



41st FSGA AGRITECH
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Reflective Mulch and Host Plant Resistance as Tools for Chilli Thrips Management in Strawberry



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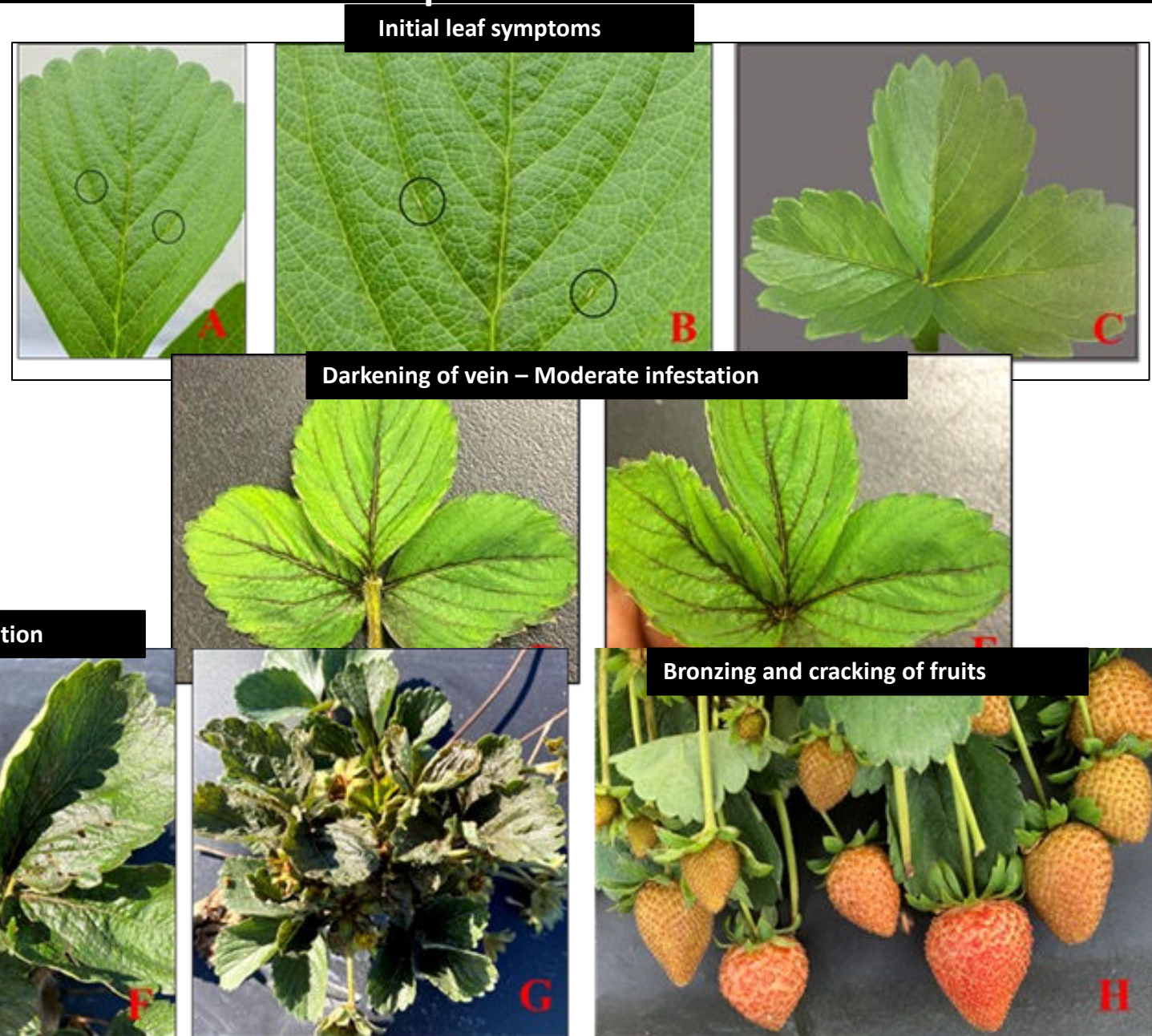
Chilli Thrips

- *Scirtothrips dorsalis* (Hood)
- Invasive and phytophagous (Kumar et al. 2013)
- Six life stages- egg, first and second instar larvae, pre-pupa, pupa and adult



Chilli Thrips

- Infest plants early in the season.
- Heavy feeding causes necrosis of leaf veins and petioles.
- Feeding damage causes bronzing and cracking of fruits.
- Yield loss.



Insecticides for Chilli Thrips Management

Specimen Label



Radiant[®] SC

Jemvelva[™] active

INSECTICIDE

[™] Trademarks of Corteva Agriscience and its affiliated companies.

For control or suppression of lepidopterous larvae (worms, caterpillars), dipterous leafminers, thrips, and certain psyllids.

Active Ingredient:

spinetoram (a mixture of spinetoram-J and spinetoram-L)	11.7%
Other Ingredients.....	88.3%

SPINETORAM	GROUP	5	INSECTICIDE
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product is highly toxic to bees and other pollinating insects exposed to direct treatment, or to residues in/on blooming crops or weeds. Protect pollinating insects by following label directions intended to minimize drift and to reduce risk to these organisms. Apply this product only as specified on the label.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read all Directions for Use carefully before applying.

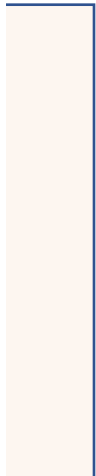
Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the state or tribal agency responsible for pesticide regulation.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment, restricted entry interval, and notification to workers (as applicable). The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

