# TURFAX™

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## JB COMMENTS - WATER MANAGEMENT

Some of the most difficult day-to-day agronomic decisions made by a turfgrass manager relate to the turfgrass irrigation practices. Evapotranspiration (ET) prediction models are now available for use in combination with a computer and microenvironmental sensor systems to provide baseline information on which to make sound day-to-day decisions. However, there are a number of critical principles that must be properly understood in order to maximize water conservation and achieve quality turfs with minimal disease problems. Two aspects that tend to be overlooked will be discussed herein.

**Irrigation and the Root Zone Profile.** It is a basic premise that the rate of water application through an irrigation system should be no greater than the soil water infiltration rate or the rate water is accepted into the soil. This approach is important in order to avoid puddling and an undesirable water saturation of the surface soil zone.

However, there are high-sand root zones that have a high soil water infiltration rate of 6 to 12 inches (150-300 mm) per hour. What is the principle in this case? The basic premise should be to apply only sufficient water to replace that lost by ET since the last irrigation. In the case of the perched hydration zone, such as the USGA Method, there is a reservoir of water held above the gravel drainbed that is readily available for uptake by the roots. Applications of water that exceed the amount lost by ET result in a waste of water that is flushed downward into the drainbed.

The perched hydration zone method of profile construction is a water conserving system, if proper irrigation practices are followed. Some turf mangers have claimed that the high-sand, perched hydration zone method results in high water use rates. This is most probably due to improper irrigation practices, such as watering daily in amounts that result in flushing of excess water down into the drainbed system. This also results in an increased fertilizer requirement because water-soluble essential elements, such as nitrate ($NO_3$) and potassium (K), also will be leached downward out of the root zone.

Another high-sand root zone situation is one built-up by frequent topdressings over an existing, impermeable, clayey soil. Again the key premise is to apply only sufficient water to replace that lost by ET since the last irrigation. Otherwise, there will be an accumulation of water to higher levels in the sand portion of the root zone due to a lack of underlying drainage. The result will be an anaerobic condition with subsequent formation of black layer symptoms and loss of rooting.

**Irrigation and Turfgrass Species.** It must be recognized that turfgrass species vary in their inherent ET rate and root system depth. For example, hybrid bermudagrass has a relatively low ET rate and a good genetic potential for deep rooting, especially during midsummer heat stress. In contrast, creeping bentgrass has a relatively high ET rate and a much poorer genetic potential for rooting, especially when root zone temperatures exceed 80°F (27C°).

Due to these inherent characteristics a bermudagrass should not have to be watered nearly as frequently or in as large a quantity as bentgrass, including putting green cultural conditions. Where bentgrass would require daily irrigation, a hybrid bermudagrass would require irrigation at only 3- to 4-day intervals, depending on the evaporative demand of the atmosphere.

An improper irrigation strategy can negate this advantage of the bermudagrass. For example, if daily, high rates of water application are practiced early in the growing season which result in a root zone environment that impairs rooting, it may necessitate daily irrigation throughout the midsummer to avoid turfgrass wilt caused by a lack of root system. A more appropriate irrigation strategy is at less frequent intervals of every 3 days early in the growing season that will encourage deeper, more extensive rooting. This may avoid the need for a daily irrigation regime during the peak evaporative demands of midsummer. An additional benefit to this irrigation strategy is a less favorable environment for disease development and more favorable surface playing conditions for turfs used on sporting facilities.

Note: Anaerobic conditions caused by a water saturated soil are especially detrimental, with the first negative plant response being a loss of the critical root hairs, which constitute over 80% of the water and nutrient absorbing surface area of the grass plant. The plant functional loss cannot be observed with the naked eye, as the root hairs can only be seen with the aid of a microscope.

## NEW PUBLICATION AVAILABLE:

**1995 Rutgers Turfgrass Proceedings, Rutgers University. 146 pages.**

This proceedings is divided into two sections. The first section contains ten papers of lectures presented at the 1995 New Jersey Turfgrass Expo. The second section contains five technical papers of research conducted by the turfgrass scientists at Rutgers University. Included are performance evaluations for a broad range of cultivars and near-release selections of five cool-season turfgrasses: bentgrasses (*Agrostis* spp.), fine-leaf fescues (*Festuca rubra* and *longifolia*), Kentucky bluegrass (*Poa pratensis*), perennial ryegrass (*Lolium perenne*), and tall fescue (*Festuca arundinacea*). This research report is a must for anyone involved in specifying or selecting specific cultivars of cool-season turfgrasses for seeding or sodding turfed areas.

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