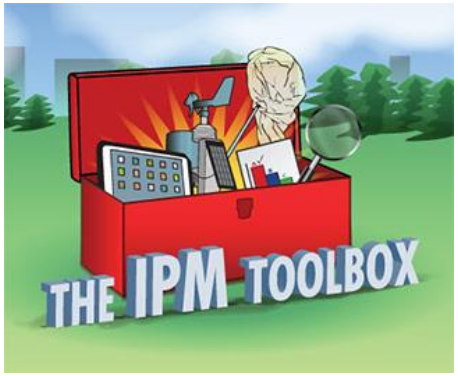
Northeastern IPM Center

Fire blight IPM using non-antibiotic control methods



USDA United States Department of Agriculture National Institute of Food and Agriculture

Webinar Details

- Welcome
- A recording of this webinar will be available within a week at

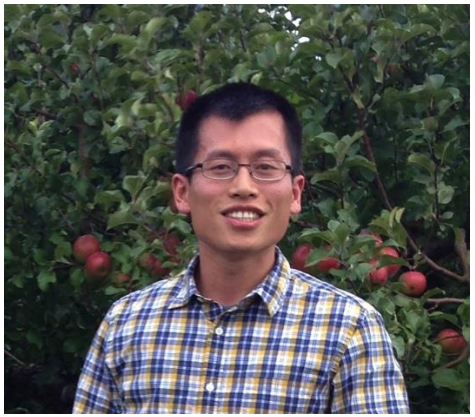
http://www.neipmc.org/go/ipmtoolbox

We Welcome Your Questions

- Please submit a question **at any time** using the Q&A feature to your right at any time

- If you'd like to ask a question anonymously, please indicate that at the beginning of your query.

Webinar Presenters



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Today's Agenda

- Fire blight hosts, pathogens, symptoms
- Critical steps of disease cycle
- Control strategies
- Non-antibiotic trial results
- Questions

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Some Questions For You

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Fire blight disease

-the host, the pathogen, and the symptoms

- ***Host***: Rosaceous plants such as apple, pear, quince, loquat, plum, Indian hawthorn, crab apple, rose, mountain ash, service berry, raspberry, blackberry.
- ***Pathogen****:* bacterium *Erwinia amylovora*.
- ***Symptoms****:* tissue turning brown or black, appear dried and shriveled. Two characteristic symptoms are the "shepherd's crook" and "ooze droplets".

Fire blight disease

-the host, the pathogen, and the symptoms

Source: MO Botanical Garden

Bradford pear

Mountain ash

Identify the critical steps of disease cycle for intervention

Fire blight disease
-Emerging challenges

- High density orchard planting system increases the risk of fire blight.

-Per acre value increased.

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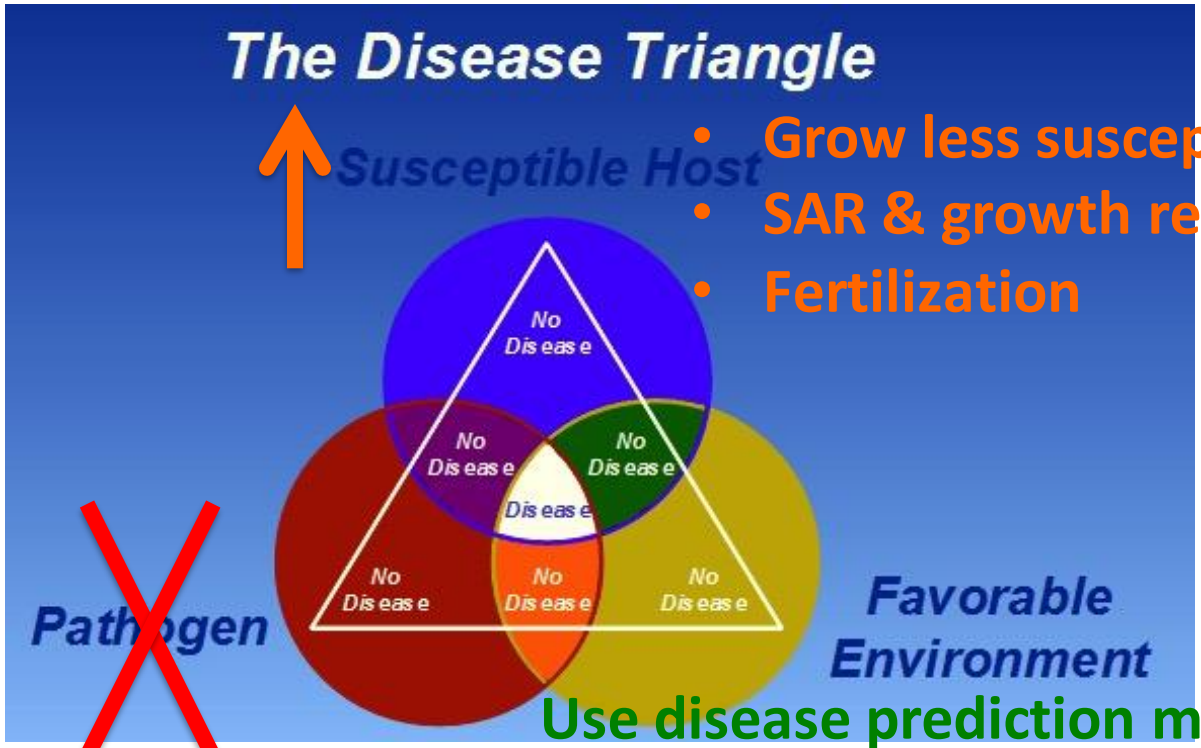
Strategies to control fire blight