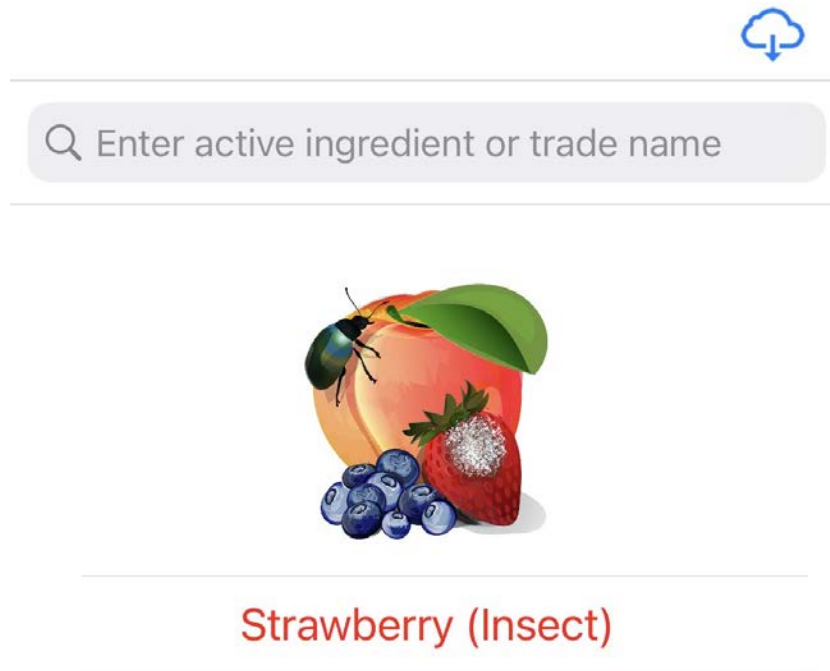
Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or equipment.



MyIPM Cellphone App.

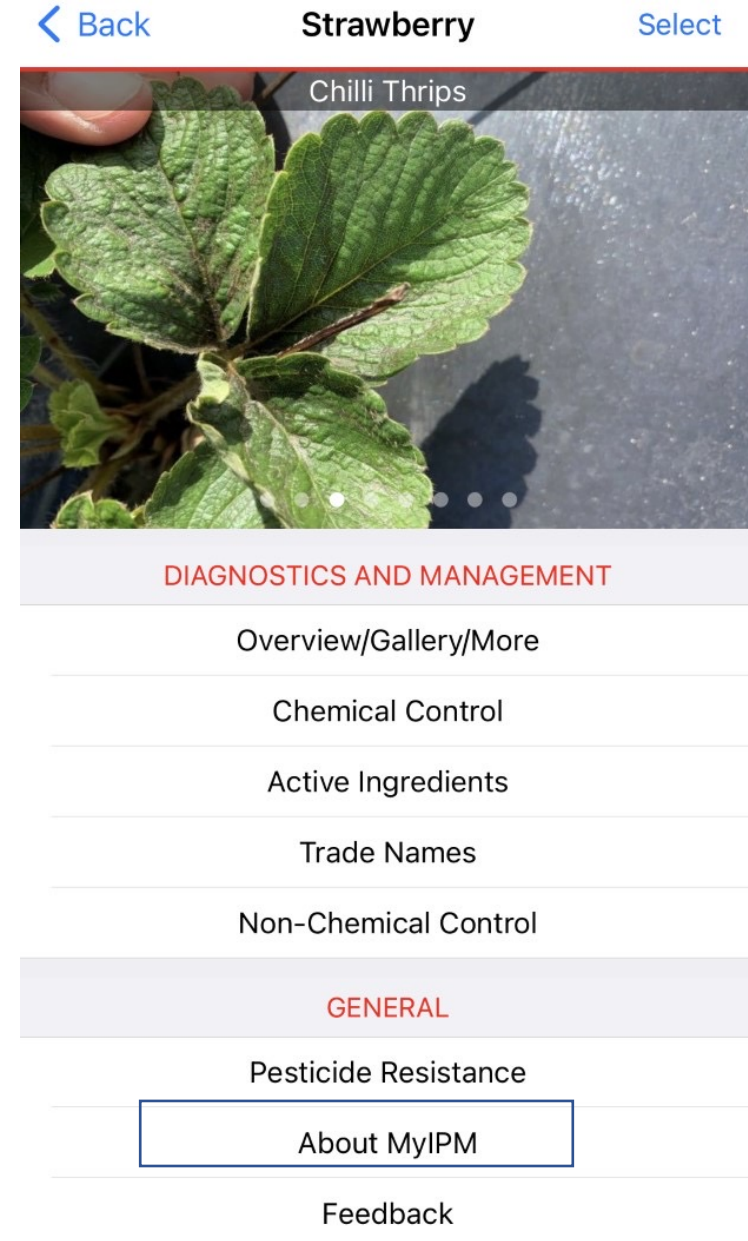
MyIPM



USDA NIFA, Agreement No. 2014-70006-22485 via Southern IPM Center Working Group


Development and Design: Guido Shnabel, Clemson Univ & Mengjun Hu, Univ. of Maryland & Brett Blaauw, Univ. of Georgia

Content for Strawberry Insects: Sriyanka Lahiri, Univ of Florida



MyIPM Cellphone App.

← Back Strawberry Select



Chilli Thrips

DIAGNOSTICS AND MANAGEMENT

- Overview/Gallery/More
- Chemical Control
- Active Ingredients
- Trade Names
- Non-Chemical Control

GENERAL

- Pesticide Resistance
- About MyIPM
- Feedback

← Strawberry Chilli Thrips Select

OVERVIEW

Chilli thrips, *Scirtothrips dorsalis* Hood, is an invasive insect from southeast Asia. It feeds on young fully expanded strawberry leaves, causing darkening of mid-ribs, which may lead to **leaf necrosis and death**. Chilli thrips feed on **young ripening fruits, causing bronzing and cracking** injury. Monitoring and species **identification is most important** to decide whether or not to spray.

Chilli thrips develop insecticide resistance easily, therefore, **rotation of active ingredients is very important**. Management decisions should be made if more than **2/strawberry trifoliolate or 10 thrips/plant** are found at an average. Active ingredients with IRAC 5, 28, 4D, and 4A, are most effective currently. Predatory mites, such as *Amblyseius swirskii* and *Neoseiulus californicus* are effective biological control agents. Also, entomopathogenic fungi (*Beauveria bassiana* strain GHA), nematodes (*Steinernema feltiae*, *Heterorhabditis bacteriophora*), and azadirachtin+pyrethrin products are effective when applied at least twice, 5-7 days apart.

