Bugs: Monitoring and Managing Grape Root Borer

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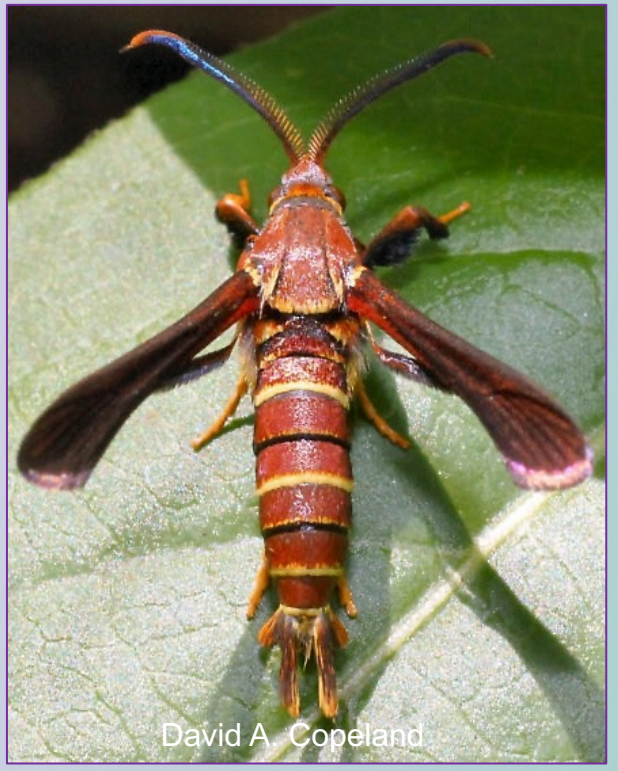
UNIVERSITY OF GEORGIA EXTENSION

USDA Agricultural Research Service

Introduction to grape root borer (GRB)

- *Vitacea polistiformis* (Harris)
- Clearwing moth → adults resemble wasps
- Attack wild and cultivated grapes



Introduction to grape root borer (GRB)

- The life cycle takes **two years** to complete
  - Full-grown larvae are about 1 in long
  - White, w/ brown heads
- Adults emerge from soil in early summer
- A single larva can reduce a vine's yield by 50%
  (Dutcher and All, 1979)
  - Reduce winter survival
  - Decrease fruit quality
  - Vine death

Grape root borer monitoring

- Pheromone-baited bucket traps

- Pupal case sampling

Grape root borer monitoring – Bucket trap

- Lidded bucket-like container
  - With a pheromone lure over a hole in the lid
  - Insecticidal strips inside the bucket
- Male moths are attracted to the pheromone
- Approximately 1 trap per 2 acres of vines
  - Deploy late June and checked weekly until Sept.
  - Helps keep track of moth population near vineyard
  - Note: traps cannot determine exact number of moths

Grape root borer monitoring – Pupal cases

- Visually count moth pupal casings at vine base
  - Provides a more accurate assessment of infestation
  - But is more labor intensive than trapping
- Pupal sampling should be done weekly
  - Begin late June and end in Sept.
  - Focus on vines with less vigor
  - Inspect soil 18 inches around base of vine
    - Bare soil is much easier to monitor than in vegetation

Grape root borer management

- Chlorpyrifos → key insecticide labeled for GRB
  - Applied as a soil drench to base of vines
  - ✗ **Banned** March 1, 2022 → Temporarily back

- Cultural methods for control of GRB
  - Mounding soil under vines to reduce adult emergence
  - Weed management can reducing egg laying sites

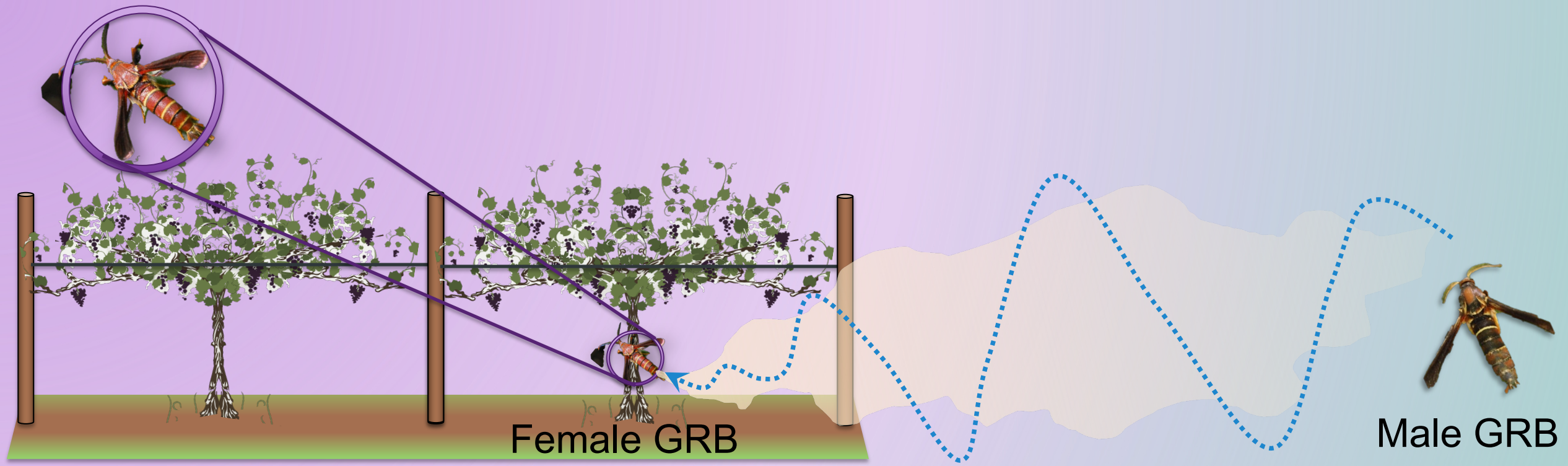
- Alternative management tactics
  - Mating disruption
  - Entomopathogenic nematodes

