Fire Blight Update

Organic Tree Fruit Industry Work Group

presented by David Granatstein

WSU CSANR, Wenatchee, WA

NOSB Meeting, Savannah, GA
Nov. 30, 2011
Organic Tree Fruit Industry Work Group

- Requested by NOSB in Seattle
- Convened by David Granatstein (WSU) and Matt Grieshop (MSU)

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.
Organic Tree Fruit Industry Work Group

5 growers, small and large  2 consultants
2 industry groups  7 states  6 universities

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<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Location</th>
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<tbody>
<tr>
<td>Harold Austin</td>
<td>Zirkle Fruit Company</td>
<td>Selah, WA</td>
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<tr>
<td>Brian Caldwell</td>
<td>Hemlock Grove Farm / Producer</td>
<td>West Danby, NY</td>
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<tr>
<td>Deborah Carter</td>
<td>Northwest Horticultural Council</td>
<td>Yakima, WA</td>
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<tr>
<td>David Granatstein</td>
<td>Washington State University</td>
<td>Wenatchee, WA</td>
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<td>Matt Greshop</td>
<td>Michigan State University</td>
<td>East Lansing, MI</td>
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<td>Matt Hemly</td>
<td>Green &amp; Hemly / Producer</td>
<td>Courtland, CA</td>
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<td>Jackie Hoch</td>
<td>Hoch Orchards / Producer</td>
<td>LaCrescent, MN</td>
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<td>Chuck Ingels</td>
<td>Univ. California Extension</td>
<td>Sacramento, CA</td>
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<td>Ken Johnson</td>
<td>Oregon State University</td>
<td>Corvallis, OR</td>
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<td>Jim Koan</td>
<td>Producer / OMRI Board</td>
<td>Flushing, MI</td>
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<td>Harold Ostenson</td>
<td>Organic fruit consultant</td>
<td>Wenatchee, WA</td>
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<td>Greg Peck</td>
<td>Virginia Tech University</td>
<td>Winchester, VA</td>
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<td>Tim Smith</td>
<td>Washington State University</td>
<td>Wenatchee, WA</td>
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<td>George Sundin</td>
<td>Michigan State University</td>
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<td>Gwen Wyard</td>
<td>Organic Trade Association</td>
<td>Corvallis, OR</td>
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<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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Thanks to Northwest Horticultural Council for travel support.
Fire blight control is based on prevention, not cure.
Genetic Resistance

Best long-term strategy

Resistance ratings not reliable

Need consumer, market acceptance for new varieties

‘Geneva’ rootstocks:
4-5 yrs until widely available

Orchard renewal:
apple 15-20 yrs
pear 30-80+ yrs
Cost >$12-20K/acre
Other Management Practices

• Sanitation
• Avoid excess vigor
• Minimize humidity
• Hand remove young tree blossoms
• Predictive models for fire blight risk
• Chemicals – copper (russetting)
• Antibiotics – streptomycin, oxytetracycline, kasugamycin
• Plant defense stimulators
• Biologicals (some are antibiotic producers)
As stand alone: low efficacy, high year-to-year and location-to-location variability; reduced # of antibiotic sprays

• 7-yr test of various biocontrol products in MI, NY, VA (BlightBan, Bloomtime Biological, P. syringae)

“…the prospects for biological control of fire blight in the eastern United States are currently not high…”

• Similar experience in CA


Zoller, B. 2011. Use of streptomycin and oxytetracycline for fire blight management in organic pear production in California.
Control of blossom infection with various materials over the past 10 years in WA

Summary of Percent Control Relative to Inoculated / Untreated

Bars = Range  Red Mark = Mean  Numeral* = Number of Trials

- Strep + ASM
- streptomycin 200 ppm
- Copper - new
- Starner (oxolinic acid)
- oxytetracycline 200 ppm
- A. pullulans (Blos. Pro.)
- kasugamycin 100 ppm
- gentamycin 200 ppm
- Serenade (various)
- fungicides (various)
- copper hydroxide
- < 5 pH acidic buffers
- SAR products
- mineral nutrients
- blight in inoc. check

(T. Smith, WSU. 2011 Progress Report, WTFRC)
Materials registered and marketed for organic fire blight control

Biologicals:
- BlightBan A506: poor to fair
- Bloomtime Biological
- Blossom Protect (expect 2011): good to very good

Antibiotics:
- Streptomycin: < 2014 expiration
- Oxytetracycline: < 2014 expiration
- Kasugamycin: < unlikely

Antibiotic-like:
- Serenade Max: fair to good

Product effectiveness
- can be excellent
- poor to fair
- poor to good
- good to very good
- < 2014 expiration
- < unlikely

(K. Johnson)
Timing ‘integrated’ treatments for organic blight suppression

Daily Fire Blight Risk - COUGARBLIGHT Model

Timing 'integrated' treatments for organic blight suppression

Biocontrol is complicated!

Timing 'integrated' treatments for organic blight suppression

Biocontrol is complicated!

Date

4-Day degree hour total (>15.5°C)

Lime sulfur plus fish oil
Bloomtime BlightBan
Blossom Max
Serenade Max
Pathogen build-up phase

Date


(K. Johnson)
Results of Field Trials, Corvallis, OR

Questions
Integrated control ✓
Frequency of treatment ✓
New yeast product ✓
Lime sulfur plus fish oil ✓

(K. Johnson)
Other Research Tracks

Chemical components of stigma exudates from ‘Gala’

Free sugars
Free amino acids
Polysachharides
Protein
Lipids

Exploit bacteriophages

Carrier bacterium is *Pantoea agglomerans*

Crabapple Laboratory Model
Funding for Fire Blight Research

Past 20 yr, over $600,000 in grower funds on research for non-antibiotic control, organic compliant practices.
- WA: > $100K of grower funds, past 10 yr
- CA: > $300K of grower funds, past 27 yr

USDA
- ARS researchers in WV, WA, NY – genetics, biocontrol; >$5 million investment
- new OREI project - OR, WA, CA, 4 yr; $476K

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<tr>
<th>Intl. Fire Blight Workshops</th>
<th># of Papers</th>
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<td>Breeding (non-GMO)</td>
<td>14 12</td>
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<td>Biocontrol</td>
<td>23 14</td>
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<td>Antibiotics</td>
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What Needs to be Done

- Registration of Blossom Protect (February 2012?)
- Field-scale grower experience; grower and consultant education
- Testing products and regimes in other regions, climates; more experience on pears; integration with scab control
- Long-term: new varieties with good market qualities and low fire blight susceptibility
Where Are We?

Getting closer in eastern Washington; OREI project starts 2012

Very questionable in Midwest and East
Avoid this…

Fire blight infected tree

…to avoid this…

Removal of diseased orchard
...and enjoy this!

(H. Ostenson)