Fire Blight Update

Organic Tree Fruit Industry Work Group

presented by David Granatstein

Wenatchee, WA

NOSB Meeting, Providence, RI
Oct. 16, 2012
Organic Tree Fruit Industry Work Group

- Requested by NOSB in Seattle
- Purpose:
  - Help create the healthiest, most sustainable organic tree fruit system possible
  - Communicate science-based knowledge and grower experience between the organic tree fruit sector and the NOSB / NOP
  - Inform deliberations that will affect the organic tree fruit sector

<table>
<thead>
<tr>
<th>5 growers, small and large</th>
<th>2 consultants</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 industry groups</td>
<td>7 states</td>
</tr>
<tr>
<td></td>
<td>6 universities</td>
</tr>
</tbody>
</table>

Thanks to Northwest Horticultural Council for travel support.
## Organic Fruit Market

### WA Shipments to date (Sept. 30)

<table>
<thead>
<tr>
<th>Year</th>
<th>Apples</th>
<th>Pears</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>508</td>
<td>105</td>
</tr>
<tr>
<td>2011</td>
<td>540 (+6%)</td>
<td>113 (+8%)</td>
</tr>
<tr>
<td>2012</td>
<td>687 (+27%)</td>
<td>162 (+43%)</td>
</tr>
</tbody>
</table>

--- 1000 boxes ---

* Season to 9/22/12

![Gala apple price graph](image-url)
Fire blight control is based on prevention, not cure.

Fire Blight Management Practices

- Genetic tolerance (limited)
- Avoid excess vigor
- Minimize humidity
- Hand remove young tree blossoms
- Predictive models for fire blight risk
- Chemicals – copper (russet)
- Antibiotics – streptomycin, oxytetracycline
- Plant defense stimulators
- Biologicals (some are antibiotic producers)
Alternative Controls

Blossom Protect® (*Aureobasidium pullulans*)
- EPA registered Jan. 2012; ~ 2,000 ac of product available
- 2012, severe fire blight in WA – compressed bloom period; grower reports are generally positive
- **Bloom use only;** not for trauma blight

Copper
- GWN 9979 (new copper hydroxide, Gowan Chemical Co.); generally similar to oxytetracycline, less control than streptomycin; slight phytotox on Comice, D’Anjou pear; not registered yet
- Phyton 27AG (copper sulfate in tannic acid, Phyton Corp.)
- Kocide 3000 (copper hydroxide, DuPont Inc.)

Integrated Control
- Different materials for different timing, flower parts
- Europe - Blossom Protect®, acidified clay powder (Myco-Sin®) and resistance inducer Laminarin (Vacciplant®)
Alternative Controls

2012 Fire Blight Control Trial - Pear Plot
Percent Control Re: Check

- Streptomycin**
- ASM + strep..
- ASM + kasumin
- ASM + Blossom Pr.
- Blossom Protect twice.
- Previsto Copper 96 oz...
- Previsto 128 oz./A
- Kasumin
- ASM Twice + Oxytet...
- Oxytet
- ASM + Prvesto 96oz...
- Previsto Copper 32 oz...
- Kocide 3000 0.5 lb...
- Phyton 27 40 oz...
- Previsto 64 oz/A..
- Serenade Low Rate..
- Regalia (SAR)..
- % Blight in Check

**Note: Inoculated w/ strep sensitive bacteria

(T. Smith, WSU)
## Alternative Controls

OREI Project, Corvallis, OR

<table>
<thead>
<tr>
<th>Treatment 2012</th>
<th>% infected clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water control</td>
<td>41.1 a</td>
</tr>
<tr>
<td>Bloomtime (2x) + Serenade Max (2x)</td>
<td>27.1 b</td>
</tr>
<tr>
<td>Fireline (oxytetracycline)</td>
<td>16.9 cd</td>
</tr>
<tr>
<td>Lime sulfur/fish oil (2x)</td>
<td>16.7 cd</td>
</tr>
<tr>
<td>Lime sulfur/fish oil (2x) + Bloomtime</td>
<td>13.0 de</td>
</tr>
<tr>
<td>Bloomtime + Fireline</td>
<td>9.3 ef</td>
</tr>
<tr>
<td><strong>Firewall (streptomycin)</strong></td>
<td><strong>5.1 fg</strong></td>
</tr>
<tr>
<td>Lime sulfur/fish oil (2x) + Blossom Protect (2x)</td>
<td>4.5 g</td>
</tr>
<tr>
<td>Lime sulfur/fish oil (2x) + Bloomtime + Blossom Protect (2x)</td>
<td>4.0 g</td>
</tr>
</tbody>
</table>

*(K. Johnson, OSU)*
Alternative Controls

Integrated Control with Biocontrols and Thinning Sprays
OREI Project, Corvallis, OR

Fire blight strikes per tree

- Blossom Protect colonizes both stigma and nectary
- Integrated control will require more sprays than antibiotics

(K. Johnson, OSU)
Does delayed dormant copper affect pathogen build-up?

Overall probability of pathogen detection ~ 16%
- Mid-bloom \( P(\text{detect } E\alpha) \) < 5%
- Petal fall \( P(\text{detect } E\alpha) \) ~ 50%

\( P(\text{detect } E\alpha) \) in ‘Copper + Oil’ \( \frac{1}{2} \) of ‘Oil alone’

No difference in Russet Severity among the ‘Copper & Oil’ and ‘Oil only’ plots

(R. Elkins and K. Johnson)
Genetic Resistance

Availability of Geneva rootstocks. Improving, but is 4-5 yr lead time (2 yr for M.9).

