HARVEST MATURITY

APAL - AgFirst Orchard Walks

Stephen Tancred
January 2009
1. Harvest maturity basics
2. 2008 case studies; starch & pressure
3. Pink Lady flesh browning
4. Lets talk about colour
5. Scald control options
Harvest maturity basics
2008 harvest case studies – starch & pressure
Percent of rooms within STARCH guidelines for **LONG TERM C. A.**

<table>
<thead>
<tr>
<th></th>
<th>Sth Vic</th>
<th>G. Valley</th>
<th>M’jmup WA</th>
<th>St’hpe Qld</th>
<th>Av.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gala</td>
<td>37</td>
<td>75</td>
<td>18</td>
<td>42</td>
<td>43</td>
</tr>
<tr>
<td>G. Smith</td>
<td>56</td>
<td>64</td>
<td>4</td>
<td>0</td>
<td>31</td>
</tr>
<tr>
<td>Pink Lady</td>
<td>17</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>
Pink Lady Starch 2008
(SmartFresh recommend 2 - 3.5)
Pink Lady Starch 2008
(SmartFresh recommend 2 - 3.5)
Pink Lady Starch 2008
(SmartFresh recommend 2 - 3.5)
Pink Lady Starch 2008
(SmartFresh recommend 2 - 3.5)
Gala Starch
(SmartFresh recommend 2.5 - 4)
Gala Starch
(SmartFresh recommend 2.5 - 4)
Gala Starch
(SmartFresh recommend 2.5 - 4)
Granny Smith Starch
(SmartFresh recommend 2 - 3.5)
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Granny Smith Starch
(SmartFresh recommend 2 - 3.5)
Granny Smith Starch
(SmartFresh recommend 2 - 3.5)
Granny Smith Starch
(SmartFresh recommend 2 - 3.5)
Percent of rooms within PRESSURE guidelines for **LONG TERM C. A.**

<table>
<thead>
<tr>
<th></th>
<th>Sth Vic</th>
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<th>M’jmup WA</th>
<th>St’hpe Qld</th>
<th>Av.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gala</td>
<td>85</td>
<td>50</td>
<td>53</td>
<td>23</td>
<td>53</td>
</tr>
<tr>
<td>G. Smith</td>
<td>53</td>
<td>71</td>
<td>0</td>
<td>16</td>
<td>35</td>
</tr>
<tr>
<td>Pink Lady</td>
<td>40</td>
<td>22</td>
<td>48</td>
<td>44</td>
<td>39</td>
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</tbody>
</table>
Gala Pressure
(SmartFresh recommend > 7.5 kg)
Gala Pressure
(SmartFresh recommend > 7.5 kg)
Gala Pressure
(SmartFresh recommend > 7.5 kg)
Gala Pressure
(SmartFresh recommend > 7.5 kg)
Granny Smith Pressure
(SmartFresh recommend > 7.5 kg)
Granny Smith Pressure
(SmartFresh recommend > 7.5 kg)
Granny Smith Pressure
(SmartFresh recommend > 7.5 kg)
Granny Smith Pressure
(SmartFresh recommend > 7.5 kg)
Pink Lady Pressure
(SmartFresh recommend > 8 kg)
Pink Lady Pressure
(SmartFresh recommend > 8 kg)
Pink Lady Pressure
(SmartFresh recommend > 8 kg)
Pink Lady Flesh Browning
Pink Lady Flesh Browning

No Silver Bullet Answer
Pink Lady Flesh Browning

No Silver Bullet Answer

But a lot more recent knowledge
Pink Lady Flesh Browning

Three Types

1. Cavity browning = CO2 disorder
2. Diffuse browning = a chilling injury
3. Radial browning = senescent breakdown
Pink Lady Flesh Browning

Three Types

1. Cavity browning = CO$_2$ disorder
Pink Lady Flesh Browning

**Three Types**

1. Cavity browning = CO$_2$ disorder
2. Diffuse browning = a chilling injury
Pink Lady Flesh Browning

Three Types

1. Cavity browning = CO$_2$ disorder
2. Diffuse browning = a chilling injury
3. Radial browning = senescent breakdown
Diffuse browning = chilling injury

- More common in cooler climates
- Cooler years more at risk
- Can be controlled by elevated storage temps, up to 3°C
Radial browning = senescent breakdown

- More common in warmer climates
- Cooler years more at risk
- Storing at 1°C helps reduce risk
- Late picked fruit more at risk
- CO₂ above 1% increases risk
Other factors

