Mid- to late-season vineyard insect management

Brett Blaauw
Department of Entomology
University of Georgia

Mid-Season Grape Workshop
6-68-2017
Outline

Key grape pests to target

– Japanese beetles
– Leafhoppers/sharpshooters
– Grape berry moth
– Grape root borer
– Mites
– Spotted wing drosophila
Japanese beetles

- Adults are shiny green and copper-colored
  - Eggs are laid in the soil
  - Overwinter as white, C-shaped grubs in soil
- Potential pest of grape during the summer
  - Adults skeletonize leaves
  - Adults are gregarious; present in great numbers on only a few vines
  - Feeding is concentrated near top of canopy
  - Intensive feeding after veraison may impact fruit quality and yield
Managing Japanese beetles

• Remove attractive non-crop host plants
  – Preferred plants
    • **Grape**, linden, Japanese maple, birch, pin oak, horse chestnut, apple, plum, cherry, rose, mountain ash, elm, Virginia creeper, crape myrtle
  – Rarely attacked plants
    • Red maple, tuliptree, magnolias, red mulberry, forsythia, ash, privet, lilac, spruce, hydrangea, yew

• Grow less attractive grape cultivars/species
  – Juice grape < hybrids < vinifera

• Milky spore **may** provide as long-term control
Chemical management of Japanese beetles

- Scout mid-June, early July
  - Look for beetles/damage
  - Do not use monitoring traps!
- Rotate chemicals
  - Note Assail is systemic
- Abundance is often higher at vineyard borders
  - Targeted management may minimize cost

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Leafhoppers / sharpshooters (for Pierce’s disease)

• Small insects with piercing-sucking mouthparts
  – Feed upon xylem or phloem tissue
  – Often cryptic in coloration – hard to visually monitor
  – Adults are expert jumpers and are strong flyers

• Potential to vector Pierce's disease of grapevines
  – Several culprits, including glassy-winged sharpshooter, blue sharpshooter, and versute sharpshooter
  – The causal agent is the bacterium Xylella fastidiosa

• Symptoms of Pierce’s disease include:
  – Yellowing/reddening of leaves leading to drying along margins
  – Fruit clusters shrivel
  – Dried leaves fall leaving the petiole attached to the cane
  – Wood on new canes matures irregularly
  – Not all symptoms are necessarily present in infected vines
Managing leafhoppers / sharpshooters

- Remove alternative hosts from vineyard
  - Bermudagrass, perennial rye, fescue grass, blackberry, willow, and elderberry

- Monitor using yellow sticky cards in canopy

- Cover sprays to suppress populations
  - Rotate chemical classes

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Grape berry moth

- Adults moths have irregular brown and gray coloring
- Overwinters as pupae in grayish silken cocoons in leaf litter
- The female sex pheromone available for monitoring purposes
  - A prebloom generation may exist in some regions
  - A second generation begins flying near bloom time
  - Potentially 4 generations
- Females lay an average of 20 eggs
  - Singly on grape stems, blossom clusters, or berries
  - Larvae are cream color at first, turning gray-green and eventually purple when mature, 3/8 in long
- Economic damage is primarily to the berries
  - Larvae enter berries, creating tunnels
  - Leave silken strands, resulting in webbed clusters
Grape berry moth management

- Begin monitoring early in the season
  - Target high-risk areas
  - Pheromone traps to detect males
  - 3 traps per site

- After first capture, start accumulating DD (base 50°F)

- Check fruit around 400-700 DD (May)
  - Treat perimeter vines if damage is observed

- Monitor again at
  - 1,200 - 1,600 DD (mid-June)
  - 2,400 - 2,700 DD (early-Aug.)
  - Treat vineyard

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Grape root borer

• Adult moths resemble wasps
  – The forewings are dark and the hind wings are more transparent
  – Male moths are about 5/8 in and females about 3/4 inches

• Each female lays an average of 300 eggs
  – Only 1.5-2.7% survive
  – First instar larvae drop to the ground and tunnel to roots

• The life cycle takes two years to complete
  – They bore into the roots and crown below the soil surface
  – Full-grown larvae are about 1 in long, white, with brown heads
  – Adults emerge from soil in early summer (July)

• Damage reduces the productivity of the vine
  – Loss of vine vigor is often the first sign of this pest
  – Vines eventually die
Monitoring for grape root borer

• Traps baited with mating pheromone and an insecticidal strip
  – Deploy traps in June and monitor until no moths are caught
  – One trap per acre
  – Place trap along border row of vines
  – Hang from bottom trellis wire

• Peak captures signals chemical intervention
Monitoring for grape root borer

- Grape root borer
- Squash vine borer
- Red oak clearwing moth
- Yellow jacket
Managing grape root borer

• Cultural control
  – Weed management beneath vines can reduce the number of eggs laid
  – Improved air flow can increase desiccation of eggs
  – Mounding of soil at base can reduce adult emergence