SUMMARY GALLERY More

← Strawberry Flower Thrips Select



SUMMARY GALLERY More

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Conventional Organic

Active Ingredient	IRAC Code	Efficacy
Abamectin; Cyantraniliprole	28; 6	+++
Acetamiprid	4A	+++
Cyantraniliprole	28	+++++
Flupyradifurone	4D	+++
Novaluron	15	+++
Spinetoram	5	+++++

< Strawberry Chilli Thrips Select

Conventional Organic

Trade Name	Efficacy	Rate/Acre
Assail 70WP	+++	0.8-3.0 oz
Exirel	+++++	13.5-20.5 fl oz
Minecto Pro	+++	10 fl oz
Radiant SC	+++++	6 to 10 fl oz
Rimon 0.83EC	+++	6-12 fl oz
Sivanto 200 SL	+++	7.0-10.5 fl oz
Sivanto prime	+++	7.0-14.0 fl oz

< Strawberry

Non-Chemical Control

Chilli thrips can be managed using non-chemical control methods such as:

1. Use of physical control tools by using reflective mulch such as white or metalized mulch.
2. Augmentatively releasing biological control agents such as predatory mites, *Amblyseius swirskii* or *Neoseiulus cucumeris*.
3. Utilize natural control from minute pirate bugs and big-eyed bugs.

Reflective Mulch for Thrips Management



Dr. Midhula Gireesh
(Post-Doctoral
Research Associate)

Reflective Mulch for Thrips Management

- 2021-2022; 2022-2023 at GCREC.
- Main treatments : Black, white and metalized mulch.
- Sub-plot treatments :
'Florida Brilliance', Sweet Sensation[®] , Florida Medallion[™] , Pearl[™] (2022-23)



Reflective Mulch for Thrips Management

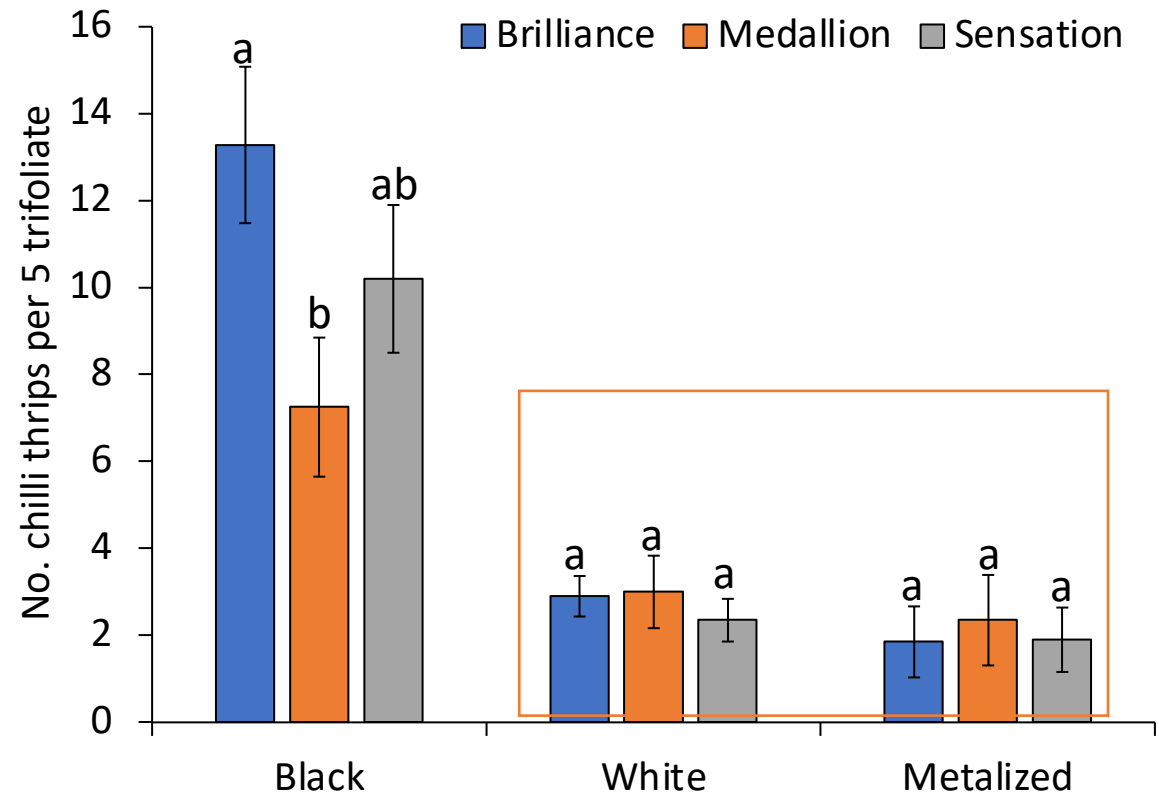
Sampling

- Eighteen strawberry plants per plot.
- Randomly selected young leaves were collected once in two weeks.
- Marketable fruit yield was collected weekly.
- No synthetic insecticide application.



