference registration promotion if they renew for 2014.

To see if you qualify for the free conference promotion, please visit www.STMA.org or call the STMA office at 800-323-3875.

STMA referral rewards

All STMA members are eligible for the association's new referral rewards program. Any current member who refers a new qualifying individual that signs up for a membership will receive a \$100 voucher that can be used on a variety of items, including STMA merchandise, conference registration fees or membership dues. There is no limit to the number of new recruits a member can refer; he/she will receive the \$100 voucher incentive for each new person they refer who signs up.

Stay tuned for more details at www.STMA.org.

Register online for the STMA Conference... and more

ONLINE REGISTRATION for the annual STMA conference is now open. STMA members and non-members can easily register online for the upcoming conference, which is January 21-25, 2014 in San Antonio, TX. Just click on the Conference Brochure cover photo at STMA.org and follow the instructions to log in and register. In addition to online registration, STMA accepts registration forms that are faxed or mailed and purchase orders. Deadline to receive the early registration pricing discount is December 15.

Through STMA's online Shopping Cart, you can also renew your:

- 2014 STMA membership dues
- 2014 Chapter membership dues
- 2014 CSFM fees (this is a NEW payment option this year for certified members)

Look for the November issue of *SportsTurf* to hit your desk next month for all the advance conference coverage. This issue will highlight the education, activities and events that will be held at the 2014 conference.

Celebrate STMA's 25th Anniversary with keynote speaker Dr. Ricky Rigsby & get inspired!



Dr. Rick Rigsby. Photo by Lisa Nikole.

CELEBRATE STMA'S 25TH ANNIVERSARY in San Antonio with all the exceptional sessions, seminars, and workshops you've come to expect from the industry's premier sports field association. Explore the rich culture, cuisine and character of a city that has proven to be one of our nation's most endearing travel destinations and benefit from the ultimate learning event of the year!

Not to be missed will be the conference's keynote speaker, Dr. Rick Rigsby. Dr. Rigsby's presentation will

be entitled "Skills to Survive in the Future".

According to his biography: "Dr. Rick Rigsby is a favorite among audiences worldwide. Whether he is motivating financial giants on Wall Street or fifth grade teachers at an elementary school—Rick Rigsby encourages and empowers audience members to become great people who do great things.

"Born and reared in the San Francisco Bay Area, Rick graduated from college in 1978 with a degree in communications and a goal to be a network correspondent. Following a successful career as a television news reporter for a CBS affiliate in Northern California, Rick earned his Master's degree from California State University, Chico followed by his Doctorate from the University of Oregon. Graduate school was followed by two decades as a college professor, the past 14 years at Texas A&M University, where Rick also served as character coach and chaplain for the Aggies football team.

"Dr. Rigsby now devotes his full attention to empowering people worldwide, from presenting leadership principles in Nigeria to speaking to Fortune 500 companies in the Americas, Europe and Canada. In high demand among educational, business and service organizations and a favorite among professional sports organizations including the PGA and the National Football League, Rick offers common-sense wisdom to those desiring to rise to greater levels of excellence."

Webcast by Dr. Nick Christians on Fertility Management of Sand-based Fields

WHEN: Tuesday, November 5 at 11 a.m. EDT

Session: Fertility Management for Sand-based Systems

Speaker: Nick Christians, PhD

Registration:

- STMA Members: \$10 Members can register via this members' only link: (<http://stma.peachnewmedia.com/store/seminar/seminar.php?seminar=16619>).

- Nonmembers: \$20 Nonmembers can register here:

<http://stma.peachnewmedia.com/store/seminar/seminar.php?seminar=22105>.

Session information

The presentation will include some basic information on the soil chemistry of sand-based sports fields and will include a discussion on how to manage these areas most effectively.

The learning outcomes are:

- to provide an expanded knowledge of soil chemistry.

- to relate those basic concepts to sand-based soil media.

- to expand the knowledge of the attendee on ways of managing sand-based sports fields.

Speaker information

Nick Christians, PhD, is a university professor of horticulture at Iowa State University, Ames, IA. His area of specialization is turfgrass science. Nick received his PhD and MS degrees from Ohio State in Agronomy and his BS from the Colorado State University School of Forestry. Between earning his BS and MS degrees, Nick was employed as an assistant golf course superintendent at Flatirons Country Club in Boulder, CO and as a golf course superintendent in Pueblo, CO. He has several state and national awards for both teaching and research.

Additional information

This presentation was rated as one of the best at the 2013 conference (based on attendee

evaluations). Dr. Christians was rated as one of the best speakers at the conference (based on attendee evaluations). Some attendee comments regarding the session:

- "Excellent talk, well presented. A lot of basic fertility management that would be helpful for turf managers."
- "Keeps difficult material at an understandable level."
- "Speaker was excellent. Information was organized and easy to understand."
- "Very good coverage of all of the basics of elements, CEC, pH, pH (buffering)"
- "Probably best presentation I've been to. Dr. Christians is a very good presenter."

