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FROM THE PRESIDENT'S DESK

Watch for a Poster Featuring Jack Nicklaus

The June meeting was hosted by our Editorial Chairman, Dale Wysocki, at the Faribault Golf and Country Club. The golf course, as many found, was a challenge for even those who were able to keep it in the fairway. Our thanks to Dale and his staff for hosting the meeting and the preparation involved. We would also like to thank Turf Supply for bringing Dr. Tony Koski in to speak on the research he has been involved in at Colorado State.

Members who played Dale's course had the opportunity to observe the work he has been doing with growth regulators on his greens. Attending the meetings often helps us as superintendents weigh certain maintenance practices and their outcome.

* * * *

The Research Committee chaired by Greg Hubbard presented its proposals for research for 1992-1993. The committee's long term goals continue to be:

1) To support research that directly pertains to issues that affect members of the MGCSA.
2) To determine the impact of golf course management on the environment.
3) To make our members more aware of integrated pest management.
4) To develop better ways of water management and allocation.
5) To investigate different methods of waste control and collection, i.e. composting, clipping disposal, etc.

This year's research will again include the monitoring program at Baker Park Golf Course concerning pesticide fate. The board also approved supporting Ward Steinstra and two projects at the University of Minnesota. The first project will be conducted at three different sites—a site in the northern part of Minnesota, a central site and a southern site. The research is to help determine alternative fungicide products for snow mold prevention in these different areas. The second research grant will be to determine the effects of alternative covers for winter protection.

* * * *

The membership will be receiving in the mail a poster with a picture of Jack Nicklaus concerning ball mark repair. We ask that you post this in the pro shop or locker area. Our compliments to Dale Wysocki for his photographic timing and his diligence in getting the approval from Mr. Nicklaus.

* * * *

Our July meeting is at Tartan Park and will be hosted by Joe Moris and Randy Allen. This will be the first Garske Scramble. The proceeds from this event go into the scholarship fund. The idea behind this event is to involve the members of your staff that may become superintendents or be considering it.

—Rick Fredericksen, CGCS
MGCSA President

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Finding Solutions For Poorly Drained Greens

By JAMES T. SNOW
National Director, USGA Green Section

Several years ago the Sports Turf Research Institute in England surveyed all of the golf courses in Britain and found that a full 80% considered that they have at least one poorly drained green. If a survey were done of American golf courses, the results would probably be quite similar.

There is no telling how much time and money are spent dealing with these problem greens on golf courses, but it must be substantial. There is little that is more aggravating or worrisome than a poorly drained green during periods of wet weather, especially when temperatures are high or traffic is heavy. Turf on poorly drained greens is generally more susceptible to disease incidence and stress injury, and the soil on such greens is more prone to compaction than greens that drain well.

For golf course superintendents who have managed poorly drained greens, the symptoms are easy enough to identify. They often include thin turf, shallow roots, compacted surfaces, greater disease, increased traffic injury, mower scalping, algae encroachment, footprinting and a predominance of *Poa annua.*

Good drainage and poor drainage are relative terms. If all greens could be incorporated into a graph, it would probably show a bell-shaped curve, with a majority of greens in a broad "mediocre" range as far as drainage is concerned. What this means is that many greens could be drainage problems under a certain set of circumstances, even though they drain satisfactorily much of the time. Golf course architects and builders who say they never lose greens to poor drainage even though they don't test their materials through a laboratory are kidding themselves and their clients. What they fail to say, or don't understand, is that many of these "low cost" greens can be a real headache during wet weather even though they many not fail completely. Many of their greens fall into the "mediocre" category.

When a golf course superintendent classifies one of his greens as poorly drained, it doesn't necessarily mean that the soil in that green is of poor quality. What he should say is that under these climatic conditions, in this location on this golf course, and under this particular cultural management program, this green drains poorly. Under a different management program, at a different site on the same course, or in an area that receives less rainfall, for example, this same green might be considered well drained.

The message is this: There are many factors that can contribute to a green being considered poorly drained, and there are many things that can be done to shift a green from the "poor" to be "satisfactory" category. Among the practices that need to be considered are irrigation management, tree effects, dealing with traffic and drainage installation.

Irrigation Management

The fact is that many greens diagnosed as being poorly drained are actually overwatered. It is telling, for example, when a new superintendent takes over a course, that he is able to eliminate the poor drainage symptoms from certain greens by instituting a different irrigation program or by redesigning or remodeling the irrigation system. After all, overwatering can be due to improper irrigation practices, poor irrigation system design or both.

