

he started working in lawn maintenance on both residential and commercial properties in the Pensacola area. His family moved to Birmingham where he began to expand into sports turf while working weekends and after school at Briarwood, a private school that he also attended. After graduating from high school, he began to pursue a degree at the University of Alabama at Birmingham, and continued maintaining the athletic fields at Briarwood. "I was lucky to have an employer like Briarwood that gave me the room to learn on my own," says DeWitt. DeWitt also credits local turf seminars and turf industry publications with not only increasing his interest in the field of turf management but also by providing the resources for him to further his knowledge about sports surfaces. Despite working in turf, he focused his college work in quite a different area and graduated cum laude from UAB with a degree in English.

His primary interest in coming to Wesleyan after graduation was getting back to that area of Georgia and exploring teaching as a possible career choice. DeWitt explains that, "My wife is an Atlanta native, and her family all lives in the area. We thought that that would be a great environment to share with our twin girls." Wesleyan did not have an opening in the English department, but did need someone to head up the grounds department. "Wesleyan hired me as Director of Grounds and basically created a student teaching position for me to get my feet wet - it was a win-win situation for me. I could see if teaching was going to work out, and if not, I had a blank slate from which to develop a grounds department," DeWitt recalls. The athletic field work was being outsourced at that time. By the end of that year he knew the fields, rather than the classroom, was where he wanted



to be and had already set lofty goals for the athletic field program. He became the school's full time Director of Grounds at the end of the 2000-2001 school year.

That college background serves him well in his current position. Requests are supported by written reports outlining what is needed, why it is needed and what will result if the request is granted. He works closely with all the coaches and the athletic director, communicating via email as well as in person. He articulates his passion for sports turf management so that others catch - and buy into - his message: that each sport is special and every player deserves to have the best possible field conditions so they can excel and fulfill their potential. **ST**

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from year to year - Manor, Monument, Revolver etc. Playoff scenarios dictate timing.

#### May

Mow as needed at 3/4 inch height of cut while transitioning in Bermudagrass.

Aerate with 3/4 inch top eject tines (2.5 x 4 x 4 in.). Harvest cores.

Spray wetting agent - Duplex (at the rate of 2 qts per acre every 2 weeks through late October)

Fertilize with 34-0-0 Ammonium Nitrate at the rate of 1 lb of N per thousand square feet at approximately 7 to 10 day intervals - or alternate with Ammonium Sulfate

21-0-0.

Aerate - Deep tine 1/2 inch hollow (3 x 5 x 6+)

Verticut in 2 directions. Blow and collect debris.

#### June

Mow daily or every other day at 3/4 inch height of cut

Aerate (try for every 3 weeks) with 3/4 inch top eject tines (2.5 x 4 x 4") Harvest cores.

Fertilize with 34-0-0 Ammonium Nitrate at the rate of 1 lb of N per thousand square feet

Use 10-in. cup cutters to harvest sod to replace wear areas that are not filling in properly

Verticut in 2 directions. Blow and collect debris.

#### July

Mow 2 to 3 times per week at 3/4 inch height of cut.

Topdress with 1/8 inch of sand

Fertilize with 41-0-0 Polyon micro-prill. 100% slow release urea at the rate of 2 lbs of N per thousand square feet

Aerate 3/4 inch top eject tines (2.5 x 4 x 4 in.) Harvest cores.

Fertilize with 34-0-0 Ammonium Nitrate at the rate of 1 lb of N per thousand square feet

#### August

Mow daily or every other day at 3/4 inch height of cut. Begin etching in

stripping pattern for football.

Fertilize with 19-19-19 at the rate of 1 lb of N per thousand square feet Specialty Application of Iron to boost color: Vig-Iron at the rate of 5 lbs of Fe per thousand square feet, or Ferromec etc.

Paint for football (Continue weekly through season.)

Mow after games with fairway unit mower

#### September

Mow 3 or more times per week at 3/4 inch height of cut. Mow in patterns for games, alternate cutting directions otherwise.

Fertilize with 19-19-19 at the rate of 1 lb of N per thousand square feet

Spray Primo+Ferromec (if turf is in suitable condition)

Seed at the rate of 12 lbs per thousand square feet using a perennial ryegrass ranked well in NTEP trials. (Timing may be in early October depending on weather and football schedule.) Fertilize with 18-24-12 (time with seeding)

#### October

Mow 2 to 3 times per week at 3/4 inch height of cut.

