

every detail of your workday, or hop on Twitter immediately and start checking in on Foursquare everywhere you go. Simply become a content generator that your company and constituencies can rely on for a steady stream of reliable, useful information.

Building your personal brand through social media doesn't have to take hours outside of your job. A common phrase in social media is, "The art of Twitter is in the re-tweet." Passing on relevant tweets is a quick and easy way to stay in front of your audience with relevant info. Another timesaver is using a program like TweetDeck to manage multiple accounts and post in different places with one click. TweetDeck links your Facebook, Twitter and LinkedIn accounts all in one, easy-to-use dashboard. However, creating original content is always the best way to keep your audience engaged. Allot a block of time and come up with some short blog posts, tweets or Facebook posts and save them in one place. That way, you have some original content in the can that can be

posted when you're short on time.

My last point is that there can be a dark side to being the face of an organization's online community. At some point, you will invariably come across a very loud complainer about something that you or your organization has done. Always, and I mean ALWAYS, take the high-road when dealing with someone like this. Never get into an argument because everything you post, tweet, or share is recorded for posterity. However, this also presents a unique opportunity for you and your group. If you can, in a timely and effective manner, reduce or eliminate their level of unhappiness, you can create what people in marketing call a "brand evangelist." These are people who, when you and/or your employer are under attack next time, will valiantly come to your defense, without you even asking. They will write letters to the editor about your environmental practices, help you out by chatting with coaches or administrators on your behalf to help get you more resources and

always be in your corner if there is a crisis beyond your control.

Using social media to build your brand, and by extension the brand of your employer, is an exciting and fun way to create a dialogue with your user groups, especially when that dialogue might be one of the only ways you have access to those groups when other marketing options are not available to individuals (ads in magazines, radio, TV, etc.). Being timely, relevant and honest with information allows you to stay ahead of problems, thus becoming an asset to your company and your community. Not only does this provide you with a sense of accomplishment and contribution, but it also gives your employer another positive outlet to their most important stakeholders- the user groups they rely on for organizational security. ■

*Patrick Allen is the Sales and Marketing Manager for STMA. He can be found online by following @rockchalkpa on Facebook and on LinkedIn. His opinions here are his own.*



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# State of Seed Supply Report

**Editor's note:** We asked principals from seed companies across the country to answer two questions: What is the state of the supply of your grass seed crop used for sports fields heading into the overseeding and heavy-use football seasons? And, what is the state of supply for sports turf looking like for Spring 2012 growing season? Here are the responses we received:

**W**E ALL KNEW the pendulum would swing from overages to shortages; it was just a matter of time. That time has come. Seed companies and growers have suffered losses on crops. Due to weak demand and state of the economy, grass seed production fields were plowed. Today inventories are cleaned up. Trying to get seed acres back into production is difficult because there is strong commodity competition from other crops. There are and will be severe shortages in the grass seed market even though consumption is expected to remain relatively flat due to a lagging global economy.—Chris Claypool, General Manager, Jacklin Seed by Simplot

Oregon grass seed farmers can finally take advantage of warm temperatures and dry skies as summer has arrived late. The workday is nearly round the clock as the crop is generally ready for harvest.



The crop is about 3 weeks late as the cool, wet spring combined with the wet weather in July pushed back harvest. It is the latest harvest in my 25 years of grass seed sales. The first fields have been all over the board, but what we are seeing has been normal yields in turf grass crops. The seed industry's inventories have been re-balancing the past couple of years. 2009 and 2010 carryover seed has been flushed out of the system by now. Today, we are dealing with spot shortages in distributor warehouses as we move forward with cleaning all turf crops. A light crop may cause some shortages in some varieties. Cool season turf grass prices at farm gate have gone up anywhere from 10 to 25% based on the species. New crop tall fescues are just starting to ship, while perennial ryegrass is a bottleneck to ship awaiting cleaning and testing in August for certified Blue Tag seed.