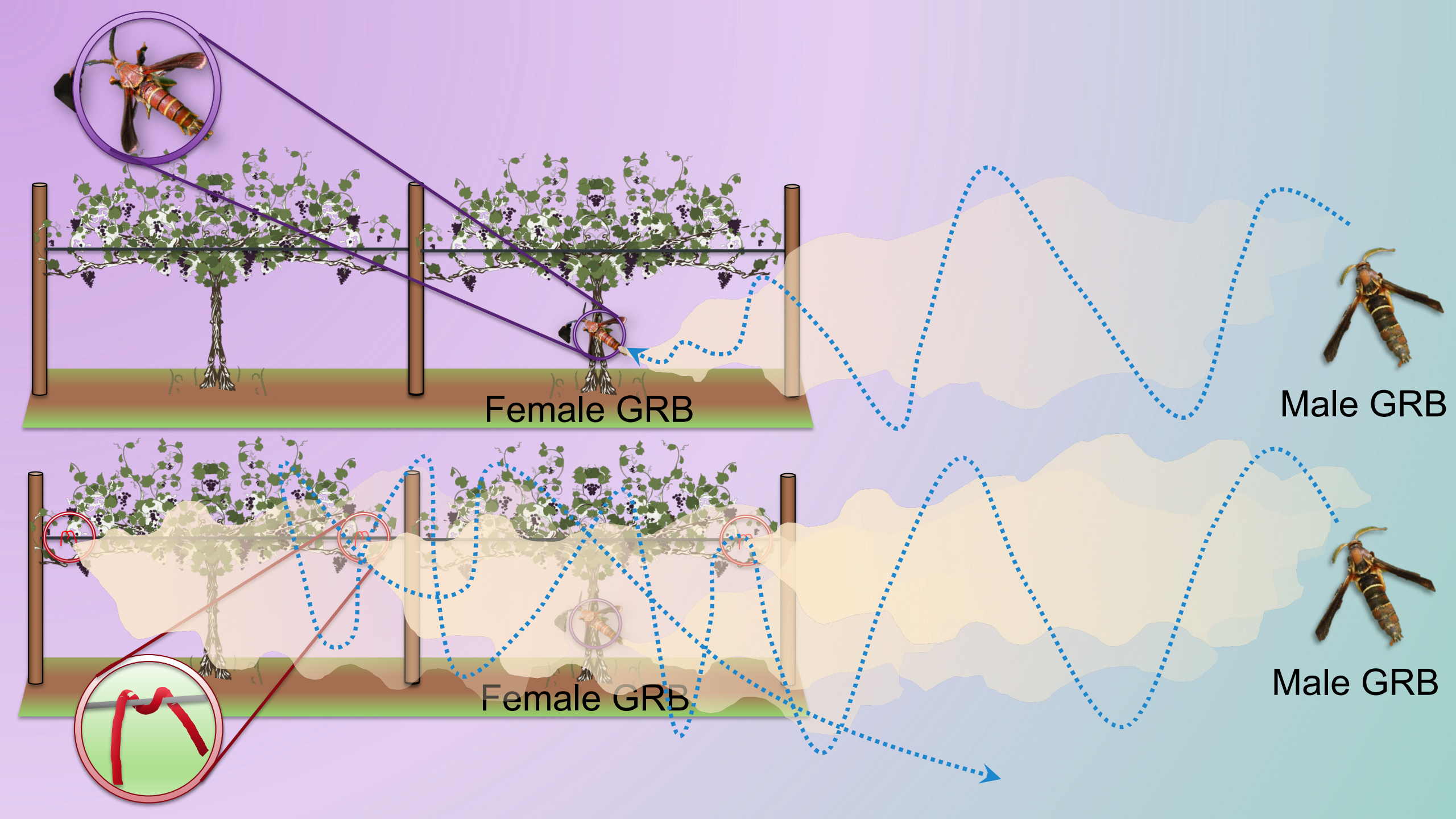
Mating disruption

Mating disruption

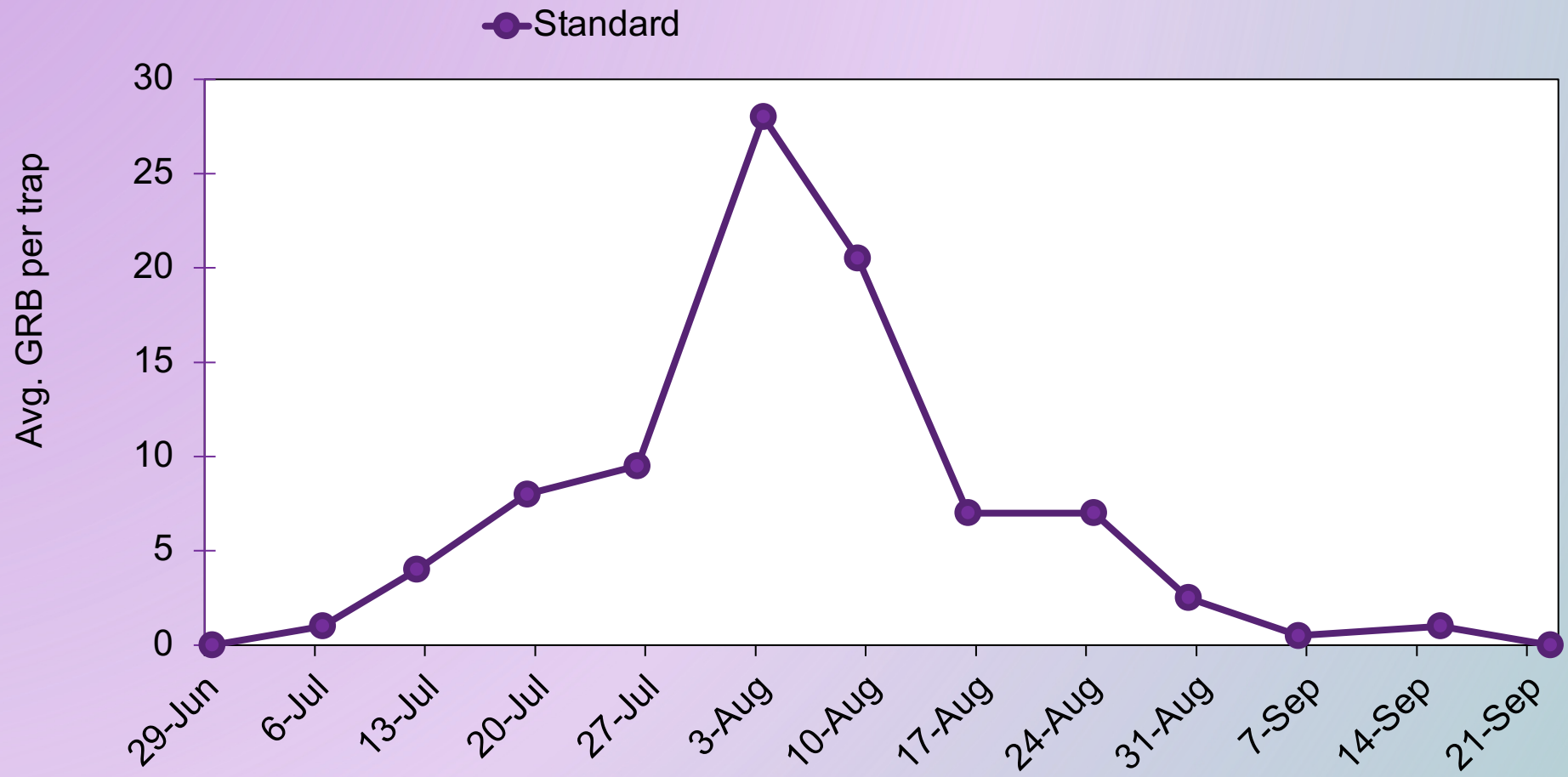
- Relies on sex pheromones
- Stop male moths finding females
  - Can dramatically decrease the number of larvae in a vineyard
  - Can significantly reduce injury to vines (Pfeiffer et al., 2010)

How does mating disruption work?

