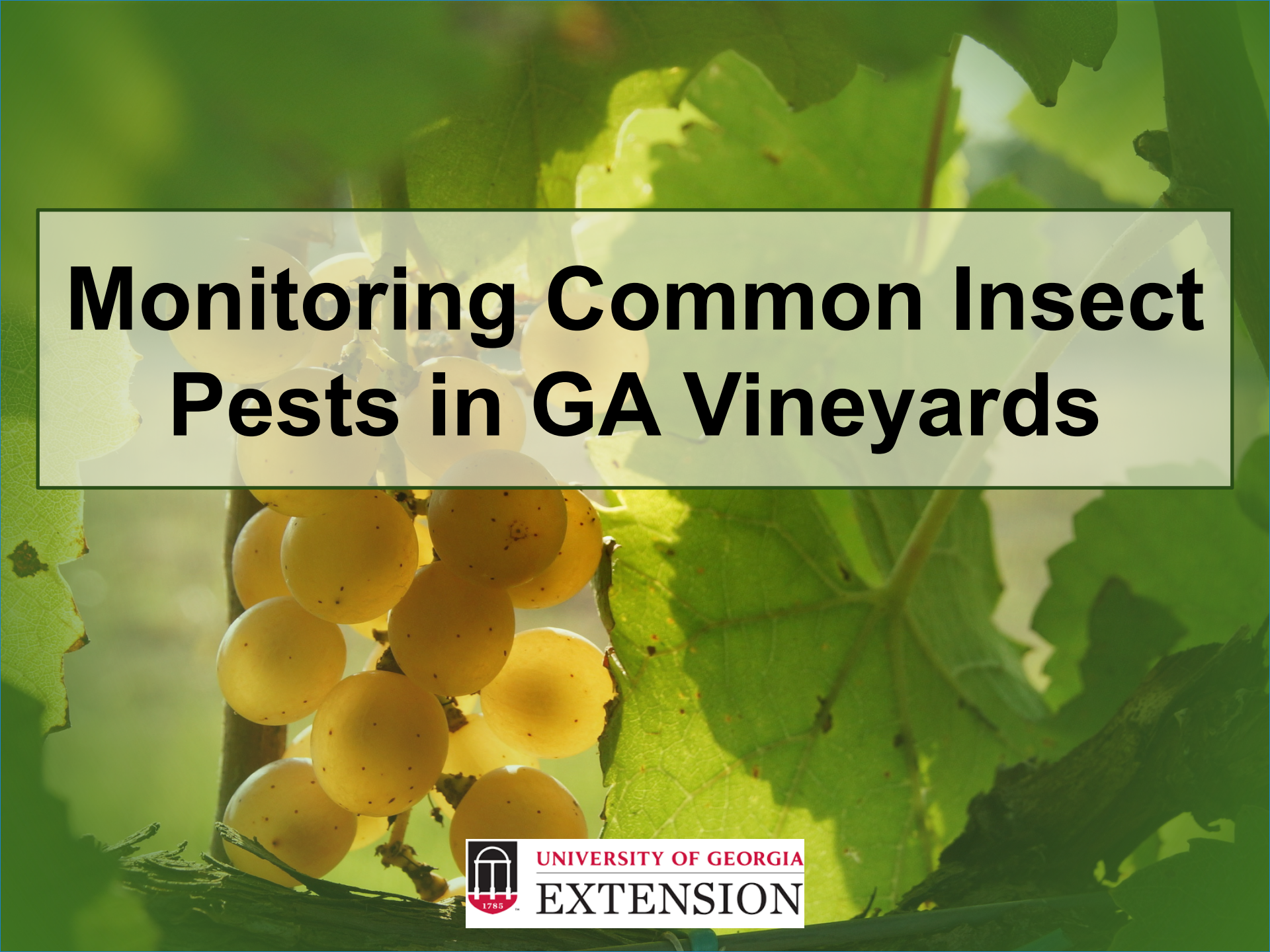
Monitoring Common Insect Pests in GA Vineyards



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Outline

- Common grape insect pests
  - Monitoring and biology of pests
  - Timing of insect activity in the field

VITICULTURE MANAGEMENT

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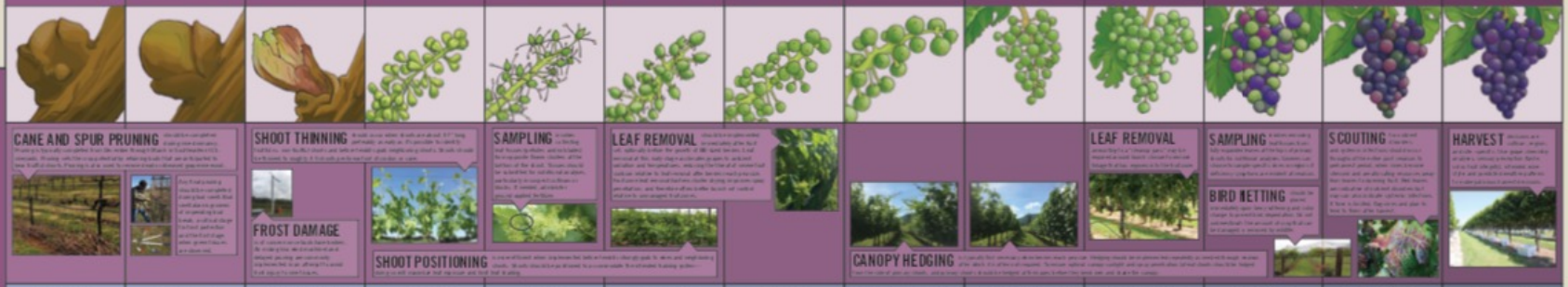
1	2	3	4	5	6	7	8	9	10	11	12	13
DORMANT	BUD SWELL	BUD BREAK	PREBLOOM	BLOOM	FRUIT SET	BB-SIZED FRUIT	PEA-SIZED FRUIT	BERRY TOUCH	BUNCH CLOSURE	VERAISON	PREHARVEST	HARVEST



