Mechanical Harvesting
California Table Olives
2006 - 2011

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California Black Ripe
Traditional Orchards: 96-139 trees
Cultural: 1308/acre

Other: 515/acre

Harvest:
Dr. Yoav Sarig: “Any horticultural crop that is not mechanically harvested is no longer globally competitive.”
Limiting Factors

- Marketable olives consumers accept
- No long term damage to tree health
  - Mechanical
  - Pathological
- Efficient Enough to be Economically viable
Harvester
Limiting Factors

- Marketable olives consumers accept:

  0 = Sin daño
  1 = Daño leve
  2 = Daño moderado
  3 = Daño severo
  Corte y mutilación

Eliminated based on receiving station grades

- Confirm with sensory and consumer evaluations
Experimental Harvests

Each row was randomly assigned to either “hand harvest” or “machine harvest”

Half were treated at “Processor A” and the other half at “Processor B”

Half were processed as “fresh olives” and the other half as “stored olives”

8 differently treated olives/row

*Olives from different rows (#1-6) which went through the same treatment were **pooled together**

2 commercial olives

*The olives were standard products to be compared against mechanically-harvested ones
Trained a sensory panel
Could distinguish fresh
Could not distinguish hand from machine harvested olives
Taste Test for Black Olives

1~3 pm
RMI Sensory Rm. 1000

Consumer Preference Panels

10~3 pm
RMI Sensory
Liked machine and hand harvested olives equally well
Limiting Factors

Marketable olives consumers accept
Limiting Factors

• No long term effects on tree health
Clamp Strength < 800 PSI
Limiting Factors

- Marketable olives consumers accept
- No long term damage to tree health
  - Mechanical +/-
  - Pathological ?
Limiting Factors

80%
Final Harvester Evaluations

- Trunk Shaking (2009, 2010)
  - Removes fruit closer to trunk
    - 64% efficient

  - Removes more exterior fruit best
    - 68% efficient
Limiting Factors

- Marketable olives consumers accept
- No long term damage to tree health
- Mechanical =/-
- Pathological ?
- Efficient enough to be economically viable
- Not yet
Trunk Shakers: imported and domestic
“Harvest method determines tree training.” Gucci, 2009
## Effect of Mechanical Pruning on Yield 2008 – 2011

<table>
<thead>
<tr>
<th>Pruning</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>T/A cum</th>
<th>T/A ave.</th>
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</thead>
<tbody>
<tr>
<td>Mech.</td>
<td>1.34</td>
<td>0.07</td>
<td>6.8</td>
<td>7.3</td>
<td>15.5</td>
<td>3.9</td>
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<tr>
<td>Topped Hedged</td>
<td>Topped Hedged</td>
<td>------</td>
<td>Hedged West</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>West</td>
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<tr>
<td>East</td>
<td></td>
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</tr>
<tr>
<td>Hand</td>
<td>1.54</td>
<td>0.18</td>
<td>8.5</td>
<td>2.8</td>
<td>13.0</td>
<td>3.2</td>
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<td>NSD</td>
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<td>P = 0.05</td>
<td>P = 0.05</td>
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</tr>
</tbody>
</table>
Mechanically Pruned vs. Hand Pruned:
- harvested 8%* more efficiently: 2010
- decreasing alternate bearing: 2008 - 2011
Intensive: 202 trees/acre

12 Feet

6 feet

3 feet
12 Feet and 2 feet
Mechanical Harvesting

Summary

• No longer a significant problems
  – Processed Fruit Quality
  – Tree Damage

• Harvester Efficiency too low
  – Improving machine
  – Improving pruning
Mechanical Harvesting
Preparation

• Start pruning trees
  – lower height
  – narrow canopy

• Experimenting with mechanical pruning

• Thin annually