

# Fire Blight Update

## Organic Tree Fruit Industry Work Group

presented by David Granatstein  
*WSU CSANR, Wenatchee, WA*

NOSB Meeting, Savannah, GA  
Nov. 30, 2011



*Fire blight damage in pears*

# 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 industry groups

7 states

2 consultants

6 universities

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

***Thanks to Northwest Horticultural Council for travel support.***

# 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).





# 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) 



# Biological Controls

**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

*Sundin et al., 2009. Field evaluation of biological control of fire blight in the eastern United States. Plant Disease 93:386-394.*

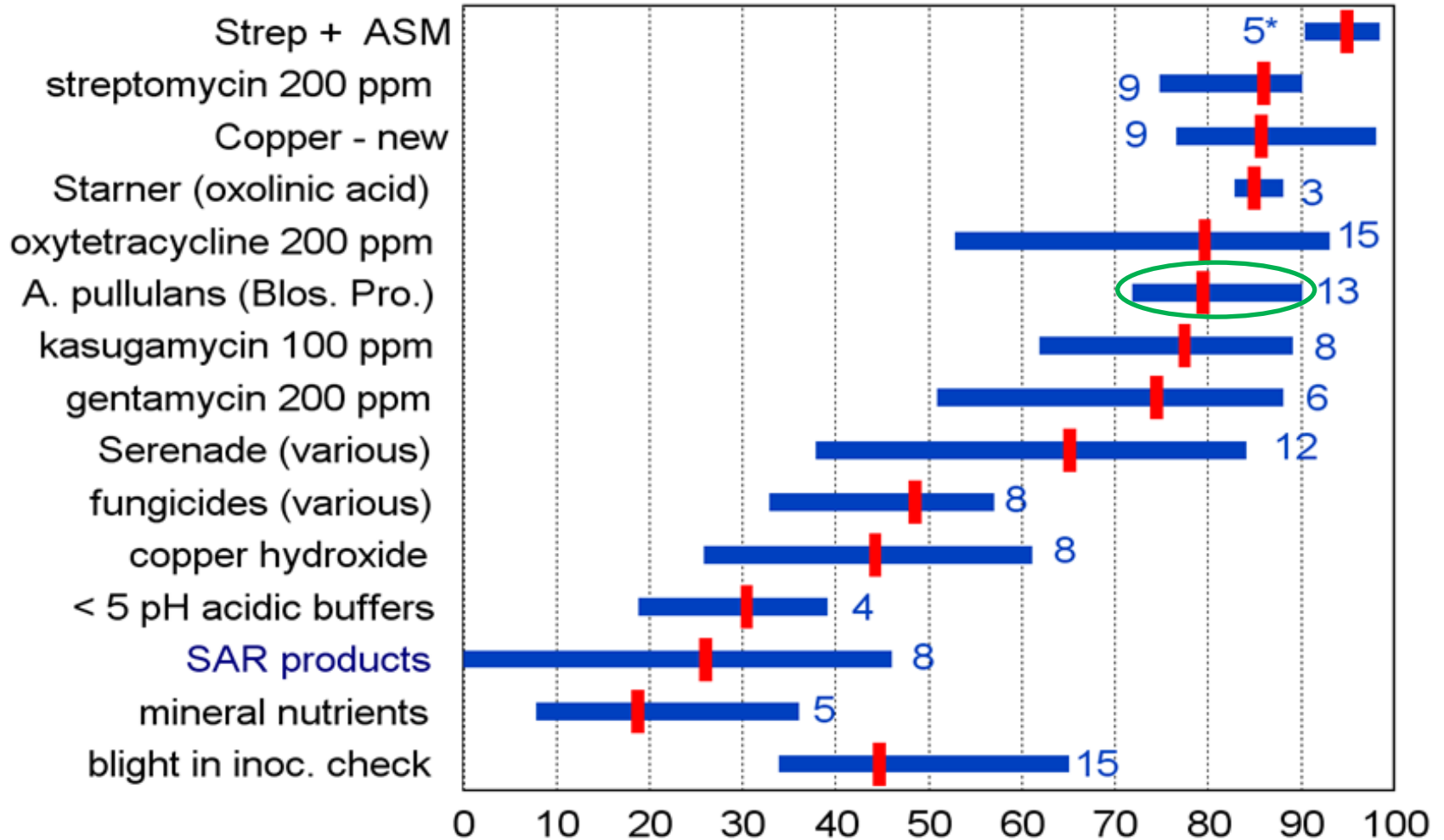
*Zoller, B. 2011. Use of streptomycin and oxytetracycline for fire blight management in organic pear production in California.*