CULTURAL PRACTICES

Viticultural practices optimize vineyard health, profitability, and sustainability and improve crop quantity and quality. Like pest management, viticultural practices should be implemented to actively fashion throughout the growing season to maximize practice efficiency and benefit gain.

- CANE AND SPUR PRUNING
- SHOOT THINNING
- FROST DAMAGE
- SHOOT POSITIONING
- SAMPLING
- LEAF REMOVAL
- CANOPY HEDGING
- LEAF REMOVAL
- BIRD NETTING
- SAMPLING
- SCOUTING
- HARVEST

DORMANT	BUD SWELL	BUD BREAK AND NEW SHOOT SPRAYS*	PREBLOOM	BLOOM	POSTBLOOM*	FRUIT SET*	EARLY COVER SPRAYS*	BERRY TOUCH AND BUNCH CLOSURE*	LATE COVER SPRAYS*	VERAISON	PREHARVEST	POSTHARVEST*

DISEASES

Disease control in grapes is critical, as grapes are susceptible to a wide range of pathogens. Implementing timely and adequate cultural practices will greatly help to suppress diseases. In addition, grapes, more so than many horticultural commodities, require aggressive fungicide programs throughout the year to maintain vine health.

*Colore bandings for the disease and insect management calendars are based on the algae observed in the Southeast Regional Small Grape Integrated Management Guide.

- Botryosphaeria Canker
- Crown gall
- Anthracnose
- Phomopsis
- Powdery Mildew
- Downy Mildew
- Black Rot
- Botrytis
- Ripe Rot
- Bitter Rot
- Pierce's Disease
- Sour Rot

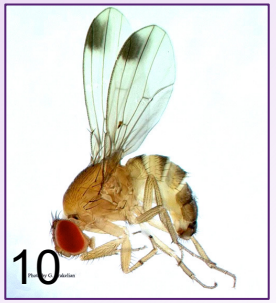
INSECTS

Integrated pest management in the vineyard combines a variety of techniques and tools to control pests. It starts with correctly identifying the insect and understanding its timing

- Mealybug
- Sharpshooter/Leafhopper
- Mite
- Climbing Cutworm
- Grape Flea Beetle
- Grape Flea Beetle
- Mealybug
- Sharpshooter/Leafhopper
- Mite
- Thrips
- Spotted Wing Drosophila (SWD)
- Grape Root Borer
- Yellow Jacket

Common Grape Pests

1. Grape flea beetle
2. Grape phylloxera
3. Grape mealybugs
4. Thrips
5. Leafhoppers / sharpshooters (for Pierce's disease)
6. Grape berry moth
7. Mites
8. Japanese beetles
9. Grape root borer
10. Spotted wing drosophila



Monitoring and biology of pests

Grape flea beetle

- Metallic blue-green beetle, ~1/5 in long
  - Adults feed on the unfolding leaves
  - Eat holes into the sides of buds and gouge out the contents as the buds swell

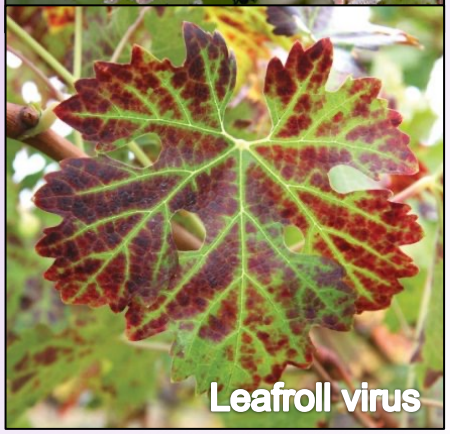
- Larvae are brown with black spots, 3/8 in
  - Larvae feed on grape leaves for 3-4 weeks
- Monitor:
  - Active early in the spring on warm, sunny days
  - Shiny beetles easily spotted on buds and canes
  - Survey **25 vines** at each of the five locations
  - Bud damage **4% or more** → management needed

Grape phylloxera

- Native to eastern US
- Tiny, pale yellow sap-sucking insects
- Feed on the leaves and roots
  - Create galls on leaves and roots
  - Stunting and/or death of European varieties
- The mobile crawler stage of phylloxera is susceptible to insecticide treatment
- Resistant American root stocks are key

Grape mealybugs

- Flat, white, and oval shaped
  - Filaments along the perimeter of the body
  - Two especially long protruding from rear
- Become active in spring
  - Multiple generations a year
  - Populations are highest on vigorous vines
  - Generally more severe on late-ripening varieties
- Mealybugs can vector grapevine **leafroll virus**
- Honeydew supports the growth of sooty mold
- Monitoring:
  - Check under bark on spurs or loose bark of prunings
  - Sooty mold and/or ants indicate mealybugs
  - Pheromone traps can monitor adult males