Just a few years ago, grass seed had the second highest production value among all agricultural commodities in Oregon. But very few crops have dropped in value the past 6 years as much as grass seed. Its value has declined nearly 50 percent since 2008, from a high of \$510 million that year to just \$256 million last year. Like the nursery industry, Oregon's top ranked commodity, the recession and the corresponding housing market slump have reduced demand and sales. A surplus of grass seed has also led to a big reduction in acreage planted. In 2008, the number of acres planted in fescue in Oregon was about 195,000. Last year, that dropped to about 136,000 acres. Also in 2008, more than 226,000 acres were planted in ryegrass. Last year, plantings were down to 203,000 acres. During that stretch, many Willamette Valley growers replaced grass seed crops with wheat. Total acreage in grass seed crops is down again this year. Since its peak in 2005, acreage has dropped about 30%. (Statistics above referenced from the Oregon Department of Agriculture.)

We are experiencing heavy demand for all cool season species. Supply is good for fall 2011, and there may be spot shortages of high NTEP ranking varieties in mid spring 2012.—Zenon Lis, Burlingham Seeds

Much of the carryover of seed from previous years has been used up. Production acres for 2011 crop of Tall fescue, Perennial ryegrass, and Kentucky bluegrass are reduced from previous years, so there will be less overall supply in fall 2011. Supply of some of the best varieties will be limited until fall 2012 crop arrives. It will be important for sports turf managers to plan ahead and possibly buy early to get the top-rated varieties they require to deliver the best turfgrass stands.—Murray Wingate, Turfgrass Marketing Manager, Lebanon Turf Products

Supplies are looking very bright for sports turf grasses from Barenbrug USA. We are producing a generous supply of seed for our distribution partners that supply the sports turf industry.

RPR, Regenerating Perennial Ryegrass, named a 2011 Innovative Product by the STMA, has been very successful for sports turf managers. This fall a new variety will be added to the *Lolium perenne stoloniferum* stable. The new variety is called Bargamma and, as with Baralpha and Barbeta, is has been intensively tested for wear tolerance. Supply for RPR looks very good.

Turf Blue Kentucky bluegrass performed well in recent NTEP trials and the supply looks very good.

SOS Cool season is our overseeding brand containing Turf type annual ryegrass, which is becoming more popular for overseeding. Dr. Minner at Iowa State University did a very good study with annual ryegrasses for overseeding during the season. In this study he overseeded and

The seed industry went through some rough years with supplies being high and the economy in recession, but as it always happens, production is reduced, supplies are sold and become tight again. This is a 7-10 year cyclical event in the grass seed industry.

—Kevin Morris, executive director of the National Turfgrass Federation

kept the wear on the plots. In the spring SOS will transition on its own. There is good supply on turf type annual ryegrass.

We supply the world's only rhizomatous tall fescues, which have the ability to repair themselves after wear and tear. Turf Saver RTF supplies also looks very good.

More and more grasses are coated with our coating technology called Yellow Jacket. Yellow Jacket contains ZEBA that holds 600 times its own weight in water. It also contains Apron to protect the seedling from Pythium. Supply on Yellow Jacket looks very good and is available on all grasses from Barenbrug.-Christiaan Arends, Barenbrug USA

There are ample supplies of SeaDwarf Seashore Paspalum and Aloha Seashore Paspalum sprigs and sod at licensed sod producing farms in strategic locations around the US and around the globe. UltimateFlora Zoysia, a medium textured zoysia developed by the University of Florida, is readily available as sod in the Southeast.-Dr. Lee Berndt, Vice President of Research and Development, Environmental Turf Celebration bermudagrass is currently

available in stable supply with certified acreages spread throughout the southern US. Shortages may occur late next spring as peak demand for Celebration occurs not only in sports turf applications during this time period, but also in golf usage. Latitude 36 and NorthBridge bermuda are two very promising grasses coming out of the Oklahoma State research and development program. Seven turf producers in the transition zone have planted both grasses with much anticipation. Both varieties are expected to be used north and south of the transition zone. Availability will be limited for 2012.

