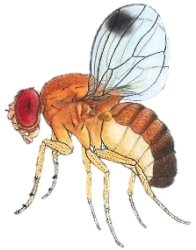

Pic by Phillip Kuhns

Update on Spotted Wing Drosophila

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Cornell University

Cornell AgriTech

New York State Agricultural Experiment Station

Spotted wing drosophila (SWD)

Drosophila suzukii

- Invasive pest, native to Southeast Asia
- First detected in US in 2008
- Widely established around North America
- Unlike other common fruit and vinegar flies, SWD targets intact fruits while they are still ripening on the plant making them unmarketable

Moving from crisis response to long-term integrated management of SWD

- SWD Biology
  -seasonality
  -crops at risk
  -wild hosts
  -overwintering biology
  -short and long-distance movement
  -host finding, chemical ecology
  -natural enemies

- Management: short-term solutions
  -monitoring
  -chemical control
  -cultural practices
  -exclusion netting

- Management: longer-term solutions
  -behavioral control
  -biological control

Research efforts to manage Spotted wing drosophila (SWD)

- Monitoring
- Chemical control
- Behavioral control
- Biological control

Monitoring is Key to Integrated Pest Management

-when management efforts need to be applied, increasing effectiveness

-delays in applying insecticides until they are needed, reducing environmental impacts and economic costs by saving sprays

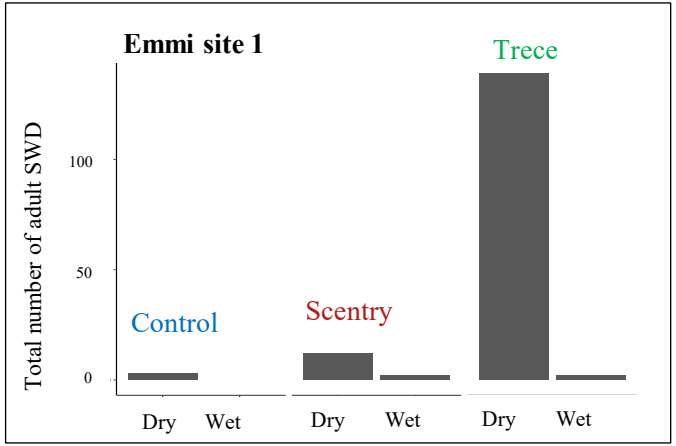
Monitoring of SWD adults

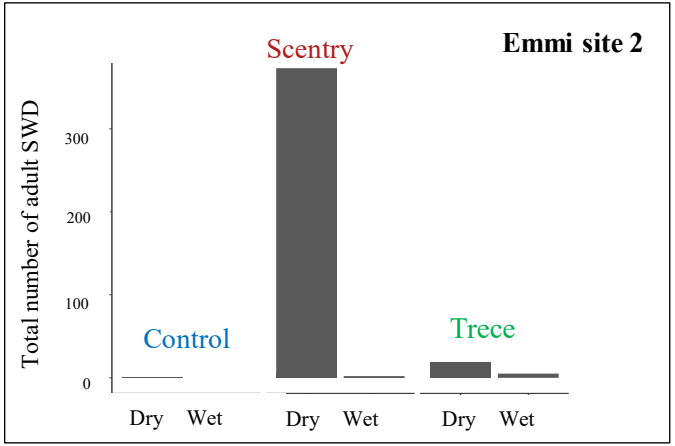
- Most common trap (Deli cup/liquid trap) with an attractive bait and a drowning solution

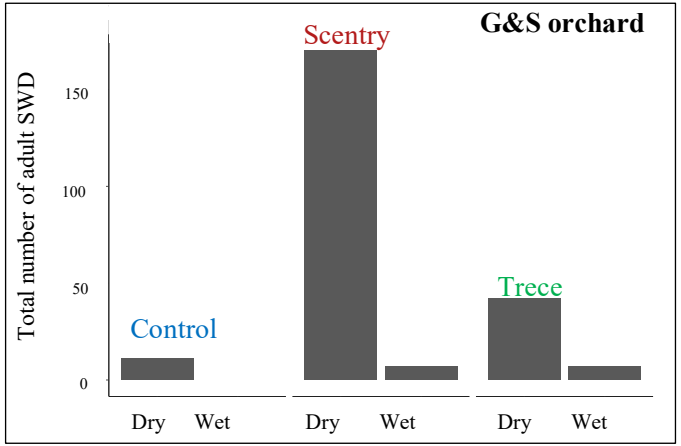
- Dry red sticky panels, counting males only, are easier to use

