JB COMMENTS

The Need for a Gravel Drainbed

A comparison of the rate of water movement through the high-sand root zones of two distinctly different root zone profile constructions reveals an important lesson. Assume profile A involves a 12 in. (300 mm) deep high-sand root zone with an infiltration rate of 4 in./hr (100 mm/h) constructed over a gravel drainbed. Profile B is constructed of a 12 in. (300 mm) deep, high-sand root zone with no gravel drainbed underneath, but with 4 in. (100 mm) diameter drain lines placed at a 12 ft (3.6 m) spacing. In both profiles it is assumed that (a) the construction is over a relatively impermeable clay soil, (b) the high-sand root zone mixes are of the same particle size distribution and physical characteristics, and (c) a water saturated condition exists in the root zone. **In the case of profile A, only 1.5 hrs. are required for water entering the surface of the root zone midway between the drain lines to reach the free-draining condition of the underlying gravel drainbed, while in the case of profile B, more than 48 hrs. are required for water to reach the free-drainage condition of the subsurface drain lines.**

A second major benefit of the gravel drainbed (profile A) is the more uniform moisture conditions. While the moisture content of the overlying root zone mixture will increase with depth, it will be relatively uniform laterally as you go from one location to another across the area. **When the gravel drainbed is omitted, as in the case of profile B, the area midway between the drain lines remains much wetter than the areas above and immediately adjacent to the drain lines.** This unevenness in moisture content makes proper water management difficult.

These comparisons illustrate the vital importance of a gravel or crushed stone drainbed for rapid drainage and the need to use a proper intermediate coarse sand layer and/or a root zone particle size distribution that minimizes the potential for clogging of the gravel or crushed stone drainbed. In the case where no gravel drainbed exists, much of the drainage capacity is related to the water holding capacity of the high-sand root zone, which can eventually become filled during a period of very intense rainfall.

ASK DR. BEARD

Q *Is the use of sugar applications to turfgrasses beneficial?*

A Based on the research conducted by J. Beard in 1957 and 1958, it has been documented that the leaves of creeping bentgrass (*Agrostis stolonifera*) have the capability to take up foliar applied water-soluble carbohydrates, such as glucose, fructose, or sucrose. The first two are monosaccharides and the third is a disaccharide. Further, it was demonstrated that these foliar applied carbohydrates are readily translocated to metabolic sites in the plant where they are utilized in growth processes for the leaves, stems, and roots.

When adequate carbohydrate supplies are not available via photosynthesis and from storage sites within the plant, a foliar application of a water-soluble carbohydrate may prove beneficial. Such conditions include (a) closely mowed turfs growing in the spring and autumn period under favorable temperatures for rapid shoot growth, (b) severe turf scalping that results in root dieback, (c) loss of the root system following spring root decline of warm-season turfgrasses, and (d) during periods of tissue hardening prior to the onset of an environmental stress. Applications of water-soluble carbohydrates are not effective during severe heat stress conditions of midsummer.

While the basic concept of foliar carbohydrate applications has been demonstrated through research conducted 40 years ago, it is only recently that interest has arisen concerning this technique. **Additional practical field research is needed concerning the most effective timings and rates of application.** A potential negative dimension in the use of foliar applied carbohydrates is the potential to induce accelerated spore germination/fungal invasion of turfgrass leaves, which increases the severity of attack by certain fungal causing diseases.

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