Fire Blight 101

Srdjan G. Acimovic
David A. Rosenberger

16 Feb 2017

121st Annual VTFFGA Meeting and Educational Program
Outline

• Conditions Favoring Infections 2016
• History of FB in Champlain Valley
• Fire Blight is Risk of Production
• Management Strategy
• Future Outbreaks
Outline

• **Conditions Favoring Infections 2016**
• History of FB in Champlain Valley
• Fire Blight is Risk of Production
• Management Strategy
• Future Outbreaks
Conditions Favoring Infections 2016
- NY -

• Late cv-s: still in bloom
• Early cv-s: rat-tail flowers; young shoots
• Extremely conducive conditions in NE:
  • Bloom (still)
  • No terminal bud set
  • Shoot growth
  • Hot: high 80’s
  • Several short rain or dew events
  • Storms with hail
  • Fire blight history (nursery, old cankers) 0.5 miles
• May 27, thinning meeting: predicted extreme risks – rain on 29 & 30
# NEWA - Summary

## Fire Blight Risk Predictions for Peru

Blossom blight predictions using the Cougarblight model begin at first blossom open.

First blossom open date: 5/7/2016

First blossom open date above is estimated based on degree day accumulations. Infection cannot occur without open blossoms. If the predicted bloom date is incorrect, enter the actual date for blocks of interest and the model will calculate the protection period during bloom more accurately. If bloom in your orchard has not yet occurred, continue to check Cougarblight daily and monitor your bloom. If bloom in your orchard has not yet occurred, enter a future bloom date, up to five days into the future, to gauge fire blight risk potential.

Orchard Blight History: Fire blight occurred in your neighborhood last year.

The orchard blight history above is the NEWA default. Select the actual blight history for your orchard and the model will recalculate recommendations.

**Blossom Blight Summary - Cougarblight**

<table>
<thead>
<tr>
<th>Date</th>
<th>Past</th>
<th>Past</th>
<th>Current</th>
<th>Blossom Blight 5-Day Forecast Forecast Details</th>
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<tr>
<td>Leaf Wetness (hours)</td>
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## Fire Blight Risk Predictions for Chazzy

Blossom blight predictions using the Cougarblight model begin at first blossom open.

First blossom open date: 5/10/2016

First blossom open date above is estimated based on degree day accumulations. Infection cannot occur without open blossoms. If the predicted bloom date is incorrect, enter the actual date for blocks of interest and the model will calculate the protection period during bloom more accurately. If bloom in your orchard has not yet occurred, continue to check Cougarblight daily and monitor your bloom. If bloom in your orchard has not yet occurred, enter a future bloom date, up to five days into the future, to gauge fire blight risk potential.

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<th>Past</th>
<th>Current</th>
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Fire Blight Risk Predictions for Peru

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**Wetness Events**

| Rain Amount | 0.00 | 0.00 | 0.51 | 0.16 | 0.00 | 0.00 | 0.07 | 0.02 |
| Rain Prob (%) Night/Day | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Dew | Yes | Yes | Yes | No | Yes | Yes | Yes | No |
| Leaf Wetness (hours) | 0 | 0 | 9 | |

Fire Blight Risk Predictions for Chazy

Blossom blight predictions using the Cougarblight model begin at first blossom open.

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**Wetness Events**

| Rain Amount | 0.00 | 0.00 | 0.38 | 0.12 | 0.00 | 0.00 | 0.09 | 0.02 |
| Rain Prob (%) Night/Day | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Dew | No | Yes | Yes | No | Yes | Yes | Yes | No |
| Leaf Wetness (hours) | 1 | 0 | 11 | |

NA - data not available

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Outline

- Conditions Favoring Infections 2016
- **History of FB in Champlain Valley**
- Fire Blight is Risk of Production
- Management Strategy
- Future Outbreaks
Fire Blight in Champlain Valley?
- Past -

- Limited outbreaks = fire blight present
- Chazy
- Crown Point

2016:
- Flower infections occurred May 29-30 with rains
- One flower can carry ≥ 1,000,000 cells
- One shoot infected with 20 cells
Outline

• Conditions Favoring Infections 2016
• History of FB in Champlain Valley
  • Fire Blight is Risk of Production
• Management Strategy
• Future Outbreaks
Fire Blight is a Risk of Production
- Biology -

Balaž et al. 2008
Diagnose – Know Your Enemy
- Actively Oozing Cankers -

http://www.omafra.gov.on.ca
Flowers
- Ooze -
Shoots & Fruitlets
- Ooze -
Shoot Blight
Fire Blight Cankers

<table>
<thead>
<tr>
<th>Determinate</th>
<th>Indeterminate</th>
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[Image of apple tree showing determinate and indeterminate cankers]
Worst Cases
- Trauma, Rootstock Blight -
- High-density tall/super spindle (~1000/A)
- No large limbs
- Highly susceptible cultivars
- Trees < 6 yr old
Outline

• Conditions Favoring Infections 2016
• History of FB in Champlain Valley
• Fire Blight is Risk of Production
  • Management Strategy
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Management - Pruning & Sprays
- Late Spring & Early Summer -

If model predicted infection: Scout 3 times per week for symptoms
~ 90-100 DD (base 55°F) after infection event
(rain during bloom or summer hailstorm)