Bella bluegrass is currently available in limited supply in certain parts of the country. Bella is the world's first dwarf bluegrass that is propagated vegetatively meaning it is propagated with sprigs (not seeded) and installed only as sod. Left unmowed, it only grows to about 4 inches in height. Bella's availability will be limited to Utah, Idaho, Wyoming, Colorado and parts of Canada in 2012.-Tobey Wagner, President, Sod Solutions

Washington II bluegrass seed will be extremely limited and should sell out this fall. An-

other bluegrass, Concerto, a shamrock-type, has readily available seed supplies now but supplies could tighten up come spring 2012.

LS 1200 tall fescue, a semi-dwarf variety, has extremely tight supplies and should sell out this fall. Another bluegrass, Ultimate, another semi-dwarf variety, has seed available but supplies could be short come spring 2012.

Perennial ryegrasses LS 2300, LS 2200, LS 2100 and LS 2000 will have supplies continue to tighten up as we move through fall 2011. If movement is good then expect supplies to be tight come spring 2012.

Over the past 3 years we have reduced acres so that inventory comes more in line with demand. At some point those two lines cross to where inventory and new crop may not be enough to meet demand. We are seeing the correction arriving sooner than expected. Expect supplies to remain tight and prices strong at least through 2012.-Brad Dozler, Lewis Seed Co. ■

#### Correction

In the traffic testing results from NTEP article in the August issue, the Kentucky bluegrass table on page 10 has an error. It refers to "LS 4000" but the actual name is "Washington II." We apologize for this mistake.

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# Are injuries on synthetic turf still a sore subject?

**I**T IS RELEASED EVERY FRIDAY during the NFL season. It can have a bigger influence on a game than a coach's game plan. It is one of the first topics discussed by announcers before a game even begins. It is...the injury report.

While injuries in the NFL steal the headlines, sport-related injuries are often an unavoidable fact of life for athletes at all levels. In addition to the physical pain and loss of playing time, according to the US Consumer Products Safety Commission, sport-related injuries to children alone cost the public more than \$49 billion per year. Certainly some injuries are inherent to

sport, but others may be influenced by a number of factors, including the playing surface.

Many of us can remember back to the days of "cookie-cutter" stadiums and the hard, abrasive synthetic turf that went with them. It was not uncommon to hear athletes complain about the toll those surfaces took on their bodies and research reports confirmed higher injury rates on first-generation (non-infilled) synthetic turf than on natural turf. But, as synthetic turf has evolved to produce a surface that more closely resembles natural turf, has injury risk also changed? The perception of many is that it has not. For example, in the 2010 NFL Players Playing Surface Opinion Survey, 82% of players felt that synthetic turf was more likely to contribute to injury than grass. But is perception reality?

## ANSWERS

With an increasing number of injury-tracking research studies being published, we are finally able to begin answering that question. But, before we get into the results of these studies, it is important to keep one thing in mind. Any time comparisons are made between synthetic and natural turf, the condition of the playing surfaces are not typically reported. As you can imagine, lumping all natural turf fields into one group can be problematic as field conditions can greatly vary. The same can be said for synthetic turf. So, it important to not just look at the results of one study and draw conclusions, but consider these studies collectively because many factors, both those measured and those not measured, can affect results and conclusions of any one

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**Injury tracking studies are considered to be the most direct method to study injury risk, but they also suffer from inherent limitations. It can be difficult to isolate the cause of the injury and the conditions at the time of injury.**

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study alone. Latching onto one particular finding or one particular study may not tell the whole story.

