

Fire blight



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How do significant fire blight outbreaks happen?

- **Warm temp conditions (70s – 80s F) during bloom leading to blossom blight infection**
- **Early shoot blight infection (within 1-2 weeks after petal fall) leading to secondary cycles of spread**
- **Infection of a susceptible variety on your farm spreading blight to \$\$\$ varieties**

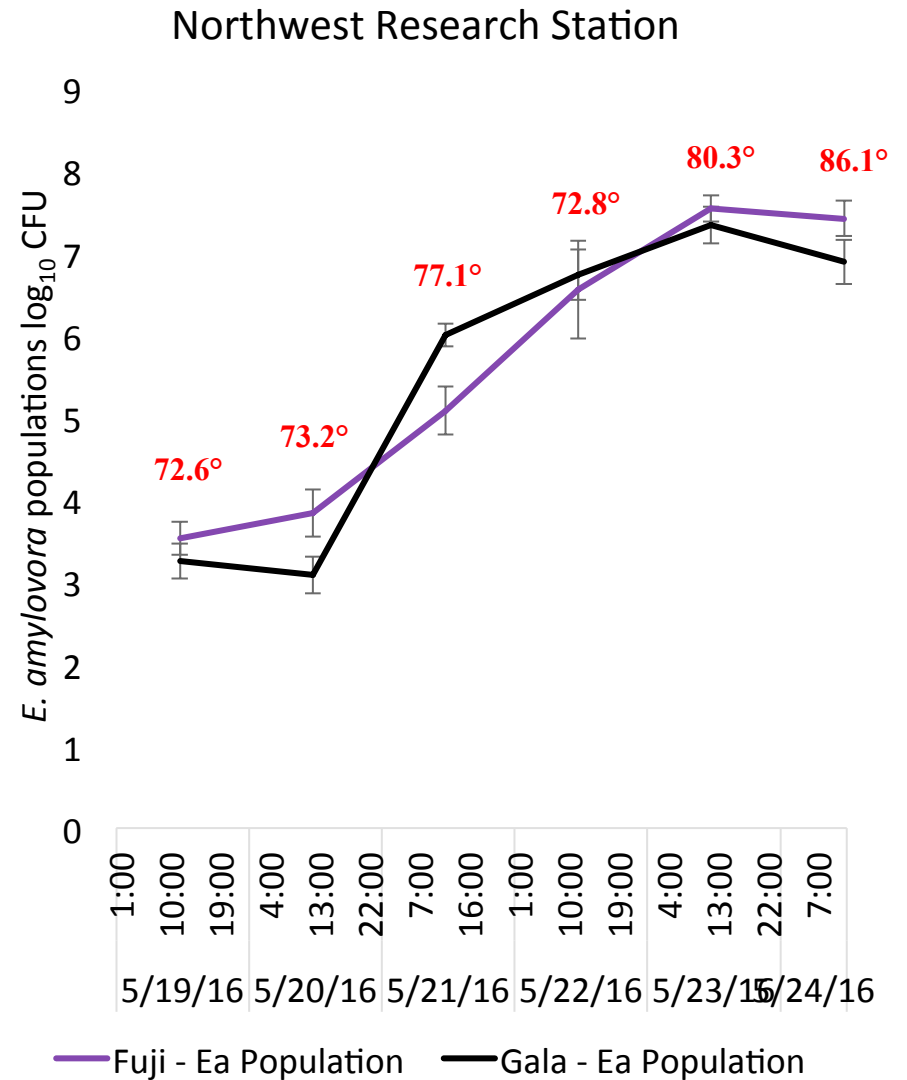
2016 – bloom, NW Michigan

