Water available to turfgrasses from rainfall and soil storage is rarely synchronized with plant needs in either time or quantity. Water problems vary from absolute desiccation to submersion and correction of these problems must be addressed by judiciously applied irrigation or drainage. The priority of irrigation as a component of turfgrass management ranges from an absolute essential for grass survival in arid climates to luxury, “cosmetic” applications in areas of high rainfall. Judicious application of irrigation water requires uniform application at rates sufficient to meet the needs of the particular turfgrass situation. Besides a well-designed and operated irrigation system, there are other parameters essential to this process. These include the infiltration rate of the soil, the evapotranspiration (ET) potential, the water requirement of the turfgrass as determined by ET rates, and the level of turfgrass performance chosen. This chapter will address itself to water requirements, direct and indirect measurement thereof, and factors which affect them.

I. WATER REQUIREMENT

Several terms have been used in studies of water use by crop plants. Use of the term water requirement, particularly by agricultural engineers, is “the amount of water from rainfall and irrigation necessary to meet specific production or performance needs.” The priority use of the term water requirement, particularly by agronomists, is that given by Briggs and Shantz (1913) in which water requirement is measured in terms of units of water per unit of crop harvested. Water use efficiency in crops has been discussed in terms of water per unit production, for example, Dobrenz et al. (1969b) or in terms of production per unit water (Pendleton, 1965; Frank et al., 1987). Under both definitions, efficiency can come from high production or low consumptive water use, but preferably both. In general, the term water re-