

Modifying spray programs for pollinator protection: Results and grower success from NY apple orchards

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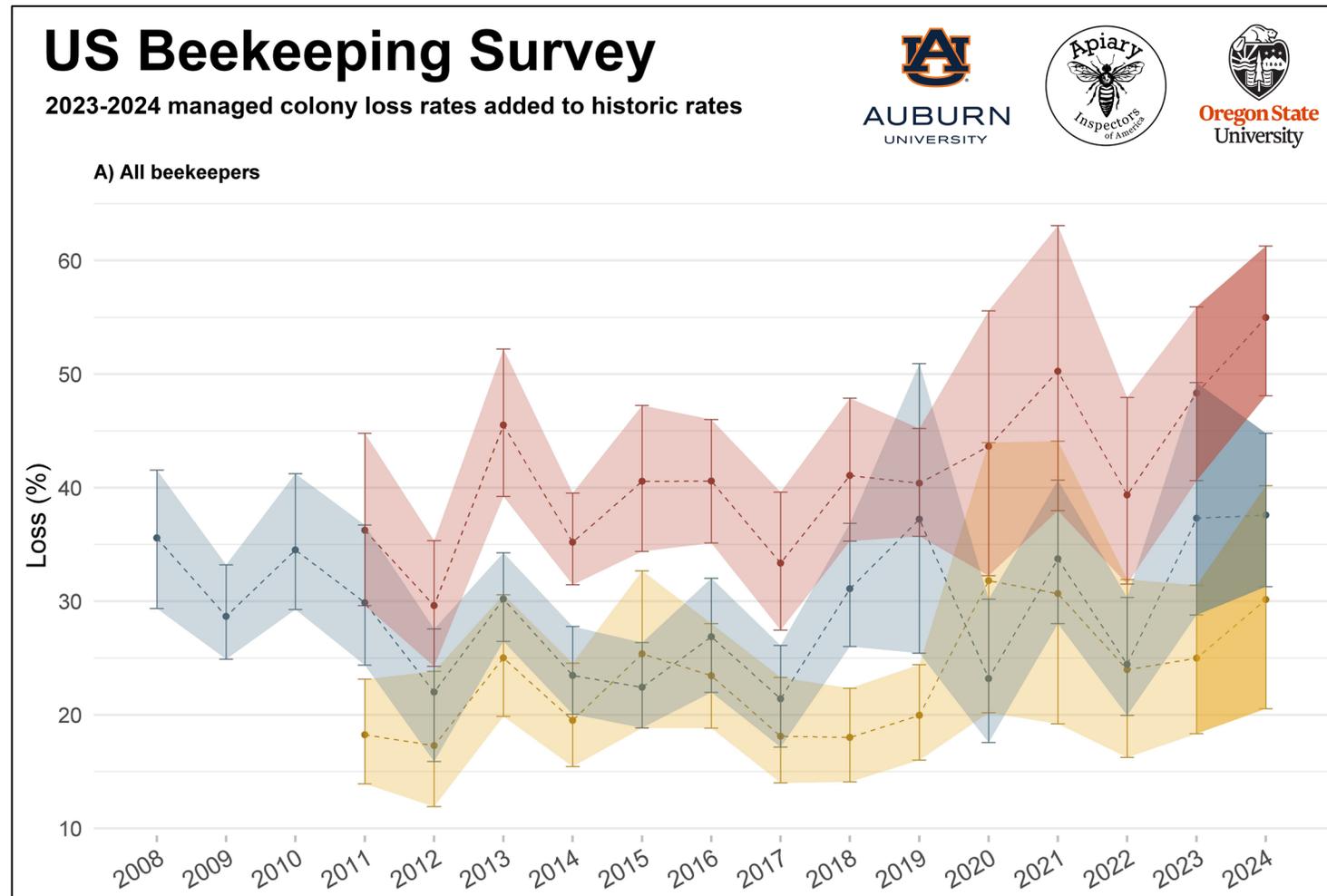
Cornell CALS
College of Agriculture and Life Sciences



Outline

- 1) What we know about pesticide risk during apple pollination
- 2) A reduced risk pollinator program
- 3) Some exciting insights (data!)

30-55% of USA honey bee colonies have died each year since at least 2011



Giacabino et al. 2024

<https://apiaryinspectors.org/US-beekeeping-survey>

Bee Diversity in Northeast Apple Orchards

- Up to 120 species of bees have been found in apple orchards in the Northeast
- The majority of species are solitary and communal nesters
- The majority of the bee species (~95%) that forage on apple are ground nesting



The Empire State
Native Pollinator Survey

2017 - 2021



“Using conservative criteria, 38% of New York’s native pollinators are at risk of extirpation from NY.”

<https://www.nynhp.org/projects/pollinators/>



\$321,839,333



\$125,701,333



\$40,683,333



\$27,615,667



\$3,667,000

Pollinators contribute ~\$400M in services annually in New York (Grout et al. 2020)

