(continued from page 18)

transition back to bermudagrass. Once the playing season ends in June, these fields see minimal use until October. When the soccer field was overseeded, the transition back to bermudagrass was difficult and occurred just prior to the summer camps. This put more stress on the turf and made preparations for the early August season more difficult.

The soccer field has not been overseeded since 1997. Potts says, "We begin using green turf dye once every two weeks when nighttime temperatures start to fall below 50 degrees. We use a rate of one gallon of dye to 30 gallons of water to just darken the color a bit. This allows the plant to capture more of the limited fall sunlight and grow at a higher rate. We're not sure exactly how it works, but feel that it helps in continuing the photosynthesis process as temperature and sunlight decrease. We need to mow more frequently and the field recovers more quickly in the fall when it is dyed. We've also noticed that the dye helps the turf emerge from dormancy more quickly in the spring. We've occasionally used the same rate of dye in an application or two in the spring to speed up the growth process."

The staff is very cognizant of environmental issues and public perception. The integrated pest management system they've developed uses control products only when levels pass the tolerance point. Billbug control has been applied on occasion. The soccer field's dense turf requires little weed control, however, we apply a pre-emergent for winter annuals at the end of September or beginning of October.

The soccer field is a team effort. Potts credits the coaches for such field preservation measures as moving the goalie practices around the field, and playing from side to side along the sideline to avoid excessive wear in the goalmouths. He says, "If wet conditions are persistent, they may move practice to the sand-based track infield, even occasionally holding a night practice to accommodate scheduling. We're also fortunate to have an administration that understands the importance of proper field maintenance and gives us the tools and staffing necessary to do the job."

Potts and Goertz both give their highest praise to their staff. Potts says, "We have a staff of high-quality, dedicated people who are committed to excellence. The reward is the positive feedback from players and coaches who appreciate the results we produce for them."

Steve Trusty is Executive Director of the Sports Turf Managers Association (STMA), and Suz Trusty is STMA Communications Director.

Texas A&M University Soccer Field Maintenance Practices

FERTILIZATION

Nitrogen: Granular applications of ammonium sulfate (21-0-0) at 8 to 10 pounds per thousand square feet, per year.

Phosphorus: Sufficient in the soil, no applications needed.

Potassium: Granular application of 0-0-22 at 2 pounds per thousand square feet, per year, based on soil and tissue testing.

Micronutrients: No micronutrient deficiencies, no applications needed.

MOWING & FIELD CARE

Mowing Frequency: Four to five times per week from spring green up until the end of July. Mowed daily from the last of July through the fall season.

Clippings: Remain on the field to avoid nutrient removal.

Height of Cut: 5/8-inch from mid-May through mid-August. Raised to 3/4-inch for fall and spring playing seasons.

MAINTENANCE PROCEDURES

Verticutting: Once per year in late May.

Aeration:

* 8-inch deep tine aeration in late May. Remove cores and topdress with sand.
* 4-inch core aeration once in summer. Remove cores and topdress with sand.
* 4-inch solid tine twice per year, timing as needed.

Overseeding: None

Green Turf Dye: Used to increase photosynthesis levels when fall evening temperatures drop. 1 gallon of dye to 30 gallons of water applied at 2-week intervals.

Painting: Game day painting and for practices depending on schedule.

Irrigation: Irrigation system run every 3 to 4 days based on evapotranspiration rates. Irrigation of drought-stressed "hot spots" with sprinklers and hoses as needed.

PEST CONTROLS

Weed control: Frequent mowing to promote dense turf. Apply pre-emergent for winter annuals at end of September or beginning of October. Hand pick any weeds.

Disease control: Control products applied only as required. To date, none needed.

Insect control: IPM with insecticides applied only when target levels exceeded.

Texas A&M's women's soccer team looks to score on North Carolina.