Following are symptoms that could indicate poor drainage characteristics, poor irrigation practices, or both. If these symptoms are observed consistently during the season, even during periods of dry weather, then they are more likely an indication of overwatering. If quite a few of these symptoms are commonly identified on your course, then perhaps your irrigation program needs attention.

- Puddling after irrigation (indicates poor irrigation design or coverage).
- Deep-pitted ball marks.
- Spike marks and wear injury around the cup.
- Complaints of wet shoes after walking on greens.
- Triplex ring symptoms (wet, lush turf is prone to traffic injury).
- *Poa annua* encroachment.
- Poor stress tolerance.
- Weak root growth.
- Heavy spring irrigation (when it is often not needed).
- Disease activity (e.g., pythium, brown patch).
- Black layer.
- Manual irrigation system (coverage and control are often poor).
- Lack of cultivation (causing surface runoff or slow infiltration).
- Lack of use of a soil probe (should be used to monitor soil moisture).
- Lack of a hand-watering program (no automatic system can do it all).
- Insufficient daily visual monitoring.
- Insufficient monitoring of the maintenance needs of the irrigation system.
- Isolated dry spots (indicates poor irrigation coverage).
- Black algae.

It is not uncommon for poor irrigation practices or a poorly designed irrigation system to be the actual cause of what many people might consider to be a poorly drained green.

The Effects of Trees

It is more than coincidence that the greens that superintendents identify as being poorly drained on their golf courses are often the ones located in a pocket of trees. On most of these courses, all of the greens were built at the same time and constructed of the same materials and in the same manner. Why, then, should these certain greens exhibit symptoms of poor drainage?

The answer to this question has to do with the environment in which the green is growing. The trees that surround these greens block air circulation through the area and may cast shadows on the turf, preventing the soil in the greens from drying as quickly as other greens on the course. They quite literally stay wet for a longer period of time than the others, and exhibit symptoms of poor drainage such as disease activity, algae and moss encroachment, poor tolerance to traffic,

(Continued on Page 6)

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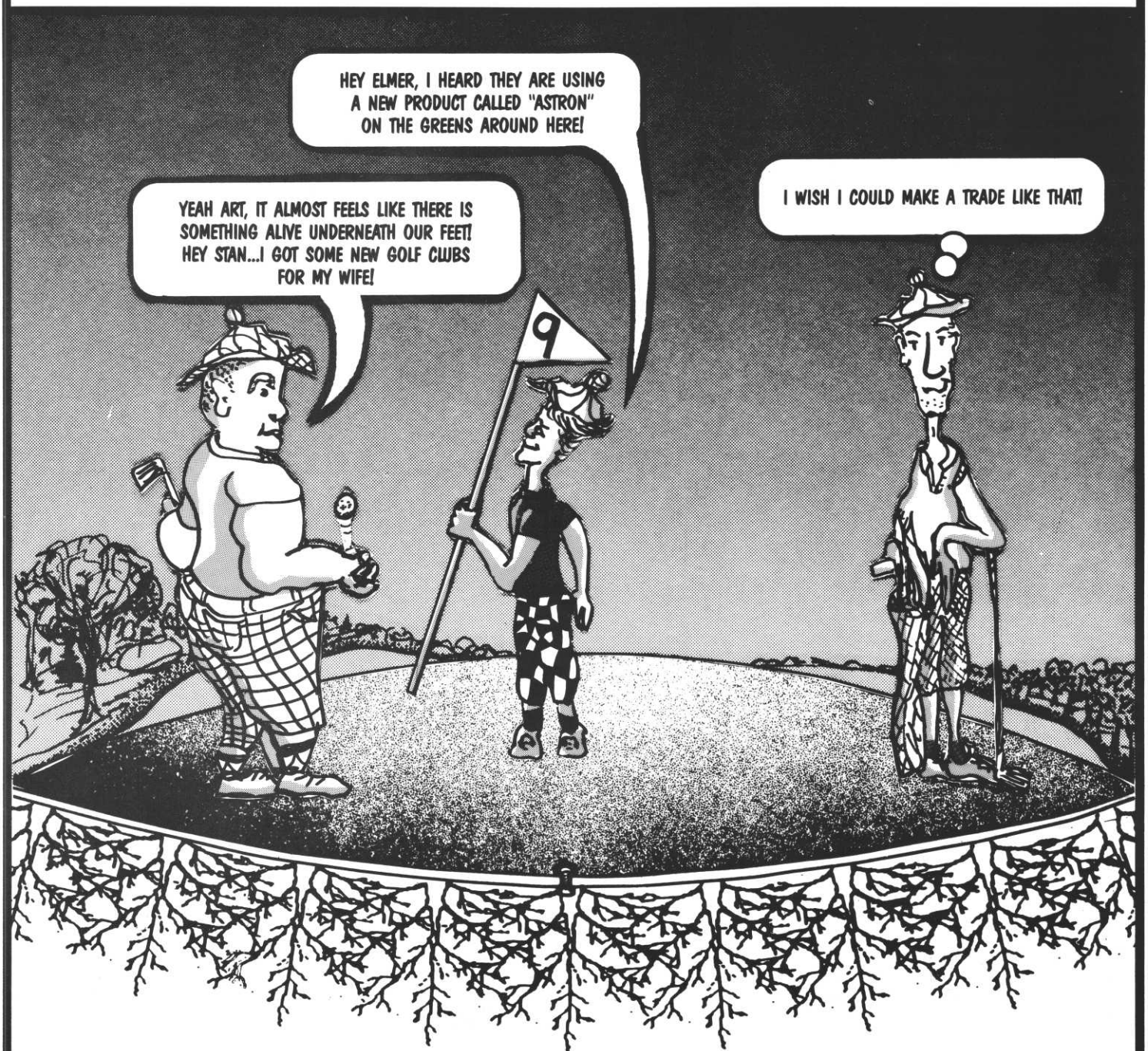