Thrips

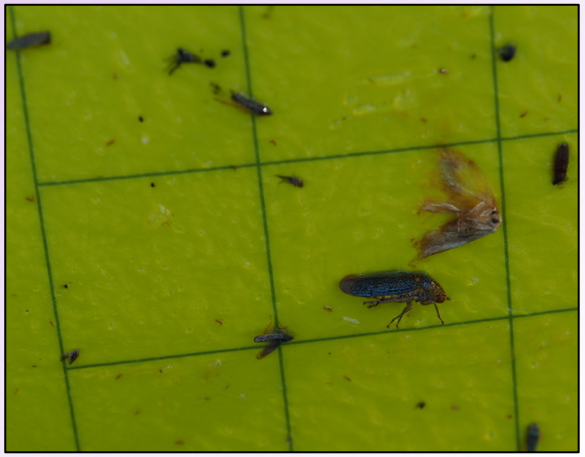
- Small, 0.04 inch long, with distinctive feathery wings
- **Western flower thrips** and **grape thrips** are the most important species
  - Western flower thrips populations peak in spring
    - Coinciding with grape bloom
  - Grape thrips populations peak in early summer
    - Coincides with peak vine growth
    - As growth slows, the numbers of thrips decreases

- Damage includes:
  - Stunted shoots and leaf stippling/necrosis
  - Halo-spotting on the fruit when they oviposit in berri
  - Scarring of berries with their feeding

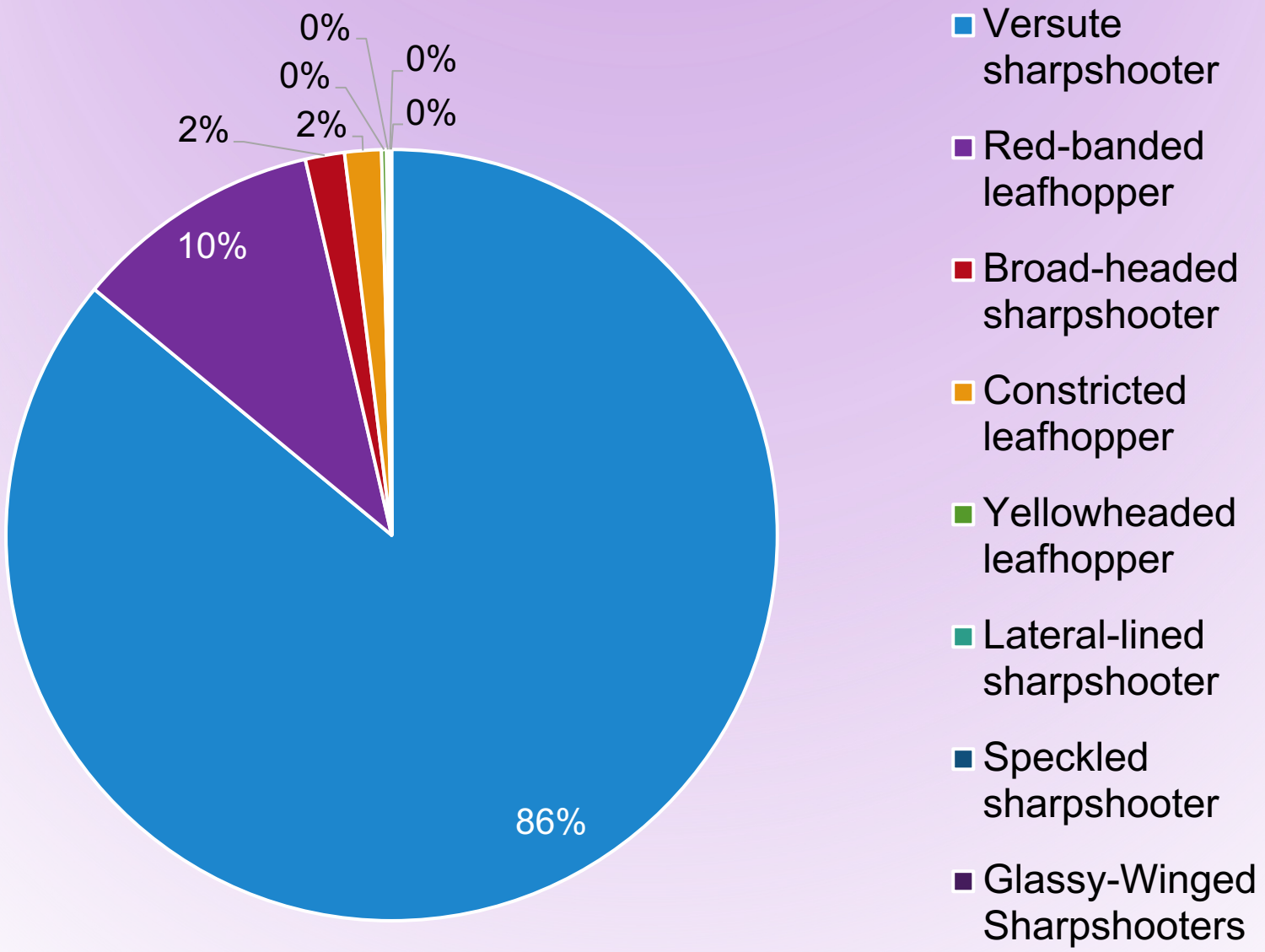
- Generally not a problem in wine grapes