Fertilize with 18-24-12 (time with seeding)

Aerate if needed and conditions allow with 1/2 inch solid tines (2.5 x 5.5 x 3 in.)

Seed wear areas with perennial ryegrass

#### November

Mow as needed at 3/4 inch height of cut (once per week or once every 2 weeks)

Fertilize with 21-0-0 Ammonium Sulphate at the rate of 1 lb of N per thousand square feet

#### December

Mow as needed at 3/4 inch height of cut (once per week or once every 2 weeks)

Fertilize with 21-0-0 Ammonium Sulphate at the rate of 1 lb of N per thousand square feet (impregnated w/ Barricade)

Take soil samples

# Prepare baseball & softball fields NOW for 2005

BY MIKE ANDRESEN, CSFM

It's our job and our passion to get worn-out fields back in shape and healthy enough to withstand the overuse that is sure to come in 2005. The last thing you might want right now is to tackle year-end projects on your baseball and softball fields, but getting the work finished early allows the beautiful fall weather to shine and polish those diamonds!

Your first consideration should be, do you need a major renovation? It's not too late to make plans for irrigation, drainage, or construction projects, but at this point you should be finishing the detailed specifications and not just jotting ideas down. The goal for fall is to maximize every wonderful day of great growing conditions. The earlier you can get back out on your fields and complete fall projects, the more mature and healthy your fields will be when you start play in early spring, so don't waste even one day of this opportunity.

Start by looking at your turf. Fall is the perfect time to grow cool season grasses. Weed competition subsides by early fall and rain becomes more predictable. If you drill seed during mid-August it will quickly germinate and have the entire fall season to establish.

Seed companies are providing much more technologically advanced varieties than even a few years ago. Take advantage of enhanced varieties and overseed as many of your field areas as you can. Seed is cheap! The best weed control program for next season is a good seeding program this fall.

To make your fall seeding program even better take advantage of freshly aerified turf. I recommend pulling cores at least once per month until winter charges in, if possible. Mow the field as short as is healthy just before aerifying. Immediately after you pull cores in August and September fill your fertilizer spreader with quality grass seed and go over your field, spreading the seed and making double or triple passes on particularly worn areas.

I then recommend drill seeding the field at this point, as the seeder blades will shred the cores. If you do not have access to a drill seeder, use the infield drag or a topdressing brush to break up the cores and move the soil and seed into worn areas. (The lower mowing height aids this step.)

This is also a perfect time to apply a starter fertilizer, one that is high in phosphorous, as the mostly immobile phosphorous can be better distributed through the aeration holes and new seedlings need phosphorous.

## More ideas

Driving equipment from the field gates to the infield has left us with a path of worn turf. We remedy the situation by topdressing 3/4-inch of crumb rubber onto this pathway. It's important to only apply one quarter of an inch at any one time. The crumb rubber, in effect, built us a "roadbed" for our equipment to travel on. It protects the crown of the plants, keeps tires from compacting the soil, as well as out of the mud during wet periods. This process took us from a badly worn area to now not even being able to tell how we get our equipment on the fields. Try it!

Fall is also a great time to annually take soil samples and send them to a lab.



Here's a drill seeder planting seed and breaking up aeration cores, providing a great seed bed. Three jobs in one pass.

Do it before fertilizing. Your results will help you determine if any supplemental fertility needs are warranted on your fields. Use the results to modify your fertility program and remember to apply 2/3 of your annual nitrogen needs during the fall growing season.

Many times we need to sod worn areas in the fall. By doing this work early in the fall we're sure to get the sod knitted and established before winter dormancy comes. If you get behind the 8-ball and have to sod late, you may be forced to use thick cut sod to ensure playability come early spring.

When considering sod, be sure to inventory the lips of grass around all soil or warning track areas. Give your field lips the "Dr. Dave Minner Test" as we've come to know it in Iowa. Stand on the lip area, facing the outfield wall, with your toes on the soil and your heels on the turf. If you can shut your eyes and feel a seam where the soil and sod come together, you need to renovate your lips.