Reflective Mulch for Thrips Management

Chilli Thrips Count

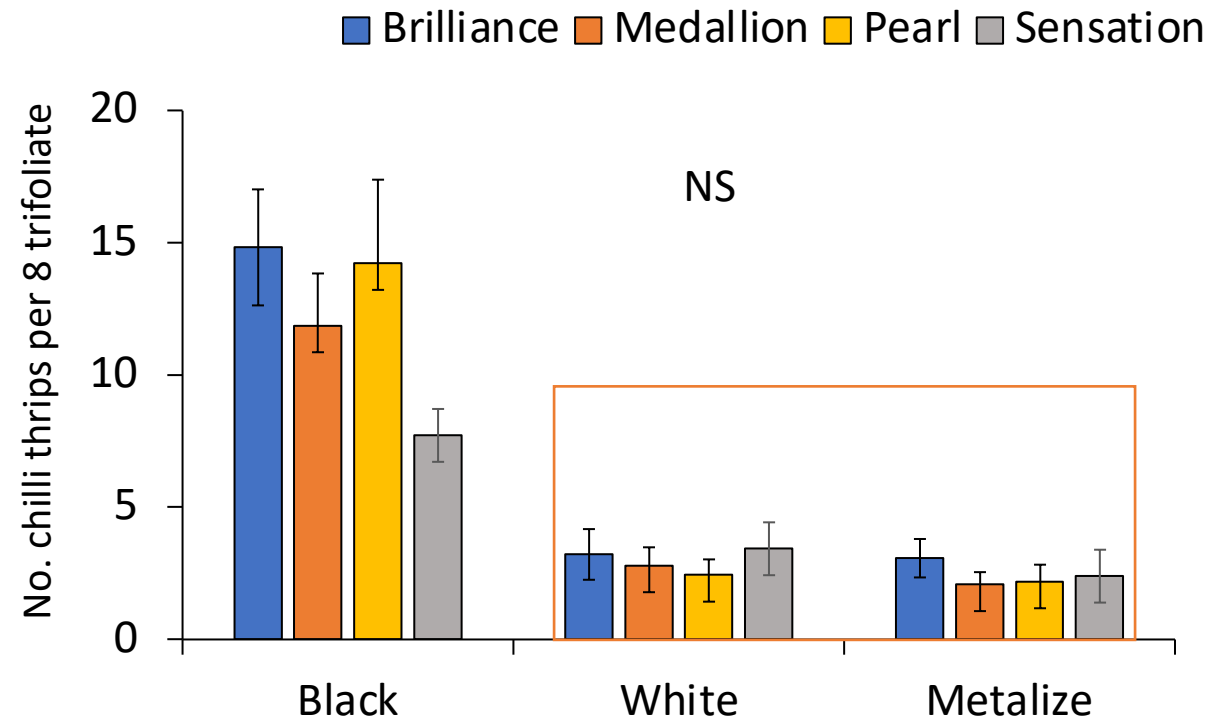


2021-2022

Mean (\pm SE) chilli thrips count in three strawberry cultivars planted on black, white and metallic mulch. PROC MIXED followed by Tukey-Kramer test ($\alpha = 0.05$), SAS Institute v.9.4.

Reflective Mulch for Thrips Management

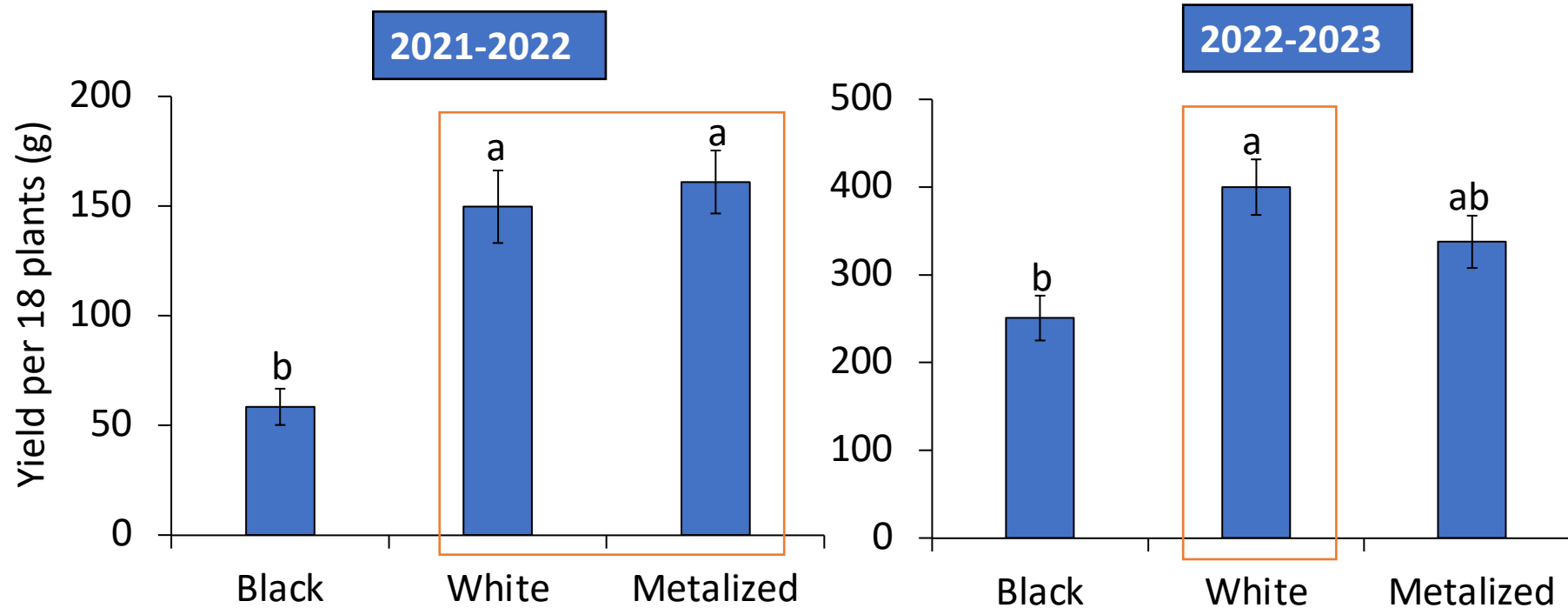
Chilli Thrips Count



Mean (\pm SE) chilli thrips count in three strawberry cultivars planted on black, white and metallic mulch.
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Reflective Mulch for Thrips Management

