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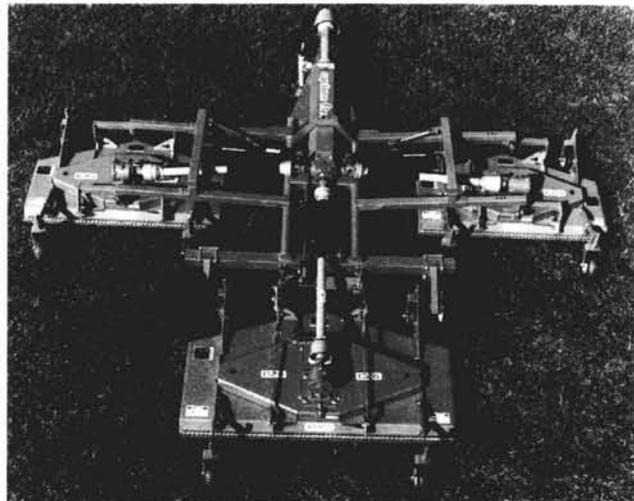
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# The Biology and Control of Localized Dry Spots on Sand Greens

by Robert A. Hudson, Ph.D. & Karl Danneberger, Ph.D.  
Department of Agronomy, 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 dieback. The symptoms observed are usually in irregularly shaped patches of variable size. Frog-eye patches, characteristic of some patch diseases, have been observed, but aren't dominant.

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 symptoms 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 the 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 of 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 yields 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 so it could not be determined if the fulvic acid associated with LDS was unique compared to those in the wettable areas.

**Symptoms are most severe in hot, dry weather.  
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will result in regrowth of the shoot system  
of plants that survive.**

Studies were conducted at 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. First, several common classes of soil organic matter were quantified and analyzed structurally using several techniques. Structural analyses of lipids (compounds that are similar to oils) were accomplished by gas chromatography/mass spectroscopy (GC/MS) and the large molecules that were extracted in alkaline solution, i.e. fulvic and humic acids, were analyzed by IR and  
(continued on page 24)



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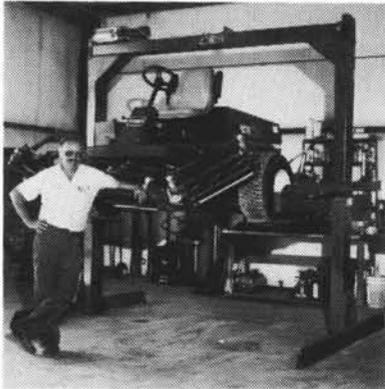
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(Localized Dry Spots continued)

nuclear magnetic resonance (NMR) spectroscopy. Second, particle size distributions for each size range. While particle size distributions were determined in previous studies, there were no reports of which fractions were the most hydrophobic, if any. Also, the area in the soil profile that displayed the most hydrophobicity was determined using soil columns collected from greens with LDS, allowed to dry down, rewetted from the bottom, and the distance that was infiltrated recorded at one and two minutes. Finally, since bentgrass roots have been reported to be colonized by various fungi, both pathogenic and non-pathogenic, roots associated from wettable and non-wettable areas were stained and examined for the extent of fungal colonization present.

Results obtained from the organic matter extraction and analysis indicated that LDS soils had greater amounts of all organic matter fractions studied than soils that were wettable. The only structural difference observed was from LDS that occurred on greens that were three years old, and this was only detected following an initial extraction with methanol. It appears that there is either a unique structure, or interaction between several structures, occurring in the LDS sample. One possible scenario to explain these results is that a unique structure or structures act to "prime" the LDS areas, and then the syndrome is intensified by subsequent drying cycles, which after several years may mask the unique component that initiated the LDS. The origin of the organic compounds could not be determined, but it is probably derived from bentgrass roots, soil microflora, or both.