Values from: Grout et al. 2020



\$5,156,667



\$10,625,667



\$6,698,333



\$12,184,000

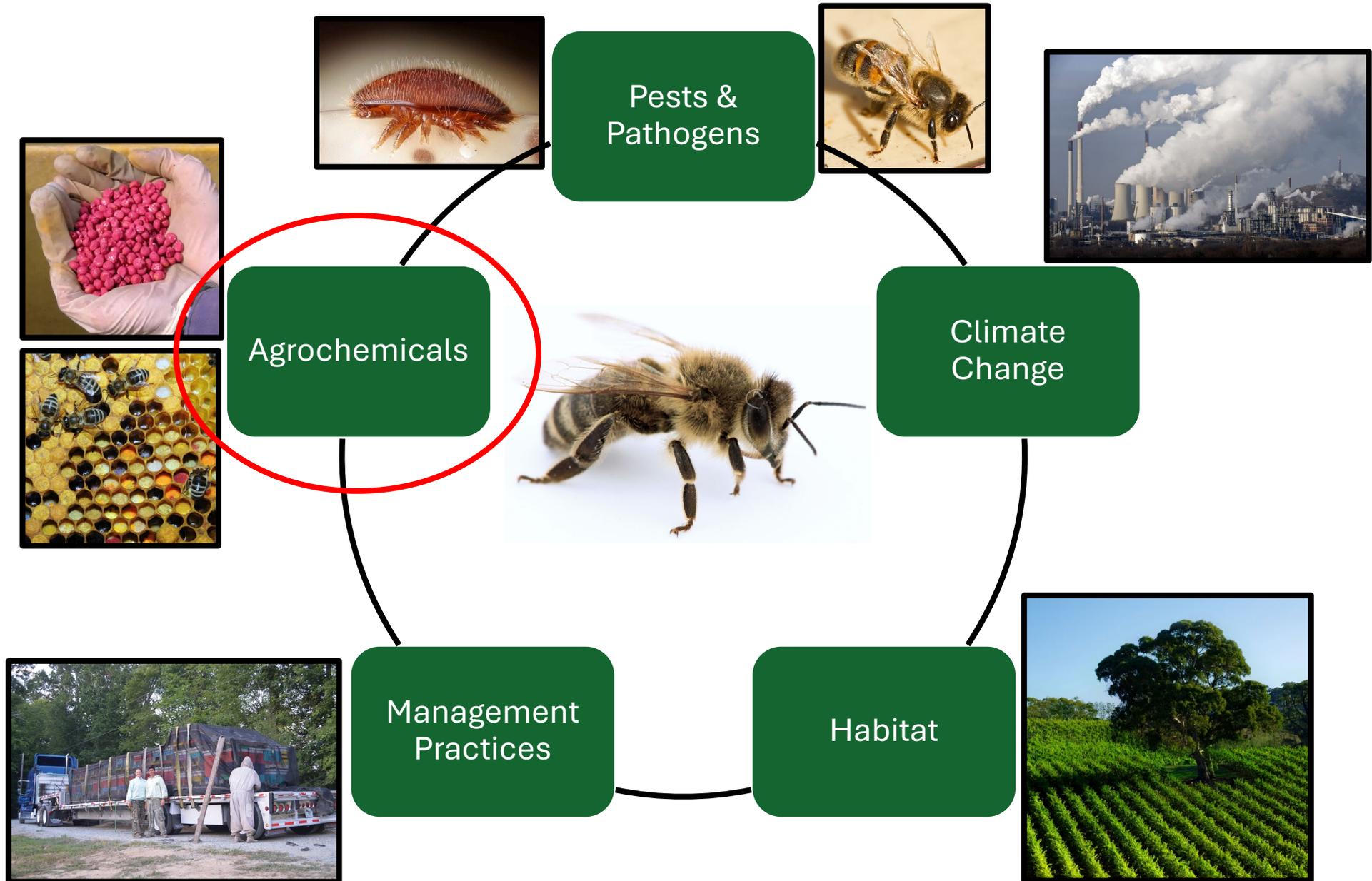


\$9,496,000



\$4,427,000

Today's talk: pesticides



Pests & Pathogens



Agrochemicals



Climate Change

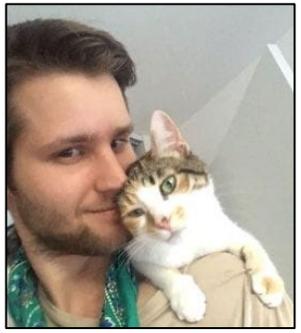


Management Practices

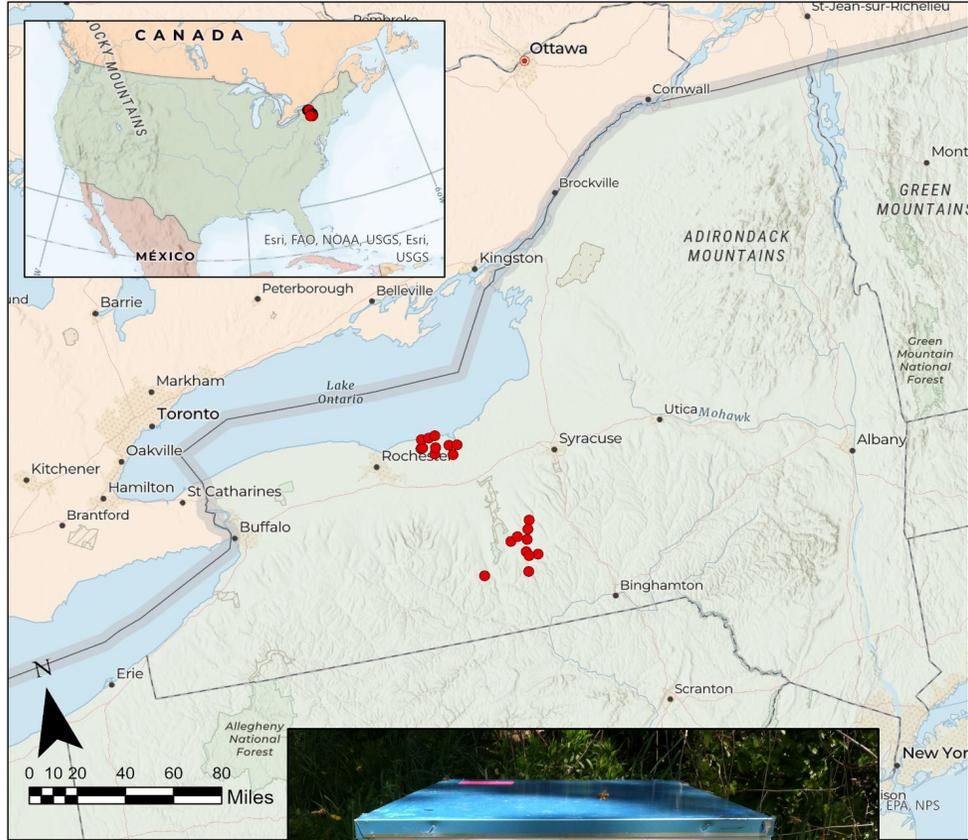
Habitat



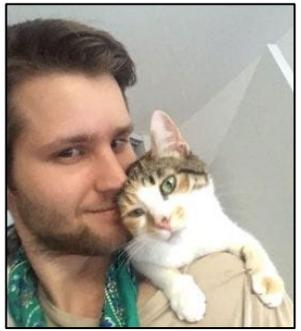
NY apple: 20 orchards, collected 6 types of bees



