

Managing Fire Blight Using A Risk Assessment Model and NEWA

2020 OHIO PRODUCE NETWORK
M.L. LEWIS IVEY, PHD
IVEY.14@OSU.EDU OFFICE PHONE: 330-263-3849

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FIVE PHASES OF FIRE BLIGHT

- Systemic disease
- **Blossom and spur blight**
- Shoot blight
- Stem cankers
- Fruit blight
- Rootstock disease



<http://ohioline.osu.edu/factsheet/plpath-fr-22-0>

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Biology of *Erwinia amylovora*

- Colonizes the stigma of flowers without causing disease=**epiphytic growth**
- Bacteria spread from blossom to blossom by pollinators and rain



Photo courtesy of George Sundin, Michigan State Univ.

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Factors That Trigger Infections and Disease

1. Bloom temperatures
2. Number of flowers with epiphytic bacteria
3. Bloom wetness

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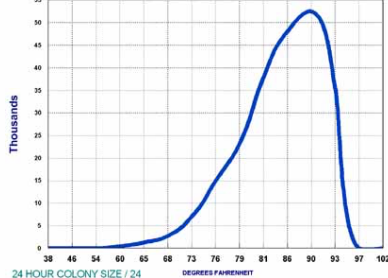
Factors That Trigger Infections and Disease

- Bloom Temperatures
- Influences population size by promoting replication

Temperature (F)	Doubling Time (Hr)
50-55	16-24
60-65	6-12
70-75	1-2
80-85	2 or more

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ONE HOUR E.a. COLONY SIZE ON STIGMA TIP RE: TEMPERATURE F



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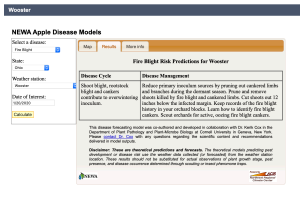
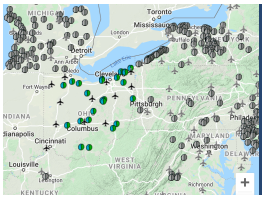
Factors That Trigger Infections and Disease

- Number of blossoms with bacteria
 - Pollinators (10-10 000 cells moved/insect)
 - Presence of non-host species in the area
 - Varietal differences
- Rain, heavy dews or fog
 - Essential for dispersal of primary and secondary inoculum



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Risk Assessment Model for Blossom Blight Management Using NEWA



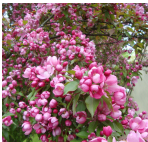
newa.cornell.edu/

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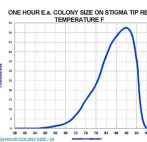
Risk Assessment Model for Blossom Blight Management Using NEWA



1. Fire blight history in orchard



2. First blossom open date (biofix date)



3. Temperature for epiphytic growth or EIP



4. Blossom wetting period

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Risk Assessment Model for Blossom Blight Management Using NEWA



1. Fire blight history in orchard

- 1. Occurred last year AND is active this year
- 2. Occurred last year
- 3. Did not occur last year

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Risk Assessment Model for Blossom Blight Management Using NEWA

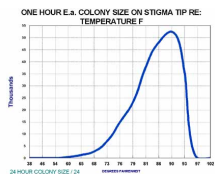


2. First blossom open date (biofix date)

- Estimates based on degree days accumulation of full pink for cv. McIntosh
- OR
- Input date for varieties in your orchard

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Risk Assessment Model for Blossom Blight Management Using NEWA



3. Temperature for epiphytic growth or EIP

- Relates average hourly temperature to population growth of bacteria on stigma
- Average of 96 hours (4 days)
- Daily temperature of 60 F or higher

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Risk Assessment Model for Blossom Blight Management Using NEWA



4. Blossom wetting period

- Blossom wetting event (rain, dew, fog, sprays)
- 2 hours or more wetting event will trigger infection (if EIP reached)

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NEWA Prediction Table

Orchard Blight History: Fire blight occurred in your neighborhood last year. ☐ Select the fire blight history in your orchard block of interest and the tool will calculate risk. Toggle orchard blight history to recalculate risk.

First blossom open date: 5/5/2018 ☐ Click if bloom has not occurred

The first blossom open date above is estimated based on degree day accumulations. Enter the actual first blossom open date for your orchard block of interest and the tool will calculate the protection period during bloom more accurately.