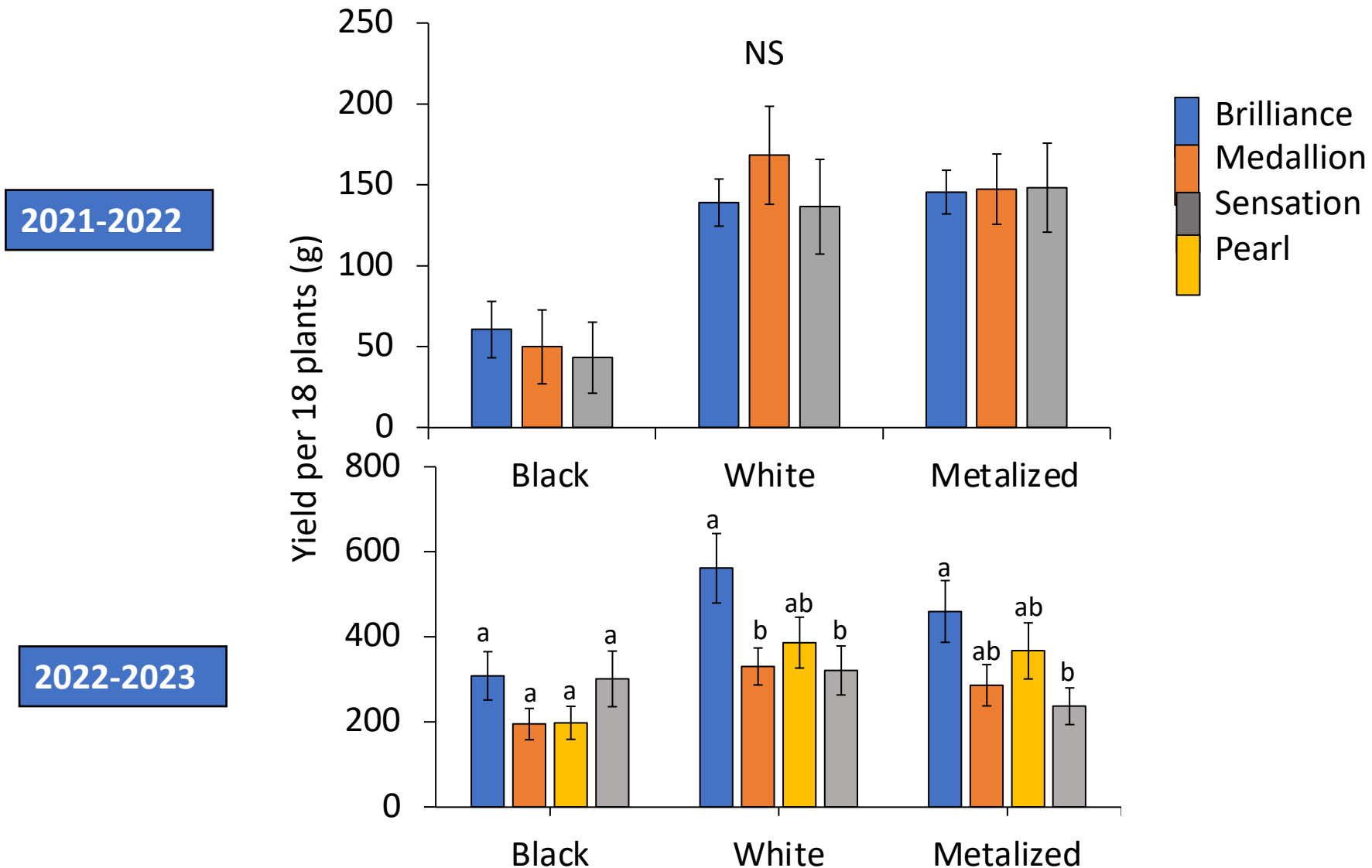
Yield



Mean (\pm SE) marketable fruit yield of three strawberry cultivars (combined) planted on black, white and metalized mulch. PROC MIXED followed by Tukey-Kramer test ($\alpha = 0.05$), SAS Institute, v.9.4.

Reflective Mulch for Thrips Management

Yield



Mean (\pm SE) marketable fruit yield of three strawberry cultivars planted on black, white and metallic mulch. PROC MIXED followed by Tukey-Kramer test ($\alpha = 0.05$), SAS Institute, v.9.4.

Host Plant Resistance



Lovely Adhikary,
(PhD Student)

Host Plant Resistance

- Location: GCREC, Wimauma, FL
- Year of study: Fall 2021, Fall 2022
- Plots were arranged in checker-board pattern
- Randomized complete block design



Beds covered with black plastic mulch

Rep 1 (Bed 1)	Rep 2 (Bed 2)	Rep 3 (Bed 3)	Rep4 (Bed4)	Rep 5 (Bed 5)
Medallion		Sensation		Pearl
	Brilliance		Medallion	
Sensation		Pearl		Medallion
	Medallion		Brilliance	
Pearl		Medallion		Sensation
	Sensation		Pearl	
Brilliance		Brilliance		Brilliance
	Pearl		Sensation	