- Disease will occur when three components are fulfilled: the host, the pathogen, and the environment.



- Grow less susceptible varieties
- SAR & growth regulators
- Fertilization

Use disease prediction model to time application.

Limit pathogen growth

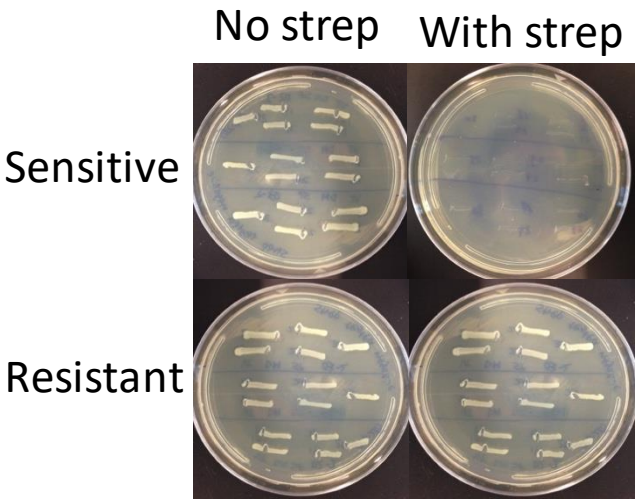
A year-round management strategy—the basics

Winter / Early spring	**Prune off fire blight cankers**
Green tip	**Use copper to sterilize canker surface**
Bloom	**Use antibiotics, copper, SAR inducers, biological controls to limit pathogen growth**
Petal fall	**Use apogee to limit shoot growth**
Active shoot growth	**Prune off infected shoots**
Terminal bud set	

Why do we need more than strep?

- Streptomycin resistance has emerged and is spreading.

  WA, OR, CA, UT, MI, NY…



- Organic growers are not allowed to use antibiotics after October 2014.

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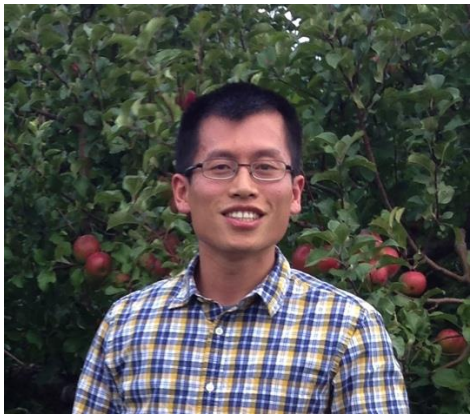
Questions?



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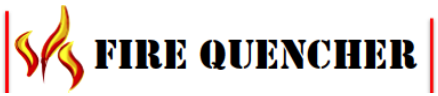
Non-antibiotic materials to limit pathogen growth

- Organic bactericides

Copper, surface sterilant.

- Biological controls

Bacteria, viruses, yeasts.