- **Low number of clusters/ strikes (5-15)**
  - Prune out rapidly, sanitize tools?
  - 18-24” below visible symptom edge
  - Or to older wood (12”)
  - Prevent further spread
  - Drop cuttings in the middle, let it dry, chop with flail-mower, or remove
  - Spray copper, Apogee
  - If done early – effective
  - Scout and cut on a cool dry day

- **High number of clusters/ strikes (25-30)**
  - Spray Apogee high rate, copper with 1-3lbs/A of hydrated lime
  - Slow migration of bacteria to the larger limbs
  - Prevent further spread
  - Severe pruning on a cool dry day
  - Every day/hour delay in spray allows FB spread
  - Pruning promotes shoot growth – more infections
  - Scout every week and cut
Management Strategy – Prevent Secondary Infections  
- Mid Summer -

**Fact:** Bacteria inside flowers, shoots, wood, fruit

**Goal:** Prevent/ Reduce inoculum spread

- Copper before/ after pruning – lower doses, cultivar dependent
  - Limit spread to shoots
  - Cuprofix, Badge SC or X2 (16 fl oz)/ Kocide (CAUTION: Russetting)
  - Bordeaux Mixture

- Apogee: 6-12 oz/100 gal; 3-6 oz for trees <5 years
  - 1-3 inch shoot growth (late bloom)
  - 14-21 days later
  - Stunt current growth
  - Stop new growth
  - Limit new infections
  - Bridge to terminal bud set
Management Strategy – Continued Pruning and Sprays
- Late Summer -

- Scout once every week and cut
- Terminal bud set is variable
- Pruning can promote new shoot growth
- Apply copper before/after pruning
- New shoot growth needs to be covered
- 7-10 day interval – use low doses until terminal bud set
- Avoid slow drying (fruit russet)
- Hand thin on a cool dry day, then apply copper
Hail
- Late Summer -

• No wounds on leaves - cause enough fruit injury for infection
• Blight is in the region
• Copper does not penetrate
• **Any hail, gusts, or T-storm (up to 24h) like June 18:**
  You must spray STREPTOMYCIN: FireWall 50WP (10 oz) of 17 (24 oz) + Regulaid
Management Strategy
- Young Trees and Suckers -

• Later bloom
• Prone to lingering bloom
• Prune ASAP and if possible on a cool dry day
• No pruning in rain
• If 12” is into leader – remove & replant
• If early control effective - suckers should not be infected
• Avoid M.26 and M.9
• Avoid nitrogen
• Minimize/ avoid irrigation
• Sanitize tools when removing suckers
• Apogee effect on suckers – no data?
Management Strategy – Scout, Pruning, Sprays
- Fall, Winter & Spring 2017 -

• **Scout, prune cankers & strikes, no tool sterilization**
  • Reduce inoculum sources (flail mow, pile burn,)
  • Difficult to find
  • 1 – 4 /2.5 Acres

• **Late dormant copper: silver to green tip/ QIG/ HIG**
  • Kills bacteria on the bark in ooze

• **Do not gamble - FB is there**
  • Warm weather boosts bacterial populations in cankers

• **Use prediction models - decide on bloom sprays**
  • Bloom: streptomycin (0.5 lb/100 gal) 50 DPI

• **Organic: Cueva + Double Nickel, Badge X2 + hydrated lime**
  • Serenade Optimum, or Blossom Protect (alternate with strep)
Spraying Antibiotics in Bloom 2017
- Considerations -

• Precise timing = high efficiency
• Bacterial build rapidly in flowers during warm weather (> 65 F)
• Antibiotic protects only blossoms that are open at the spray time
• After drying, antibiotic will not redistribute
• Spray just before wetting (all open blossoms are protected during infection)
• Use models to time strep sprays and avoid control failures
• MID-BLOOM: enter first strep spray in NEWA, calculate the need for additional treatment
• Reaplication to protect newly opened blossoms before the next rain
Fact: For at-risk orchards (blight history), apply antibiotic:
1. Any open flowers,
2. No antibiotic in previous 3-4 days and the DH over 65° currently exceed or are expected to exceed 145 (MaryBlyt 7.1 EIP of 75) within the next few days

Goal: antibiotic protects lingering bloom in young orchards

Consequence: 50,000 infected shoots
- One flower: ≥ 1,000,000 cells
- Shoot infection: 20 cells
Outline

• Conditions Favoring Infections 2016
• History of FB in Champlain Valley
• Fire Blight is Risk of Production
• Management Strategy
• **Future Outbreaks**
Future Outbreaks = Yes
- Take home -

• FB present
• A lot of inoculum
• It waits until conditions are right
• Use prediction models to guide sprays
• Bloom: use FireWall (up 24h after rain event) or FireLine
• Cheaper to spray when conditions favor fire blight

**FB prediction accuracy – depends on weather forecast:**
• Each year is different: use NEWA Cougarblight & Maryblyt
Models Are Not Perfect
- However -

• Border line cases - early season:
  • Warm but dry
  • Cold during bloom

• Relative humidity unaccounted
  • 85%?
  • Canker survival research

• Much more accurate from mid-bloom on
  • Usually much warmer days
  • Cold nights
  • Dew, fog, spraying
Thank you!

• blogs.cornell.edu/acimoviclab/

Fire Blight in Champlain Valley 2016 (II) – Management Options in 2016 & 2017  
September 12, 2016

Fire Blight in Champlain Valley 2016 (I) – History  
August 26, 2016

E-mail: acimovic@cornell.edu