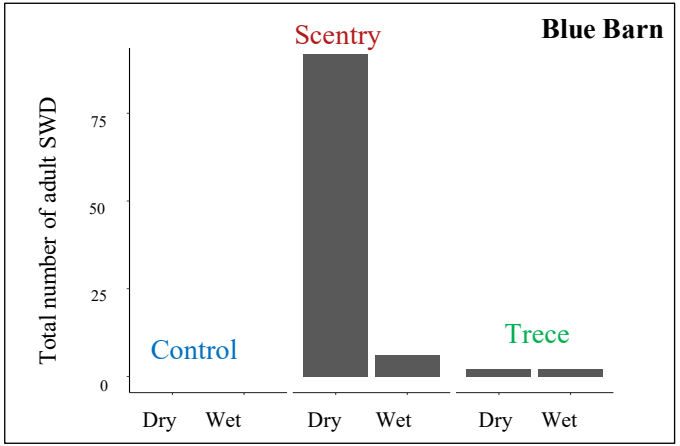
Traps integrating (red visual cue + olfactory cue) captured more SWD than the clear deli-cup traps

New York farm's dry and wet trap trials in 2021









Dry red sticky traps are more effective to capture SWD than wet traps

Monitoring of SWD in NY- 2022

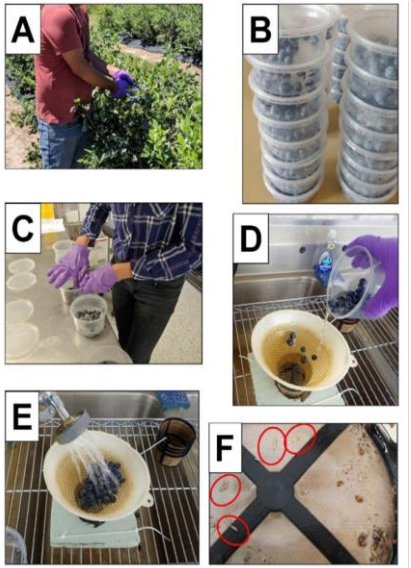
Red Sticky Trap baited with lure

To simplify monitoring for SWD for risk assessment and initiating control

- Four different sites (June-August)
- Collaboration with grower influencers

Correlate male capture with fruit infestation levels to optimize SWD monitoring

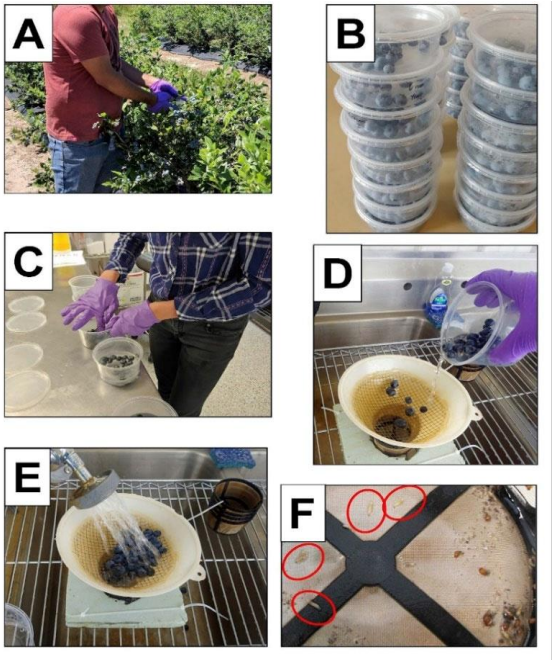
Larvae monitoring



Salt flotation

Goal: develop economic based aid tool to help growers to make optimal SWD control decisions