The majority of research studies comparing injury rate on infilled synthetic turf and grass have examined soccer injuries in Europe. A wide demographic of soccer players have been analyzed in these studies, ranging from youths to professionals. In addition to injuries occurring in games, several studies also tracked injuries during practices and training. The overall conclusions of the nine published studies tracking soccer injuries is



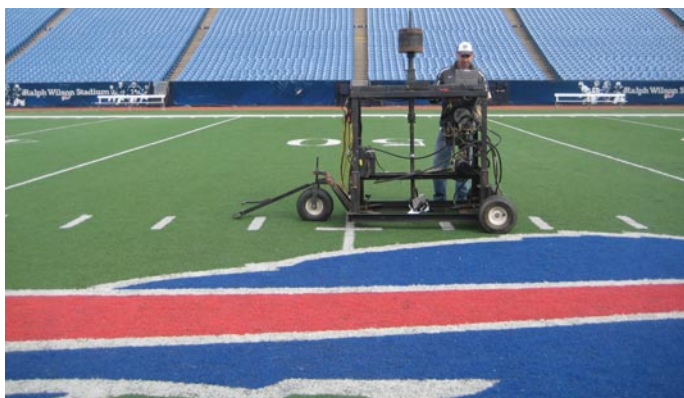
>> **BIOMECHANICS TESTING** in progress at Penn State's Sports Surface Research Center.

that there is no difference in overall injury risk when playing on infilled synthetic turf compared to natural grass.

In other words, the number of injuries occurring on synthetic turf and natural turf were comparable. A recent study tracking injuries to rugby players also found the same result. There was some evidence of different types of injuries occurring on each surface in many of these studies, but because of relatively small sample sizes, results were not considered to be statistically significant.

There have been two published studies examining injuries that occurred during football games, one tracking injuries in high school and the other in college. The high school study tracked injuries suffered by high school football players in Texas over a 5-year period. Just as in the soccer studies, overall injury risk was comparable between the playing surfaces. Additionally, this study further broke down injury occurrences into several categories and found several differences. For example, epidermal (skin breaks) and non-contact injuries were found to be more common on infilled synthetic turf while ligament injuries occurred more frequently on natural turf. The same researcher conducted a similar study on collegiate football injuries and found a slightly lower overall injury rate on synthetic turf compared to grass.

While we are unaware of any published scientific research study showing a higher injury rate on infilled synthetic turf, a report released by the NFL in the spring of 2010 contradicts the results of



>> PennFoot, a device developed at Penn State used to measure rotational traction and linear traction on turfgrass.

the previously described studies. The NFL Injury and Safety Panel reported considerably higher incidences of knee and ankle injuries on infilled synthetic turf than on grass. Currently, only an abstract from this study has been released and the full study has yet to appear in a scientific journal. When and if that study becomes available, it will be interesting to compare the complete data set with the other studies that found no difference in injury risk.

Injury tracking studies are considered to be the most direct method to study injury risk, but they also suffer from inherent lim-



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itations. It can be difficult to isolate the cause of the injury and the conditions at the time of injury. For example, what type of shoes was the athlete wearing? What were the weather conditions at the time of the injury? Did the athlete aggravate a previous injury? Other methods to predict injury have been developed to eliminate some of these questions. But, not surprisingly, these methods also have their advantages and disadvantages.

Mechanical traction testing is probably the most common method to measure the potential for lower extremity injury. At Penn State, we use Pennfoot to measure traction on both synthetic and natural turf. Several other universities have also developed similar devices. These machines can be outfitted with any type of shoe and can generate large volumes of traction data. What they cannot do is determine if a field is “safe” or “unsafe”. While there is evidence that excessive levels of rotational traction lead to a higher risk of knee and ankle injuries, we do not know at what level injury becomes significantly more likely to occur. Consequently, it is difficult to draw conclusions related to injury risk based solely on traction data. Data obtained with these devices does allow us to make comparisons from surface to surface and from one shoe to another. For example, data that we have generated shows higher levels of traction on non-infilled synthetic turf than on infilled synthetic turf and grass, which correlates well with the injury tracking studies, which showed higher injury rates on the earlier, non-infilled generation of synthetic turf.

The use of human subjects (both alive and cadavers) can also provide information related to injury risk. Sensors have been placed on different parts of the body and forces have been measured with sophisticated computer and camera systems. While comparing playing surfaces with these methods is still in its infancy, research studies using human subjects offer valuable insight into the stresses felt by actual athletes. However, just as with mechanical testing, it can be difficult to correlate this type of data to actual injuries.