During spring and summer you worked diligently sweeping, blowing, raking, and power washing the lips to make the transition of soil to grass seamless. At times during the past season you may have been forced to cut the lips out with a spade or sod cutter. When you check the health of your infield lips it is very likely you will find that the infield mix has encroached onto the first foot or so of turf. This is almost unavoidable. The turf looks very healthy but close inspection with a knife shows that crowns of plants are buried in infield clay or warning track material. Remove that bad turf, replace it with a strip of sod and start next season off with fresh lips.

One trick we use is to cut sod from foul territory in the outfield, or along the warning track and use it for new infield lips. This ensures the turf color matches up to the surrounding infield turf. Use sod from your nursery or a turf farm to replace the missing outfield strips.

## Re-sodding tips

If you have only small areas that need re-sodding, such as in front of the mound, consider this less-intrusive method: Borrow a cup-cutting tool from your local golf course and cut out 2-inch deep plugs (or shallow cups) of worn out sod from in front of your mound. We like to use the 8-inch diameter cutter. Find an

area in the outfield or your nursery to cut plugs of the same depth and use these to replace those you cut out from in front of the mound. Place a guideline on the cup cutter with a permanent marker to ensure you cut consistently deep plugs. Within days these new plugs of sod will fill in and form a solid stand of turf. We only recently adopted this practice but the results from this "micro-sodding" have been fantastic.

On the subject of cutting sod, I recommend not having cut out areas for coaches boxes, fungo or on-deck circles. Unless meticulously maintained these areas usually become depressions in the field or trip hazards for athletes trying to make plays. Sure, they will become worn turf areas as your season progresses but the potential liability of cut outs in the field of play makes me tolerant of the worn-out turf look. The proof is this: if you cannot close your eyes and walk from the grass onto the rock areas without noticing a change in grade from one to the next, it's time to remove the aggregate and sod them in. I've seen these areas edged with wood boards, commercial edging, concrete, and asphalt. All are hazardous to athletes and should be removed immediately.

#### **Irrigation concerns**

Irrigation is one element of your field that needs consistent attention. Are your drives and nozzles the same as specified originally? If not, you may be setting yourself up for inefficient precipitation rates or improper field coverage. All irrigation heads should be at the proper grade with no sunken areas, or "bird baths" in which someone could twist or break an ankle.

Fall might be a time to renovate or upgrade your irrigation system. Double check that your rain shut-off sensor is mounted and in good operating condition to save you money and embarrassment from having the irrigation run while it's raining. Many people spend hours each day hand watering the infield skin in an effort to keep moisture at optimum levels for evening play. Consider putting some of the faster rotating heads around the infield skin (infield and outfield edges) and have them face toward the skin area. If your diamond has irrigation already, this is an excellent and easy solution for you to cut some of the "hose time" that all of us accrue in season.

It's key that these heads only water the skin area and are not doubling up on any of your turf areas. Sure, windy days may have you still hosing down dry spots but you'd be surprised how frequently these heads can be used to your advantage. Because the heads rotate at a high rate of speed the coverage is thorough before large amounts of water accumulate in any one spot. Visit with a knowledgeable irrigation specifier or consultant to ensure you get desired results.

The nuts and bolts on any diamond is the skinned infield area. Far and away the majority of all softball and baseball games are determined within this small area, and it is where your reputation as a sports turf manager will be made. I have read articles that recommend varying percentages of clay, silt, and sand. One thing is for sure: you need to have your infield mix tested before a recommendation can be made. (Dave Minner here at Iowa State is running an on-going study on infield skins and would appreciate your sample as well.) You know whether your skin plays too soft or too hard. If you're unsure, talk to the players or coaches. Knowing the exact composition of your infield skin can help you decide whether the remedy for your problem may be adding clay or sand, or maybe one of the many infield products available from commercial vendors. Fabulous skin products are available

to help remedy soft and hard or wet and dry playing conditions on your field.

If you intend to add a product to your skin you must scarify the existing skin before adding the material. Work the product to a specified depth so that your top 2-4 inches of skin are consistent. Merely "capping" or topdressing an infield with any product will not alleviate problems. By not working the mix to a specified depth you will create a shear plane just below the top layer at which the field will break apart during play. The upper and lower planes may have two differing optimum moisture levels that will be impossible to manage. Consistency in your infield is the goal. To allow players to be comfortable fielding on your infield skin



Asphalt covered coaching box cut outs are dangerous for athletes making a play in foul ground.

