Fruit Quality

• Maximum quality starts with dormant pruning.
• Next timing is at bloom.
• Chemical thinning.
Fertilization of Apple Flowers

• It takes about 2.5 days for flowers to be fertilized.

• Use model to time blossom thinners.
• Lime Sulfur Oil
• ATS
Apple

Days to Fertilization @ Ave Temp

<table>
<thead>
<tr>
<th>Temp</th>
<th>Days</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>15.2</td>
<td>364</td>
</tr>
<tr>
<td>50</td>
<td>7.6</td>
<td>182</td>
</tr>
<tr>
<td>55</td>
<td>3.8</td>
<td>91</td>
</tr>
<tr>
<td>60</td>
<td>2.5</td>
<td>61</td>
</tr>
<tr>
<td>65</td>
<td>2.1</td>
<td>51</td>
</tr>
<tr>
<td>70</td>
<td>1.9</td>
<td>46</td>
</tr>
<tr>
<td>80</td>
<td>1.7</td>
<td>41</td>
</tr>
<tr>
<td>85</td>
<td>1.7</td>
<td>41</td>
</tr>
<tr>
<td>95</td>
<td>3.2</td>
<td>76</td>
</tr>
</tbody>
</table>

2017 48°F
2016 52°F
PTGM Steps

• Selection variety and block.
• Measure 25 to 50 pistils.
• Get the average length and enter into model.
PTGM Steps

• Set model start clock when 5 to 10% bloom open.
  – OR If you want 100 apples/tree, then when 100 flowers are open

• For Example:
  – Day 0    a few blossoms open
  – Day 1    10% bloom opened overnight
  – Set start at: 8 am day 1
PTGM Steps

• When model predicts 100% fertilization, spray 1st blossom thinner.

• For Example:
  – Day 3 @ 2pm = 100% fertilization.
  – Spray between 2 and 3 pm.
PTGM Steps

• Restart clock by entering spray info.
• Spray again when you get more than 50% but before you get 100%.
• Repeat again if necessary.
The second blossom thinning spray in the Block should be 60% of the style length. Entering this spray date resets the model to 0%. If a frost killed the king bloom, the later block the crop. Therefore, it may warrant waiting until reaching the 100% fertilization threshold before applying the subsequent.

Sunday
6 pm
6th 7th 8th
Fertilization is determined by evaluating stained pollen tubes using fluorescence microscopy.
MEASURE STYLES AS SHOWN FOR FLOWER STYLES MEASURED WITHOUT REMOVING FROM TREE
<table>
<thead>
<tr>
<th>Apple</th>
<th>Average Style Length 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>SweeTango</td>
<td>9.92</td>
</tr>
<tr>
<td>Zestar</td>
<td>9.61</td>
</tr>
<tr>
<td>Gala</td>
<td>9.12</td>
</tr>
<tr>
<td>Empire</td>
<td>9.05</td>
</tr>
<tr>
<td>Granny Smith</td>
<td>8.79</td>
</tr>
<tr>
<td>Honeyscrisp</td>
<td>8.66</td>
</tr>
<tr>
<td>Jonagold</td>
<td>8.52</td>
</tr>
<tr>
<td>Gingergold</td>
<td>8.51</td>
</tr>
<tr>
<td>Nova Spy</td>
<td>8.14</td>
</tr>
<tr>
<td>Fuji</td>
<td>7.81</td>
</tr>
<tr>
<td>Jonathan</td>
<td>6.92</td>
</tr>
<tr>
<td>Red Delicious</td>
<td>6.75</td>
</tr>
</tbody>
</table>
Average Style Length 2018

Pistil Length mm

SweeTango
Zestar
Gala
Empire
Granny Smith
Honeycrisp
Jonagold
Gingergold
Nova Spy
Fuji
Jonathan
Red Delicious

Blossom Spray Gala, May 16th, 2018, 7:30 pm
Lime Sulfur Oil Blossom Spray Gala, May 18, 2018, 6:00 PM UTC
Example 1: Pradacci, Trentino, Italy.
Bloom PGR’s+