Monitoring of SWD larvae



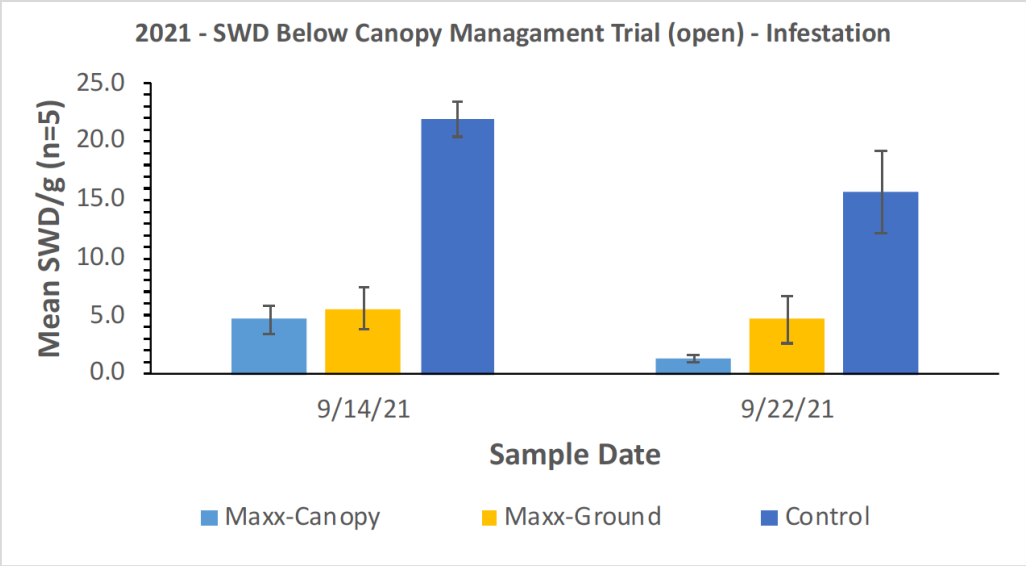
- A. Collect berries
- B. Put the berries in the cups
- C. Crush the berries
- D. Add salt solution and leave for an hour
- E. Filter the solution through mesh
- F. Count the SWD larvae

Salt flotation to check for SWD larvae

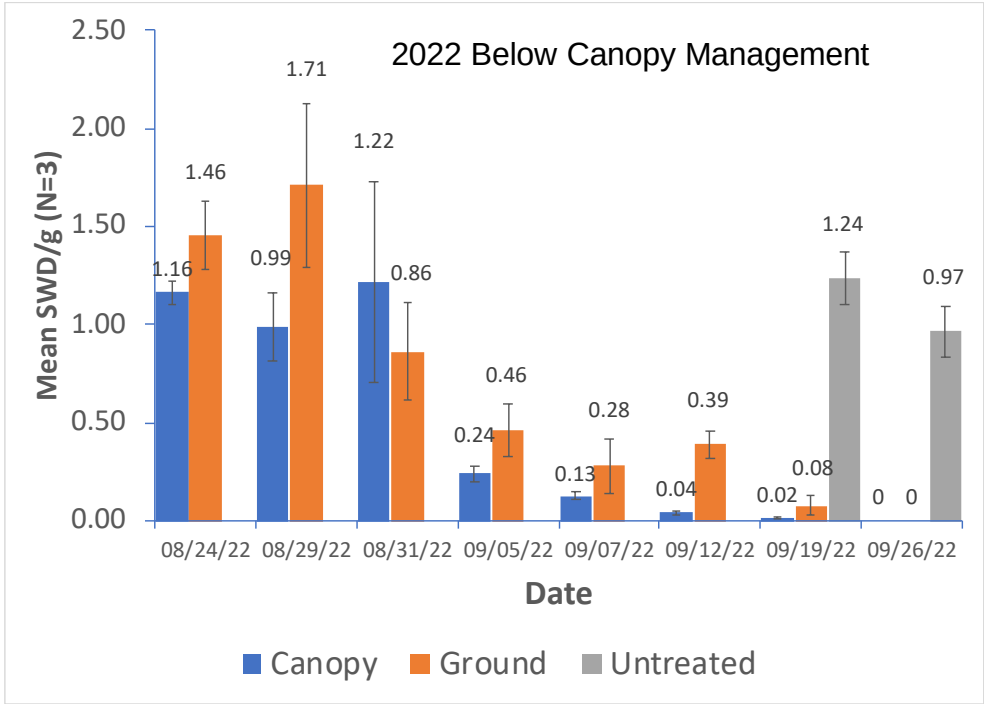
Majority of control efforts for SWD rely on chemical control