## **SOD WORN AREAS EARLY IN FALL TO GET IT KNITTED AND ESTABLISHED BEFORE WINTER DORMANCY COMES.**

you want the ball to respond exactly the same from every spot in your skinned area. This means you need to have consistent material and moisture in the top 4 inches of your surface.

Winter winds often blow skin materials into adjoining turf areas causing lips. Higher budget facilities are purchasing special infield tarps that cover skinned areas of ball diamonds during high wind winter months. A less costly way to control blowing and drifting of infield skins is to erect a simple but effective snow-fence-like barricade. Managers are placing 2 x 4-inch boards along the front and back edges of their infield skins, about 6 inches from the adjoining turf edges. Spikes or sandbags are used to anchor the boards to the infield. The snow fence effectively keeps the infield material from blowing into the outfield and infield turf. Upon removal of the boards in spring you will find a ridge of infield mix along side the boards that you simply grade and drag back into the infield.

#### **Bagged materials work**

The clay areas seem to require most of our focus during the season. There are

ways to save yourself much of the drudgery of tamping clay but to do so takes commitment from you and your staff. Many mounds, home plates, and bullpens consist of native clays from local sources. I encourage you to consider using one of the many available bagged clays, clay mixes, or unfired brick products. These materials are screened, shredded, and bagged at optimum moisture levels to produce ready-to-use products. For softball, consider introducing the clay products around bases to help prevent holes from forming where players lead off at the edge of bases.

To install any of these products you should remove the existing clay to a depth of 4-6 inches from the working areas of these field areas. For mounds, this means in front of and behind the rubber as well as the landing area for any size pitcher. At home plate it is best to do the entire batters box areas as well as the catcher's area. After you remove the existing material you should lightly water the area (no puddles!) and rough up the area with a garden rake.

If you're using a bagged clay product you should install the clay in "lifts." This means if your area is 4 inches deep, you should install to a 2-inch depth, pack it in with a tamper, lightly scratch with a garden rake in preparation for the next "lift," then add another 1 1/2 inches of material. The raking of the surface of the compacted clay allows the subsequent layer of material to adhere and form one solid bed of clay. Fill the entire depth of the working area with clay then add a thin layer (1/2 inch) of mound mix or native clay on top to finish off the project.

If you choose to use unfired clay bricks as your base the process is similar to the bagged clay except that the depth of your dug out area should start out only slightly deeper than the depth of your bricks. Lightly water and rake the native material to ensure you get positive adherence between profiles. Lay the bricks as you would any pathway.

At this point I've seen success achieved a couple different ways. A practice I like is to then add a thin layer of bagged mound clay, water gently and trowel, forming a smooth, solid bed of clay on top of the bricks. By working the top layer of moistened clay around with a trowel you are sure to fill cracks between the bricks with the bagged clay product. Over time this bed of clay solidifies and achieves your desired result.

If you do not add the skim coat of bagged clay on top of the unfired bricks you must tamp, or use a motorized plate compactor, to ensure the bricks all "melt" into one. One tip before tamping is to go around each brick and tamp lightly with a hammer. This helps initially press the edges of the bricks together. You are ready now to add the thin layer of mound mix or native clay to finish off the installation.

After you've successfully installed the beds of clay into these areas of high activity it is important to acquire a tarp for each of the clay areas. The tarps are



Unfired clay brick installation of batter's boxes and catcher's area.

used to keep moisture in, not out! Installations of these high quality clays will surely crack and become difficult to manage if allowed to dry out. Clay is hydrophobic so once it dries out it becomes difficult to get it back to a solid, moist condition. Mound and batting area tarps are often used to prevent excessive drying and to keep clay from washing down the sides of your mound and into the surrounding turf. You go to a lot of work getting your mound to game specifications and perfectly shaped, don't let Mother Nature undo your craftsmanship.

