IMPACT OF AN ETHYLENE INHIBITOR ON PEACH QUALITY

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2011-2012 GROWING SEASON

• Peach acreage increasing
• Crop diversification

• Typical year = chilling unit satisfaction
  • 2011 La Niña dominated

• 2011-12
  • Low chill units, in some cases no accumulated chill
Total Accumulated and Projected  Accumulated by Period  Map

Model: 30-45 °F; County: HIGHLANDS (FL)

Accumulated period from Oct 1 to Apr 9:
- This season: 116 hours
- Last season: 70 hours
- Historic average: 253 hours

Historic Average
Neutral years, long-term climatology
Current accumulation
Last season

Total accumulated and projected

http://agroclimate.org/tools/ChillAccum/

2 Chill Units Accumulated by 12/31/11!
MARKETING CHALLENGE

- Peach bloom = 3 weeks early
ETHYLENE

- Important plant hormone
  - Involved in ripening process
    - Bananas
    - Apples

- Inhibitors can delay ripening
  - Predominantly used in apple industry
  - Aminoethoxyvinylglycine (AVG)

- Delayed ripening
  - Increase fruit size by allowing longer hang time
METHODS AND MATERIALS

• Two farms in South Central Florida
  • Large, commercial acreage
• ReTain® + ProGibb® (Valent Biosciences)
  • 1 packet (333 grams) ReTain per acre
  • 10 fl. oz. ProGibb (4%) per acre

• Farm 1 –
  • ‘UFSun’
    • Non-melting variety
    • First to be harvested in Florida
• Control
• ReTain® + ProGibb® (gibberellic acid)
  • Increase firmness and fruit size
• Applied 2 weeks before anticipated harvest
METHODS AND MATERIALS

• Farm 2
  • Two varieties
    • ‘UFSun’ and ‘Tropic Beauty’
    • Non-melting flesh vs. melting flesh

• Treatments
  • Control
  • ReTain® + ProGibb®

• Applied two weeks before anticipated harvest

• Yield, fruit number, average fruit weight
• Firmness
• Brix, pH, titratable acidity (%TA)
FARM 1 RESULTS – AVERAGE ‘UFSUN’ YIELD

<table>
<thead>
<tr>
<th>Date</th>
<th>Control Yield (lbs.)</th>
<th>Retain + ProGibb Yield (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/22/2012</td>
<td>36.8 lbs. (7.36 lbs./tree)</td>
<td>38.1 lbs. (7.62 lbs./tree)</td>
</tr>
<tr>
<td>3/27/2012</td>
<td>36.8 lbs. (7.36 lbs./tree)</td>
<td>38.1 lbs. (7.62 lbs./tree)</td>
</tr>
</tbody>
</table>

**Total Yield:**
- Control - 36.8 lbs. (7.36 lbs./tree)
- Retain + ProGibb - 38.1 lbs. (7.62 lbs./tree)
FARM 1 - AVERAGE FRUIT WEIGHT

Control  ReTain + ProGibb

Fruit Weight (Lbs.)

3/22/2012  3/27/2012

- 0.05
- 0.1
- 0.15
- 0.2
- 0.25
- 0.3
- 0.35
- 0.4
### FARM 1 - FIRMNESS, BRIX, pH, TA

<table>
<thead>
<tr>
<th>Date</th>
<th>Treatment</th>
<th>Firmness (lbf)</th>
<th>Brix</th>
<th>pH</th>
<th>TA (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/22/12</td>
<td>Control</td>
<td>6.96</td>
<td>10.95</td>
<td>3.91</td>
<td>0.67</td>
</tr>
<tr>
<td></td>
<td>ReTain + ProGibb</td>
<td>6.81</td>
<td>11.10</td>
<td>4.04</td>
<td>0.63</td>
</tr>
<tr>
<td>3/27/12</td>
<td>Control</td>
<td>7.2 B</td>
<td>12.95</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>ReTain + ProGibb</td>
<td>10.3 A</td>
<td>12.81</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
FARM 2 - AVERAGE ‘TROPIC BEAUTY’ YIELD

Total Yield:
Control - 172.4 lbs. (34.5 lbs./tree)
ReTain + ProGibb - 85.6 lbs. (17.1 lbs./tree)
FARM 2 - ‘TROPIC BEAUTY’ AVERAGE FRUIT WEIGHT

Fruit Weight (Lbs.)

Control ReTain + ProGibb

<table>
<thead>
<tr>
<th>Date</th>
<th>Treatment</th>
<th>Brix</th>
<th>pH</th>
<th>TA (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/7/12</td>
<td>Control</td>
<td>12.53</td>
<td>4.16</td>
<td>0.50</td>
</tr>
<tr>
<td>‘UFSun’</td>
<td>ReTain + ProGibb</td>
<td>12.01</td>
<td>4.28</td>
<td>0.44</td>
</tr>
<tr>
<td>4/27/12</td>
<td>Control</td>
<td>12.33</td>
<td>3.74</td>
<td>0.79</td>
</tr>
<tr>
<td>‘Tropic Beauty’</td>
<td>ReTain + ProGibb</td>
<td>12.33</td>
<td>3.72</td>
<td>0.91</td>
</tr>
</tbody>
</table>
FARM 2 – TWO WEEK STORAGE RESULTS

<table>
<thead>
<tr>
<th>Date</th>
<th>Treatment</th>
<th>Firmness (lbf)</th>
<th>Brix</th>
<th>pH</th>
<th>TA (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/21/12</td>
<td>Control</td>
<td>3.22</td>
<td>12.42</td>
<td>4.34</td>
<td>0.39</td>
</tr>
<tr>
<td>‘UFSun’</td>
<td>ReTain + ProGibb</td>
<td>3.34</td>
<td>11.94</td>
<td>4.34</td>
<td>0.40</td>
</tr>
<tr>
<td>5/21/12</td>
<td>Control</td>
<td>2.41</td>
<td>12.99</td>
<td>3.97</td>
<td>0.54 B</td>
</tr>
<tr>
<td>‘Tropic Beauty’</td>
<td>ReTain + ProGibb</td>
<td>3.72</td>
<td>12.86</td>
<td>3.95</td>
<td>0.61 A</td>
</tr>
</tbody>
</table>

Trays of fruit were stored between 32-34°F for 14-21 days.
OTHER OBSERVATIONS

- Treatments with ProGibb® tended to tear less at stem end with ‘Tropic Beauty’

- Warm spring accelerated fruit phenological stages
  - Small fruit size throughout the state
    - Irrigation challenges
  - Farm 2 – actually applied material 1 week before actual harvest

- Market conditions and harvest times
  - Ideal harvest timing for two treatments?

- Differences due to ReTain® or ProGibb®?
  - Need separate treatments
  - Melting vs. Non-melting flesh
  - Variety differences?
CONCLUSIONS

- ReTain® + ProGibb® helped to increase firmness at least two weeks after application
  - Firmness should be due to ReTain
  - Chemical combination
- No effect on Brix, pH, or TA
- Separate chemicals need to be evaluated to determine which increases firmness
  - Potential for fruit size increase with GA