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Finding Solutions for Poorly Drained Greens

(Continued from Page 4)

poor root development, etc. This prolonged period of wetness also makes them more subject to soil compaction, a factor that compounds the drainage problem.

This problem is made worse yet by careless irrigation practices on these greens. Since they stay wet for a longer period of time, greens located in pockets of trees should not be irrigated as often or as heavily as other greens. Superintendents who do not recognize this and who don't make the necessary adjustments often blame the subsequent turf problems on poor soil drainage.

The solution to this drainage problem is sometimes as simple as removing or thinning out a few of the nearby trees to improve sunlight penetration and air circulation. Adjustments to the irrigation program may also have to be made. If trees cannot be removed for some reason, or if these practices do not work, then the traditional methods of drainage or reconstruction may have to be used.

The Effects of Traffic

Many greens that exhibit adequate drainage characteristics under light to moderate use can develop poor drainage symptoms when subject to heavy traffic. When a municipality takes control of a private club, for example, this scenario is quite common. It also can occur when a switch is made from walk-behind greensmowers to triplex greensmowers.

The cause of the problem in this situation is compaction in the upper part of the root zone. Water infiltration is reduced in compacted soils, causing runoff and puddling symptoms in many instances. Also, compacted soils do not dry as quickly, compounding the problem even more.

When poor drainage symptoms occur due to the effects of heavy traffic, cultivation practices should be increased. Core cultivation, followed by core removal and topdressing with a sandy, compaction-resistant material, should be practiced as often as necessary to improve and maintain good water infiltration. Deep-tine cultivation may be needed on soils that are being affected at a greater depth.

Green design sometimes impacts the effects of traffic. For example, heavily trafficked greens that lack adequate cupping area can show severe symptoms of surface compaction and poor drainage in the most common hole locations. By redesigning the green to expand hole location areas, these symptoms can sometimes be greatly reduced or eliminated.

When traffic problems occur on walk-on and walk-off areas, redesigning the green or the nearby sand bunkers can sometimes relieve the symptoms. Also, switching to walk-behind mowers for part or all of the time can significantly reduce traffic effects.

Dealing with Poor Drainage

If drainage symptoms persist, even though the problems mentioned previously have been addressed, then a more direct approach to solving the drainage problem will be needed. First, the cause of the drainage problem in the green needs to be determined. It could be one or more of these three possibilities:

- Poor surface drainage.
- Poorly drained soil
- Layering problems.

Poor surface drainage is often recognizable by the surface puddling that occurs after light to moderate rainfall or irrigation. It stems from poor green design or settling after the green was built.

Poor surface drainage can be overcome in several ways, depending on the extent and severity of the problem. In some cases, low spots can be eliminated by selectively topdressing the area on a light, frequent basis. Where a broader area is involved, sod may have to be removed, the subsurface regraded and the sod replaced. In some instances, the entire surface may have to be stripped, regraded and resodded, or be rebuilt completely. Sometimes, nothing at all needs to be done if good surface infiltration can be maintained with a program of regular core cultivation.