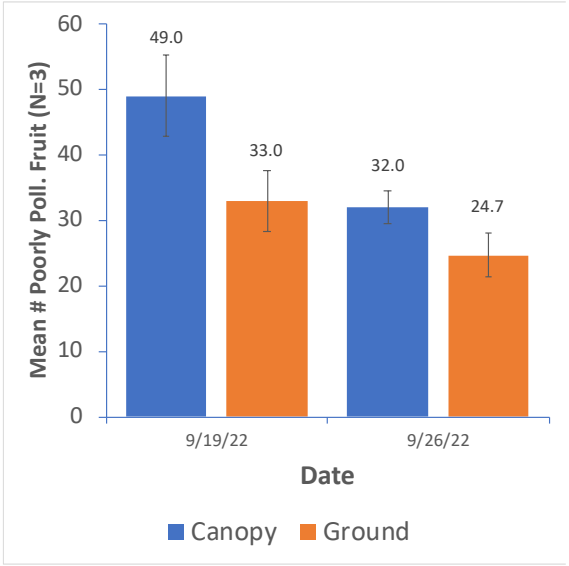
- weekly insecticide applications
- Insecticides can be very effective, but they have disadvantages:
  - non-target effects
  - health risk
  - secondary pests
  - insecticide resistance
  - costly

Insecticides: Below Canopy Sprays



Insecticides: Below Canopy Sprays





Insecticide resistance trial

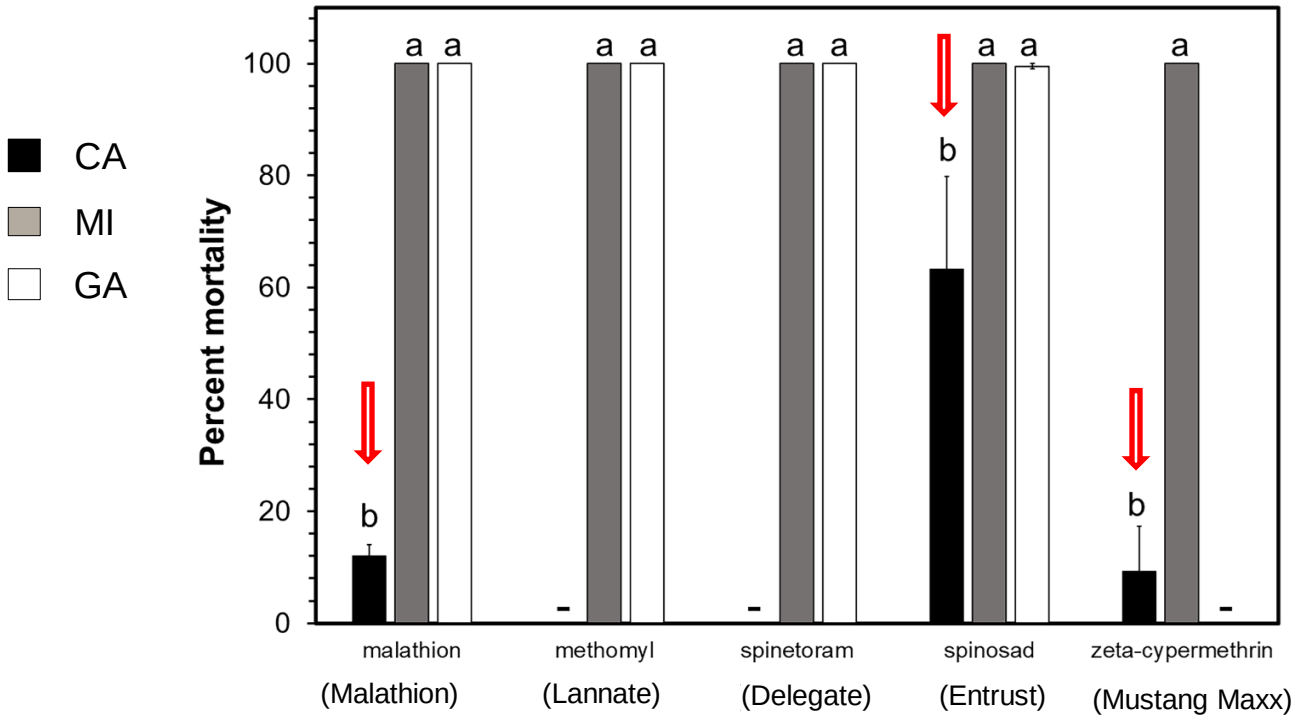
RAPID = Rapid Assessment Protocol for IDentification of resistant SWD populations

Van Timmeren et al. *Pest Manage. Sci.* ***2019***

Dose-Response Panel:

- malathion
- methomyl
- spinetoram
- spinosad
- zeta-cypermethrin
- bifenthrin
- fenpropathrin
- acetamiprid
- cyantraniliprole

Resistance high in California, but low in Michigan and Georgia



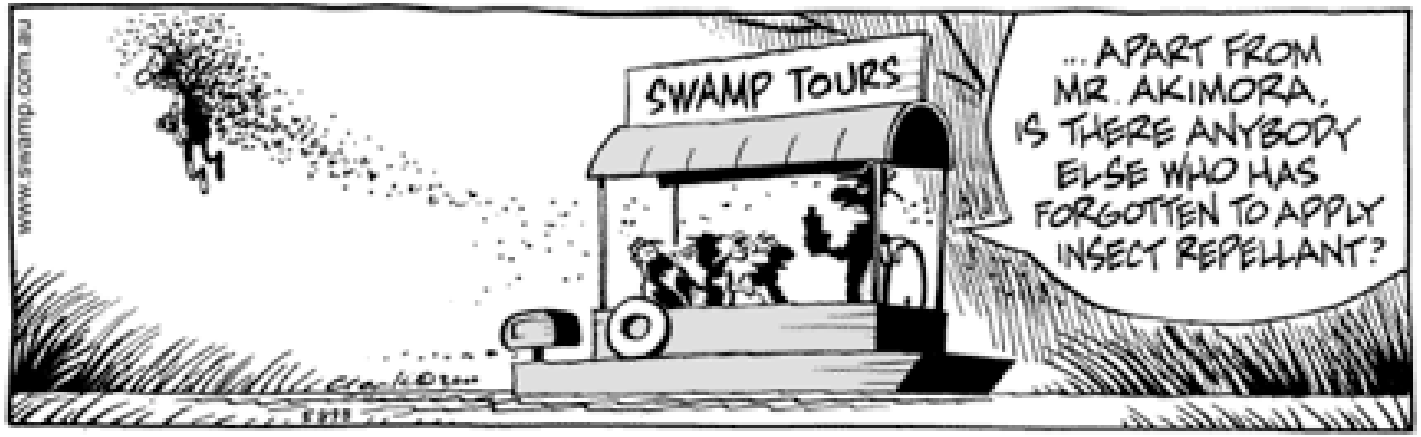
NY similar to MI in limited testing

Journal of Economic Entomology, Isaacs et al. 2022

How can we manage Insecticide Resistance?

- Maximize number of effective active ingredients used in rotation programs
- Avoid treating non crop areas
- Participate in resistance monitoring efforts
- Report concerns about control failures

Behavsioral Control
Focus on Repellents

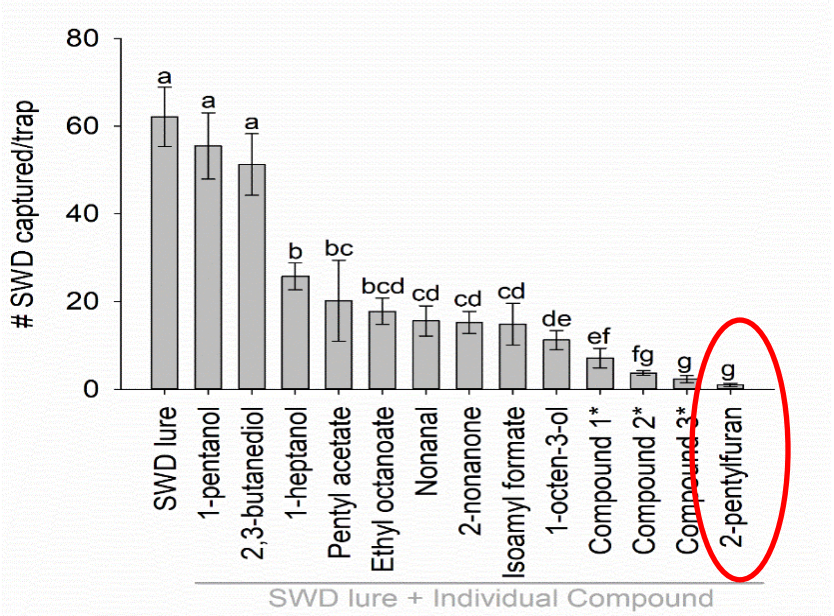


Repellents defined as any substance that elicits an avoidance reaction in an organism