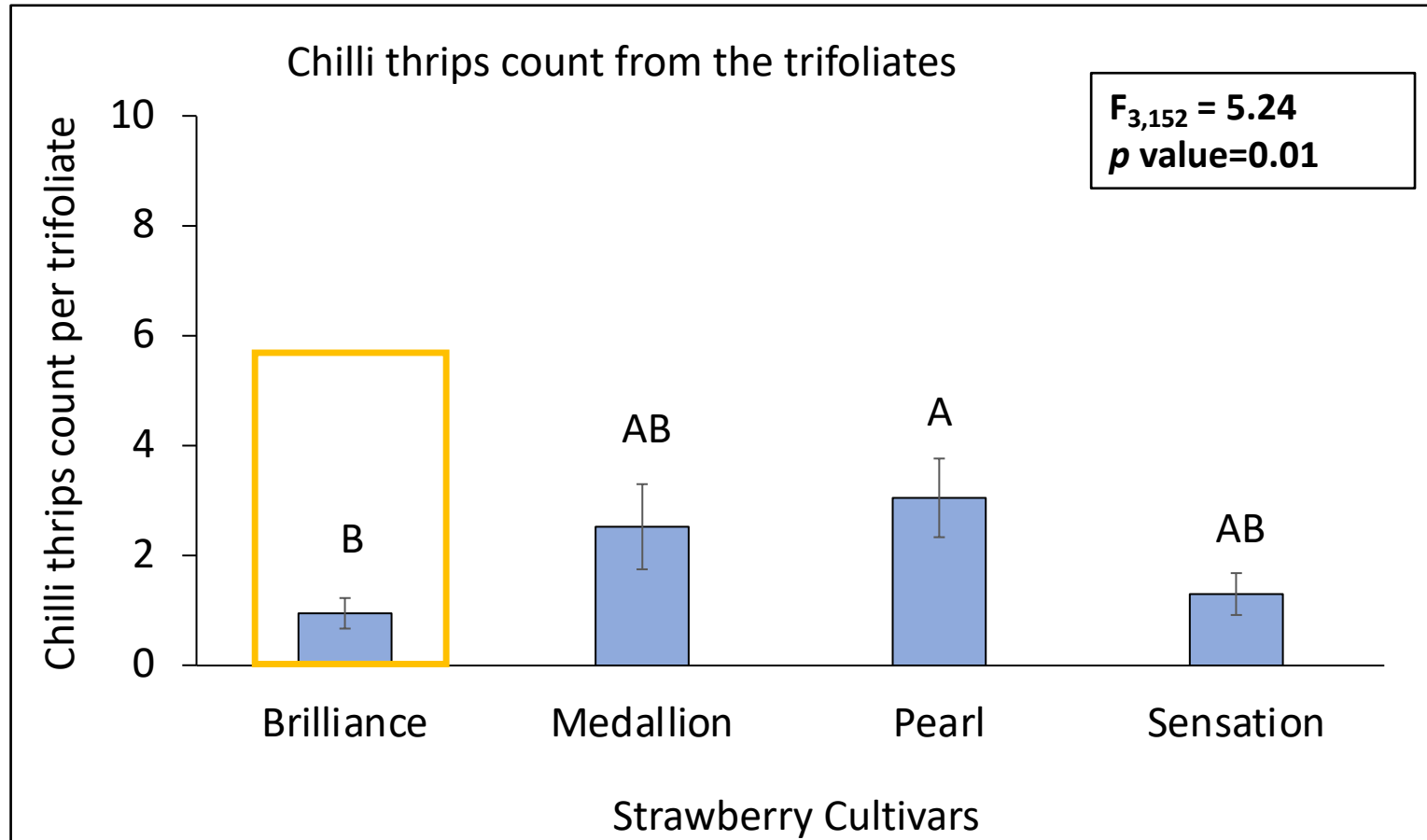
Field design 2021

Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Brilliance		Pearl		Beauty		Festival	
	Sensation		Medallion		Sensation		Radiance
Radiance		Medallion		Brilliance		Sensation	
	Festival		Pearl		Festival		Pearl
Medallion		Beauty		Medallion		Brilliance	
	Brilliance		Radiance		Radiance		Festival
Pearl		Festival		Sensation		Medallion	
	Beauty		Beauty		Pearl		Sensation
Sensation		Radiance		Pearl		Beauty	
	Medallion		Festival		Medallion		Medallion
Festival		Sensation		Radiance		Pearl	
	Pearl		Brilliance		Brilliance		Beauty
Beauty		Brilliance		Festival		Radiance	
	Radiance		Sensation		Beauty		Brilliance

Field design 2022

Chilli Thrips Count

2021-22

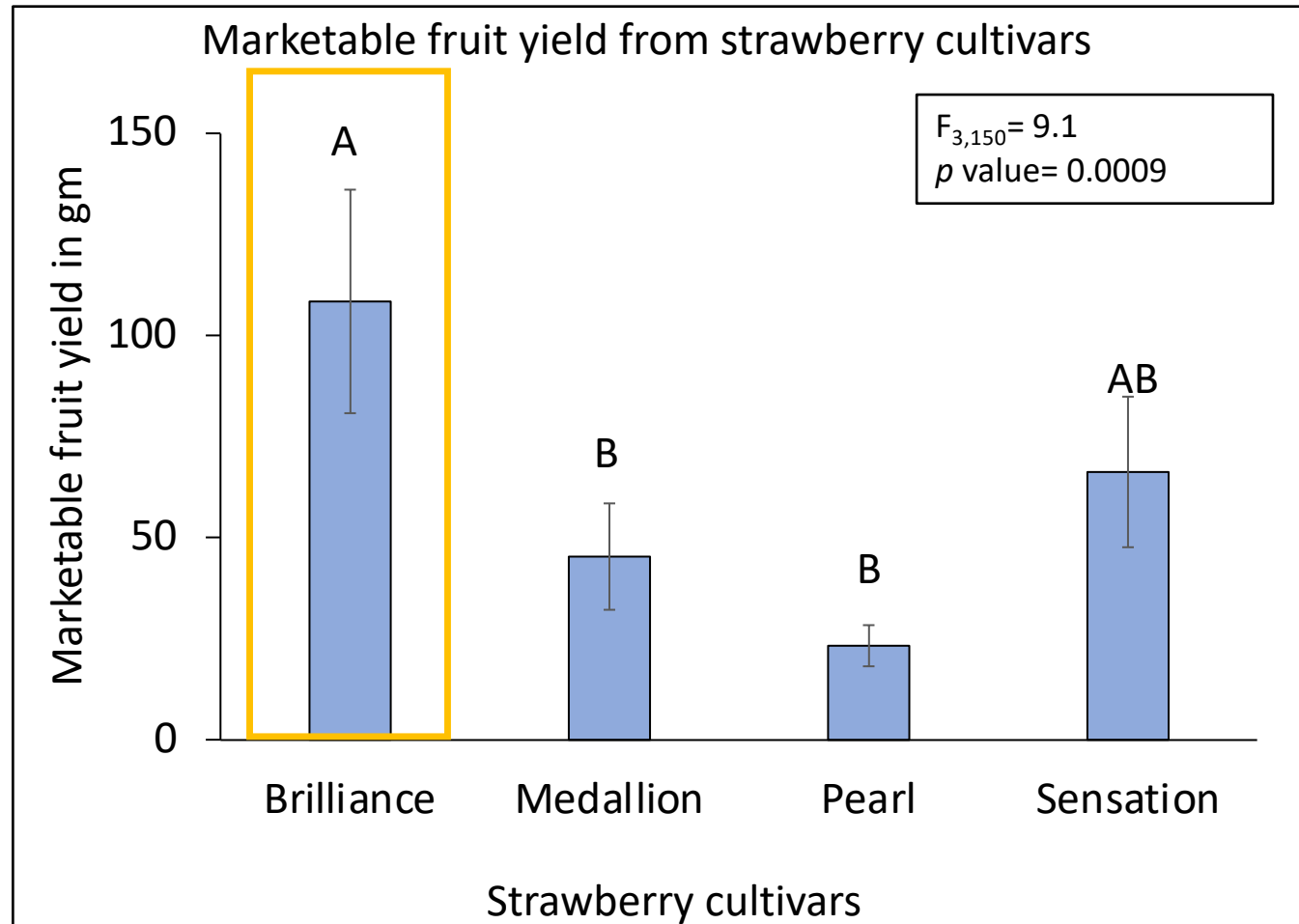


Bars with same letters are not significantly different; Proc Mixed, $\alpha = 0.05$; Tukey-Kramer for separation of means; SAS Inst.