# 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





# Materials registered and marketed for **organic** fire blight control

## Biologicals:

BlightBan A506

Bloomtime Biological

Blossom Protect (expect 2011)

## Product effectiveness

poor to fair

poor to good

good to very good

## Antibiotics:

Streptomycin

Oxytetracycline

Kasugamycin

can be excellent

< 2014 expiration

< 2014 expiration

< unlikely

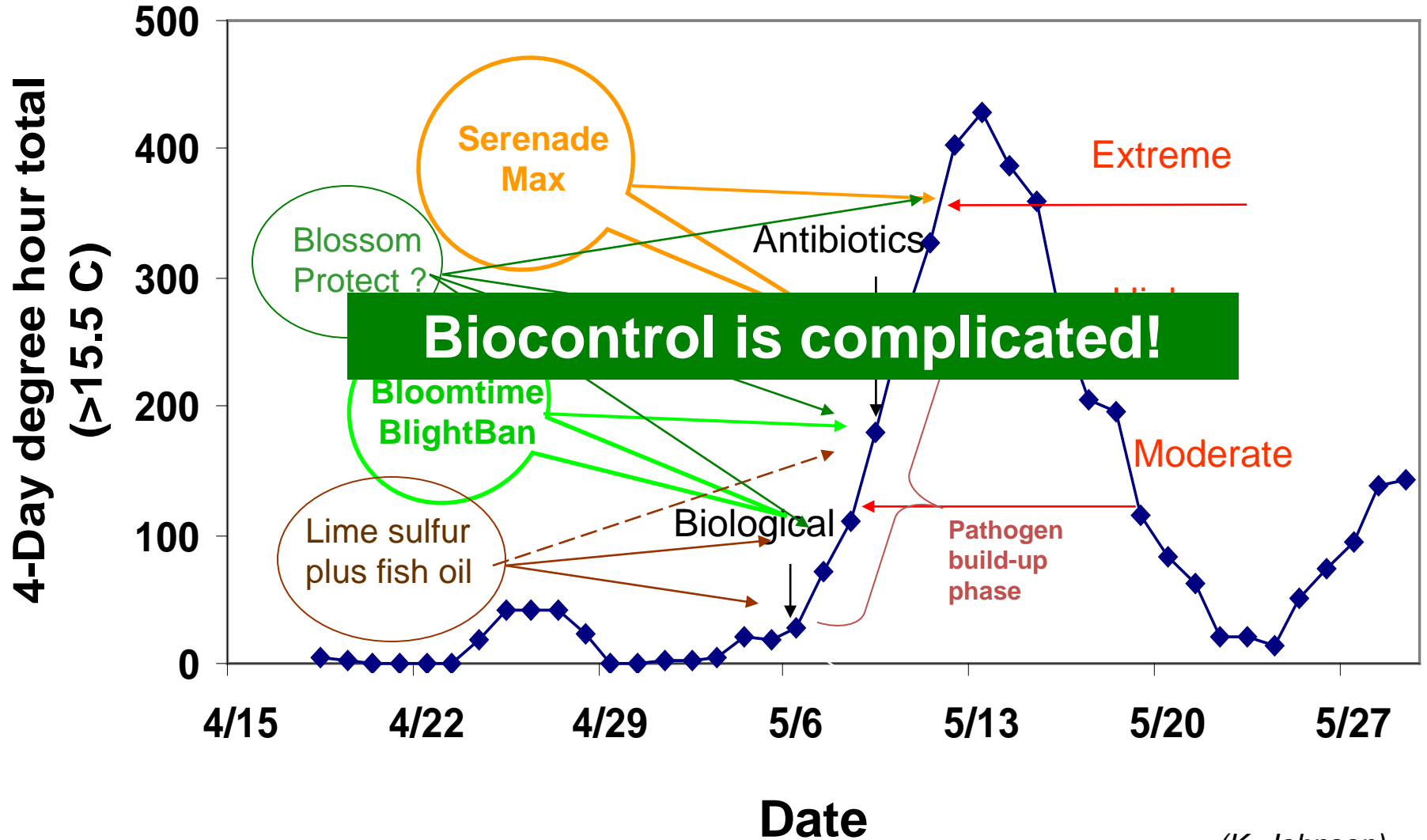
## Antibiotic-like:

Serenade Max

fair to good

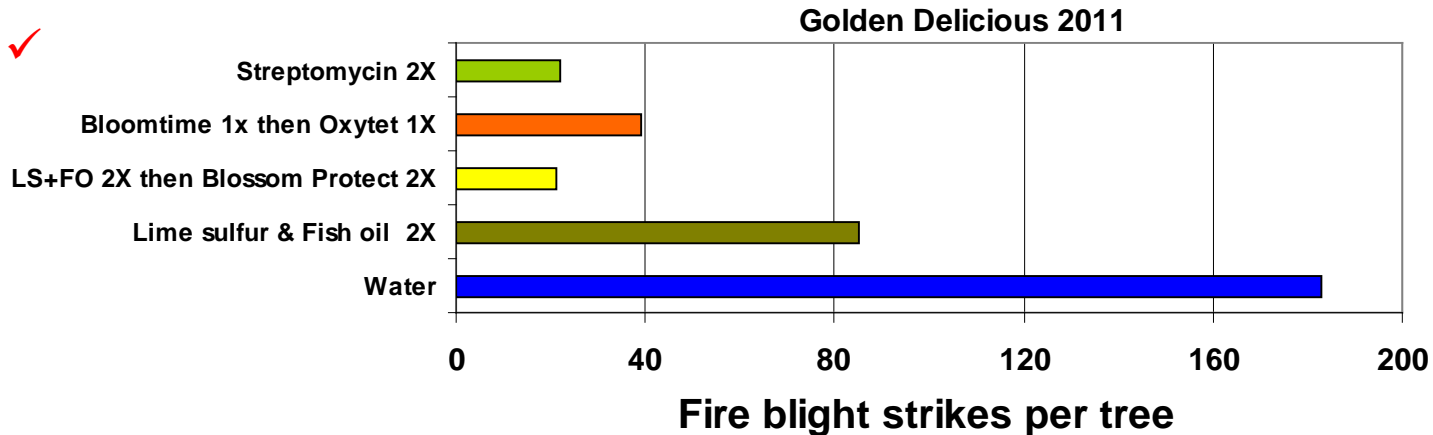
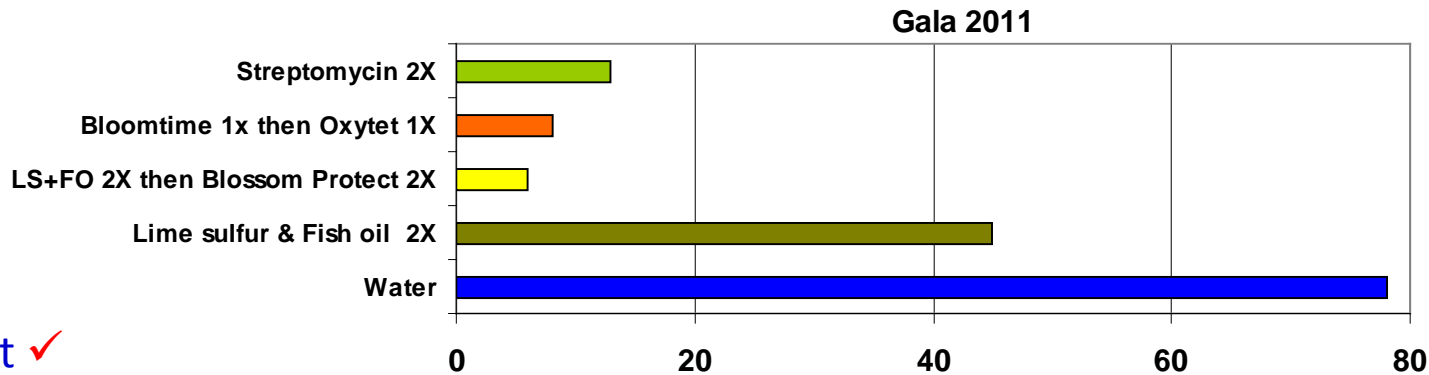
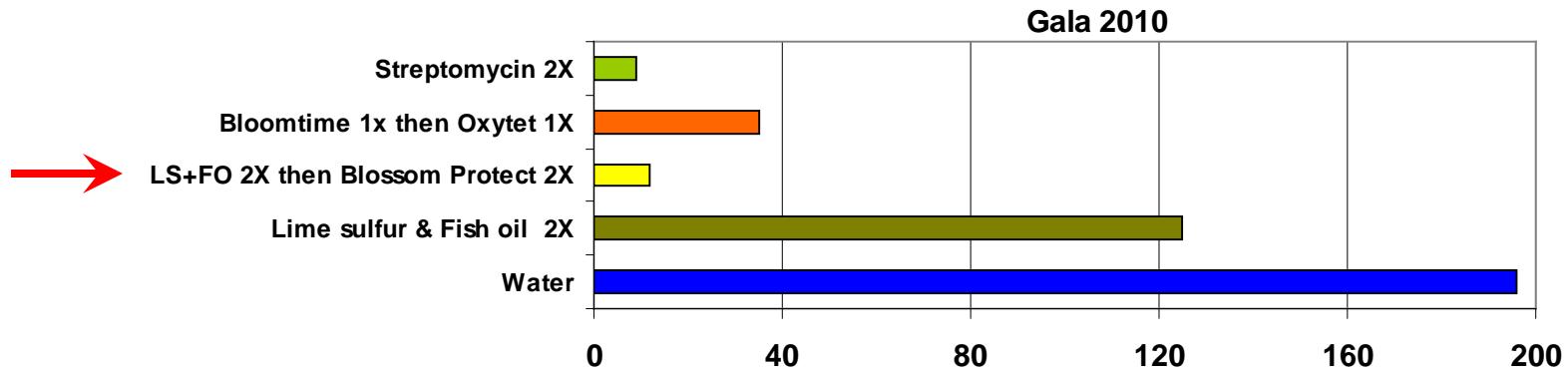
# Timing 'integrated' treatments for organic blight suppression

