FAQs about LDS

Localized dry spots fuel superintendents' questions.

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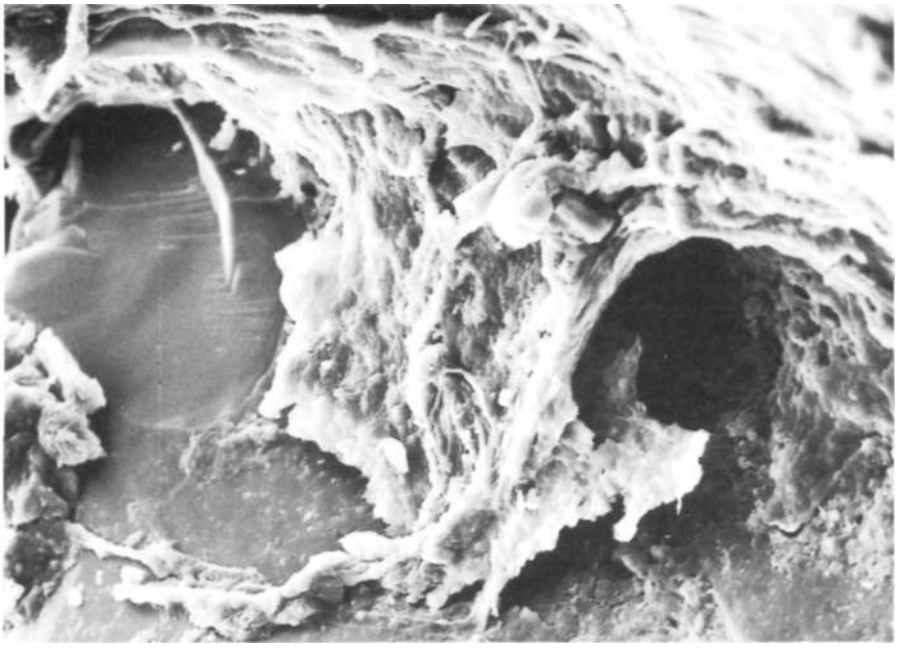
Localized dry spot (LDS) is a common problem on golf courses. The spots tend to occur during the stressful months of summer and most often appear on sand-based greens. On occasion, LDS can be a serious problem on tees and fairways.

Many questions arise as superintendents encounter dry spots. Here are some we've heard recently at seminars and education sessions.

Q: What causes LDS?

A: Water-repellent soils remain one of the primary reasons for the occurrence of LDS on golf course putting greens. But because LDS is really a symptom of stress, there can be many causes. Anything that causes drought-like symptoms can be responsible for LDS, such as excessive thatch or mat, compaction, salts, soil layering, improper chemical usage, certain



Photos courtesy of Keith Karnok

Localized dry spot is caused when certain types of soil fungi coat sand particles with a waxy, water-repellent layer shown here in this scanning electron micrograph of a sand particle.

KEY POINTS

- Water-repellent, or "hydrophobic," soils are often the cause of dry spots on well-irrigated turf.
- Although dry spots may be "localized," treating the entire turf with a wetting agent will improve the uniformity of a stand afflicted with hydrophobic soils.
- Preventive measures are not available to avoid the development of hydrophobic soil.

diseases and insects or poor irrigation coverage.

