



Results from Three Years of Studying Chilli Thrips Behavior



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Chilli thrips, *Scirtothrips dorsalis* Hood



- **Taxonomy:** Thysanoptera: Thripidae:
- **Origin:** Southeast Asia/Indian subcontinent
- **Distribution:** Asia, Africa, Caribbean & Americas
- **Host range:** Highly polyphagous (>225 plant spp.)
- **ID:** Bodies are pale yellow, dark-fringed wings

Florida:

- **Severe blueberry losses**

- First documented: 1991,
- Confirmed on **knock-out roses:** 2005
- First recorded in **blueberries:** 2008 (Liburd et al. 2020)





Chilli thrips, Injury





Chilli Thrips

Objectives over the past 3 years

Objective 1

- Evaluate monitoring approaches for chilli thrips detection in SHB

Objective 2.

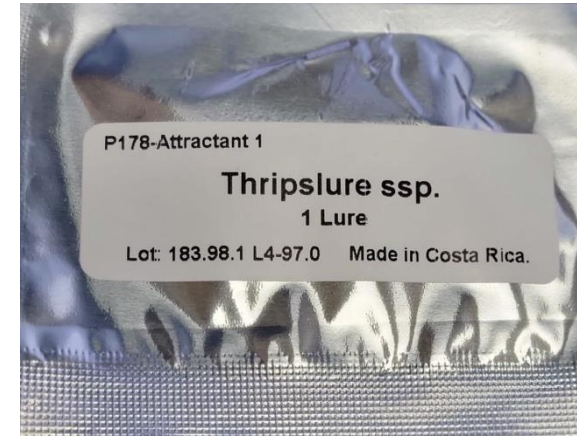
- Assess the performance of reduced-risk insecticides against chilli thrips

Objective 3.

- Determine cultivar susceptibility and plant traits associated with resistance



Objective: Determine the most effective visual and olfactory cue for monitoring chilli thrips in SHB (*field*)



Rationale:

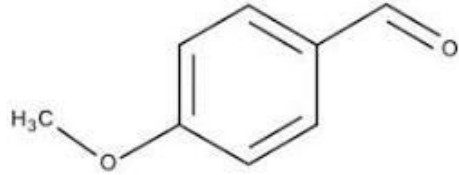
- Chilli thrips use visual cues to locate host plants
- Colored sticky traps are used for monitoring
- Lures may increase trap attractiveness, and early detection

Q: Which **trap** and **lure** combination maximizes chilli thrips captures in SHB?



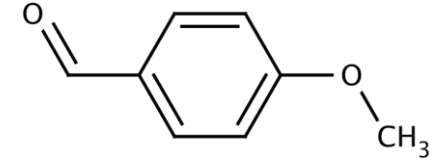
Alpha Scents lure

- 4-Methoxybenzaldehyde (**100%**)
... other chemical compounds



AgBio thrips-lure (P178)

- 4-Methoxybenzaldehyde (**508g ai/kg**)
... other chemical compounds



- **Plant volatile-based** lures previously shown to improve trap catches of thrips
- They were evaluated for their potential to improve monitoring of *S. dorsalis*

Research design

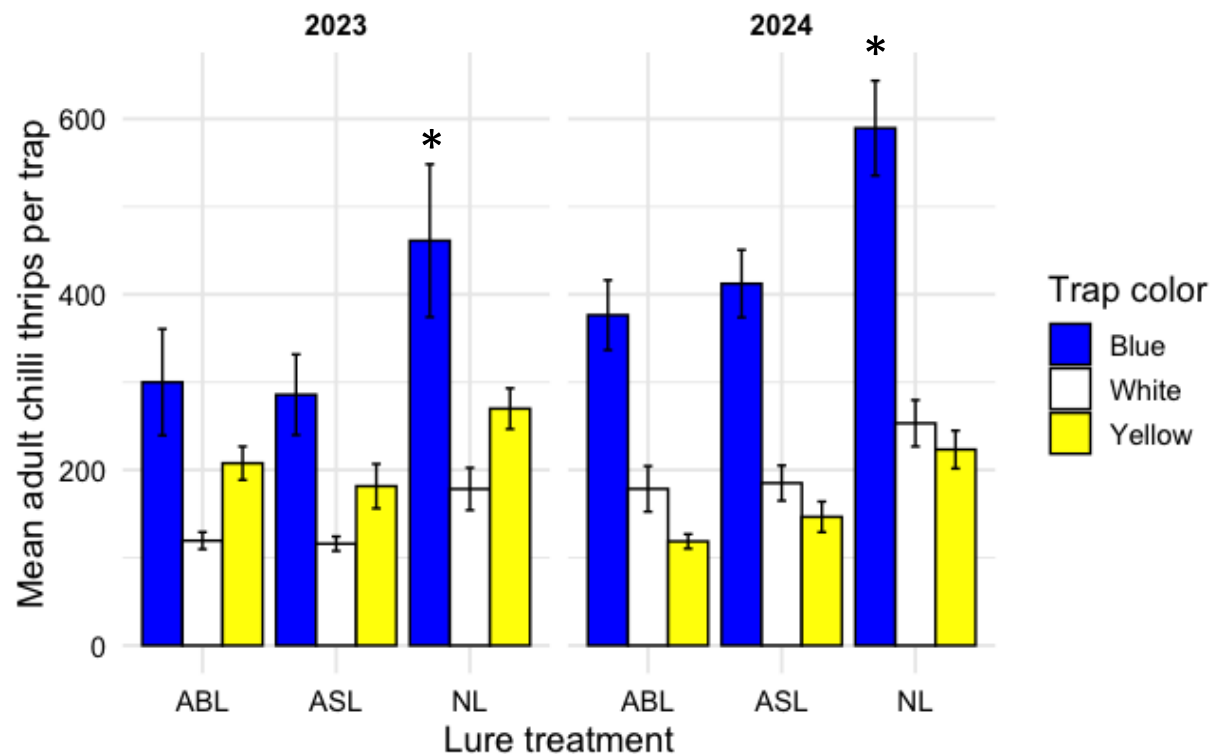
- Location: SHB Field **Central, FL**
- Blueberry plants aged **3- 5 years**
- Plot: 5 bushes, Buffer: 5 bushes
- Hung **within the canopy (0 – 20 cm)** & collected after 7 days
- **Each colored sticky trap** was deployed weekly – per plot
- **RCBD** (9 trts; 4 reps) Two-way factorial
- Traps replaced and re-randomized weekly within the block – for 8 weeks
- **Commercial lures** were replaced every **3 weeks**
- Total # thrips (adults and larvae)/traps were counted – 40X dissecting microscope
- Linear mixed models - repeated measures ANOVA; Tukey's HSD; $\alpha=0.05$

	Treatments
	Yellow + NL
	Yellow + Ag.Bio
	Yellow + Alpha Scents
	White + NL
	White+ Ag.Bio
	White + Alpha Scents
	Blue + NL
	Blue + Ag.Bio
	Blue + Alpha Scents

