

Improving Irrigation Efficiency

Turfgrass irrigation is often the most imprecise aspect of management systems. Not only are there inherent inadequacies in most irrigation systems but also there are a variety of biological variables, such as grass species and pest management.

Researchers at Rutgers University conducted a study to determine how "little" water you could apply and maintain acceptable turfgrass health and quality. Fairway maintained creeping, colonial and velvet bentgrass were irrigated at 100, 80, 60 and 40% of measured evapotranspiration (ET). The researchers collected data on the amount of soil water lost, the water use efficiency (amount of energy produced by the plant per unit of water consumed), and turfgrass quality.

Interestingly while all three species are bentgrass, there were significant differences in their water use. In fact, colonial bentgrass was the least drought tolerant and largest water user compared to creeping and velvet bentgrass. There was some evidence that the lower shoot density, rapid leaf extension and more upright leaves of colonial bentgrass contributed to its water use characteristics when compared to velvet bentgrass.

In addition to the species variability there was a significant seasonal effect on water use and irrigation needs. All species performed well during the summer months when irrigated to 60 to 80% of ET and in the fall the species performed well when irrigated to only 40% ET.

The researchers concluded that velvet and creeping bentgrass species are more efficient in water use compared to colonial bentgrass. This is important information as more turfgrass managers are seeking biological (grass type) and technological (irrigation systems) solutions to reducing overall water use while maintaining turfgrass quality. From: DaCosta, M and B. Huang. 2006. Deficit irrigation effects on water use characteristics of bentgrass species. *Crop Science* 46:1779-1786.

Preventing Turf Winterkill

A significant amount of turf dies each year from injury sustained during the winter months. Of all the managed turf, annual bluegrass seems to sustain the worst injury and coupled with its omnipresence on golf courses and sports fields, winter kill events can be catastrophic for an operation.

Over the last decade Canadian researchers have been investigating aspects of winter injury of annual bluegrass. Studies have focused on physiological aspects of dormancy and hardiness as well as understanding the role of winter protective covers. A recent study conducted in Quebec explored the role of soil organic matter as a contributory factor in winter injury.

The study focused on the difference in recurrent injury on native soil greens with high organic matter levels and sand-based greens constructed to USGA specifications. Oxygen levels were measured under a variety of protective covers that included felt, straw mulch, wood shaving mats, or clear polyethylene cover over wood shaving mat.

There were significant differences in oxygen consumption under the various covers and there was also recurrent damage to greens that could not be explained by ice encasement, disease, freezing temperatures or excess water. However there was a clear relationship between soil respiration rates (an indication of microbial activity on organic matter) and winter damage, i.e., the more organic matter the more winter injury.

The use of impermeable covers has been shown to be an important aspect of preventing winter injury to turf, especially regarding ice accumulation. Maintaining a dry surface during winter will enhance survival, however the oxygen consumption under these covers by soil organisms appears to be lethal and exacerbated on native soil greens. It is recommended that new sand based greens be constructed to reduce the incidence of winter injury or provide for ventilation under the protective covers to prevent anoxic conditions. From: Rochette, P., J. Dionne, Y. Castonguay and Y. Desjardins. 2006. Atmospheric composition under impermeable winter golf green protections. *Crop Science* 46:1644-1655.

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Scanning the Journals

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