Dormancy- breaking sprays for low chill in apples

David Finger’s Orchard Launching Place

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Product Development Manager
E.E. Muir and Sons
Trial Aims and Benefits

• **Aim:** Compact flowering consequenting in fewer picks

• **Benefits:**
  - Manipulating harvest timing
  - Better pollination and fruit set
  - Easier orchard spray management, i.e thinning sprays
  - Simultaneous ripening and uniformity of fruit
  - Increased fruit size and quality
Dormancy breaker products

<table>
<thead>
<tr>
<th>Active constituent</th>
<th>Erger®</th>
<th>Waiken™</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decanol alkoxylate (fertilizer adjuvant)</td>
<td>250g/L</td>
<td>388 g/L Methyl esters of fatty acids</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product Rate</th>
<th>Erger®</th>
<th>Waiken™</th>
</tr>
</thead>
<tbody>
<tr>
<td>5L/100L water (5% v/v)</td>
<td>4 L /100L water (4% v/v) @ 1000L/ha</td>
<td></td>
</tr>
</tbody>
</table>
Erger® mode of action
Application timing

- The timing of the application prior to green tip and winter chill is crucial
- Target the S-Endodormancy phase (the first stages of metabolic activation)
Block 1- Early application 1st August 2018 (40 days before green tip)

Queensland DAFF website – Heidi Parkes
Block 2 – Late application 14\textsuperscript{th} August 2018
35 days before green tip

Grower Data Chill Accumulated (14 Aug 2018): 944 Chill Units

Queensland DAFF website – Heidi Parkes
What was evaluated?

• Flowering window
• Growth stages using the BBCH scale
• Average percentage fruit set
• Fruitlet size
• Harvest fruit size
Early Application (1\textsuperscript{st} of August) Percentage Flowering

<table>
<thead>
<tr>
<th>Assessment timings</th>
<th>Control</th>
<th>Erger</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>62</td>
</tr>
<tr>
<td>2</td>
<td>37</td>
<td>86</td>
</tr>
<tr>
<td>3</td>
<td>78</td>
<td>21</td>
</tr>
</tbody>
</table>
Early application post 800 RCU 1st August 2018

Photos taken: 1st of October
8th October – Control - 80% bloom, Erger – 60%
Petal fall
Early application – Average fruit set and fruitlet size assessed 29th October

Size of fruitlets

Number of fruitlets per 5 trees

Fruitlet size grades (mm)

- Control
- Erger
Late application 14th August post 944 RCU 8th October
Average fruit set and fruitlet size

Early application

<table>
<thead>
<tr>
<th>Fruitlet size grades (mm)</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>60</td>
<td>50</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>Erger</td>
<td>50</td>
<td>40</td>
<td>30</td>
<td>20</td>
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Late application

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<thead>
<tr>
<th>Fruitlet size grades (mm)</th>
<th>8 mm</th>
<th>10 mm</th>
<th>12 mm</th>
<th>14 mm</th>
</tr>
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<tbody>
<tr>
<td>Control</td>
<td>100</td>
<td>90</td>
<td>80</td>
<td>70</td>
</tr>
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<td>Erger</td>
<td>100</td>
<td>90</td>
<td>80</td>
<td>70</td>
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Size of fruitlets
## Percentage Picked at Harvest

<table>
<thead>
<tr>
<th>Application Date</th>
<th>DBGT</th>
<th>RCU</th>
<th>Harvest Dates</th>
<th>Erger</th>
<th>UTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/08/18</td>
<td>40 days</td>
<td>800</td>
<td>21/3, 26/3, 30/3, 8/4, 17/4</td>
<td>36% 20% 44% 0% 0%</td>
<td>50% 0% 0% 50% 0%</td>
</tr>
<tr>
<td>14/08/18</td>
<td>50 days</td>
<td>944</td>
<td>21/3, 26/3, 30/3, 8/4, 17/4</td>
<td>49% 0% 41% 0% 10%</td>
<td>43% 0% 44% 0% 13%</td>
</tr>
</tbody>
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**UTC**

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**UTC**
Results

• Only the earlier Erger spray had noticeable compacted flowering – flowering was more even throughout the tree.

• Late application was observed to delay flowering but not significantly.

• Dormancy breakers can assist with thinning applications.

• Need to consider flowering time for pollinating varieties if spraying blocks of trees.

• Impacts on bud burst and flowering are likely to vary between seasons.

• Important to maintain good records for green tip and full bloom dates.
Observations- Envy cv. Treated 1st August

Erger significantly increased lateral growth in the upper canopy of the tree.
Retain

- Active constituent: AVG aminoethoxyvinylglycine hydrochloride
  1. Blocks ethylene biosynthesis in plant tissues
  2. Prevents pre-harvest fruit abscission
  3. Increases fruit quality – firmness

Aim of trial: To assess fruit quality and maturity. By evaluating colour, firmness, fruit retention and Storage potential.
Retain on Galaxy Gala

- Application rate 830g/ha + 25% organosilicone (MAXX)

- Treatment timings:
  7 days prior to harvest – 19^{th} Feb
  21 days prior to harvest – 1^{st} Feb
  21 days and 7 days prior to harvest.

Application date: 1/2/2019. Munckhof triple fan sprayer
Assessments

- **Maturity Testing:**
  - Starch Index
  - Harvest timing and % picked at 1, 2, 3 picks
- **Quality Testing:**
  - Brix
  - Firmness
  - Titratable acidity
Maturity – Starch Index
Maturity – Firmness

Pressure 7 DBH

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<tr>
<th>Treatments</th>
<th>Pressure (kg/cm²)</th>
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</thead>
<tbody>
<tr>
<td>Control</td>
<td>7.69</td>
</tr>
<tr>
<td>Retain 7 DBH</td>
<td>7.83</td>
</tr>
</tbody>
</table>

Pressure 21 DBH

<table>
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<tr>
<th>Treatments</th>
<th>Pressure (kg/cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7.95</td>
</tr>
<tr>
<td>Retain 21 DBH</td>
<td>8.4</td>
</tr>
</tbody>
</table>

Brix 7 + 21 DBH

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Soluble solids (°Bx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>9.38</td>
</tr>
<tr>
<td>Retain 7 + 21 DBH</td>
<td>9.65</td>
</tr>
</tbody>
</table>
Maturity – Soluble Solids

**Brix 7 DBH**
- Control: 10.02 °Bx
- Retain 7 DBH: 9.63 °Bx

**Brix 21 DBH**
- Control: 9.77 °Bx
- Retain 21 DBH: 10.515 °Bx

**Brix 7 + 21 DBH**
- Control: 9.38 °Bx
- Retain 7 + 21 DBH: 9.85 °Bx
Maturity – Titratable acidity

Titratable acidity 7 DBH

Titratable acidity 21 DBH

Titratable acidity 7 + 21 DBH