

(Water Usage cont'd.)

extend through (permeate) the entire volume of soil to a depth of 12 inches. If the roots are only three to four inches, obviously the soil may have to be replenished more frequently — irrigated daily or even twice daily. With a limited root system or one that does not fully occupy the volume of soil; the soil must possess the characteristics necessary to move the needed amount of water at a rate rapidly enough to permit its uptake by the root. Generally, plant water needs can be satisfied if enough supplemental water is applied to replenish that portion of the available water in the root zone which has been used since the last irrigation. Some authorities indicate that water should be added when approximately 50% of the available soil water has been exhausted. Thus, if the roots fully occupy the soil to a depth of six inches and the soil holds one inch per cubic foot, the ET rate is 0.25 inches per day, the green must be watered daily, since 50% of the potentially available water will have been used in that period of time.

Enough water should be applied to ensure that the entire root zone will be wetted. Too, on natural soils, as opposed to those modified for intensive use (golf greens and bowling greens), sufficient water should be applied to bring about contact with sub-soil moisture. Continuous contact between the upper and lower levels of moisture will avoid development of a dry layer through which roots cannot penetrate.

Under arid or semi-arid conditions, or any location where salts may have, or will accumulate, water must be added in quantities greater than is actually required to satisfy the water needs of the grass or to replenish the soil reservoir. This is necessary to ensure periodic “flushing” of the soil to remove the salt accumulations.

Application of too much water at one time (misuse) is serious when the soil is poorly drained and the excess cannot be removed within a reasonable period of time. Such a situation is more critical in saline or salty areas or when saline water is being used. When such conditions obtain, water usage must be modified.

Soils have little direct affect on plant usage of water. Plant use of water is a solar driven phenomenon. The water evaporated and transpired as a result of this solar energy is approximately equal to that required to meet the plant's need. This relationship must be clearly understood to make efficient use of this vital, and dwindling resource.

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Measuring Roots' Muscle Power

As plant roots grow toward water and nutrients, they exert pressures of up to 150 pounds per square inch, often splitting granite boulders and upheaving sidewalks and streets in the process. U.S. Department of Agriculture scientists are studying root pressure and growth in order to breed plants that can better penetrate compacted or dry soils. For these studies, the scientists invented special research tools, including a miniature pressure gauge less than five-millionths of an inch in diameter to record pressure inside individual root cells, and sensitive rulers to measure root growth — often less than one thirty-second of an inch per hour. These tools have allowed detection in growing root tips of minute pressure changes caused by the plant's response to its environment, and give scientists some indication of the roots' muscle power.

Pictures from the Inverness C.C. Meeting held in April