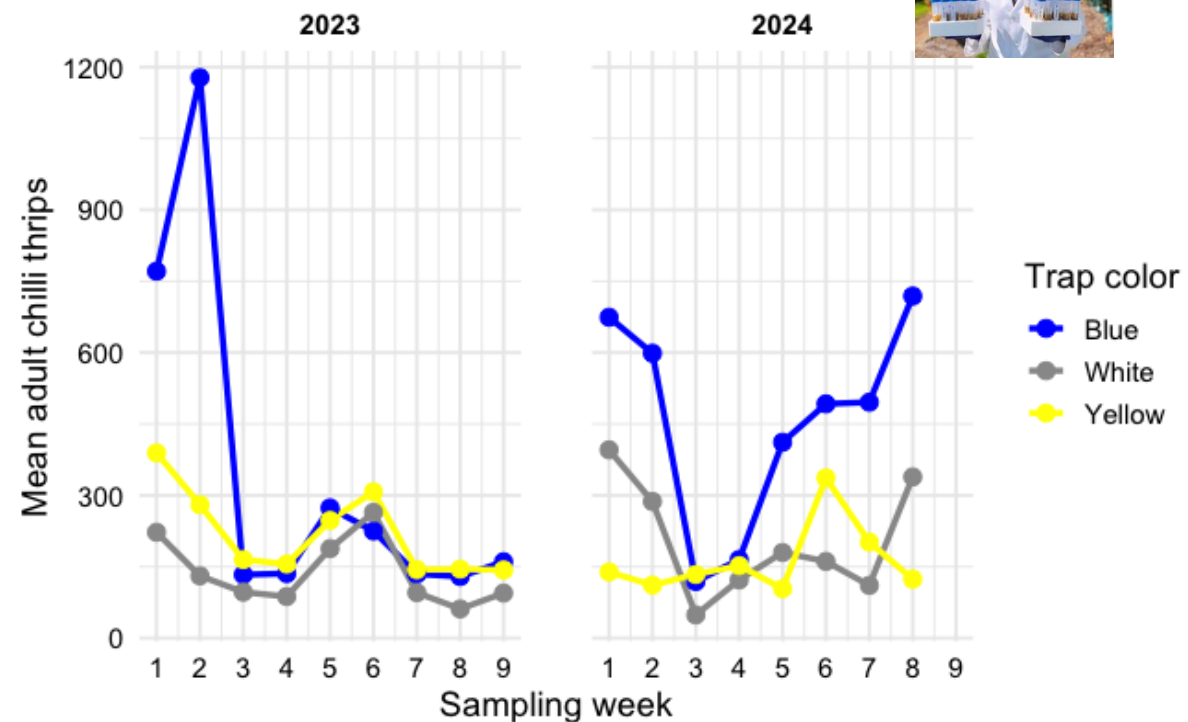


Cultivar: 'Avanti'

Performance of Various Traps and Lures in 2023 & 2024



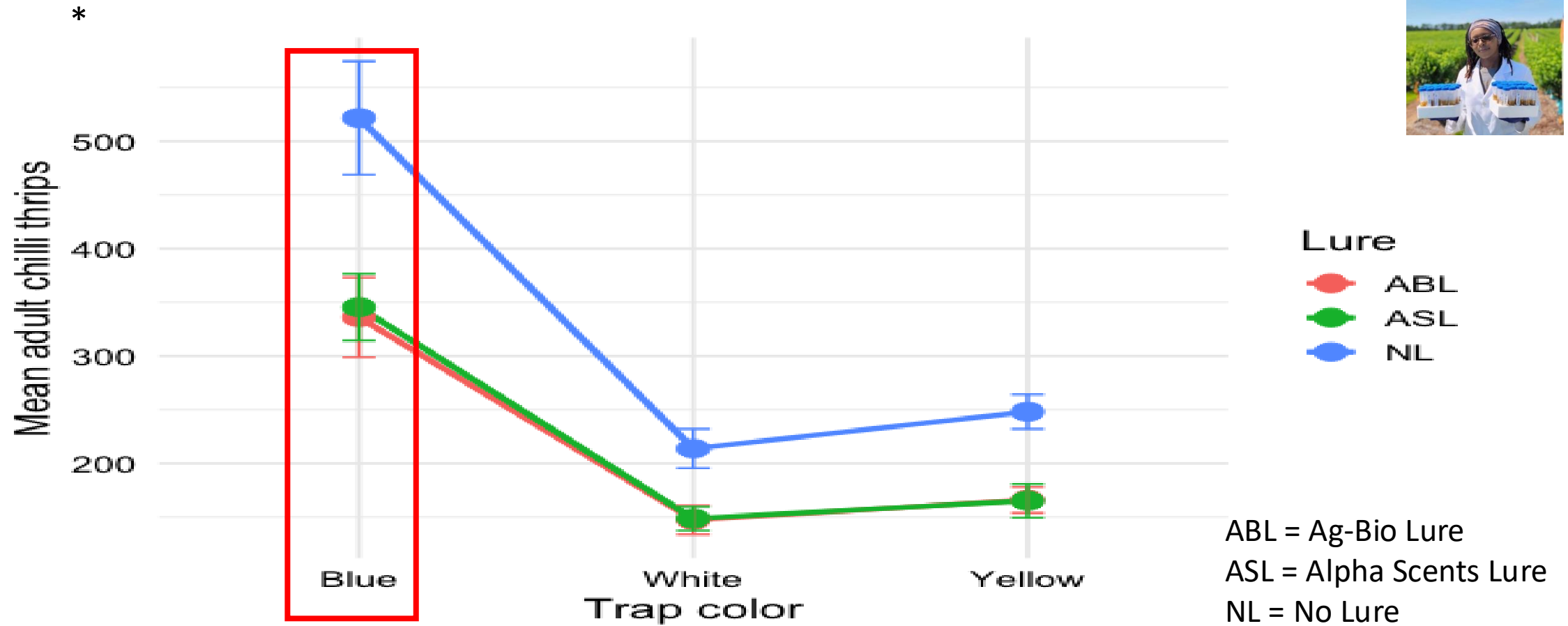
ABL = AgBio Lure
ASL = Alpha Scents Lure
NL = No Lure



Seasonal population trends of adult chilli thrips



Results: Lures offered no advantage – may interfere with captures



Overall interaction between trap color and lure treatment on adult chilli thrips captures

Tapping versus alcohol dip method as a tool for monitoring chilli thrips in SHB blueberries (*Field study*)

Tapping is a **non-destructive** and **cost-effective monitoring approach** that involves **gently tapping** a section of the **blueberry bush** onto a **white plastic** sheet and counting the number of dislodged thrips



Advantages

- Leaf tapping provides direct field estimates of infestation
- Quick and easy to accomplish
- If successful, could improve sampling efficiency

Q: Can tapping accurately estimate chilli thrips abundance compared with leaf sampling?

