

Fire Blight Update

Organic Tree Fruit Industry Work Group

presented by David Granatstein
Wenatchee, WA

NOSB Meeting, Providence, RI
Oct. 16, 2012



Fire blight damage in pears

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

5 growers, small and large

2 industry groups

7 states

2 consultants

6 universities

Thanks to Northwest Horticultural Council for travel support.

Organic Fruit Market

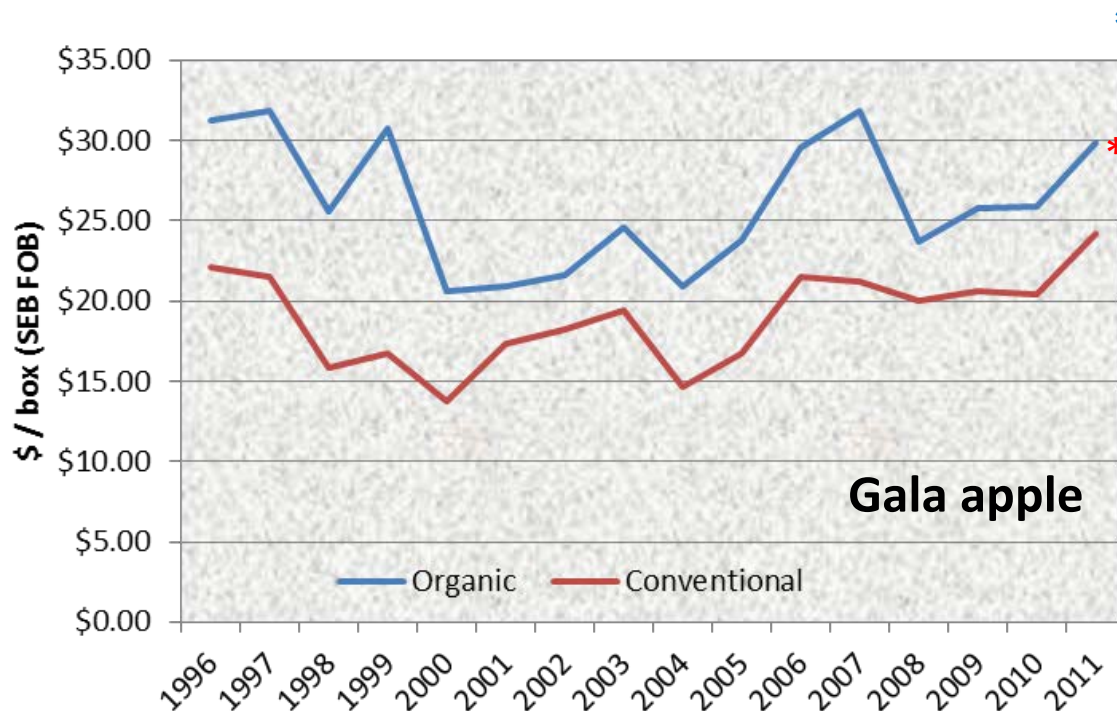
WA Shipments to date (Sept. 30)

Apple

Pear

---- 1000 boxes ----

2010	508	105
2011	540 (+6%)	113 (+8%)
2012	687 (+27%)	162 (+43%)



* Season to 9/22/12

Fire Blight Disease Cycle



Modified by J. Norelli, USDA, Appalachian Fruit Research Station, March 2003), based on disease cycle of Sherman Thomson (Thomson, S.V. 2000. Epidemiology of fire blight. P. 9-36. IN: Fire Blight: The disease and its causative agent, *Erwinia amylovora*. CABI Publishing).

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 oxytet, less control than strep; 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.)