Growth of the fire blight pathogen on flowers at the NWMHRC

Growth was very fast due to warm temps

High population thresholds on flowers, major disease risk

Daily high temperatures



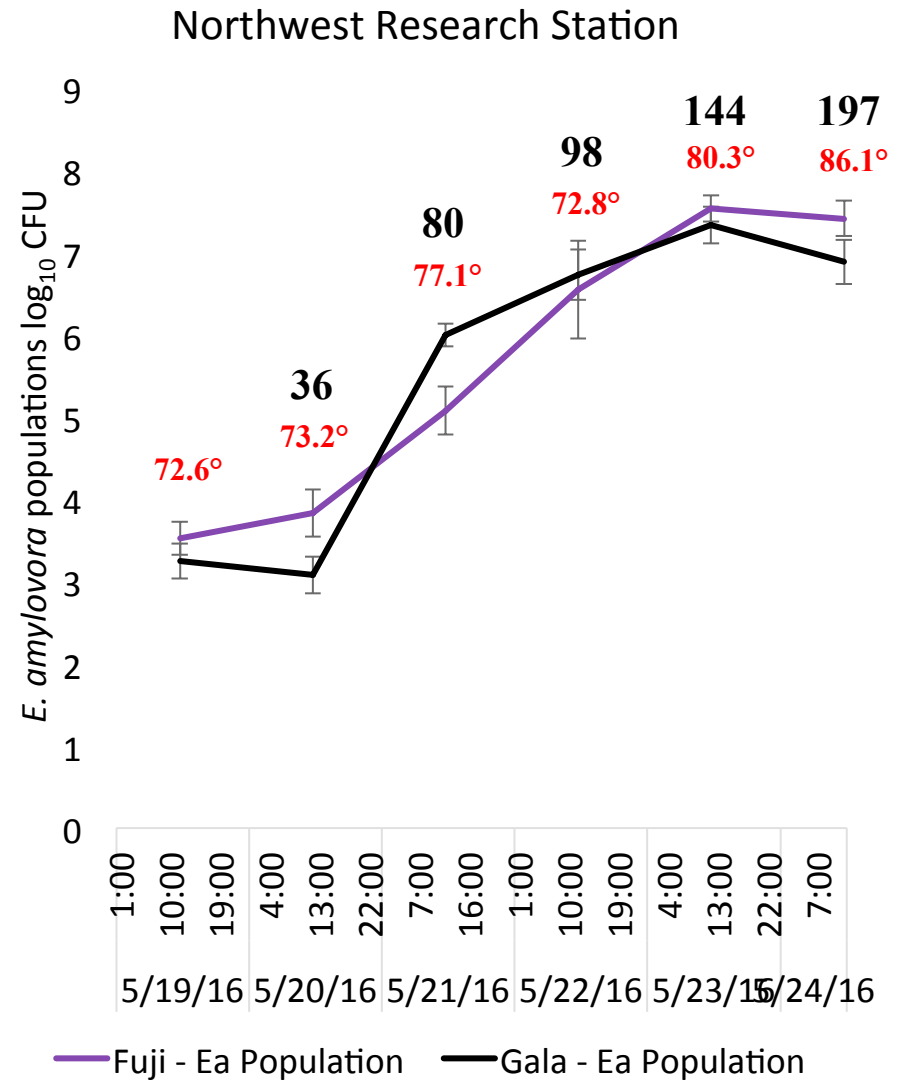
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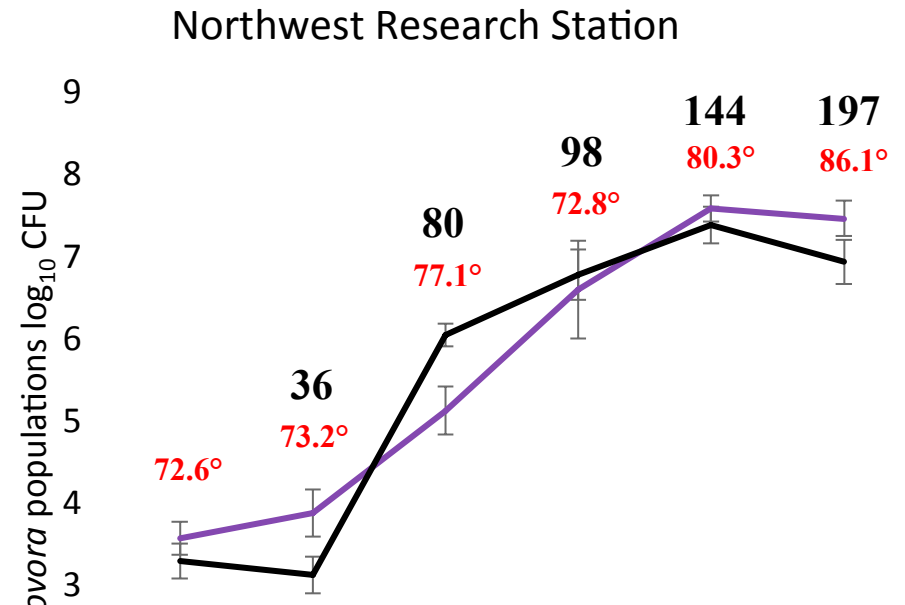
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Once growth starts happening in orchards, newly-opening flowers will be quickly colonized



