# Controlling Fire Blight in Landscape Settings

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North Bay Landscape Seminar
November 9, 2017

# *NOT* an EH EXPERT!

- No direct experience controlling fire blight in landscape trees, e.g. ornamental pear
- Experience is fire blight in pear orchards where *fruit finish* is a key parameter in evaluating materials, in addition to efficacy;
- Recent focus has been on organically-approved control since NOP eliminated antibiotics in October 2014.

# Fire Blight Hosts
## Rosaceae (Rose family): 200 species

- MAJOR: Apple, pear, quince




# ORNAMENTALS

*Cotoneaster*

Hawthorn (*Crataegus)*

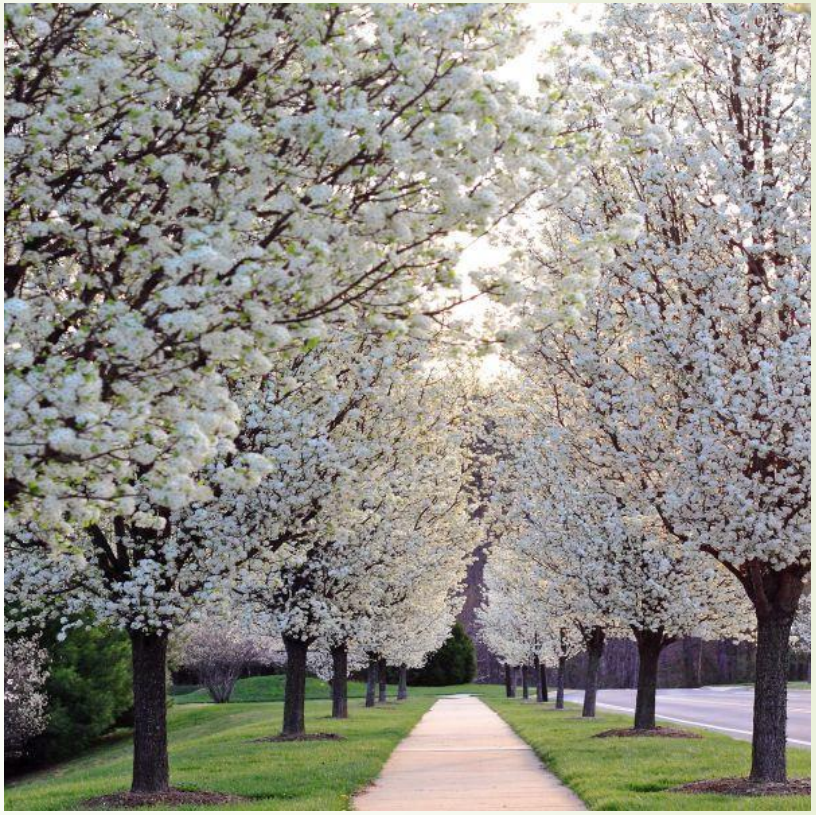
*Stranvaesia*

*Pyracantha* (firethorn)

Mountain ash (*Sorbus*)

# Ornamental Pear (*P. calleryana*)

'Bradford'



'Chanticleer/Cleveland Select'

"This plant is invasive in Missouri. The species should not be planted in the Midwest. Control and Alternatives"; **THIS IS NATIONWIDE IN SCOPE!**

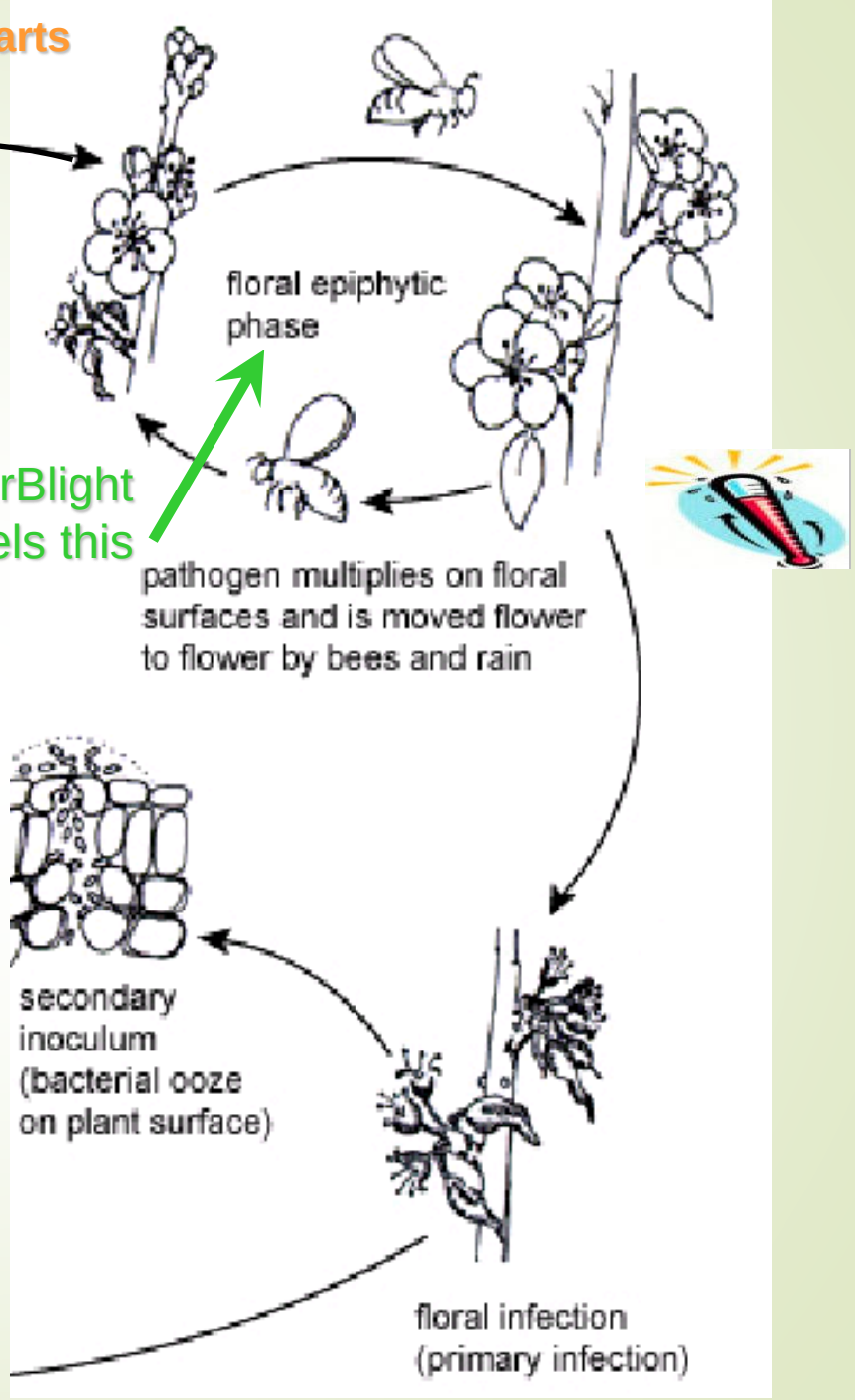
Pathogen overwinters here

A. Jones, APSnet

This jump starts the cycle

CougarBlight models this

Not this




# Significance of old cankers & bloom temperature

# When is the fire blight pathogen active?

Is the fire blight pathogen in this bag of flowers?