It's key to understand that the binding properties of clay are compromised when contaminated with invasive materials such as, sand, calcined clay, soil, and aglime. After play loose materials that have been contaminated will not bind to the base material. After each game you need to sweep loose clay and soil from the dugout spot and replace it with the introduced material. For clay bricks, you will spade out the bad spot, add a slice of a new clay brick then tamp it to form the uniform bed of clay again. It's very easy maintenance but you must be committed to doing the repair regularly.

#### Beyond the field

Now that you've achieved your field goals for fall renovation, it's time to look beyond the playing field and into the stadium. Inventory and repair all fences and padding that may have been damaged by mowers, vandalism, or players. You shouldn't have loose or jagged materials on which players could potentially injure themselves. Document hazardous items for repair on a safety checklist. Check bleacher areas for sharp edges or missing parts. Much legislation has occurred around the country regarding bleacher safety and you are the first defense against liability claims. If something is in need of repair it is probably your

responsibility to identify and rectify it!

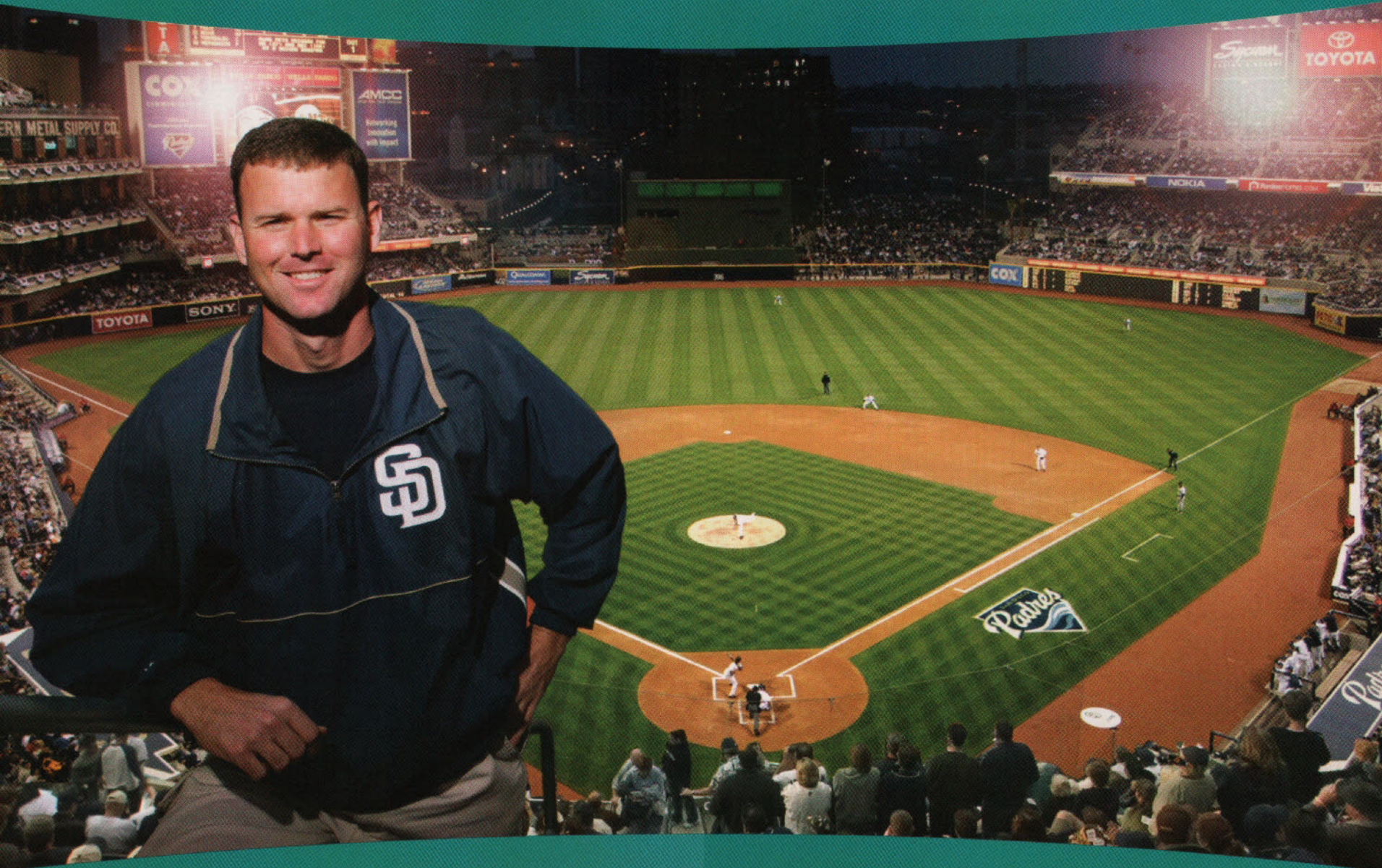
You or someone needs to check out the field lighting and determine its efficiency. Maybe there are burned out bulbs, ballasts that are inefficient, or other items that could be dangerous to fans, players, or your staff. Many different people judge our facilities from many different perspectives. To have yours identified as "first class" you need to think about all aspects of your baseball and softball complex, not just the playing surface.