Leafhoppers / sharpshooters (for Pierce's disease)

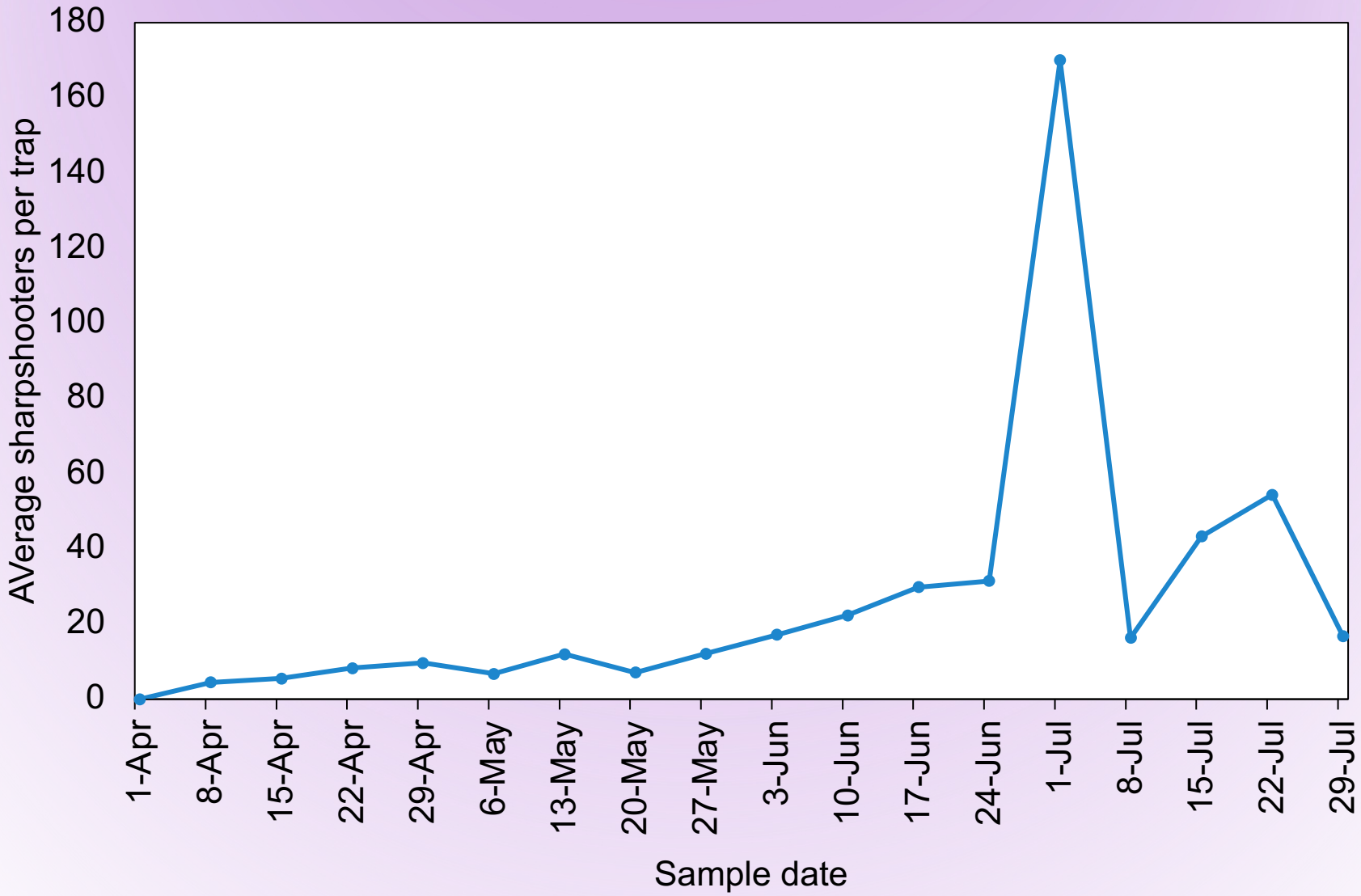
- Small insects with piercing-sucking mouthparts
  - Feed upon xylem or phloem tissue
  - Often cryptic in coloration – hard to visually monitor
  - Adults are expert jumpers and are strong flyers
- Potential to vector Pierce's disease of grapevines
  - Several culprits, including **glassy-winged sharpshooter**, **blue sharpshooter**, and **versute sharpshooter**
  - The causal agent is the bacterium *Xylella fastidiosa*
- Monitoring:
  - Begin at bud break
  - Use double-sided yellow sticky traps
  - Hang traps every 150 feet at canopy height
  - Check traps weekly