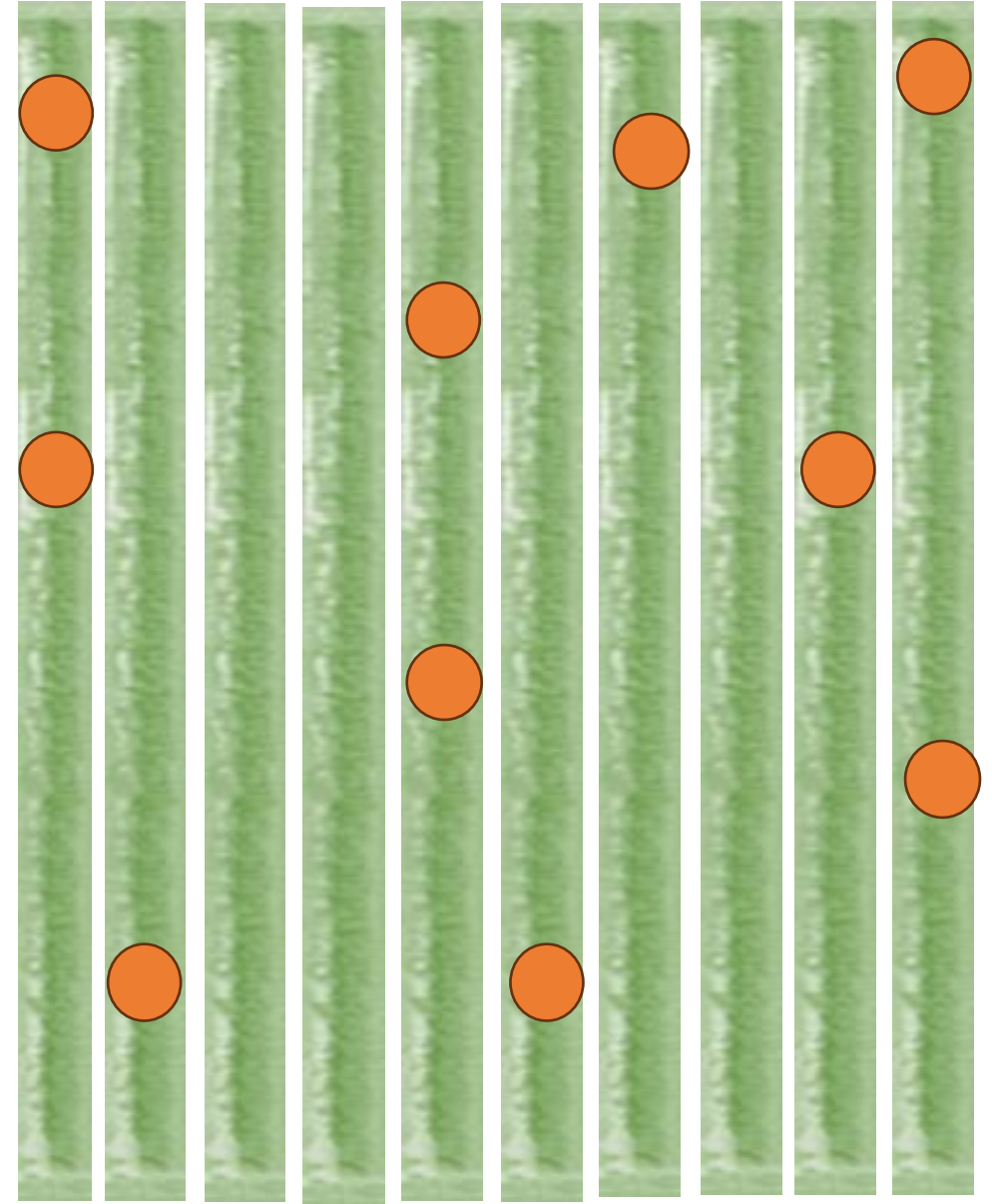


Research design

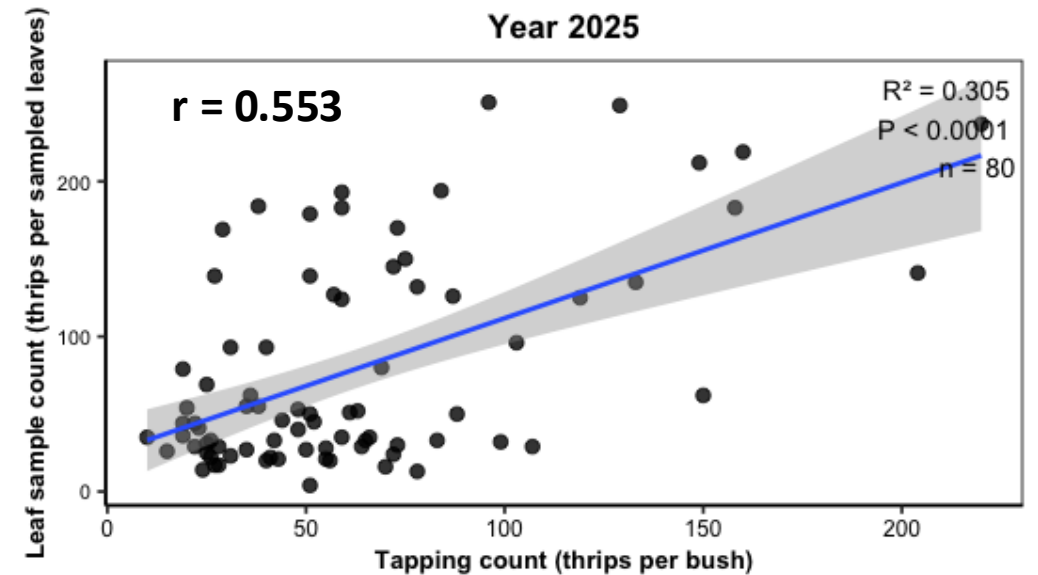
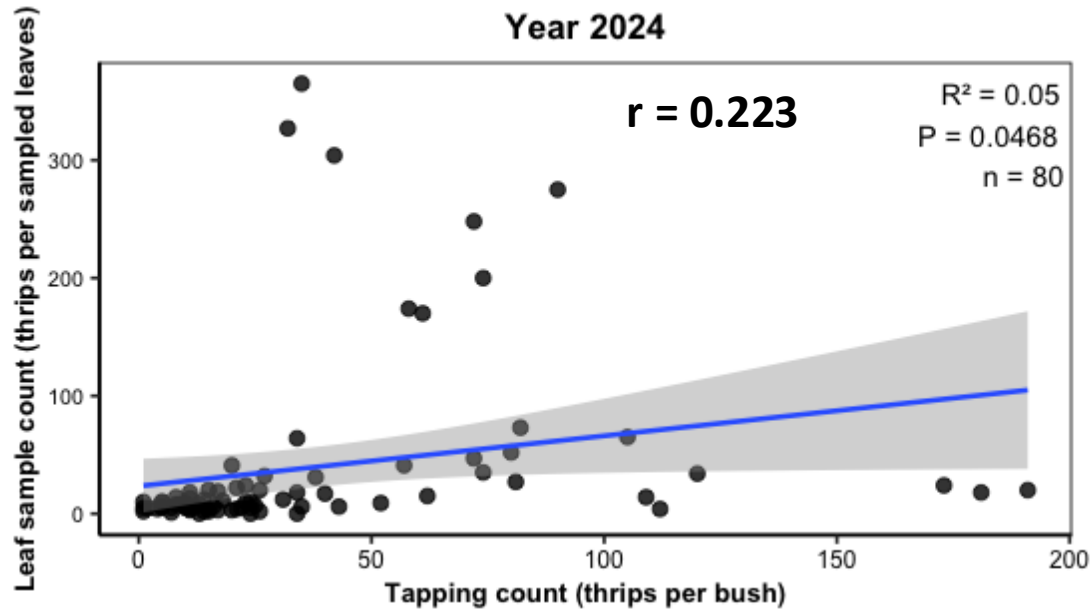
- Study site: SHB Field in Central, **FL.** - plants aged **3-5 yrs**
- **10 randomly selected sampling points per week**
 - Plant selection was randomized weekly (8 weeks)

At each sampling point (paired approach):

- **Tapping:** $\frac{1}{2}$ of the **canopy** was **tapped 4 times** onto a **white sticky surface** .
- **Leaf sampling:** Opposite $\frac{1}{2}$ of the **canopy** - **6 young shoots** were collected – processed in the lab
- # of chilli thrips larvae and adults for each method was counted – using 40X dissecting microscope
- Data analysis:
 - Pearson's correlation – assess relationships btwn methods
 - Regression analysis – evaluate predictive ability of tapping
 - ANOVA, $\alpha = 0.05$



Results: 2024 & 2025



2024: moderate relationship
2025: strong relationship

**Year-specific relationship between tapping and destructive leaf sampling methods
for estimating total chilli thrips abundance in 2024, 2025**

Tapping versus leaf sampling



The two methods measure fundamentally different aspects of the thrips population - leading to discrepancy

Tapping (non-destructive):

- Primarily dislodges **mobile adults** that are easily disturbed
- It provides information on **adult activity** and **dispersal**

Leaf sampling (destructive):

- Quantifies the **entire resident population**
- Including less mobile but highly damaging **larval stages** concealed in foliage

Overall Findings

- Blue traps captured more chilli thrips than yellow and white
- Lures did not increase chilli thrips captures
- There is a relatively weak relationship between leaf tapping and collecting shoots
- Tapping assesses adult activity but provides very little information on immatures (nymphal activity).



Chilli thrips insecticide efficacy trials in blueberries (2026)



Treatment	Insecticide	A.I.	Rate	Frequency	IRAC #
NIS was added to all insecticide treatments except the Incipio treatment at a rate of 0.25% v/v					
control	none	none	/	/	/
Apta	Apta®	tolfenpyrad	27 fl oz/ acre	14 days	21A
Entrust	Entrust® SC	spinosad	6 fl oz/ acre	7 days	5
GPI002 low	GPI002	Geraniol, peppermint oil, cotton seed oil, rosemary oil	16 fl oz/ acre	7 days	
GPI002 high	GPI002	same as above	24 fl oz/ acre	7 days	
Rimon low	Rimon® 0.83 EC	novaluron	20 fl oz/ acre	10 days	15
Rimon high	Rimon® 0.83 EC	same as above	30 fl oz/ acre	10 days	15
Incipio Plinazolin technology	Incipio™	Isocycloseram	5.1 fl oz/ acre	14 days	30
Incipio + NIS	Incipio™	same as above	5.1 fl oz/ acre	14 days	30

Sampling Methods

- **Chilli thrips: shoot samples**

- 5 shoots from the 3 middle bushes were collected from each of the 5-bush treatment plots and placed in 70% ethanol
- Shake-and-rinse method
- Pretreatment and 3, 7, and 10 days after each 14-day application

