Update on Peach Systems Trial

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Fruit Research Extension Center
Penn State University
Goals of an “Ideal” System:

• Valuable Crop
  – Variety
  – Size and Quality
• Early yield & ROI
• Sustained High Marketable Yields
  – Light interception
  – Light distribution
• Labor efficient production
  – Minimal ladder use
  – Simple tasks
Objectives:

• Compare and demonstrate

• 2 peach varieties:
  – Loring (conventional growth habit)
  – Sweet-N-Up (upright growth habit)

• 4 training systems: 172 - 484 trees / A
Upright Variety
Peach Systems Trial

Perp V, 484 T/A

Hex V, 242 T/A

Quad V, 346 T/A

Open Ctr, 173 T/A

Bird’s Eye View
Peach Systems

• Planted 2007
  – All @18’ cross row spacing
• Evaluate:
  – Tree growth
  – Yield and precocity
  – Fruit size & quality
  – Canopy light
  – (Labor efficiency)
Last Year Summary - Variety

• Loring trees were slightly larger
• Similar cumulative yield for both
  – Sweet n Up had highest yield in 2009
  – Decrease in yield for Sweet n Up in 2010
  – Increase in yield for Loring in 2010
• Sweet n Up Yield efficiency > Loring
Last Year Summary - System

• Closer spacing = smaller trees
  – Every season, including 1st

• Higher tree density = higher early yield, except
  – Perp V < Quad V and = to Hex V

• Quad V : highest yield, both seasons & varieties

• Traditional open center had lowest yields
  – largest peaches under drought of 2010, but
  – Cumulative large peaches < medium density systems
  – Irrigation during final swell is a necessity
Last Year Summary - System

• Lower tree canopies growing in low light
  – All systems
  – Even though trees still young
  – Summer pruning

• Yield differences relate to bearing surface
  – 5 ft. is too close
  – 7-10 ft. is best
  – All out-perform the commercial standard
Last Year – Take Home Msg

• Key advantages of HDP peach:
  – Early yield,
  – Simple pruning,
  – Adapts to mechanization.

• Key disadvantages:
  – Ladder or platform required (?)
  – Fruit size concern (?)

Preliminary conclusion: Quad V at 7’ x 18’ is best so far...
New in 2011:

IRRIGATION DURING FINAL SWELL!
New in 2011:

- All plots string thinned
- 2 passes / row
- Follow-up hand thinning
N. Blosi platform used
Thinning
Mating disrupt.
Summer pruning
Harvest
New in 2011: Partial Budget Analysis

• Specified costs / A:
  – Establishment (trees, planting, etc.)
  – Pruning (dormant and summer)
  – Thin (hand 2009, 2010; mech. + hand 2011)
  – Harvest (ladder 2009, 2010; platform 2011)

• Income based on reported market prices for the harvest periods + fruit size distribution
Tree Growth
Trunk Cross-Sectional Area

SweetNup

<table>
<thead>
<tr>
<th>Year</th>
<th>OV14</th>
<th>HV10</th>
<th>QV7</th>
<th>PV5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>110</td>
<td>90</td>
<td>80</td>
<td>70</td>
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<tr>
<td>2010</td>
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Loring

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Average Canopy Width

**SweetNup**

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<tbody>
<tr>
<td>Width (feet)</td>
<td>12</td>
<td>10</td>
<td>8</td>
<td>6</td>
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**Loring**

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Cross-Row Canopy Width

SweetNup

Loring

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Light Interception and Distribution
Light Interception per tree (before summer pruning)

**SweetNup**
- OV14
- HV10
- QV7
- PV5

**Loring**
- OV14
- HV10
- QV7
- PV5
2011 Yield

**SweetNup**

**Loring**

<table>
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<th>Yield (bu/acre)</th>
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<tbody>
<tr>
<td>SweetNup</td>
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Legend:
- Cyan: >3.0"
- Purple: 2.75-3.0"
- Green: 2.50-2.75"
- Red: 2.25 - 2.50"
- Blue: < 2.25"
Cumulative Yield, 2009-2011

**SweetNup**

- OV14: Yield distribution for different rainfall categories.
- HV10: Similar to OV14.
- QV7: Similar to OV14.
- PV5: Similar to OV14.

**Loring**

- OV14: Yield distribution for different rainfall categories.
- HV10: Similar to OV14.
- QV7: Similar to OV14.
- PV5: Similar to OV14.