When poorly drained soil is the cause of the problem, developing a solution is usually a matter of degree. Where the problem is not too severe, a good program of core cultivation, core removal, and topdressing with a sand or high-sand-content material affords relief over a period of years. Deep-tine aerification also can be incorporated into the program for faster results.

Where the symptoms are severe, the addition of drainage tile to the green may be necessary. The installation of 2″ to 4″ plastic perforated pipe sometimes works quite well, though the disruption to the putting surface can sometimes take years to eliminate. Various types of sand injection systems and geotextile-covered drainage systems have been tried, but in many instances the results have been insufficient or temporary. If a green has a long history of drainage problems, the best solution is to rebuild to USGA specifications.

Layering problems caused by poor construction, topdressing inconsistencies or some other factor, can sometimes be overcome by breaking through the layer and allowing water to reach the well-drained soil below. This is accomplished by regular core cultivation or deep-tine cultivation, depending on the location of the layer. If the coring holes are filled with sand, real progress can be made in overcoming the effects of the layer. In a more severe case, it may be necessary to add drainage tile. Greens that do not respond well to these techniques should be rebuilt to USGA specifications.

Summary

Green drainage problems aren't necessarily what they appear to be. Poor irrigation practices, tree effects and traffic effects sometimes mislead golf course superintendents into thinking they have a drainage problem. On greens where poor drainage is identified, the cause of the problem could be 1) poor surface drainage, 2) poorly drained soil or 3) layering problems. The cause must be determined before a good solution can be developed and implemented.

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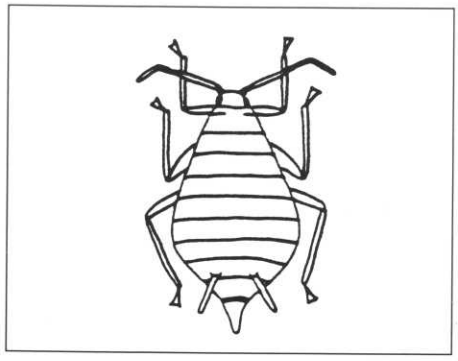
Aphids on Trees & Shrubs

Jerry Spetzman and Jeffrey Hahn

Aphids, sometimes known as plant lice, are insects which are common on trees and shrubs, including mockorange, viburnums, ash, maples and fruit trees. They are small (about 1/10 inch long), pear-shaped, soft-bodied insects which occur in many colors, such as black, green, pink, red, yellow, brown or gray. They tend to cluster on the underside of young leaves or developing stems.

Aphids have a complex life cycle that often involves several different plants. They usually overwinter as eggs hidden in cracks and crevices on the bark or near the buds of trees and shrubs. After egg hatch, aphids give birth to live young with about one week between generations. Periodically, winged forms develop to fly to other locations.

Aphids suck plant juices through a fine, needle-like stylet. Feeding causes leaf curling, stunting of growth, distortion or chlorosis, which sometimes is mistaken for herbicide damage. Large populations of aphids can cause serious



Typical aphid adult.

damage on infested plants. Some aphids can also carry plant diseases, especially viruses, from plant to plant.

Excess sap ingested by aphids is excreted in the form of honeydew, a sticky, sugary liquid which coats bark, leaves and other objects below. A black fungus called sooty mold may form on the honeydew. Sweet-feeding ants feed on the honeydew and will tend and protect the aphids to maintain this food source.

Aphids are usually not an important problem as their populations are kept low by many natural enemies, such as ladybugs (ladybird beetles), green lacewings, damsel bugs, syrphid flies, aphid parasites and certain fungi. During normal springs, heavy rainfalls also provide natural control by knocking the aphids out of the trees and shrubs and killing them. In the absence of such hard rainfall, as was the case in 1987 and 1988, aphid numbers can build rapidly.

Most healthy, mature trees and shrubs are able to tolerate aphids, even when they occur in large numbers. Recently transplanted or stressed ornamentals can be significantly weakened by heavy aphid numbers.

When an aphid's natural enemies are present, insecticides should not be used as they will kill the natural enemies as well as the aphids. High pressure spraying with a garden hose is a good non-chemical control to dislodge and kill the aphids.