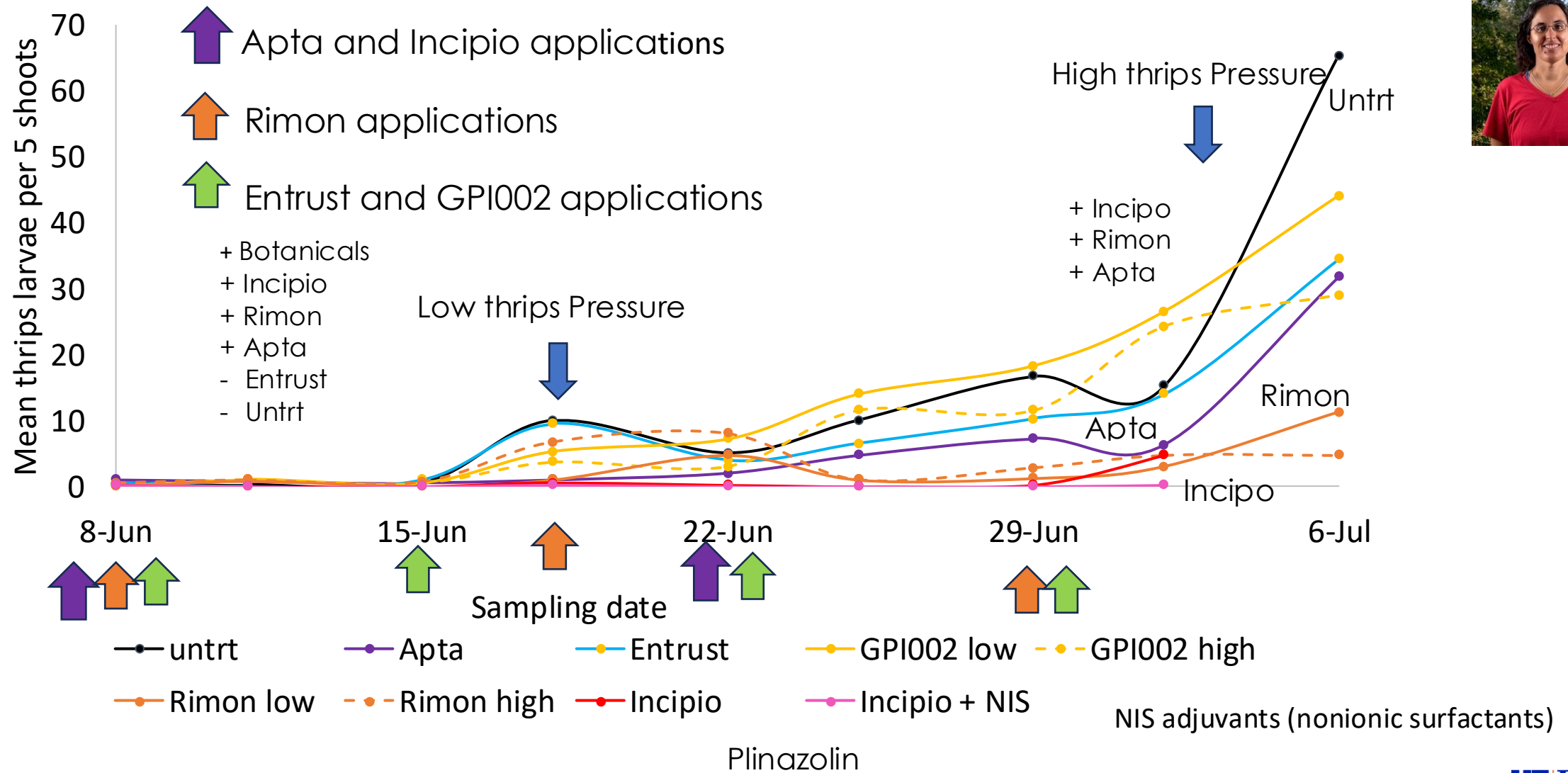
- **Injury**

- Three middle bushes rated on a scale of 0 (no injury) to 4 (> 60% injury)
- Pretreatment and weekly after that

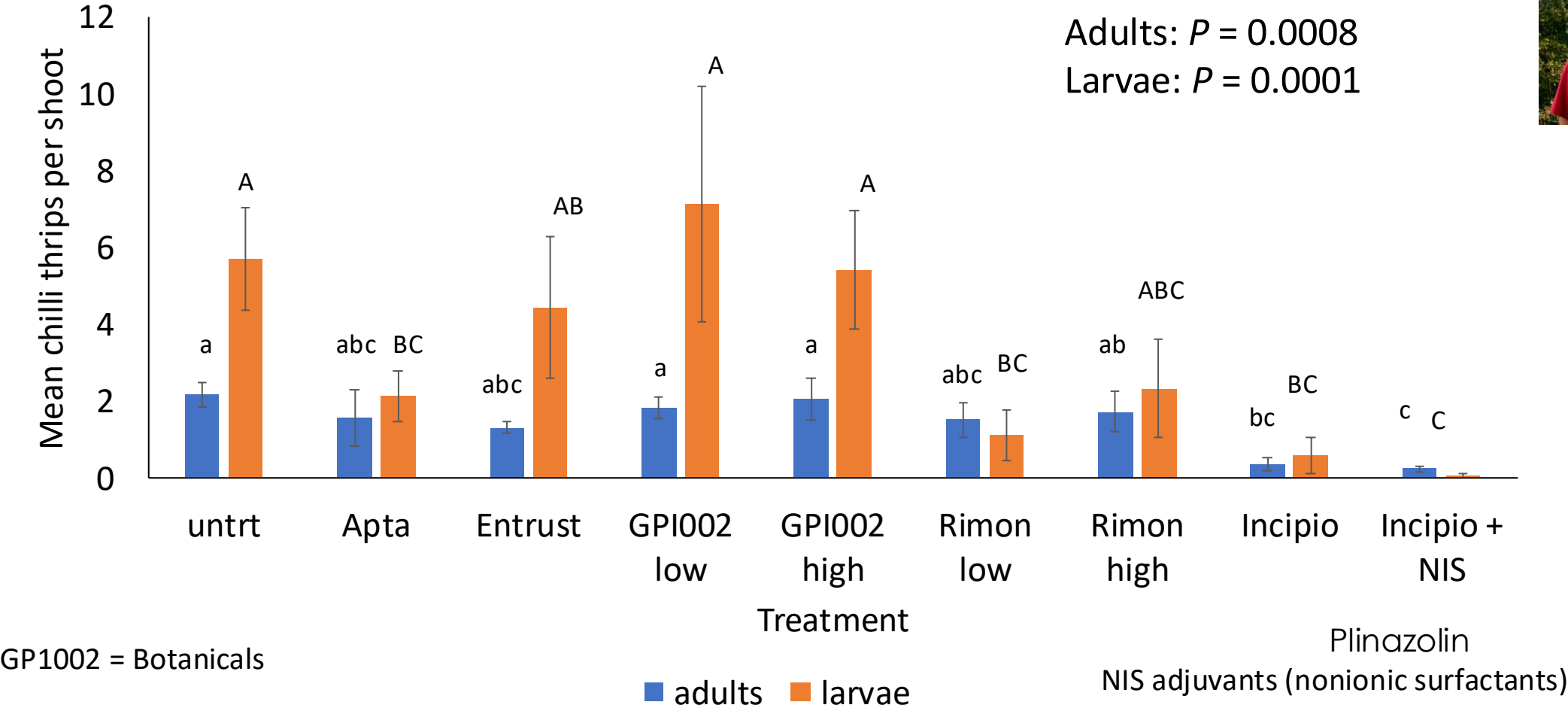
- **Natural enemies**

- Yellow sticky traps, one per treatment plot, hung in the middle of the center bush
- Pretreatment, then hung 3 days after each 7-day application and collected before the next application

