

Management of Key Vineyard Pests

Brad Baughman

Commercial Horticulture Educator

MSU Extension, Berrien County

Sources: E154, Fruit Mgmt Guide 2016



MICHIGAN STATE UNIVERSITY | Extension

FOR COMMERCIAL FRUIT GROWERS

Michigan Fruit Management Guide

2016



Extension Bulletin E154 • Information Current as of November 1, 2015 • Revised Annually • **DESTROY PREVIOUS EDITIONS**

Management of Key Vineyard Pests

- Insect pest life cycles, damage, recommended management
- Disease life cycles, damage, recommended management



Verbage

- Residual
- Contact material
- Ingestion material
- Systemic material
- Scouting
- Cultural control
- Primary Inoculum
- Secondary Inoculum



Insect Pests

- Spring bud feeders:
 - Flea beetles
 - Climbing cutworm



Insect Pests

- Spring bud feeders:
 - Flea beetles
 - Climbing cutworm
- Leaf feeders:
 - Leafhoppers
 - Japanese Beetle



Insect Pests

- Spring bud feeders:
 - Flea beetles
 - Climbing cutworm
- Leaf feeders:
 - Leafhoppers
 - Japanese Beetle
- **Grape Berry Moth**



Insect Pests

- Spring bud feeders:
 - Flea beetles
 - Climbing cutworm
- Leaf feeders:
 - Leafhopper
 - Japanese Beetle
- Grape Berry Moth
- Mealybug
- Phylloxera



Classes of Insecticides

- “Reduced-risk”
 - longer residual
 - ingestion poisons
 - specific
- “Broad-Spectrum”
 - =“Conventional”
 - shorter residual
 - contact poisons
 - kill everything



Classes of Insecticides

- “Reduced-risk”
 - Delegate, SpinTor, Entrust
 - Intrepid
 - Altacor, Belt
 - Dipel (B.T.)
 - Agri-Mek
 - Oberon, Movento
- Broad-spectrum
 - Lorsban, Imidan
 - Danitol, Mustang Max, etc.
 - Lannate, Sevin
- In Between
 - Neonicotinoids

What is “reduced risk?”

- “Risk” refers to...
 - Applicator, consumer, and neighbor health risks
 - Non-target critters
 - Bees
 - Predatory insects
 - Predatory mites
 - Parasitoids
- Official “Reduced Risk” EPA designation for some materials.
- Often, these are *ingestion poisons* rather than *contact poisons*.
 - *More thorough coverage needed,*
 - *More precise timing needed*



Bud Feeders

- Feeds from bud swell to 2-5 inch shoots
- Scouting: brown/black, hollowed out buds.
- Can result in serious damage!



Bud Feeders

- Flea beetle on clay soils
- Cutworm on sandy soils
- Cultural control:
 - Leave extra buds
 - (+ frost protection)
 - Clean understory
 - >4% buds: poison



(D. Pfeiffer, V. Tech)

Cultural control: Sanitation



No place for flea beetle to emerge from!

Insecticides for Bud Feeders

- **Flea Beetle**

- Pyrethroids

- Gladiator
 - Brigade
 - Brigadier
 - Danitol
 - Hero
 - Baythroid
 - Mustang Max



- **Sevin**

- **Climbing Cutworm**

Excellent control

Pyrethroids: Gladiator, Brigade, Danitol, Hero, Baythroid, Mustang Max

Lorsban

Good control

Oberon*

Delegate*

Altacor*

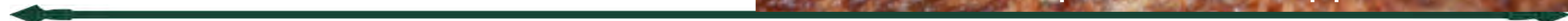


The Leafhoppers

- One species comes in on storm fronts from the Gulf in May or June
- Summer leaf feeding



Adult potato leafhopper



Leafhopper damage

- During an infestation:
 - clouds of them jump up from the grass when disturbed.
- Two types of leaf damage:
 - slight yellowing, leaf edges curl
 - yellow to orange stippling on leaf surface



Insecticides for *Leafhoppers*

- Excellent Control
 - Belay, Scorpion*, Venom, Leverage, Agriflex
 - Baythroid
- Good Control
 - Lannate, Sevin
 - Brigade, Danitol, Mustang Max
 - Gladiator
- Soil-applied, 6-12" shoot:
 - Admire Pro*
 - Platinum
 - Venom
- Note: generally a nuisance pest when present, sprays seldom needed.