## Daily Fire Blight Risk - COUGARBLIGHT Model



(K. Johnson)

# Results of Field Trials, Corvallis, OR

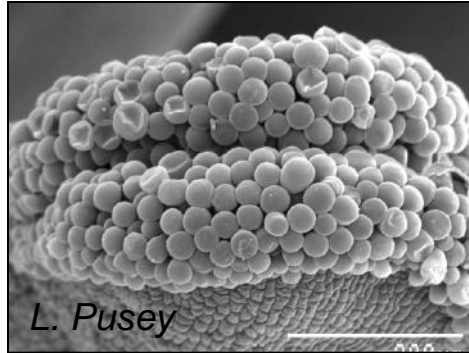


## Questions

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

# Other Research Tracks

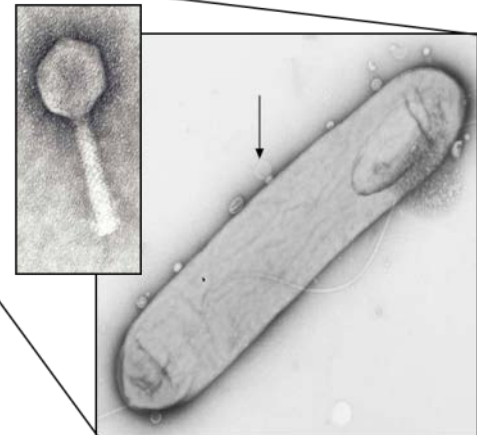
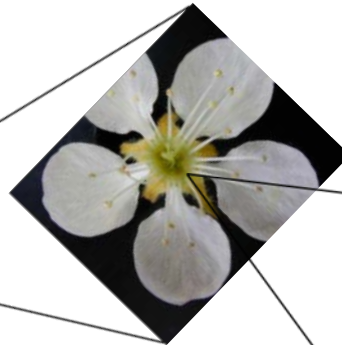
## Chemical components of stigma exudates from 'Gala'



