Irrigation Management for Wheat

Mike Ottman, Doug Munier, and Steve Orloff
What input is more important than water?
Important questions

• Water use?
• Irrigation requirement?
• Irrigation system?
• Scheduling tools?
• Irrigation timing?
Total water use – Central Valley

<table>
<thead>
<tr>
<th>Stages</th>
<th>WATER USE (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot</td>
<td>8</td>
</tr>
<tr>
<td>Soft dough</td>
<td>16</td>
</tr>
<tr>
<td>Maturity</td>
<td>23</td>
</tr>
</tbody>
</table>

(Adapted from Fulton, 2006)
Monthly water use – Central Valley

(Adapted from Fulton, 2006)
Irrigation requirement

• Water use
• Effective rainfall
  – Leaching
  – Runoff
  – Evaporation
• Irrigation efficiency
  – Flood
  – Sprinkler
  – Drip
## Number of irrigations

<table>
<thead>
<tr>
<th>Region</th>
<th>Irrigations*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central coast</td>
<td>1-3</td>
</tr>
<tr>
<td>Sacramento Valley</td>
<td>1-3</td>
</tr>
<tr>
<td>Intermountain area</td>
<td>1-4</td>
</tr>
<tr>
<td>San Joaquin Valley</td>
<td>3-6</td>
</tr>
<tr>
<td>Imperial Valley</td>
<td>5-7</td>
</tr>
</tbody>
</table>

* More irrigations generally applied with sprinkler or drip (adapted from Fulton, 2006)
Irrigation Systems

- Flood
- Sprinkler
- Furrow
- Drip

Steve Wright, U. Calif.
Kurt Nolte, U. Ariz.
Steve Orloff, U. Calif.
Irrigation scheduling methods

- Calendar date
- Crop stage
- Soil moisture content
- Crop stress
- Soil water balance
  (checkbook)
## Irrigation Schedule – Central Valley

<table>
<thead>
<tr>
<th>Stage</th>
<th>Irrigation or rainfall date</th>
<th>Crop water use between dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planting</td>
<td>Dec 15</td>
<td>0 inches</td>
</tr>
<tr>
<td>Tillering</td>
<td>Feb 28</td>
<td>1.75</td>
</tr>
<tr>
<td>Jointing</td>
<td>Mar 26</td>
<td>2.75</td>
</tr>
<tr>
<td>Boot</td>
<td>Apr 15</td>
<td>3.50</td>
</tr>
<tr>
<td>Kernel watery</td>
<td>May 01</td>
<td>4.00</td>
</tr>
<tr>
<td>Soft dough</td>
<td>May 16</td>
<td>4.00</td>
</tr>
</tbody>
</table>
## Irrigation timing

<table>
<thead>
<tr>
<th>Technical terminology</th>
<th>Glass analogy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil texture</td>
<td>Glass width</td>
</tr>
<tr>
<td>Rooting depth</td>
<td>Glass height</td>
</tr>
<tr>
<td>Soil moisture</td>
<td>Water height</td>
</tr>
</tbody>
</table>
Germination irrigation

- **Pre-irrigation**
  - Germinate weeds
  - Nice seedbed
  - Narrow planting window

- **Irrigate up**
  - Timeliness
  - Crust

- **Rainfall**
  - Save water
  - Rain not reliable
First irrigation

• Early
  – Cool soil
  – Waterlog soil

• Late
  – Reduce tillering
  – Reduce rooting
Last Irrigation

• Early
  – Reduce yield
  – Shriveled kernels
  – Low bushel weight

• Late
  – Waste water
  – Increase lodging
  – Delay harvest