Sharpshooter/leafhopper community



Sharpshooter/leafhopper activity

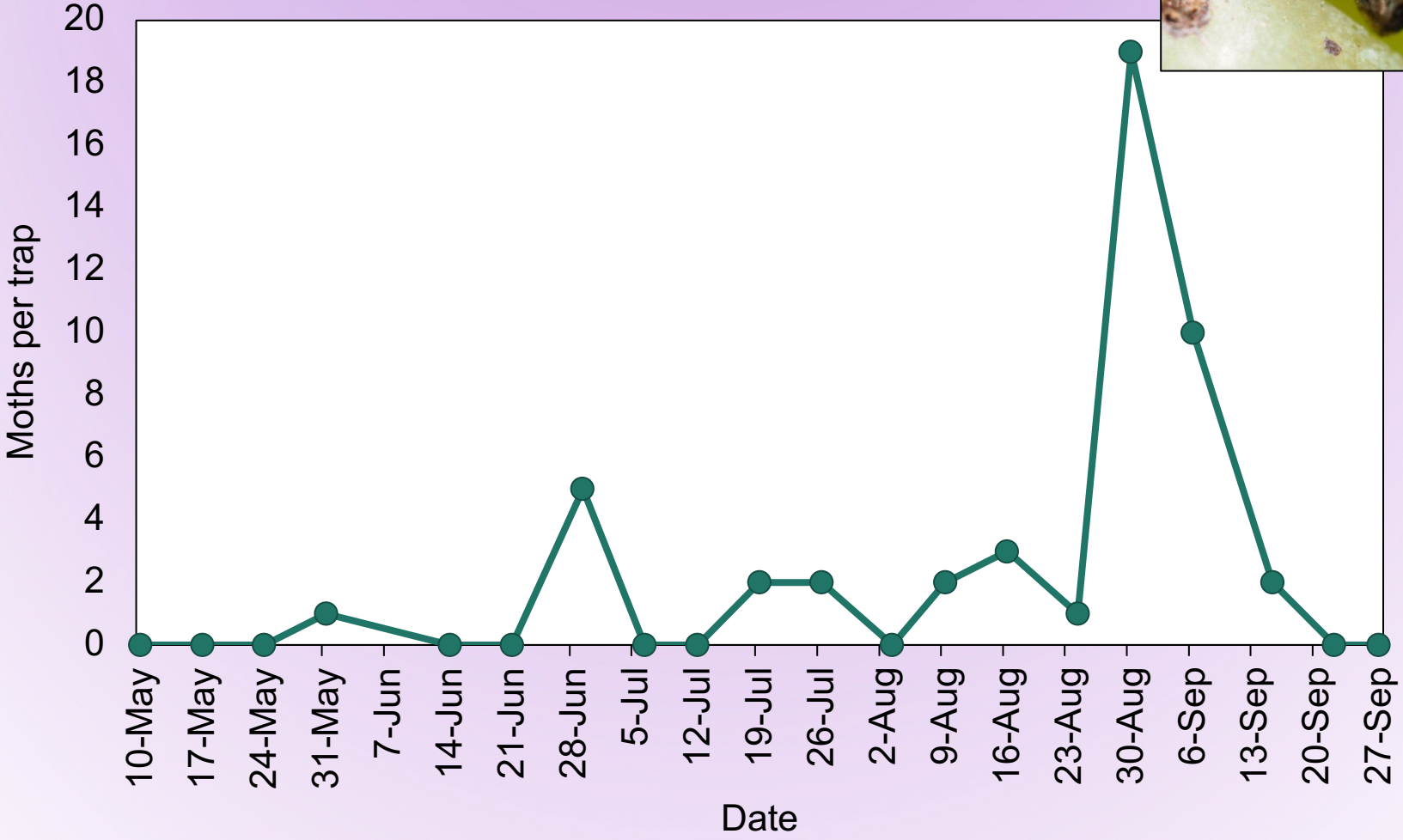


Grape berry moth

- Adult moths, different shades of brown with grey saddle
  - Eggs laid on grape stems, blossom clusters, or berries
  - Larvae are cream, then gray-green, then purple when mature, 3/8 in long
  - Overwinter as pupae in silken cocoons in fallen leaves

- Economic damage is primarily to the berries
  - Larvae enter berries, creating tunnels (dark surface)
  - Create webbed clusters
- Monitoring
  - Pheromone available for monitoring
  - A prebloom generation may exist in some regions
  - 2nd generation near bloom time, with 3 or 4 gens
  - 50% emergence at 187, 869, and 1094 DD after first male catch

GBM activity



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

European Red Mite

Monitoring for Mites

- During the dormant period:
  - Inspect vines for overwintering ERM eggs
  - Clusters of 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

Japanese beetles

- Adults are shiny green with copper-colored elytra
  - Overwinter as white, C-shaped grubs
- Can be severe pest of grape during the summer
  - Skeletonize leaves, rarely feeding on berries
  - Gregarious; present in great numbers on a few vines
  - Feeding concentrated in the upper part of the canopy
  - Feeding **after veraison** may impact fruit quality
- Monitoring:
  - No specific threshold
    - Manage at about 15% of the leaves damaged
    - Or damage is found below top trellis wire

