Morris is in charge of the Ole Miss golf course and the football, baseball, and track facilities. A member of the national Sports Turf Managers Association, he credits learning opportunities and information exchanges between peers as a major factor in producing and maintaining top-level sports turf.

Prior to accepting the Ole Miss position four years ago, Morris spent 15 years in golf course maintenance and two years with the Miami Dolphins at Joe Robbie Stadium. He's no stranger to big events, having been at the stadium for Super Bowl XXIII. The opportunity to work with a variety of sports drew him to Ole Miss.

"All the credit for the award-winning Swayze Field goes to Steve Horne and his tight-knit team," Morris asserts. "These guys do a terrific job. I supply the fertilization and chemical schedules, conferring with them on special needs, and they take it from there."

Meeting High Expectations

The field itself is built on the Champion sub-surface system designed by Southern Turf Nurseries of Tifton, GA. A network of underground perforated piping lies below the entire field, covered by a geotextile fabric. Above the geotextile is 12 inches of sand with a light overlay of peat to allow for maximum percolation after rains and irrigation. The field has a Toro underground irrigation system that can be set on automatic timer or handled manually.

The playing field is comprised of a thick carpet of Tifway bermudagrass. It is overseeded with a mixture of perennial ryegrass cultivars in the fall and winter months at a rate of 12 pounds per thousand square feet. During the season, the field is mowed basically every day. Mowing before every game is done in three directions to create a striping effect. The outfield grass is mowed at 1 1/4 inches with a riding mower. The infield is mowed at one inch with a walk-behind mower. During the off season, all the turf is maintained at 1 3/4 inches, with the mowing height slowly lowered to reach in-season grass heights.

Horne must pay particular attention to diamond's skinned areas. "We really have to stay on top of things when it comes to the skinned areas because of Coach Kessinger, who played 14 years as a Major League shortstop," he reveals. "He knows what a Major League infield plays like and insists on having the same for his players."

The infield is made up of a mixture of clay soil and white sand, with Pro's Choice Soilmaster added to help with drainage and texture of the soil. The mound is maintained with Beam Clay mound mix, along with a top layer of Pro's Choice Soilmaster.

The skinned area of the infield is nail-dragged three times a week, then raked by hand before games. A typical routine for a 7 p.m. game is to drag the area around 9 a.m. then wet it to near-saturation. Additional waterings are done around noon and 3 p.m., applying less water each time. By 7 p.m., the skinned areas are soft and workable. In the approximate 20-minute interval after pre-game warm-ups and workouts are completed, Horne and his crew move in for the finishing touches. They wet the skinned area lightly and do the final hand-raking to keep the upper one inch "soft and fluffy" and the lower surface firm.

Throughout the entire routine, care is taken to ensure that the skinned area and bordering grasses meet on a level surface. To avoid creating lips, the crew uses a push broom or rake to move away any soil or infield mix on the grass that borders the skinned areas. The borders are also washed down every day, during the early morning session. The borders of the entire infield area edged every two weeks to keep tight, sharp corners.

Following each game, the crews use a push broom on the front of the mound and lip areas to remove any soil or mix, prior to morning wash down.

Horne adopted two procedures to cut down on the wear around the grass in front of the mound. First, the circular cutout in front is extended about 14 inches toward home plate. This keeps the grass stronger and helps it stand up to the punishment of pitchers' spikes. The distance of the rubber to the plate, of course, is regulation — only the circular cutout.

"The pitcher rarely walks out much further than 14 inches when he steps down off the mound," Horne explains "So many mounds at the college level are not kept up. There is usually just a rubber and some dirt and that's about it. We take our mound to the next level. It is repaired immediately following each game. The mound is shaped (sloped on the sides and flat on top) and ready to go whenever our players walk out on the field."

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OXFORD STADIUM/SWAYZE FIELD SUPPLIERS AND MANUFACTURERS

The following is a list of manufacturers and suppliers used at Oxford Stadium's Swayze Field:

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(601) 922-4162

Partac Peat Corp (Beam Clay)
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(800) 247-BEAM

PBI/Gordon Corp
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(816) 421-4070

Pro's Choice Products Inc.
P.O. Box 70, Barrington, IL 60011
(800) 648-1166

Reeds Sports Nets
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(800) 748-8692

Smithco
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Terra International Inc.
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Toro
5825 Jasmine Street, Riverside, CA 92504
(909) 688-9221

World Class Athletics Surfaces
200 Washington Ave., Greenville, MS 38701
(800) 748-9649

College Diamond of the Year

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The second procedure happens at midseason, when Horne makes a light application of pregerminated perennial ryegrass seed every 10 games or so. It's a spot treatment for any weak areas, which are usually centered in the front part of the infield, such as around home plat and the fungo circle areas.