I encourage you to also take the fall season to work on your relationships. Many times it's the relationships we nurture that prove to be long-term benefit to us. Write thank you notes to team and league officials and let them know you appreciate their care and commitment to these facilities you share. Write a note to key commercial suppliers and thank them for their efforts in support of your operation. Jot down a note to your employer and let him or her know how much you appreciate their support throughout the year. Express how vital continuing education is to the maintenance of your facility. Explain how attending a conference or local workshop will have lasting benefit and long reaching impact for your operation. Our challenge is to sell our profession and we do this through professional interaction with others and our outward image. Don't just be the person that comes in each day, mows the grass, drags the dirt, and paints the foul lines. Come to work and prove that you are a professional sports turf and athletic facility manager. **ST**

*Mike Andresen, CSFM, is Athletic Building and Grounds Manager for Iowa State University. He is the Secretary of the STMA Board of Directors, and also a member of the SPORTSTURF Editorial Advisory Board. He can be reached at man-drese@iastate.edu.*

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# Fungicide use on athletic fields

BY DR. NATHANIEL A. MITKOWSKI

**L**ike every other living thing, turfgrasses suffer from disease. While many of these diseases are a minor nuisance in low maintenance turf, they can quickly become a very costly problem in high maintenance stands like athletic fields. In fact, the more uniform a stand of turf, the more susceptible it is to disease. Compounding this problem is that even a minor flaw on high maintenance turf will become readily apparent to even the most casual observer.

There are a number of different strategies for dealing with disease on athletic fields. The strategy you choose will depend upon many factors but the most important considerations are the available budget and the intensity of management. A larger budget allows for more fungicide applications and an intensely managed turfgrass will require more pesticide inputs.

Of course, the target pathogens will also have a major impact on fungicide usage. Some pathogens have a very narrow time frame in which disease is expressed and may require only a single preventative fungicide application. Other diseases may persist throughout the growing season. And geographical location has a major impact, e.g., Grey Leaf Spot is common throughout the mid-Atlantic, but it is rarely found in New England.

Regardless of the disease involved, combating them usually requires fungicides. Fungi are the primary causal agents in almost every case of turf disease. Fungicides, however, are not inexpensive. The cost of a single fungicide application can easily reach into the tens of thousands of dollars for a large athletic complex, depending upon which chemical is being applied. Consequently, the specific active ingredient, fungicide rate, timing, and host grass must all be carefully considered before committing to a fungicide application.

Even if the budget does allow for continuous application of very expensive fungicides, that in itself is not a good justification for fungicide application. Excessive fungicide applications do more harm than good by encouraging fungicide resistance unnecessarily and by causing potential non-target effects.

## Preventative vs. curative

The terms "preventative" and "curative" are often used in regards to fungicides.

Unfortunately, people regularly confuse their usage when dealing with rates and application timing. A "preventative application" is put down before fungal infection takes place. "Preventative rate" refers to the lowest recommended labeled rate. A "curative application" is put down after fungal infection takes place. The "curative rate" is the highest labeled rate. It is important to realize that a rate and an application are not the same thing. While a "preventative rate" is generally used in a "preventative application," higher labeled rates may be used when disease pressure is likely to be severe. An additional difficulty is that fungal infection occurs before disease symptoms are observed. A causal agent may be infecting tissue but not producing symptoms. In such a case, a "preventative rate" may not be successful.

