



The Water Cronicles

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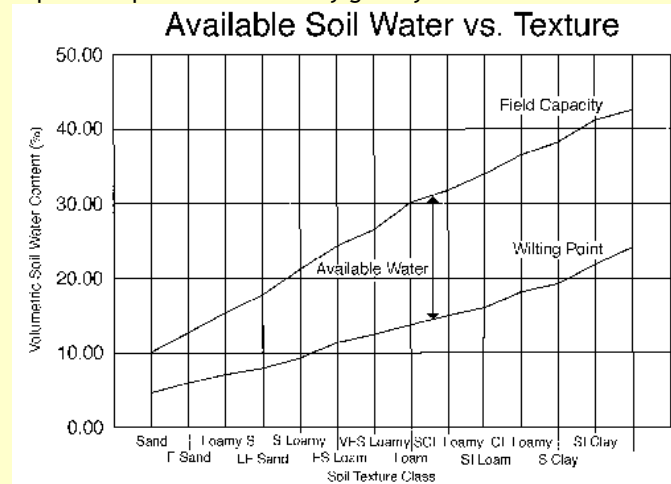
Proper Watering, It is all about Soil and Roots.

By Chris Vasecka

Assuming that in a perfect world you have a well designed irrigation system that is operating at proper pressure and that the sprinklers are all working properly. Then applying the right amount of water is all we have left to figure out. Up till now the need to water has only been driven by the appearance of the lawn and the landscape on the surface. Knowing what is happening below the surface will give us better insight on the actual water needs of the plant.

Some General Assumptions

To make this discussion easy to understand, let's assume that the general crop that we are irrigating is Turfgrass "Bluegrass or Ryegrass for the Northern Regions". If the property was built in the last 20 years, the whole property was excavated the Building was built, backfilled and the landscape was topped with 6 to 8 inches of Top Soil. If the lawn is established we can insure maximum rooting depths of up to 8 inches in any given year.



Soil.

If the soil is Sandy Loam the field capacity of the 8 inches of soil is 1 inch of water maintained within the soil profile. This would be water available to the plant. The wilting point for turfgrass is 20% of the 1 inch or less than a 1/4 of an inch. To play it safe we want to be somewhere within 50% to 100% of capacity when we irrigate our turf. Anything over or under would be inefficient and either we would lose plant material or we would be wasting water. If we know that after a rain event has happened and the soil is at field capacity then we know that we can lose a half an inch of water before we need to irrigate.

Weather and Evapotranspiration.

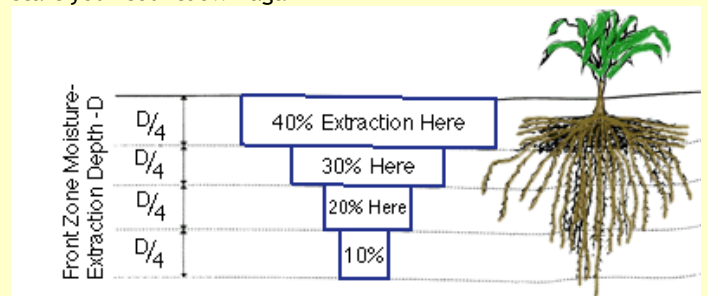
Wind, Sun, and temperature effect how fast our soil and plants lose their available soil moisture this is called Evapotranspiration or ET. Pending on the time of the season

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this ET can range from .05 inches per day up to .25 inches per day. The first would occur in April and October and the last would occur between July and August. Knowing this we can apply the same amount of water only in different frequencies. In April and October if there is no rain event, you could go up to 10 days before you would need to apply water. In July and August you would need to apply that same amount of water every other day. If there is a rain event, you can only count the beneficial rain which would be the first 1/2 inch, any other rain would either leach through the root system or simply run off. So in the case of a 1/2 inch rainfall you would be back to full capacity. You would be able to start from scratch and start your countdown again



Roots.

Though your turf can grow up to 8 inches of roots, the depth of the roots change through out the year. In late spring and early fall, root will drive deep in preparation of a hot summer and a cold harsh winter. The better the root development the better the chance for survival through summer and winter. The last thing we need to do is to get in the way of that root development. The common saying of "Water Deep and Infrequent" applies to these times of year. Because the weather is not too hot we can push our plants to become more dependant on the water which is in the deeper soil. Because our root zone mix is only 8 inches those roots will only go that far. During the summer months the grass plants begin to use up it stores of food and the roots begin to retract in depth. In mid July the root depth can retract up 2-3 inches of total root depth. The watering strategy at this time of year changes dramatically. Remember that Sandy loam only holds 1/8 of the water in each inch of soil. In this case we are only working with 3/8 inch of water available to the plant. Deep watering during this time would be senseless and our plants would probably be dead. Frequency should be everyday with light amounts of water. Now most cities require that you have to water even or odd. This does not mean that you can not run a cycle after midnight and before midnight of the same day, effectively watering every evening. Once early fall arrives these cycles can be changed as the weather cools and the plants begin putting down new roots.

Effective Application

The application of the water to the soil can be done in many different ways and with different tools. For this application we will look at the different tools which are used in an irrigation system. Rotors, Sprays, and Microsprays are the tools which are used most commonly. Sandy Loam on a flat surface can take up between $\frac{1}{2}$ to $\frac{3}{4}$ of an inch of water an hour. If the area is sloped this amount changes to $\frac{1}{4}$ to $\frac{1}{2}$ inch of water per hour. Rotors put out .6 to .75 inches per hour, Sprays put out 1.5 and 2 inches per hour, and Microsprays put out between .6 to .7 inches per hour. If you are watering a flat surface with either rotors or microsprays you could water all at one time. If you have spray zones you would have to run $\frac{1}{2}$ of the water and wait for one hour before applying the second half. This is called cycle soak. If you are watering a sloped area, you will need to cycle soak with rotors and microsprays, and you may need to cycle soak twice with sprays. **Helpful Solutions**

Knowing that good soil depth will help in the depth of roots, you may want to look at your soil profile and determine how deep your growth medium is. The sprinkler system design is crucial in managing the amount and the distribution of the water applied. Having a system audit will expose design faults that can be fixed. A good working irrigation controller with multiple programs and start times can allow you to install various programs to work with different weather situations. The availability of a Global percentage button can allow you to turn up and down the whole system without changing any programs. The ultimate control solution is to install a smart clock, which will calculate the needs of the lawn according to soil, plant, slope and weather inputs. The program will change daily according to the needs. New controllers with soil moisture meters also control the system by adjusting the output according to the actual soil moisture levels.

Weather based smart Clock.

ESP-SMT Smart Controller by Rainbird.

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