Japanese Beetle

- Grubs underground in sod, pasture, turf environments
- Adults emerge Jun/Jul, migrate into vineyards
- Traps: NOT RECOMMENDED



Insecticides for Japanese Beetle

- Good Control:
 - Altacor*
 - Avaunt*
 - Neonicotinoids: Provado*, Actara*, Assail*, Belay
 - Pyrethroids: Brigade, Danitol, Baythroid, Mustang Max, Hero
 - Imidan
 - Sevin
- *Excellent* Control:
 - Scorpion* (Neonic)
 - JB tend to clump in small areas, usually spot-spraying is what's needed.



A note on leaf-feeders...

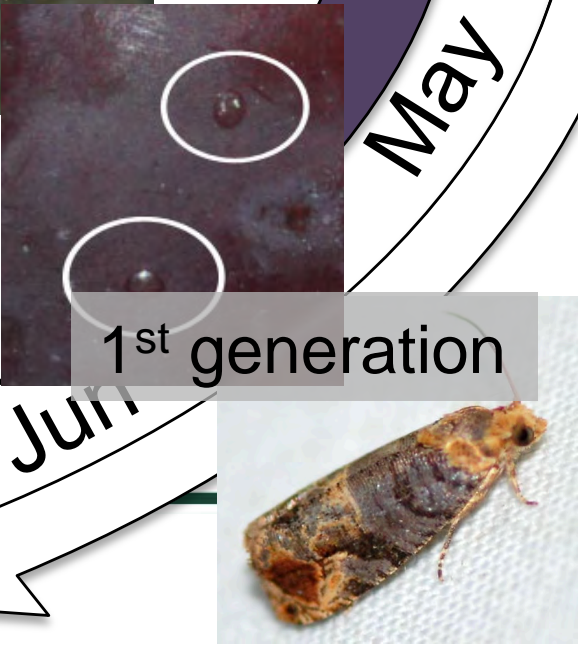
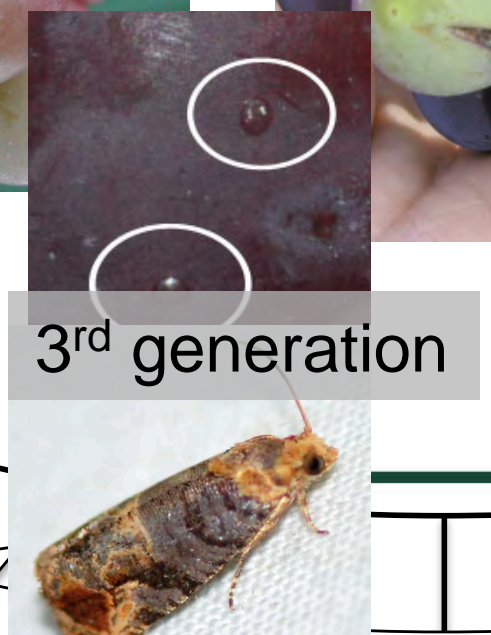
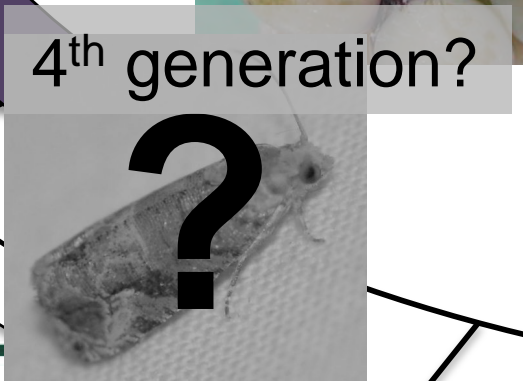