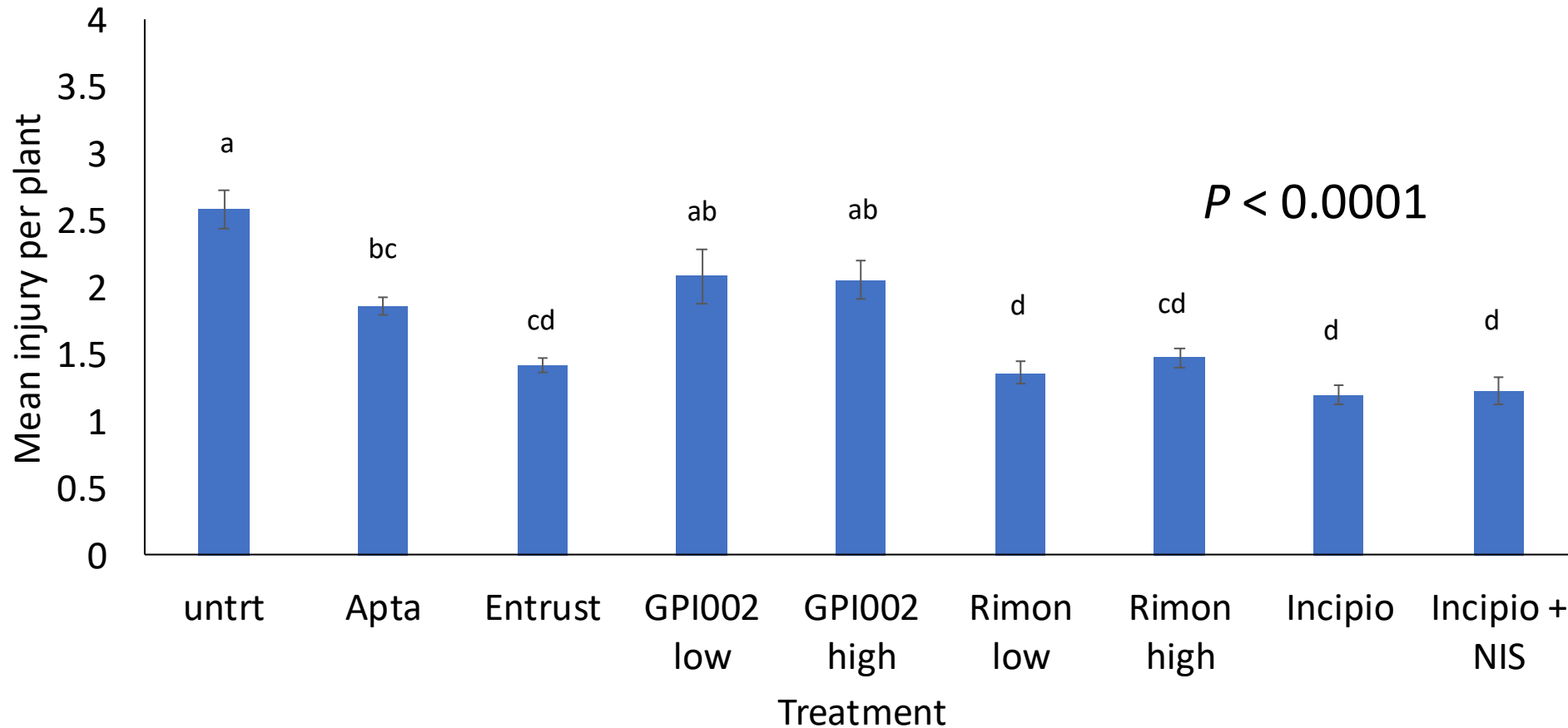
Suppression of Chilli thrips Larvae over Time



Abundance of Chilli thrips in a Research Plot in Central Florida



Injury to Blueberry Bushes Resulting from Chilli thrips Infestation



Incipio Insecticide

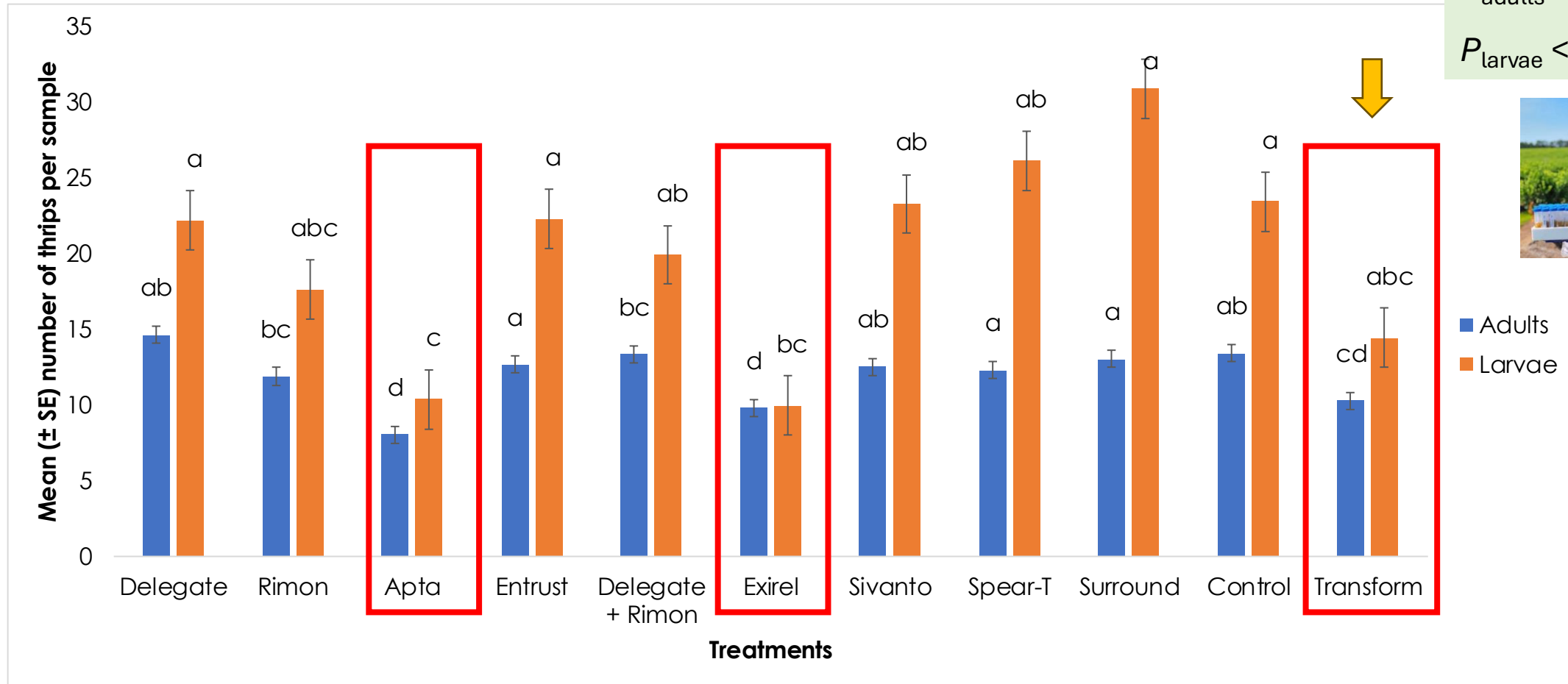
Broad-spectrum insecticide from Syngenta powered by Plinazolin@ tech.

Key Characteristics

- **Active ingredient:** Isocycloseram
- **Mode of action:** Contact + ingestion; rapid feeding cessation
- **Resistance management:** No known cross-resistance
- **Performance:** Strong residual, rainfast, and UV-stable



Overall performance of selected insecticides against **chilli thrips** in SHB blueberries (2024)



