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TURFGRASS TRENDS

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BACK TO BASICS

Water
How Turfgrasses Obtain and Use Moisture

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Having survived a 1998 summer season that offered some of you the driest weather on record, it might be useful to review some of the basic ideas on how and why turfgrasses uses water. Being familiar with these principles of water use may help you decide when water conservation is wise and when it may do more harm than good.

The management of water use on turf has been considered within these pages (Hull 1996a; Richie et al. 1997; Shank, 1998; Qian and Engelke 1999; Richie et al. 1999) and elsewhere (Hull 1996b; Fry et al. 1998; Fry and Jiang 1998). Most of these articles assume that the reader has a basic understanding of how turfgrasses acquire, transport and lose water. This is generally a safe assumption but might not always be true because of advances in our understanding of plant water relations. In this *Back to Basics* piece, I will review some long accepted concepts and add a few new wrinkles to our understanding of water use by turfgrasses.

How water functions in turf

Water is the medium of all biology. Life presumably originated in the primordial seas and to this day operates within an aqueous environment that resembles the probable composition of early oceans. Life is essentially a complex of controlled chemical reactions that function in water. Water is even a substrate for some of these reactions, e.g. photosynthesis and hydrolysis.

As plants invaded and colonized the land about 450 million years ago, they created ways for maintaining the integrity of their aqueous environment while growing and reproducing in a largely dry and often hostile world. Today, turfgrasses are frequently managed under similarly hostile conditions. To survive, plants needed to evolve ways for absorbing water from where it was available (usually the soil), transporting it to above-ground organs (stems and leaves), and controlling its loss so aerial organs would not desiccate and die. Also, this transport of water from roots to shoots soon became the principal route by which plants also transported all essential mineral nutrients from the soil to shoot organs.

As this system evolved, the evaporative loss of water from leaves and other shoot organs could not be entirely prevented and still allow for the necessary exchange of atmospheric gases. This was not all bad because the cooling effect of evaporation proved useful for stabilizing shoot temperatures within a range that was compatible with life chemistry. Thus,

IN THIS ISSUE

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