**Results obtained from the organic matter extraction and analysis indicated that LDS soils had greater amounts of all organic matter fractions studied than soils that were wettable.**

Particle size distribution analysis showed no significant differences between the wettable and non-wettable soils. Hydrophobicity, as determined by how long it took a water drop to penetrate the sample, indicated that particles less than .25 mm in size were the most hydrophobic. Since the greens are constructed with 85-90% sand this size fraction has been largely ignored in previous studies on LDS, but since this is the most chemically reactive fraction, due to the presence of clays, it would not be surprising that this is where organic-inorganic interactions would be the most prevalent. The hydrophobicity was the greatest in the area immediately below the thatch-soil interface. This is the area in the soil profile with the most biological activity, especially in regards to root colonization and thatch degradation. Electron photographs of soil particles that were approximately 0.1 mm in diameter showed that the particles in LDS samples had an extensive organic coating compared to particles from wettable soils.

Results from these studies indicate that the role of the bentgrass root system, and associated microflora, on the development of LDS should be investigated in more detail. Previous studies have attempted to characterize the chemical and physical properties of LDS soils, but the impact of biological influences on its development cannot be ignored.

Credit: ICGSA Newsletter



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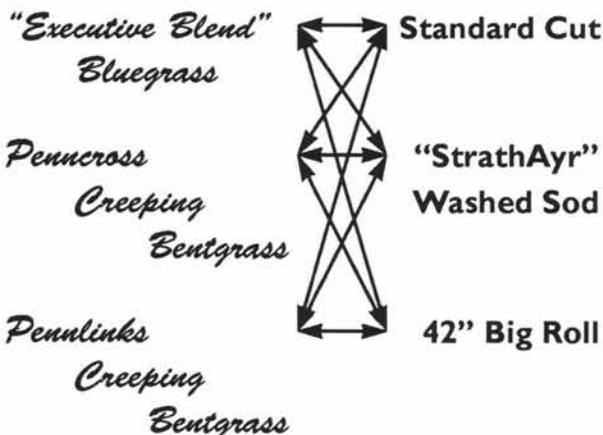
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# Wetland Policy Issues

by CAST, Council for Agricultural Science & Technology

This new CAST report discusses the basis for the ongoing controversy surrounding wetland regulation. The task force synthesized, sifted, and summarized the voluminous data, divergent perspectives, and existing philosophies into this single manuscript. Several suggestions, conclusions, and implications for the various entities in the wetland issues are offered.

## SUGGESTIONS

Wetland scientists should

- recognize the legitimate bounds of their disciplines and the proper role of science in policymaking.
- interact with agricultural and ecological interests and the public to support the development of public policy, and
- devote more attention to the relative values of nonwetland landscapes.

Wetland policymakers/regulators should

- recognize that not all wetlands are equal,
- resolve the property rights issue,
- define wetland more clearly,
- recognize that nonwetland landscapes have value too, and
- recognize that wetland can be valuable for more than its natural functions.

The agricultural community should

- know that the world is changing, especially with respect to the assignment of "rights."
- appreciate the other side(s) of the wetland issue, and
- recognize that trade-offs are necessary in a world of increasing scarcity.

The environmental community should

- recognize that government is anthropocentric (like it or not).
- acknowledge that money is the common denominator for exchange.
- recognize that trade-offs are necessary in a world of increasing scarcity.
- appreciate the other side(s) of the wetland issue, and
- encourage efforts to identify values of nonwetland landscapes to the degree of effort expended on wetlands.

The public should

- not rely on science or public officials to determine what they want protected; they should become informed and get involved.

## CONCLUSIONS/IMPLICATIONS

- Debates over the use and allocation of wetlands continue.
- Although approximately half of the lower 48's wetlands have been converted to other uses, that alone is not justification for preserving all of the remaining half.
- There is scarce middle ground in the discussion of wetlands — or at least few are willing to occupy it. Those informed and interested enough in the subject to take a position usually end up at one or the other extreme in the debate.
- While wetlands perform numerous useful functions, quantification, elaboration, and enumeration of wetland values in the absolute are of little use; what is needed are estimates of the relative values of wetlands and all other landscapes or alternative uses, which may have to be given up to protect wetland. Unless similar evaluations of forest land, agricultural land, grassland, and urban land are available, no meaningful relative basis exists on which to suggest land management or allocation policies.

