

## WATERING GREENS EFFECTIVELY — A REVIEW

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To water greens effectively requires an understanding of several basic concepts which, individually and collectively, affect water and its proper use. There can be no set or predetermined formula or prescription for effective green watering. Rather the superintendent must balance the variables that affect watering practices and arrive at the solution that best suits each green.

To water effectively requires an understanding of the fundamental role water plays in plant growth, of the effects climate and weather have on growth rates and how they influence water-use rates and choice of grass. Effective green watering demands a knowledge of the basic physical and chemical soil properties and how these effect water absorption, storage and drainage, as well as the frequency, rate and manner in which water must be applied. All such basic information must be correlated with the requirements for play and adjusted to fit the existing irrigation facilities.

### Role of Water

Water is essential to plant growth and activity, and is involved either directly or indirectly in all phases of the care and management of turfgrass. Water is necessary for germination, cellular development, tissue growth, food manufacture (photosynthesis), temperature control and resistance to pressure.

It acts both as a solvent and as a carrier of plant food materials, for nutrients dissolved in the soil are taken in through the roots and then carried to all parts of the grass plant in water. The food manufactured in the leaves is also distributed throughout the plant body in water.

Water transpired by the leaves and evaporated from the surface serves as a temperature regulator for the plant. Syringing is based on these phenomena. The amount of water within the cells of the grass leaves plays a role in counteracting the effects of traffic. When the plant cells are filled with water (above 80%) they are said to be turgid, a condition that helps leaves resist pressure from traffic (foot and vehicular) and avoid the damage, sometimes death, that may occur. Wilt is a condition that exists when cells do not contain enough water and are said to be flaccid. A 10-20% loss of water from the plant body frequently will cause permanent wilting and death.

### Soil

The soil for any turfgrass area must provide support for the grass, serve as a storehouse for nutrients, supply oxygen and act as a reservoir for moisture. The texture (size of soil particle), structure (arrangement) and porosity (percentages of soil volume not occupied by solid particles) of a soil are the basic physical factors which control the movement of water into the soil (infiltration), through the soil (percolation) and out of the soil (drainage). The texture, structure and porosity, along with organic matter content, determine the water-holding capacity and control the air-water relationships of the soil.

These characteristics directly affect satisfactory green watering practices. The intake of water is through the roots—the root hairs are the organs through which water is taken. Hence, the depth of rooting and the extent to which a given root system occupies the soil determines the available water capacity of that rootzone. When the need for water by the plant is great (high temperature, high wind movement, low

humidity), this reservoir must be continually replenished.

If the need for moisture (evapotranspiration) is 0.3 inch daily — as the case may be during July and August — the soil must easily supply that amount between irrigations. Soils that are good for putting greens otherwise may only hold 0.50 to 0.75 inches per cubic foot. This would be an adequate amount of water for one to two days if it is available to the plant. For this to be the case, the roots must extend through this volume of soil, the soil must supply the needed amount of water, or have the characteristics necessary to **move** the needed amount of water at a rate rapidly enough to permit uptake by the active roots.

The root systems on most putting greens frequently extend only to a depth of three or four inches, so the volume of potentially available water is drastically reduced. Thus, the advice to water deeply and infrequently is **not valid** for many putting greens. For that matter, for many turfgrass areas.

Poor aeration, whether from poor drainage, compaction or an inherent soil condition, further complicates effective green watering.

### Equipment for Applying Water

Equipment presently available permits the **controlled** application of **precise** amounts of water. Further, the flexibility of the automatic control mechanisms is such that pinpoint (each head) application of the amounts of water needed by the grass can be delivered in conformance with the ability of a given green to take in (infiltration capacity) and store it (water-holding capacity). Master controllers located in the superintendent's office, or in any central area, may be programmed to signal satellite controllers to re-cycle or to apply water at intermittent periods. This assures proper infiltration and prevents run-off with subsequent overly wet spots on greens. The satellite controllers, located in easy view of the green, may be operated independently for syringing.

Today's controllers, valves and sprinklers, when used in accordance with a good design, when installed properly and when serviced and maintained, will aid substantially in the effective watering of putting greens.

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