Warm Season Turfgrass Disease Management

Knowing which diseases can affect your fields during the warm season can help you identify and combat those foes.

by Drs. Ed A. Brown (Plant Pathology) and Gil Landry (Crop and Soil Science) University of Georgia

Even though there are more than 70 diseases reported to attack turfgrasses, less than six commonly cause problems on sports fields. These disease causing organisms require specific environmental conditions to proliferate and infect a turfgrass. The disease triangle is used to examine the interaction between the disease causal agent (pathogen), the plant (host), and the environmental conditions required by the pathogen to infect the turf. This same triangle can be a means of formulating a plan to manage the pathogen, the turf or the environment, to prevent or reduce the disease infection.

Since bermudagrass is the main warm season turfgrass used for sports fields, and since it is relatively resistant to most organisms, the focus will be on the more common organisms. Also, because a healthy turf is the first step in managing potential disease problems, a review of the common turf management practices associated with disease problems is important.

Water management is probably the most common practice that can affect disease problems. Most of the time it is not excess water that causes problems on sports fields but the lack of water. Even though grass growth slows from moisture stress, there is still generally sufficient moisture from dew formation to enable the pathogen to proliferate on the weakened turf.

Thus providing water when needed to maintain a healthy plant is important. In fact, simply irrigating to encourage moisture-stressed turf is often enough to reduce the disease problem. Before sunrise is considered the best time to irrigate because of low wind and temperature and the removal of morning dew from turf leaves. Irrigation before the dew has dried in the morning or before it forms at night extends the period of free surface moisture and may enhance disease development.

Obviously, water management is also related to soil conditions. Hard, compacted soils reduce turf rooting and increase moisture stress. Thus, cultivation to alleviate compaction can reduce disease potential.

Some thatch is desirable on sports fields because it forms a cushion which decreases turf wear. Thatch also insulates the soil from high and low temperatures and reduces vaporation losses of water from the soil surface. However, a thatch layer becomes undesirable when it exceeds a depth of one-half inch. Thatch then begins to restrict water and air movement into the soil, encouraging a shallow root system. It also provides an ideal environment for disease organisms. Thus, proper thatch management is essential to disease management.

These large circular patches, usually two to four feet in diameter, are typical symptoms of brown patch.

Finally, managing soil fertility is critical to maintaining a healthy plant, and manipulating nutrients can significantly reduce or increase disease problems.

With those general turf management principles covered, the remainder of this article describes conditions that favor disease development, symptoms of the disease, and turf management practices for disease control.

BROWN PATCH

Brown Patch is caused by the fungus Rhizoctonia solani which can infect all warm season grasses. This disease can be devastating and is difficult to control after developing. The most favorable disease conditions occur from April through October.

Environmental Conditions Favoring Disease:

Wet leaves and soil favors growth of the fungus. A heavy dew alone does not usually promote disease unless the wet period is extended by rain or improper irrigation. High nitrogen (more than one pound of N per 1000 sq. ft.) applications can excessively stimulate the development of young succulent turf and cause brown patch to be more severe. Although the most favorable temperatures for infection are 80-85F, the fungus can be active at 50F and up to 90F. Since the temperatures usually drop below 90F for much of any 24-hour period, the fungus may continue to be active all summer, awaiting a favorable combination of temperature, nitrogen-induced succulent turf, and water to infect. This disease mainly occurs in the summer. However, a different strain is now frequently being found in the cool months of the fall and during spring greenup.

Symptoms:

The fungus starts to develop from microscopic fungal mycelium fragments surviving in the thatch and organic debris and rapidly forms a circular pattern. The circular patches can be from several inches to 20 feet in diameter, but usually are between two to four feet in diameter. Affected areas are thin in the center with sprigs of grass surviving and thinner at the margin of the advancing outer edge of the ring. During periods of activity, the outer edge has a smoke ring that is grayish to reddish brown in color. Fungus mycelium can be seen at the margin in the early morning when the dew is heavy or water is present. In bermudagrass, only the foliage is generally affected and the grass will recover from healthy rhizomes.