When conditions favor growth of fire blight pathogen on flowers:

- **Rapid spread of pathogen to other flowers**
 - **Quick growth on those newly-colonized flowers**
- **1-2 days: populations reach critical numbers**
- **Rain event will wash those cells to base of flower where infection will occur**

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Blossom blight infection can lead to epidemic conditions if weather favors further spread



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Two critical factors for successful fire blight management

- **Prevent blossom blight**
- **Prevent early shoot blight**

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- **Prevent blossom blight**
 - **Greatly reduce chances for significant shoot blight infection**
- **Prevent early shoot blight**
 - **Reduce chances for significant shoot blight infection**
 - **Lower the risk of blight spreading into central leader of young high-density trees**

Fire blight management strategies

- **Remove / reduce inoculum**
 - **Prune cankers**
 - **Early season copper**
- **Control blossom blight**
 - **Streptomycin, Kasumin during bloom**
- **Control early shoot blight**
 - **Apogee**

Fire blight cankers:

Pathogen overwintering site

Ooze emergence in spring

Insects (flies) are attracted to the ooze, carry pathogen cells to flowers



Copper at bud break

- Coat apple trees with a blanket of copper
 - Reduces inoculum from cankers missed during pruning
- Only useful in orchards that had blight in the last 2 years
- Typical application rate is 2 lbs metallic copper per acre
- Use fixed coppers, long residuals on trees
 - Cuprofix, Kocide etc
 - Copper ions will be slowly released with rains, hopefully will be present when *Erwinia* bacteria emerge from cankers
- Optimally, can reduce about 50% of overwintering inoculum



Materials Currently Available for Fire Blight Disease Management

- **Overwintering Inoculum**
 - **Copper – 2 lbs metallic / A**
- **Blossom Blight**
 - **Streptomycin (Agrimycin and generics)**
 - **Kasumin**

 - **Oxytetracycline (Mycoshield, FireLine)**

 - **Serenade Optimum**
- **Shoot Blight**
 - **Prohexadione-Ca (Apogee)**

Antibiotic use for blossom blight control

- Use a fire blight disease prediction model
 - **MaryBlyt, Cougar Blight**
 - **MaryBlyt EIP > 70**
- Antibiotic sprays (streptomycin and Kasumin) are bactericidal; time them to reduce/eliminate *Erwinia* populations on stigmas
- Streptomycin and Kasumin are the best choices in high disease pressure situations