• Mating disruption
  – Isomate-GRB
  – 100 dispensers per acre

• Chemical control
  – Applied when moths are first caught in traps
  – Lorsban applied to base of vine
  – Not within 35 days of harvest

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Mites

- **European red mite** (ERM), *Panonychus ulmi*,
- **Two-spotted spider mite** (TSM), *Tetranychus urticae*,
- Can be a major pest within vineyards
  - Leaves have mild chlorotic spots and become bronzed if populations are sufficiently high
  - Severe infestations may result in defoliation
  - No direct fruit injury → reduction in photosynthesis negatively affects fruit quality
  - May lead to reduced shoot growth and fruit bud in the following year
Mites

Two-spotted Spider Mite
  Adult
  Webbing

Leaf damage

European Red Mite
  Female
  Male
Monitoring for Mites

• During the dormant period:
  – Inspect vines for overwintering ERM eggs
  – Clusters of tiny (less than 1/50 inch), red spheres

• Post-bloom:
  – Assess leaves for adult ERM and TSM mites
  – Use hand lens to inspect leaves
  – Tap branch and collect mites onto white sheet of paper

• Chemical control should be considered only if ERM exceed 10 ERM and/or 5 TSM per leaf
Biological control of mites

- Insecticides and miticides can also impact beneficials (natural enemies)
  - Not all mites are bad!
  - Predators, like lady beetles, feed on mites

- Use insecticides and miticides selectively
  - When possible - avoid pesticides that are toxic to the natural enemies (e.g. pyrethroids)
  - Monitor for natural enemy populations before applying chemicals

- Encourage alternative resources, such as flowering plants
Chemical management of mites

- **Dormant**: If ERM are found, a dormant oil application may be justified at bud swell
  - Horticultural oil
  - High spray volume (100 gallons per acre)

- **Post-bloom**: apply miticides as needed before serious plant damage occurs
  - Based on thresholds
  - Necessary to rotate modes of action for miticides

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Spotted Wing Drosophila

• Vinegar (fruit) fly

• Adults are 0.07-0.13 in long, have red eyes
  – Males have a characteristic black spot on the tip of each wing
  – Females have a saw-like, ovipositor

• Hosts include blackberries, blueberries, cherries, peaches, pears, plums, strawberries, raspberries, and grapes

• Lay eggs in ripening fruit
  – Can transmit sour rot
  – Larvae feed and pupate within fruit
  – Full life cycle as quick as 9 days

• Larvae may infest fruit at harvest

• Monitoring and management are crucial
Monitoring for SWD

- SWD is attracted to many volatiles
  - Including vinegar, wine, yeast, and fruit

- Early season yeast bait
  - 1 tablespoon dry yeast, 4 tablespoons white sugar, and 2 cups of water

- Late in the season bait
  - Red wine + apple cider vinegar mixture (60:40 wine:vineger)

- The solution in the trap should 1–2 inches deep and contain one drop of unscented soap

- Traps can be made from plastic containers with six to twelve 3/16-inch-diameter holes about 2/3 around

- Additionally, commercial lures and traps are available
SWD trap placement

- Deploy traps in the field 2 weeks before fruit begins to color
- Place traps on the north side of rows at fruit level
- Females may be caught first → difficult to identify without 16x magnification
- Monitor any field where you suspect SWD may be present
- SWD is more likely to be in the shady side and where humidity is highest
Checking fruit for larvae

Indicates whether sprays are effective

• Collect intact, ripening grapes
• Place fruit in a flat, dark pan or zip-lock bag
• Add a salt solution (1/4 cup salt to 4 cups water)
• Wait ~15 minutes for larvae to exit fruit
• Larvae found in recently ripened fruit are likely to be SWD
Management of SWD

- SWD attack and infest fruit as berries ripen
- Risk significantly increases when fruit reach **15 degrees Brix**
- Applying sprays before SWD is present may needlessly decimate beneficial insects
  - Monitoring is crucial → initiate sprays only if flies are captured
  - It is critical to rotate among differing modes of action
- Good canopy management is important
  - Better visual inspection of the fruit
  - Reduces cluster rots after SWD injury,
  - Better coverage of insecticides
- Practice proper sanitation → flies will re-infest fallen fruit, so waste disposal is important

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IPM/Production Guides

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  - Southeast Regional Blueberry Horticulture and Growth Regulator Guide
  - Southeast Regional Organic Blueberry Pest Management Guide
- Caneberries
  - Southeast Regional Caneberries Integrated Management Guide
  - Southeast Regional Caneberry Production Guide (PDF)
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  - Southeast Regional Muscadine Grape Integrated Management Guide
- Strawberries
  - Southeast Regional Strawberry Integrated Management Guide
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  - Fungicide Selection for Botrytis and Anthracnose Fruit Rot Management 2017
Questions?
Contact Me

Brett Blaauw
Department of Entomology
University of Georgia
353 Biological Sciences Bldg.
Athens, GA 30602
e-mail: bblaauw@uga.edu