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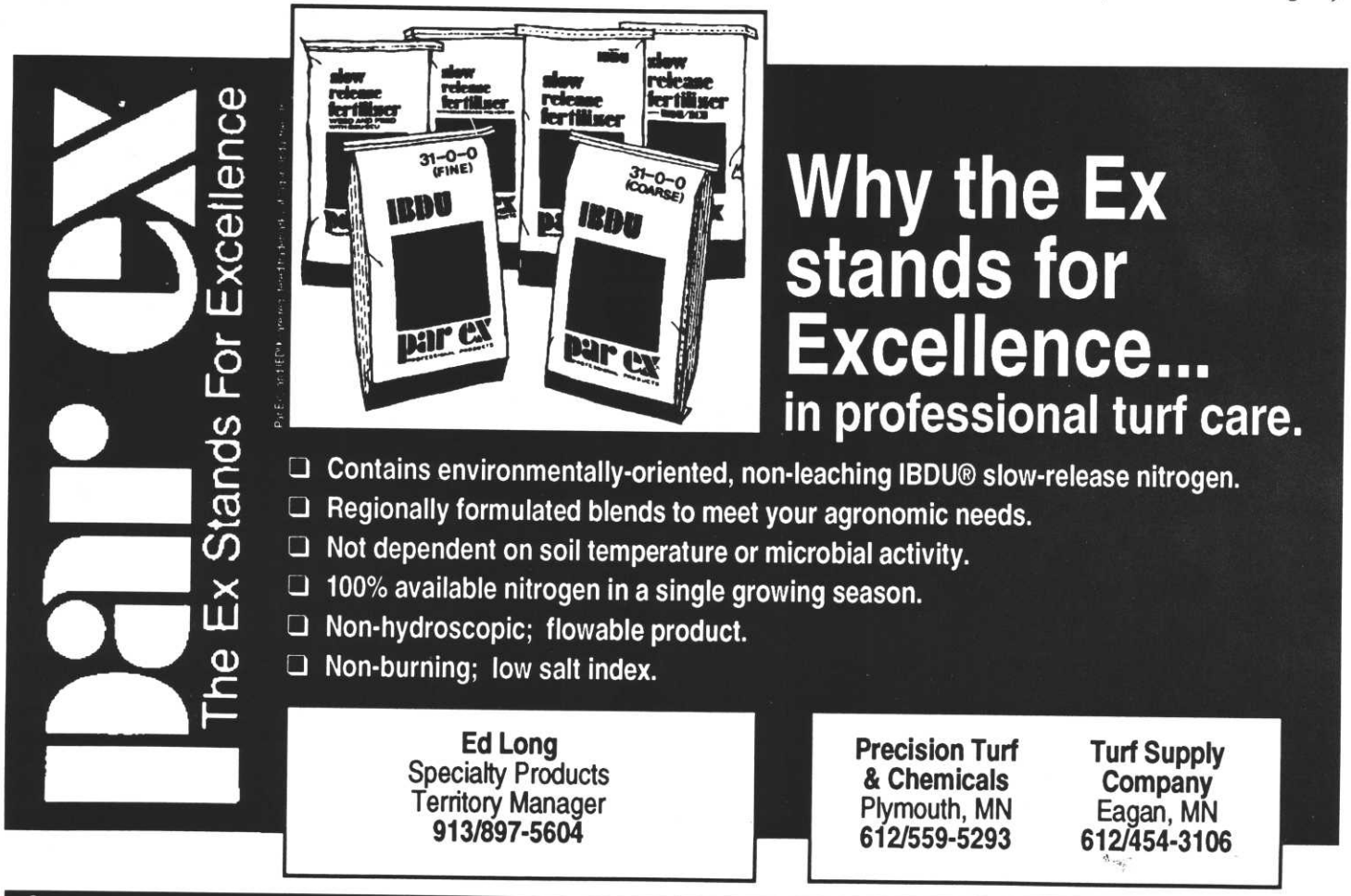

