

INJECTION OF OXYTETRACYCLINE FOR HLB MANAGEMENT

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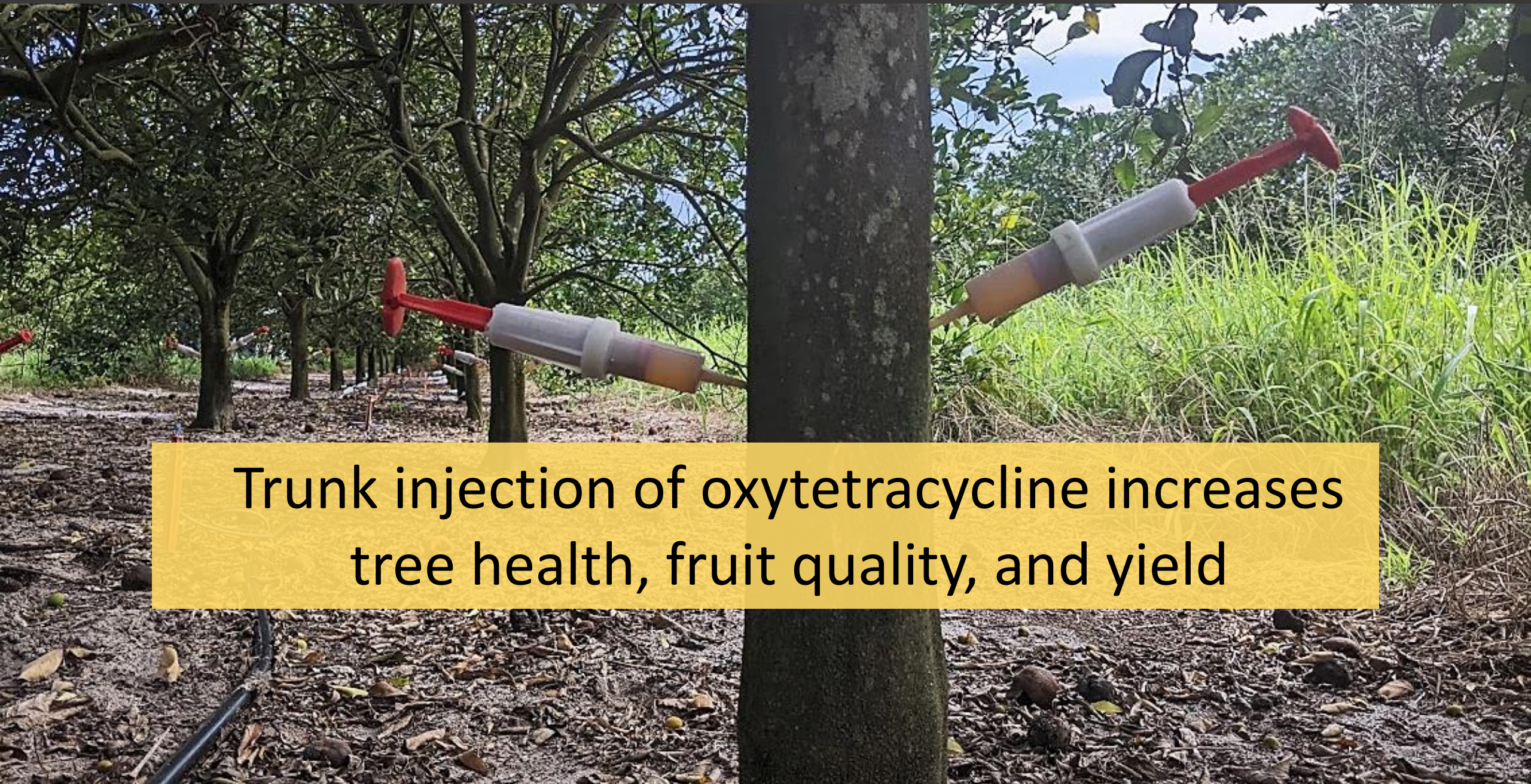
University of Florida/IFAS

Southwest Florida Research and Education Center, FL, USA

Packinghouse Day, Lake Alfred, 24 August 2023



2020-2022 STUDIES



Trunk injection of oxytetracycline increases tree health, fruit quality, and yield


INJECTION OF OTC IS EFFECTIVE



horticulturae

Review

Trunk Injection as a Tool to Deliver Plant Protection Materials—An Overview of Basic Principles and Practical Considerations

Leigh Archer¹, Jonathan H. Crane² and Ute Albrecht^{1,*} 

Disease Control and Integrated Management



HORTSCIENCE 58(7):768–778. 2023. <https://doi.org/10.21273/HORTSCII7172-23>

Evaluation of Trunk Injection Techniques for Systemic Delivery of Huanglongbing Therapies in Citrus

Leigh Archer and Ute Albrecht

University of Florida/IFAS, Southwest Florida Research and Education Center, Immokalee, FL 34142, USA