So, is the perception of an increased injury risk on infilled synthetic turf reality? The results of the published scientific research papers show little evidence of increased injury risk on infilled synthetic turf. Of course, each injury occurrence is unique, making it difficult to make broad conclusions that apply to all circumstances. But, based on the data from the published studies, there is little difference in overall injury rate between playing on infilled synthetic turf and grass. Additional research will hopefully provide further insight into different injury patterns on these surfaces as well as appropriate injury prevention techniques such as shoe selection.

As part of our Sportsturf Scoop video series, we have a video focusing on injury risk available on our website at <http://cropsoil.psu.edu/ssrc/sportsturf-scoop>. Links and summaries for each of the injury studies are also available on our website. ■

*Thomas Serensits is manager of Penn State's Sports Surface Research Center, University Park, PA.*

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# Technical manager discusses diseases, weeds and insect pests

**Editor's note:** For an overview of diseases, weeds and insect pests that have impacted turf this summer, as well as how to deal with these challenges and also prepare for the fall and winter months, we interviewed Michael Agnew, Ph.D., senior field technical manager at Syngenta.

**ST:** What turf diseases, insect pests and weeds are turf managers dealing with this year?

**Agnew:** I use history as a good barometer of the future. Last year's weather conditions, where we had one of the worst summers in a long time as far as heat and rain, was pretty much mimicked by early high temperatures and rains this summer [though] there has been greater devastation due to heavy rains, flooding and tornadoes. A significant amount of rain in the spring can be a precursor to several disease, weed and insect issues.

Turf managers often weren't able to get out onto the properties to make needed applications, because it was too wet. In those cases, some of the products they ultimately applied may not have stayed in the soil and moved below the zone of germination. As such, I expect to see several failures on pre-emergent herbicides, simply because the weather conditions set it up for that.

With insects, it depends on how wet it was. If it was really wet, turf managers may see some mortality of grubs. All living organisms require oxygen to survive, and saturated soils leave no room for oxygen. Across the transition zone, from Kansas City to Maryland, it is pretty consistent that you get some grub activity on a yearly basis. The type of grub will vary upon your location.

Surface feeders are not perceived as being as severe of a problem, but the bluegrass billbug is one that can be pretty devastating. I've seen entire sod fields wiped out within days following an infestation.

When it comes to disease, brown patch is likely to be the number one pathogen—especially with tall fescue or ryegrass. Those species are very susceptible to infection by brown patch.

High soil moisture, high humidity and high temperatures are needed for disease activity. If you have continued wetness for 10 hours on the leaf surface, and you have temperatures above 85 degrees, that's a perfect storm for a diseases like brown patch and Pythium blight. These two diseases can hap-

pen at the same time, and usually, it takes two different fungicides to control them. So you have to have the right fungicide down.

In the south, one thing I would be concerned about is a leaf spot problem on bermudagrass because there is some root rot that can happen when cool wet weather goes to a warm, dry period.

Another disease that some may be experiencing is summer patch on species like Kentucky bluegrass, annual bluegrass, and fescues, especially in areas that are prone to drought quickly, such as hillsides. The best way to treat for these diseases is preventive. Areas that are injured by summer patch are sites to consider for introduction of tolerant species.

Saturated soils can lead to root systems that are compromised. The lack of oxygen can lead to a weakened root system that is more prone to disease, especially when you experience the higher temperatures.

On a typical year, if you can control Pythium blight and brown patch, you can get through the summer in pretty good shape.

**ST:** Is curative treatment preferred over preventive?

**Agnew:** Early curative is fine. The key is to look for symptoms, and if you are using a scouting system that is combined with monitoring of the weather conditions, treatments applications are still preventive.

There are predictive models that use weather conditions that give you ample warning to schedule an application. This type of application can be just as effective as making applications every 30 days. Late curative applications can be considered post-mortem application, the damage has been done. Applications at this point are to prevent any further spread.

