• Pink Lady internal browning
• 2008 case studies; starch & pressure
• Let's talk about colour
Pink Lady Flesh Browning

No Silver Bullet Answer

But a lot more recent knowledge
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
- CO$_2$ above 1% increases risk
- Worse in light crops and low fruit calcium
Radial browning
= senescent breakdown

“Radial flesh browning is a combination of a senescent disorder and a chilling injury occurring when ‘Cripps Pink’ apples are harvested over mature and stored below 1°C and in high CO₂ for longer than 4 months”
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
Growing Degree Days = GDD

- Classify a district
- Compare to recent years and long term averages
- 2010 was high; 2,746 hours above 10°C
Orchard Factors

- Crop load
- Ca nutrition
- Harvest maturity
  - starch
  - 2\textsuperscript{nd} pick fruit

Storage Factors

- Step wise cooling
- Delay C.A.
- Store a bit warmer (SF)
- DPA dipping
- Keep CO\textsubscript{2} below 1%
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>
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</table>
Pink Lady Starch 2008
(SmartFresh recommend 2 - 3.5)
Percent of rooms within PRESSURE guidelines for **LONG TERM C. A.**

<table>
<thead>
<tr>
<th></th>
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<th>Av.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gala</td>
<td>85</td>
<td>50</td>
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<td>23</td>
<td>53</td>
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<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>
</tr>
</tbody>
</table>
Pink Lady Pressure
(SmartFresh recommend > 8 kg)
Pink Lady Pressure
(SmartFresh recommend > 8 kg)

2-Apr 12-Apr 22-Apr 2-May 12-May 22-May 1-Jun 11-Jun
Lets talk about colour

High colour allows you to pick early.

Early picking reduces internal browning risk.
Let's 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

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

• Leave the fruit on the tree longer
Orchard Factors

• Crop load
• Ca nutrition
• **Harvest maturity**
  - starch
  - 2\textsuperscript{nd} pick fruit

Storage Factors

• Step wise cooling
• Delay C.A.
• Store a bit warmer (SF)
• DPA dipping
• Keep CO\textsubscript{2} below 1%