For creating lines on the field, Horne uses paint from World Class Athletic Surfaces. "The paint is terrific," he asserts. "I only have to apply it once a week."

Brutal Schedule

Swayze Field hosts more than 300 games and practices, both day and night, per year. The field is hosts Ole Miss baseball team games and practices, and is shared in the summer months with Oxford Park Commission. Youth camps and tournaments are held on the field, as are special events hosted by the commission. In effect, the week after the college baseball season ends, the commission's events begin.

To keep the grass growing at an optimum rate to recover quickly from all this activity, Morris has developed a fertilization schedule that requires light applications of granular fertilizer approximately every two to three weeks before February and September. Horne and Morris adjust this as needed according to the look and wear of the field, as well as weather conditions. Approximately 3/4-pound of nitrogen is included in each application. Occasional applications of liquid fertilizer are used to augment this program. Any quick-release products are followed by slow-release products. Milorganite is used frequently to maintain the rich turf color. Soil tests are taken twice a year to provide feedback on necessary adjustments in the fertilization schedule. Liquid iron applications are made twice a year, and a lime application usually once a season as necessary to adjust pH. The winter fertilization program is adapted annually to meet field and weather conditions.

Insect problems are usually minimal, especially when harsh winters cut down on populations. A preventative fungicide program is used throughout the season.

The field is aerated four to five times a year, and the resulting plugs are collected. Topdressing is done twice a year, following two of the aeration treatments.

In the past three years since Horne has been head groundskeeper, the field has seen major additions. They include the installation of a 12-foot dugout track, walkways to home plate, fungo circle cut-outs, and cut-out boxes for the coaches. Horne and his crew had help with the dugout track, but handled the other additions themselves. These improvements were not included in Swayze Field's original plan — they came from Horne and his desire to make the field among the best in the nation.

"The field always had the makings of a beautiful facility, but it needed a few fine tuning adjustments to bring out its maximum beauty," says Horne. "We are currently working on changing the color of the outfield fence from green to blue (one of the Rebel colors) and adding a blue windscreen to the chain link fence that surrounds the field in order to promote an 'encased' look. Due to a limited budget, things must be done slowly."

As for most college fields, funding is tight. During the season, Horne usually puts in 70-hour weeks to keep the facility in mint condition. With the heavy-use schedule of the field, its limited budget

and short two-month off-season, an organized plan, he says, is essential to keep ahead of things.

Horne learned of the Diamond of the Year Award from Morris. It became one of Horne's professional goals.

"I wanted to win this award for our school as well as for myself and my grounds crew," he says. "To have our field designated as the best collegiate field in the nation makes me feel as good as a national championship-winning baseball coach.

"My philosophy is simple — I always give 100 percent every day and expect my crew to do the same. I am always open to learning better ways to do things. You can't be set in your ways in this type of work. And always, always leave the field a little bit better than when you walked on it that morning." ❑

Editor's note: Bob Tracinski is the manager of public relations for the John Deere Company in Raleigh, NC, and public relations chairman for the Sports Turf Managers Association. The Diamond of the Year Awards are sponsored by Beam Clay, the national Sports Turf Managers Association and sportsTURF Magazine.

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Editor's Note: This list was inadvertently ommitted from last month's feature on West Palm Beach Municipal Stadium, 1992 Professional Diamond of the Year.

Getting a Jump on Summer Disease Problems

By Dr. R.T. Kane and Dr. H.T. Wilkinson

Dr. H.T. Wilkinson examines necrotic ring spot on Kentucky bluegrass. Photos courtesy R.T. Kane.

Although spring is barely (if at all) underway, most northern turf managers should now start planning their control strategies for summer diseases. Of special interest are a number of important diseases that can be controlled more effectively if alternative management practices are utilized. Management decisions you make now can greatly affect your disease control success later.

Examples of important diseases that can be at least partially controlled by altering management practices include the root and crown rot "patch diseases," necrotic ring spot, summer patch and take-all patch. Also, common foliar diseases such as dollar spot, red thread, Pythium blight and Rhizoctonia brown patch respond well to changes in cultural and other management practices.

