

FireLine™ & *FireWall*™

Programs for Fire Blight Control

Presentation to GS Long Growers
Hood River, OR
January 9, 2014

by

Rene Amundson, Ph.D.
Representative for AgroSource, Inc.

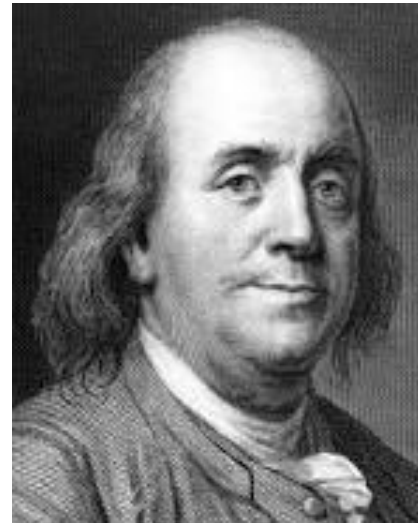


Is Fire Blight a Certainty?

“In this world nothing can be said to be certain,
except death and taxes.”

- *Benjamin Franklin (1789)*

... and perhaps fire blight?



Conditions Required for Fire Blight

1. Host –

Rosaceae family, *i.e.*, pome fruit, *e.g.*, apples and pears

2. Pathogenic bacteria –

Erwinia amylovora (*Ea*)



Photo courtesy K.B. Johnson
and American
Phytopathological Society

3. Conducive weather –

Warm temps(> 60 - 65F) after threshold degree days accumulated
Moisture (rain, dew, etc.) during primary *OR* secondary bloom

Fire Blight – The Disease Cycle

Three major phases to fire blight disease cycle –

1. *Blossom Blight*

Most efforts are directed at this stage to prevent growth and establishment of the pathogen in flowers.

2. *Shoot Blight*

Some efforts directed to control shoot growth using PGRs, but ...

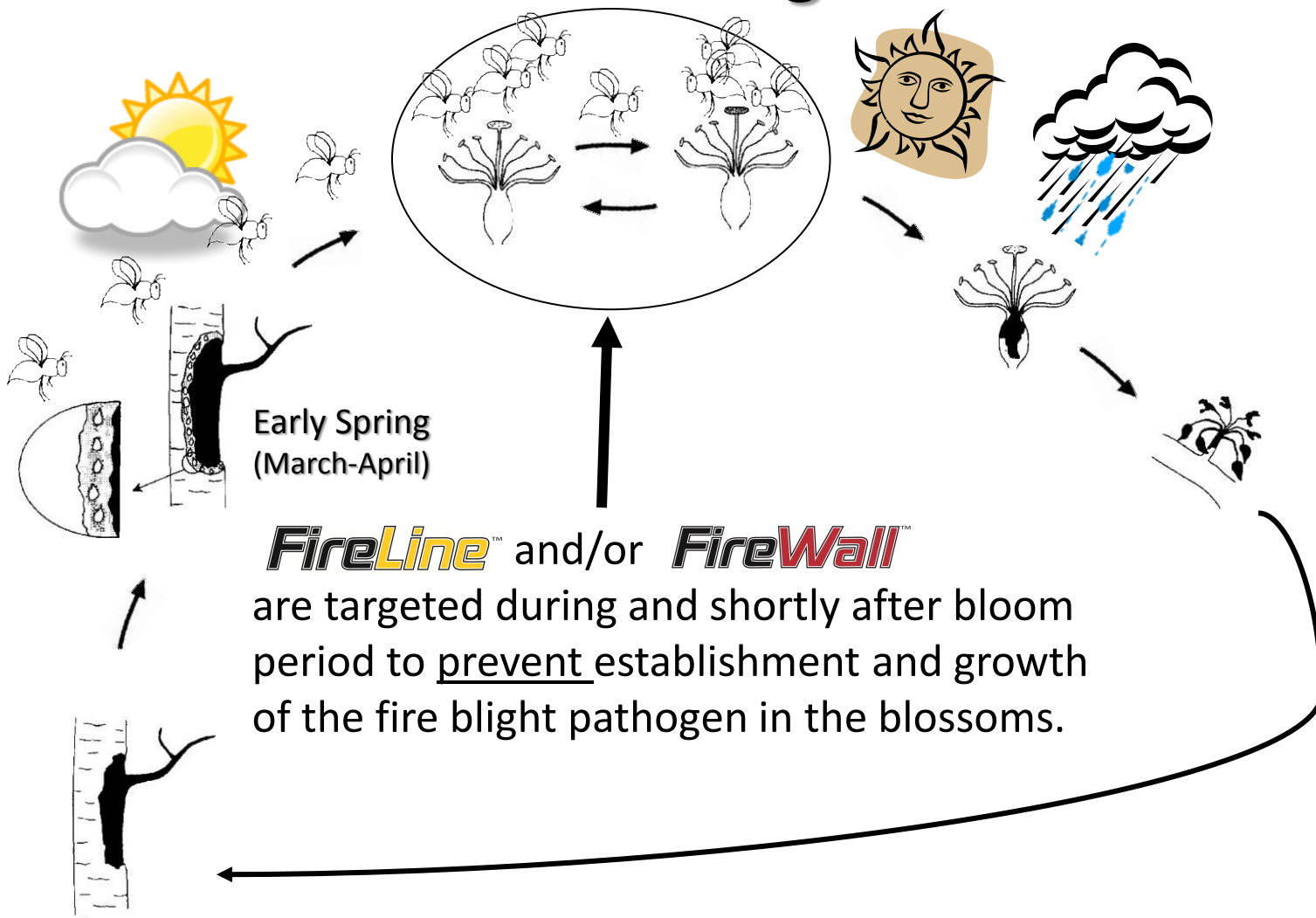
Secondary (“rat-tail”) bloom can be source of post-bloom fire blight infections – BEWARE & TREAT ACCORDINGLY.