If turf damage has been done, now is the time to start thinking about seeding in the fall.

**ST:** What recommendations do you have to limit the spread of disease?

**Agnew:** Mowing is one of the main ways of spreading diseases such as leaf spot, Pythium, brown patch and dollar spot. The mowing process is essentially an inoculation

process because you are transferring infected leaf blades to otherwise healthy leaf blades.

One way to prevent spread from one site to another is to clean the mowers between job sites. If you believe there is an issue, hose off the blades and make sure they are clean before you go to other sites.

Another way to reduce spread is to use a PGR [plant growth regulator] to slow down the growth. This reduces the need to mow as much. PGRs can be used in combination with fungicides as a good way to control diseases in the turf. The reduction in mowing equates to less plant stress caused by leaf removal.

Also, less mowing equals less removal of fungicides during the mowing process. Applying a PGR before rainy periods can prevent excessive clippings. Also, if mowing has been delayed because of rainy conditions, removing large amounts of leaf tissue causes a great deal of stress to the turf and can make it prone to disease.

Proper irrigation is also critical, but don't keep the turf saturated. Also, allow the soil to dry a little between irrigation sessions. This helps decrease disease activity.

Check with the local extension services, as many local offices provide regular alerts. Use diagnostics, good scouting, and make sure that you know your diseases. If you suspect that you have Pythium blight, do the feel test. Plant infected with Pythium blight will have a greasy feel to the leaf surface and a lot of cottony mass.

If the leaf tissue is just dying back from the tip, and does not have a slimy feel to it, that may be brown patch or gray leaf spot. It is important to understand that there are many diseases that can be active during the middle of summer. When it gets hot like it did last year with rains or over-irrigation, diseases can run rampant.

**ST:** At what point should turf managers begin preparing for fall and winter? Also, what should they be preparing for, and how?

**Agnew:** Fall and winter preparation depends on your location. In the north, winter diseases can be devastating. It is best to start preparing for fall and winter in the summer. Know the health of your grass. If the area has been damaged by insects, disease or weather, you should overseed in the fall, and do this early enough to ensure a mature plant before winter. Develop your plan early, so you can have a successful fall and a survival during the winter. All seeding should receive adequate moisture and fertility to establish.



Last fall many areas experienced drought conditions. Much of the seeded grass didn't develop, and people were put into a situation where they had to do some overseeding in the spring. A good guideline is to do all of the preparation early. The recovery from summer stress requires that any repair work be done as early as possible, and that the right amount of nutrients are applied to feed the plant during recuperative months of fall, which are more conducive for cool season grass growth.

Fall is the time where the plant is building up its stored carbohydrates in the crown, roots and rhizomes. Build it up in the fall to protect it through the winter, and then in the spring again to protect it through the summer.

When a plant goes dormant because of drought, it uses those stored carbohydrates to recover. If it doesn't have stored carbohydrates, it doesn't recover.

Also, be mindful that the nutrient regime ties right in to your disease-control regime. You need to have enough nitrogen present so turf can grow, but not so much that you are not pushing the disease. Therefore, use as much slow release nitrogen as you can. This will help prevent lush growth that is going to be more prone to disease activity. Some diseases are prone under low nitrogen; some are prone under high nitrogen. Summer diseases tend to be more active on high-nitrogen soils.

**ST:** What is the recommendation regarding contact products versus systemic products?

**Agnew:** With Pythium diseases and brown patch diseases, a sys-

temic fungicide is usually best. It can spread through the crown. It will protect from the inside out. A lot of times people will put a systemic with their contact in the application. The issue is that not all contacts can be used everywhere.