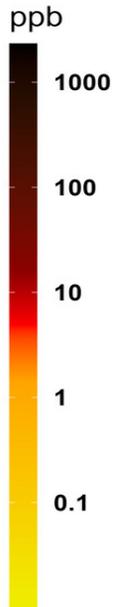
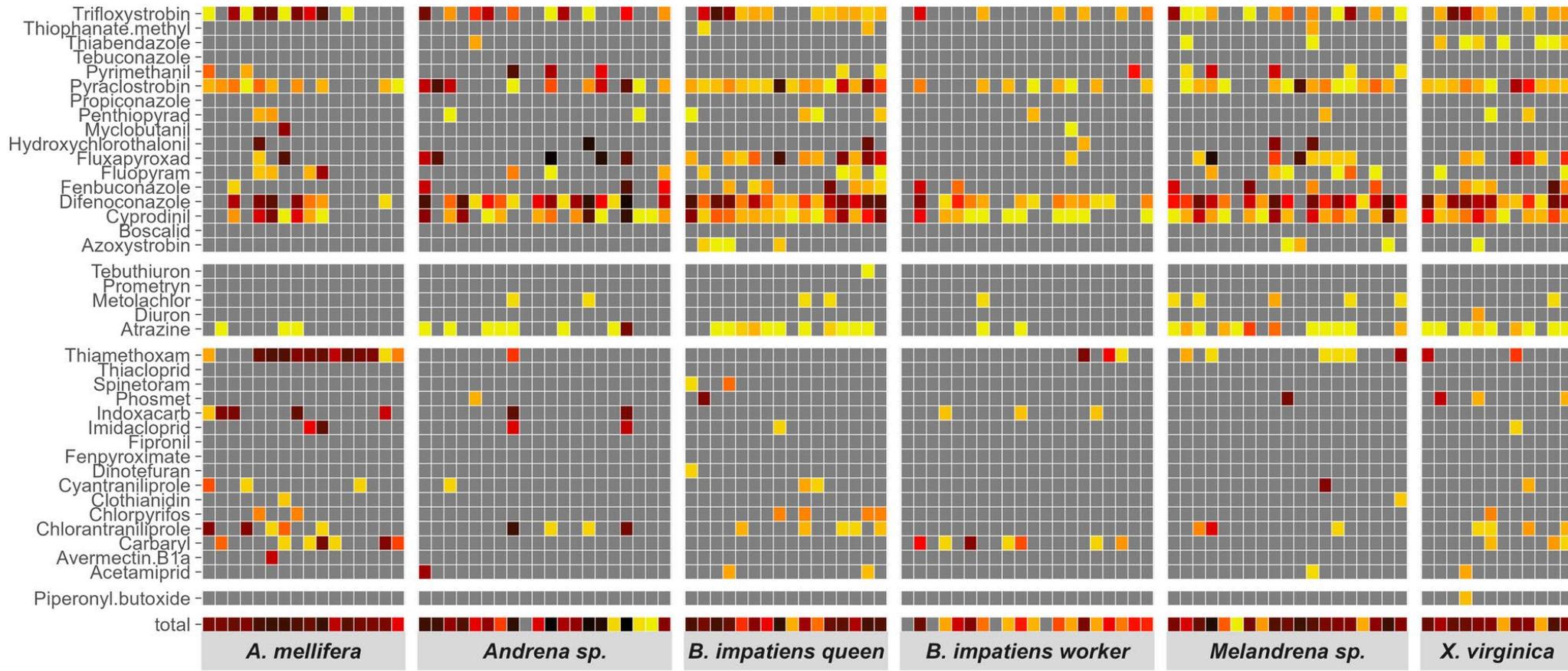
Tobias Mueller



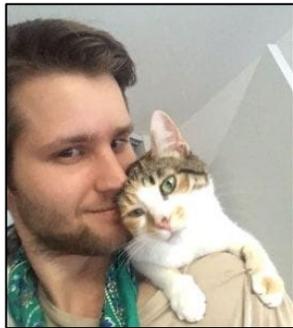
Pesticides in bees during NY apple pollination



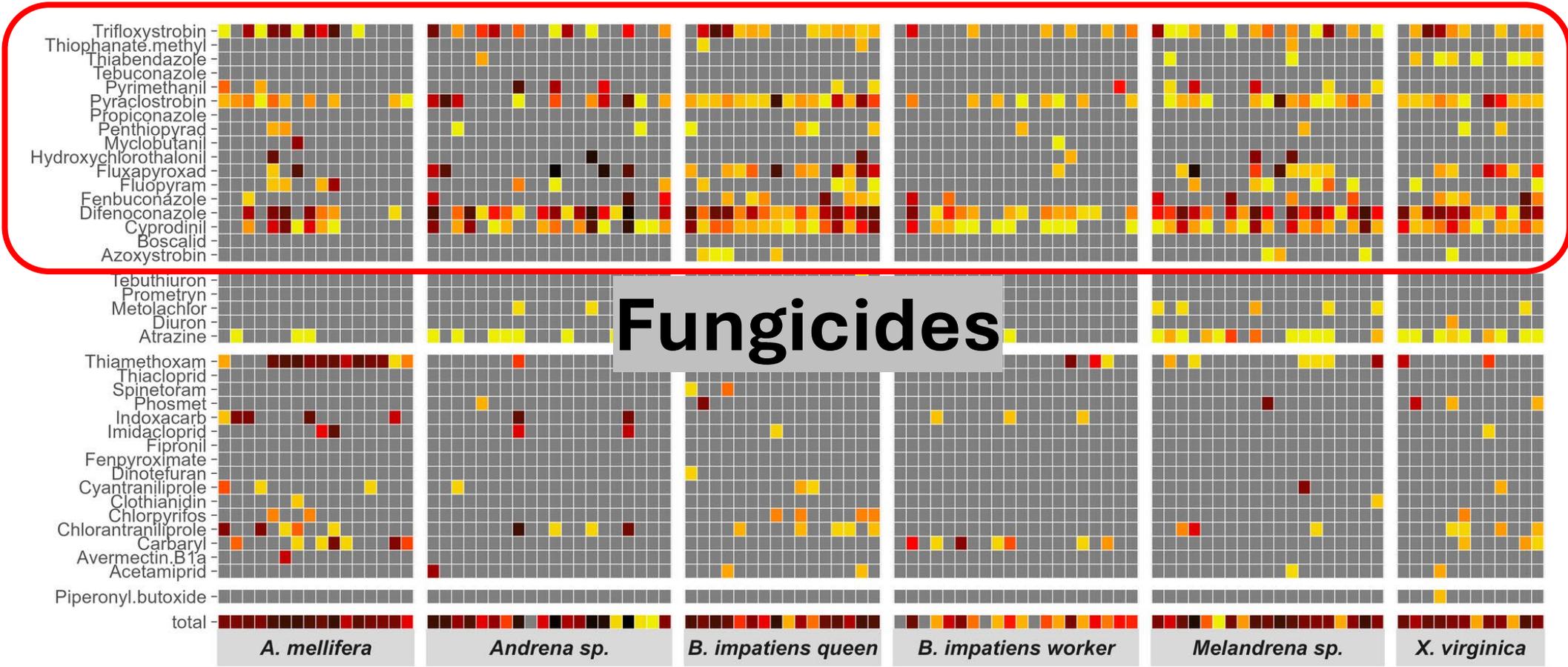
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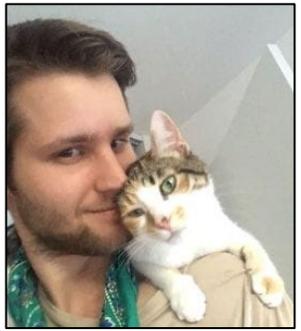
Fungicides in bees during NY apple pollination