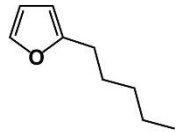
-Detheir 1947

Behavioral manipulation using repellent

Discovery of 2-Pentylfuran



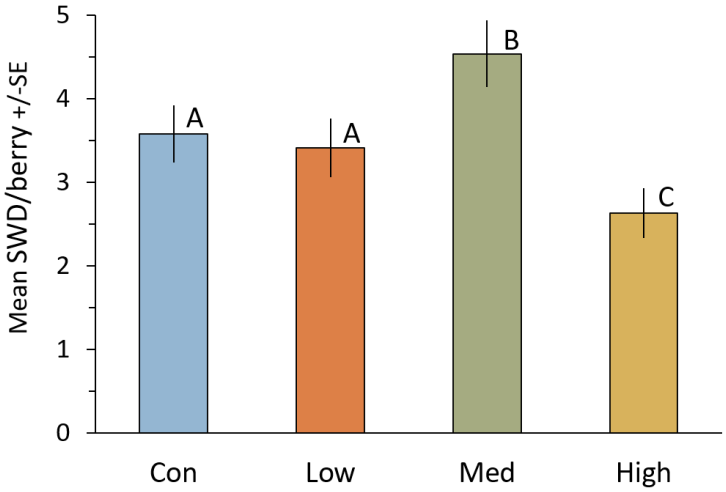
2-Pentylfuran



Pest Manag Sci, 2021: Cha et al.

Field Tested 2-Pentylfuran on a small to medium scale

Pest Manag Sci, 2021: Cha et al.



2pf treatment

Puffer to deploy 2PF repellent in the field

Features of Puffer

- Automated dispenser
- Release 8 mg per puff (puff every 1 min.)
- Time set up: 6 am to 10 pm (16 hours/ day)

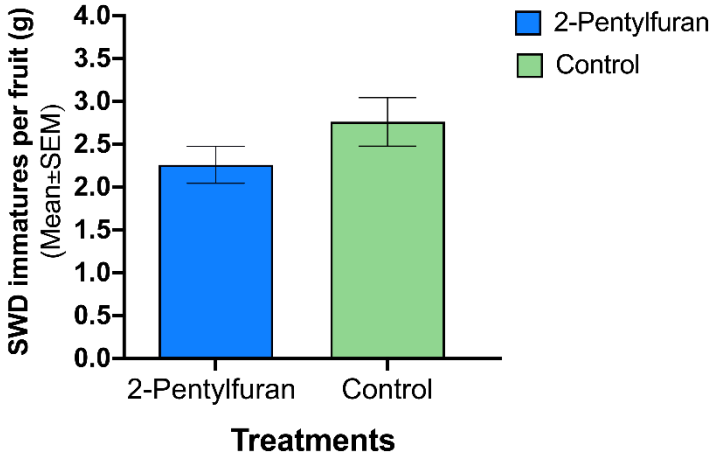
SCENTRY BIOLOGICALS INC.

Fall bearing raspberries (Primocanes)

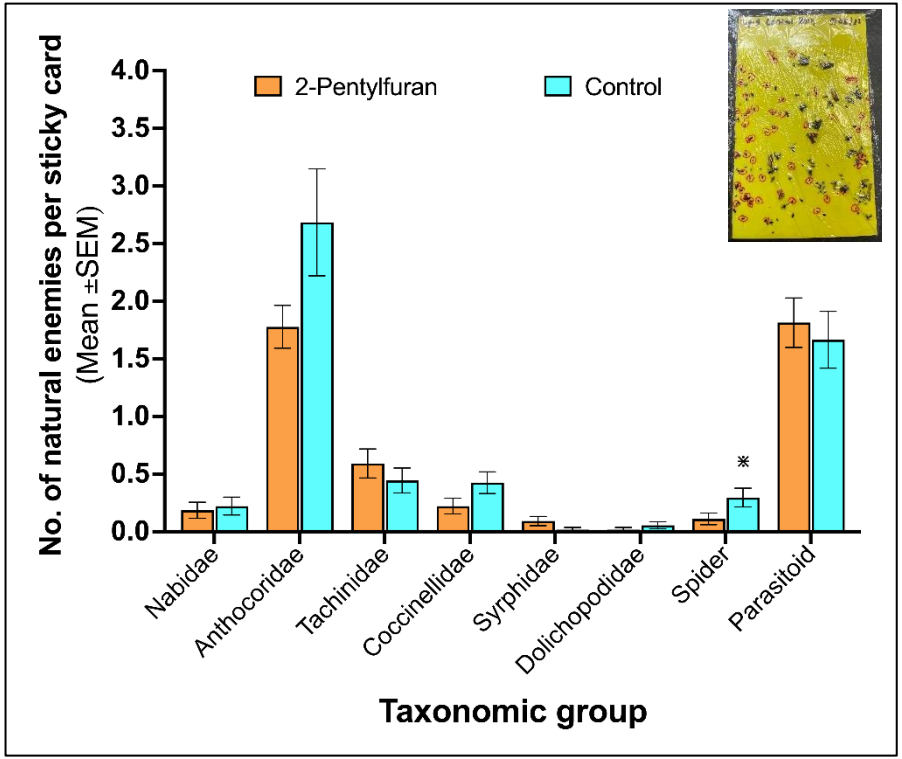
High SWD pressure
(August-September)