- MaxCel: Mild, Cell Division
- NAA, NAD: Mild Thinning
- Promalin: Cell Division, +/- Thinning
- Lime Sulfur Oil: Photosynthesis, Caustic
- ATS: Caustic
- ReTain, Apogee: Increases Fruit Set
- Ethrel: Thinning, Unreliable
Blossom Thinning

Fruits drop early.
Thinning early maximizes fruit size.
Thinning early maximizes return bloom.
Can be beneficial on difficult to thin varieties.
Allows additional step in reducing a heavy crop.
Blossom Thinning Action

- Depresses Photosynthesis.
- Burns Pistils
- Prevention of Fertilization and Pollen Germination
Blossom Thinning 2006
Red Delicious

Lime Sulfur + Oil

UTC
Blossom Thinning 2006

Lime Sulfur + Oil

UTC
Blossom Thinning

Use Liquid Lime Sulfur and Oil (1 to 5%)
  LS @ 2.5 gal/100
  Oil @ 2 gal/100

Apply @ 100/acre
Target 80% FB (just after KB)
Follow every 3 to 4 days
ATS (Ammonium Thiosulfate)

Burns Pistils

Use ATS @ 1.5 to 2 gal/100
Apply @ 100/acre
Target 80% FB (just after KB)
Follow 2 days later
Regalia

- Organic bio fungicide.
- Shown to thin when applied during bloom.
- Mild thinner.
Risks

• Phytotoxicity
• Russet
• Bee injury
Idared blossom injury by airblast application

Non-treated flower

Regalia 2 pt/A
No russet
Flower and Leaf Damage
## Full Bloom Percent Thinning

<table>
<thead>
<tr>
<th>Thinner Choice</th>
<th>Difficult to Thin</th>
<th>Easy to Thin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal Weather</td>
<td>Moderate Carb Stress</td>
</tr>
<tr>
<td>NAA 5 ppm</td>
<td>0-5</td>
<td>0-15</td>
</tr>
<tr>
<td>NAA 15 ppm</td>
<td>0-10</td>
<td>0-20</td>
</tr>
<tr>
<td>6-BA 100 ppm</td>
<td>0-3</td>
<td>0-5</td>
</tr>
<tr>
<td>NAD</td>
<td>0-5</td>
<td>0-10</td>
</tr>
<tr>
<td>Promalin</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Blossom Thinning

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Average Blossom Thinning Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit / Tree</td>
<td>24% Decrease Fruit / Tree</td>
</tr>
<tr>
<td>Yield / Tree</td>
<td>18% Decrease Yield / Tree</td>
</tr>
<tr>
<td>AFW (Average Fruit Weight)</td>
<td>4% Increase AFW</td>
</tr>
<tr>
<td>Fruit Set / Cluster</td>
<td>1% Decrease Fruit Set / Cluster</td>
</tr>
<tr>
<td>FTCA (Fruit / Trunk Cross-Sectional Area)</td>
<td>46% Decrease FTCA</td>
</tr>
<tr>
<td>Pygmy / Tree (Fruit &lt; 2”)</td>
<td>34% Decrease Pygmy / Tree</td>
</tr>
</tbody>
</table>
Blossom Thinning 2006
Yield/Tree & AFW/Tree

Blossom Thinning Trials 2006

% of UTC

Gala
Honeycrisp
Empire
Gingergold
Goldens
Reds
Fuji
Average

Fruit/Tree
AFW
Yield/Tree (g)
PTGM Site

• Link to PTGM for 2019:

• http://ptgm.newa.cornell.edu
Thank you!
The second blossom thinning spray in the Block should be applied when the pollen tube length is between 50 and 60% of the style length. Entering this spray date resets the model to 0%. If a frost killed the king bloom, the later blooming flowers may be the ones you want to keep to set the crop. Therefore, it may warrant waiting until reaching the 100% fertilization threshold before applying the subsequent bloom thinning spray.

Emergence: NaN%
Cumulative HrG: NaNmm
The second blossom thinning spray in the Block should be applied when the pollen tube length is between 50 and 60% of the style length. Entering this spray date resets the model to 0%. If a frost killed the king bloom, the later blooming flowers may be the ones you want to keep to set the crop. Therefore, it may warrant waiting until reaching the 100% fertilization threshold before applying the subsequent bloom thinning spray.