Trunk Injection of Oxytetracycline for Huanglongbing Management in Mature Grapefruit and Sweet Orange Trees

Leigh Archer,¹ Sanju Kunwar,² Fernando Alferez,¹ Ozgur Batuman,²  and Ute Albrecht^{1,†} 

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Article

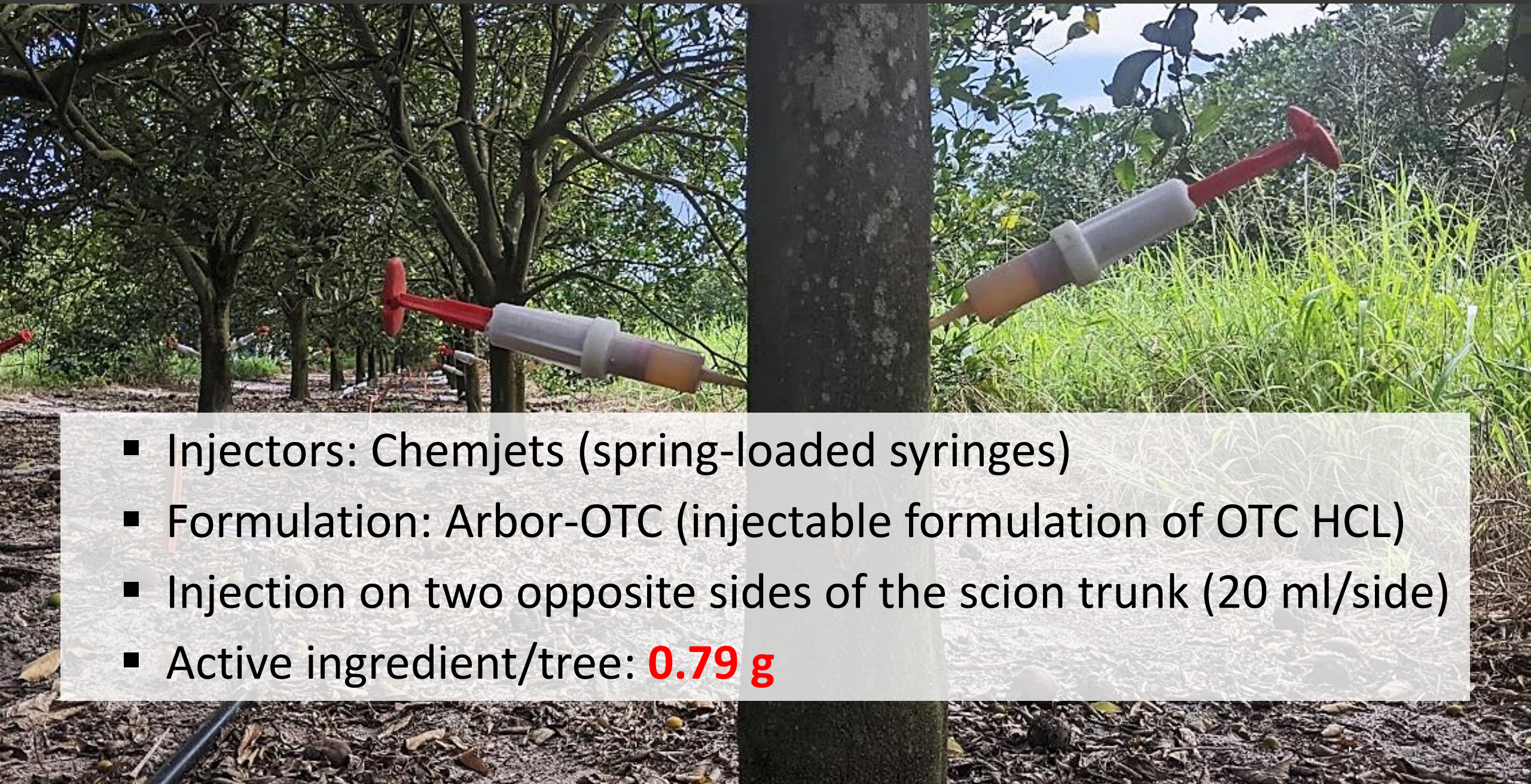
Efficacy of Trunk Injected Imidacloprid and Oxytetracycline in Managing Huanglongbing and Asian Citrus Psyllid on Sweet Orange (*Citrus Sinensis*) Trees

Leigh Archer¹, Jawwad Qureshi² and Ute Albrecht^{1,*} 

Wound reaction to trunk injection of oxytetracycline or water in huanglongbing-affected sweet orange (*Citrus sinensis*) trees

Leigh Archer¹  · Ute Albrecht¹ 

2020-2022 STUDIES




- Injectors: Chemjets (spring-loaded syringes)
- Formulation: Arbor-OTC (injectable formulation of OTC HCL)
- Injection on two opposite sides of the scion trunk (20 ml/side)
- Active ingredient/tree: **0.79 g**

THE LABELS

Volume	BEARING TREES		
	Trunk diam.	5,500 ppm	11,000 ppm
25 ml	2.15" – 3"	0.138 g	0.275 g
50 ml	3" - 4.25"	0.275 g	0.55 g
100 ml	4.25" – 6"	0.55 g	1.1 g
150 ml	> 6"	0.825 g	1.65 g

FIFRA Section 24(c)
Special Local Need Label

 *Handwritten signature*
1/30/2023


For distribution and use only within Florida
This labeling must be in the possession of the user at the time of the pesticide application

Rectify™ is a systemic injectable bactericide for the control of *Candidatus Liberibacter asiaticus* (CLas) or suppression of Huanglongbing (HLB, Citrus Greening) for Citrus Group 10-10.