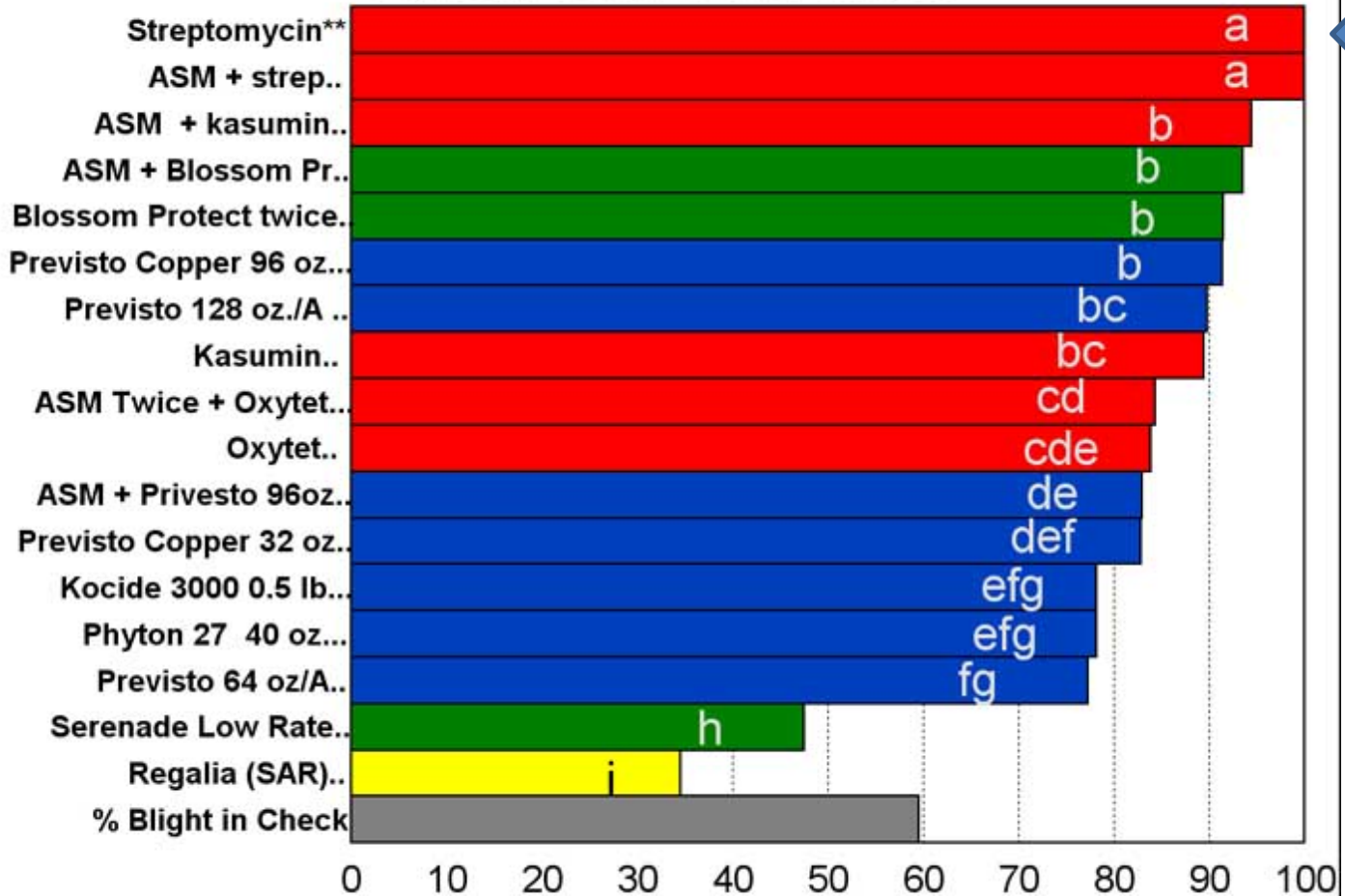
Integrated Control

- 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



**Note: Inoculated w/ strep sensitive bacteria

(T. Smith, WSU)