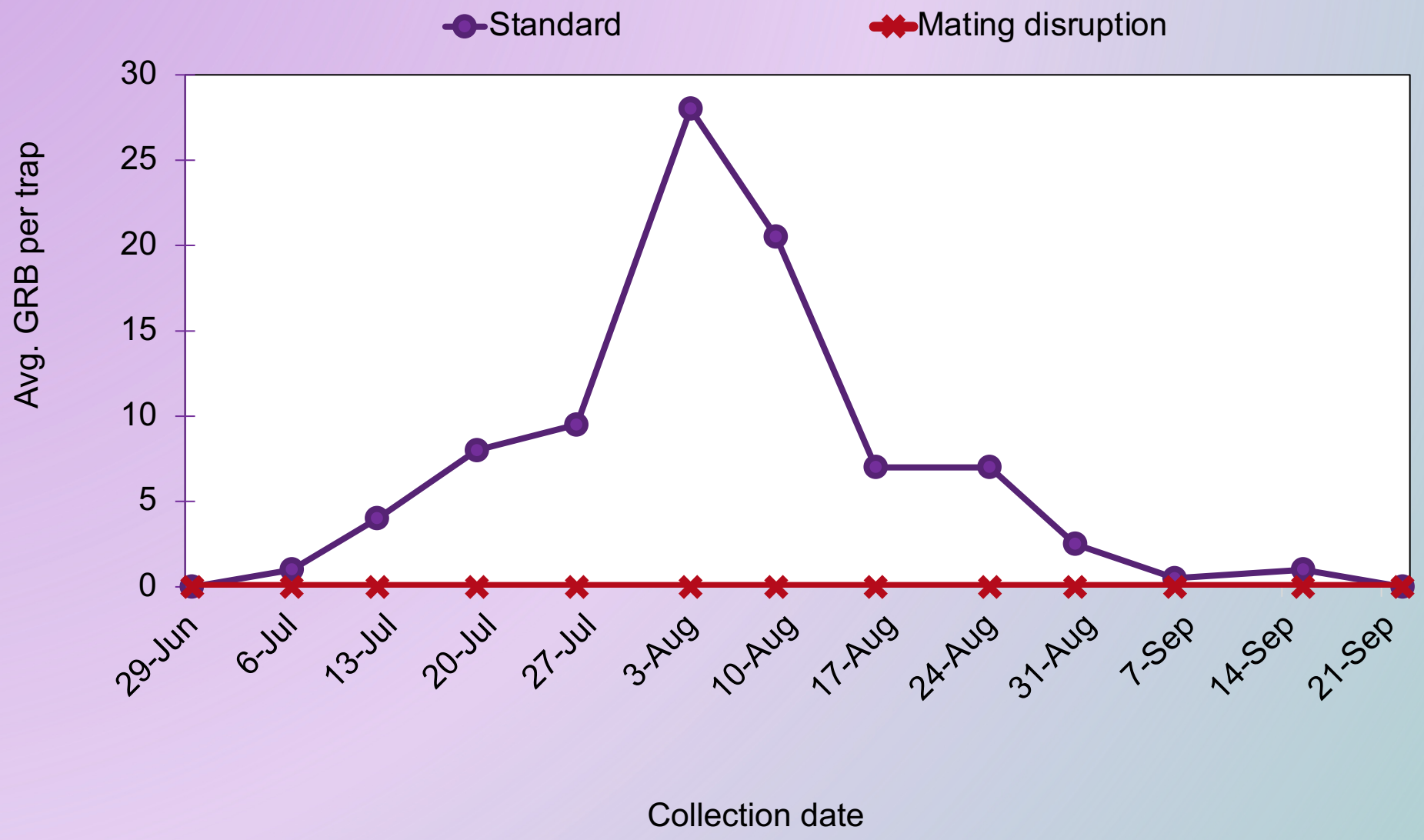

Female GRB
Male GRB


Female GRB
Male GRB
Female GRB
Male GRB

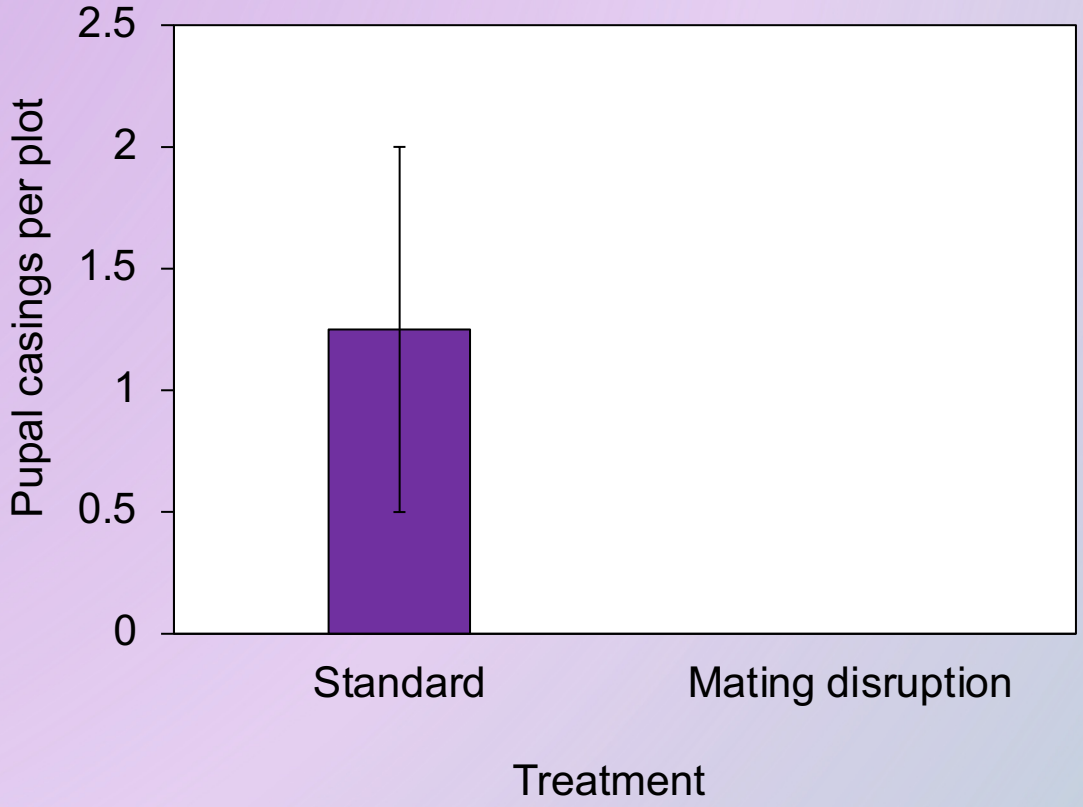
Grape root borer activity



Grape root borer activity



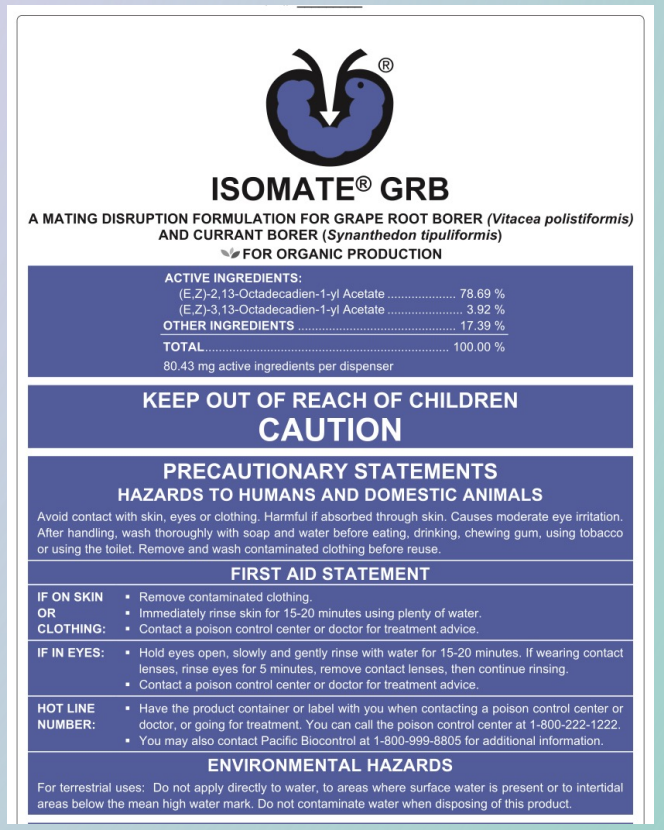
Grape root borer suppression



Mating disruption for GRB

Isomate-GRB

- Only commercially-available product for GRB
  - 100 twist ties per acre
  - Deployed before adult emergence
    - ie. no later than the first week of July
  - Twist ties are effective for one field season
  - May take years to see decrease infestation
- New registration → hopefully available for 2024



ISOMATE® GRB

A MATING DISRUPTION FORMULATION FOR GRAPE ROOT BORER *(Vitacea polistiformis)* AND CURRANT BORER (*Synanthedon tipuliformis*)

FOR ORGANIC PRODUCTION

ACTIVE INGREDIENTS:	
(E,Z)-2,13-Octadecadien-1-yl Acetate	78.69 %
(E,Z)-3,13-Octadecadien-1-yl Acetate	3.92 %
OTHER INGREDIENTS	17.39 %
TOTAL	100.00 %

80.43 mg active ingredients per dispenser

KEEP OUT OF REACH OF CHILDREN

CAUTION

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

Avoid contact with skin, eyes or clothing. Harmful if absorbed through skin. Causes moderate eye irritation. After handling, wash thoroughly with soap and water before eating, drinking, chewing gum, using tobacco or using the toilet. Remove and wash contaminated clothing before reuse.

FIRST AID STATEMENT

IF ON SKIN OR CLOTHING:	• Remove contaminated clothing. • Immediately rinse skin for 15-20 minutes using plenty of water. • Contact a poison control center or doctor for treatment advice.
IF IN EYES:	• Hold eyes open, slowly and gently rinse with water for 15-20 minutes. If wearing contact lenses, rinse eyes for 5 minutes, remove contact lenses, then continue rinsing. • Contact a poison control center or doctor for treatment advice.
HOT LINE NUMBER:	• Have the product container or label with you when contacting a poison control center or doctor, or going for treatment. You can call the poison control center at 1-800-222-1222. • You may also contact Pacific Biocontrol at 1-800-999-8805 for additional information.

ENVIRONMENTAL HAZARDS

For terrestrial uses: Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of this product.

Entomopathogenic nematodes

Entomopathogenic nematodes

- AKA beneficial nematodes or EPNs
- *Heterorhabditis bacteriophora* (*Hb*)
  - Can reduce grape root borer infestations
  - As effective as chlorpyrifos (Williams et al., 2002)
- Commercially available
  - Reasonably priced
  - Can be easily applied
  - Potentially preventative **and** curative