Answered by 'LAMP' assay that detects pathogen DNA:

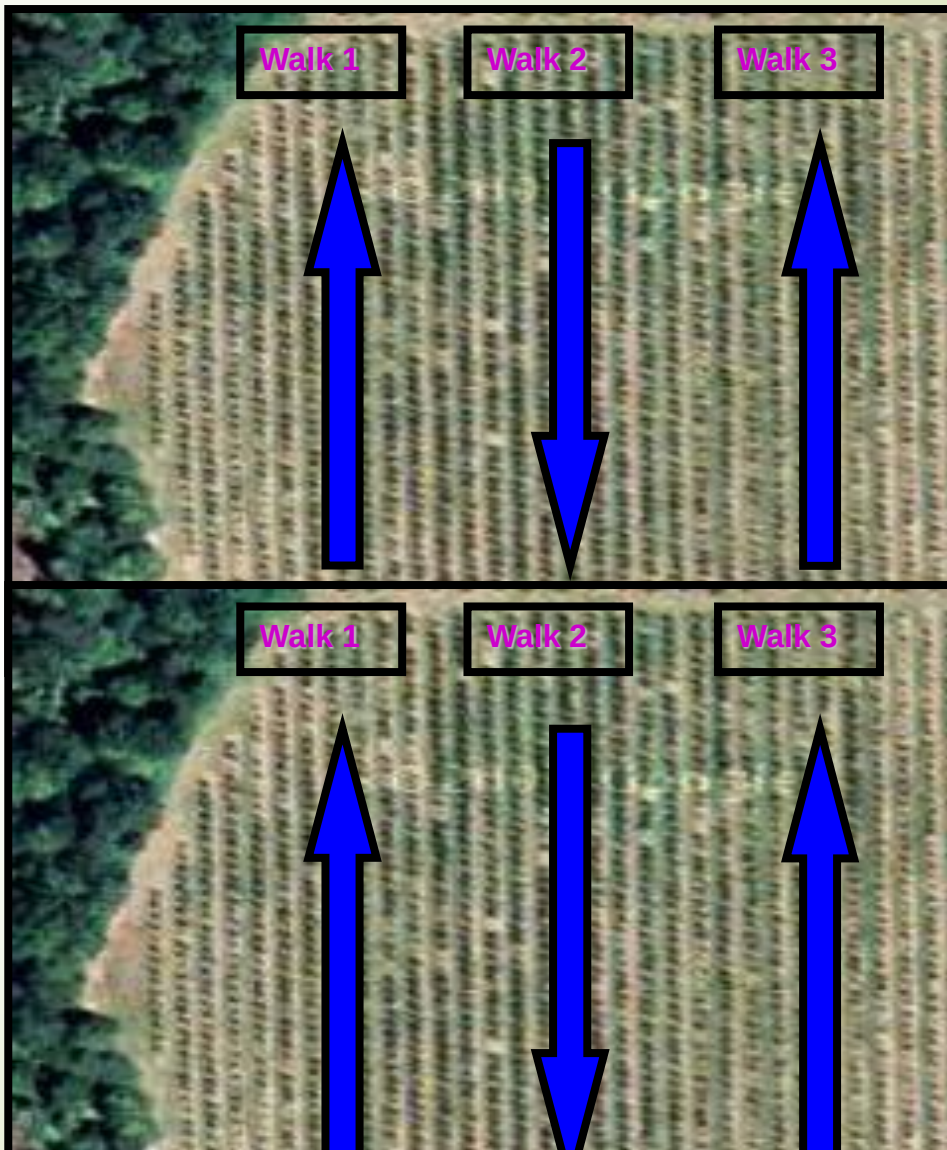
# Showed using delayed dormant copper

- **Delayed dormant oil plus**

  **CuOH+CuOCl** (6 lbs/A)

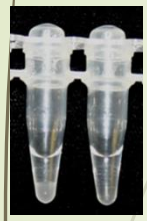
**In 2010-2013 we split fourteen ~10-acre blocks**