Control and Management:

Turfgrass management is important in brown patch control. Avoid high N applications (more than 1 pound per 1000 sq. ft.) and avoid N if the disease is active. Fungicides can be applied as a preventive measure if the oncoming weather indicates wet conditions. Curative applications should be applied when first symptoms are observed. The fungicide should be applied in a minimum of 120 gallons of water per acre. This is important to provide foliage, stem and upper root zone/thatch coverage with the fungicide.

DOLLAR SPOT

The fungus Sclerotinia homeocarpa (Lanzia sp. and Melerodiscus sp.) causes dollar spot. The severity of dollar spot disease is determined by soil moisture, nitrogen and potassium levels, and temperature.

Environmental Conditions Favoring Disease:

Ideal conditions for disease development include the combination of low nitrogen levels, low soil moisture,

The straw-colored lesions on the bermudagrass, which have developed from the leaf margin and moved across the leaf eventually girdling the blade, are from dollar spot.

temperatures in the 60-80F range, heavy dew, or excess water.

Symptoms:

Early symptoms are straw-colored patches one to three inches in diameter. Infection can be severe and these damaged spots coalesce to form rather large areas where the foliage is bleached to a tan to whitish or straw color. There are straw-colored lesions on the grass blades that develop from the margin of the blade across eventually girdling the leaf. This fungus is primarily a foliage disease and a warm season grass like bermudagrass generally has no problem recovering from the damage. Overnight mycelial growth can be seen during active disease periods as cottony growth in the morning dew.

Control and Management:

Management practices that help control this disease are the addition of nitrogen and providing adequate soil moisture. Obviously, soil compaction can increase disease incidences by restricting rooting. Soil moisture should be adequate enough for good growth. Soil potassium levels should be maintained at medium to high levels. When the first symptoms are observed, evaluate if a fungicide should be applied. If so, select a contact fungicide that is not suspected of developing pest resistance and follow up after the labeled recommended interval with a systemic fungicide for longer residual control. The fungicides should be applied in a minimum of 120 gallons of water per acre. This will assure good coverage of the foliage, stems, and the upper thatch or organic zone.

HELMINTHOSPORIUM DISEASES

There are actually several fungi that cause this type of disease symptom. These fungi include Bipolaris spp., Exserohilum spp. and Drechslera spp., which were once classified as Helminthosporium spp. They are now considered to be Helminthosporium diseases. This is to facilitate communication to not confuse the issue with turfgrass managers. Some of these fungi can cause leaf, crown and root diseases. In most cases bermudagrass is tolerant of these fungi, although under stress and potassium deficient conditions it can be affected.

Environmental Conditions Favoring Disease:

The ideal temperature for infection is 77F, but infection can occur from 68-95F. However, Drechslera spp. diseases can cause disease during cooler temperatures. Infection by most of these fungi can take place at any time during the spring, summer and fall, provided adequate moisture is available. Problem areas in turf are usually associated with prolonged periods of leaf wetness and nutrient imbalances which weaken the turf.

Symptoms:

Black to purple spots on leaves and leaf sheaths with spots turning tan to brown in the center. The lesions are often elongated running in the direction of the veins of the leaf blade. Root and crown rot are also associated with these fungi. These phases are generally associated with dry periods during the hot part of the summer and cause a collapse of the turf tissue resulting in thinning and decline. Lesions can be found on the stolons and rhizomes under severe disease conditions.

Control and Management:

Fertilize with adequate amounts of potassium and nitrogen. Areas that are shaded or protected by structures or landscape may have more problems, so improving air movement in these areas would be helpful.

PYTHIUM BLIGHT

Bermudagrass is fairly tolerant of Pythium spp. infections if managed correctly. Poor surface and/or subsurface drainage are often associated with this disease. Pythium spp. are water molds and need excess water to infect.

Environmental Conditions Favoring Disease:

Overseeded bermudagrass can have Pythium spp. problems but it is generally the cool season turf and not the bermudagrass that has the problem. Over-fertilization to stimulate excess young succulent turf and overwatering are usually associated with these problem areas.

