Keeping up with Managing Fire Blight in 2013

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Northwest Orchard and Vineyard Show; January 21, 2013
Fire Blight pathogen -- starts small, grows extremely fast under conducive weather conditions
Fire Blight is complex, but also can be very simple; however, that doesn’t make it any easier to manage.
ca. 100,000 to 1,000,000 cells / flower
Erwinia Epiphytic Phase

- Population size of the pathogen is influenced by:
  - Temperature
    - Regulates generation time
  - Number of flowers in which the pathogen is established
    - Increased by pollinating insects and rain
  - Thus, high temps during bloom and insect activity are risk factors that promote the establishment and growth of the pathogen on floral surfaces
- RAIN or heavy dew during or at the end of a warm period is a third risk factor
Fire Blight -- Flowers

Temperatures:
- 50’s
- 60’s
- 70’s
- 80’s

Rainfall
What slows growth on flowers?

#1. Weather
#2. Antibiotics
#3. Flower window of infection
#4. Initial inoculum entry into trees
Where do we need to control the fire blight pathogen?
Management of Blossom Blight with Streptomycin

Trial data, East Lansing, MI
Streptomycin Resistance in *E. amylovora* in Michigan

- Early-mid 1990’s -- Southwest Michigan
- 2004 -- Fruit Ridge area
- 2005 -- Fruit Ridge area (further spread), Ionia cty.
- 2006 -- Oceana county
- 2010 – Grand Traverse county
- 2012 – Antrim and Leelanau counties
Materials Currently Available for Fire Blight Disease Management

• Overwintering Inoculum
  – Copper

• Blossom Blight
  – Streptomycin (Agrimycin and generics)
  – Oxytetracycline (Mycoshield, FireLine)
  – Kasugamycin (Kasumin) [Section 18 for Michigan]
  – Optiva
  – Bloomtime E325 – *Pantoea agglomerans*
  – Blossom Protect – *Aureobasidium pullulans*

• Shoot Blight
  – Prohexadione-Ca (Apogee)
Streptomycin Alternatives -- Summary

- Oxytetracycline
- Kasugamycin
- Biologicals
  - Optiva, Bloomtime Biological, Blossom Protect
  - Highly variable
  - Low to moderate pressure
- Integration of biologicals with antibiotics
  - Offers the most promise for efficacy and reduced number of antibiotic applications
KASUMIN

• Kasugamycin – aminoglycoside antibiotic in the same class as streptomycin
• Targets the bacterial ribosome – target site is different from that of streptomycin
• No cross resistance between streptomycin and kasugamycin
• No medical uses, no animal agriculture uses
Trials by Year and Variety

Evaluation of Kasumin for fire blight control in East Lansing, MI field trials

- 2006 - Gala
- 2007 - Jonathan #1
- 2007 - Jonathan #2
- 2008 - Gala
- 2008 - Jonathan
- 2009 - Jonathan

Graph showing % Blossom Blight with treatments:
- Black: Streptomycin
- Green: Kasumin
- Purple: Nontreated control
Kasumin 2L

• Section 18 was granted by EPA for 2010, 2011, and 2012; pending for 2013

• Kasumin is the alternative for streptomycin where we have resistance

• Section 3 registration is still pending; decision hopefully later in 2013
Kasumin 2L

- Section 18 counties for 2013:
  - Berrien, Cass, Van Buren
  - Kent, Ionia, Montcalm, Newaygo, Ottawa
  - Oceana
  - Antrim, Grand Traverse, Leelanau
Kasumin Section 18

• Conditions required prior to application:
  – MARYBLYT EIP of 100 or greater

• Do not apply Kasumin as the first spray of the season
• 64 fl oz per acre
• Maximum 3 applications per season; 2 consecutive
• Do not apply after petal fall
**Shoot infection:**
Vigorous growth
Microscopic injuries
Weather conditions to move inoculum
Variety important
Shoot Blight Infection can Kill Young Trees Planted on Susceptible Rootstocks
Apogee (Prohexadione-Ca)

- Reduces shoot growth
- Absorbed by apple foliage, transported acropetally to growing shoot tip
- Shoot-specific treatment
- Excellent control of shoot blight
- (Do not use on Empire or Winesap due to fruit cracking issues)
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Summary

• Kasumin Section 18 – best alternative to streptomycin
• Apogee for shoot blight control
  – Don’t use on Empire or Winesap
• Mycoshield, FireLine – effective under low to moderate disease pressure
• Variability in biological controls
New video resources from MSU Tree fruit pathology

www.youtube.com -- search for “tree fruit pathology”
Biological control of Fire Blight

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Tree Fruit Pathology
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