- **Delayed dormant oil**



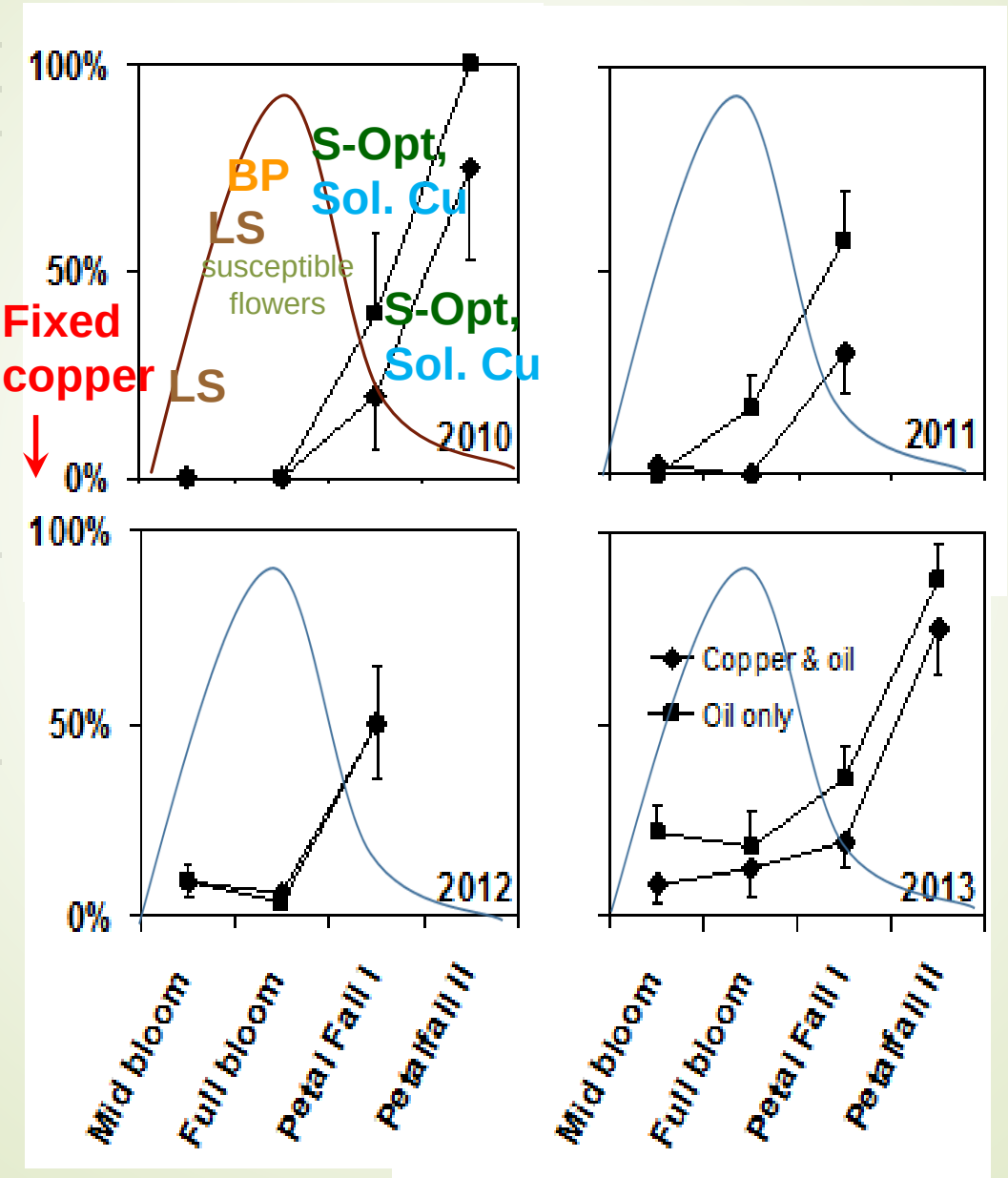
# When do we find the fire blight pathogen in flowers?

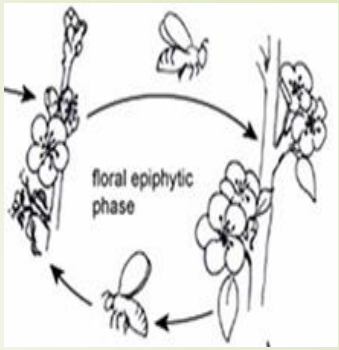
AMP is a molecular
ssay we employ to
detect the fire blight
athogen in flowers

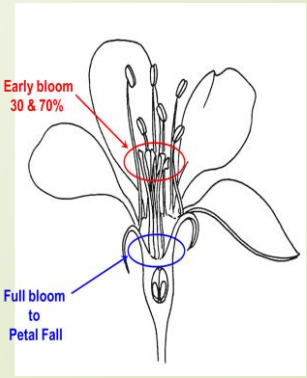


Each year, twelve
ommercial Bartlett
pear orchards in
orthern California
were surveyed
ing the bloom period