1. ***Which products provide the best control against fire blight in the Northeast?***
2. ***Can we further enhance the efficacy by using the two categories of products together?***

Field trial set up

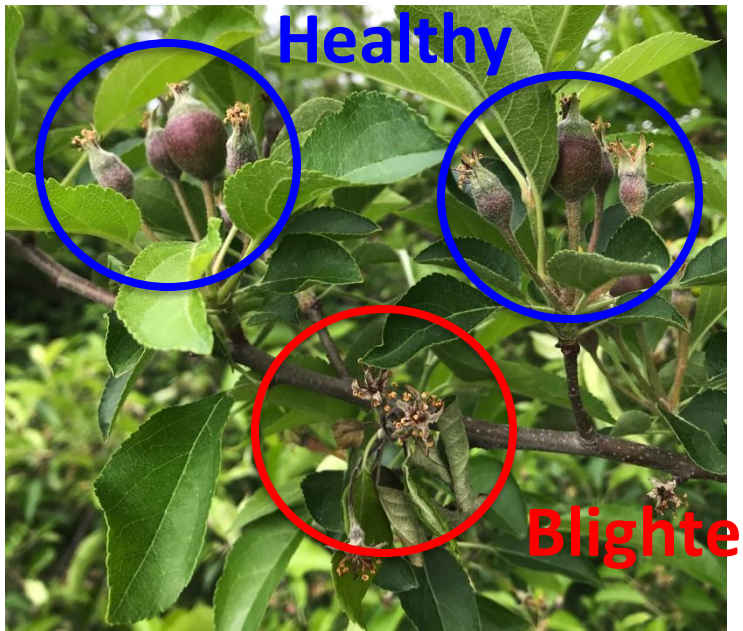
- 25-year old apple trees ‘red delicious’
- 4 reps per treatment, in a complete randomized design.

Materials tested

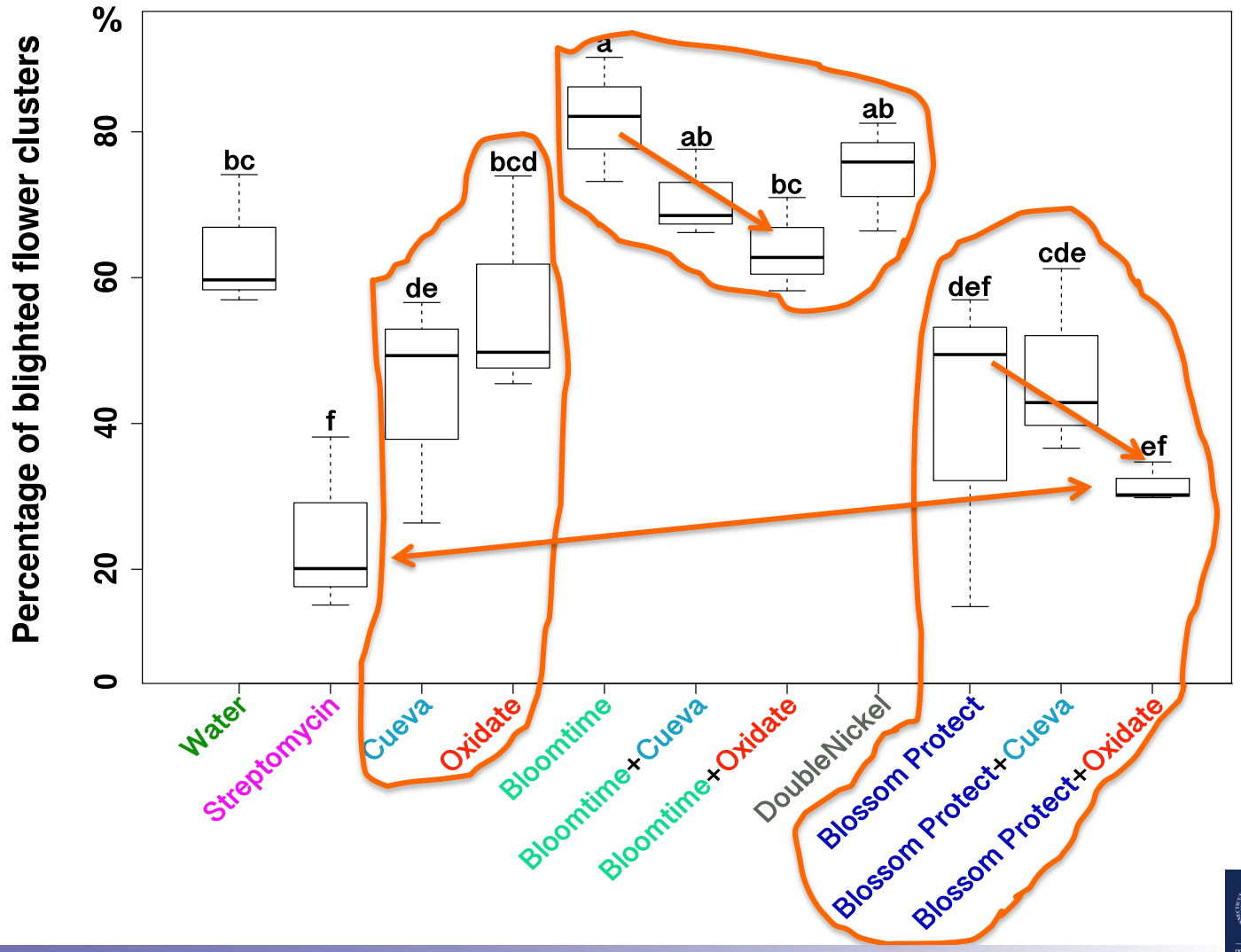
Treatment	Active ingredient
Double Nickel	*Bacillus amyloliquefaciens,* bacteria
BlightBanA506	*Pseudomonas fluorescens*, bacteria
Blossom Protect	*Aureobasidium pullulans,* yeast
Bloomtime	*Pantoea agglomerans,* bacteria
Cueva	Copper octanoate, organic bactericide
OxiDate 2.0	Hydrogen dioxide + peroxyacetic acid, surface sterilant
FireWall	Streptomycin, antibiotic
Water	control