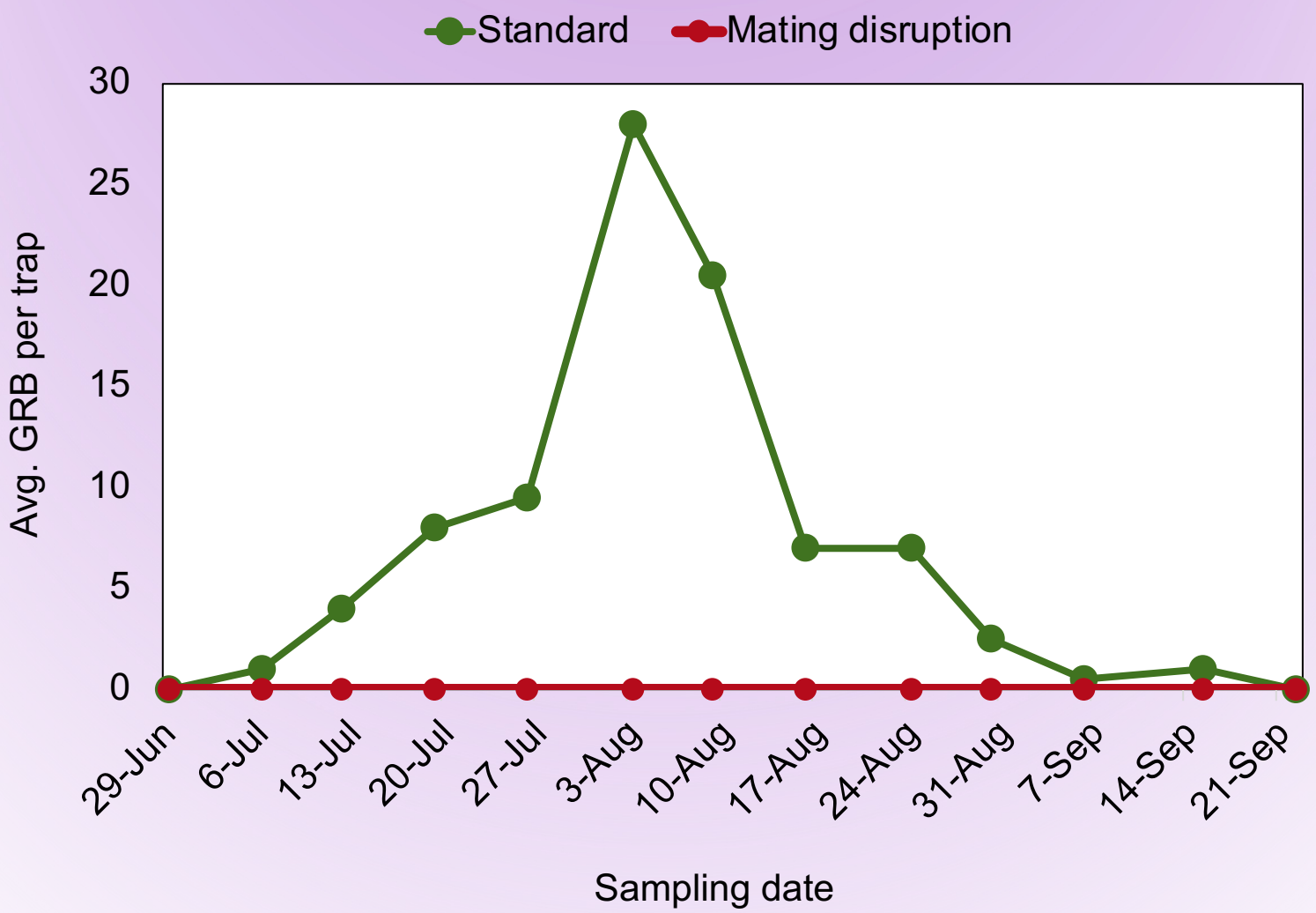
Grape root borer

- Adult moths resemble wasps
- Each female lays an average of 300 eggs
  - Only 1.5-2.7% survive
  - Larvae drop to the ground and tunnel into roots
  - The life cycle takes two years to complete
  - Full-grown larvae are about 1 in long, white, and have brown heads
  - Adults emerge from soil in early summer
- Damage reduces the productivity of the vine
  - Roots may be hollowed
  - A lack of plant vigor is usually the first sign
  - Vines eventually die

Grape root borer monitoring

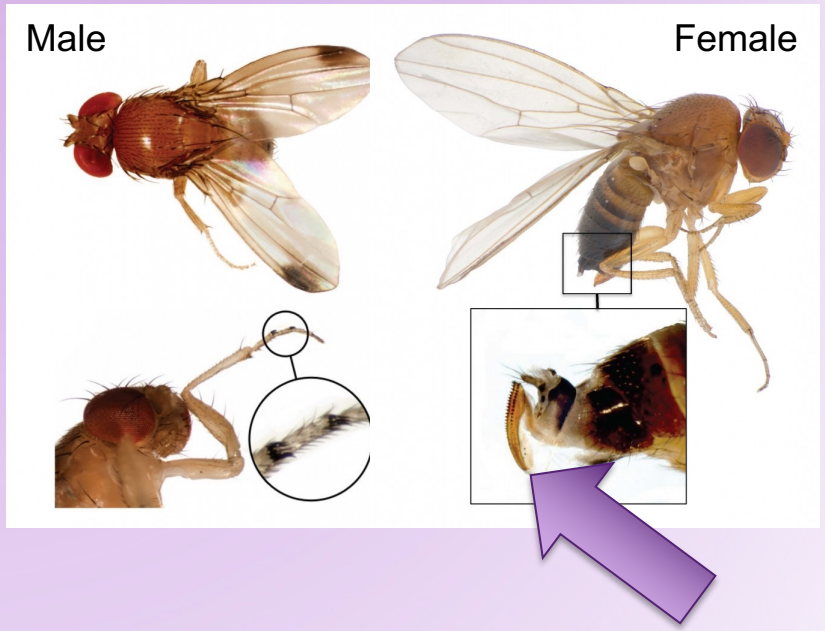
- Bucket trap and pheromone
  - 1 trap per 2 acres
  - Begin mid-June
  - Check traps weekly
- Check for pupal casings at vine base