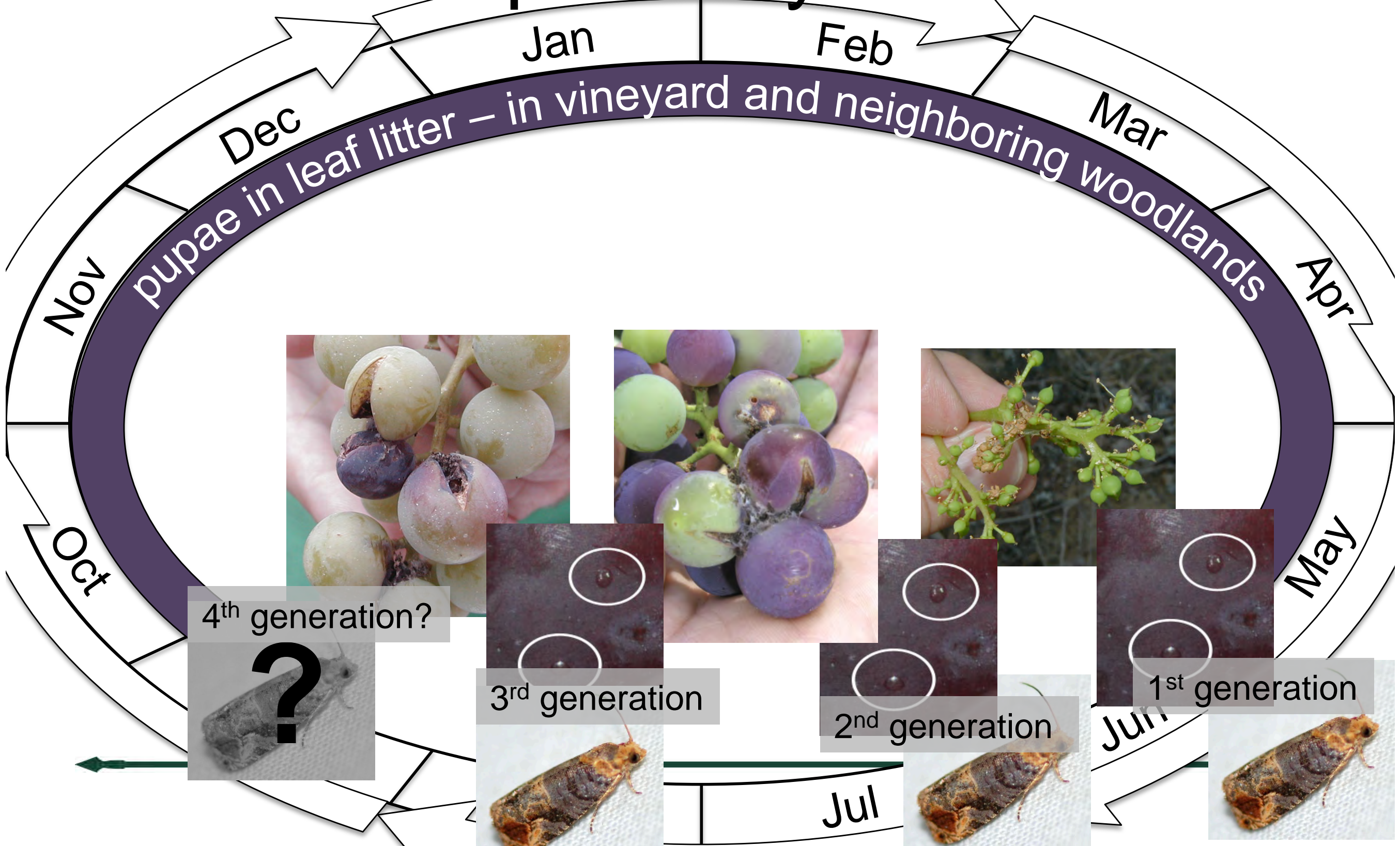
- Looks ugly?
 - May be harming yield, quality, growth, or hardiness
 - But not always!
- Leafhoppers: Mild damage -> no impact on fruit quality...
- JB 15% leaf loss or more



Grape Berry Moth



Grape Berry Moth



4th generation?

3rd generation

2nd generation

1st generation

Grape Berry Moth

- Scouting
 - flat, white eggs on clusters
 - characteristic wounds and webbing in clusters
 - infested red grapes will get color early in the season
- Infestation worse on borders



(Rufus Isaacs, MSU)

Grape Berry Moth

- Sprays: timing and location of sprays are everything.



