IRRIGATION – SCHEDULING

Irrigation Scheduling Methods
- According to the calendar.
- Plant water stress signs.
- Soil water status.

Scheduling methods based on soil moisture status:
1. A water budget procedure based on the estimated crop water use rate (ET) and soil water storage.
2. A direct measurement procedure based on instrumentation to measure the soil water status.
3. A combination of 1 and 2.

All soil moisture based irrigation scheduling procedures require knowledge of:
1. crop water requirement,
2. effective root zone,
3. water holding capacity of the soil and
4. irrigation system capabilities.

Water holding capacity of the root zone
The difference between field capacity and the permanent wilting point is the water available to the plant.
### Maximum Allowable Depletion

The level at which the decision is made to turn on the irrigation is called the **allowable depletion**.

Allowable depletions of \( \frac{1}{3} \) to \( \frac{2}{3} \) of available soil water are commonly used in irrigation scheduling. As a "rule of thumb", an allowable depletion of \( \frac{1}{3} \) of AW should be used if other specific date is not available.

### Soil Water Retention

<table>
<thead>
<tr>
<th>Type of Soil</th>
<th>Range (inches/ft)</th>
<th>Average (inches/ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sands and fine sands</td>
<td>0.4 to 1.00</td>
<td>0.75</td>
</tr>
<tr>
<td>Moderately coarse-tex-tured sand loams and fine sandy loams</td>
<td>1.00 to 1.50</td>
<td>1.25</td>
</tr>
<tr>
<td>Medium texture very fine sandy loams to silty clay loam</td>
<td>1.25 to 1.75</td>
<td>1.5</td>
</tr>
<tr>
<td>Fine and very fine tex-ture silty clay to clay</td>
<td>1.50 to 2.50</td>
<td>2</td>
</tr>
<tr>
<td>Peats and mucks</td>
<td>2.00 to 3.00</td>
<td>2.5</td>
</tr>
</tbody>
</table>
Irrigation Methods based on Soil Moisture Measurements

- tensiometers
- electrical resistance blocks (gypsum blocks)
- neutron probe
- TDR.

Combination methods

Tensiometers (or other soil moisture indicators) used in combination with ET measurements or estimation. The soil meter is read to determine when to irrigate, and the ET data are used to calculate the volume of water lost since the last irrigation which is the net amount of water necessary to apply to the crop.

A general rule for vegetable irrigation, is to provide irrigation before 50% of this water is used in order to avoid plant stress. Frequent, low-volume application allows the soil moisture content in the root zone to be maintained near the optimal levels.

If possible, 33% depletion should be used for scheduling drip irrigation. This requires frequent (once or more per day), short water applications.
Depth of the root zone | Available water per 100 ft of row | Maximum duration of irrigation | 50% depletion
--- | --- | --- | ---
1.0 ft | 90 gal | 45 gal | 1 hr 30 min
1.5 ft | 135 gal | 68 gal | 2 hr 15 min
2.0 ft | 180 gal | 90 gal | 3 hr

Guide to irrigation for Florida sandy soils (0.72 in/ft) (tape discharge of 0.5 gpm/100ft assumed)

Frequent, short irrigations (once a day or more) are always better than infrequent and long irrigation cycles.

For most vegetables, it is recommended that irrigations be scheduled when the tensiometer reading reaches 10 cbars for a tensiometer placed at the 6-inch depth.

For typical Florida sandy soils, this corresponds to 50% water depletion. A reading of 7-8 cbars is approximately a 33% depletion.

Tensiometers should be used to monitor soil moisture and avoid water stress to the plants. They are relatively inexpensive and have been proven to be very reliable in Florida's sandy soils.