Host Plant Resistance

Yield

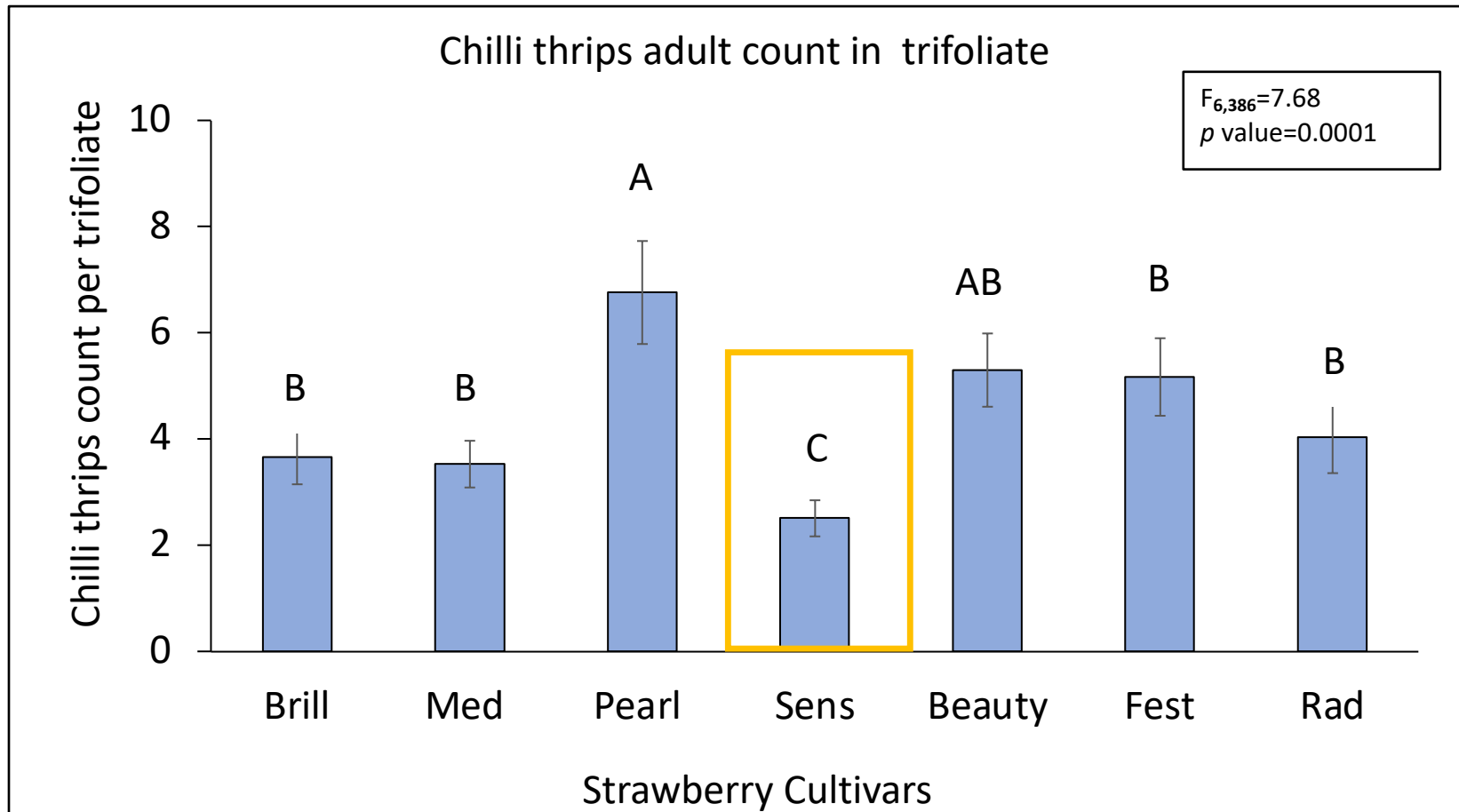
2021-22



Bars with same letters are not significantly different; Proc Mixed: Repeated measures ANOVA $\alpha = 0.05$; Tukey-Kramer for separation of means; SAS Inst.

