Insect & Vertebrate Control: 
*Maintaining berry integrity throughout the season*

Advanced Viticulture Short Course
Webinar - May 20, 2020
Significant Insects that Threaten Berry Integrity

**Grape Berry Moth**
Larvae feed on developing berries

**Drosophila spp. fruit fly**
Contributor to Sour Rot Complex

Best controlled Integrating Pest Management
Raccoons

Trapping –
Inspect traps daily
Relocate far from vineyard
Raccoons can become trap shy

Electrified perimeter fence
Birds
Bird Abatement for Vineyards

No 1 system has proved effective.

- Netting
- Scare Systems
- Predatory Birds
- Lasers
- Repellants

Use a combination of systems
Change system up during ripening
Bird Netting

Most effective bird deterrent
Varies in weave and strength
# Scare Systems

<table>
<thead>
<tr>
<th>AUDITORY</th>
<th>VISUAL</th>
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<tbody>
<tr>
<td>Bird Digital recordings of local bird predators &amp; local birds in distress</td>
<td>Kites</td>
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<td>Propane Cannon</td>
<td>Mylar Tape</td>
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<td>Owls</td>
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<td>Scarecrows</td>
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**Repellent**

**Methyl Anthranilate (MA):**

- Methyl ester of anthranilic acid
- FDA “substance generally considered safe” as a flavoring agent
- Applied as spray
- Deters birds by sight, smell, and color with some formulations Irritates bird mucous
**Rapture birds**

- Falcons, hawks, owls
- Intimidate & scare nuisance birds
- Effective & natural
- Hired falconers most effective

**Lasers**

- Deterrent & repellant
- Permanently mounted
Sour Rot Complex
A complex of late-season bunch rots

Develops when *Drosophila* spp. are present.

Begins with injured berry

Most commonly:
- After late season rains
- In tight-clustered varieties
- When berry separates from pedicel, causing berry skins to split
- Under dense canopies with heavy foliage blocking the fruit zone.
Dynamic Trio Partnership in Infection

1. Yeast – begins to ferment berry juice producing ethanol
2. Acetic Acid Bacteria – converts ethanol to acetic acid
3. Drosophila fruit flies – contribute to the breakdown of the berries

ALL 3 MUST BE PRESENT
Dynamic Trio in Control

Insecticides targeting *Drosophila* fruit flies significantly reduced sour rot severity. zeta-cypermethrin (Sevin) or Spinetoram

Combine antimicrobial sprays + insecticide - even better

Managing canopy + antimicrobialial sprays + insecticide = best results

Begin spraying when berries reach 15\(^\circ\)Brix, before symptom onset
Repeat weekly until harvest

Am J Enol Vitic. May 2018 : **Control of Sour Rot via Chemical and Canopy Management Techniques**
Megan E. Hall, Gregory M. Loeb, Wayne F. Wilcox
Grape Berry Moth

*Paralobesia viteana*
Grape Berry Moth Life Cycle

- Overwinter in leaf debris
- Lay eggs on flowers & new berries
- Eggs hatch within 5-10 days
- Larvae burrow into developing berries to feed
- 4-5 generations per year
Grape Berry Moth Detection

Scout for webbing in flowering clusters

Traps up before bloom

Replace pheromone monthly

Inspect traps weekly
Grape Berry Moth
Integrated Management of Berry Integrity

• Manage Canopy Density
  Manage Air Flow - *reduce humidity*

• Maintain a Clean Vineyard - *disturb insect habitat*
  Burn or remove vine debris
  Keep weed free vine rows
  Mow before heads go to seed
Nuisance Larvae
Moth larvae – Lepidopteran Control
Insecticides – Caterpillar & Moth Specific Lepidopteran Control

IRAC Group

18  **Mode of Action**: hormone disruptor  methoxyfenozide

*Intrepid 2F*  
Some residual effect
Manage resistance by rotating chemical sprays
Insecticides — Caterpillar & Moth Specific Lepidopteran Control

IRAC Group

5 Caterpillar & Moth — Lepidopteran Control Biologics

- Entrust: spinosad
- Delegate: spinetoram
- DiPel: *Bacillus thuringiensis var. kurstaki*
Taint the Fruit

Sphinx moth caterpillar

Stink Bugs

Green June Beetle
Stink Bugs
Eggs Hatch Mid May

Photos Courtesy of Paul Darst
Grasshoppers- *Melanoplus differentialis*
Green June Beetle

*Cotinus nitida*
Green June Beetle

*Cotinus boylei*

Photo: Jim Rummage
Secondary Insects to Grapevines

Flea Beetle
*Korynetes caeruleus*

Aerial Phylloxera
*Daktulosphaira vitifolii*

Leaf Cutter Ant
<table>
<thead>
<tr>
<th>Insecticide – common name, trade name</th>
<th>Grape Berry Moth</th>
<th>Grape Cane Borer</th>
<th>Grape Flea Beetle</th>
<th>Grape Leafhopper</th>
<th>Green June Beetle</th>
<th>Leafhopper/Sharpshteer</th>
<th>Mealybugs</th>
<th>IRACa</th>
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<td>acetamiprid (Assail 30SC)</td>
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<td>spinosad (Entrust SC)</td>
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To prevent insect resistance to one chemical mode of action, avoid successive applications of insecticides with the same IRAC codes.

*Restricted use pesticide.

**May be applied through chemigation systems.
**General Insecticide**

IRAC Group

**1A** Carbaryl attacks nervous system & can be toxic on contact

- Sharpshooters
- GBM
- GJB
- Flea Beetle
- Leaffolder
- Stinkbug
- Flea beetle
- Grasshopper
- *Drosophila* fruit fly

Kills on contact, no residual, inexpensive, not so effective
# Group 4 – Nicotinic acetylcholine receptor ANTAGONISTS

**Attack the nervous system**

**Many insects**

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<td><em>Sivanto Prime, Sivanto HL</em></td>
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REQUIRES Resistance Management –
Do not make more than 2 applications per season.

- Through drip irrigation for systemic action through the root system
- Foliar spray to kill on contact – NO residual benefits
Time insecticide applications according to emergence.

Grape Berry Moth

Glassy Winged Sharpshooter
Factors that Contribute to Damage by Insects

Environmental
- Heat & Drought
- Wind damage
- Cold and frost injury
- Hail Damage

Cultivation Practices
- Nutritional disorders
- Chemical misapplications
- Faulty irrigation
ASIAN GIANT HORNET
“Murder Hornet” NOT identified in Texas

As of May 2020, no ASH have been found outside Of Washington state.
SUMMARY

Manage Canopy Air Flow
Maintain a Clean Vineyard
Determine Economic Threshold
Monitor Emergence
Time Insecticides that Target the Stage