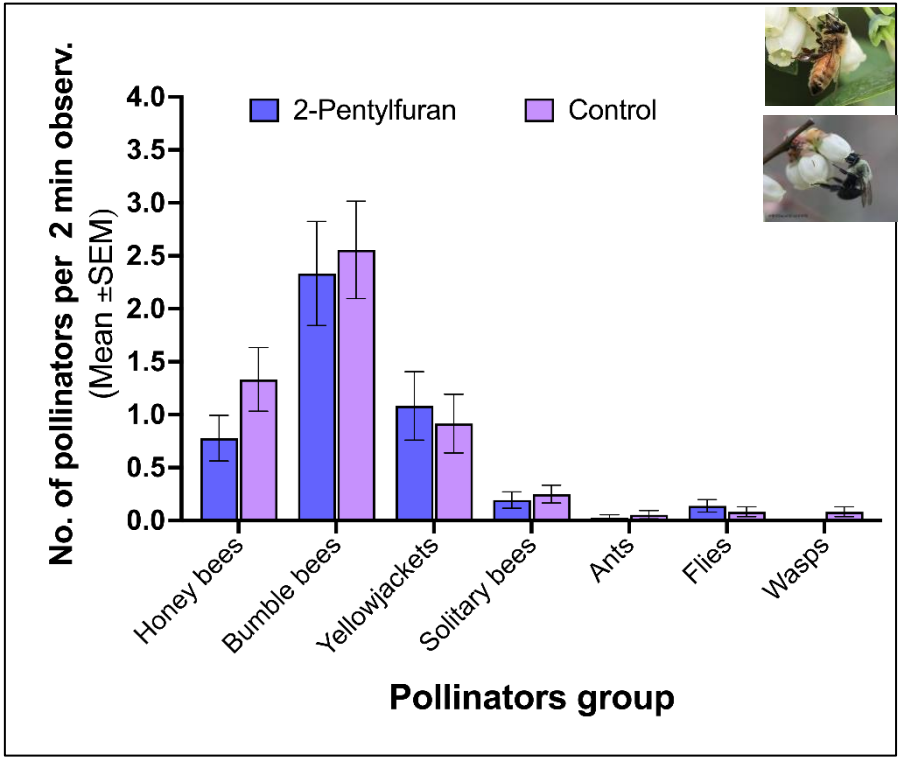
16 hours/d at 1 puff/ min
(8mg/puff)