Chilli Thrips Count

2022-23

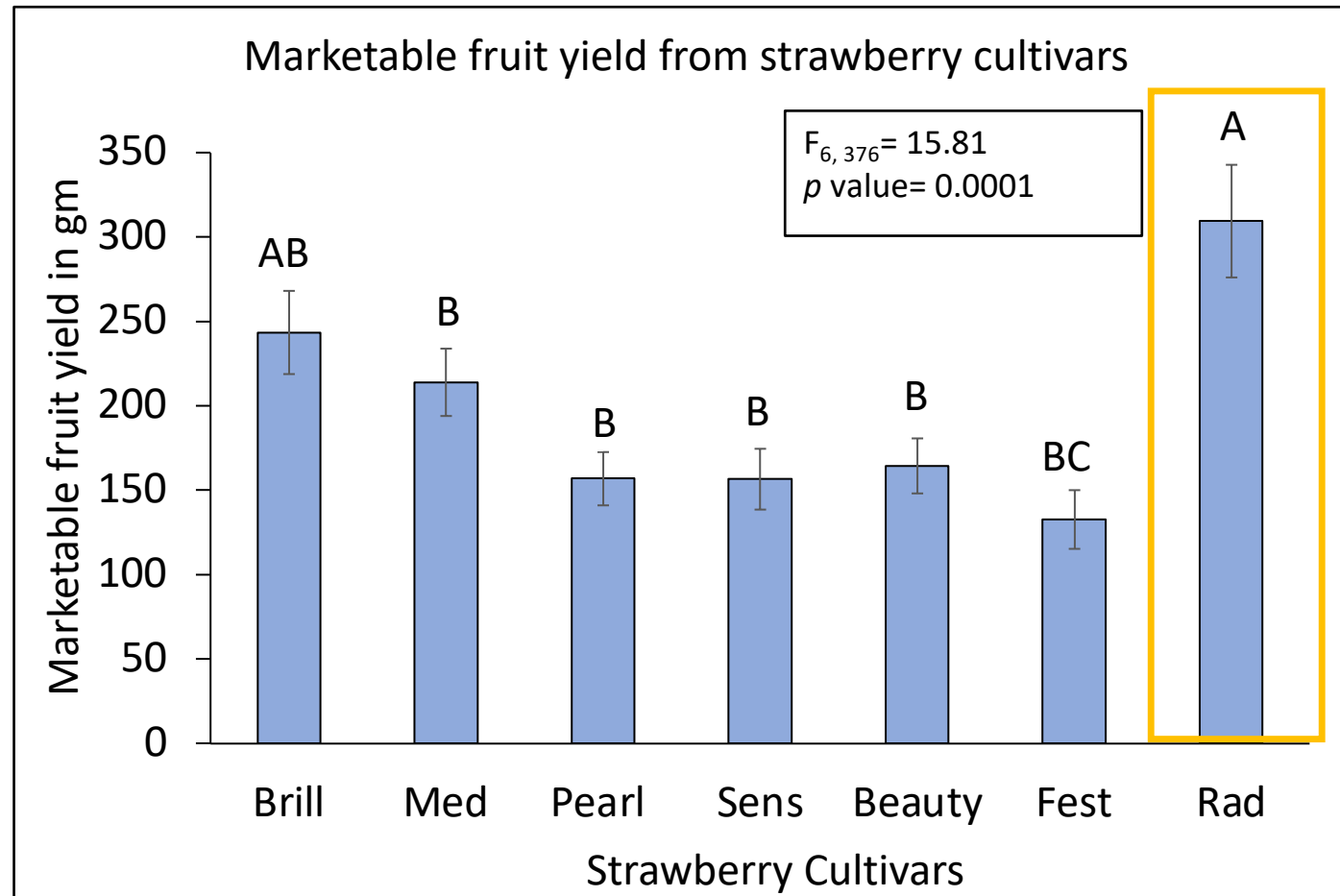


Bars with same letters are not significantly different; Proc Mixed, $\alpha=0.05$; Tukey-Kramer for separation of means; SAS Inst.

Host Plant Resistance

Yield

2022-23

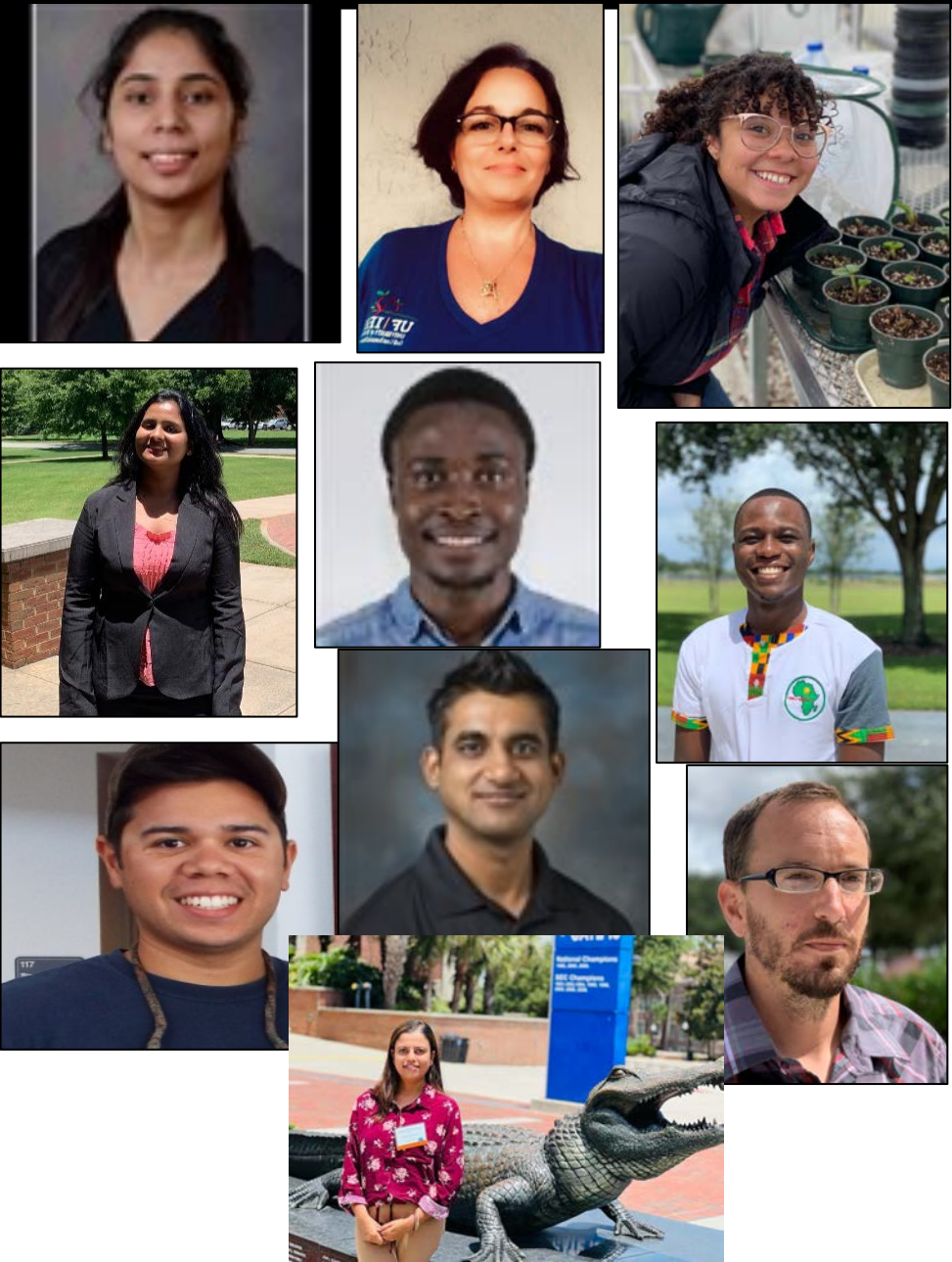


Summary

- 'Florida Brilliance' and 'Florida Radiance' had highest fruit yield among tested cultivars for HPR. 'Sensation' had lowest chilli thrips infestation in 2022.
- White reflective mulch provided maximum chilli thrips suppression and yield gain over black plastic mulch across all strawberry cultivars tested.
- Effective use of resistant strawberry cultivars, reflective mulch, and insecticide rotation program, chilli thrips can be managed long-term, sustainably.



Acknowledgements



Industry Partners

Gowan USA

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Natalia Peres

Shinsuke Agehara

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