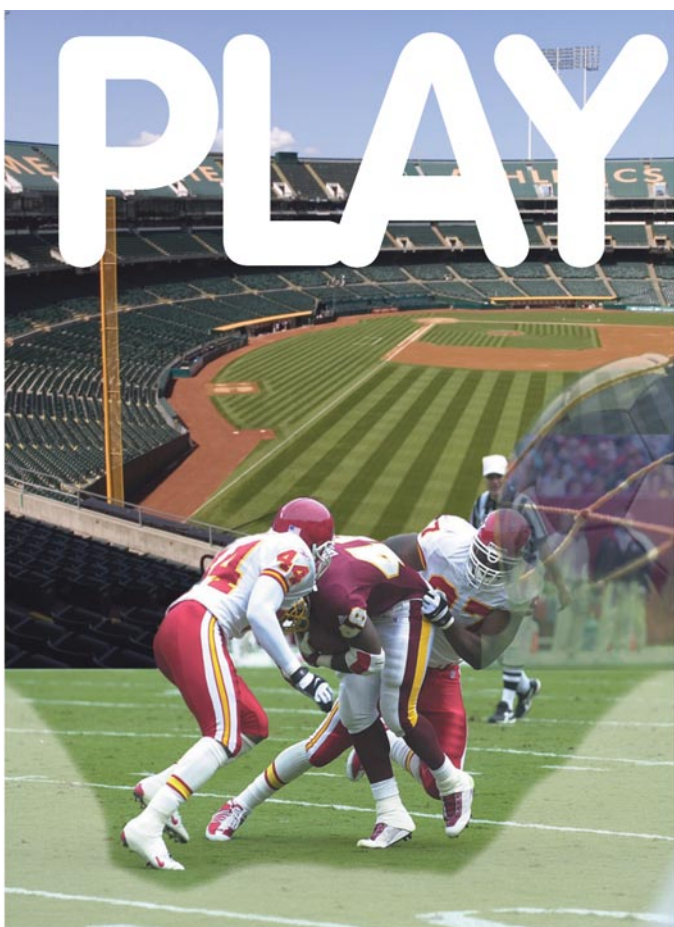
For sports fields that have a higher variety of diseases, putting a contact on the turf is probably a good way to go to knock down diseases. But with the regulations, check the label. Labels have changed tremendously over the past 10 years. Research the label and the EPA regulations on it.

**ST:** What are your thoughts regarding granular versus spray treatment, and spot versus blanket treatment?

**Agnew:** Granular products are great for fertilizers, pre-emergent herbicides and soil insecticides. They work pretty much the same as liquids, though not all granular pesticide products are effective in particular circumstances. Be sure to select a granular product that has an active ingredient that will control the target pest.

For fungicides, liquid applications are generally better than granular. There are granular fungicides that are effective, that can move into the plant, move into the roots, and actually move up into the plant. These types of fungicides can be used as a spot treatment. Why fill up a sprayer to treat 1,000 square feet when a granular application may be just as effective?

Always read and follow label directions before buying or using the types of products mentioned in this article. The directions contain important conditions of sale, including limitations of warranty and remedy. ■



