Irrigation Management of Strawberries

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Strawberry Industry and Cooperating Growers
Specific questions about Strawberry Irrigation

- How much water is applied during the production season?
- How much do water requirements of strawberry vary among locations, varieties, and soils?
- Are there opportunities to conserve water or improve production with better management?
We monitored 34 strawberry fields during the 2010 production season

- Proprietary and UC variety (Albion)
- Pajaro and Salinas Valleys
- Flow meters installed to monitor ~ 0.5 acres
- Subset of 17 fields were intensively evaluated for irrigation schedule, soil moisture, salinity, soil and plant nutrients
Total Seasonal Applied Water

Field Total (January - October 2010)

Avg = 21.0 inches
Did growers over or under apply water?

- **Seasonal Crop ET (inches)**
  - Average = 21.5 inches

- **Applied Water (% of crop ET)**
  - Average = 93% Crop ET
Crop coefficients for strawberry were based on canopy cover:

\[ ET_{\text{crop}} = ET_{\text{ref}} \times K_{\text{crop}} \]

\( K_c \) varied from 0.05 to 0.95

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Canopy development was similar among varieties and planting configurations.
Does yield potential affect water requirement?

\[ 6500 \text{ cartons/acre} \times 11.5 \text{ lbs/carton} = 74750 \text{ lbs/acre} \]

\[ 74750 \text{ lbs/acre} \div 8.3 \text{ lbs/gal} = 9006 \text{ gal/acre} \]

\[ 9006 \text{ gal/acre} \div 27154 \text{ gal/acre-inch} = 0.33 \text{ inches or 1.6\% of seasonal amount of water (21 in) applied to berries} \]
Effects of irrigation on seasonal soil moisture
Soil moisture tension (cbar)

Watermark  Soil Water Tension
(Site 17-Sandy Loam)
Applied Water and Crop ET (Site 17-Sandy Loam)
Watermark -- Soil Water Tension
(Site 13- Silt Loam)

![Graph showing soil moisture tension over time at different depths.](image)
Applied Water and Crop ET (Site 13-Silt Loam)
Effect of Irrigation on Fruit Yield

Seasonal Berry Yield (% of maximum) vs. % of Crop ET

ECw = 1.27
Average Soil Salinity levels increased by 0.64 dS/m

Soil ECe of 1.3 dS/m = 90% of yield potential
## Irrigation System Uniformity

<table>
<thead>
<tr>
<th>Distribution Uniformity</th>
<th>Tape Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
</tr>
<tr>
<td>site 1</td>
<td>88</td>
</tr>
<tr>
<td>site 2</td>
<td>84</td>
</tr>
<tr>
<td>site 3</td>
<td>80</td>
</tr>
<tr>
<td>site 4</td>
<td>82</td>
</tr>
<tr>
<td><strong>AVG</strong></td>
<td>84</td>
</tr>
</tbody>
</table>
Average system flow rate variation = 19%
Regulate Pressure of Blocks
Summary

- Seasonal water applied to strawberries ranged from 10 to 37 inches (avg = 21 inches)
- Variation in applied water could not be explained by differences in crop ET, planting configurations or variety
- Poor control of pressure may partially explain variation in applied water
- Applying less water than 75% of crop ET may lead to higher soil salinity levels and yield loss