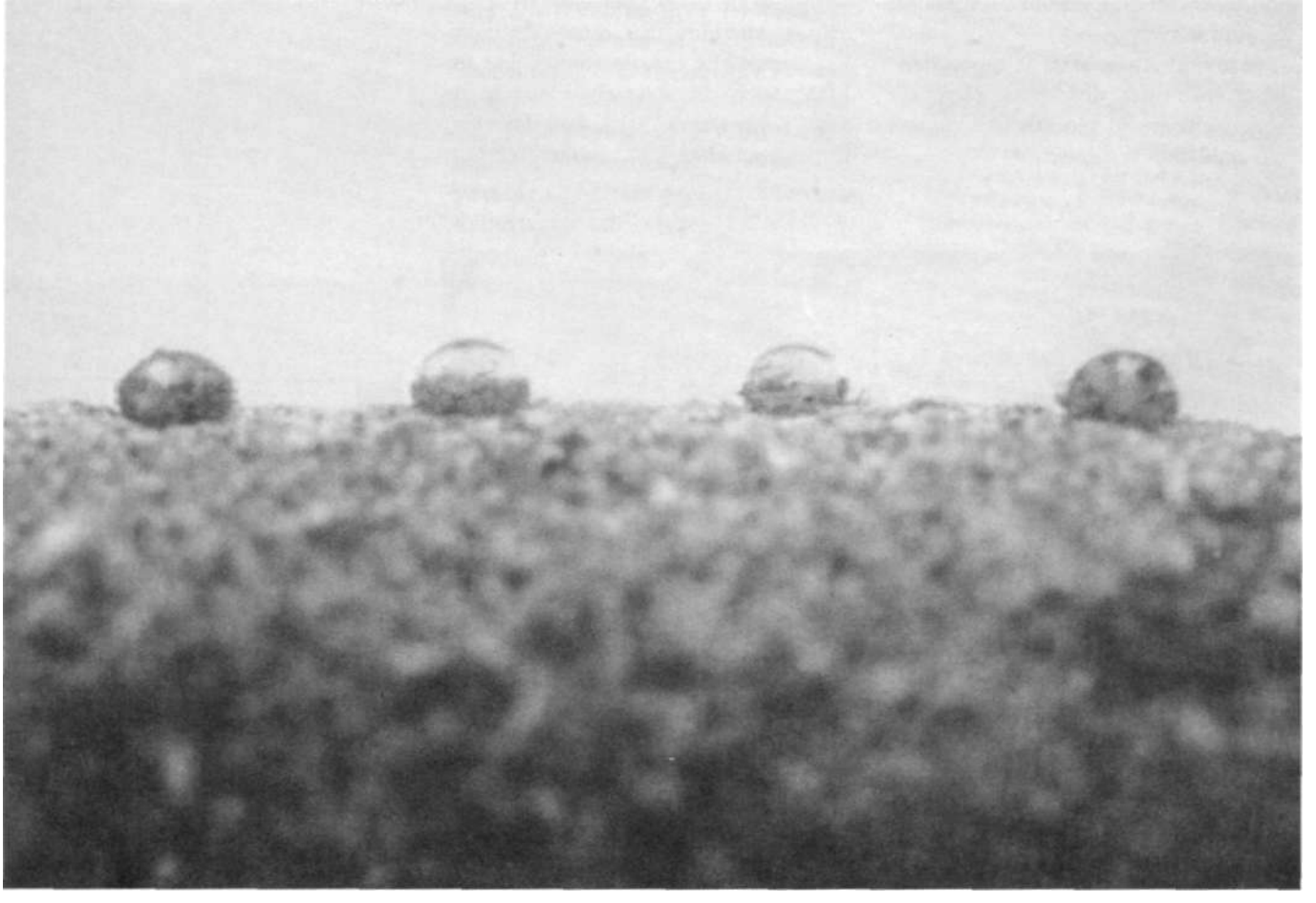
Q: Does the hydrophobic (water-repellent) nature of the root-zone material originate with the greens mix before construction?

A: It's unlikely that a new greens mix would be sufficiently hydrophobic to cause a significant problem. Water-repellent soil occurs with the formation of certain substances during organic matter decomposition. After a new greens mix is installed, it normally takes several months to a few years to accumulate enough of these substances to cause hydrophobicity.

Q: Can I prevent the hydrophobic condition before it occurs?

A: In a predominantly sandy root zone (without amendments) the answer is "no." Because the hydrophobic condition is the result of organic matter decomposition and there is no way to stop (nor would we want to) this normal process, the substances responsible for water repellency continue to accumulate until reaching a level that causes the soil to repel water. Research has shown that adding various amounts of certain soil amendments or sand substitutes will sometimes help reduce the occurrence of LDS. However, there is little research information available that addresses the long-term effects of these materials on the physical characteristics of the soil.

Q: Is LDS more common on pushup greens than USGA greens?



A core of a hydrophobic soil demonstrates its ability to resist water.

A: Regardless of whether the green is "pushed up" soil or is constructed to meet USGA recommendations, if the top inches of the root zone are predominantly sand, water-repellent dry spots will usually occur.