All orchards
received multiple
antibiotic sprays

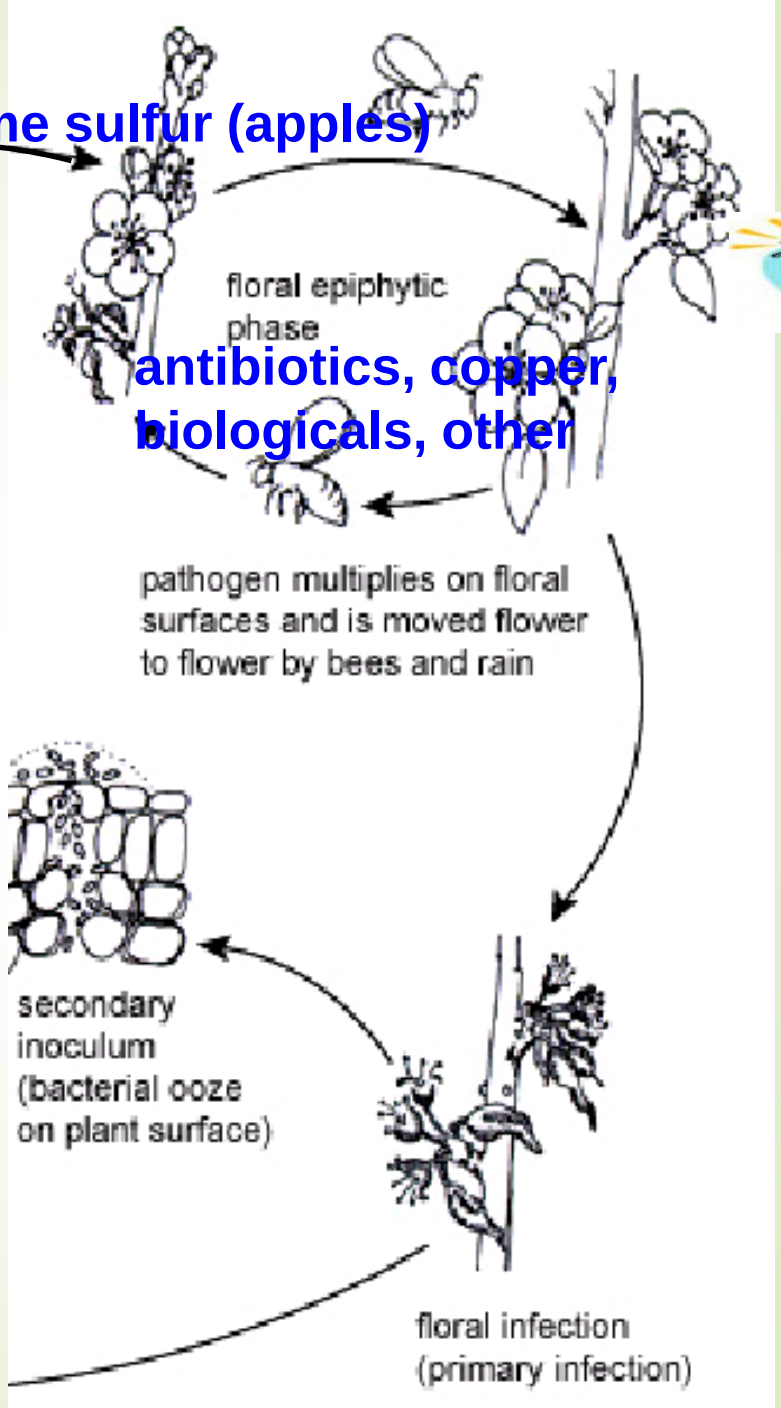


**lime sulfur (apples)**

**fixed copper, SARs**



# Ornamental Fire Blight Management Options (order of desirability)

- *PLANT SELECTION*: Resistant cultivars, remove alternative hosts (e.g. Pyrancantha)
- *SANITATION*: Cut out infected wood if possible (impractical if too many); complete removal
- *TREATMENT*: Antibiotics (streptomycin terramycin, kasugamycin); copper (fixed, soluble); SARs (Actigard); nutrient-based (phosphorous acid); biologicals (A506, Blossom Protect):

  **CHEMICALS IMPRACTICAL FOR ORNAMENTALS IN MOST CASES! WATCH LABELLING!**

# 2016 Pacific Northwest Plant Disease Management Handbook

**Bradford, Capital, *Cleveland Select**

*moderately susceptible*; weak branching

**Aristocrat, Autumn Blaze, Early Red,Redspire**

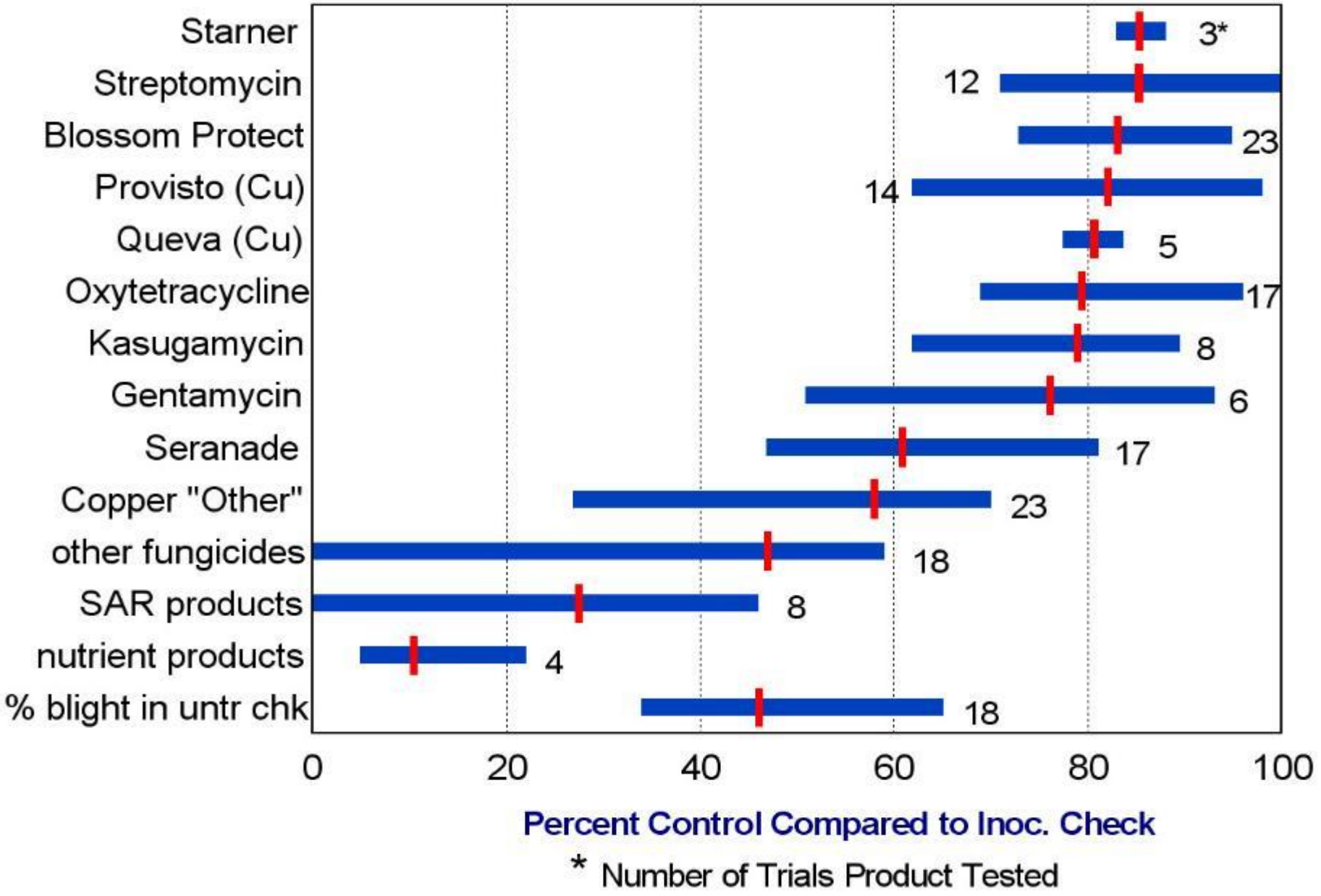
*least resistant*; stronger branching

***Chanticleer, Trinity, Whitehouse**

*most resistant* (*contradicts* C. Select)