(Rufus Isaacs, MSU)

Grape Berry Moth: Many poisons that work well...

Excellent Control:

- Intrepid*
- Altacor* and Belt*
- Imidan
- Sevin
- Danitol, Hero, Gladiator

Good Control:

- BT toxin*
- Entrust*
- Avaunt*
- Neonics: Belay, Scorpion*, Venom
- Oberon*
- Spinosyns: Delegate,* SpinTor*
- Lannate
- Pyrethroids: Mustang Max, Leverage, Baythroid, Brigade

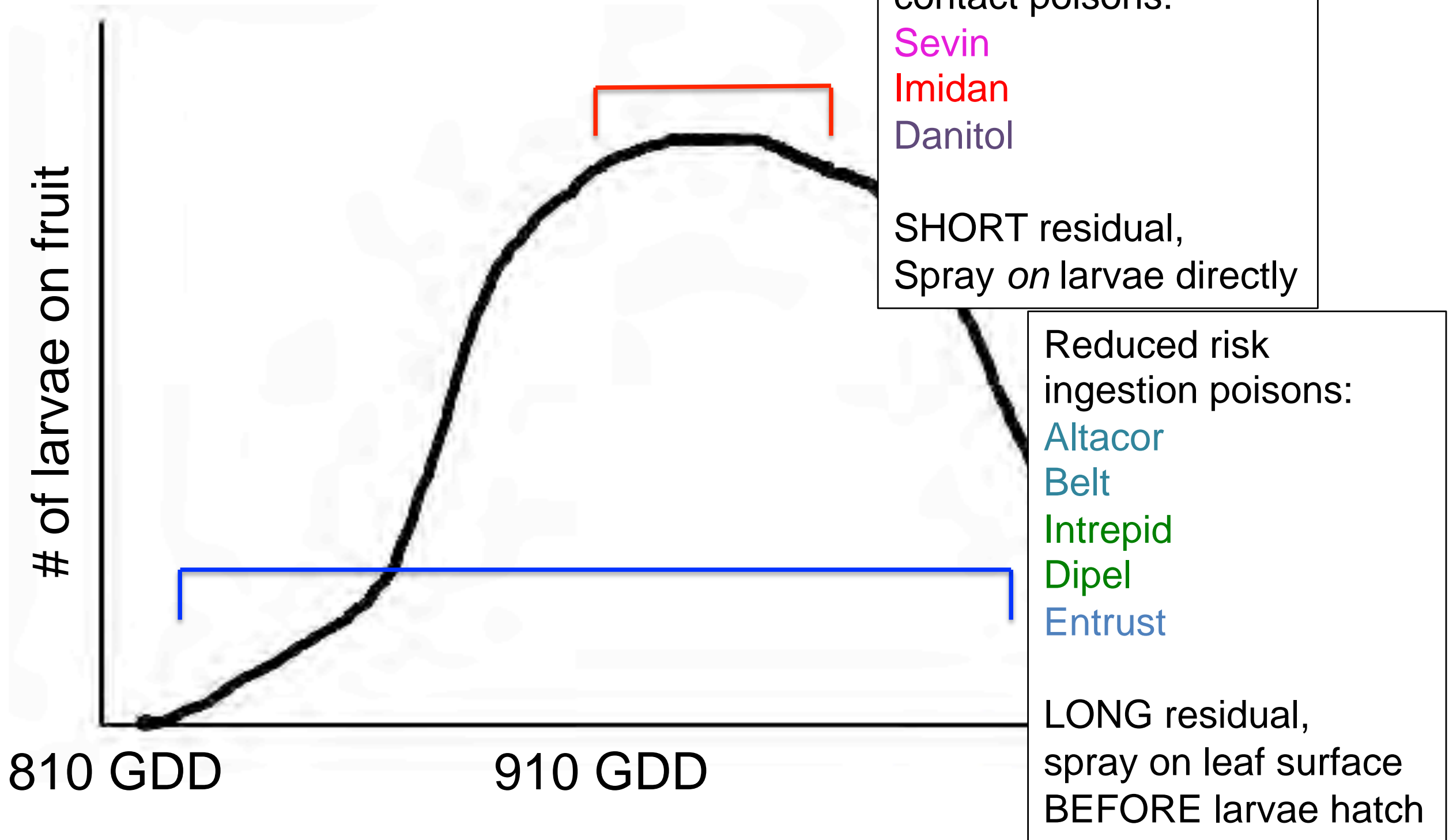


Grape Berry Moth: Spray Timing

- Why is timing so important?