Q: Are biostimulants an effective treatment for LDS?

A: Biostimulants have no proven effect on soil water repellency. However, in theory, if a biostimulant enhances root growth, the plant's ability to take up water from deeper non-hydrophobic soil should be improved, thus relieving LDS.

Obviously, any management practice that encourages root growth (fertilization, irrigation, cultivation) should help reduce occurrence of LDS. Biostimulants should not be used as a substitute for good agronomic practices. Before using such materials, it is advisable to request university test results and conduct your own on-site testing with small quantities.

Q: Will the introduction of commercially available microbes into the soil eliminate the hydrophobic condition?

A: The substance causing the hydrophobic condition is the end product of organic matter decomposition. There is no evidence to suggest that any (commercially available or otherwise) microorganism will further break down these substances, thus eliminating the hydrophobic condition.

Q: Does the use of organic fertilizer have any effect on the development of water repellent soil?

A: It would appear that the addition of more organic matter through the use of organic fertilizers might enhance the development of soil water repellency; however, the amounts of organic matter being applied are minuscule compared with the amounts of organic matter being produced by the turfgrass plant itself. Therefore, it is doubtful that the use of these types of fertilizers would have any effect on the development of hydrophobic soil.

Q: Can LDS or hydrophobic soils be prevented by using certain fungicides?

A: Fairy rings often contain dry spots. Early treatment of fairy ring with a fungicide will prevent LDS by controlling the fungus. However, fairy ring does not cause *all* dry spots, so a fungicide will not necessarily prevent the formation of water-repellent soil when other, non-fairy ring organisms are responsible for its formation.

Q: With all the wetting agents being sold, which one is really best?

A: First, one would have to define "best." To some superintendents, the best would mean low-burn or phototoxicity potential. To others, cost would be a very significant factor. Ease of handling and application can be of primary importance as well.

Certainly, most superintendents are interested in the efficacy or effectiveness of the wetting agent. But even this can be considered in two ways:

- How well does it eliminate the hydrophobic condition?
- How often must it be applied?

Therefore, there is no simple answer. Every commercially available wetting agent tested at the University of Georgia has decreased soil hydrophobicity compared with an untreated control. However, there are huge differences in burn potential, cost, ease of handling and application and efficacy.

Some appear to be very effective even on the most hydrophobic soils, whereas others seem suited to less-severe conditions. Research at the University of Georgia will hopefully better delineate these differences.

There is little question that there are significant differences among wetting agents in terms of frequency of application. Some recommend re-application as often as every two weeks while others only have to be applied every three to six months depending on the conditions.

Is less-frequent application better? Some superintendents say "yes" without question, but others believe they maintain better control of soil moisture

by using a shorter residual wetting agent. Therefore, "best" is a personal opinion determined by the conditions and needs of the situation.

Q: Is treating the entire green with a wetting agent worth the money? Is spot treatment just as effective?

A: Soil hydrophobicity can vary significantly across a turfgrass stand (this accounts for the "localized" nature of LDS), as can other wetting and drying characteristics. A lack of uniform soil moisture could result in nonuniform shoot and root growth. Treating the entire green with a wetting agent allows more uniform wetting of the green and more uniform turfgrass growth.

Treating a less hydrophobic area with a wetting agent will not result in that area holding more water than a very hydrophobic area treated with the same material at the same rate. Spot treating only the obvious dry spot areas with a wetting agent may prevent less hydrophobic areas from wetting uniformly, thus result in subtle but possibly significant growth differences in the turfgrass.

If not managed properly, localized dry spot can become severe, especially on sand-based root zones, and lead to significant turf loss.

Q: Do certain wetting agents cause excessive moisture retention at the soil surface?

A: This question has been raised several times over the past few years. Preliminary research at the University of Georgia using several wetting agents has been unable to reproduce this effect either on a hydrophobic or non-hydrophobic root-zone mix. Regardless of the wetting agent or irrigation regime used, soil moisture content and rate of soil dry down were similar for all materials tested. Research is under way to examine the influence of thatch, mat and soil organic matter content on wetting agent movement and efficacy

There are many questions still to be answered about this perplexing problem. Research currently under way at the University of Georgia should provide answers for many of these questions.

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