Dr. Christians is speaking again at the 2014 conference Friday, January 24 from 8:30-10 am - STMA 302 – Water Quality and Soil Conditions. The presentation will include basic information on principles of soil chemistry and water quality and how they relate to sports field management.

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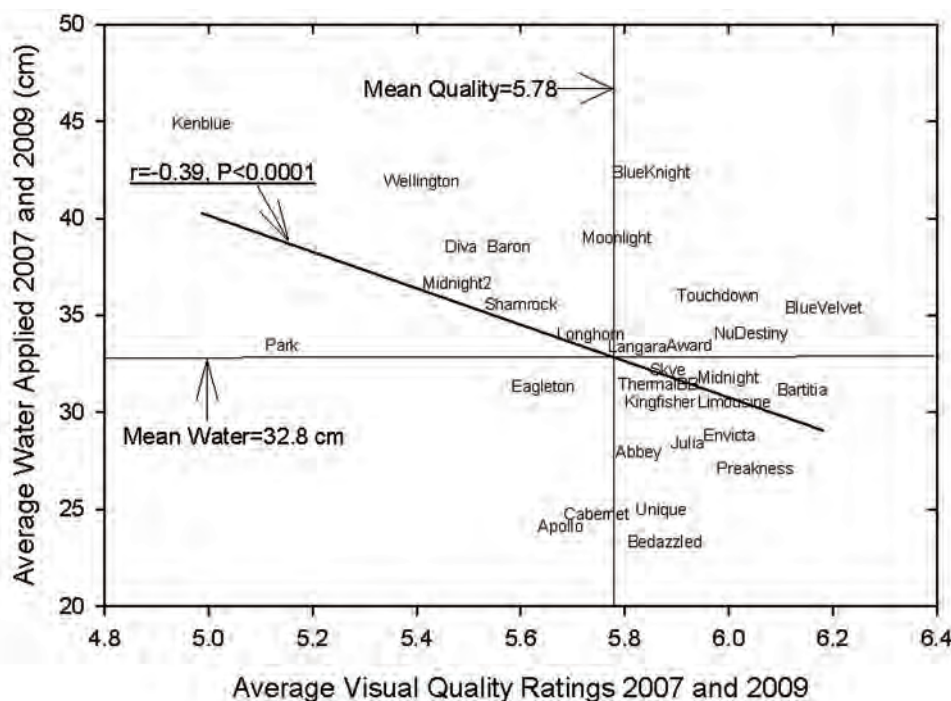
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Continued from page 16

As a group, the Compact Midnight types remained above a quality of six for longer than the Common as well as the BVMG types, but also received more water than the Compact America and Mid-Atlantic groups (Fig. 3).

RELATIONSHIPS BETWEEN WATER APPLIED AND VISUAL QUALITY

Ideally, cultivars or groups that require the least water would also have the highest visual quality. Those relationships are illustrated in the scatter biplot in Fig. 6, in which cultivars with the most favorable characteristics appear in the lower right section. In general, irrigation applications were greater in bluegrasses with poorer quality (Fig. 6, upper left section). This pattern probably resulted from improved cultivars with morphological properties that both enhanced turf quality and reduced evapotranspiration (water use). Such improved properties include compact or dwarfed growth habits, horizontal leaf orientation, and greater shoot density. All 15



▲ **Figure 6. WATER APPLIED TO KENTUCKY BLUEGRASS CULTIVARS AND HYBRID BLUE-GRASSES** versus average visual quality ratings on a 1-9 scale with 9=optimum and 1=brown turf. Data were averaged over the periods June 19 - Oct. 1, 2007 (105 days) and June 22 - Oct. 7, 2009 (108 days).

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bluegrasses with the lowest water applications were also ranked among those with the highest visual quality (Fig. 6; there were no statistical differences among cultivars with average visual quality greater than 5.5). The amount of water applied to these 15 cultivars with superior turf quality was also below the mean water applied to all 30 bluegrasses (32.8 cm). Similarly, visual quality in 12 of the 15 bluegrasses that received the least water was greater than the mean of all 30 bluegrasses (5.78), although all 15 were statistically similar.

In contrast to the 15 top performers, six cultivars were ranked within the group that received the most water and had the lowest visual quality (Fig. 6). Those six cultivars, which included Kenblue, Wellington, Midnight II, Baron, Diva, and Shamrock, had

neither the high visual quality nor low water requirement traits we were screening for in this study.