Free sugars  
Free amino acids  
Polysachharides  
Protein  
Lipids



## Crabapple Laboratory Model



**Exploit bacteriophages**

Carrier bacterium is  
*Pantoea agglomerans*

Courtesy: L. Pusey



# 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



	# of Papers	
Intl. Fire Blight Workshops	<u>1998</u>	<u>2010</u>
Breeding (non-GMO)	14	12
Biocontrol	23	14
Antibiotics	3	1

# 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?**

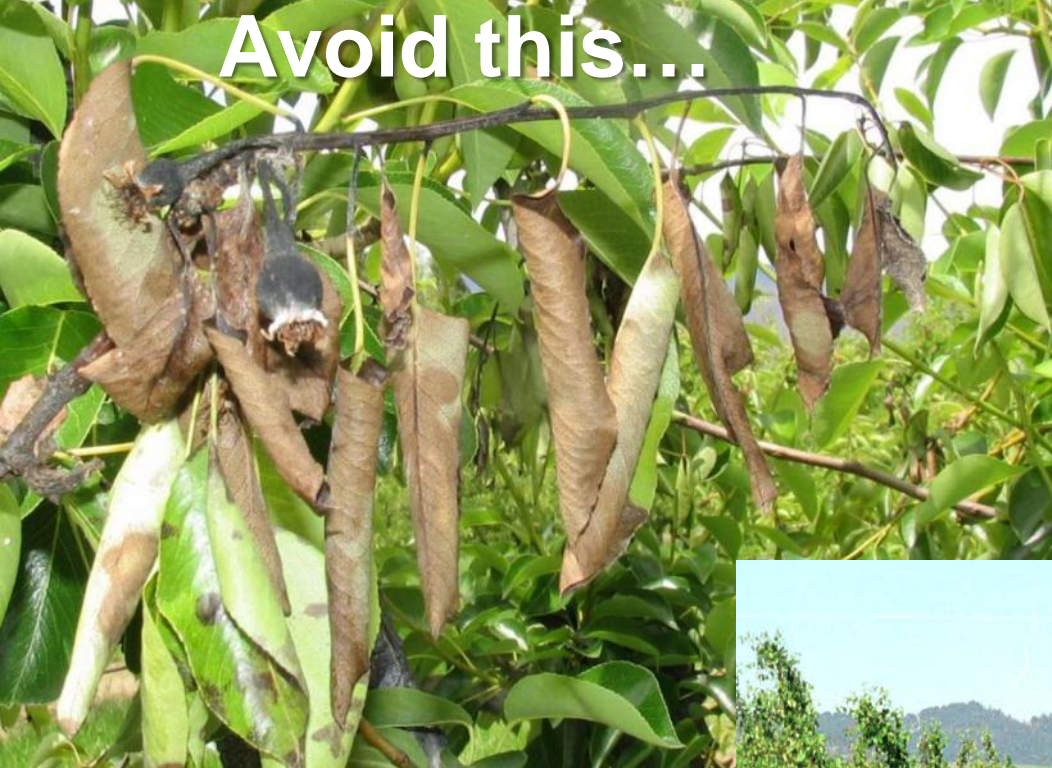
**Getting closer in eastern Washington;  
OREI project starts 2012**

**Very questionable in Midwest and East**





**Avoid this...**



*Fire blight infected tree*

*Removal of diseased orchard*

**...to avoid this...**





...and enjoy this!

# Organic Produce

honestly  
**BETTER**

- Over 200 organic items available
- Today and every day

Organic Granny Smith Apples  
\$2.49 lb

Organic Fuji Apples  
\$2.49 lb

Organic Pink Lady Apples  
\$2.49 lb

Organic Red Delicious Apples  
\$2.49 lb

Organic Gala Apples  
\$2.99 lb

Organic Jonagold Apples  
\$2.49 lb

Organic Golden Delicious Apples  
\$2.49 lb

Organic Bosc Pears  
\$2.49 lb

Organic Tangerines  
3/\$2.00

Shells, Fish  
and Clams

EAT REAL FOOD

(H. Ostenson)