Symptoms:

Greasy brown patches of turf an inch or less in diameter, increasing to several inches and turning straw colored. Cottony mycelium on leaf blades may be seen in the morning dew. The roots and crowns can be damaged. These turf problems are usually found in low areas where drainage is poor. Improving the nutrition may not cause the expected growth response, because there are limited roots to translocate the nutrients.

Control and Management:

Do not over-water or over-fertilize. After turf recovery, aerify if necessary to improve drainage. Fungicides may be useful in a fall overseeding program. If a problem has been identified previously, then consider a preventive fungicide application. Use treated seed for overseeding. If warm weather persists after the overseeding has germinated, then a fungicide application may be recommended until cool weather persists and the threat of disease is over.

Sports turf diseases can usually be beaten by good sound management. Monitoring weather conditions and providing the best possible management for the turf are the best disease controls. Being alert and able to identify disease problems as they develop, and then knowing what preventative and curative steps to take, will reduce the potential of significant disease damage to a sports field.

Finally, relying on fellow professionals, your local county Extension office, well-trained suppliers, or your state land grant university, can help you manage turf problems.

Drs. Ed A. Brown and Gil Landry are Professors of Turfgrass Management at the University of Georgia. Dr. Landry, a past president of STMA, may be contacted at e-mail: glandry@uga.edu.

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Dealing With Extremes

How to protect turf from the havoc of various weather conditions and the use of fields for other events.

by Dan Douglas, Reading Phillies

Ask a sports turf manager about extremes and his or her first thought is about the weather. They conjure up memories of spring floods while thousands of kids are chomping at the bit to use the fields after a long winter; or the surprise snowfall just before the championship football game in early November. Certainly the drought a few years back cannot be forgotten. Practically anywhere you go the locals say, "If you don't like the weather, wait a minute."

Dan Douglas is accustomed to dealing with the unpredictable weather patterns of Reading, PA, such as this October ice storm.

Weather forecasters like to use the word "normal"—normal high temperature, normal low temperature, normal rainfall, and the like. When is the last time you had a day where the weather was normal? Normal is really the average of extremes. As an example, in 1999 those of us in the mid-Atlantic region suffered through a drought. Then, in early fall, the remnants of hurricane Floyd dropped close to a foot of rain on us. As the climatologists closed the books on 1999 they concluded we had "normal" rainfall for the year.

When dealing with these weather extremes, our biggest asset is our experience. I realize that my 15 years experience as a sports turf manager pales in comparison with many of my peers. I was talking with a golf course superintendent the other day. The conversation naturally turned to the weather. He has been in charge at the same country club for over 40 years. He wasn't comparing weather conditions from year to year, but rather from decade to decade. I humbly accept that I am still a mere pup in this industry. With that said, I will share some of the lowlights of my sports turf career.

The Need for Proper Drainage

I began working for the Reading Phillies in 1991. I inherited a field that was constructed in 1950 and had been abused for over 40 years. Field construction concepts were a tad different 50 years ago than they are today. Take right field for instance. The warning track sloped from the fence toward the outfield. Every time it rained the water washed onto the playing surface from behind the outfield wall. One day in late July, unbeknownst to me, a contractor sprayed an herbicide behind the outfield wall. A heavy thunderstorm blew in shortly thereafter and within a few days we had about 3000 square feet of dead turf in right field. You can't get any more extreme than death. Ryegrass and green paint allowed me to limp into fall when, needless to say, major regrading occurred and a certain chemical applicator was fired.

Adequate drainage is a major component to the success of every athletic field. The best time to address the drainage of the playing surface is during construction. A complex drainage system is nice, but a field constructed with an appropriate slope and proper grading will be able to withstand the worst deluge.

Snow tends to create havoc at times. During the baseball season I treat snow as white rain. The infield is tarped and I helplessly watch the radar. My approach to snow is "Mother Nature put the snow there, so she can take it away." If the temperatures don't rebound enough to melt the snow, then we don't want to be playing baseball in those conditions anyway.