Grape Berry Moth: Spray Timing

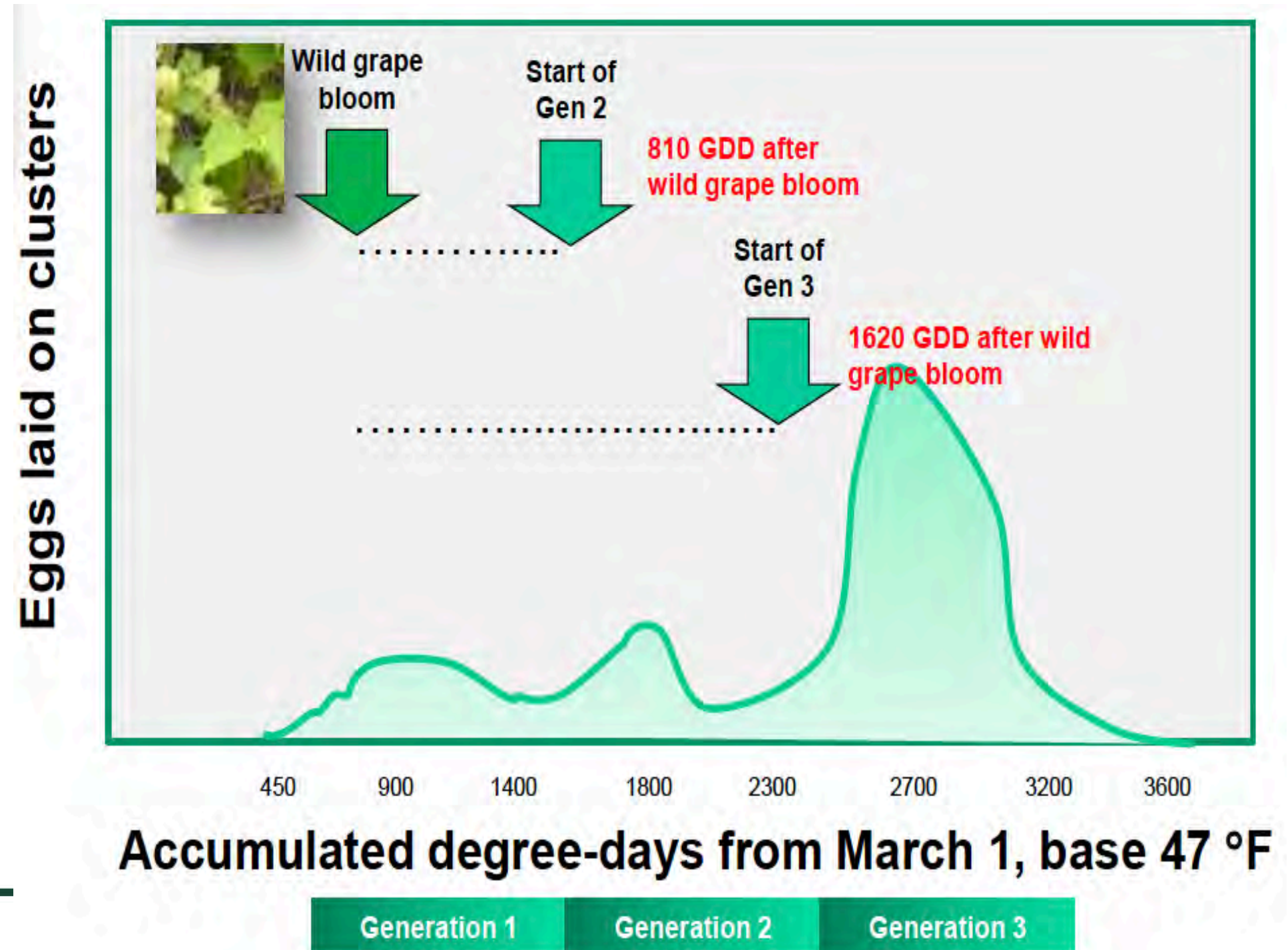


What is a “Growing Degree Day?”