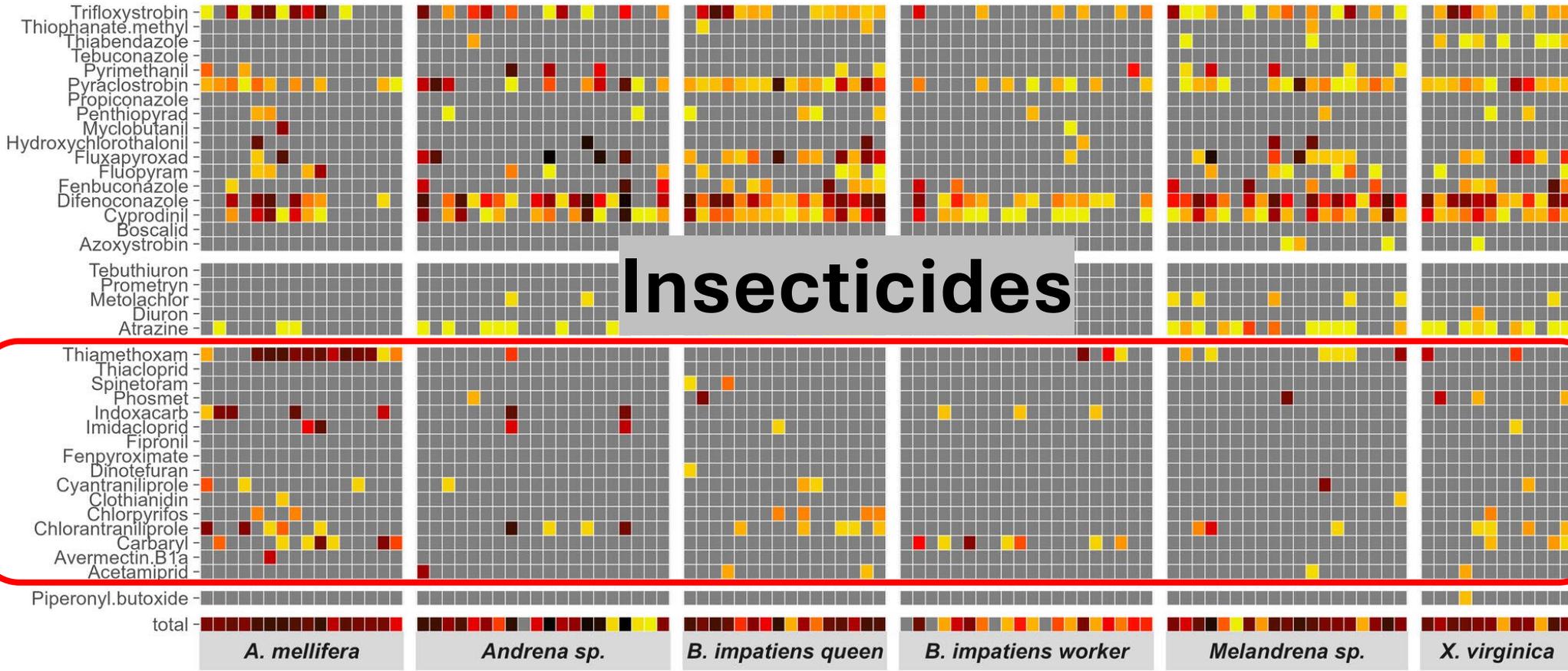
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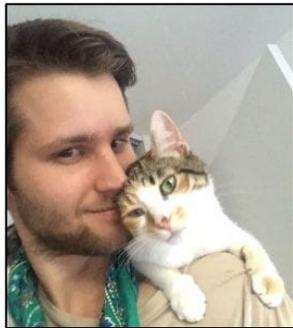
Insecticides in bees during NY apple pollination