(continued page 28)

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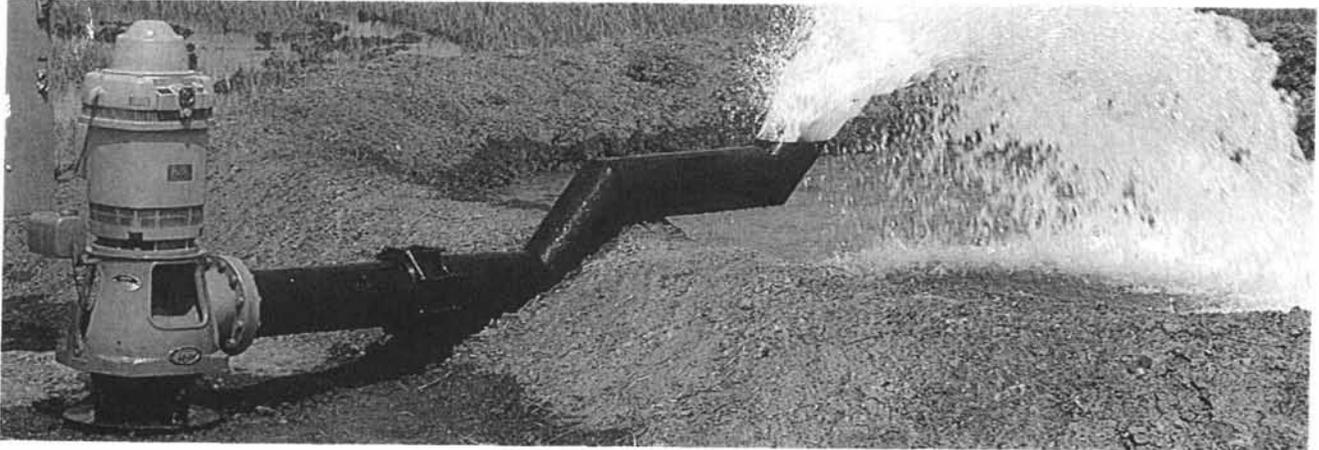
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- The public is largely oblivious to wetlands and the wetland debate. The combination of distance from the public's everyday focus and the technical nature of wetland issues contributes to confusion about the real problems that exist.

- One of the principal constraints to resolving wetland debates is agreeing on what constitutes a wetland. Science alone cannot decide for society what is and is not wetland. Wetland is as much a social construct as a topographic feature, therefore the public policy arena rather than the academic laboratory is the proper locus for defining wetland.

- Existing wetland legislation leads to confusion because many of the terms (e.g., mitigation, restoration, creation, or no-net-loss) are not defined clearly.

- Wetlands are dynamic components of the landscape and dynamic in the way society perceives them.

- Social value, an appropriate common denominator for social decisionmaking, frequently is confused with ecological value and function of wetlands. For there to be social value, wetland function must lead to some potential perceptible change in human well-being.

- There are many well informed, rational people who place higher values on alternative uses of wetland than on "natural" wetland.

- All wetland regulations affect the economic decisions of individuals, firms, and the public. Regulation also affects the distribution of income among present generations and between the present and future generations.

- Science will not, and should not, be the last word on wetland issues.

- Science has made contributions toward resolving the issues, but, despite decades of excellent wetland science, the issues remains largely

- an issue of philosophical and ethical value differences,
- a political-legal issues of explicitly assigning property rights,
- a social-technical issue of defining exactly what a *wetland* is,
- a largely regional-local issue most often discussed at the national level, and
- a matter of having to make decisions today in spite of not resolving the above four points.

## Super 'N' Site Profile

by John Gurke, CGCS  
Public Relations Committee

The host of this month's MAGCS meeting is Jim McNair of Orchard Valley Golf Club. Unlike its Superintendent, Orchard Valley is a young course (opened in July of '93) with lots of character. The Ken Kavanaugh design features 50 acres of wetlands, 10 acres of sand, and 12 acres of naturalized fescue areas (all perfect for my game). The course is currently ranked in the top five public tracks — I love saying "tracks" — in the Chicagoland area, and is a challenge from whichever tees you choose to hit from.

Jim broke into the business way back in 1965 when he worked for Wadsworth Construction, and in 1967 started at Fox Bend. From 1970 to 1993, he was Superintendent of Fox Bend (another Fox Valley Park District course). In fact, he did, for a time, carry the title of Superintendent for both courses simultaneously.