Accumulated degree days (base 45°F) through 5/20/2018: 314 (0 days missing)

	Past	Past	Current	Easing 5 Days				
Date	5/3	5/4	5/5	5/6	5/7	5/8	5/9	5/10
CougarBlight	-	-	-	Low	Low	Low	High	High
4-Day DII	-	-	-	11.9	13.6	18.6	41.9	49.7
Infection Potential	-	-	-	High	Moderate	Moderate	High	Extreme
EIP value	-	-	-	23	15	20	115	129

Wetness Events

	Past	Past	Current	Easing 5 Days				
Date	5/3	5/4	5/5	5/6	5/7	5/8	5/9	5/10
Rain Amount	0.13	0.13	0.00	0.00	0.02	0.00	0.13	
Dew	Yes	Yes	No	No	Yes	Yes	No	No
Leaf Wetness (hours)	11	10	0	2	4	4	0	5
Hours >90% RH	6	8	0	0	4	3	0	0
RH max/min	93/58	94/51	88/40	83/54	93/45	93/40	85/33	88/45
Temp avg F	68	65	60	63	65	66	64	64

NA - data not available

[View CougarBlight Charts](#)

Download Time: 5/11/2018 23:00

☐ Indicates incomplete accumulation of the 4-day DII total. The DII value may reach "Caution," "High" or "Extreme" levels before sporeing the 4-day accumulation cut-off time of CougarBlight.

History of fire blight

First bloom open date (biofix)

Wetting period

Temperature

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May 2017

May 2018

May 2019

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History of fire blight

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Wetting period

Temperature

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	Past	Past	Current	Ensuing 5 Days				
Date	5/3	5/4	5/5	5/6	5/7	5/8	5/9	5/10
Cougarblight	-	-	-	Low*	Low*	Caution*	Extreme	Extreme
4-day DH	-	-	-	99*	130*	296*	583	675
Infection Potential	-	-	-	High	Moderate	Moderate	Infection	Infection
EIP value	-	-	-	44	47	91	174	174

Wetness Events								
Rain Amount	0.44	0.04	0.00	0.05	0.00	0.00	0.00	0.09
Dew	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Leaf Wetness (hours)	14	7	9	10	8	2	6	6
Hours >90% RH	4	2	8	9	9	5	5	0
RH max/min	96/63	93/52	98/43	97/42	97/51	95/38	96/35	90/53
Temp avg F	69	66	57	63	58	59	65	68

NA - data not available

[View Cougarblight Charts](#)

Graphical data

Streptomycin Spray Date: Click to enter date
If you applied streptomycin before all flowers were open, enter the date of the streptomycin application to recalculate the blight risk predictions.

First streptomycin spray date

* Indicates incomplete accumulation of the 4-day DH total. The DH value may reach "Caution", "High" or "Extreme" levels before spanning the 4-day accumulation cut-off time of Cougarblight.

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Hours >90% RH	4	2	8	9	9	5	5	0
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[View Cougarblight Charts](#)

Download Time: 5/11/2018 21:08

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Streptomycin Spray Date: Click to enter date
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CougarBlight Risk and Weather Summary for Wooster
First blossom open date (5/15) is indicated by a dashed green line.

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Streptomycin Spray Date: Click to enter date
If you applied streptomycin before all flowers were open, enter the date of the streptomycin application to recalculate the blight risk predictions.

Disease Cycle	Disease Management
Blossom blight	Blossom blight risk predictions begin at first blossom open . If bloom in your orchard has not yet occurred, continue to check for blight risk predictions and monitor bloom daily. Infection cannot occur without open blossoms. Most serious fire blight epidemics begin with infection during bloom. Certain antibiotics can effectively protect against blossom infections when applied shortly before or immediately after they occur. The Cougarblight and Infection Potential risk levels are based on the principle that: (a) a certain number of heat units must accumulate during bloom for a threshold level of inoculum to be reached; (b) a wetting event is necessary after this point to wash the bacteria to their infection sites; and (c) the average temperature is above 60F. Low risk If only the heat units are met during bloom, Cougarblight risk is "Caution" and it is advisable to watch the forecast closely for continuing warm weather and rain. Caution or Moderate risk If only one of these conditions is met during bloom, Infection Potential risk is "Moderate" and it is advisable to watch the forecast closely for continuing warm weather and rain. High risk If two conditions are met during bloom, risk is "High" and forecasted wetting events should be carefully considered and a bactericide applied just before (or after) a rain. Extreme or Infection risk If all three conditions are met, risk is "Extreme" or "Infection" and no antibiotic should be applied just before (or after) a rain.

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Why Use Risk Assessment Models for Blossom Blight Management?



- Reduce uncertainties of when infections occur
- Allows for controlled use of streptomycin
- Improve the effectiveness and durability of streptomycin

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How to Get Started Using NEWA



- Internet or cellular connection
- Access to NEWA
 - Yearly subscription (free to Ohio producers)
- Weather station
 - Rainwise AgroMET & IP-100 (\$1890+)
 - Onset HOBO data logger (\$1896+)
- Request Onboarding
 - support@newa.zendesk.com OR
 - lvey.14@osu.edu

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