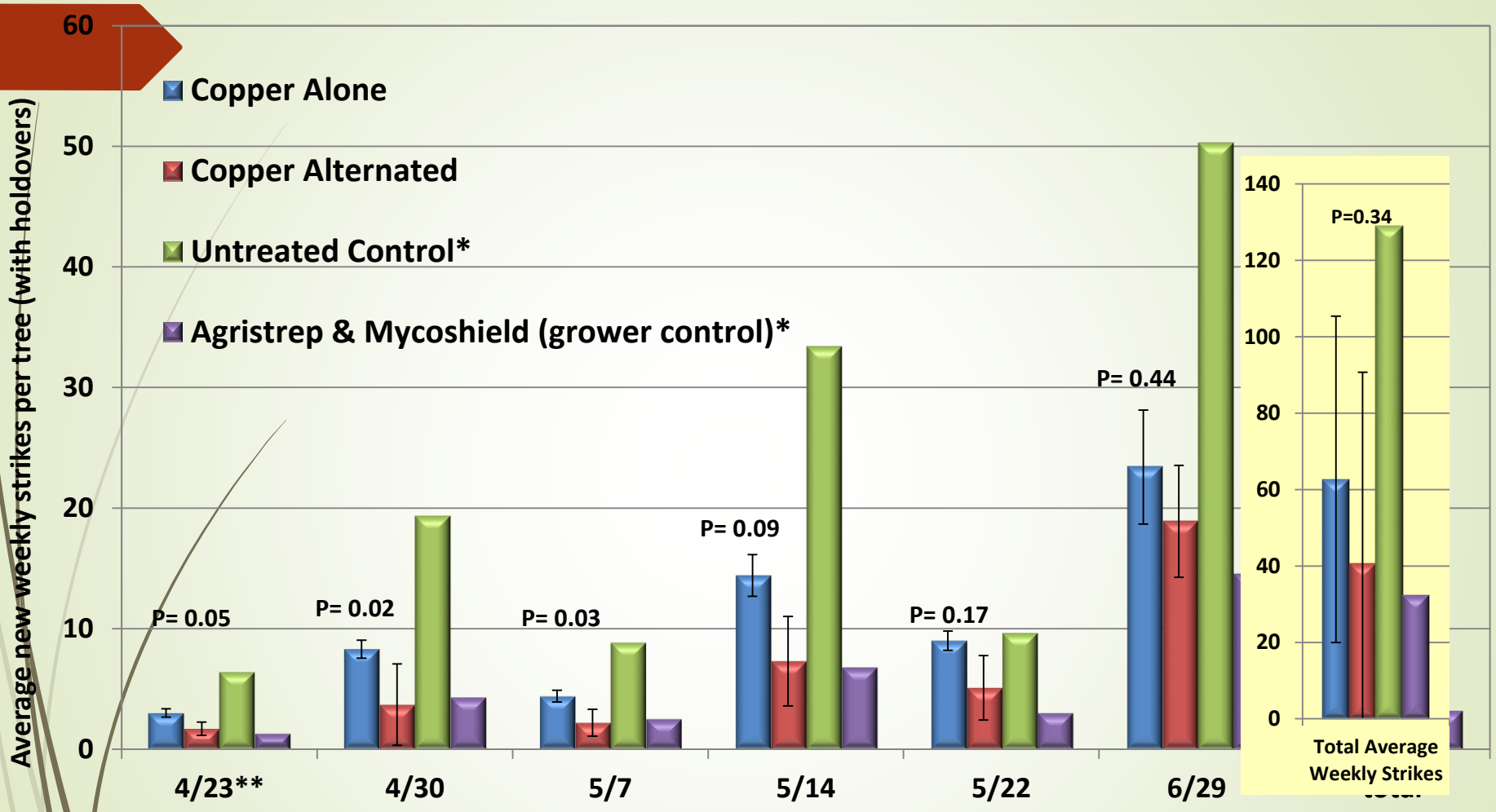
# Summary of Efficacy - % Control Fire Blight

## Innoculated Treated Flowers




* Number of Trials Product Tested

# THIS APPLIES TO *MOST OTHER* NON-ANTIBIOTIC MATERIALS




* Control and antibiotics means for comparison only, not included in t-test. ** Date of last antibiotic and 'alone' applications.
**Error bars=standard error.**

**Average number of weekly fire blight strikes, copper alone versus alternated with antibiotics, 'Bartlett' pear trees, Scotts Valley (Lakeport), Lake County, California, 2015**

# **New Research** (UC, OSU, WSU, PSU, VA, Cornell, MI)

**ANTAGONISM**: Biological organisms (bacteria, yeast, other) (e.g. BlightBan A506, Blossom Protect; mainstay of organic programs

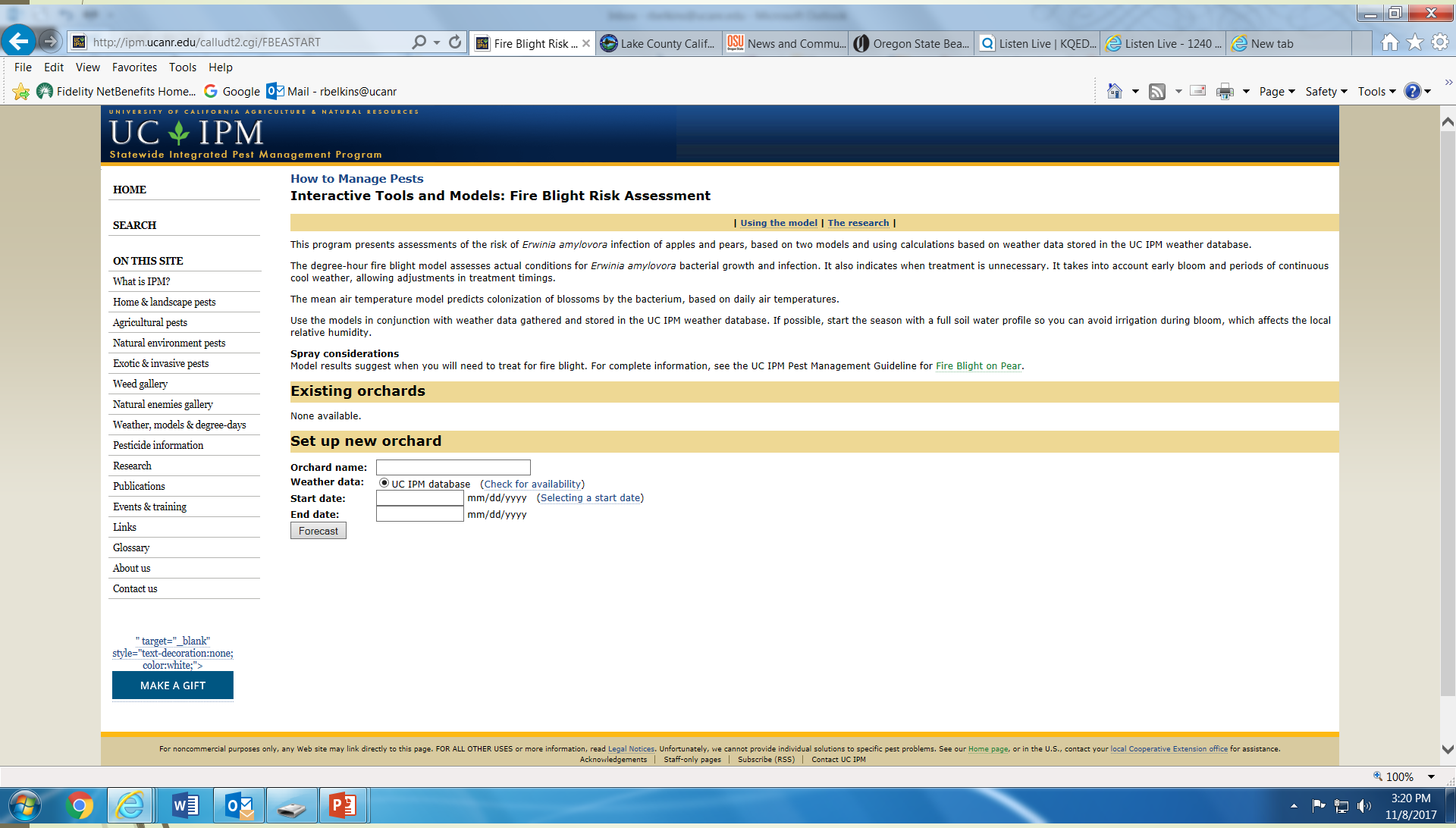
**ACQUIRED SYSTEMIC RESISTANCE (SAR)**
(e.g. Actigard): bark paints (ornamentals in future?), foliar sprays; new CA label