Fruit infestation

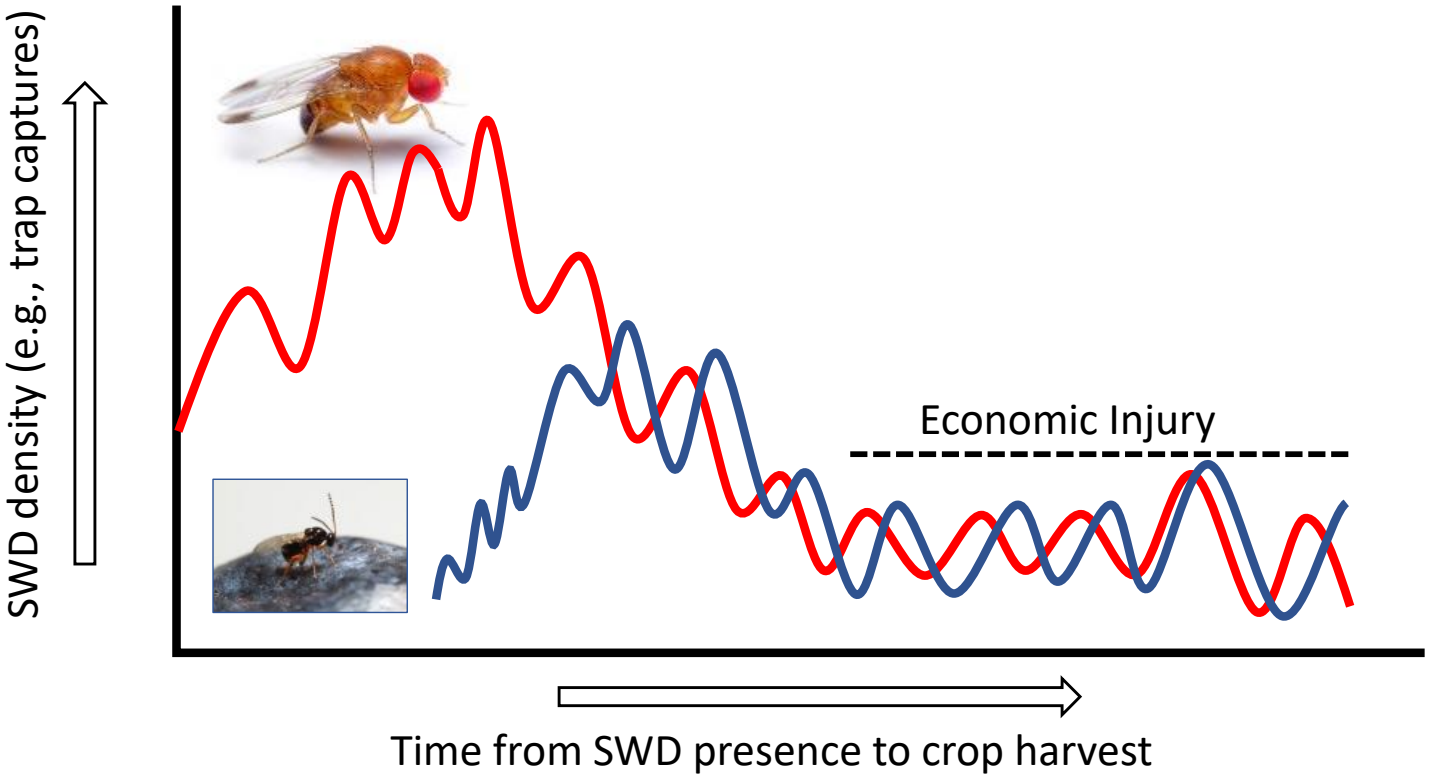


Are there any effects on natural enemy and pollinator activity?





Classical BioControl – Introduction of Exotic Natural Enemy



Importation Bio-Control

Larval parasitoids

G1 - *Ganaspis brasiliensis* (Figitidae)

- 3 different species tested
- This species selected for safety and efficacy

Federal approval to release in US

Leptopilina japonica (Figitidae)

Not approved for release because it has a slightly wider host range

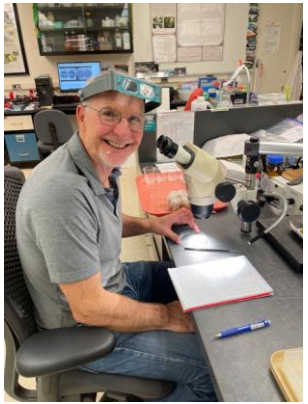
- Accidently made it to many areas in the Northeast and down to at least NC
- Found in several sites before releasing *Ganaspis*

New USDA CPPM Grant Award

Classical Biological Control For Spotted-Wing Drosophila In The Northeastern United States

Phil Fanning, U. Maine

Cesar Rodriguez-Saona,Rutgers



Greg Loeb, Cornell

Ganaspis releases in NY - 2022

- Released in **wild habitat**
- At four sites: 600 parasitoids released

Surveys of parasitoids establishment

✓ sampling of fruits from wild hosts

✓ sentinel traps baited with infested fruit

Future directions

- Improve monitoring methods to develop economic-based tools for SWD control
- Continue assessing benefits and potential of below canopy insecticide applications
- Optimize the deployment method of 2PF in combination with other control measures
- Evaluation and optimization of *G. brasiliensis* releases and establishment

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SCENTRY BIOLOGICALS INC.

Sustainable SWD Management
Project # 2020-51181-32140

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Thank you!
Questions??