CONCLUSIONS

Cultivar selection in KBG had significant impacts on water requirements and visual quality ratings. Among cultivars, differences in seasonal water applications were as great as 21.6 cm and differences in days to 50% wilt between irrigations were as great as 6.7 days, nearly 1 week). Based on statistical range tests, only 15 of the 30 cultivars were in the group that both received the least water and had the greatest visual quality. Results indicated that, under conditions similar to those in our study, KBG in the Compact America and Mid-Atlantic phenotypic groups can be selected

for their lower irrigation requirements without sacrificing visual quality, and types from those two groups may represent the best selections for breeding efforts to achieve such goals.■

Dr. Dale J. Bremer is associate professor, Dept. of Horticulture, Forestry and Recreation Resources, Kansas State University; Dr. Jason D. Lewis is assistant professor, Dept. of Horticulture & Crop Science, California Polytechnic State University, San Luis Obispo. This article was reprinted with permission from Sports Turf Manager, Vol 26, No 1, Spring 2013.

This research was funded by United States Golf Association, Turfgrass Producers International, and the Kansas Turfgrass Foundation. The technical assistance of Tony Goldsby was greatly appreciated.

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Q&A



BY DR. DAVID MINNER

Professor, Iowa State University

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Soft water?

We just got our practicefield in ground irrigation done this summer. I am wondering what your suggestion would be on how much and how often to water. Our grass is thin and worn in the high traffic areas and now the field has become quite hard. Our head coach would like to have it watered more to make it softer. What do you think about that idea?

Scott Danielson, assistant football coach, Lincoln HS, Washington, IA

This question basically asks should a hard field be watered to make it softer. My first rule is to always take whatever immediate steps are necessary to please the coach and make the field safer and more playable. So my short answer is yes, on dry and hard fields moisture can be increased to improve cleat penetration and reduce surface hardness. Most native soils with more than 60% silt+clay by weight increase in hardness as they dry.

In contrast, sand fields are usually firmer when wet and can become overly loose and unstable as the soil surface dries. Like many native soil fields with high clay content, the field at Lincoln High School can be made softer in such a way that playing quality of the surface and player performance is improved. With that being said it is a real art to get the moisture just right on the entire field so that traction is maximized.

This is another good example of why irrigation designers should carefully consider field use pattern when placing heads in a block

Practice fields are anything but uniform. Worn areas with exposed soil in the center can quickly turn to mud while grass areas outside the hash marks are getting just the right amount of water. This is another good example of why irrigation designers should carefully consider field use pattern when placing heads in a block. Whenever possible block high use areas separate from low use areas to get better control whether it is for establishing grass seed or watering hard areas to make them more player-friendly.

The upper limit for preferred running, diving, and falling on soccer fields is 80 Nm as measured by a 1 pound Clegg Impact device and most fully grassed fields I experience are below this limit if turf is watered to prevent severe wilting. Excessively dry bare soil areas of a field can easily exceed this limit.

Cleat penetration is also an important part of field playability. When cleats don't fully penetrate hard surfaces players feel a sense of skating on top of the surface that results in timid running. Sufficient grass cover reduces this problem since cleats can grip into the surface mat of roots and shoots. When there is no grass one way to immediately increase cleat penetration is to water the field. Solid tine aerification can also be used during the playing season to reduce hardness caused by hard dry soils.

The trick with watering bare soils is to allow sufficient time for surface drainage or drying because wet soils are easier to compact. So watering to soften a field can be a double-edged sword; yes, it increases cleat penetration and makes the field softer; but it also makes it easier to compact soils that in the long run just make the field harder. If your watering program and play-

ing schedule result in smearing of the soil surface or mud collecting on players shoes, then you need to back off with the watering. It will take some trial and error because zones that water both grassed and bare soil areas will likely be either over- or under-watered to achieve the desired effect of growing grass or softening the field. Use heavier doses of water when you have time to let the field drain and dry, i.e., water heavy on Friday since play won't start until Monday.

Managing the bare soil areas of a football field is a lot like managing the skin on a baseball field; sometimes it takes a good soaking to maintain moisture deeper in the soil profile so that as the soil surface dries moisture actually moves upward through the profile to keep the surface moist, and in this case softer for better play. Hard dry soils without grass cover are difficult to rewet with small doses of water. Wetting agents can also help moisture penetrate tight soils and reduce runoff that ultimately reduces field hardness.

The most encouraging message received from Scott was that they now have a new dedicated watering system that allows them to control the moisture whether it is for growing grass or managing the hardness of the dirt. It also affords them the opportunity to start with a sand topdressing program because they now have irrigation. Without irrigation sand topdressing is not an option. So the short answer is yes irrigation can temporarily be used to reduce field hardness, but the more permanent fix is to use your new irrigation system along with sand topdressing, aerification, and repeated seeding to provide continuous turf cover that adds cushion to the field. ■

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