Rainfall categories:
- >3.0" (light blue)
- 2.75 - 3.0" (purple)
- 2.50 - 2.75" (green)
- 2.25 - 2.50" (red)
- <2.25" (blue)
Cumulative Yield, by Year

**SweetNup**

**Loring**

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<tr>
<td>2011</td>
<td>200</td>
<td>400</td>
<td>600</td>
<td>800</td>
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<td>2009</td>
<td>200</td>
<td>400</td>
<td>600</td>
<td>800</td>
</tr>
</tbody>
</table>

Total yield (bu/acre)
## Economic Analysis

<table>
<thead>
<tr>
<th>Income over specified costs/acre</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>Cumulative</th>
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</thead>
<tbody>
<tr>
<td><strong>Loring</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>OV14</td>
<td>$1,449</td>
<td>$1,952</td>
<td>$4,594</td>
<td>$7,995</td>
</tr>
<tr>
<td>HV10</td>
<td>$2,261</td>
<td>$3,823</td>
<td>$7,410</td>
<td>$13,494</td>
</tr>
<tr>
<td>QV7</td>
<td>$4,417</td>
<td>$1,034</td>
<td>$7,486</td>
<td>$12,937</td>
</tr>
<tr>
<td>PV5</td>
<td>$2,210</td>
<td>$1,083</td>
<td>$6,230</td>
<td>$9,522</td>
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<tr>
<td><strong>Sweet N Up</strong></td>
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</tr>
<tr>
<td>OV14</td>
<td>$1,974</td>
<td>$875</td>
<td>$2,627</td>
<td>$5,476</td>
</tr>
<tr>
<td>HV10</td>
<td>$3,425</td>
<td>$2,754</td>
<td>$5,862</td>
<td>$12,041</td>
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<tr>
<td>QV7</td>
<td>$2,953</td>
<td>$839</td>
<td>$5,710</td>
<td>$9,502</td>
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<tr>
<td>PV5</td>
<td>$3,213</td>
<td>$375</td>
<td>$3,853</td>
<td>$7,441</td>
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</table>
## 2011 Hand Thinning: Platform Vs Ladder ($/ acre)

<table>
<thead>
<tr>
<th>System</th>
<th>Ladder cost</th>
<th>Platform cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open vase 14</td>
<td>18.53</td>
<td>18.53</td>
</tr>
<tr>
<td>Hex V 10</td>
<td>40.75</td>
<td>19.34</td>
</tr>
<tr>
<td>Quad V 7</td>
<td>37.11</td>
<td>18.53</td>
</tr>
<tr>
<td>Perp V 5</td>
<td>34.92</td>
<td>17.20</td>
</tr>
</tbody>
</table>
2012 Summary - Variety

• Similar tree size for both
  – Sweet N Up trees were taller (con)
  – Loring Trees were wider (pro)
• Loring trees had more yield in 2011
• Loring pulling away on cumulative yield
  – Sweet n Up had highest yield in 2009
  – Loring has been yielding more since 2010
• Advantage: standard spreading habit
2012 Summary - System

- Closer = smaller tree continues
- Closer = higher yield?:
  - Perp V 2011 yield < quad and hex
  - Hex 2011 yield now = quad
  - Quad cumulative yield still > Hex (for now)
  - Open vase has lowest yield (half of best systems)
2012 Summary - System

- Quad or Hex Vs Perp V – More scaffolds per tree did little to reduce tree height.
- V systems have filled their space
  - 2012: will manage for tree height at 14’
  - Vs may have peaked on yield / acre
- Open vase has > 2 feet to go to fill space
  - Expect annual yield to keep rising
2012 – Systems and Fruit Size

• OV has proportionately more large peaches
  a) Lower yield / acre
  b) We have lifetimes of experience with OV
     • Good at it!
  c) Perhaps we need to prune V trees harder to eliminate some (small) fruit
  d) Perhaps 500 Bu / acre is the target?
  e) Adjust fertilizer practices to reflect high yields?
     • No signs of deficiency...yet
500 Bu/A = 50,000 fruits/A

<table>
<thead>
<tr>
<th>System</th>
<th>Trees / A</th>
<th>Fruits / tree</th>
<th>Fruits / scaffold</th>
<th>Shoots / scaffold</th>
</tr>
</thead>
<tbody>
<tr>
<td>O. Vase</td>
<td>173</td>
<td>282</td>
<td>50-70</td>
<td>17 - 23</td>
</tr>
<tr>
<td>Hex V</td>
<td>242</td>
<td>207</td>
<td>35</td>
<td>12</td>
</tr>
<tr>
<td>Quad V</td>
<td>346</td>
<td>145</td>
<td>36</td>
<td>12</td>
</tr>
<tr>
<td>Perp V</td>
<td>484</td>
<td>103</td>
<td>52</td>
<td>17</td>
</tr>
</tbody>
</table>
Last Year – Take Home Msg

- Preliminary conclusion:
- Quad V at 7’ x 18’ is best so far...
2012 Take Home Message

• Hex V at 10 x 18 & Quad V at 7 x 18
• Quad:
  – Easier to get 4 good scaffolds
  – Earlier Bu. / A = best system for high value crops
• Hex:
  – Performance $\geq$ to Quad and Perp V with less initial investment
  – Scheduled replacement of declining peach blocks
Acknowledgements

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- Dr. Rich Marini
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- Edwin Winzeler
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- Tom Kon
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- SHAP Extension Committee
- SHAP Research Committee