More resistant cultivars. None known to be in pipeline. Once identified, is ~10 yr to commercialization.

(from survey of tree nurseries, Sept. 2012)

Fire blight resistant pear – US 71655-014. Tested in Hood River, OR for 10 yr, still not released. Next, 0.6 ac demo planting in 2014 for grower evaluation, test marketing, etc.


Field screening of modern varieties (*Fazio et al.*)
## Fire Blight Screening, Geneva, NY

<table>
<thead>
<tr>
<th>Stock</th>
<th>Mean % Lesion Ea273</th>
<th>Mean % Lesion Ea4001a</th>
<th>Max % Lesion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G.41</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>M9 EMLA</td>
<td>6</td>
<td>42</td>
<td>100</td>
</tr>
<tr>
<td>M.27 EMLA</td>
<td>28</td>
<td>19</td>
<td>58</td>
</tr>
<tr>
<td>Red Delicious</td>
<td>4</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>Empire</td>
<td>0</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Golden Delicious</td>
<td>22</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td>Gala</td>
<td>30</td>
<td>4</td>
<td>37</td>
</tr>
<tr>
<td>HoneyCrisp</td>
<td>5</td>
<td>8</td>
<td>29</td>
</tr>
<tr>
<td>Pinova</td>
<td>25</td>
<td>16</td>
<td>41</td>
</tr>
<tr>
<td>WSU2</td>
<td>24</td>
<td>21</td>
<td>54</td>
</tr>
<tr>
<td>NevisSonya</td>
<td>0</td>
<td>0</td>
<td>0</td>
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Trees infected via leaf cuts. May not be representative of blossom infection. Sonya – club variety, currently restricted to 400 ac in US

*(Fazio, Aldwinckle and Norelli, unpublished)*
Extension Activities


6 grower meeting presentations, winter 2011/12


Midwest OREI proposal for organic fire blight control not funded
How would the loss of antibiotics for fireblight control impact your operation?

1. Little or no effect
2. Reduce acres of organic pears
3. Reduce acres of susceptible apple varieties
4. Exit organic apple and/or pear production

January 2012 WA organic grower meetings (n=94)
Have you tried a non-antibiotic control regime?

- Yes: 73%
- No: 27%

If so, was it successful?

- Yes: 67%
- No: 33%

Before Blossom Protect

January 2012 WA organic grower meetings (n=94)
Should another petition be filed with NOSB asking for extension of tetracycline use beyond 2014?

1. Yes
2. No

January 2012 WA organic grower meetings (n=94)
Next steps…

Develop rational phase out plan for antibiotics

Minimize disruption to growers, production, market, consumers;

Extend expiration date

Continue testing alternatives:
• OREI project, CA and Midwest trials
• More experience on pears
• Registration of new products – e.g. coppers
• More testing of integration of controls

More research on novel methods (e.g. bacteriophage)

Educational materials to growers – extension publications

For more information go to

http://www.tfrec.wsu.edu/pages/organic/fireblight
# Organic Tree Fruit Industry Work Group

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Producer</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harold Austin</td>
<td>Zirkle Fruit Company</td>
<td>Selah, WA</td>
</tr>
<tr>
<td>Brian Caldwell</td>
<td>Hemlock Grove Farm / Producer</td>
<td>West Danby, NY</td>
</tr>
<tr>
<td>Deborah Carter</td>
<td>Northwest Horticultural Council</td>
<td>Yakima, WA</td>
</tr>
<tr>
<td>David Granatstein</td>
<td>Washington State University</td>
<td>Wenatchee, WA</td>
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<tr>
<td>Matt Grieshop</td>
<td>Michigan State University</td>
<td>East Lansing, MI</td>
</tr>
<tr>
<td>Matt Hemly</td>
<td>Green &amp; Hemly / Producer</td>
<td>Courtland, CA</td>
</tr>
<tr>
<td>Jackie Hoch</td>
<td>Hoch Orchards / Producer</td>
<td>LaCrescent, MN</td>
</tr>
<tr>
<td>Chuck Ingels</td>
<td>Univ. California Extension</td>
<td>Sacramento, CA</td>
</tr>
<tr>
<td>Ken Johnson</td>
<td>Oregon State University</td>
<td>Corvallis, OR</td>
</tr>
<tr>
<td>Jim Koan</td>
<td>Producer / OMRI Board</td>
<td>Flushing, MI</td>
</tr>
<tr>
<td>Harold Ostenson</td>
<td>Organic fruit consultant</td>
<td>Wenatchee, WA</td>
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<tr>
<td>Greg Peck</td>
<td>Virginia Tech University</td>
<td>Winchester, VA</td>
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<tr>
<td>Tim Smith</td>
<td>Washington State University</td>
<td>Wenatchee, WA</td>
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<tr>
<td>George Sundin</td>
<td>Michigan State University</td>
<td>East Lansing, MI</td>
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<tr>
<td>Gwen Wyard</td>
<td>Organic Trade Association</td>
<td>Corvallis, OR</td>
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<tr>
<td>Keith Yoder</td>
<td>Virginia Tech University</td>
<td>Winchester, VA</td>
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<tr>
<td>Broc Zoller</td>
<td>The Pear Doctor / Consultant</td>
<td>Kelseyville, CA</td>
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