Applying fungicides before disease expression is an excellent strategy on high maintenance facilities that can afford regular fungicide applications. Once a disease has established itself, it requires higher rates and careful attention to minimize the disease's impact.

The real trick is determining what disease to spray for preventatively. Environmental factors play a major role in disease expression. New England has notoriously variable weather during the growing season. In 2002, anthracnose was extremely severe. In 2003, summer patch was at its height all season long and very little anthracnose was observed.

No one reliably can predict disease severity and weather conditions 1-2 months in advance. As a result, the best predictor of disease expression is past experience and the next 2-week weather forecast. Although not foolproof, preventative applications based on these parameters can save a lot of headaches. For example, if *Pythium* has been a problem on a soccer field in previous years and the next week's forecast is calling for 80 percent humidity and 90 degree temperatures, a preventative *Pythium* application is probably warranted. The weather may turn out to be dry and cool, but a fungicide application will surely cost less than losing all your turf should the weather become favorable for the disease.

## Labeled diseases

While it is true that the label is the law, the label is not really the most reliable source for choosing the right fungicide for your particular need. It is illegal to use a product against a pathogen for which it is not labeled. But just because a product is labeled for a specific pathogen does not mean it is the best product for that particular



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**Count on it.**

pathogen. When a chemical company registers a fungicide, they try to get it labeled for as many diseases as possible. The more pathogens on the label, the more widespread its use and thus the more profit for the company. While a fungicide should work against every disease or pathogen on its label, it often does not. Don't blame the manufacturer, it's not usually their fault. Some fungi have developed widespread resistance to a chemical and it just doesn't work anymore. Some chemicals only worked marginally from the start. And sometimes, newer chemicals hit the market that far surpass the performance of the others and just make them look bad.

There are a lot of fungicides available for turf use; about 30 different active



ingredients at last count. Often two or three of these individual active ingredients are combined in a single package, increasing the ability of that combination to combat fungi. Before I go into details on specific diseases, however, it is important to discuss the place of generics in the marketplace. When a manufacturer develops and registers a fungicide, they have exclusive rights to that chemical for 17 years from when it was patented. In reality, that may only give them less than 10 years of sales and marketing. Fungicide development is not a cheap prospect; it can easily cost tens of millions of dollars. When the patent runs out, anyone can then manufacture their version of the particular fungicide and sell it.

Generics usually offer a price incentive. And from our experience, the generics often work just as well as the original brand name products. But in order to keep their edge, the brand name manufacturers will constantly tinker with their product, trying to make it work a little better, a little faster, or work against more targets. This article is not intended to promote one specific manufacturer; instead we will share which active ingredients are most commonly used against specific pathogens. Trade names (both brand names and generic names) have been included but no endorsement is intended. In addition, lists of trade names are not exhaustive (new generics are constantly coming to market and it is often difficult to keep track of them all). One additional caveat: the recommendations below are specific to the Northeast. While they are likely to be applicable across most of North America, this is not always the case. Always consult with your nearest University Extension Service when in doubt.

**Dollar Spot.** Dollar Spot is the most prevalent turf pathogen around and requires constant fungicide applications to keep it in check. It is caused by *Sclerotinia homoeocarpa* and is most active in late spring and early fall but pops up throughout the summer. Both systemic fungicides and contacts are effective against the pathogen. The most commonly used systemics are thiophanate-methyl (Anderson's Systemic, Cleary's 3336, Fungo, Systec, T-Storm) and the DMI's. The DMI's are a large group of fungicides that include fenarimol (Rubigan), myclobutanil (Anderson's Golden Eagle, Eagle), propiconazole (Banner Maxx, Spectator, Propiconazole Pro) and triadimefon (Anderson's Fungicide VII, Bayleton, Lescoc Systemic & Granular Fungicides). Unfortunately, resistance is most commonly seen first in these two groups of fungicides.