Summer patch in Kentucky bluegrass mowed at one inch.

Plant Health and Disease Management

Fungal pathogens that cause our most important turf diseases are ubiquitous in natural environments and cannot be readily eliminated. Intensive applications of fungicides in attempts to eradicate certain pathogens are usually futile (especially over the long term) and have adverse effects on the turf ecosystem as a whole. Examples are increased rates of thatch accumulation or increases in diseases not affected by a certain fungicide. Instead of eradication of pathogens, we should integrate all options for managing diseases (and the agents that cause them) at economically or aesthetically acceptable levels.

Many options for managing diseases become apparent when we examine a basic principle — the disease triangle. Plant diseases result from the complex and dynamic interaction between a susceptible host (the turf), a pathogenic agent (the fungus), and the ambient environment. In past, we have focused our efforts primarily on controlling pathogens with fungicides. Now we are identifying opportunities to reduce disease severity by improving the health and reducing external stresses on turf when possible.

Any specific actions you want to consider to alter pest populations, plant health or the environment should be based on past experience with disease problems on your managed turf areas. Certain sites may require changes in one direction while other sites may be improved by going in other directions. The management factors we emphasize in this article are fertility and pH; cutting height, thatch, aeration and compaction; irrigation and drainage; use of resistant cultivars or alternative species where adapted; and the timely use of pesticides.

Patch Diseases

Patch diseases are often grouped together because of the similar nature of the pathogens involved, their similar destructive action on the plant root sys-

tem, and their distinctive symptom patterns. Patch fungi all have a characteristic ectotrophic growth phase in which darkly pigmented "runner hyphae" grow along the surface of the root or stem base before penetrating into the vascular tissue of the plant. Because the early ectotrophic growth of the fungus is more accessible to control measures, it is important to take timely action if you suspect that a patch disease will be a problem.

Because of the root-rot nature of the patch diseases, cultural practices should be employed that reduce stress on the root systems or otherwise promote good root growth. Lower than recommended cutting heights, thatch accumulation, soil compaction and frequent light irrigation all contribute to patch disease development. Timely core cultivation to increase aeration and water penetration and reduce thatch can help alleviate stresses that contribute to patch diseases.

Nitrogen sources and their effect on the pH of the soil closely surrounding the root (rhizosphere) may be one avenue to gain control of patch diseases, especially take-all patch of bentgrass (caused by *Gaeumannomyces graminis*) and possibly summer patch of bluegrasses and fine leaf fescues (caused by *Magnaporthe poae*). Lowering the pH in the rhizosphere is thought to inhibit the ectotrophic phase of *G. graminis*, either directly or indirectly by stimulating antagonistic microflora. Although significant changes in overall soil pH are hard to achieve, minor changes in the rhizosphere pH can take place when acidifying fertilizers are used. Examples of such fertilizers are ammonium chloride (NH4Cl) and ammonium sulfate (NH4SO4). Applications of elemental sulfur have also shown some positive effects over longer periods of time. Reduction of patch disease severity may also occur following use of other elements, such as chlorine. Lime applications should be avoided where patch diseases occur and soil pH is high (greater than 7.5).

Summer patch and necrotic ring spot (caused by *Leptoshaeria korrae*) occur primarily on bluegrasses, including *Poa annua*, and to a lesser extent on fine leaf fescues. Among Kentucky bluegrass cultivars, there have been reports of moderate resistance or tolerance to summer patch and necrotic ring spot. Examples include Adelphi, Baron, Challenge, Eclipse, Midnight, Rugby, Sydsport and Victa Kentucky bluegrasses. Check with your state university extension personnel to determine which varieties are best adapted to your region.

Under severe disease pressure, you may want to consider planting a grass species that is not susceptible to patch diseases. Replacement of susceptible species of bluegrass or fescues with improved perennial ryegrass (Lolium) cultivars is an alternative, since perennial ryes have so far proven highly resistant to patch diseases. The removal of *Poa annua* from extensively managed turf and replacement with resistant species is the best solution to a patch disease problem with this species. Most bentgrass cultivars are susceptible to take-all patch, although some of the newest varieties appear to have some resistance.

Control of patch diseases using only systemic fungicides is not easily achieved. Their effectiveness can be maximized through proper application. Timing of the application(s) and delivery of the product to the appropriate site in the thatch-rhizosphere-soil system are thought to be critical. Fungicides should be applied when the fungi are first beginning to colonize the roots — fungicide applications made after symptoms first appear are too late and will usually provide no relief.

