FUTURE ORCHARDS 2012

ORCHARD WALK 6

Chemical Thinning and Application Technology
Orchard Factors

- Variety
  - Easy: Young Royal Gala
  - Young Pink Lady®
  - Hard: Fuji
  - Spur Delicious

- Vigour/Tree age - huge effect
- Tree health - waterlogging
- Biennial phase
- “Hicane” and other dormancy breakers
- Wood type/Flower stage
- Cross pollination pressure
- Target market
Weather Factors That Influence Chemical Thinner Response

- Winter and Spring Temperatures
  - Determine length of blossom period
- Cool, dry conditions prior to application
  - Less response
- Rain, warm cloudy and humid weather
  - Increases response
  - May reactivate or wash off thinners
- Rising temperature during and following application
  - Increases response
- Frost
  - May increase response and russet risk
- Wind
  - Distorts spray patterns
  - Evaporates spray droplets
Forecast Weather Conditions

Absolutely Critical!!

Overrides precise development stage

**Temperature dependant thinners**
- NAA
- Ethrel
- Cylex
- Carbaryl

**Humidity dependant thinners**
- NAA
- Cylex needs a minimum of 3 days with maximum temperatures above 18 degrees celsius
Sprayer Calibration

• Objective is to have uniform fruit density

• Target upper tree
  • Turn off or reduce nozzle output directed at lower tree

• Droplet size
  • Humid conditions 100 to 150 micron range
  • Dry conditions 300 micron
Apples

Blossom Period
- NAA
- Amidthin
- ATS (ammonium thiosulphate)
- Ethrel™
- Cytolin® NAA mixtures
- Lime sulphur/fish oil mixtures

Post-Blossom
- Benzyladenine (Cylex®, Accel®) (BA)
- Carbaryl
- Thiram
- Combinations of above with NAA.
Pears

Blossom Period
• ATS
• Ethrel®

Post-Blossom
• Benzyladenine
Sprayed with Benzyladenine

Yes

No
ATS / Blossom Burners

- Destroy flower parts before pollination
- Timing relative to flower development critical
- Set early flower
- 1st application 40 to 50% full bloom
- 1 to 1.5% commercial product
- Use high volume sprays in dry climates
- Re-wetting with rain or irrigation increases thinning
Flowering of Royals

08 October → spurs + terminals → one-year wood → 30 October
ATS Damage - Royal Gala
Using ATS

- Coverage - know your sprayer
- Timing
  - monitor branches within blocks
- Multiple applications
- Spray Volume
  - rewetting
- Concentration
- Other Thinners/dormancy breakers
Primary Thinner
- active over blossom period

Stage of development sensitive
- Pink to balloon blossom most sensitive
- 30% open flower stage 2.5 x more sensitive than 100% full bloom stage

![Pink bud](image1.png)
![Balloon Blossom](image2.png)
![King Petal](image3.png)
![Full Bloom (10% petal fall)](image4.png)
Temperature Sensitive

- Little activity if maximum temperature only 12 to 14°C.
- Recommend at least 18 °C maximum on day of application.
- 2 x more active at 24 °C than at 16 °C.

<table>
<thead>
<tr>
<th>Estimated Max Temperature</th>
<th>Multiply the 18°C rate by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 °C</td>
<td>1.16</td>
</tr>
<tr>
<td>17 °C</td>
<td>1.08</td>
</tr>
<tr>
<td>18 °C</td>
<td>1</td>
</tr>
<tr>
<td>19 °C</td>
<td>0.93</td>
</tr>
<tr>
<td>20 °C</td>
<td>0.87</td>
</tr>
<tr>
<td>21 °C</td>
<td>0.78</td>
</tr>
<tr>
<td>22 °C</td>
<td>0.72</td>
</tr>
<tr>
<td>23 °C</td>
<td>0.63</td>
</tr>
<tr>
<td>24 °C</td>
<td>0.52</td>
</tr>
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Rate Sensitive

• Thinning response increases with rate.
• Normal concentration range 100 to 200 ppm. (21 to 42 ml/100 l dilute)

Variety Sensitive

• Braeburn, Fuji and Pacific series responsive.
• Royal Gala less responsive.
Strengths

- Strong promotant of return bloom.
- Gives some vigour control.
- Rapid response.
- May enhance fruit calcium status.

Weaknesses

- Possible increase in russet if applied in adverse conditions.
- May flatten fruit if used at higher rates.
- Later applications at high rates may suppress fruit sizing.
- With time, trees become less responsive.
Use Opportunities

1. Management of biennial bearing.
   • “On crop” years.
   • Timing for king bloom petal fall on early opening flower clusters.

2. Selective thinning of late flower.
   • Apply when lateral bud one year wood in pink bud to flower opening stage.

3. Warm weather windows.
NAA

- Synthetic auxin
- Stages: Full bloom to 10 mm fruitlet size
- Best immediately after petal fall
- Temperature and rate sensitive
- Works best in warm, humid weather
- Capable of enhancing action of other thinners
BA Products

Cytolin®
• Stage: Full bloom to early petal fall

Cylex®
• Stage: Post blossom. Best 8 – 12 mm fruitlet size.
• Temperature dependent >18 °C
• Rates 50 to 150 ppm range
• Response variety dependent
Experience with Cylex

Return Bloom Effects

Specific Crop Load 1998 Harvest &
Return Bloom Spring 1998  (*Pacific Rose*)

<table>
<thead>
<tr>
<th>Fruit No./cm²</th>
<th>Blossom Clusters/cm²</th>
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<tbody>
<tr>
<td>Control</td>
<td>Cylex</td>
</tr>
<tr>
<td>3.3a</td>
<td>1.92C</td>
</tr>
<tr>
<td>2.35a</td>
<td>6.31D</td>
</tr>
</tbody>
</table>

**Fruit No./cm²**
- Control: 3.3a
- Cylex: 2.35a

**Blossom Clusters/cm²**
- Control: 1.92C
- Cylex: 6.31D
Carbaryl

- Stage: Petal fall
- Temperature dependent
- Shade increases response
- Response variety dependent
- Toxic to bees
- Residues a problem in certain markets
Cocktails

- Carbaryl with NAA
- BA with Carbaryl
- BA with NAA

- Generally more aggressive thinning
- Used in hard to thin situations
Evaluation of Response

1. Always leave an unsprayed check.
   For accurate assessment mark branches, count flower clusters.

2. Keep good records.