Alternative Controls

OREI Project, Corvallis, OR

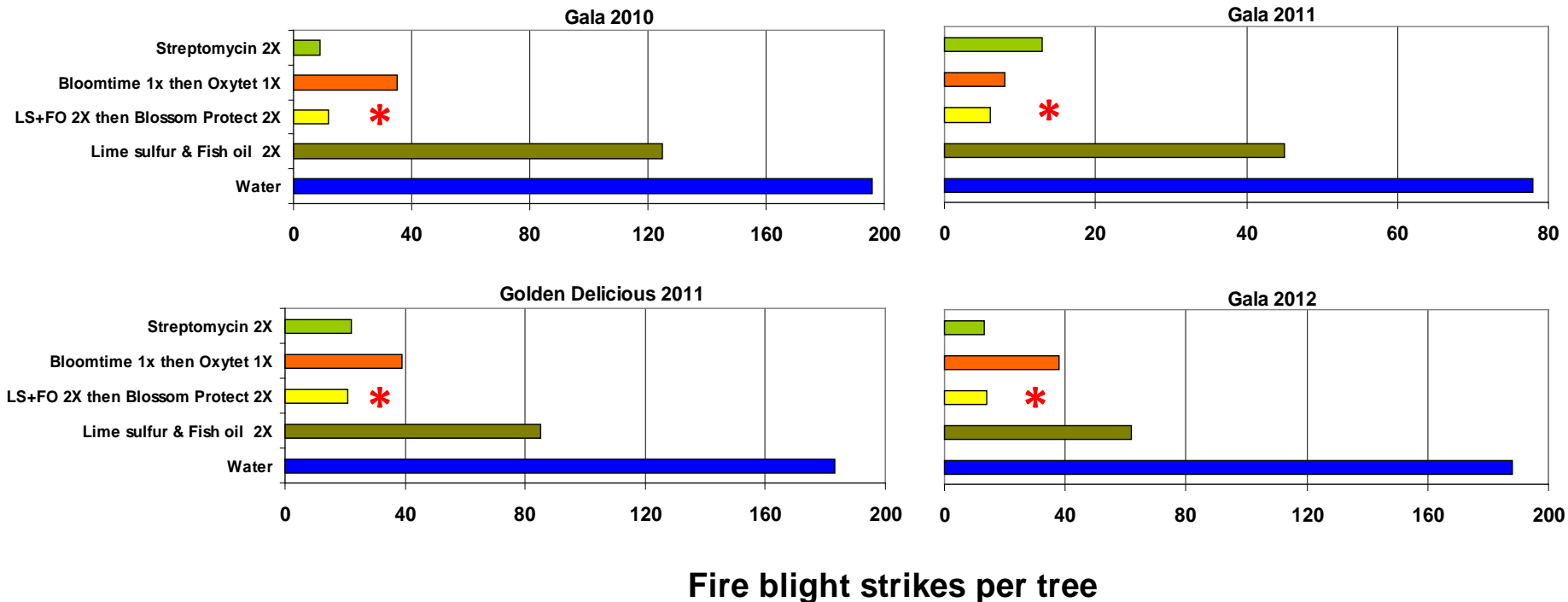
Treatment 2012		% infected clusters
Water control		41.1 a
Bloomtime (2x) + Serenade Max (2x)		27.1 b
Fireline (oxytetracycline)		16.9 cd
Lime sulfur/fish oil (2x)		16.7 cd
Lime sulfur/fish oil (2x) + Bloomtime		13.0 de
Bloomtime + Fireline		9.3 ef
Firewall (streptomycin)		5.1 fg
Lime sulfur/fish oil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



(K. Johnson, OSU)

Alternative Controls

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

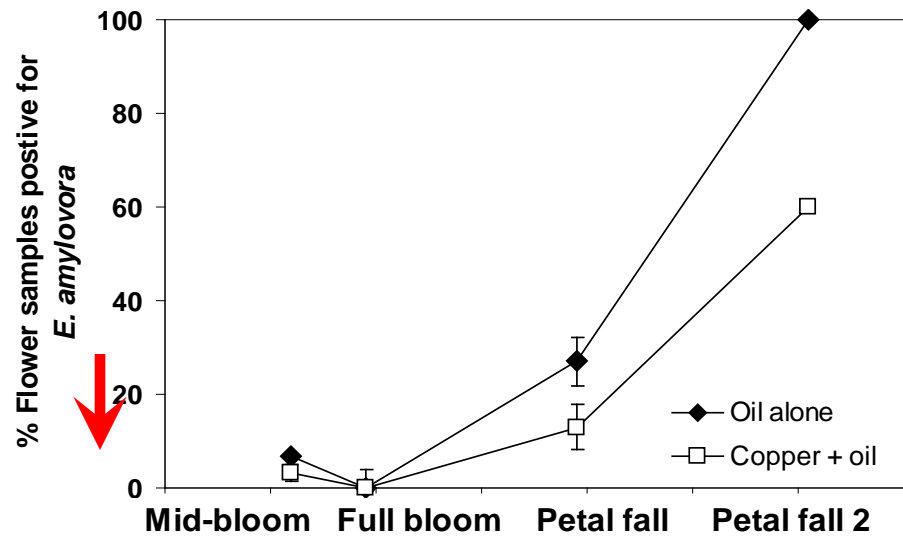


(K. Johnson, OSU)