Monitoring soil temperatures is the best way to determine when patch fungi are likely to become active. For summer patch, preventative fungicide applications should be made when consistent midday soil temperatures in the 18-22 C (64-72 F) range are reached. If soils stay in this range for more than five to six weeks, multiple applications, two to four weeks apart, may be made. Necrotic ring spot and take-all patch appear to be active at cooler temperatures, so fungicides should probably be applied earlier in the spring than for summer patch. A fall application for patch disease control also may be prudent where disease has been severe and alternative controls are not available or helpful. Root regrowth that occurs in autumn would then have some protection.

Low Nitrogen Diseases: Dollar Spot and Red Thread

Dollar spot and red thread are caused by two different fungal pathogens. Dollar spot is caused by a "mysterious," sterile ascomycete that has been classified as

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Summer Disease Problems
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Sclerotinia, Lanzia or *Moellerodiscus*. Red thread is caused by the basidiomycete *Laetisaria fuciformia*, once known as *Corticium fuciforme*. We are considering these diseases together because of the similarities in symptom expression (small circular patches), time of symptom appearance, and environmental and cultural factors that favor development. Also, most fungicides that control one disease also will control the other. Because of these similarities, we can develop disease management strategies that will help control both diseases.

Perhaps of greatest importance is the fact that both diseases are favored by nitrogen deficiencies. Maintaining optimum fertility, especially nitrogen, will promote adequate growth and stress resistance and will reduce the severity of these diseases. During the unusually cool 1992 season, we observed strong activity of both of these diseases, especially in the late summer and early fall. Dollar spot continues to be a problem on golf course fairways, primarily because of low fertility and other programs designed to reduce the competitiveness of *Poa annua*. Red thread was a problem in less intensively maintained bluegrass/perennial rye turf areas that also were poorly maintained.

Patch diseases are often grouped together because of the similar nature of the pathogens involved.

Both dollar spot and red thread are favored by "droughty" soil coupled with warm air temperatures and high relative humidity. Properly timed and adequate irrigation can enhance the overall health and vigor of the turf and reduce its susceptibility to both pathogens. Severe red thread almost always occurs on unirrigated sites, such as golf course roughs.

Most cool-season grass species are susceptible to these diseases, although moderately resistant cultivars are available within each species. Many Kentucky bluegrass, perennial rye and fine fescue varieties are available that have good levels of disease resistance, especially if managed at optimum fertility and soil moisture. Also, we have observed that newer, improved bentgrasses have good resistance to dollar spot, whereas older are more susceptible.

In a case where new resistant cultivars cannot easily be introduced, control with fungicides remains an important avenue, especially for dollar spot. However, fungicide sprays can be minimized and application rates lowered if chemical applications are combined with the previously mentioned cultural factors. We have field research data showing great benefit, both in disease management and plant health, from tank-mixing low rates (0.1-0.2 pounds per 1,000 square feet), urea or other soluble nitrogen sources with fungicides for dollar-spot control.

High Nitrogen Diseases: Pythium Blight and Brown Patch

Foliar blights caused by *Pythium* and *Rhizoctonia* species are most common on dense, well-watered, well-fertilized turf. Disease activity is enhanced during periods of high air temperature (80-85 F) and relatively high humidity (80 percent or more). Proper fertilization is again a key to limiting disease pressure. Over-applications on nitrogen or application of a quick-release form just before a warm, humid weather pattern can contribute to outbreaks of Pythium blight and brown patch. Dialing in nitrogen rates to control leaf growth and applying slower release formulations with adequate P and K and key management factors. Controlled irrigation and drainage improvements to limit the amount of free water also is important in limiting these pathogens.

Pythium blight attacks all species of cool-season grasses, but is most severe on bentgrasses, *Poa annua*, and perennial ryegrass grown under high-maintenance regimes. *No* Pythium-resistant cultivars are available at this time among cool-season grass species (some bermudagrasses exhibit resistance). Brown patch also attacks all cool-season species and is most severe on bentgrass, bluegrasses, and turf-type tall fescues. Some tall fescues are perennial ryegrass cultivars have moderate resistance to brown patch.