Timing of application

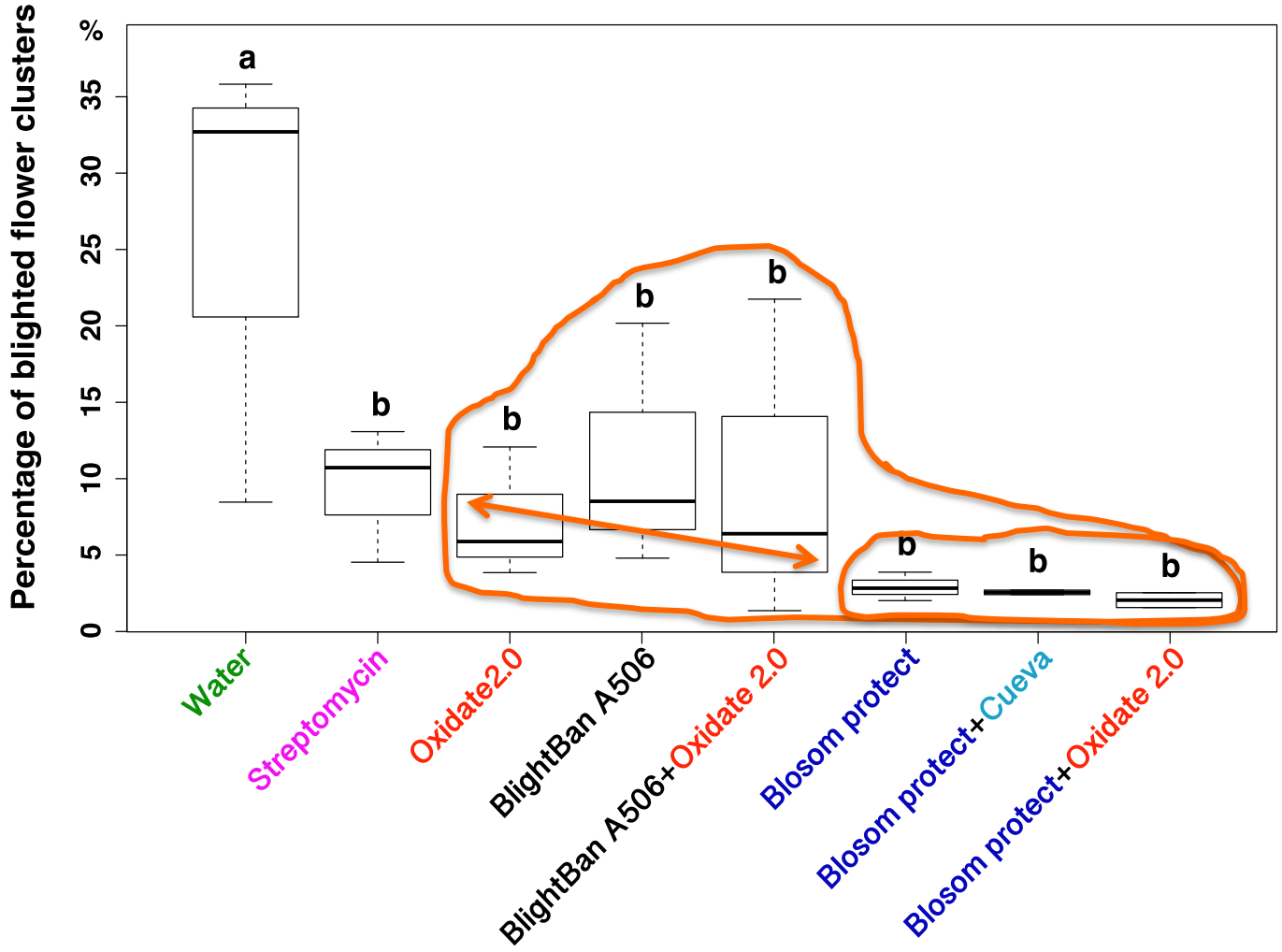
- Biological controls: @ 30% and 70% bloom
- Organic chemicals: @100% bloom and 24 hr after.
- *E. amylovora* inoculation: 10^6 CFU/ml @ 100% bloom
- Disease rating: % of blighted clusters, 3 weeks later.