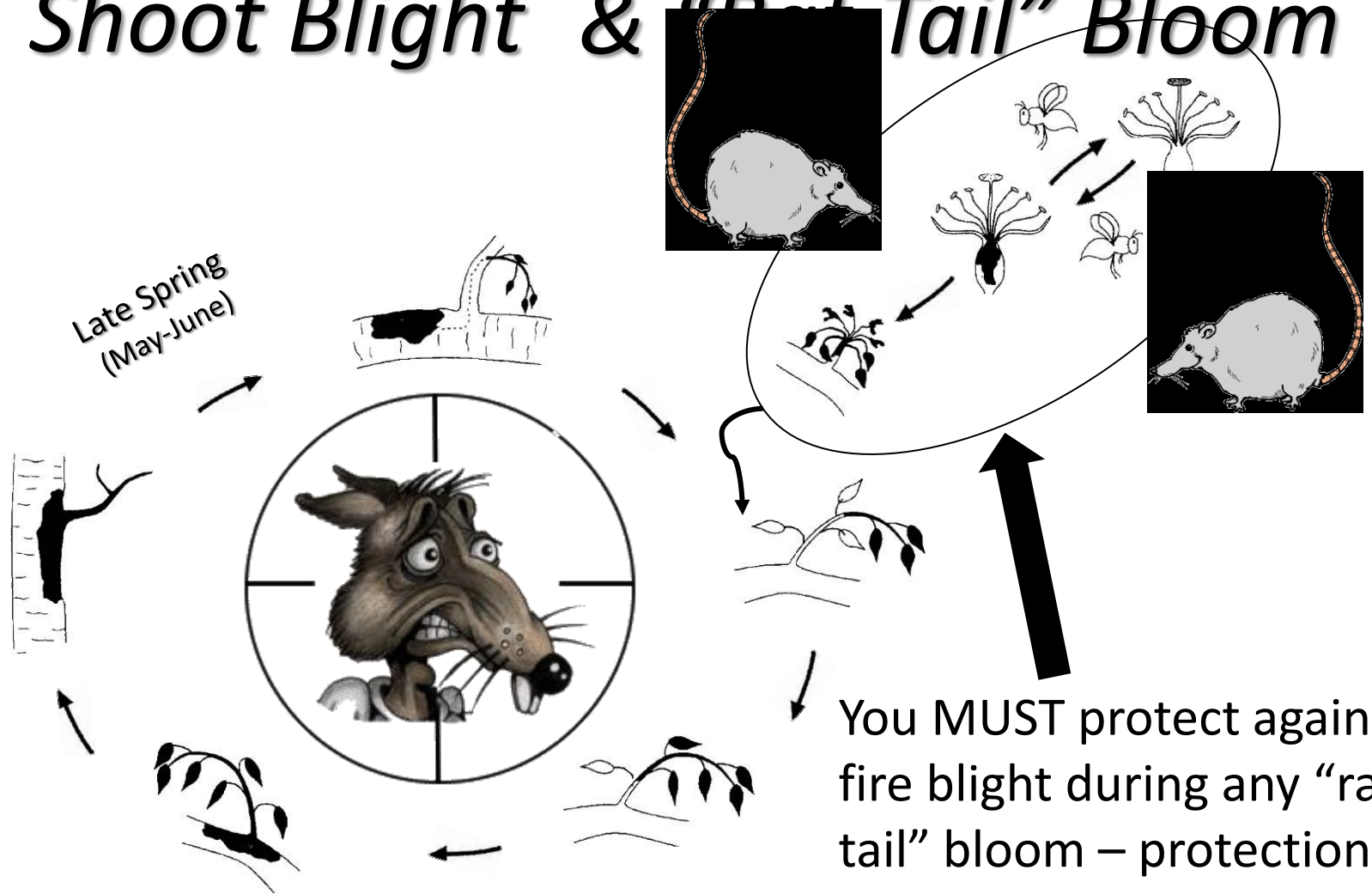
3. *Root Blight*

Generally no treatments directed here

Fire Blight Disease Cycle – *Blossom Blight*



Fire Blight Disease Cycle – *Shoot Blight* & “*Rat Tail*” Bloom



You **MUST** protect against fire blight during any “rat tail” bloom – protection during primary bloom will not carry over!

Fire Blight – Infection Process

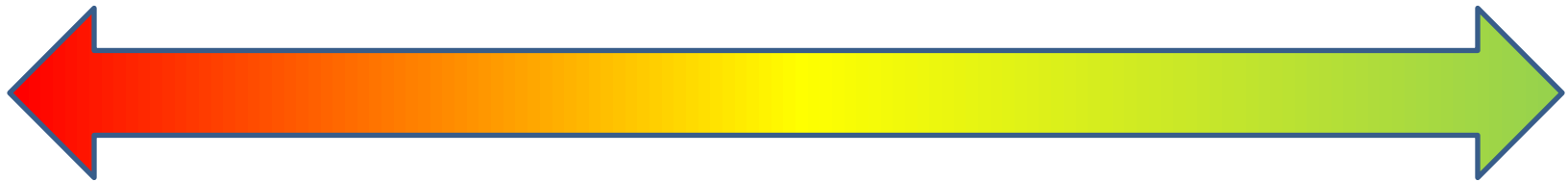


*Photo Courtesy Mark Longstroth, MSU Extension
Photo Courtesy Tim Smith, WSU Extension*

Cultivar Susceptibility to FB - Apples