Other commonly used systemics include boscalid (Emerald), iprodione

(Anderson's Fungicide X, Chipco 26GT & 26019, Iprodione Pro, 18 Plus) and vinclozolin (Curalan, Touche, Vorlan). Pyraclostrobin (Insignia) has shown suppressive activity against Dollar Spot but not complete control. Chlorothalonil (ChloroStar, Concorde, Daconil, Echo, Manicure) and mancozeb (Dithane, Fore, Formec, Junction, Mancozeb) are the most commonly used and effective contact fungicides for use on Dollar Spot. These contacts can be used against Dollar Spot in the absence of a systemic but need to be applied every 14 days at a minimum and preferably every 10 days. While other products are available, those listed above are the generally the most commonly encountered and the most effective. While azoxystrobin (Heritage) is not labeled for Dollar Spot, it must be used with care when Dollar Spot pressure is high. When applied in the absence of fungicides labeled for Dollar Spot, it will actually increase Dollar Spot incidence.

**Brown Patch.** Brown Patch is often seen on many types of turf and can spread quickly. It is caused by *Rhizoctonia solani* and requires high humidity and temperature. Night temperatures usually need to be in the low 70's for this disease to pop up. While the same contacts used for Dollar Spot are effective against Brown Patch, the most effective systemic fungicides have not yet been mentioned. These include flutolanil (Prostar) and azoxystrobin (Heritage). The other strobilurins (or QOI's), trifloxystrobin (Compass) and pyraclostrobin (Insignia) are also very effective against Brown Patch. A very old fungicide, polyoxin-D, has recently been resurrected by Cleary's under the trade name Endorse and has worked very well in field trials. Fludioxonil (Medallion) has also proven very effective against Brown Patch. While the DMI's, thiophanate-methyl, iprodione and vinclozolin can be used against Brown Patch, they are simply not as consistently effective as those listed above. When these chemicals are used in an aggressive Dollar Spot prevention program, however, they will often provide sufficient control against Brown Patch.

**Pythium.** Pythium is very similar to Brown Patch in its environmental requirements and can spread even faster. However, the fungicides used to control this disease are completely different from those used for either Dollar Spot or Brown Patch. Multiple species of this organism are responsible for foliar Pythium blight. The most commonly used systemic for Pythium is mfenoxam (Anderson's Pythium Control, Subdue MAXX). Mfenoxam is actually a "refined" form of metalaxyl. Additional systemics include propamocarb (Banol) and fosetyl-Al (Aliette, Signature, Prodigy). The most commonly used contacts are chloroneb (Anderson's Fungicide V, Teremec) and etridiazole (Koban, Terrazole). All of these chemicals are very effective against foliar Pythium and also work well against cool season root Pythium. The QOI's are also labeled for Pythium and have been shown to be effective in many cases, however, they are not usually the chemicals of choice for controlling Pythium.

**Tank Mixes and Mixed Products.** Rotating fungicides is the key to delaying fungicide resistance. But for many fungicides, resistance is inevitable, regardless of how conscientious a rotation program. Faced with not being able to use a chemical to prevent resistance or using it until resistance develops, most people will chose to use it. When rotation is not an option or resistance is a major concern, tank-mixing fungicides is an additional method of reducing the likelihood of resistance development. By combining fungicides with multiple modes-of-action, resistance can be effectively blocked. In addition, a wider spectrum of fungicidal activity may be achieved.

Cost, of course, will increase with every additional component in the mix. Combining a systemic and a contact is an even better way to minimize resistance development, but care must be taken in choice of chemicals. Some systemics must be watered in. The efficacy of most contacts will be reduced when watered in. In order to simplify the process of tank mixing, many companies have developed products that combine multiple active ingredients. While none of these have been discussed in detail, they can save a lot of time and energy and are generally as effective as stand-alone products (for example, a thiophante-methyl plus chlorothalonil product vs. just a thiophante-methyl product), assuming that equivalent rates of active ingredient are used.

Whichever fungicide you choose to control a disease problem, make sure you have some reasonable expectation of success (in other words, use the appropriate tool for the job). Excessive applications are both costly and environmentally irresponsible. **ST**

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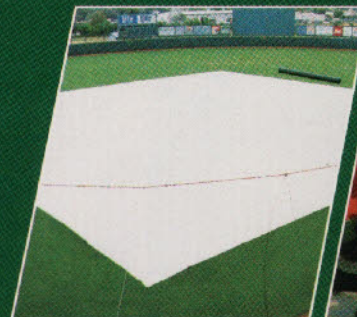
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