



Water Loss & Use by Plants

Plants depend on the soil to provide their root systems with sufficient water and nutrients to allow consistent, full growth. The past couple weeks of heat have pushed plants' ability to maintain healthy water status, in some cases even when there should be sufficient water in the soil. In drier soils or spots in our region which missed some rain events, plants definitely experienced moisture deficit stress.

Water usage by plants can be measured, but it is very difficult to do. Instead, plant professionals, farms, and irrigation planners utilize a well-documented and tested equation that takes climatic conditions into account. This single number measure is termed Evapotranspiration (ET). It accounts for water loss from the soil through both evaporation and transpiration. Evaporation is the water lost simply due to wind and sun taking water out of the soil. Transpiration is the water which is taken up by the roots and emitted as water vapor through the stomata found in leaves. Transpired water accomplishes plant growth, whereas evaporated water does not.

ET varies consistently according to four key climatic conditions: temperature, wind speed, humidity, and solar radiation. These four factors are easy to measure and can be inputted into equations, and a crop or plant type coefficient can be added into the equation to have a calculated ET for a particular plant growth situation. The three biggest factors in a farm field or home garden situation end up being stage of growth of the crop/plant grouping; temperature; and the amount of solar radiation on a given day.

You don't need to track all this information yourself, if you are interested in keeping track of ET for your farm or garden. There is a website which does it for you, managed by the Ag Weather group of UW-Madison, Division of Extension and found

at: https://agweather.cals.wisc.edu/sun_water/et_wimn You can view a map of the most recent day's information, and you can also change the coordinates on the page to view information for a spot very near your location. As an example, while writing this article, I put in coordinates that would correspond to approximately Middle Inlet and found that the calculated ET's for July 3-9 ranged from 0.21 inches to 0.29 inches per day, with a total ET of 1.78 inches.

Those are relatively typical summer ET values, and they show precisely how important it is to ensure that you are providing your plants with enough water availability. The ET and actual ET can be different; as having canopied crops or mulched areas between plants, as in a vegetable or perennials garden, will decrease actual ET from what the calculated potential ET indicates. If weather patterns change and we cool off, the ET values will decrease. Higher degrees of cloud cover in a day will also decrease ET, but lower humidity levels will increase ET.

Understanding ET values helps farms manage their irrigation plans, if they have irrigators on any portion of their farm. Using irrigation in excess is inefficient economically, and has the opportunity to increase nitrate loss to the groundwater. Conversely, not using irrigator units when they should be getting used creates crop yield loss. These same concepts hold true in a home vegetable garden or perennial bed. If you let your plants experience water stress, their quality of growth and potential yield will be reduced. If you water more than necessary, you waste resources and increase the opportunity for nutrient loss and extra disease pressure.

In summary, our area has experienced the heat of summer in recent weeks, but our plants have not gotten stressed in most areas due to sufficient rainfall. Areas which did experience stress have experienced fairly short term stress, so we probably have not lost much yield potential, to this point in the growing season. As we progress through the rest of the year, make sure you are managing your plants' water needs to the best of your ability. When watering home landscapes and gardens, try to use overhead watering in the early morning to be most efficient and to not increase disease potential. If using soaker hoses or drip irrigation, time of day is less critical.

As always, if you have any questions regarding agricultural or horticultural issues, you can contact Marinette County Agriculture and Horticulture Agent Scott Reuss. He serves as the local link to all of the resources of UW-Madison's Division of Extension in those programs. He can be reached at 715-732-7510 or e-mail to scott.reuss@wisc.edu