Highly Susceptible

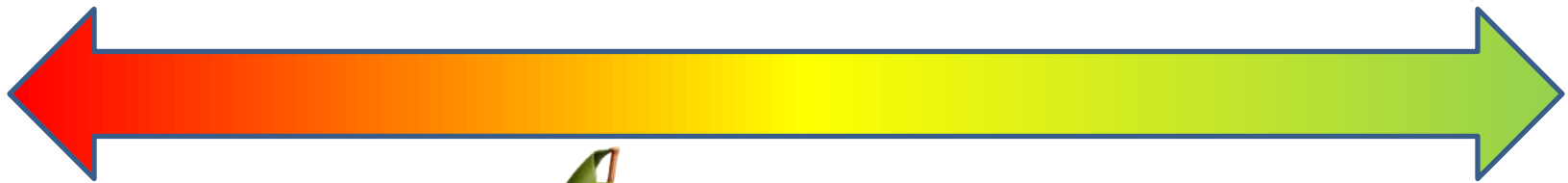
Moderately Susceptible



Cultivar Susceptibility to FB - Pears

Highly Susceptible

Moderately Susceptible



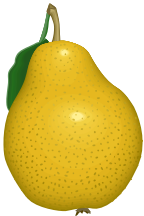
Bartlett

Anjou



Moonglow

Bosc



Max Red

Comice

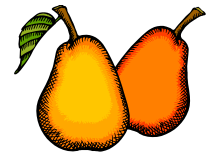
Winter Nallis

Magness

Aurora

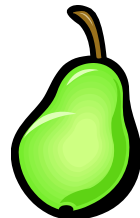
Douglas

Dawn



Concorde

Conference



Harrow Delight

Clapp's Favorite

Seckel

Kieffer




Shensheiki, Hosui (Asian pears)