Infective juveniles enter host

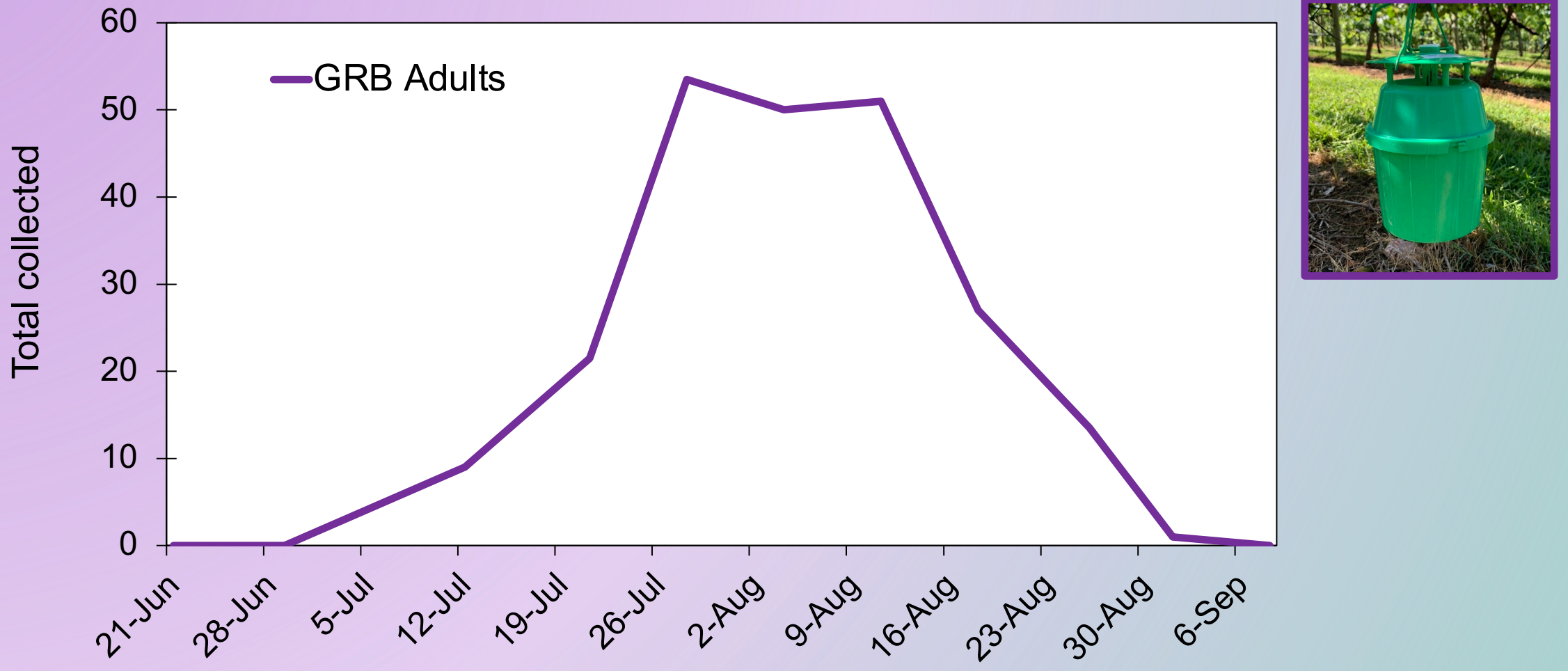
Diagram by Bill Joyner, USDA-ARS

Courtesy of David Shapiro-Ilan, USDA

EPNs for GRB management

- Several commercial products available for *Hb*
  - Follow label for mixing and application methods
  - 500,000 infective juveniles per vine
- Apply EPNs during GRB pupal stage
  - Approximately **late May**
  - Apply to base of vines
    - Backpack spray, herbicide sprayer, etc.
    - Remove any filters from nozzle
  - Water in with irrigation or ¼ gallon of water/vine

