Summertime - Irrigation at Its Most Critical

By J.R. Hall, III
Extension Agronomist, Virginia Polytechnic Institute

Although working on the end of a hose may not sound or look important, it is a job that if left to the untrained can lead to job hunting for golf course superintendents. Water management is critical in hot, wet summers.

Timing of irrigation is important in relation to disease activity in that the length of time that leaf surface and thatch remain wet likely affects fungus spore germination and therefore success of fungal entry. Irrigation is most beneficial when applied in the cool, early morning period as leaf blades can dry before mid-day temperatures rise and sugar-laden guttation droplets are washed off the leaf blades, reducing available fungal substrate.

Water movement into and through a soil is affected by soil texture, topography, thatch accumulation, soil moisture, compaction, and other factors. The water available to the turfgrass plant will vary depending upon rooting depth and type of soil mixture. In a sand green, plant available water may range from 0.4 to 1.0 inches of water per foot, whereas in a clay loam the range would vary between 1.8 and 2.1 inches of available water per foot of soil. Obviously the sandy soil will require more frequent irrigation if the rooting depth and turfgrass density are equal. Frequency of irrigation will also be affected by evapotranspiration rates which average from 0.11 to 0.16 inches per day from April to September in most areas of Virginia. This represents roughly 3000 to 4400 gallons of water lost per day that must be replenished by rainfall or irrigation if the soil moisture reservoir is inadequate.

Syringing is an important method of cooling turf areas that are entering drought or heat stress. It is different from normal irrigation in that it is not designed to wet the soil, but to mist the plants. Turfgrass plants with limited root systems incapable of absorbing adequate amounts of water can rapidly develop internal water deficits which, if not corrected, can lead to death of the plant. Bentgrass and annual bluegrass are very prone to this dry wilt death.

The practice of syringing is an art and should not be relegated to anyone without good common sense. When an untrained individual is faced with the impending death of turf due to dry wilt, there is a great tendency to overwater the turf and throw the plants into "wet wilt," which is just as deadly as "dry wilt." Wet wilt commonly occurs on poorly drained areas where the soil is saturated and the plant cannot absorb water because of a combination of a lack of oxygen in the warm soil and very low transpiration rates due to extremely high humidity near the leaf surface. It is thought that the lack of oxygen decreases respiration in the roots leading to root die-back and the possibility of disease interaction.

The theory of syringing is to simply place a mist of water on the surface of the leaf. The cooling effect arises from the fact that the water absorbs some of the sun's heat. Obviously, the cooler the water, the greater the cooling effect. However, as the sun's rays impinge on cool or warm water on the leaf blade, it is converted from the liquid state to a vapor state. This conversion of water from a liquid to a gas requires approximately 539 calories of energy for every gram of water converted. If the water were not present on the blade of grass to be converted to gas, this energy would simply hit the blade and increase the leaf temperature.

If well-drained sandy greens are exhibiting dry wilt symptoms, more than a syringing may be necessary, especially if the roots at a 6- to 8-inch depth are dying back because of lack of moisture. Likewise, the decision to irrigate on a poorly drained soil, when a syringing was really what was needed, could lead to death of the turfgrass plants. It is essential that the individual making the decision about whether a green needs to be syringed or irrigated have a soil probe. This will allow the individual to observe soil moisture conditions, rooting depth, and health and to make an informed decision about whether to syringe or irrigate.

Making informed decisions about whether to syringe or irrigate is essential to successful golf green management in Virginia. It demands good common sense, a detailed knowledge of the soil types being irrigated, evapotranspiration rates for the area, and the depth of the root system being managed.

Reprinted from the Old Dominion Spreadsheet.