Starkrimson

Sparklett

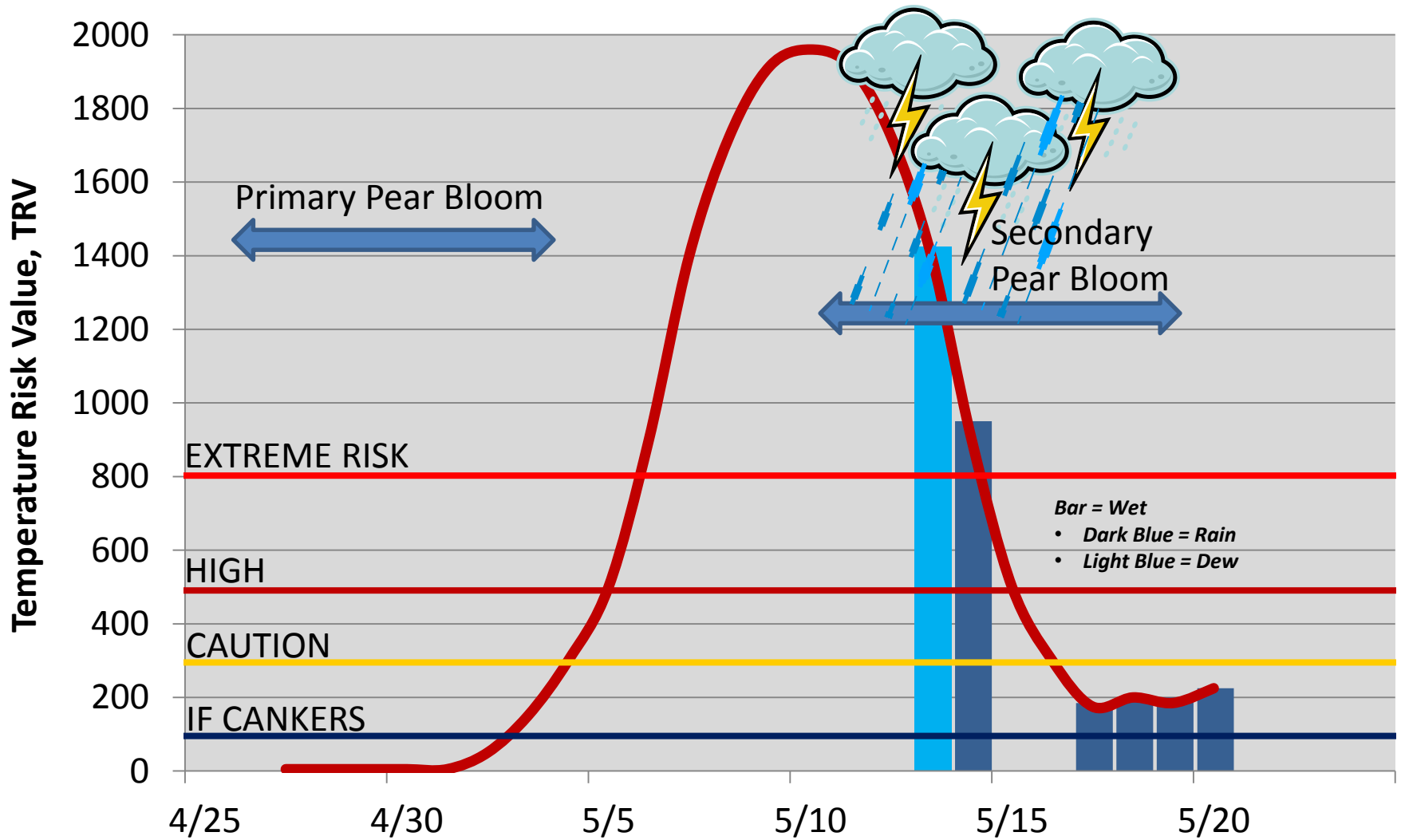
Fire Blight in PNW - 2013

- Generally cool conditions during primary bloom – relatively low fire blight pressure, but ...
- Very warm weather in May (90F+) provided ideal conditions for multiple thunderstorms, 
- This, in turn, caused the rapid growth of fire blight pathogen already present internally,
- Any open and unprotected secondary blooms (“rat-tail”) during this time served to spread fire blight even further – compounding the situation.