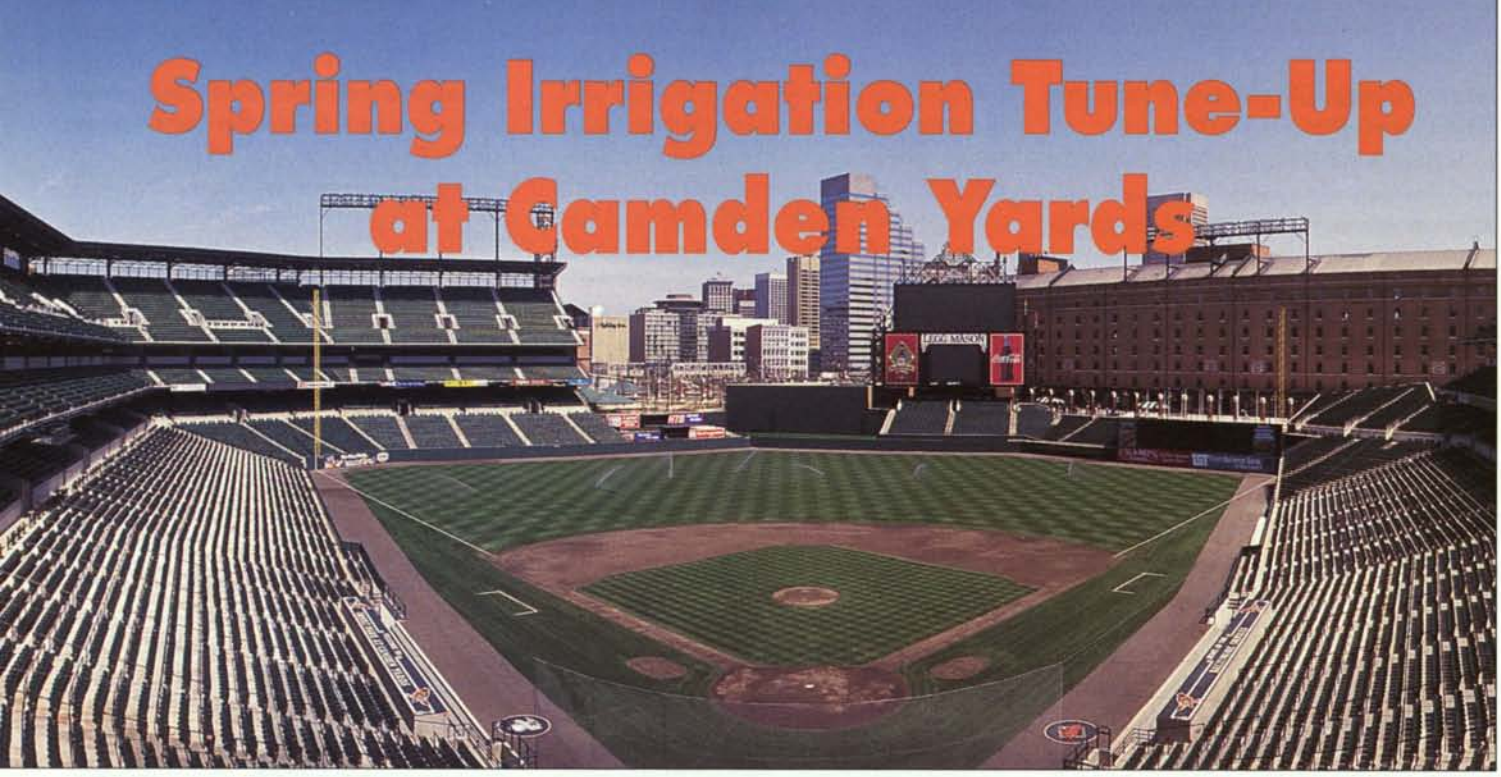
Fungicides are extensively used to protect fine turf areas from these pathogens. Several IPM techniques may reduce these amount of fungicides needed in certain situations. For example, turf managers should identify and frequently monitor warm, humid weather. Spot spraying only those hot spots on a preventive or early curative basis is much more efficient than blanket spraying. Disease outbreaks can also be forecast by using computer-controlled weather monitors and predictive computer models. These systems can optimize fungicide applications and reduce unnecessary spraying, saving dollars and reducing environmental impact.

Big Picture Critical

In general, turf managers need to have broad-based control strategies in mind when planning for summer diseases. Cultural factors such as balanced fertility, alleviation of soil compaction, appropriate irrigation and drainage, and use of host plant resistance where available should be integrated into an overall plant health management program. Strategic and targeted use of fungicides can and should be part of an overall integrated pest management program, but managing fungicide sprays should be just one aspect of an overall plant health management scheme. ❑

Editor's note: Dr. Randy Kane is the turfgrass advisor for the Chicago District Golf Association and an adjunct assistant professor of plant pathology at the University of Illinois in Urbana-Champaign. Dr. Hank Wilkinson is an associate professor of turfgrass pathology at UIUC. Both earned their Ph.Ds in plant pathology from Cornell University. This is their second article for sportsTURF.