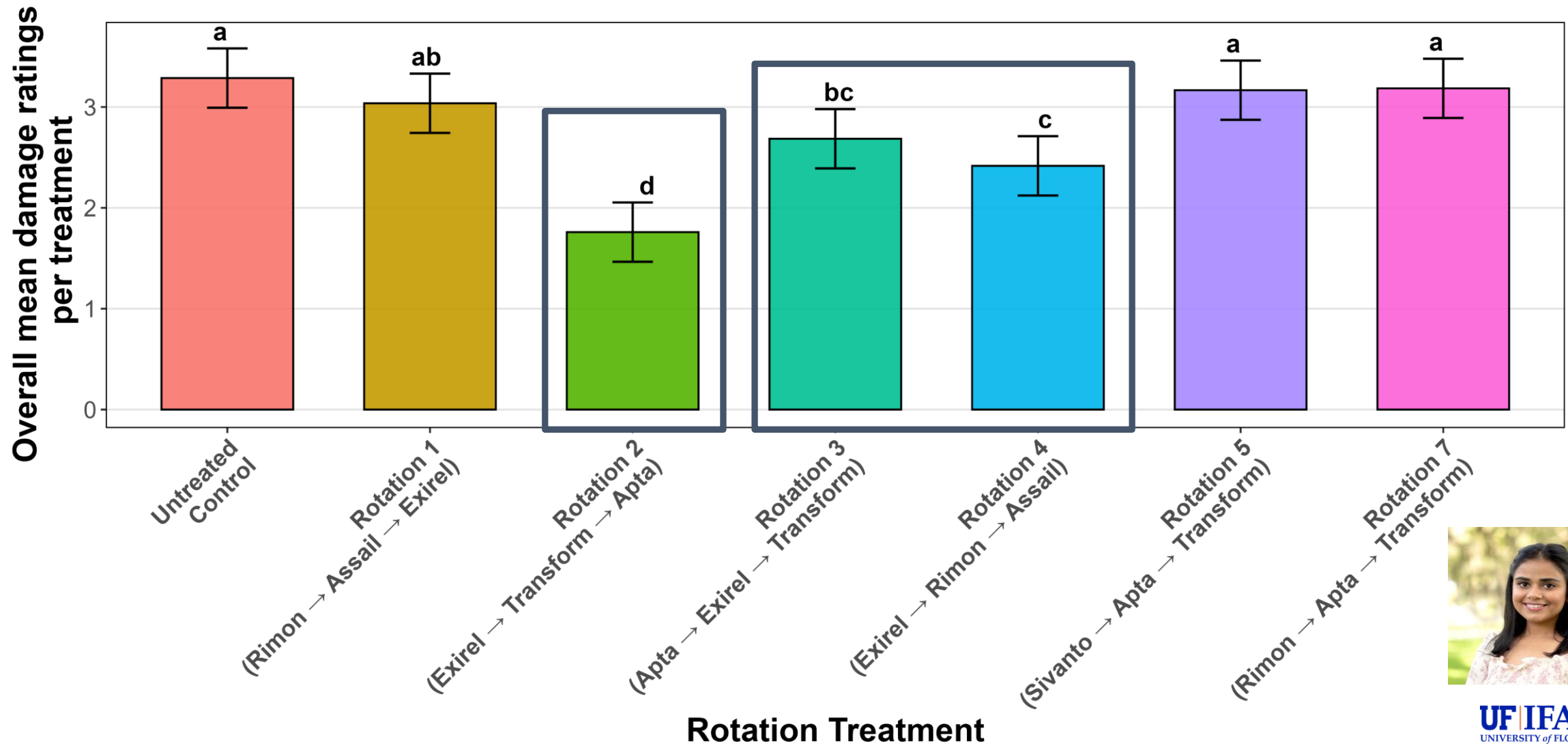
$P_{\text{adults}} = 0.0223$

$P_{\text{larvae}} < .0001$



Means on bars followed by the same letters are not significantly different

Effectiveness of Insecticide Rotation Programs on Injury symptoms on Southern Highbush Blueberries (2025)



Evaluate the **susceptibility** of selected southern highbush blueberry **cultivars** to chilli thrips (**field & greenhouse**)



Q: Do SHB cultivars differ in susceptibility to chilli thrips, and which plant traits contribute to these differences?

Rationale:

- SHB blueberry cultivars differ in plant traits that may influence chilli thrips feeding and performance
- Identifying less susceptible cultivars can support management
- Limited information exists on cultivar resistance to chilli thrips in SHB



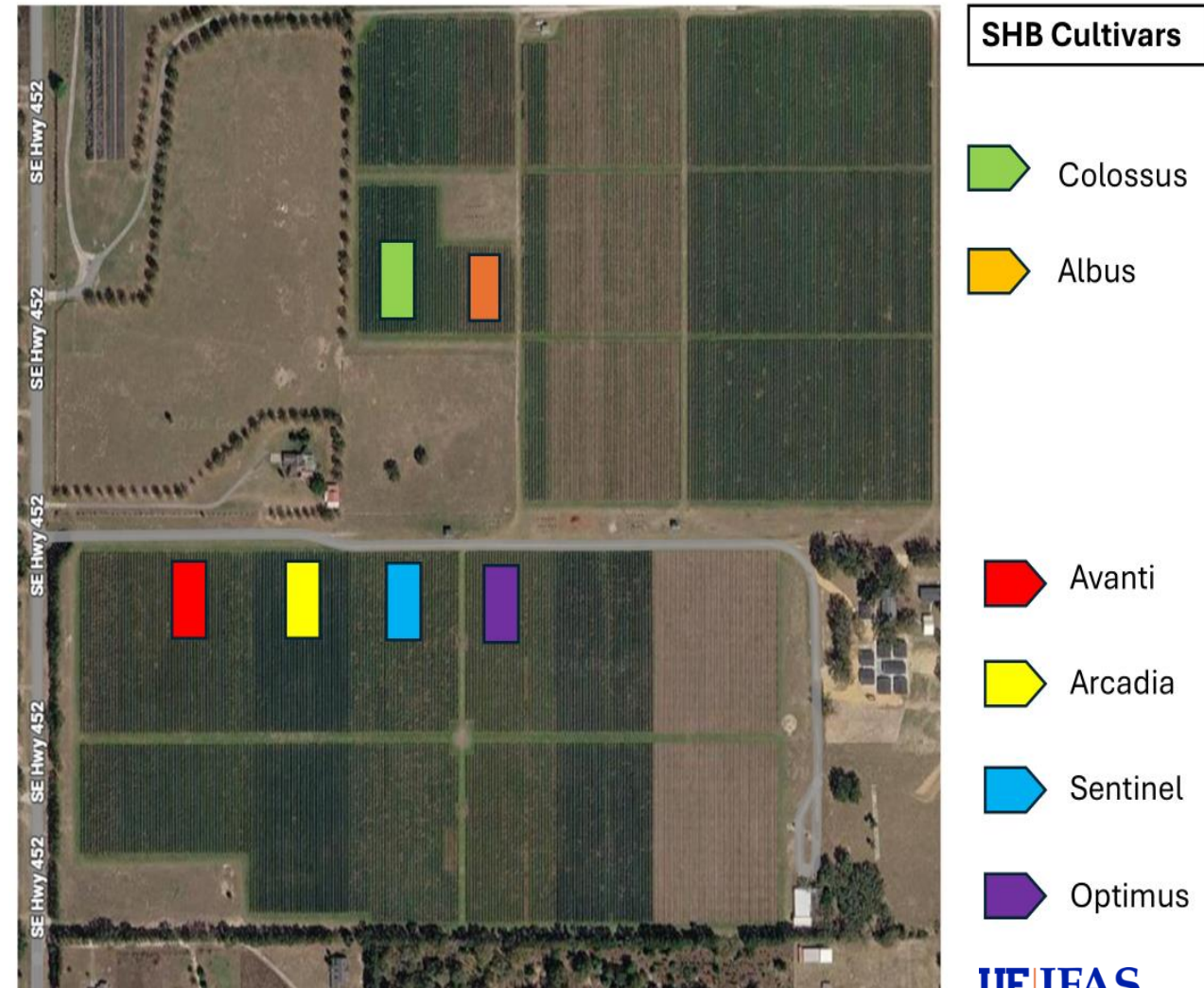
Materials and Methods: Field Cultivar Screening

- **Study site: Commercial SHB in central, FL**
- **6 cultivars:** Avanti, Arcadia, Sentinel, Optimus, Colossus, Albus
- **Design:**
 - RCBD (6 cultivars, 4 replicates)
 - Plot: 6 bushes, buffer: 6 bushes

Sampling & response variables:

- **6 young blueberry shoots collected per plot**
- **Samples** processed at UF's SFVIPM Lab
 - Chilli thrips abundance recorded
 - Larvae,
 - Adults,
 - Total thrips/cultivar