Grape Berry Moth: Spray Timing

- That's why we suggest Growing Degree Day model.

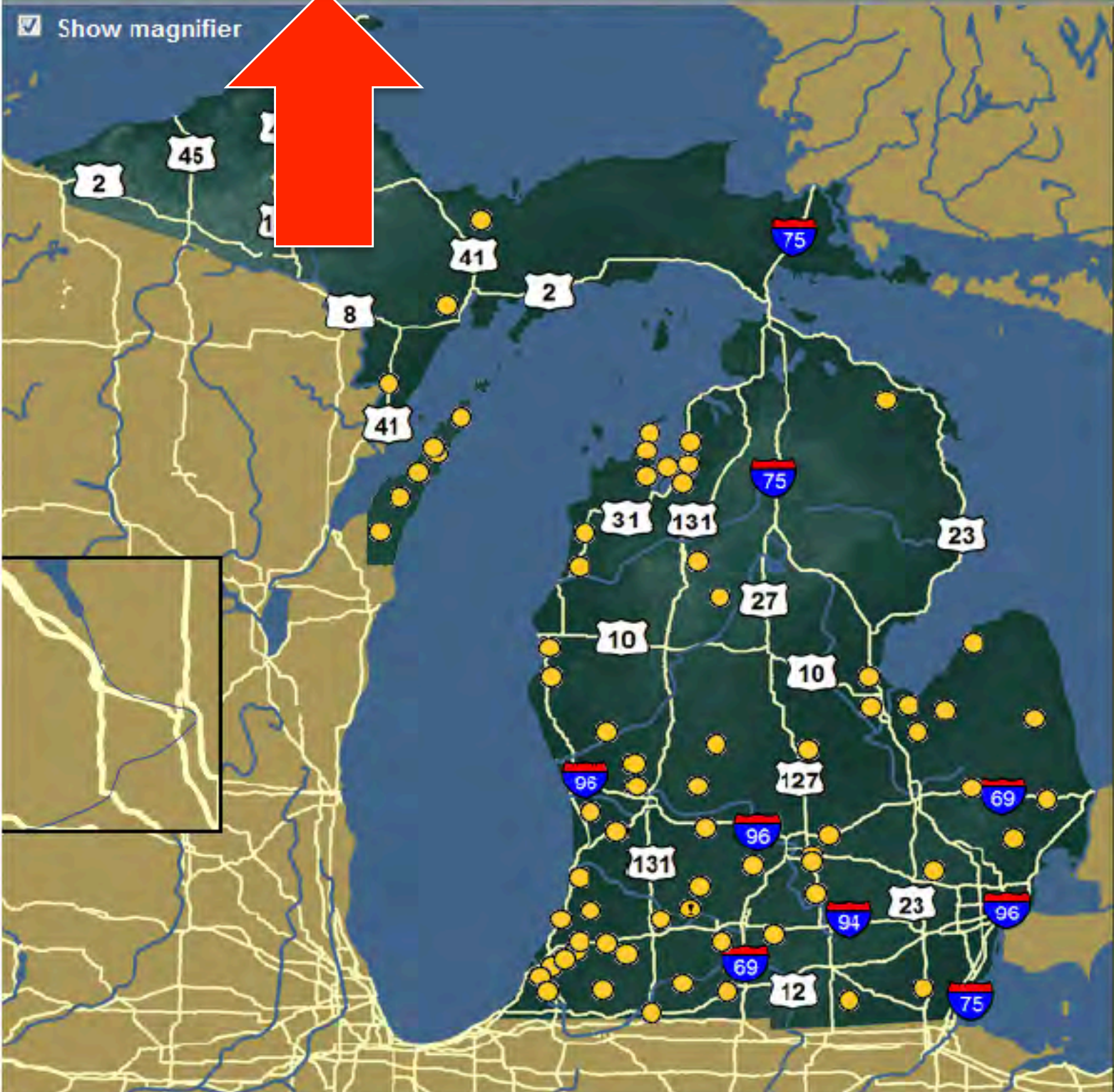


How can I track berry moth degree days?