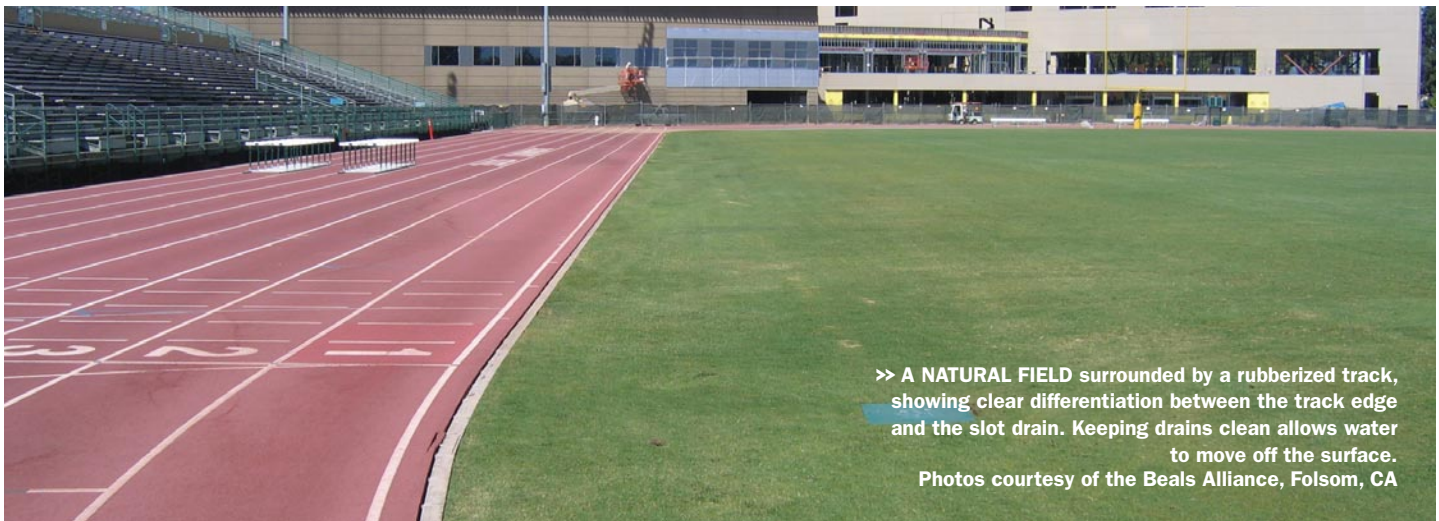
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>> A NATURAL FIELD surrounded by a rubberized track, showing clear differentiation between the track edge and the slot drain. Keeping drains clean allows water to move off the surface. Photos courtesy of the Beals Alliance, Folsom, CA

# Principles of good drainage

**N**O MATTER how great it looks, no matter how many important games are played on it, a field is going to be judged by how well it rebounds from a rain-storm and is ready for action. So unless you feel a deep-seated urge to call coaches on a regular basis to tell them to find a rain date, you need to make sure your drainage is up to par.

Much attention has been paid to the drainage systems installed in synthetic fields, but not everyone recognizes that a natural field, too, can be designed to make it through the rain and be ready for business. It needs two main ingredients: good construction (this includes having the right soil for its weather conditions and use), and regular maintenance.

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

A sand-based system, meanwhile, is one in which the native soil is completely removed, and replaced with

an under-drain system and a drainage media layer (principally stone and rootzone material that is largely sand) to improve drainage.

Neither type of field is 'better,' per se; however, one may be better under the given conditions. According to the book, *Sports Fields: A Construction and Maintenance Manual*, "The main problem with native soil fields is drainage. Most native soils absorb water quite slowly and cannot handle large amounts; therefore, without additional provision for drainage, these fields can easily become muddy, worn and/or unusable."

Dan Wright of SportsTurf Company, Inc. in Whitesburg, Georgia, says that because of its composition, a native

soil field can compact over time, particularly with continued play, mowing and more.

"Thatch and mulch builds up and when water falls on the field, the field will absorb the water but the water doesn't really go anywhere. That's what usually causes the problem. Then you have wet soil and if people play on it, it tears the field apart."

## DRAINAGE PRINCIPLES

According to the book, "to facilitate drainage, the preferred site would be a relatively level plane that is higher than the surrounding terrain. Realistically, however, many sites for athletic facilities are less than ideal."

Turf managers know the first step to good drainage is insuring that any water that goes on the field comes from either rainwater or planned irrigation. In other words, it is important to make sure that water isn't coming onto the field from another source: running down bleachers, dripping off dugout roofs, running down nearby hillsides, etc. Proper drainage around and under such areas can go a long way toward helping alleviate ponding on the field.

## SITE GRADING

The phrase, "level playing field" isn't just a metaphor for fair competition; it's a description of something that is absolutely critical in construction. Even a slight dip in the field can cause water to collect on the surface or for some areas to remain muddy after the rest of the field is playable.



...experts agree that both the usefulness of the field and its long-term performance, are tied to having an effective drainage system.

>> **UNDERGROUND DRAINS** are commonly used on natural and artificial fields. The concerns with this type drain are usually not addressed but are significant to drainage performance.