Management of Key Vineyard Pests

Brad Baughman
Commercial Horticulture Educator
MSU Extension, Berrien County

Sources: E154, Fruit Mgmt Guide 2016
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:
  - Leahoppers
  - 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!

(S. Van Timmermen, MSU)
Bud Feeders

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

- Pupae in leaf litter – in vineyard and neighboring woodlands

- First generation
- Second generation
- Third generation
- Fourth 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)
Sprays: timing and location of sprays are everything.
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

# of larvae on fruit

810 GDD 910 GDD

Broad spectrum contact poisons:
Sevin
Imidan
Danitol

SHORT residual, Spray on larvae directly

Reduced risk ingestion poisons:
Altacor
Belt
Intrepid
Dipel
Entrust

LONG residual, spray on leaf surface BEFORE larvae hatch
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?

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!

www.enviroweather.msu.edu
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 3 sensors

This station is hosted at MSU Horticulture
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
- 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

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

This station is hosted at MSU Horticulture Teaching & Research Center
We estimated 810 GDD around **July 2\textsuperscript{nd}**.
910 GDD **July 6\textsuperscript{th} or 7\textsuperscript{th}**

- Spray **Belt, Altacor, Delegate, or Intrepid** as close to July 2\textsuperscript{nd} (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.
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*
• 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