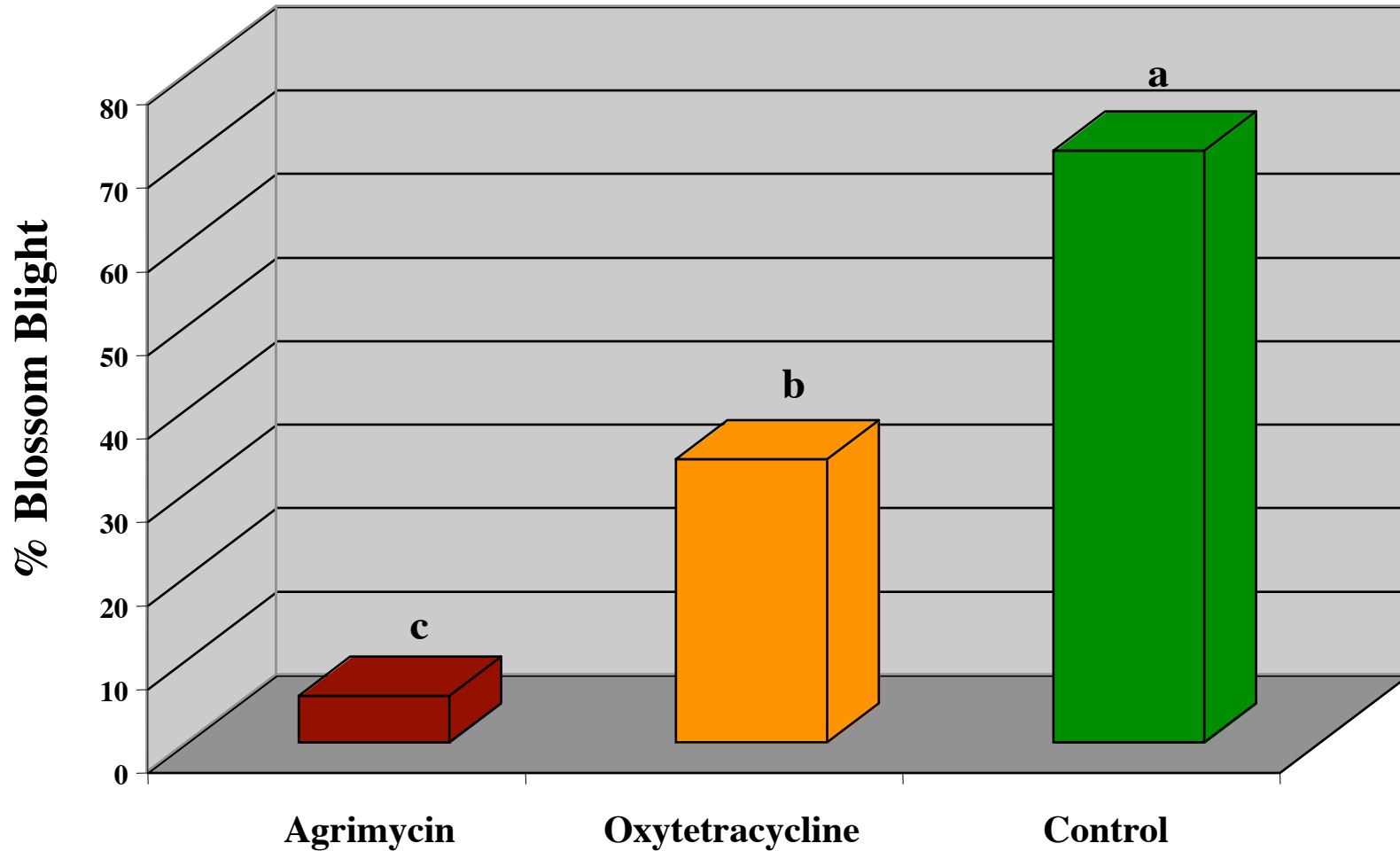
Streptomycin resistance

- We have detected streptomycin resistance in several growing regions in Michigan
- Southwest MI – **widespread, some locations remain sensitive**
- Fruit Ridge -- **widespread**
- Oceana, west central area -- **scattered**
- Northwest MI -- **scattered**
- Benzie – **one detection**

Streptomycin resistance

- **Streptomycin-resistant fire blight pathogen can move between orchards**
- **Kasumin – necessary replacement in SW, Fruit Ridge**
- **Other regions – start working with Kasumin but streptomycin is still 1st choice material**
 - **Second option is streptomycin / oxytetracycline tank mix (full rates of both)**
- **Strain surveys, resistance screening conducted yearly by Sundin lab**

Oxytetracycline and Blossom Blight Control Under Higher Pressure



Notes on Antibiotics for Fire Blight Disease Management

- **Streptomycin and Kasumin are fairly equivalent in control**
- **Use a surfactant such as Regulaid for optimal distribution on flower surfaces**
- **Oxytetracycline or Serenade are only good options under lower disease pressure**
 - **Mary Blyt EIP 30-70 range**



Application timings, need for re-treatment

Conditions after Strep or Kasumin spray:
Timing (~ 50% bloom vs full bloom)
Rainy weather
Warm (high EIP) conditions

**Shoot Blight Infection can Kill Young Trees
Planted on Susceptible Rootstocks**









Apogee (Prohexadione-Ca)

- **Reduces shoot growth**
- **Shoot-specific treatment**
- **Excellent control of shoot blight**
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- **Consider $\frac{1}{4}$ to $\frac{1}{2}$ rate on young high-density plantings, especially highly-sensitive varieties**



Fire Blight Summary – NW MI

- **Streptomycin (if no resistance present)**
 - **MAXIMUM 3 sprays per season is ideal**
- **Kasumin – best alternate to strep**
- **FireLine, Mycoshield – alternate to strep**
- **Apogee for shoot blight control**
 - **Consider a reduced rate for young, high-density trees**
- **Copper early**



Problems with fire blight- susceptible rootstocks

**High density apple planting
on M9 rootstock**

**Collingwood, Ontario
Nov., 2016**







Two issues that can kill MANY trees in high density plantings:

- 1. Shoot blight moving rapidly to central leader**
- 2. Rootstock blight**





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Michigan Apple Committee

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