**COPPER FORMULATIONS**: soluble formulations to reduce russet and enhance coverage (e.g. Previsto, Cueva)

**ADJUVANTS TO ENHANCE CONTROL**: citric acid-type materials (MO of phosphorous acid product?)

**BREEDING**: resistance = MAIN AVENUE IN FUTURE (genetic markers)

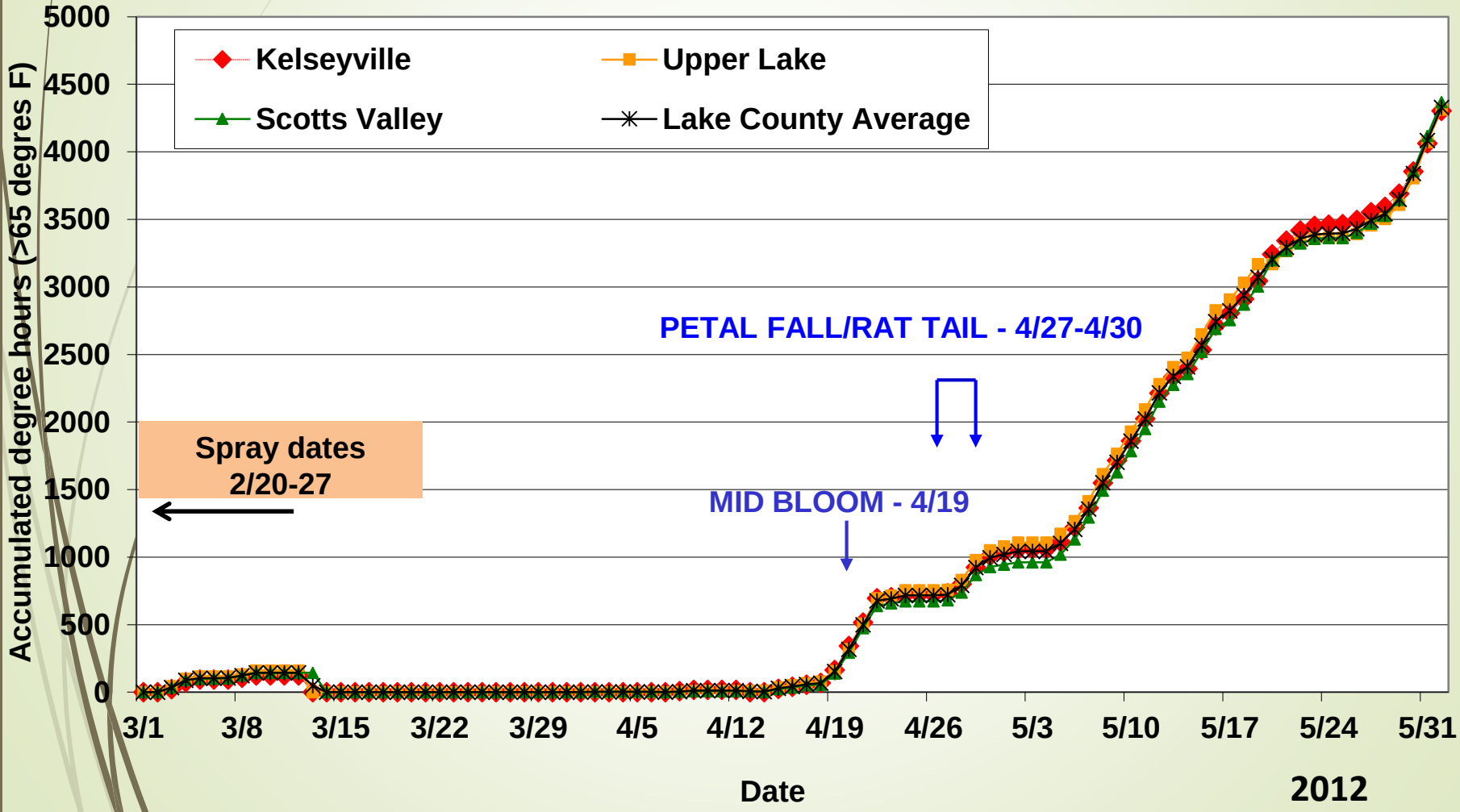
# http://ipm.ucdavis.edu



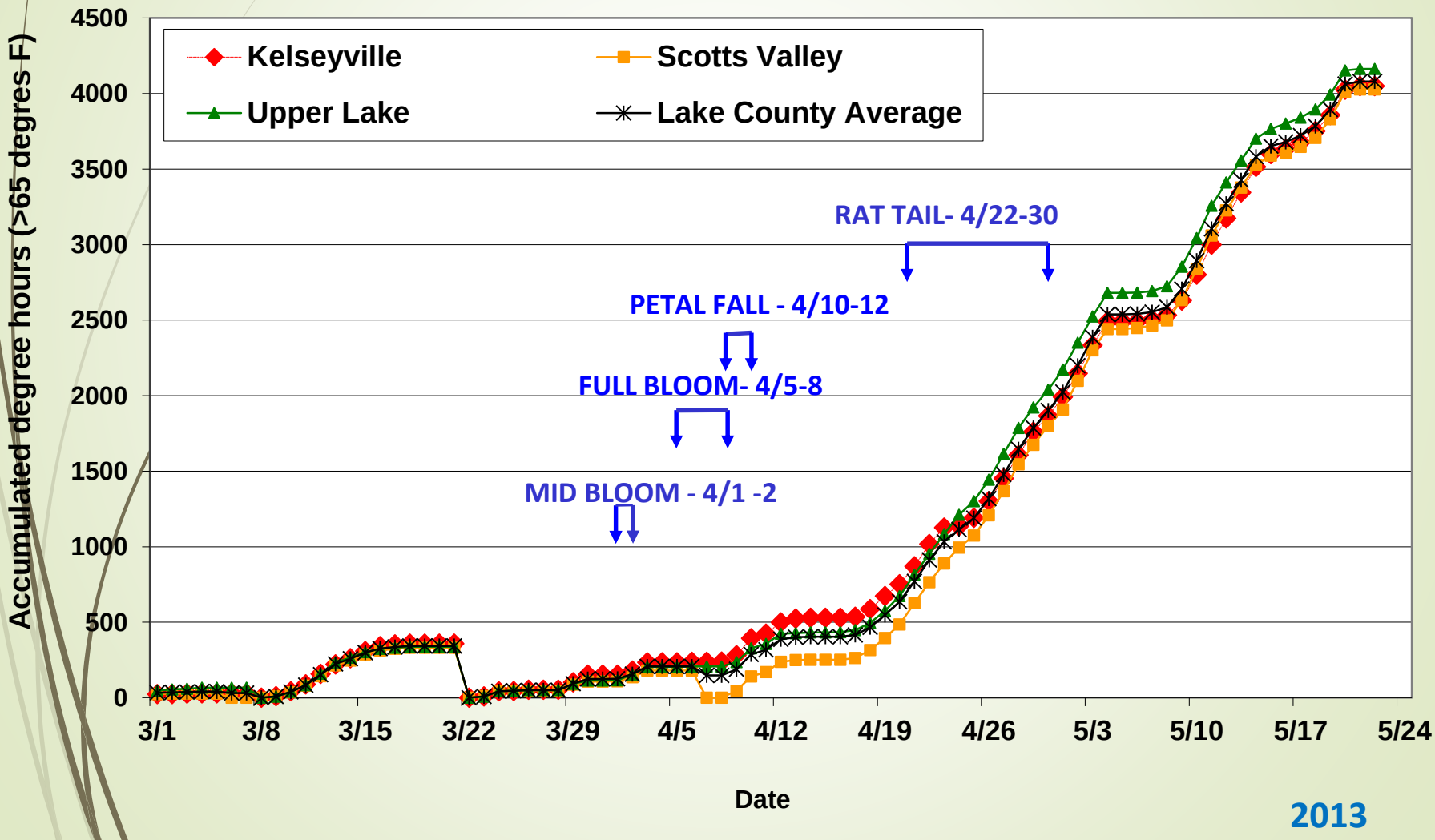