MICHIGAN STATE UNIVERSITY | **Enviro-weather**
Weather-based pest, natural resources,
and production management tools

Tools for: Field crops | **Fruit** | Trees | Turfgrass | Vegetables | Landscape & Nursery | More weather

Show magnifier



Welcome to Enviro-weather!
For weather-based tools: Click on a station on the map.
For access to specific commodity tools: Select from list above.

Enviro-weather is made possible by the generous support of our sponsors. Help keep it going: **Contribute today!**

MICHIGAN STATE UNIVERSITY
Extension

Michigan State University
AgBioResearch

Project GREEN

www.enviroweather.msu.edu

[Expand All](#) | [Contract All](#)

Resources for:

Tree fruit

- 📁 [Apple](#)
- 📁 [Cherry](#)
- 📁 [Pear](#)
- 📁 [Other tree fruit](#)
- 📁 [Multi-Crop Disease Summaries](#)

Small fruit

- 📁 [Blueberry](#)
- 📁 [Grape](#)
- 📁 [Other Small](#)
- 📁 [Multi-Crop Disease Summaries](#)

Tools for fruit are made possible by the generous support of:



East Lansing (MSUHort), Michigan

Latest observations at East Lansing (MSUHort)

12/04/2014 03:00 PM (Station online). Measurements by 5-minute average or total unless otherwise indicated.

30.6 F	Air temperature
0.0 in.	Rainfall(12/04/2014)
43.5%	Relative Humidity
11.0 F	Dewpoint
E	Wind Direction (hourly average)
3.6 mi./hr.	Windspeed
0%	Percent of last full hour wet - leaf wetness (tripod-mount)

Weather observations and summaries

- ▶ [overnight temperatures/ hours below freezing](#)
- ▶ [Rainfall comparisons for Region](#)
- ▶ [Temperature, rainfall and degree-day summary](#)
- ▶ [Rainfall comparisons last 5 years](#) at this station
- ▶ [Soil conditions](#)
- ▶ [More weather](#) for this station

Degree-day tools

- ▶ [Current degree day](#) maps
- ▶ Degree Day accumulations [for Region](#)
- ▶ Degree Day accumulations [for Region](#) (alfalfa and corn development)
- ▶ [Average degree day](#) summary
- ▶ Degree day comparisons: [Compare 2 sensors](#)



National Weather Service [radar](#) and [local forecast](#) for East Lansing



[Weather Station at East Lansing \(MSUHort\)](#)

Thanks to our station sponsors:

This station is hosted at MSU Horticulture

[Expand All](#) | [Contract All](#)

Resources for:

Tree fruit

- 📁 [Apple](#)
- 📁 [Cherry](#)
- 📁 [Pear](#)
- 📁 [Other tree fruit](#)
- 📁 [Multi-Crop Disease Summaries](#)

Small fruit

- 📁 [Blueberry](#)
- 📁 [Grape](#)
 - Crop Development**
 - ▶ [Concord Berry Weight Model](#)
 - Pest Management**
 - ▶ [Grape Berry Moth](#)
 - ▶ [Black Rot of grapes](#)
 - ▶ [Daily Weather and Disease Summary for Station](#)
 - ▶ [Station Disease Report: Seasonal History of Wetting Events](#)
 - ▶ [Regional Disease Report](#)
 - Resources**
 - ▶ [IPM Resources](#)
 - ▶ [Grapes.msu.edu](#)
 - ▶ [MSUE News for Fruit](#)

East Lansing (MSUHort), Michigan

Latest observations at East Lansing (MSUHort)

12/04/2014 03:00 PM (Station online). Measurements by 5-minute average or total unless otherwise indicated.

