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Scheduling irrigation

What is the best way to schedule our irrigation cycles? I am at a new municipal park and athletic facility with bermudagrass (Tifway) that was grown-in the last few months. We currently water each field each night to replace daily ET losses. Our fields tend to be a little on the wet side. For the most part, we can only run the in-ground system at night. Since our run times are pretty short, we can get all the fields watered before our crew arrives in the morning.

Oahu, Hawaii

With a grow-in, turf is often watered much more than once the turf is established and has a more mature root system. Irrigating with frequent light watering on mature turf is generally not recommended. This method never allows the soil profile to be wetted to any depth, encouraging shallow root growth. With proper irrigation scheduling, turf health will not be limited by water stress from droughts and the waste of water and energy used in pumping will be minimized.

While ET is an oft-used method for irrigation scheduling, it does have its flaws. Most ET information is based on a model that predicts water use since actual on-site measurement is often impossible. These methods generally make an assumption that climatic data used is directly correlated to how the turf responds under those conditions. I understand that these methods (models) are better for long-term prediction but have some limitations for the short-term. Soil moisture status has also been used to determine soil moisture depletion.

Wilting point

During irrigation, water is distributed in the soil by gravity and capillary forces until it begins to drain downward. At this time, soil moisture in the root zone may be considered to be in storage, depleted primarily by ET. This upper limit of water storage is called "field capacity." If water in the soil is not replenished as it is removed, the plant will eventually show water stress and begin to wilt. This low limit of soil water has been defined as the permanent wilting point. The difference between field capacity and permanent wilting point is available soil water. This available soil water is what allows you to stretch you irrigation interval, depending upon ET rate. Soil type has a significant influence on available water capacity. There are actually water budget methods to calculate available soil water with ET losses and irrigation/rain additions. Allowable depletions of 1/2 to 2/3 of the available soil water are commonly used to schedule irrigations.

Because irrigation's objective is to maintain a favorable water status for turf health, the plants themselves are the best indicators of the need for it. Moisture-stressed grass appears blue-green or grayish-green in cooler, recuperates slowly (>1 minute) after walking or driving across it, or wilts continuously. This is because a plant rolls its leaves and wilts to conserve moisture. Often certain areas or patches of turfgrass tend to wilt before others due to poor irrigation distribution, to poorly developed root structure, or to a localized dry spot from a soil influence. It is good that you are irrigating at night when efficiencies can be maximized.

Since you are already using an ET-based method, I would suggest that you also include some plant-based observations into your scheduling so that you can increase you irrigation interval. By lengthening the interval between irrigations, you are maximizing the root systems. Plants tend to have continued root growth relative to shoot growth during periods of water stress. This results in an increase in the root-to-shoot ratio and is an important mechanism for avoiding drought stress. You can increase this interval by understanding a little more about your soil-water storage.

But I don't think elaborate calculations are necessary to determine when to water. Just a basic understanding of the available water and some careful observations can be used very effectively. After a thorough watering, monitor your fields for "hot spots" or general drought stress. Using your ET information and experience, you should be able to determine how much water is available in your soil. Therefore you can predict with ET when your plants will begin to show signs of stress and require an irrigation cycle. Depending upon sunlight, relative humidity, temperature, wind, rainfall, and available soil moisture, you may need irrigation after one day, or you may be able to go months. You will generally not need to water every day. I also suggest that you replace a less than the total ET loss when you irrigate, especially if rain is in the forecast. ST

Have Questions?

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