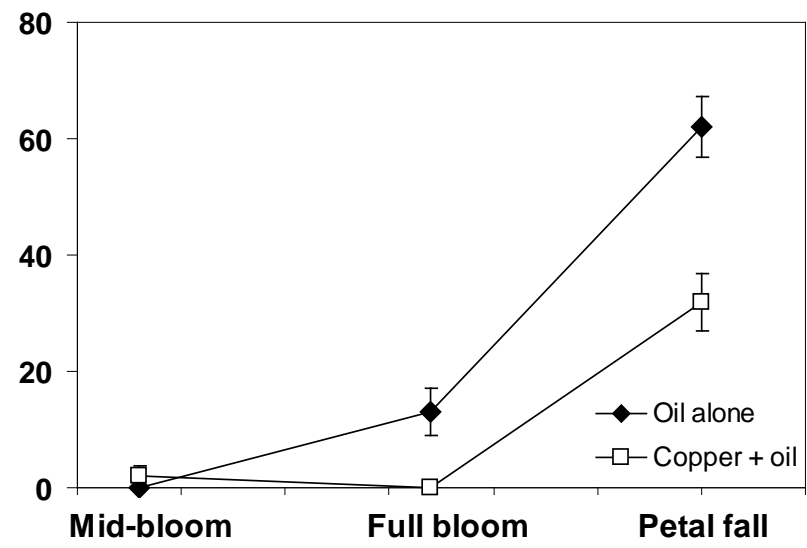
- Blossom Protect colonizes both stigma and nectary
- Integrated control will require more sprays than antibiotics

Does delayed dormant copper affect pathogen build-up?

California pear LAMP survey 2010



California pear LAMP survey 2011



(R. Elkins and K. Johnson)

Overall probability of pathogen detection ~ 16%
 Mid-bloom $P(\text{detect } E_a) < 5\%$
 Petal fall $P(\text{detect } E_a) \sim 50\%$
 $P(\text{detect } E_a)$ in 'Copper + Oil' $\frac{1}{2}$ of 'Oil alone'
 No difference in Russet Severity among the
 'Copper & Oil' and 'Oil only' plots



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.

New project: Incorporating fire blight resistance into Washington apple cultivars . J. Norelli (USDA-ARS) and K. Evans (WSU). Using *Malus sieversii* accessions as sources of fire blight resistance, and planting a Crop Reference Set with demonstrated fire blight resistance.

Field screening of modern varieties (*Fazio et al.*)

Fire Blight Screening, Geneva, NY

Stock	Mean % Lesion		Max % Lesion
	Ea273	Ea4001a	
G.41	0	0	0
M9 EMLA	6	42	100
M.27 EMLA	28	19	58
Red Delicious	4	10	22
Empire	0	6	12
GoldenDelicious	22	30	100
Gala	30	4	37
HoneyCrisp	5	8	29
Pinova	25	16	41
WSU2	24	21	54
NevisSonya	0	0	0

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

“Fire Blight Control in Organic Pome Fruit Systems Under the Proposed Non-antibiotic Standard”. eOrganic webinar, March, 2012 (247 participants).

6 grower meeting presentations, winter 2011/12

“Systems approach to fire blight control in organic pear and apple without antibiotics.” Johnson, K., Temple, T., Elkins, R. and Smith, T. 2nd International Organic Fruit Research Symposium, Leavenworth, WA, June 2012 (120 participants).