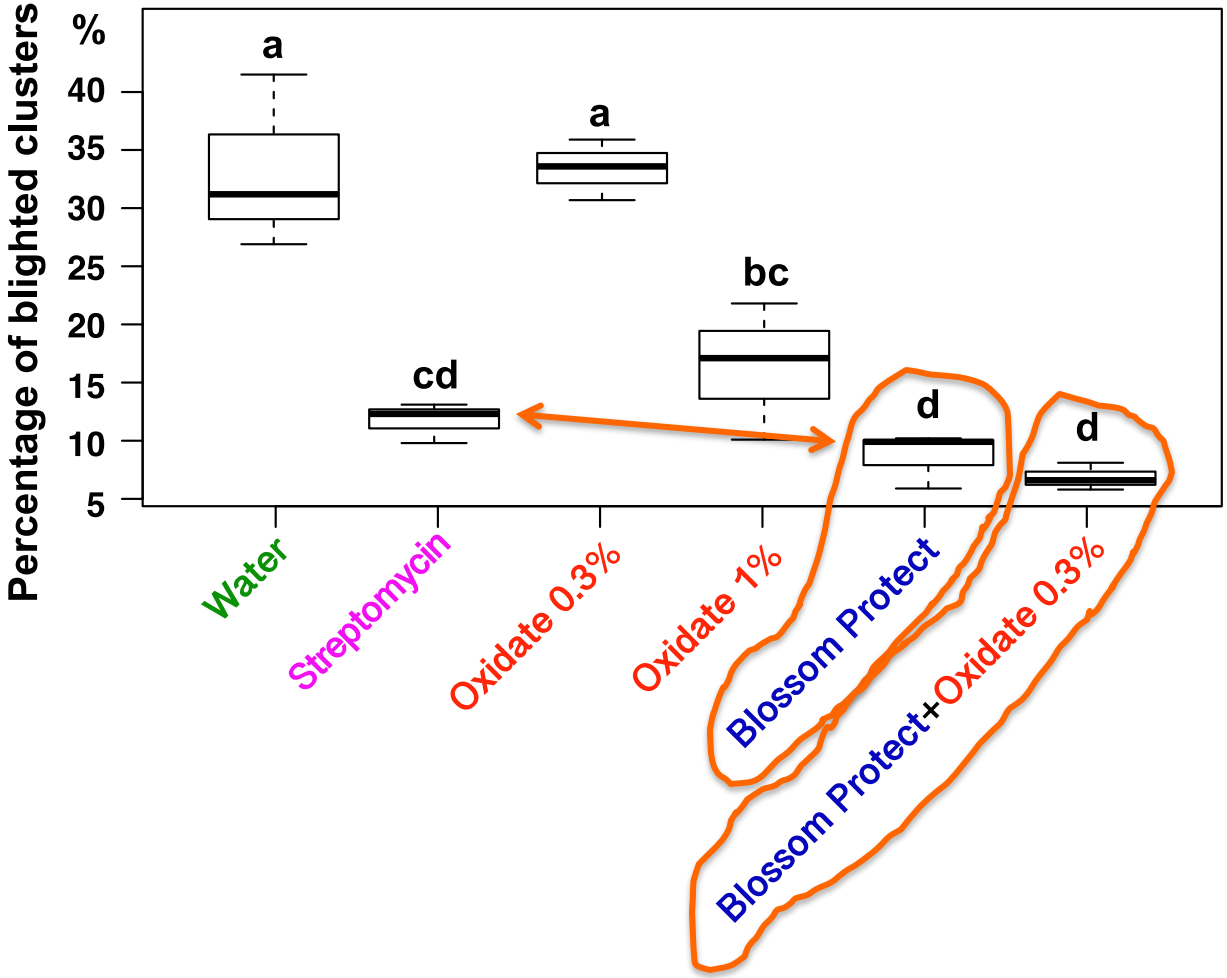
2017 Hamden, CT trials



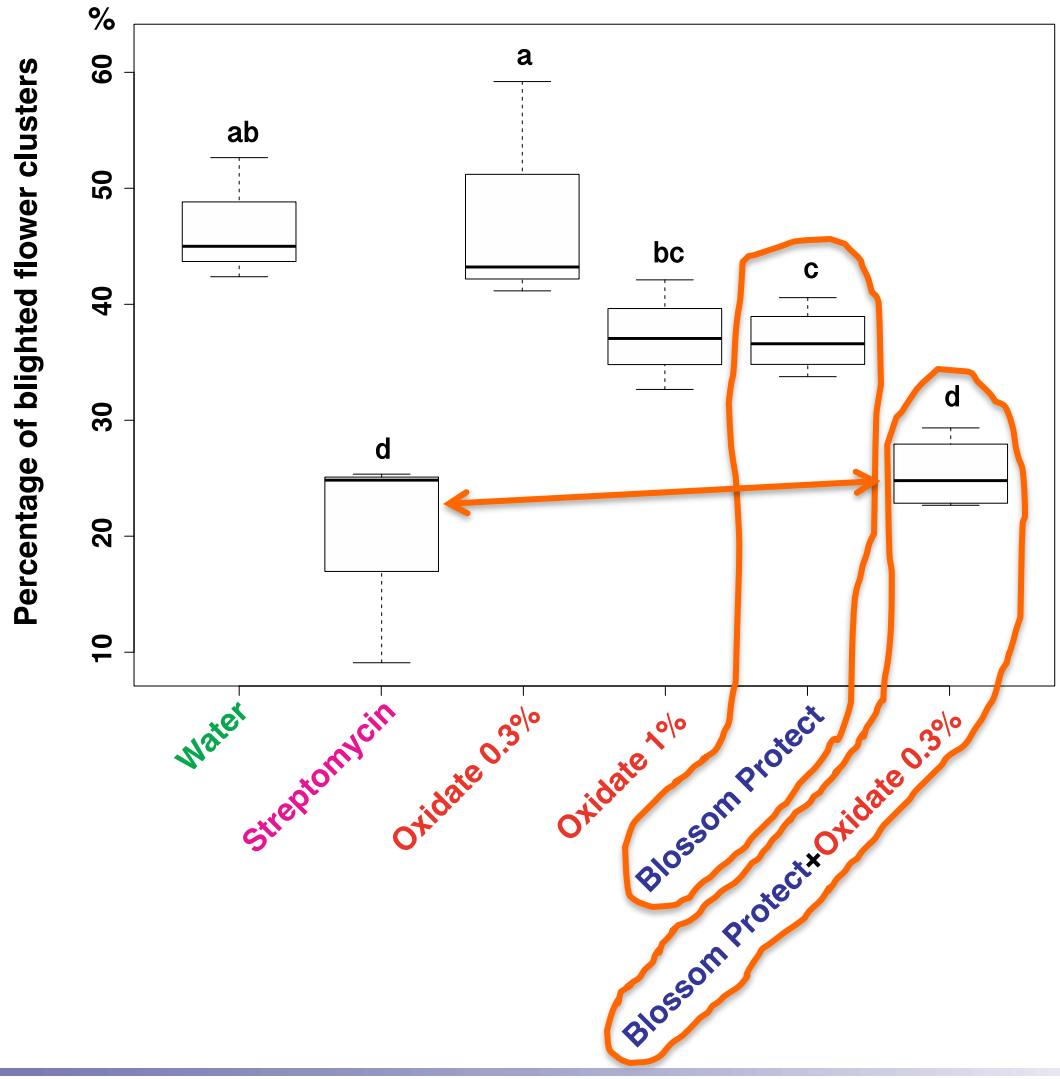
2018 Hamden, CT Trials



2019 Hamden, CT Trials



2015 Hamden, CT trials



2018 Belchertown, MA trials

Comparison of organic and conventional controls

Equivalent to the percentage of control by Streptomycin

	2015	2017	2018	2019	Overall
Blossom Protect	45%	38%	138%	115%	84%
Blossom Protect + OxiDate	91%	75%	143%	130%	110%

Summary of observations

- *Blossom Protect* provided consistent, high level of protection against blossom blight.
- The control effect of Blossom Protect can be further enhanced by *organic bactericides*.
- Other biological and organic chemical products provide some level of control and can be useful when disease pressure is low.

Recommended non-antibiotic fire blight control protocol

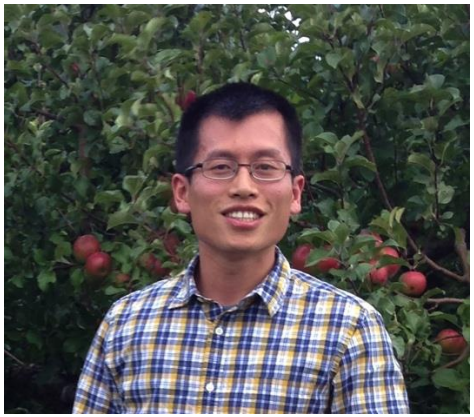