Spring Irrigation Tune-Up at Camden Yards



Irrigation in action at Camden Yards. Photo courtesy Rain Bird.

Working out the rough spots, discovering strengths and weakness, coming together as a team—that's what spring training is all about in Major League Baseball. It's a time of discovery and evaluation for rookies. A "hot prospect" may turn out to be lukewarm, a "sleeper" wide awake. Veterans come to polish their talents under the critical eyes of owners, managers and coaches.

But spring training isn't just for the "boys of summer." Professional field managers also must gear up for the coming season. As the Baltimore Orioles gear up for another season, so too must those who care for the team's field, Oriole Park at Camden Yards. With 81 home games played there at the park each year, which was constructed in 1991 and opened in 1992, the field takes almost as much abuse as a visiting team's mascot.

Paul Zwaska, head groundskeeper, makes sure the field can stand up to the grueling schedule in top condition at all times. Among the many ways he ensures field health — fertilization, aeration, mowing and more — is focusing on preparing the irrigation system for the new season.

Strictly Baseball

Oriole Park at Camden Yards is used strictly for baseball. Monster trucks, motocross and rocks concerts do not "grace" this exceptional, natural grass facility. Down to the green slat seats, the stadium is true to its "old-time baseball" roots.

Field construction, however, is anything but old-time. The field itself is a Prescription Athletic Turf (PAT™) system, which features positive drainage (see February 1993 *sportsTURF*). The irrigation system integrates Rain Bird R-70 and R-50 rotors to deliver even water distribution.

"Because the stadium is only used for baseball, we have a good window of time to prep the field for the next season," Zwaska explains. "In fact, we start immediately after the season has ended in fall to prepare for spring."

Winter to Spring

Camden Yards is subject to freezing. That means after the baseball season has ended, the irrigation system must be "winterized." The entire system must be drained of water, which would, if left in the system, freeze, expand and possibly burst the irrigation piping.

System drainage is accomplished by carefully pushing a large volume of air, generated by a compressor, from the point of connection through the lines. The air forces any remaining water in the pipes through each zone in the system. After the system is drained, Zwaska turns off the controller for the winter. For a few months, the field "rests."

As the spring season approaches, the water is turned on and run through the lines without using the irrigation system's booster pump. At 50 psi, the city's water pressure is low enough to avoid bursting pipes, but high enough so Zwaska and his crew can detect any water distribution problems.

After running the water through the system at 50 psi, Zwaska checks out the system at 110 psi, using the booster pump. If all is well, the water will remain at 110 psi for the rest of the season.

Zwaska's years of experience help him fine-tune Oriole Park's irrigation system. He is, however, occasionally thrown a curve.

"You have to adjust," he explains.

His flexibility has been put to the test of late by the "Storm of the Century," which left snow piled high on the field just a few weeks before the start of the regular baseball season. "Right now, we're using the irrigation system to melt snow of the field," he says.

Oriole Park at Camden Yard is a showpiece of natural fields. As such, it has already come under intense scrutiny. Zwaska isn't fazed, but knows he is, in a sense, also under the spotlight, particularly when it comes to maintaining and managing irrigation.

"I better be a good water manager," he notes. "The club offices face the field, and every irrigation move I make gets noticed." ❑

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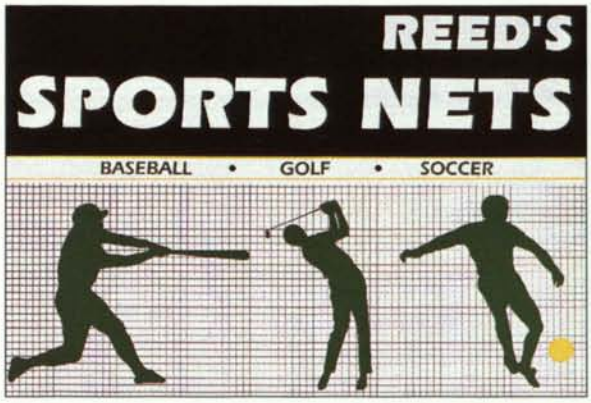

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