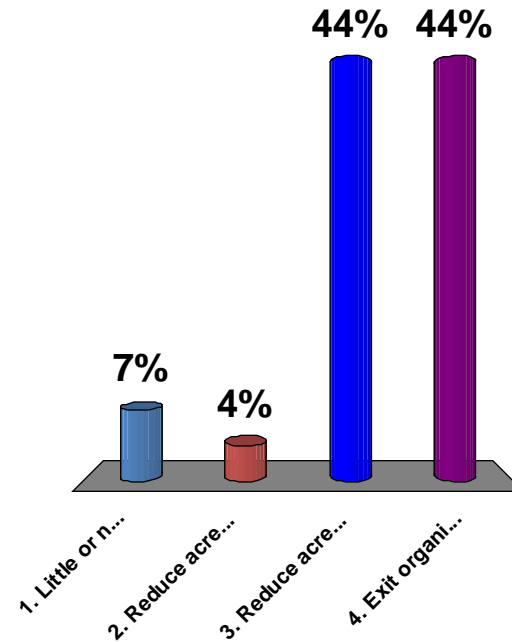
Johnson, K. B., and Temple, T. N. 2012. *Strategies for fire blight control in organic pome fruit without antibiotics*. Plant Disease (accepted).

Midwest OREI proposal for organic fire blight control not funded



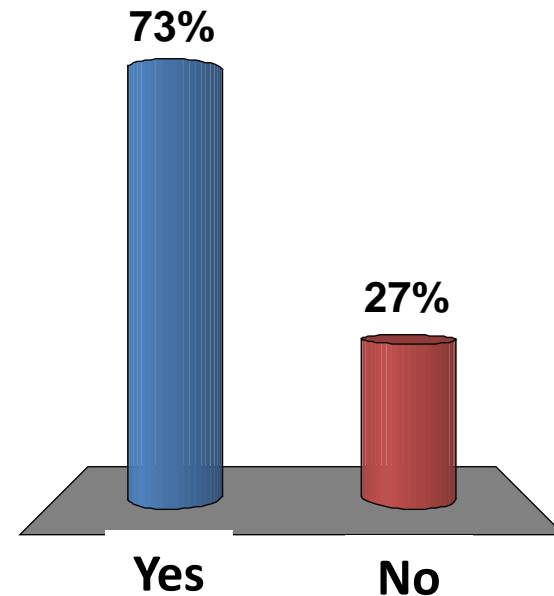
How would the loss of antibiotics for fireblight control impact your operation?

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



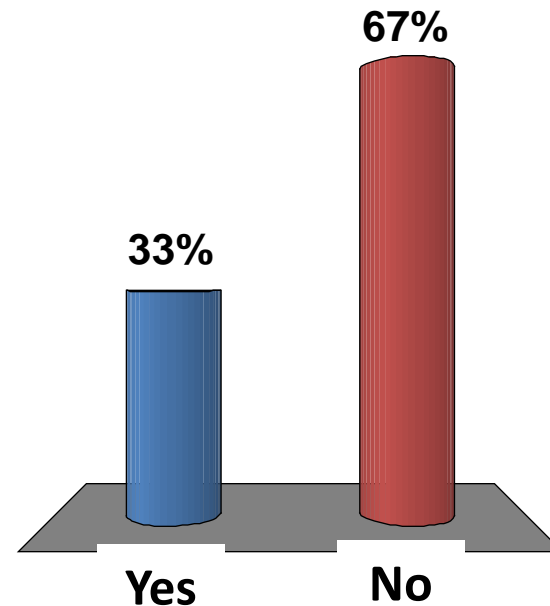
January 2012 WA organic grower meetings (n=94)

Have you tried a non-antibiotic control regime?



If so, was it successful?

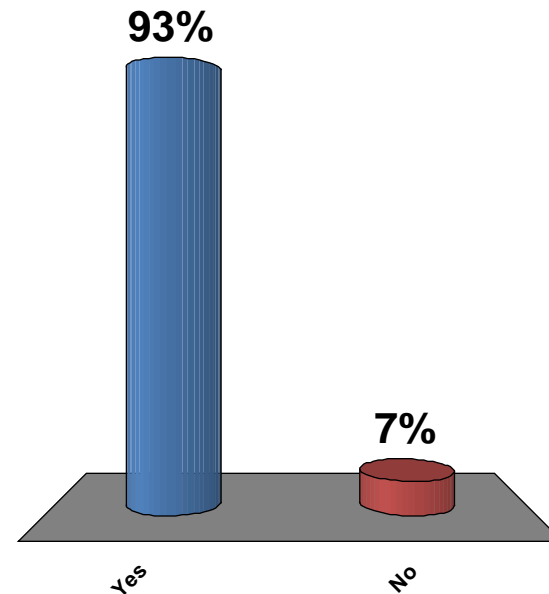
Before Blossom Protect



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

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