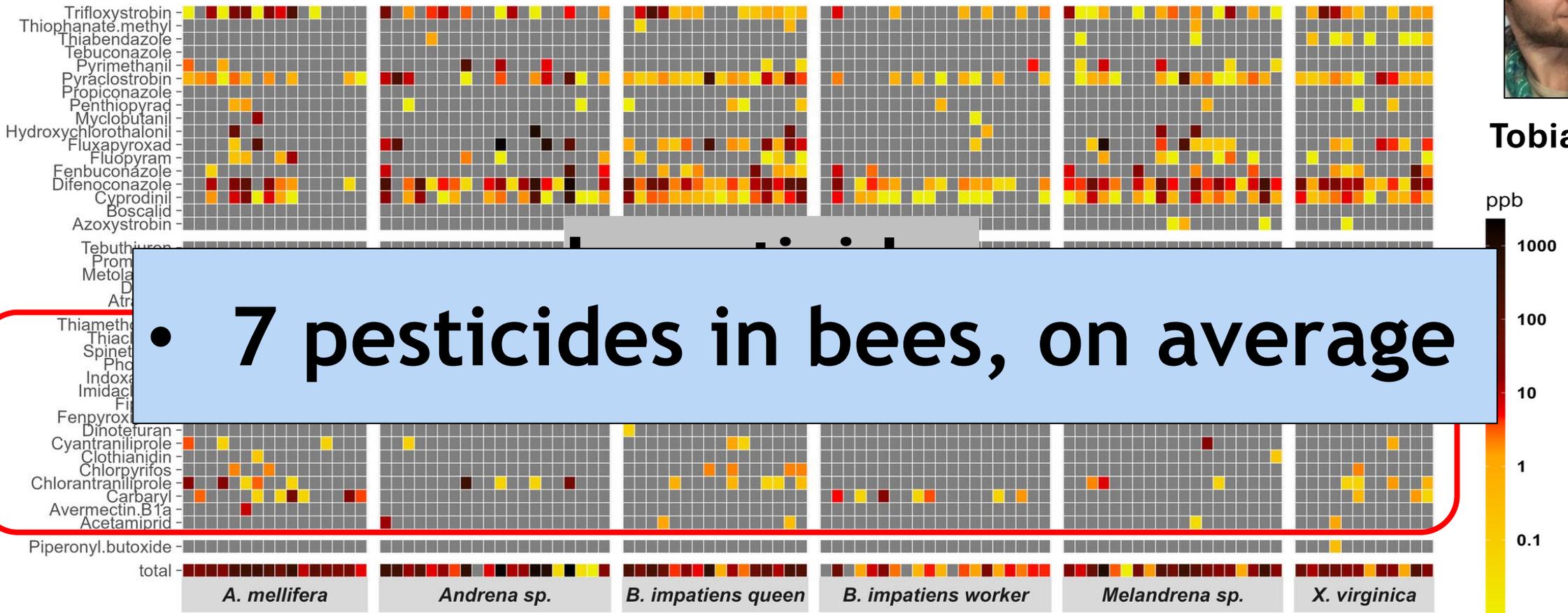
Tobias Mueller



Insecticides in bees during NY apple pollination



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• 7 pesticides in bees, on average





Mott's Pollinator Program Approach

Program objectives: Grower responsibilities

- 1) Selecting pesticide options **between first pink and one week after petal fall** with reduced toxicity to pollinators
- 2) Completing two scouting events to support pest management activities between pink and first cover
- 3) Providing justification/support through scouting records where high-risk pesticides are used
- 4) Avoiding pesticide synergies, including at first cover

Pyrethroids

2025 (Pink to first cover)

- Zero pre-bloom or petal fall applications
- Two first cover applications
- All growers avoided pyrethroid/sterol inhibitor fungicide tank mixes → synergies

Program impacts

- **77.8% decrease in use over last 3 years (2023 – 2025)**

Avermectin

Petal Fall Avermectin

- 13 applications (2021, 2022)
→ NONE in 2025
- **85% reduction in petal fall applications**
 - **Shifted to first cover**

First Cover Avermectin

- 2 applications (2021, 2022) →
8 applications (2023-2025)
- Participants successfully shifted avermectin applications away from petal fall and into first cover
- Avoided tank mix synergies

Neonicotinoids

2025

- **80% reduction in petal fall neonic from 2023-2025 → replaced with Indoxacarb**

Petal Fall Avaunt

- Growers have successfully adopted the use of petal fall Avaunt applications as a replacement for pyrethroids and neonicotinoids
- Average of 6 Avaunt applications per year across all three program years

Avoiding synergies

- Avermectin (Agri-Mek, Reaper) + **difenoconazole (Inspire SUPER)**
- Imidacloprid (Admire Pro, Alias) + **difenoconazole (Inspire SUPER)**
- Thiamethoxam (Actara) + **difenoconazole (Inspire SUPER)**
- Acetamiprid (Assail) + **Fenbuconazole (Indar)**



So we did some science...

