Vegetable: Soil water management

Soil Management

Soil Structure, Soil Texture, Soil Type, Tilth

Why important?
   a. Seeding, Plant Establishment
   b. Root growth/penetration, aeration
   c. Water infiltration and movement
   d. Root, tuber and bulb crops – Quality and shape of crop

Key management Practices
   a. Site selection
   b. Tillage of correct type and correct soil moisture level
   c. Crop rotation
   d. Cover crop and/or mulch

Soil Fertility and Plant Nutrition

Soil Testing – provides knowledge of soil levels at start of cropping season and allows adjustment of fertilizer according to needs.
   1. Nitrogen
   2. Phosphorus
   3. Potassium
   4. pH
   5. Micronutrients – zinc, iron, copper, manganese, sulfur, etc.
   6. Toxicities or imbalances

Plant Tissue Analyses – provides current nutritional status during growing season; most useful for adjusting fertilization of future crops

Management Practices
   a. Soil Test
   b. Apply fertilizer according to specific crop needs
   c. Crop rotation – e.g. alternate deep and shallow rooted crops
   d. Proper irrigation management

Water Management

Why important?
   1. Crop Yield
   2. Crop Quality
   3. Disease Management

Management Practices
   Pre-Irrigation leads to
   a. Better crop establishment
   b. Better weed management strategy
   c. Water may be more available during off-season
   d. Less irrigation during crop season

Prepared by Ron Voss and Mark Bell. April 8, 2008

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Water Management (continued)

Frequency and Amount of Irrigation
a. Warm season vegetables – usually deeper rooted, thus infrequent irrigation with higher amounts of water.
b. Cooler season vegetables – usually shallow rooted, thus more frequent irrigation with lower amounts of water
c. Growth stage important

Method of Irrigation – criteria for choosing
a. custom/knowledge,
b. efficiency,
c. infiltration rate into soil / aeration,
d. capital available,
e. value of crop

Types of Irrigation – Advantages, Disadvantages

<table>
<thead>
<tr>
<th>Method</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Border</td>
<td>Inexpensive, Least technology</td>
<td>High irrigation rates, Low water infiltration and soil aeration</td>
</tr>
<tr>
<td>Furrow</td>
<td>Inexpensive, Relatively low capital and technology, potentially lower weed control costs</td>
<td>Inefficient, Requires leveling of soil, salt accumulation</td>
</tr>
<tr>
<td>Sprinkler</td>
<td>Leaching of salts, uniform application, higher efficiency, application of fertilizer</td>
<td>Capital investment cost, foliar disease, technological knowledge, higher weed population</td>
</tr>
<tr>
<td>Drip</td>
<td>Most efficient, application of fertilizer, lower foliar disease and weed incidence, uniform application</td>
<td>High initial cost, higher technological knowledge</td>
</tr>
</tbody>
</table>

Monitoring or Measuring Irrigation Needs
a. Monitor soil moisture – e.g. tensiometers
b. Measure or estimate crop water use – e.g. ET (evapo-transpiration)
c. Combination of soil-moisture and water-budget based scheduling approaches

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