Grape root borer activity



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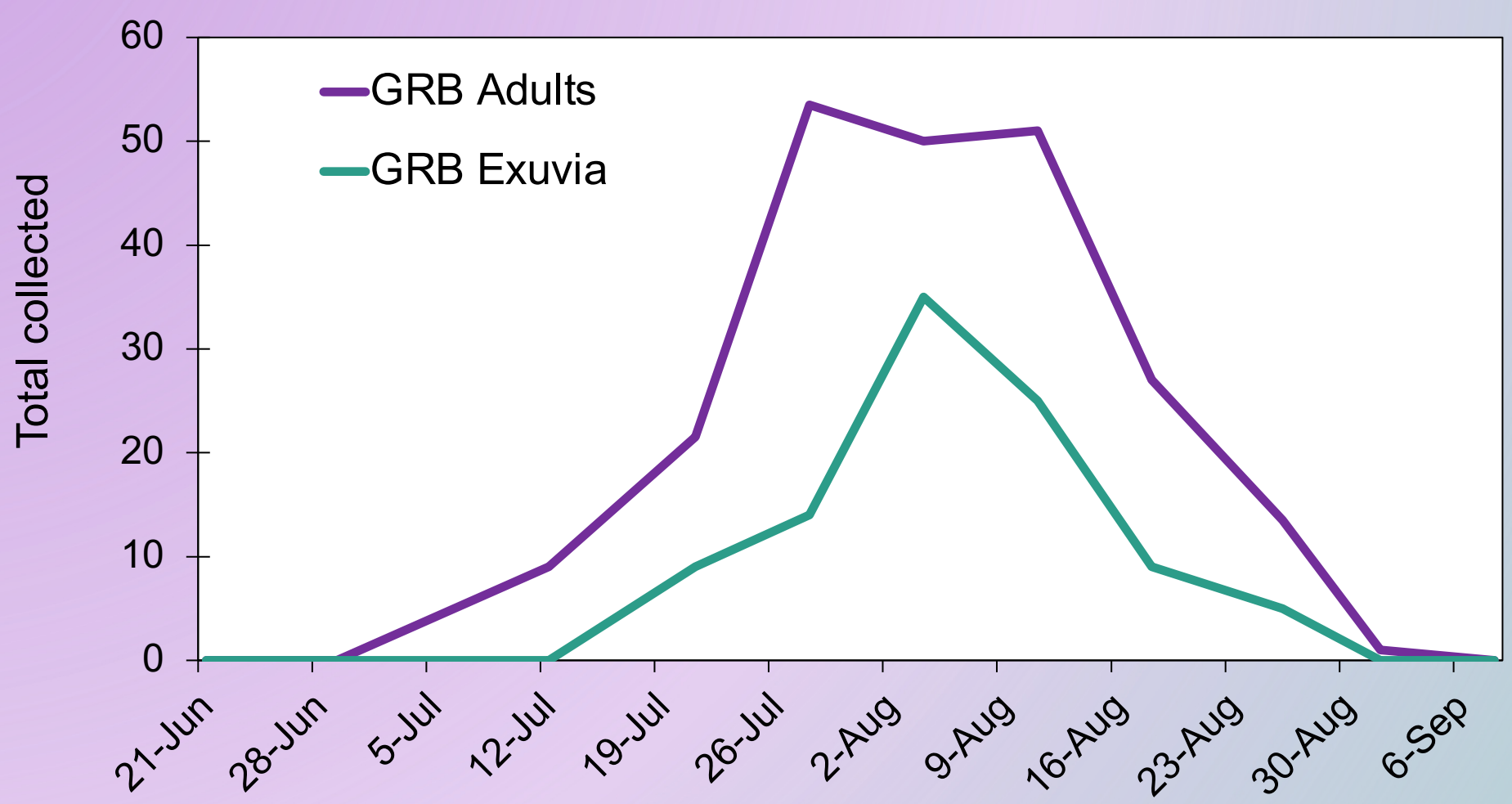
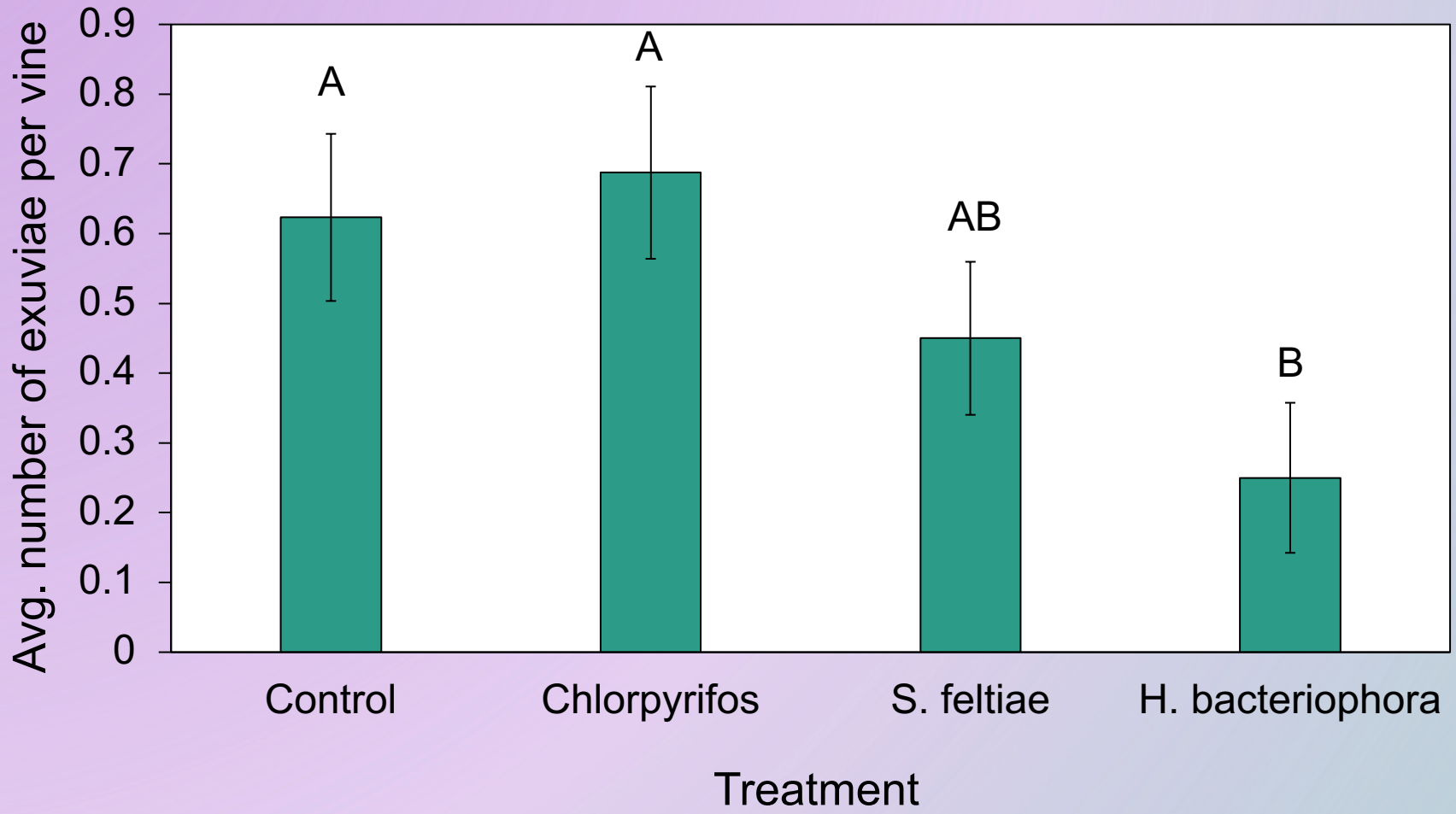
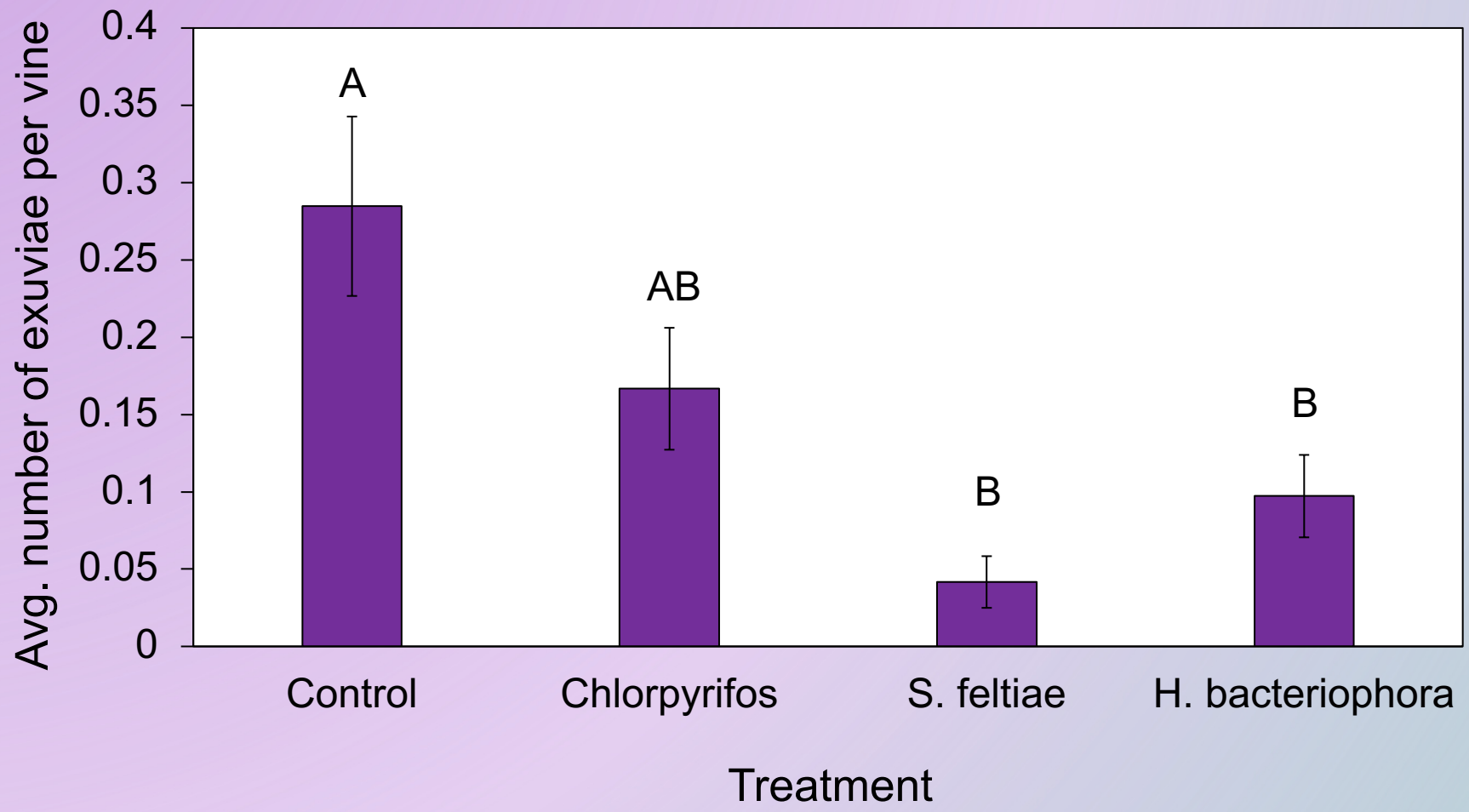


Grape root borer suppression - 2021



P = 0.0402; Tukey's HSD *P* = 0.05

Grape root borer suppression - 2022



P < 0.001; Tukey's HSD *P* = 0.05

Summary

- Chlorpyrifos fruit tolerances were banned March 1, 2022
- Weed management is first line of defense
- Effective management options:
  - Mating disruption
  - Entomopathogenic nematodes
    - *H. bacteriophora* → significantly fewer exuviae

Thanks!

- UGA Peach Entomology Lab
- Clark MacAllister
- Nathan Eason
- Stacy Byrd

- Grower cooperators

- Funding
  - Southern Region Small Fruits Consortium

USDA Agricultural Research Service

the Southern Region small fruit consortium


Questions?