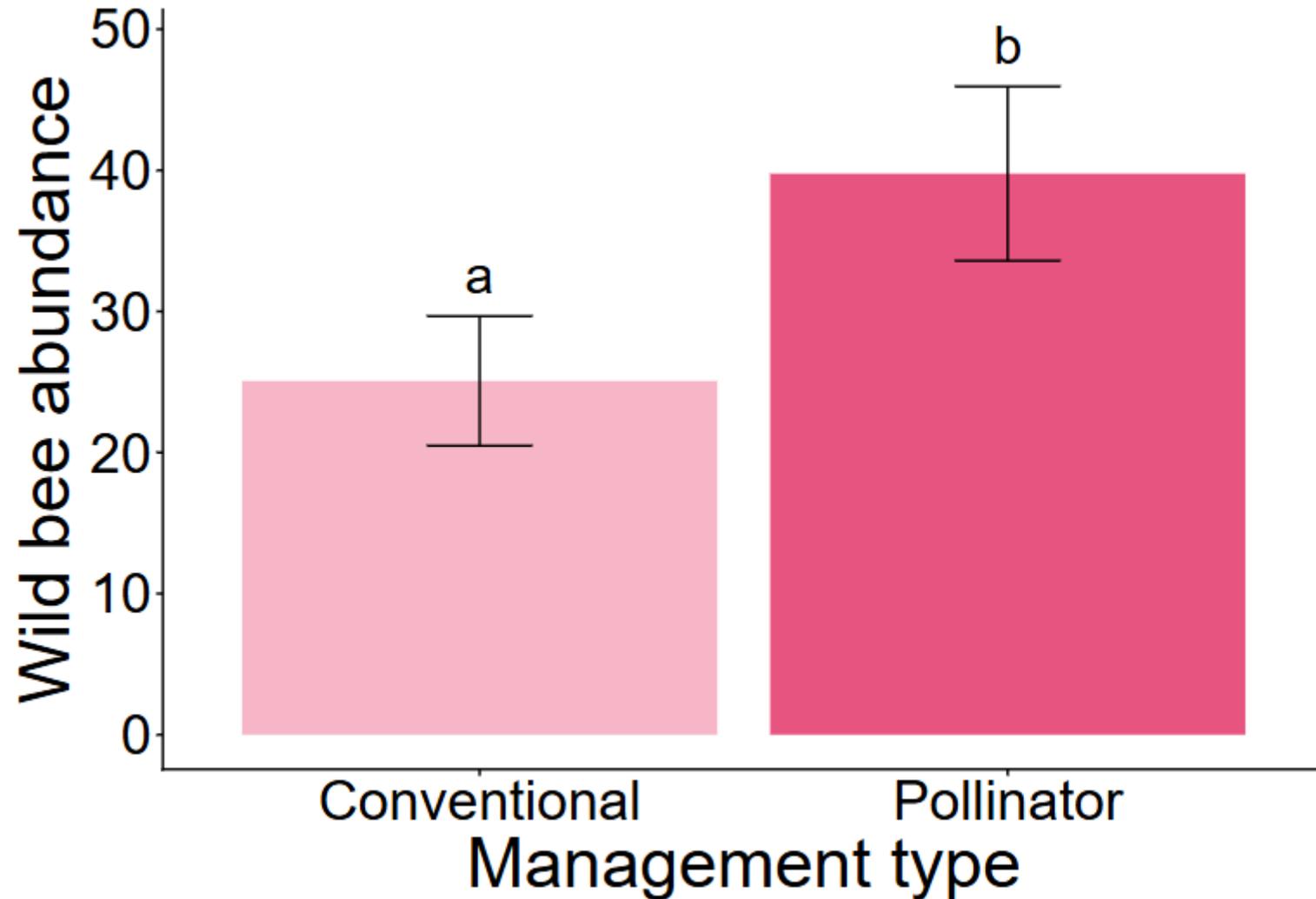
- 3rd year of project, 1st year of data
- How do these changes in management practice affect wild pollinator populations?
- How effective are these changes in maintaining pest management expectations?
- What does this all mean for YOU (the growers!)
 - Pollination → Fruit quality → Economics

So we did some science...

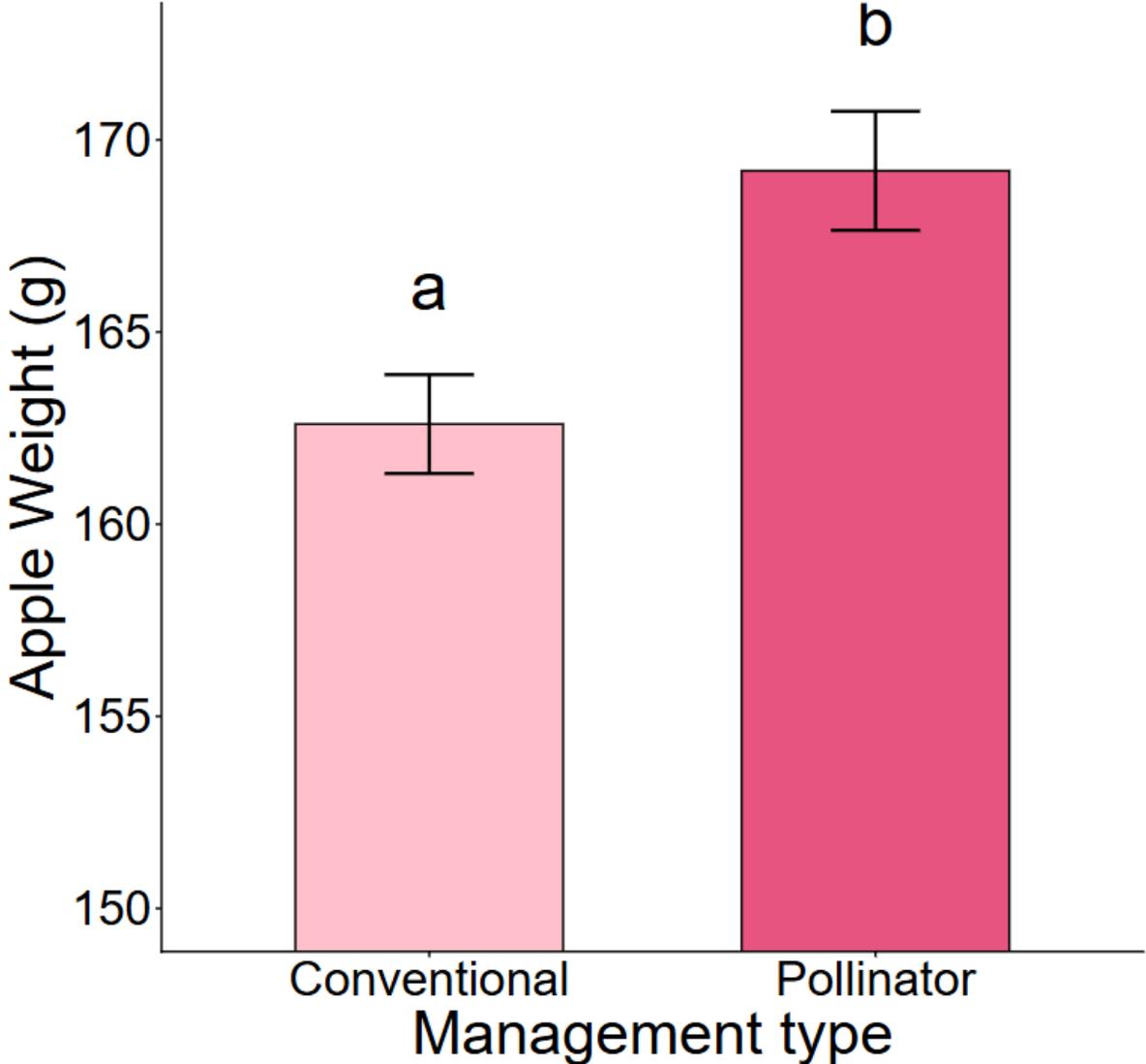
- Controlled set up
 - 15 enrolled blocks paired with 15 “conventional” blocks
- Pollinator surveys during bloom
- Pest and pathogen scouting post-PF, mid summer, and pre-harvest
- Fruit quality assessments
- To come: economic analysis, multi-year dataset