CougarBlight FIRE BLIGHT MODEL – 2013

Loomis Valley, WA

WSU DAS Actual TRV



Data shown are courtesy Tim Smith, WSU Extension

FireLine™

- 17% oxytetracycline (18.3% oxytetracycline hydrochloride)
 - FRAC Code 24
-

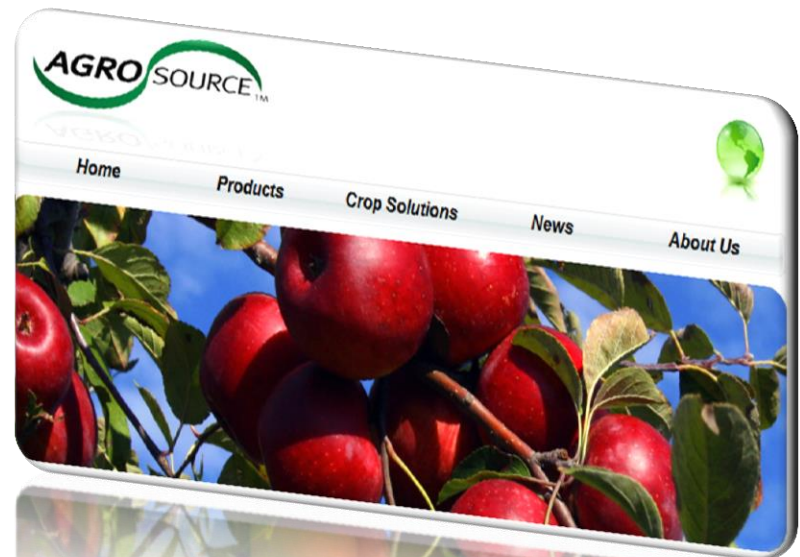
FireWall™

- 17% streptomycin (22.4% streptomycin sulfate)
 - FRAC Code 41
-

Technical Bulletins –  **download from www.agrosource.net**

- Resistance Management Programs
- Performance Comparisons
- Product Quality Appraisals
- Tank Mixing Strategies

More coming in 2014 ...



General Product Recommendations

	<i>FireLine</i> ™	<i>FireWall</i> ™
Minimum Rate	1 lb./100 gal/Acre (higher rates may be applied depending on historical conditions and potential severity – see labels for details)	
Timing	<ol style="list-style-type: none"> 1. Begin at 20-30% bloom if risk of fire blight predicted. 2. Repeat at 2-3 day intervals as risk conditions warrant. 3. <u>Re-apply during “rat-tail” bloom according to fire blight risk.</u> 4. Apply immediately after hail damage for “trauma blight”. 	
Max. Applications	6	8
PHI (apples)	60 days	50 days
PHI (pears)	60 days	30 days
REI	12 hours	12 hours

Note: For best results and based on model predictions and recommendations from your professional advisor, *FireLine* and/or *FireWall* are recommended to be applied in advance of potential fire blight infection.

Organic Status

FireLine[™]

FireWall[™]



- The **active ingredients** in *FireLine* and *FireWall* are on the USDA National List of approved substances for organic production.



- *FireLine* and *FireWall* are listed on the WSDA Brand Name Materials List and currently may be used in organic apple and pear production during the 2014 season.

- AgroSource has actively supported efforts by the NHC, WSHA, WSU and others to maintain USDA-NOP listing for oxytetracycline and streptomycin.



What About Strep Resistance?

	% <i>E. amylovora</i> strep-resistant	
Washington	1988: (Loper <i>et al.</i>)	2010:
Isolates:	76 of 95 (80%)	5 of 23 (22%)
Orchards:	29 of 32 (90%)	2 of 8 (25%)
Oregon & CA	1992-1998:	2009:
Isolates:	-	6 of 19 (31%)
Orchards:	52 of 125 (41%)	5 of 13 (38%)

Based on these data, recommendation by OSU & WSU Extension has shifted from: “Don’t use strep” to “Strep once per season, but only mixed with full rate of oxytet.”