• No +ive or –ive effect from Smartfresh
• DPA dipping reduces risk
• Stepwise cooling reduces risk
• Delayed CA reduces risk
• 2\textsuperscript{nd} picked fruit more at risk
• Low O\textsubscript{2} (< 1\%) a factor
Growing Degree Days = GDD

- Classify a district
- Compare to recent years and long term averages
- 2008 was 7% cooler in Qld, 6% cooler in Orange
Lets talk about colour
Increasing Colour

LONGTERM SOLUTIONS

• Plant red strains
• Use dwarf and semi-dwarf rootstocks to reduce shoots and shade
• Prune to a central leader
• Avoid setting light crops
Increasing Colour

LONGTERM SOLUTIONS

• Plant red strains
Increasing Colour

LONGTERM SOLUTIONS

• Plant red strains
• Use dwarf and semi-dwarf rootstocks to reduce shoots and shade
• Prune to a central leader
• Avoid setting light crops
Increasing Colour

WITHIN-SEASON SOLUTIONS

• Keep potassium well supplied
• Water well
Increasing Colour

WITHIN-SEASON SOLUTIONS

• Keep potassium well supplied
• Water well
• Summer prune
• Use Regalis
• Use reflective mulch eg Extenday
Increasing Colour

WITHIN-SEASON SOLUTIONS

- Keep potassium well supplied
- Water well
- Summer prune
- Use Regalis
- Use reflective mulch eg Extenday
- Use Retain (?) depends on weather
Increasing Colour

LAST RESORT SOLUTIONS

• Leaf pluck
Increasing Colour
LAST RESORT SOLUTIONS

• Leaf pluck

• Leave the fruit on the tree longer
Scald control options

- Scald more prevalent in early picked fruit
- Scald worse in hot dry seasons
Scald control options

• Scald more prevalent in early picked fruit
• Scald worse in hot dry seasons
• GS and Red Dels
• CA reduces it, Ultra low CA even more so
• High nitrogen and low calcium
Scald control options

- Scald more prevalent in early picked fruit
- Scald worse in hot dry seasons
- GS and Red Dels
- CA reduces it, Ultra low CA even more so
- High nitrogen and low calcium

- MUST treat for longer storage
Scald control options

DPA and Smartfresh only real options
Scald control options

DPA and Smartfresh only real options

Putting Smartfresh to the test with early picked Granny Smiths from Qld and Shepparton
## Stanthorpe Granny Smith Trials

<table>
<thead>
<tr>
<th>Storage</th>
<th>Smart fresh</th>
<th>DPA</th>
<th>2006</th>
<th>2007</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>4 months</td>
<td>8 months</td>
</tr>
<tr>
<td>RA storage</td>
<td>×</td>
<td>×</td>
<td>94</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>×</td>
<td>✓</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>✓</td>
<td>×</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>✓</td>
<td>✓</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>CA storage</td>
<td>×</td>
<td>×</td>
<td>0</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>×</td>
<td>✓</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>✓</td>
<td>×</td>
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</tr>
<tr>
<td></td>
<td>✓</td>
<td>✓</td>
<td>0</td>
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</table>
# Shepparton Granny Smith Trials

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<thead>
<tr>
<th>Storage</th>
<th>Smart Fresh</th>
<th>DPA</th>
<th>% Scald 2007</th>
<th>Grower A</th>
<th>Grower B</th>
<th>Grower C</th>
<th>Grower D</th>
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</thead>
<tbody>
<tr>
<td>RA 5 months</td>
<td>x x</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>x x</td>
<td></td>
</tr>
<tr>
<td>RA 5 months</td>
<td>x ✓</td>
<td>57</td>
<td>29</td>
<td>0</td>
<td>17.3</td>
<td>✓ ✓ ✓ ✓</td>
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<tr>
<td>CA 9 months</td>
<td>✓ x</td>
<td>0</td>
<td>0</td>
<td>1.4</td>
<td>0</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
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<tr>
<td>CA 9 months</td>
<td>✓ ✓</td>
<td>12</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
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<tr>
<td>CA 9 months</td>
<td>x ✓</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
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<tr>
<td>CA 9 months</td>
<td>✓ x</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
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<tr>
<td>CA 9 months</td>
<td>✓ ✓</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td></td>
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</tbody>
</table>
2007 Shepparton GS - 5 months RA
(+ 14 days ambient)
2007 Stanthorpe GS - 8 months CA
(+ 14 days ambient)
Post Harvest – its hard

- but its worth it