It’s HOT- are your Veg Crops getting enough WATER?

It’s easy to get busy with so many things this time of year that you forget to focus on the thing that makes up 80 to 95% of your vegetables. Growth rates of many important crops can be exponential right now, especially in the heat, so water is critical. If your plants are doing just “OK“ but you would expect more explosive growth, consider that there’s a water issue. Think of it this way: if your car doesn’t start and you don’t remember the last time you put gas in the tank, that might be the first thing to check.

Water and Your Soil Conditions: Texture, Organic Matter, Tilth

What is the texture of your soil? If yours is in the silt loam category, you probably have your mind on water a lot less than if it’s in the loamy sand category, where you may watch crop plants go through a routine mid-day wilt in hot weather. Organic matter (OM) increases water holding capacity in lighter, sandier soils, but because they are also well aerated, OM decomposition is rapid, and accumulation is slow. If your sandy soil has more than 5% organic matter, don’t despair, you’re doing very well. It’s important to not “burn” that up through excessive tillage, which aerates the soil and hastens decomposition. Excessive tillage can also cause surface crusting, which decreases infiltration, which is especially an issue with our more frequent heavy rainfall events. Siltier soils allow for more rapid OM accumulation but can be even more at risk for surface crusting.

Soil texture and organic matter also influences what water does as it infiltrates, as seen in the diagram on the left. This is especially important when using drip irrigation, which is really efficient. But sometimes, one drip tape is not enough.
**Soil conditions, continued...**

Surface **mulch** can prevent evaporation in hot, dry weather. Organic mulches such as leaf mold, wood chip, or straw, promote formation of **aggregates**, courtesy of earthworm activity just under the mulch. Infiltration improves because rain drops are dispersed, and pore space is increased. Black plastic mulch performs an important service in warming spring soils, and does hold moisture in where there is drip installed underneath, but it is non-porous, so only heavy rain provides for plants that are growing through it. Landscape fabrics, which have gained in popularity, allow infiltration, hold down weeds, and reduce evaporation.

Under the surface, **compaction layers** are not uncommon. There are two problems with this as it relates to water. Even “shallow” rooted vegetables like brassicas, lettuce and onions can reach as deep as 2’, but compaction layers are often in the 8” to 16” range. This limits roots’ ability to “search” for deeper water (and nutrients). Such a layer can also prevent heavy rainfall from draining out, leaving saturated anaerobic conditions that favor root rot pathogens. You can check for a compaction layer with a Penetrometer. In fact, we have one at URI and you are welcome to borrow it.

One more key thing about soil conditions and water: if soil isn’t holding moisture or you’re not getting enough into the soil, **microbial activity** is limited, and that means **mineralization of N and P** (conversion from organic forms into available mineral forms) is reduced. So is plant growth.

**Water for your crops: What do they want and When do they want it?**

“Shallow” rooted crops include lettuce, brassicas, onions, spinach and (believe it or not) potato. But how shallow is shallow? If there’s no compaction layer and the topsoil is deep, these can grow roots beyond 2’. More often than not, much of the root growth is in the top foot, usually where nutrient sources are more concentrated following repeated applications of amendments. And also because sometimes, not enough irrigation water is applied to infiltrate any deeper (unlike a good drenching rain). This can mean that deeper rooted crops, such as squashes, peppers and tomatoes, remain shallower than they might otherwise, and that restricts their ability to find **nutrients that are actually present in your soil**. Water deeply: 30 minutes of drip doesn’t reach down very far. Run the drip for three hours where you know things have really dried out. You can tune your hands to what a thorough watering feels like: **DIG IN** the next day, then in 2 more days. There are more sophisticated units like tensiometers or electronic sensors which can make it a little easier, but you do need to maintain the discipline to check them.
An Informal Trial at SODCO

John Eidson, who manages turf production at SODCO, is very pleased with their Microclover Black Beauty sod, which requires no nitrogen fertilizer. He is interested in whether it could work well as a living mulch between rows of vegetables. Pictured (right) are narrow beds which he cut into existing turf and then transplanted tomatoes. He reduced N fertilizer to about half rate. Drip lines are installed for each row. It will be interesting to find out how they do.

And in a similar vein...

Allegra Halverson planted buckwheat this spring between these rows of trellised peas. Living mulches can suppress weeds while maintaining living groundcover which keeps the soil microorganisms flourishing and in this case, provides some forage for bees (until it’s time to mow it down to prevent setting of seed.)

What do they want and when do they want it, continued...

Many fruiting vegetable crops are beginning to fruit right now, and this is a “water expensive” process. For tomatoes, especially, it’s important to maintain steady moisture to avoid blossom end rot. Same goes for cucumbers, especially to avoid misshapen fruits. Chard has a deeper root system than kales, and if you’ve been picking on a planting for sometime now, the roots are now really deep. Kales, on the other hand, will not find the deeper moisture. Onions are beginning to bulb, so this is also a critical time for water availability. Potatoes are forming tubers, also a very water-demanding stage. In short: This is a time of high water demand for many crops, surface evaporation rate is very high, and it looks like we are not getting the rain.

Sprinkler irrigation has its place at this time of year. As long as leaves are able to dry off, it’s an easy way to water large areas with a minimum of bother. Later in the season as leaf-drying is reduced, there's more risk of foliar diseases. Micro-sprinklers work well for broad beds of salad greens where multiple drip tapes would otherwise be required.
Sightings and Be-On-The-Look-Outs-For...

Potato leafhoppers are now causing hopper burn, and dry weather makes it worse. Watch your beans, eggplant and potato.

Squash bugs are laying eggs and nymphs are around. At high numbers they can really weaken squashes and cucumbers.

Tarnished Plant Bug is causing damage on numerous crops, including broccoli heads (the so-called “beads”, which are really flower buds). They feed on terminal buds of many vegetable crops and can cause: abortion of young fruit or buds, deformation of fruit, necrosis near the site of feeding, damage to seeds, and reduced or deformed vegetative growth including tip die-back (when an apical bud or very young stem is the feeding site). See the New England Vegetable Management Guide for control measures.

Basil Downy Mildew has been seen in Westport, MA, and it is likely appearing in locations in RI.

High tunnels get too hot for tomatoes during heat waves. The result is toasted tomato blossoms. Hopefully there won’t be another heat wave...