DA-Meter protocols in the field, Observations and Results

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Stonefruit Field Laboratory fruit maturity
Value Chain System approach to Quality

- CONSUMER
- Retailer
- Field - Harvest
- Storage
- Packaging

Determines the quality
Fruit maturity ($I_{AD}$) as common denominator to monitor quality and determine next step in the chain (market of choice)
DA Technology

- Allows rapid and accurate indexing of fruit maturity along the whole chain providing consistent quality fruit that meets consumer expectations and improves **profitability**

- Allows to build a brand of guaranteed quality
Usefulness along the value chain

- **Pre-Harvest**
  - Understand the orchard
  - Optimise agronomic practices (time sensitive sprays)
  - Reduce number of picks
  - Reduce fruit variability
  - Identify harvest windows (prediction tool)
  - Harvest at the correct time for the chosen market
Usefulness along the value chain

• Post-Harvest
  – Monitor maturity of stored fruit
  – Determine shelf-life potential
  – Determine length of storage depending on the chosen market
  – Sort fruit according to maturity (suitability of postharvest treatments – 1-MCP, maturity retardants)
  – Increased market flexibility
  – Reduced variability and therefore losses
  – Increased consumer satisfaction
$I_{AD}$ in Pre- and Post-Harvest
Optimal functionality with identification of maturity classes
Correlation with ethylene

Maturity classes (optimal harvest – Market Specific)

Variety Specific

Can be done in the field or shed

New protocol in Australian Stonefruit Grower – August 2016

Autumn Bright $I_{AD}$-Ethylene correlation

- Mature
- Commercial
- Immature
Multiple year ethylene production

Summer Flare 34 nectarine

Climacteric

On-Set

Pre-Climacteric

Ethylene production (nL/L h kgFW)

IAD values
<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Seasonality</th>
<th>Immature (no ethylene, not to be harvested)</th>
<th>Harvest ready (on-set climacteric, suitable for export and domestic)</th>
<th>Mature (climacteric peak, suitable for domestic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golden May</td>
<td>Apricot - Mid</td>
<td>&gt;1.20</td>
<td>1.19 – 0.60</td>
<td>&lt; 0.59</td>
</tr>
<tr>
<td>Angeleno</td>
<td>Plum - Late</td>
<td>&gt;1.30</td>
<td>1.29 – 1.0</td>
<td>&lt; 0.99</td>
</tr>
<tr>
<td>Rose Bright</td>
<td>Nectarine - Early</td>
<td>&gt; 0.90</td>
<td>0.89 – 0.50</td>
<td>&lt; 0.49</td>
</tr>
<tr>
<td>Snow Flame 23</td>
<td>Peach - Early</td>
<td>&gt; 1.0</td>
<td>0.99 – 0.50</td>
<td>&lt; 0.49</td>
</tr>
<tr>
<td>Snow Flame 25</td>
<td>Peach - Mid</td>
<td>&gt; 1.10</td>
<td>1.09 – 0.60</td>
<td>&lt; 0.59</td>
</tr>
<tr>
<td>Summer Bright</td>
<td>Nectarine - Mid</td>
<td>&gt; 0.70</td>
<td>0.69 – 0.30</td>
<td>&lt; 0.29</td>
</tr>
<tr>
<td>Fire Sweet</td>
<td>Nectarine - Mid</td>
<td>&gt; 1.0</td>
<td>0.99 – 0.50</td>
<td>&lt; 0.49</td>
</tr>
<tr>
<td>Summer Flare 26</td>
<td>Nectarine - Mid</td>
<td>&gt; 1.0</td>
<td>0.99 – 0.60</td>
<td>&lt; 0.59</td>
</tr>
<tr>
<td>Summer Flare 34</td>
<td>Nectarine - Mid</td>
<td>&gt; 1.20</td>
<td>1.19 – 0.60</td>
<td>&lt; 0.59</td>
</tr>
<tr>
<td>August Fire</td>
<td>Nectarine - Late</td>
<td>&gt; 1.0</td>
<td>0.99 – 0.50</td>
<td>&lt; 0.49</td>
</tr>
<tr>
<td>Autumn Bright</td>
<td>Nectarine - Late</td>
<td>&gt; 1.50</td>
<td>1.49 – 0.90</td>
<td>&lt; 0.89</td>
</tr>
<tr>
<td>September Red</td>
<td>Nectarine - Late</td>
<td>&gt; 1.10</td>
<td>1.09 – 0.60</td>
<td>&lt; 0.59</td>
</tr>
<tr>
<td>September Bright</td>
<td>Nectarine - Late</td>
<td>&gt; 1.60</td>
<td>1.59 – 1.0</td>
<td>&lt; 0.99</td>
</tr>
<tr>
<td>August Flame</td>
<td>Peach - Late</td>
<td>&gt; 1.40</td>
<td>1.39 – 0.90</td>
<td>&lt; 0.89</td>
</tr>
<tr>
<td>September Sun</td>
<td>Peach - Late</td>
<td>&gt; 1.50</td>
<td>1.49 – 1.0</td>
<td>&lt; 0.99</td>
</tr>
</tbody>
</table>
Maturity field monitoring with DA-Meter

• Started 6-7 weeks prior to harvest
  – Weekly measurements (minimum)
  – 80-100 fruit random from whole orchard by canopy system

• 4 weeks prior to harvest
  – Increased frequency, if possible (3-5 days)
  – Separation top, bottom
  – Separation by crop load
  – Separation by block
  – Separation by irrigation volumes

T204 peach $I_{AD}$ field development

The diagram shows the DA value development over time from 23-Dec-16 to 28-Jan-17. The top and bottom values are represented by different lines, with the top line in blue and the bottom line in orange. The DA value decreases significantly over the period, with both lines showing a consistent downward trend.
Position x Canopy experiment

Peach ‘August Flame’
August Flame peach $I_{AD}$ field development

- Tatura Trellis
- Vert Axis

Graph showing the development of $I_{AD}$ for Tatura Trellis and Vert Axis from 22/12/16 to 2/3/17.
August Flame peach $I_{AD}$ field development 2015-17

DA Value

- 2017
- 2016
- 2015

Dates:
- 26/11/16
- 6/12/16
- 16/12/16
- 26/12/16
- 5/01/17
- 15/01/17
- 25/01/17
- 4/02/17
- 14/02/17
- 24/02/17
- 6/03/17
- 16/03/17
Autumn Bright nectarine $I_{AD}$ field development 2015-17
Position X Canopy Experiment

Nectarine ‘Autumn Bright’
Field monitoring summary

• Important to understand and predict optimal harvest

• Variety plays an important role in possible variability:
  – Canopy training system
  – Crop load
  – Canopy position
  – Block
  – irrigation

• More monitoring = more understanding = better planning
  = improved whole farm logistic = HIGHER PROFITABILITY
Thanks to:

**Horticulture Team**
- Tatura: Dave Haberfield
- Mark O’Connell
- Jim Selman (casual)

**AgriBio:**
- Dario Stefanelli
- Bruce Tomkins
- Christine Frisina
- Janine Jaeger
Issues

• Stagnant market for fresh fruit
  – Price stasis
  – Need to differentiate during marketing

• Need to increase export
  – Market selection especially in Asia

• Importance to cater to consumers
  – High consumer dissatisfaction
  – Retailers dictate quality