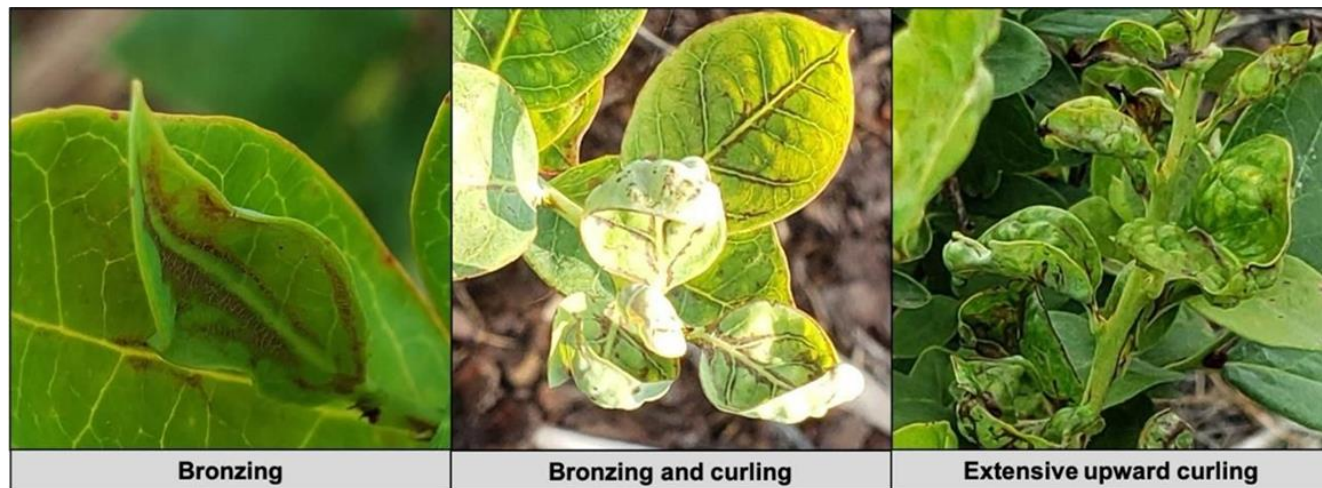
(SHB bushes, leaf samples, and microscopy)



Materials and methods: injury ratings (Obj 2a.)

Assessment

- **Damage ratings** were assessed based on the **amount of feeding injury**
 - 0 = no injury;
 - 1 = <10% (bronzing of leaf and petiole);
 - 2 = 10-30% injury (bronzing);
 - 3 = 31-60% injury (bronzing and curling);
 - 4 = > 60% injury
- Data collected from **4 inner bushes per plot**
- Statistical analysis:
 - Repeated measures ANOVA (SAS)
 - Tukey's HSD mean separation
 - Significant level: $\alpha = 0.05$

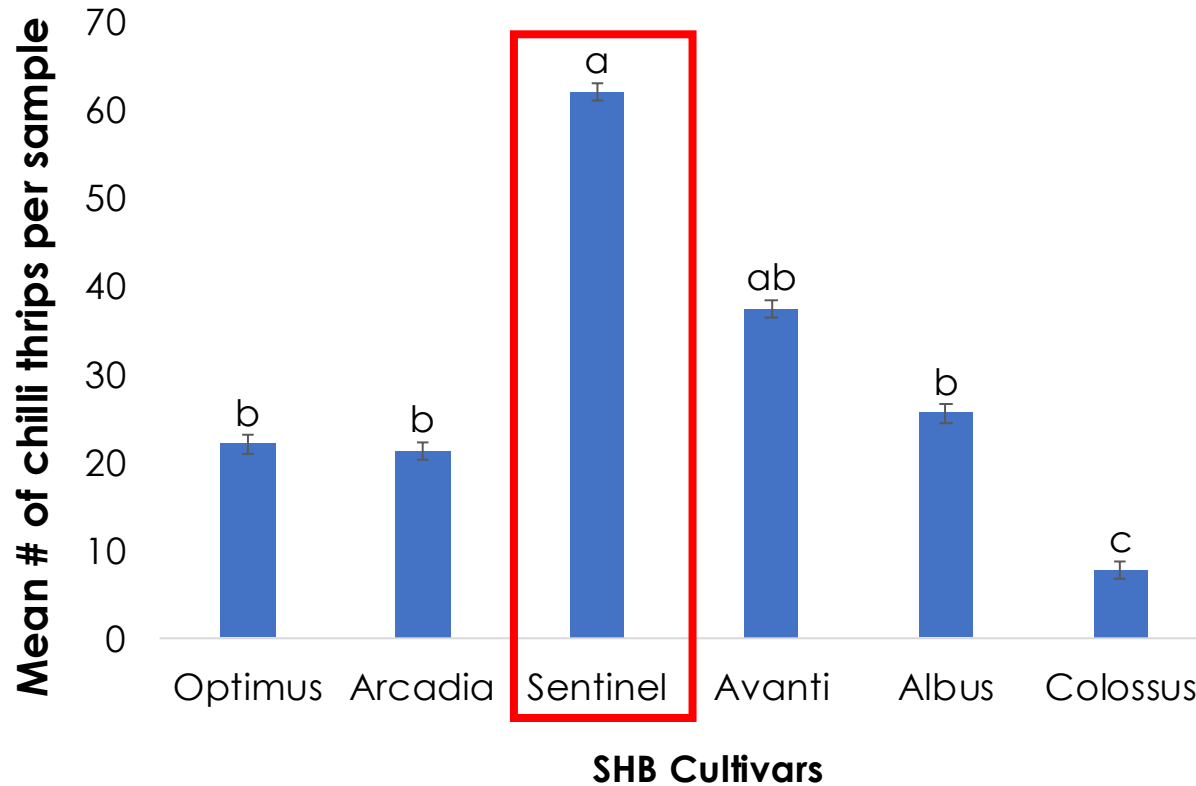


(Liburd et al. 2020; Babu Panthi; Kendi Muthomi – images below)

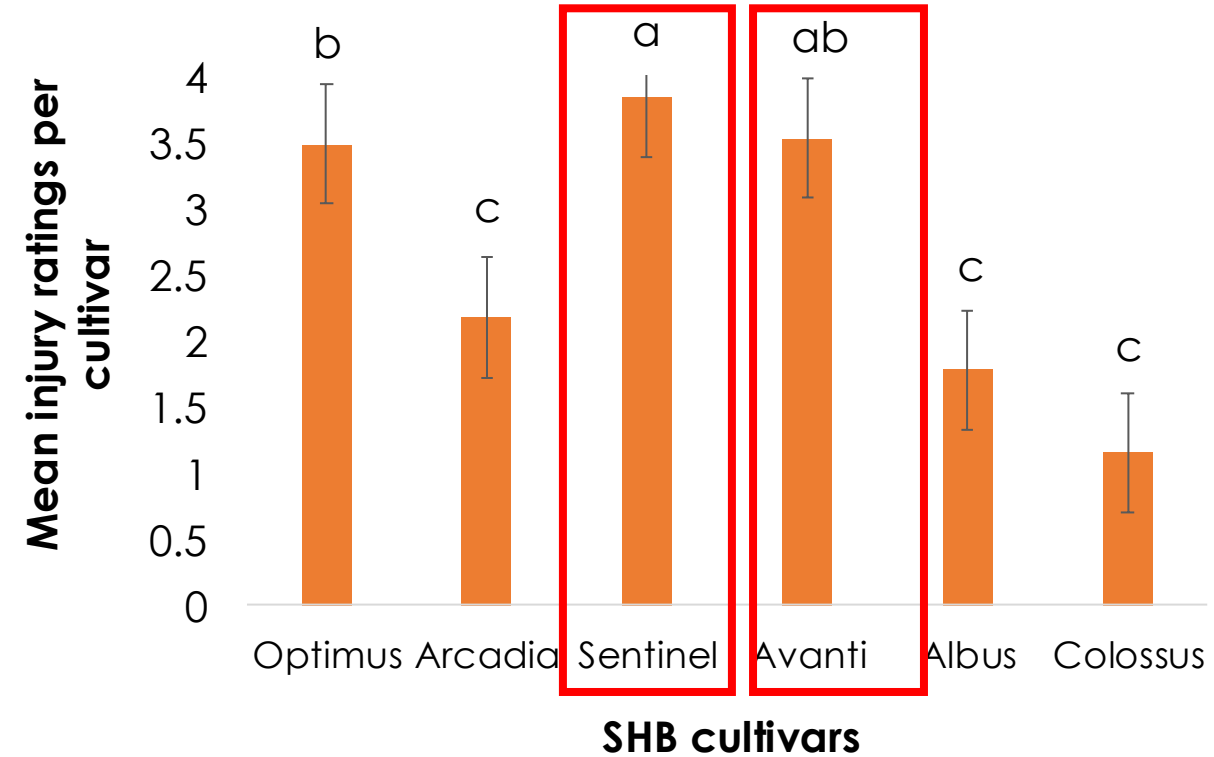


Cultivar effects on chilli thrips abundance & feeding damage

$F=10.53$; $df= 5, 186$; $P < 0.0001$



$F=89.79$; $df= 5, 186$; $P < 0.0001$



Means on bars followed by the same letters are not significantly different



Research design - greenhouse

- **Location:** SFVIPM Greenhouse
- **Design: CRD** (6 cultivars, 6 reps)
 - 'Optimus,' 'Farthing,' 'Arcadia,' 'Albus,' 'Sentinel,' and 'Colossus'
- **Exp arena:** Mesh cages with potted 10 plants aged **12 – 16 months old**