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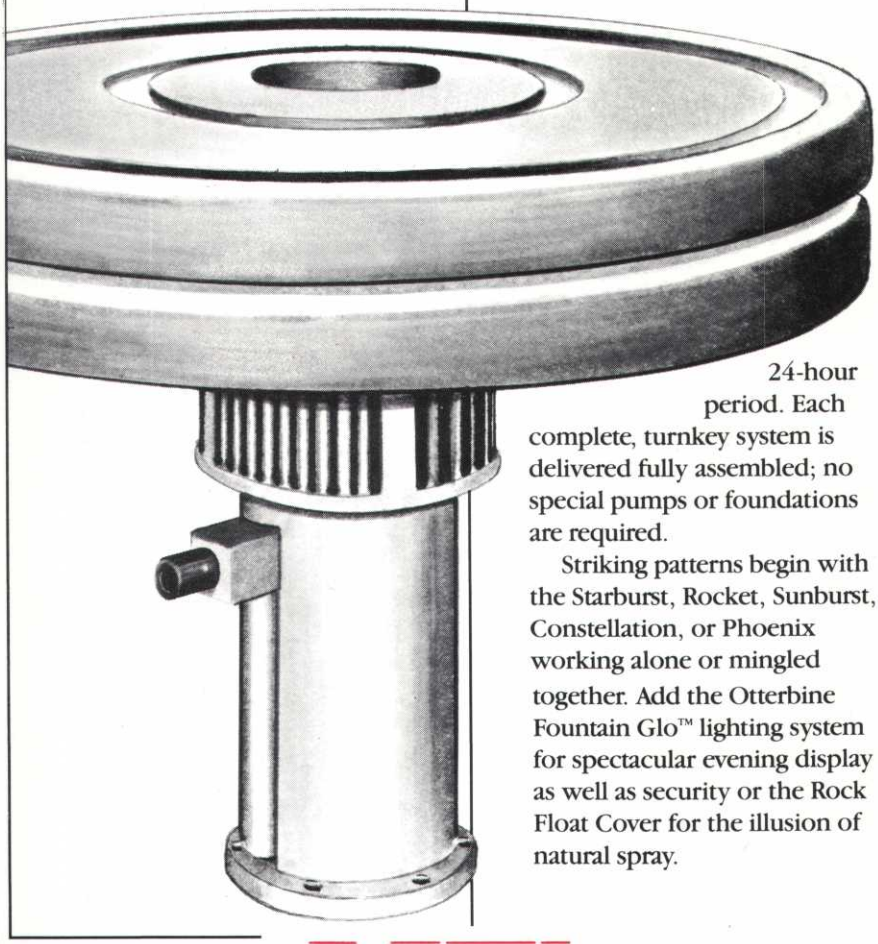

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The Biology and Control of Localized Dry Spots on Sand Greens

By ROBERT A. HUDSON, Ph.D. and KARL DANNEBERGER, Ph.D.
Department of Agronomy
The Ohio State University

Hydrophobic (non-wettable) soils occurring on bentgrass sand greens constructed to USGA specifications have been previously described and partially characterized. These areas, which resist wetting, have been termed localized dry spots (LDS). The LDS syndrome starts with the turf turning a blue-green color followed by a loss of turgor and finally shoot die-back.

The symptoms observed are usually in irregularly shaped patches of variable size. Frog-eye type patches, characteristic of some turfgrass patch diseases, have been observed but are not predominant. Symptoms are most severe in hot, dry weather. Lower temperatures and adequate water will result in regrowth of the shoot system of plants that survive.

Management practices for the control of LDS are inconsistent at best, yet the following practices have aided in reducing symptom severity. Topdressing with sand that contains a minimal amount of "fine" particles. As will be discussed later, small particles (especially in the silt-clay size) may tend to aggravate the problem over time. Repeated core cultivation, especially in the spring and fall, has helped reduce the severity of LDS. Wetting agents, which reduce the surface tension of water, have given some degree of control for LDS, but are best used in a preventative program. Syringing of the greens may be used as a stop-gap measure, but primarily serve to lower the canopy temperature and rarely will alleviate symptoms. Frequently, various combinations of the above strategies are necessary, and a trial and error type approach is needed to achieve adequate control of LDS.

Previous studies have shown an organic coating is present on sand grains associated with LDS, and removal of the coating yielded substances with an Infrared (IR) spectra characteristic of fulvic acids. Fulvic acids are a diverse group of large molecules, common in most soils, that are extractable in solutions with a high pH and do not precipitate when the pH is lowered to approximately 1 or below. Previous studies did not include an extraction of wettable soil from bentgrass sand greens, and therefore it could not be determined if the fulvic acid associated with LDS was unique compared to fulvic acids in the wettable areas.

Studies were conducted at the Ohio State University from 1989 through 1991 to provide a more complete characterization of the organic matter and soil characteristics associated with LDS, and included samples from wettable areas for comparative purposes.

(Continued on Page 12)

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