30.6 F	Air temperature
0.0 in.	Rainfall(12/04/2014)
43.5%	Relative Humidity
11.0 F	Dewpoint
E	Wind Direction (hourly average)
3.6 mi./hr.	Windspeed
0%	Percent of last full hour wet - leaf wetness (tripod-mount)

Weather observations and summaries

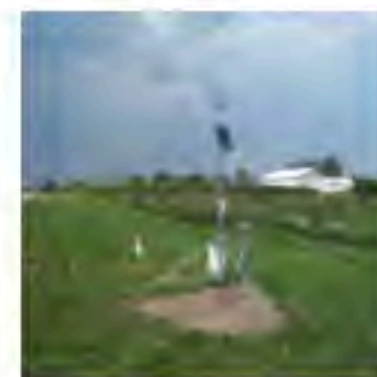
- ▶ Overnight temperatures/ [hours below freezing](#)
- ▶ Rainfall comparisons [for Region](#)
- ▶ Temperature, rainfall and degree-day [summary](#)
- ▶ [comparisons last 5 years](#) at this station
- ▶ [conditions](#)
- ▶ [more weather](#) for this station

Degree-day tools

- ▶ [Current degree day](#) maps
- ▶ Degree Day accumulations [for Region](#)
- ▶ Degree Day accumulations [for Region](#) (alfalfa and corn development)
- ▶ [Average degree day](#) summary
- ▶ Degree day comparisons: [Compare 2 sensors](#)
- ▶ Degree day comparisons: [last 5 years](#) at this station



National Weather Service [radar](#) and [local forecast](#) for East Lansing



[Weather Station at East Lansing \(MSUHort\)](#)

Thanks to our station sponsors:

This station is hosted at MSU Horticulture Teaching & Research Center

We estimated 810 GDD around **July 2nd**.
910 GDD **July 6th or 7th**

- Spray **Belt, Altacor, Delegate**, or **Intrepid** as close to July 2nd (810 GDD) as possible!
- Spray **Sevin, Imidan, Danitol** (or other **Pyrethroids**) at July 6 or 7 (910 GDD).





Grape Berry Moth: Points to Remember

1. Scout vineyards to determine the level and distribution of GBM.
Focus in regions with higher pressure (near woodlots)
2. If cluster protection needed, time sprays to **prevent larval entry.**
3. Sprayers must get excellent **cluster** coverage.
pruning to keep canopy open
increase water volume through season
spray every row
4. Select insecticides based on:
activity spectrum
residual control
resistance management
5. Beware of late-season pest pressure starting at veraison.

*Critical for any insecticide,
essential for many
new insecticides*



A note on spray equipment...

- Good coverage matters for:
 - reduced-risk insecticide applications
 - consistent disease control – reduce # of sprays needed
- Early season: not much foliage, kick it up a notch and skip rows.
- As canopy fills in:
 - Slow down
 - Spray every row



Grape Mealybug and Leafroll virus

- In vinifera winegrapes
- Numerous infestations detected 2014 in Michigan
- Vector the grape leafroll virus
- Virus causing vine decline in some vineyards



- Grape leafroll virus
 - White varieties: leaf curl
 - Red varieties: leaf curl plus early senescence



Grape Mealybug and Leafroll virus

- Prevent spread of virus:
 - Chemical option for mealybug
 - [Movento](#)
 - Source new vines from virus-tested suppliers



Grape Mealybug and Leafroll Virus

- Prevent spread of *mealybug*:
 - moves on machinery, harvested grapes, people
 - SW Michigan wineries, growers doing custom harvest, etc:
practice sanitation



Michigan Fruit Management Guide

2016



- **Confused yet?**
- Available at your local MSU Extension office
- Also online:
 - shop.msu.edu
 - Extension Bookstore tab off on the right

Disease Management

- Powdery Mildew
- Downy Mildew
- Black Rot
- Phomopsis
- Anthracnose
- Botrytis



Types of Fungicides

- **Protectants**

- On surface of plant - kill fungal spores as they germinate, therefore:
 - *Preventative only*
 - Kill by poisoning several sites in fungus, therefore:
 - *Less likely for resistance to develop*

- **Systemics**

- Absorbed into plant and kill fungus as it penetrates the plant.
- Generally a single-mode poison:
 - *resistance more likely*



Modes of Action

FRAC code:
Fungicide Resistance Action Committee

- Rotate FRAC codes throughout the season!
- Especially with systemic fungicides



Cultural Control!

- Air
 - Sunlight
 - On leaves
 - On clusters
 - With pruning!
- Resistant varieties!
(when marketing permits)
 - See Fruit Management Guide for big list