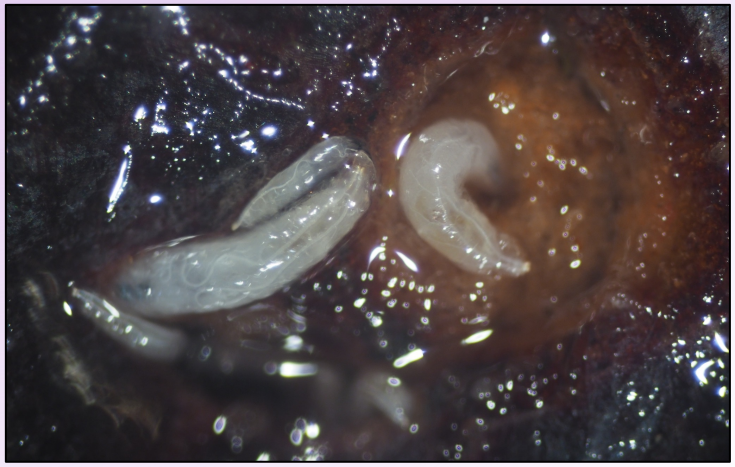
GRB activity



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



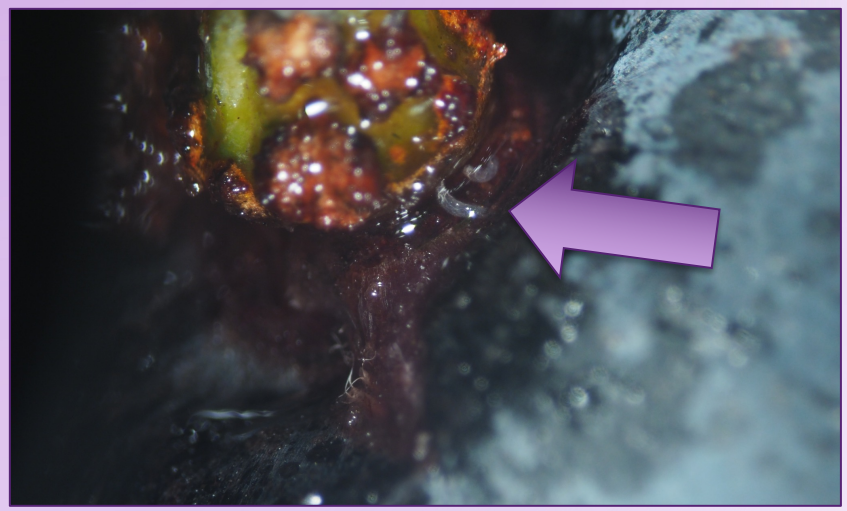


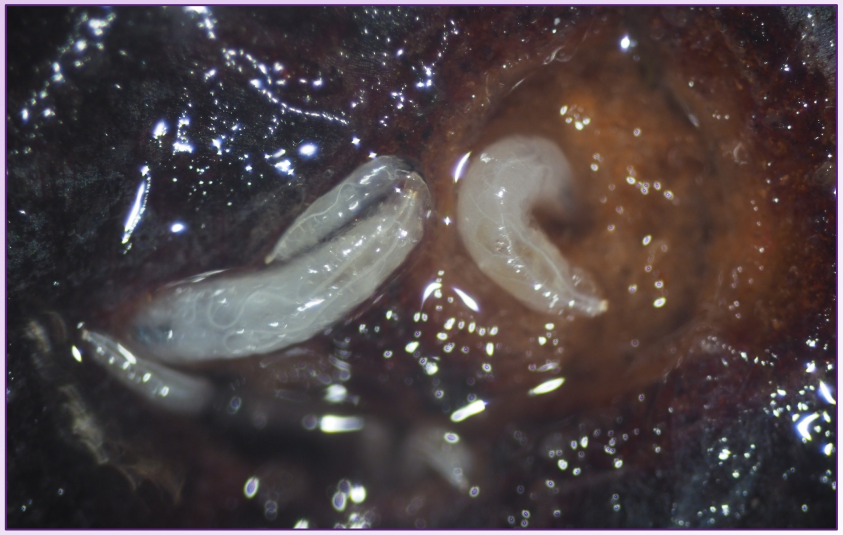
Monitoring for SWD

- SWD is attracted to many volatiles
  - Including vinegar, wine, yeast, and fruit
- Bait for traps
  - 1 tbsp dry yeast, 4 tbsp white sugar, and 2 cups of water + unscented dish soap
  - Solution should be 1–2 inches in trap
  - Traps can be made from plastic containers with 6 to 12, 3/16-inch-diameter holes about 2/3 around
- Commercial lures and traps are available
- Deploy traps 2 weeks before fruit begins to color
- Place traps on the north side of rows at fruit level

Checking Fruit for Larvae

- Larvae may be present in fruit before adults are caught in traps
  - Also 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 the fruit
  - Larvae found in recently ripened fruit are likely to be SWD





Timing of insect activity in the field

Bud swell through budbreak

- Grape flea beetle

- Mealybugs

- Leafhoppers/sharpshooters
  (for Pierce's disease suppression)