(continued page 29)

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The main challenges for Jim in making the transition from "The Bend" to "The Valley" have been learning the Network 8000's many capabilities, but don't get him started talking about it — you'll be there a long time. I have never known a person more infatuated with and in awe of an inanimate object as Jim is with his irrigation system. Another challenge is that 50 acres of wetlands means 50 acres of goose grease. Jim's control methods include moon rockets with report (I have no idea what this means — I'm just quoting), and "NO GEESE ALLOWED" signs posted throughout the course. My dog is chomping at the bit for an invitation to come over and help out ...

Jim's family (besides the irrigation system) includes his wife Joy; his sons Dan, a senior at ISU, and Matthew, 9, and his daughter Carrie, a junior at Waubonsie Valley High. We all are looking forward to playing his great course this month. See you there.



## Diseases

### VERTICILLIUM WILT

Verticillium wilt can affect a wide variety of plants, both herbaceous and woody. Symptoms on trees and shrubs often appear in mid-summer. "Flagging" of twigs and dieback of twigs and larger branches are typical symptoms. Verticillium wilt is caused by soilborne fungi, typically *Verticillium dahliae* in the Midwest.

This disease may be confused with other problems. Sudden wilting of twigs, with or without yellowing, is characteristic of Verticillium wilt. This could also be due to various stresses, cankers, insects, or other problems. Entire branches may be killed, including the entire crown of trees. Trees may appear in a state of general decline. Trees may continue to be affected the following year or they may recover. The disease may cause additional wilting and dieback years later.

One symptom which can help greatly in identifying Verticillium wilt is discoloration of the sapwood of twigs and branches that are wilting. Cut into these twigs at an angle, and examine the cross-section for streaks of brown or green. This disease invades the water conducting tissues, which is why wilting and death occur.

Verticillium wilt persists in the soil and typically invades wounds but may also directly penetrate roots. The fungus then invades the vascular tissue and can move within the plant. Wounds to the trunk or branches of trees may also serve as entry sites for spread by insects.

The best control strategy for Verticillium wilt in trees and shrubs is to increase the vigor of the plant. Fertilizing and watering are suggested. However, do not fertilize woody plants now; wait until late fall or next spring to avoid winterkill potential.

Wait until branches are dead on trees before removing, as they may recover if they are just wilting. Once dead, they should be removed. Disinfect pruning equipment between cuts with 70% rubbing alcohol. Wood known to be infected with Verticillium wilt should not be chipped and used as mulch, as it could spread the disease to other plantings.

Many woody plants are susceptible to Verticillium wilt. Among the more common trees include ash, maple, linden, viburnum, sumac, smoketree, catalpa, and boxelder.

Trees not known to be susceptible to Verticillium wilt include arborvitae, aspen, bald cypress, beech, birch, crabapple, ginkgo, hackberry, hawthorn, hickory, honeylocust, juniper, bur and white oak, pine, serviceberry, spruce, willow, and yew, among others.

Credit: Chicagoland Hort Newsletter, July '92

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# Leaves, Limbs, Needles & Boughs



by Fred Opperman

**Tree Trivia:** There are about 850 species of trees in the United States and more species of trees in the Appalachian mountains than in all of Europe. But there are more species of trees in three acres of a Malaysian rain forest than in all of the U.S.

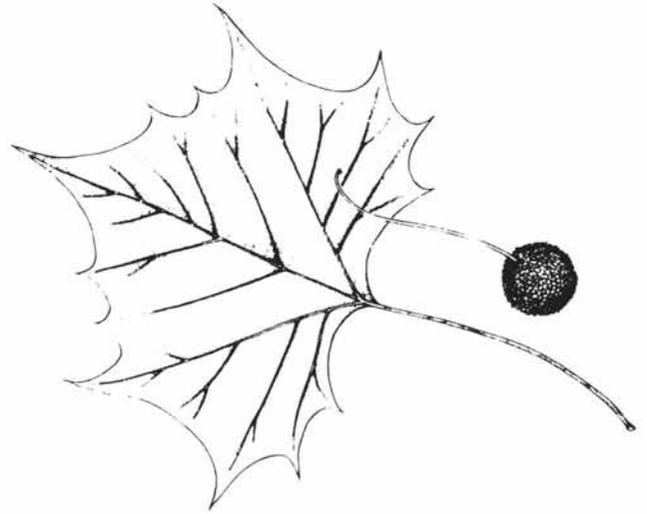
**Sycamore** — *Platanus occidentalis*, is the chosen tree for this month. It is a tree that most golf courses would rather not have due to its litter problem of shedding bark, twigs and large leaves. Most years in this area the tree gets anthracnose which affects the developing leaves and stems. During these years there is a die back and “witches broom” is the result of this disease.