# Degree hour accumulation differences 2012-2015: effect on treatment timing and interval

# (observe when the 1000 DH threshold is crossed)

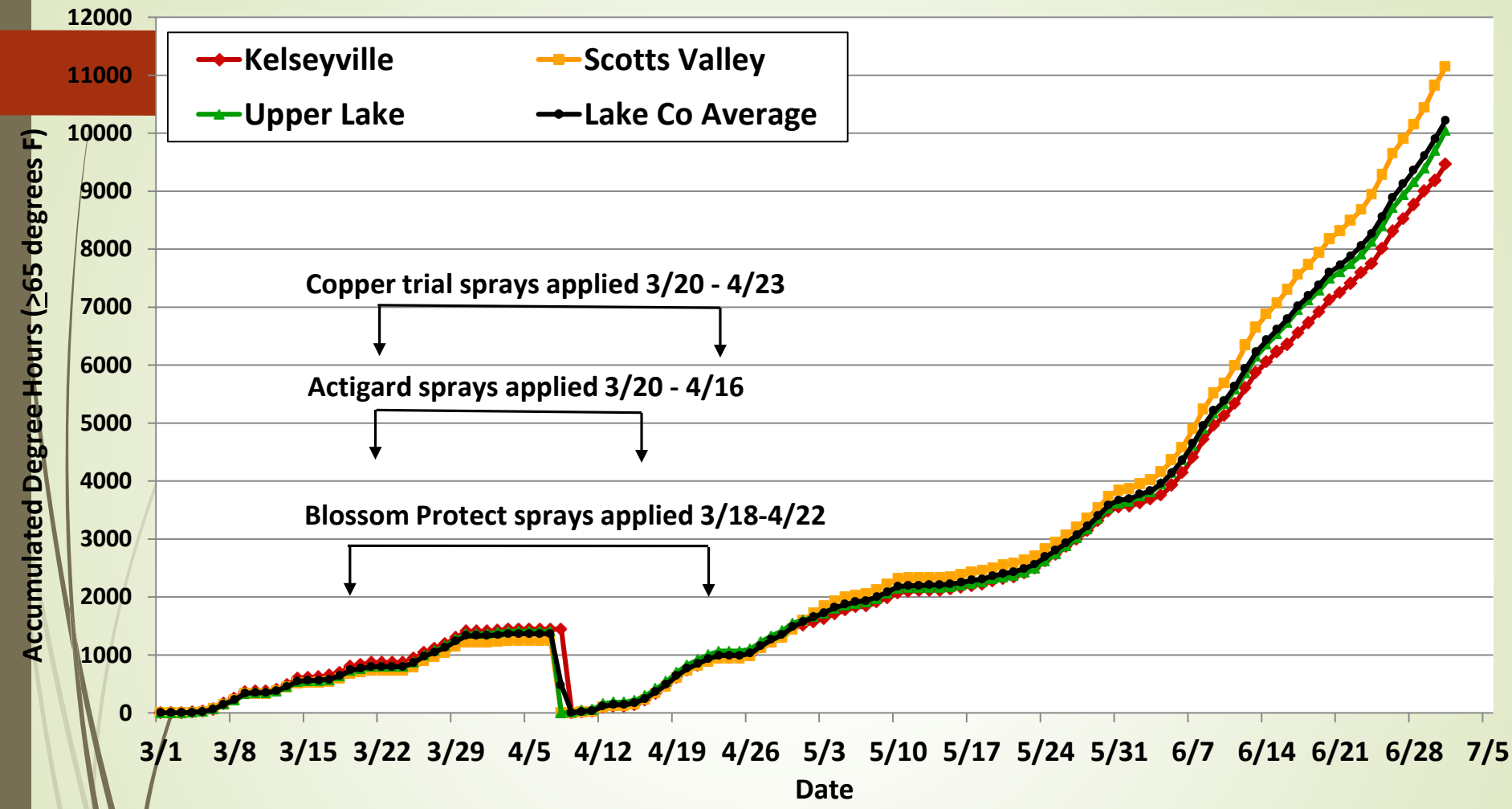
# Relationship between accumulated degree hour s (base >65°F) for Kelseyville, Scotts Valley (Lakeport) and Upper Lake, Lake County, California, March 1 to June 1, 2012 and positive LAMP samples (shown in blue.