The Need for Efficient Irrigation

My first year in Reading featured a very dry summer. With plans to install an inground irrigation system that fall, I did what I could to keep the grass growing with garden hoses. It became a frequently repeated, night-

An occasional April snow is treated as white rain, and the field cover is used to keep the infield dry until nicer weather conditions return.

GPU Stadium is also used for other events such as concerts. Here, Dan and his crew make preparations to protect the infield from concert-goer abuse.

long vigil. I would set up a sprinkler in the outfield, give that spot a good, deep soaking, then move the sprinkler to a new location. I would never get enough water on the field, but it did keep the turf alive, and by the end of the night I at least felt like I'd tried to take control of the situation.

The 1999 season was a whole different story. Following a very dry fall and spring came a hot summer. The Governor declared a drought emergency in late July and nobody knew what that meant to them. Eventually an archaic set of regulations began to appear which essentially stated that athletic fields could not be watered at all. Practices for fall sports were getting underway during the height of the drought and many school boards had discussions about field safety and even considered postponing the start of the fall sports season. Fortunately, the hurricane struck, and we went back to dealing with drainage issues.

The drought was a public relations juggernaut for the organization and myself. Technically, we could not apply any water to the playing surface. Realistically, we had to and did. I was on the evening news explaining the relationship between water and player safety and how we had cut our usage by over 50%. The public was understanding (especially the head of our local water authority) until I told a reporter off camera that we use 15,000 gallons of water during an irrigation cycle and she went on the air and said we use 150,000 gallons per cycle. I had some phone calls the next day.

Most of us in the turf industry were caught off guard when the drought emergency was declared. We thought our usage would be restricted but not eliminated. Check with your state to find out what regulations you will have to follow if a drought emergency is declared in your area. The Pennsylvania Department of Environmental Protection decided to update the regulations after the drought and the latest version is a lot more athletic field friendly.

The Need for Control

Like it or not, none of us can do anything about the weather except complain about it. There are other sources of extremes though. Many of our stresses occur because our fields are used in ways they are not designed for. Concerts are an excellent source of ulcers for me. I learned long ago that I need to be the one calling the shots during the concert set-up and tear-down. We used to allow the equipment trucks on the field, but, after one backed through a barrier and parked in a newly sodded area, they are now kept in the parking lot and we forklift the equipment to the stage. A roadie once called me an "anal-retentive gardener." Yes I am. My field, my rules.

Over the years a lot of situations occurred, or were about to occur, that I had not had previous experience with. My peers came to my rescue. When a situation presents itself that you are not comfortable with, grab the STMA membership roster and call someone who has handled the problem in the past. Our industry prides itself on sharing information with one another. The best advice I received in college from a professor was that I don't need to know everything, but I do need to know where to go to get information (I wish he had told me that before my last semester).

An observation I have made is that the fields that were in good shape before some extreme event hit, were the fields that handled the stress the best. Take all the necessary steps your budget allows to insure that your fields are in the best possible condition. Have a plan in place for dealing with whatever Mother Nature or management can throw at you. Phone your peers and gather information in preparation for an event you haven't had the experience to handle yet.

The best part about "extremes" is that they make "normal" feel special.

Dan Douglas is Stadium Grounds Superintendent for the Reading Phillies Double A Baseball Club in Reading, Pennsylvania. He's President of the Keystone Athletic Field Managers Organization (KAFMO Chapter of STMA), and was key to the formation of that Chapter. He's a frequent speaker at turf conferences and contributor to turf publications.

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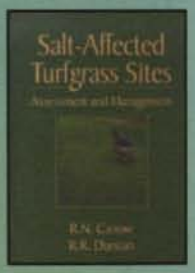

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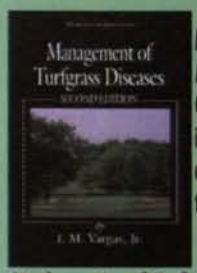

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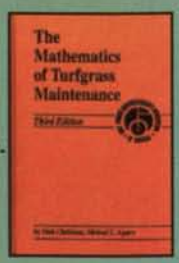

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