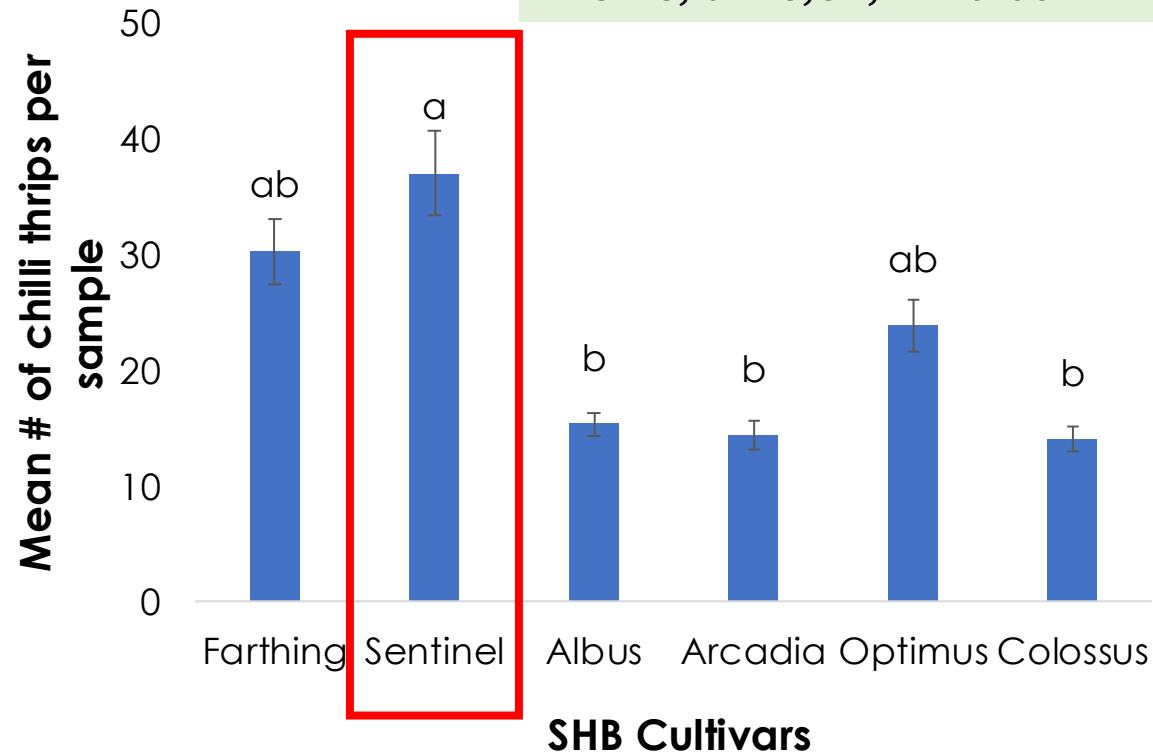
Sampling

- 10 chilli thrips were released per plant – waited for week
- Thrips abundance and damage were assessed for 5 weeks
- Randomly **selected 3-4 shoots**/plant
- Counted **total # of larvae and adults' thrips** (40x microscope)
- **Damage ratings** were assessed based on the **amount of feeding injury**
- **Data analysis:**
 - Repeated measures ANOVA; HSD ; $\alpha = 0.05$

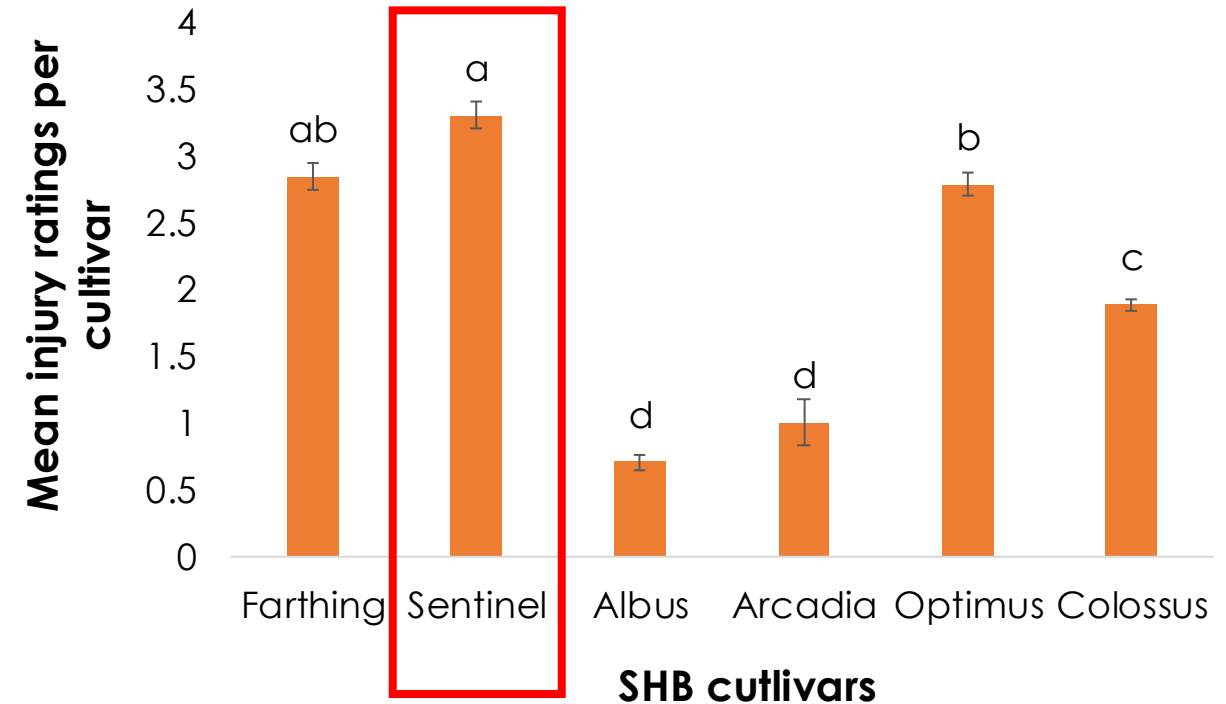


Cultivar effects on chilli thrips abundance & feeding damage (greenhouse)

$F=8.18$; $df= 5,54$; $P < 0.001$



$F=156.06$; $df= 5,54$; $P < 0.0001$



Means on bars followed by the same letters are not significantly different



Findings & Conclusions

Cultivar

- **'Sentinel', Farthing, and 'Avanti'** consistently supported **higher thrips populations** and sustained **more serious damage**
- **'Albus', 'Arcadia', and 'Colossus'** generally exhibited **lower thrips densities** and **lower damage**

Insecticides

- Incipo (Plinazolin) was the best-performing insecticide in 2026, suppressing thrips and preventing crop damage
- No change from the rotation suggested in 2025 (Incipo, Plinazolin-not Reg.)
 - Exirel, Rimon & Assail (rotation 1); Exirel, Transform, Apta (rotation 2)



EL-Nino – Impact on Potential Pest Population

Damp fall – milder Winter

- Predictions – fewer issues with mites
- More issues with gall midges
- Higher populations of chilli thrips (2027)



Thank You!



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Questions

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