# Relationship between accumulated degree hours (base ≥65°F) for Kelseyville, Scotts Valley (Lakeport) and Upper Lake, Lake County, California, March1 to May 23, 2013 and positive LAMP samples.




2013




**Accumulated degree hours (base ≥65°F with 4-day crash) for Kelseyville, Scotts Valley (Lakeport) and Upper Lake, Lake County, California, March 1 to July 1, 2015. Degree-hours calculated using data from Kelseyville-0.1P (Kel), Scotts_Valley-0.2 P (SVL), and Upper_Lake-0.1 P (UPL) (Source: UCIPM).**

2015

# Weather conditions relevant to fire blight infection and russet formation during early fruit development, Lake and Mendocino Counties, California, April and May 2014

| Location | Air Temperature | | | | | | Moisture | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Minimum (°F) | | No. days ≤ 32°F | | No. Hours 70-85°F | | Precipitation (Total inches) | | Average Relative Humidity (%) | | Maximum Relative Humidity (%) | | Leaf Wetness (Total hours) | |
| | April | May | April | May | April | May | April | May | April | May | April | May | April | May |
| Kelseyville[1] | 39.2 | 41.6 | 0 | 1 | 120.6 | 132.0 | 1.01 | 0.00 | 61 | 52 | 86 | 67 | 100.4 | 4.4 |
| Scotts Valley[2] | 35.9 | 38.5 | 7 | 3 | 120.2 | 147.2 | 0.96 | 0.02 | 72 | 64 | 98 | 82 | 231.2 | 96.3 |
| Upper Lake[3] | 39.6 | 42.5 | 0 | 0 | 115.1 | 148.5 | 1.36 | 0.01 | 72 | 63 | 98 | 80 | 204.0 | 59.6 |
| Ukiah[4] | 41.3 | 43.3 | 0 | 0 | 97.8 | 107.6 | 0.25 | 0.01 | 63 | 54 | 87 | 73 | 169.4 | 53.7 |

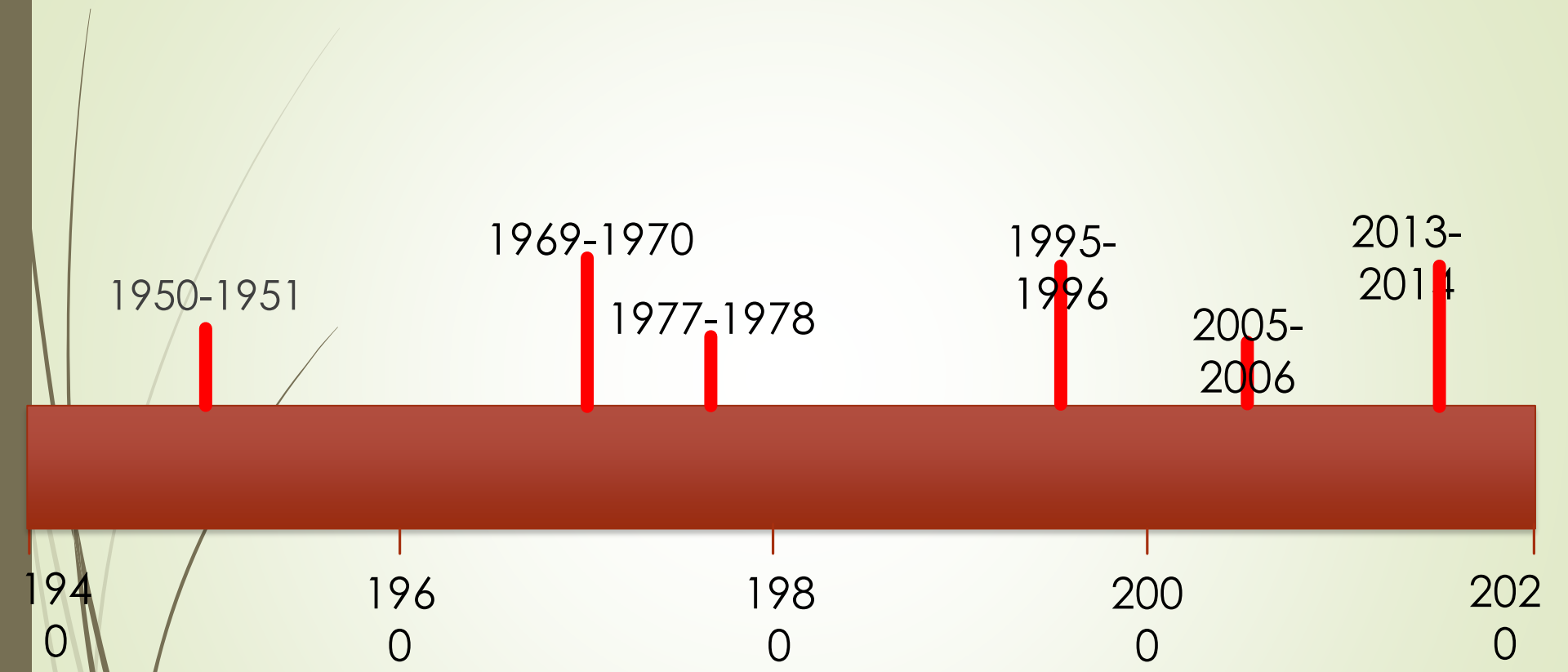
[1] Location of single-tree shared protocol trial, three grower-applied Blossom Protect and four grower-applied Actigard trials

[2] Location of single-tree GWN-10073 (Previsto® and Copper Count-N trial and one grower-applied Actigard trial

[3] Location of (one each) grower-applied Blossom Protect and Actigard trials

[4] No formal trial at this location; informational purposes only

# Low chill winters come every few decades



# QUESTIONS?

University of California
Agriculture and Natural Resources

## THANK YOU!!