**Bark:** Reddish-brown when young, quickly breaking into thin flat scales that tend to flake off through out the year. The flaking off then reveal large patches of whitish or greenish inner bark. A mature tree is very striking with its mottled bark.

**Twigs:** Smooth, light brown, somewhat in a zigzag shape. Leaf scars are alternate, encircling the buds with 5-7 bundle traces.



**Leaves:** Alternate, simple, blades circular in outline, divided into 3 or 5 shallow sharp pointed lobes. Leaves up to 7 inches long and 4-6 inches wide.



**Fruit:** Round light brown heads, about 1 inch in diameter on long drooping stems. The balls contain many small seeds surrounded by hairs.

**Habitat:** Bottomlands, along stream banks and lakes. Likes deep moist rich soil.

**Wood:** Hard and strong and is used for furniture.

**Credit:** “Forest Trees of Illinois”

## Take a Load Off Of Your Back

Most of you are aware that there is a right way and wrong way to lift something. However, back injuries and hernia continue to be a major problem — possibly because these injuries often occur over long periods of improper lifting. For example, workers might not feel immediate pain over one box lifted incorrectly, but after lifting many boxes incorrectly for days, months and even years, the chance of injury multiplies.

Here are some steps for minimizing your risk while lifting and carrying heavy or awkward items. *If you are experiencing back pain or hernia, refrain from lifting heavy objects.*

1. Before lifting the object, look it over to determine if you can lift it alone, or if you should have someone help you. A good rule of thumb is: When in doubt, get help! If the item is in a package or box, be sure that the box is stable and sealed. Falling items often land on the feet of the person lifting.

2. Look over the area where you're going to be carrying the object to make sure it's clear of obstacles. Be sure to check for, and avoid, slick or wet surfaces.

3. Get a good footing close to the load to be lifted. Place your feet 8 to 12 inches apart.

4. While keeping your back straight, bend your knees to grasp the load. Bend your knees outward and straddle the load somewhat.

5. Get a firm grip on the load. If you have to handle the load awkwardly, then it isn't ready to lift. (For example, if you need to wrap your arm underneath the load so contained materials don't fall out, secure the load first. See item 1.)

6. Remember, you want to keep the load close to your body as you lift and carry.

7. Lift carefully and smoothly by straightening your legs.

Do not jerk the load up, since the weight could suddenly transfer from your legs to your back.

8. If you are carrying the load in areas of pedestrian traffic, be sure to give vocal warning that you are approaching. This will ensure that fellow workers will not bump into you. If you are walking around corners and blind spots, be sure to make wide turns so you can see someone coming into your path.

9. Use your feet to change your direction. Do not twist your body, as this will shift the burden of the weight to your back.

10. When you reach your destination and are ready to set the load down, simply reverse the lifting steps. Keep your back straight and the load close to your body. Slowly bend your knees. Watch your fingers as you set the load down. If you are setting a load down onto a raised surface such as a table or bench, set the object just over the edge and slide the rest of the load onto the surface.

### Lifting Above the Waist

If you are lifting an item above the waist:

- First, follow proper lifting procedures.

- Rest the load on a firm object for support, change your grip and once again bend your knees to get extra leg muscle into the final effort.

- Never attempt to change your grip or the position of your load while you are moving.

Your back is a very important part of your body, but it's easy to forget that you have one until you injure it. Practice these safety tips and keep your back and body operating comfortably.

**CREDIT:** California Fairways