- ***Early to full bloom***: two applications of Blossom protect (with buffer protect). ← **Essential**

- ***Full bloom***: one application of 0.3% OxiDate (2.0 or TV)

  ↖ ↙ **Subject to adjustment based on disease prediction models**

- ***24 hours after full bloom***: one application of 0.3% OxiDate (if disease pressure is high / history of fire blight).

Questions?



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Upcoming Events

2020 RFA is available: Deadline November 15th
https://www.northeastipm.org/grant-programs/ipm-center-grants/ipm-partnership-grants/

New Tools for Identifying and Prioritizing Range-Shifting Invasive Plants

Tuesday, November 5th, 2:00 p.m. – 3:00 p.m.
Jenica Allen, Campus Living Laboratory Manager, Mount Holyoke College
Bethany Bradley, Associate Professor, University of Massachusetts Amherst
https://www.northeastipm.org/ipm-in-action/the-ipm-toolbox/

Fifth IPM On-Line Conference

Wednesday, October 30th, 9:30 a.m. – 12 noon
The rapid style conference will feature 5 minute presentations in which the speakers will discuss, show, or possibly sing! about 1 or 2 highlights from their projects.
https://www.northeastipm.org/ipm-in-action/current-news/fifth-integrated-pest-management-online-conference/

Find a Colleague

- To post a profile about yourself and your work:

  http://neipmc.org/go/APra

- "Find a Colleague" site

  http://neipmc.org/go/colleagues

Archive of Today's Webinar

- Today's Webinar will be available to view **on demand** in a few business days.

http://www.neipmc.org/go/ipmtoolbox

- You can watch as often as you like.

Acknowledgements

This presentation was funded in part by the Northeastern IPM Center through Grant #2018-70006-28882 from the National Institute of Food and Agriculture, Crop Protection and Pest Management, Regional Coordination Program.