AgroSource Resistance Management Program for Fire Blight

Condition "A"	Recommendations*
<p>Strep-<u>RESISTANT</u> Orchards</p> <p>(Documented full strep resistance in orchard)</p>	<ul style="list-style-type: none"><li>• Apply <i>FireLine</i>[™] at full rate as needed according to threat of fire blight.<li>• Do <u>not</u> apply <i>FireWall</i>[™] to orchard.

*apply as indicated by risk model and in accordance with label recommendations.

AgroSource Resistance Management Program for Fire Blight

Condition “B”	Recommendations*
<p>Strep-<u>SENSITIVE</u> Orchards</p> <p>(No known resistance to strep in orchard)</p>	<ul style="list-style-type: none"><li>• Tank mix <i>FireLine™</i> & <i>FireWall™</i> at full rates each, as needed according to fire blight potential.

*apply as indicated by risk model and in accordance with label recommendations.

AgroSource Resistance Management Program for Fire Blight

Condition “A+B”	Recommendations*
<p>Strep <u>SEMI-SENSITIVE</u> Orchards</p> <p>(Some strep resistance is known to exist in orchard)</p>	<ul style="list-style-type: none"><li>• Tank mix <i>FireLine</i>™ and <i>FireWall</i>™ at full rates each, but just <u>once</u> per season.<li>• <i>Proceed only after guidance from state extension agent and/or your Professional Crop Advisor.</i><li>• Thereafter, <i>FireLine</i>™ at full rate for all fire blight bloom sprays, as needed.

*apply as indicated by risk model and in accordance with label recommendations.

Superior Formulation of *FireLine*[™]

- Dr. Ken Johnson, Oregon State University*
 - *FireLine*[™] is ... “so much easier to work with compared to (Product X)... because it dissolves so nicely. (Product X), in contrast, does not mix up as well and always has a stony grit in it that can clog nozzles. We use FireLine exclusively and have no intention of going back.”

* Does not constitute Product endorsement by Ken Johnson or Oregon State University

- Ease of mixing ... even in cold water
 - *FireLine*[™] rapidly and easily mixes and disperses in water, even cold irrigation water usually seen in the spring.

Relative Cost Comparison

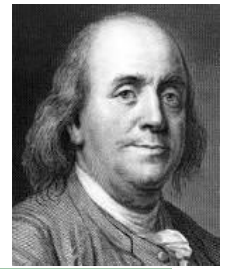
Fire Blight Program	Applications (cost factor)	Cost/Acre (FireLine = 1)
<i>FireLine</i> [™]	1	1.0
<i>FireWall</i> [™]	1	1.0
<i>FireLine</i> + <i>FireWall</i>	1	2.0
Biological Yeast	1 – 3	~ 2.1 – 6.3
Antimicrobial Bactericide (not yet registered by EPA)	1	~ 2.6
Biological (<i>Bacillus subtilis</i>)	3	~ 5.4

“Bottom Line” Costs Analysis

- No other Product on the market today, “conventional” or “biological”, delivers the cost-effective performance against Fire Blight as do –

FireLine[™] &
FireWall[™]

Is Fire Blight a Certainty?



- Sooner or later, fire blight will likely show up in your orchard(s).
- But you CAN significantly reduce the potential for this disease.
- So ... whether or not fire blight strikes in your orchard depends greatly on the decisions YOU make.

Conclusions

FireLine™

FireWall™

- **Quality Formulations** designed specifically for ease of handling and application (excellent mixing even in cold water)
- **Robust Product Performance** you can count on to combat fire blight
- **Unsurpassed Stability** for flexibility between growing seasons
- **Long History of Safe Use** on apples, pears and other crops
- **Products of Choice** for resistance management programs
- **Deliver the best “bang-for-buck”** of any bactericide available
- **THE BEST Products** for fire blight control representing the **New Standards** for fire blight management



Thank you!

Company Contact Information

Sales

Rick Bird

(309) 838-9702

Rick.bird05@gmail.com

Technical

Rene Amundson

(509) 679-9916

rene@amconserv.com

For more information, visit



at: www.agrosource.net