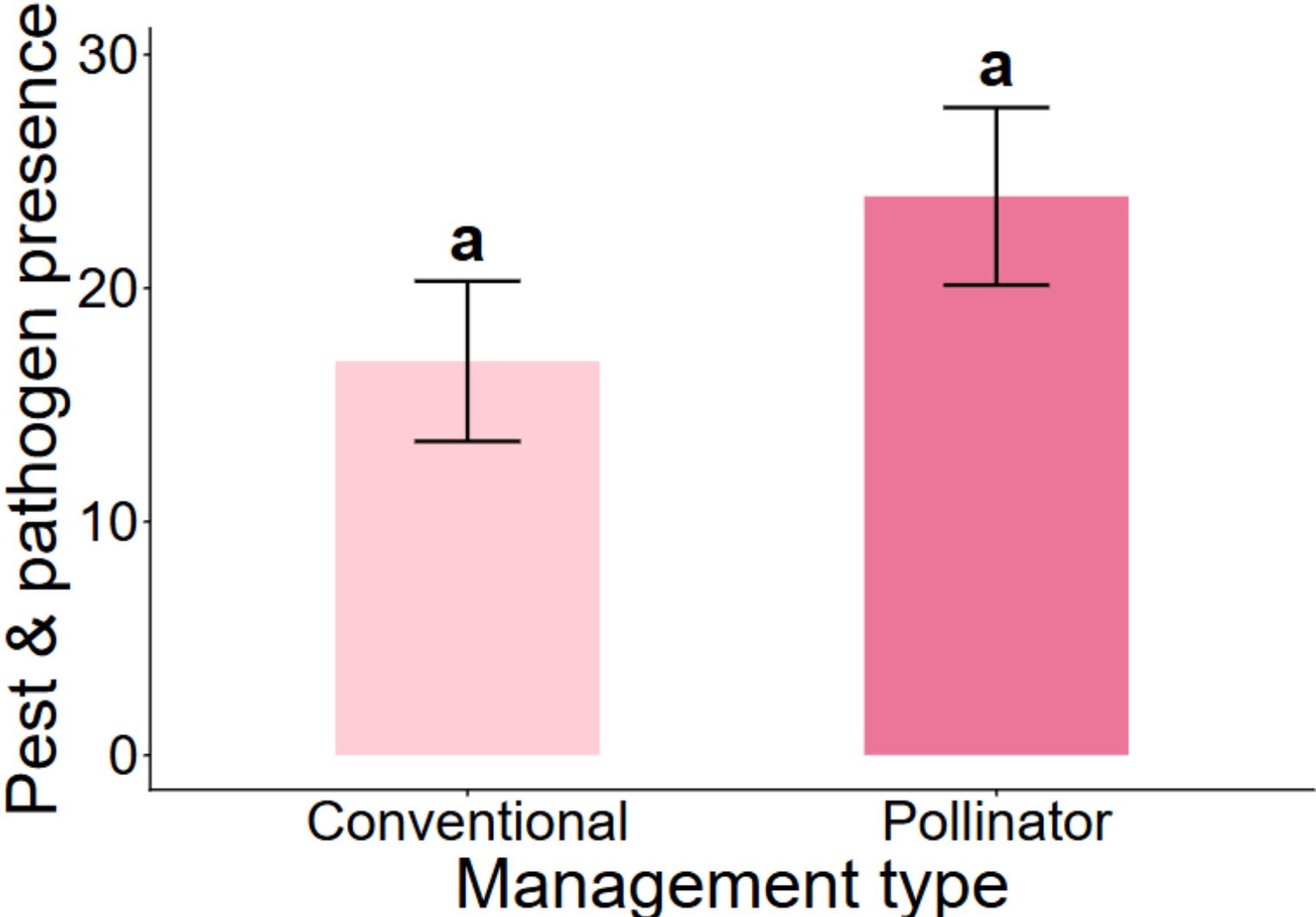
36% more wild bees on average



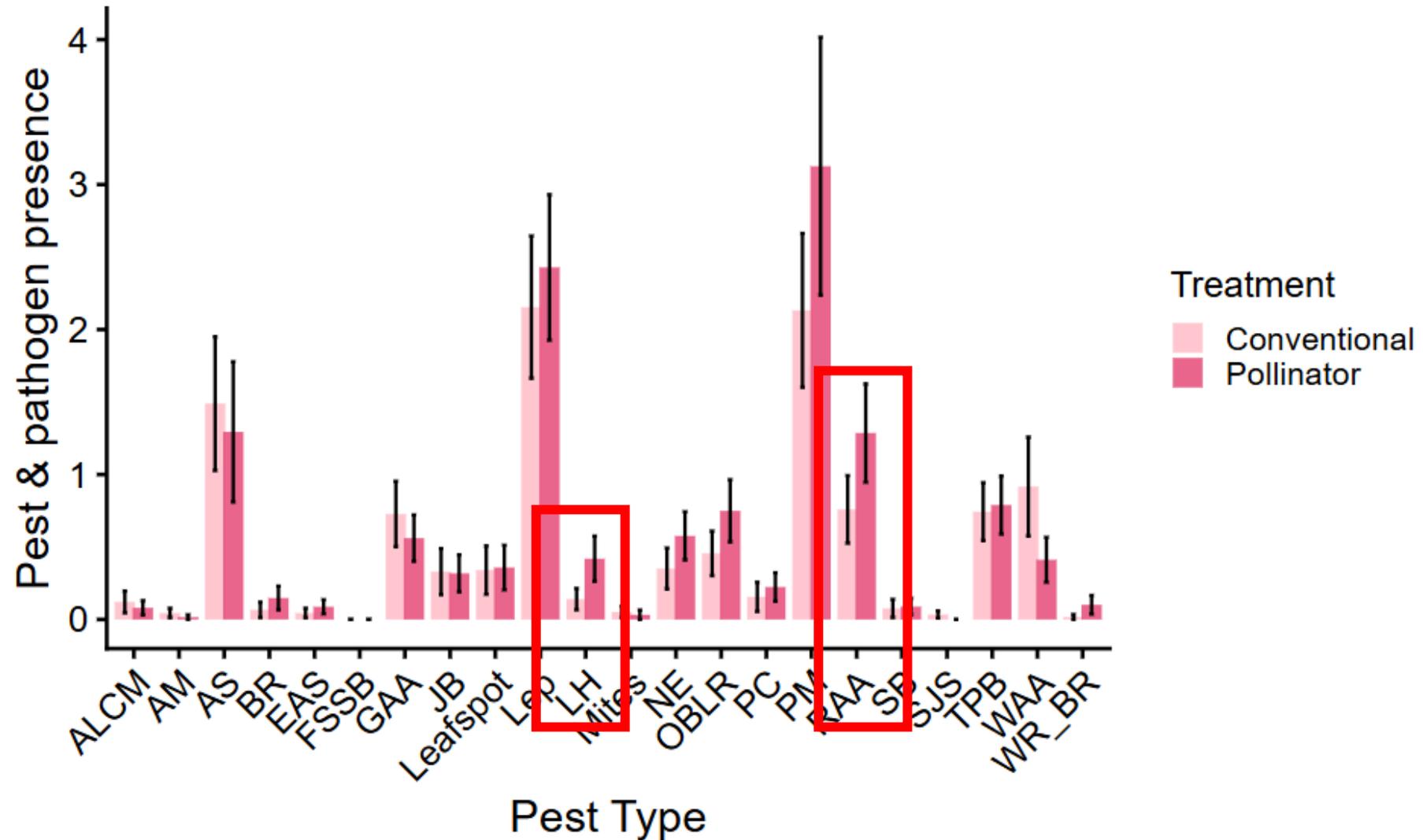
Apples, on average, 4% larger



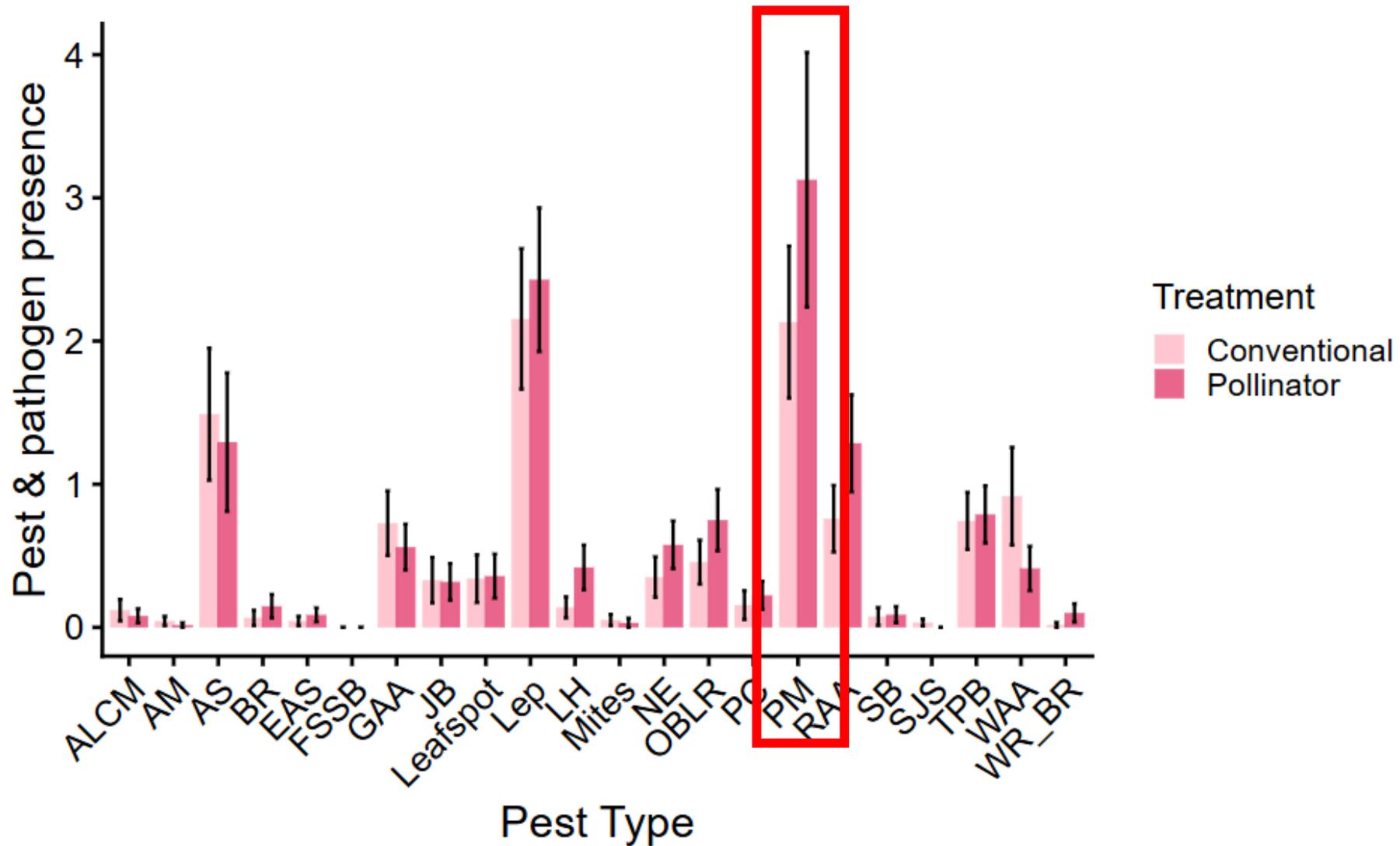
And very similar rates of pest damage



Keep an eye on pest trends in future years



Fungal related issues could be interesting...



Conclusion

- Promising so far! (Caveat, only 1 year of data)
- Really excited that Motts wants to support this, but we are so excited for this that we have applied for larger grants to continue studying these questions
- Results can help growers of all scales, multiple crops, etc.



THANK YOU!

McArt Lab: <https://blogs.cornell.edu/mcartlab/>

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