Prebloom

- Grape flea beetle
- Leafhopper/ sharpshooters
- Grape berry moth

Bloom

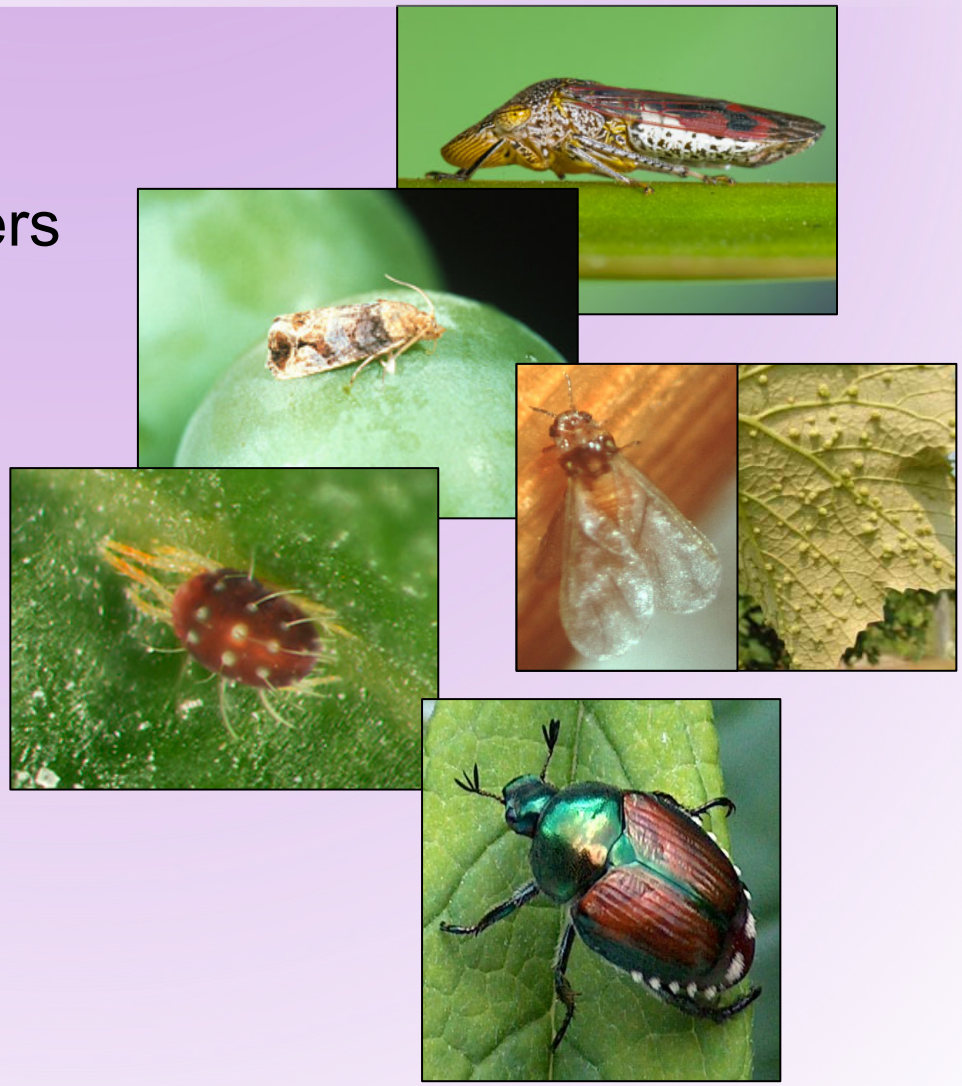
- Thrips

Fruit set

- Leafhopper/ sharpshooters
- Grape berry moth
- Grape phylloxera
- Mites

Cover sprays
Peppercorn to veraison

- Leafhopper/ sharpshooters
- Grape berry moth
- Grape phylloxera
- Mites
- Japanese beetles



Mid-May to Early-June

- Grape root borer (mating disruption)

Veraison – 15º brix

- Spotted wing drosophila

Plus:

- Leafhopper/ sharpshooters
- Grape berry moth
- Mites
- Japanese and June beetles

Pre-harvest – at least 35 days

- Grape root borer

Plus:

- Leafhopper/ sharpshooters
- Grape berry moth
- Mites
- Japanese beetles

the Southern Region small fruit consortium

Smallfruits.org

SRSFC Activities | Crops | Regional Experts | IPM/Production Guides | County Agent Training | Weather

IPM/Production Guides

Last updated Friday 5 January 2018 8:9 GMT

Blueberries

- Southeast Regional Blueberry Integrated Management Guide
- Southeast Regional Blueberry Horticulture and Growth Regulator Guide
- Southeast Regional Organic Blueberry Pest Management Guide

Bunch Grapes

- Southeast Regional Bunch Grape Integrated Management Guide

Caneberries

- Southeast Regional Caneberries Integrated Management Guide
- Southeast Regional Caneberry Production Guide (PDF)
- Southeast Regional Caneberry Production Guide (Online Version)

Muscadines

- Southeast Regional Muscadine Grape Integrated Management Guide

Strawberries

- Southeast Regional Strawberry Integrated Pest Management Guide
- Southeast Regional Strawberry Plasticulture Production Guide
- Fungicide Selection for Botrytis and Anthracnose Fruit Rot Management 2017