OXYTETRACYCLINE GROUP 41 FUNGICIDE/BACTERICIDE

Active Ingredient:
Oxytetracycline Hydrochloride* 95.0%
• Other Ingredients 5.0%
Total 100.0%
*Equivalent to minimum 88.0% Oxytetracycline

FIFRA Section 24(c) *KW 10/28/2022*
Special Local Need Label

 *ts,*

For distribution and use only within Florida. *se la*

ReMedium TI® is a systemic injectable antimicrobial for the control or suppression of Huanglongbing (HLB, Citrus Greening) for Citrus Group 10-10. *ou in detail.)*

OXYTETRACYCLINE GROUP 41 FUNGICIDE/BACTERICIDE *o. 65387-AR-2*

Active Ingredient *XX*
Oxytetracycline Hydrochloride*95.0%
Other Ingredients5.0%
Total 100.00%
*Equivalent to 87.9% Oxytetracycline

KEEP OUT OF REACH OF CHILDREN

CAUTION

See inside booklet for Additional Precautionary Statements,
Directions for Use and Restrictions.
Si usted no entiende la etiqueta, busque a alguien para que se la
explique a usted en detalle.
(If you do not understand the label, find someone to explain it to you in detail.)

Sec 24(c) Registrant: EPA SLN FL220005 Exp. 12/4/2025 Net Contents: 165 Grams
Produced for: TJ BioTech LLC PO Box 21 Buffalo, SD 57720
EPA Est. No. 100305-IND-1 Lot No. XXXX

Page 1 of 10 *page 1 of 9*

COMPARISON



Ongoing since 2022.
Both methods have so far
yielded similar results



Other ongoing studies



MATURE TREE STUDY – SW FL



MATURE TREE STUDY – SW FL

Valencia/Carrizo

Planted in 2014

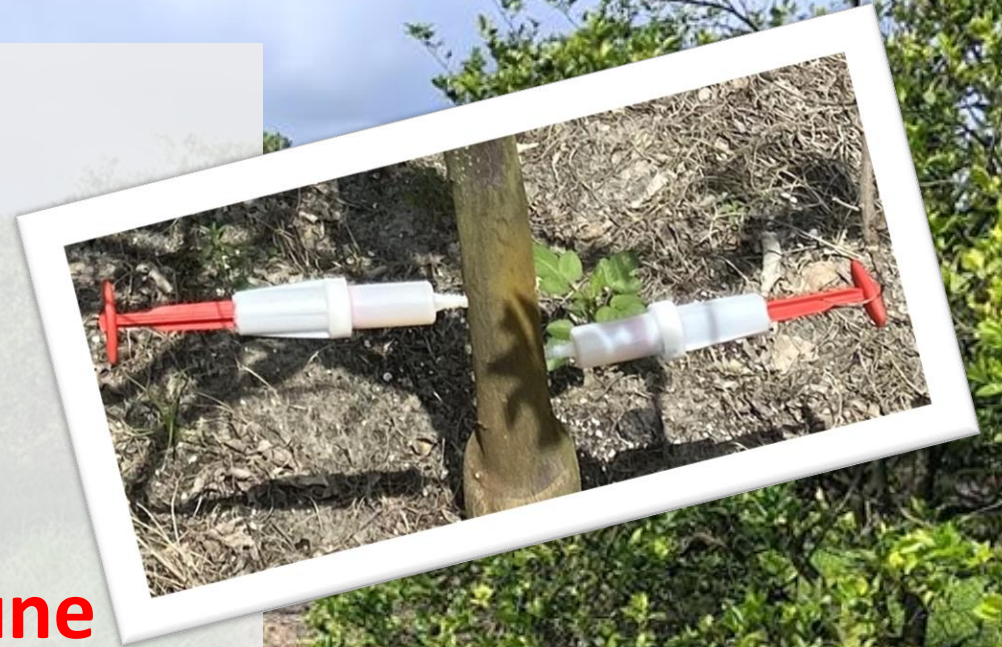
Av. Trunk diam. - 5.4"

INJECTORS: Chemjets

INJECTION TIME: **April** or **June**

OTC DOSE: **0.79 g** or **1.2 g** a.i. per tree

START: 2022



TREE HEALTH

March 2023

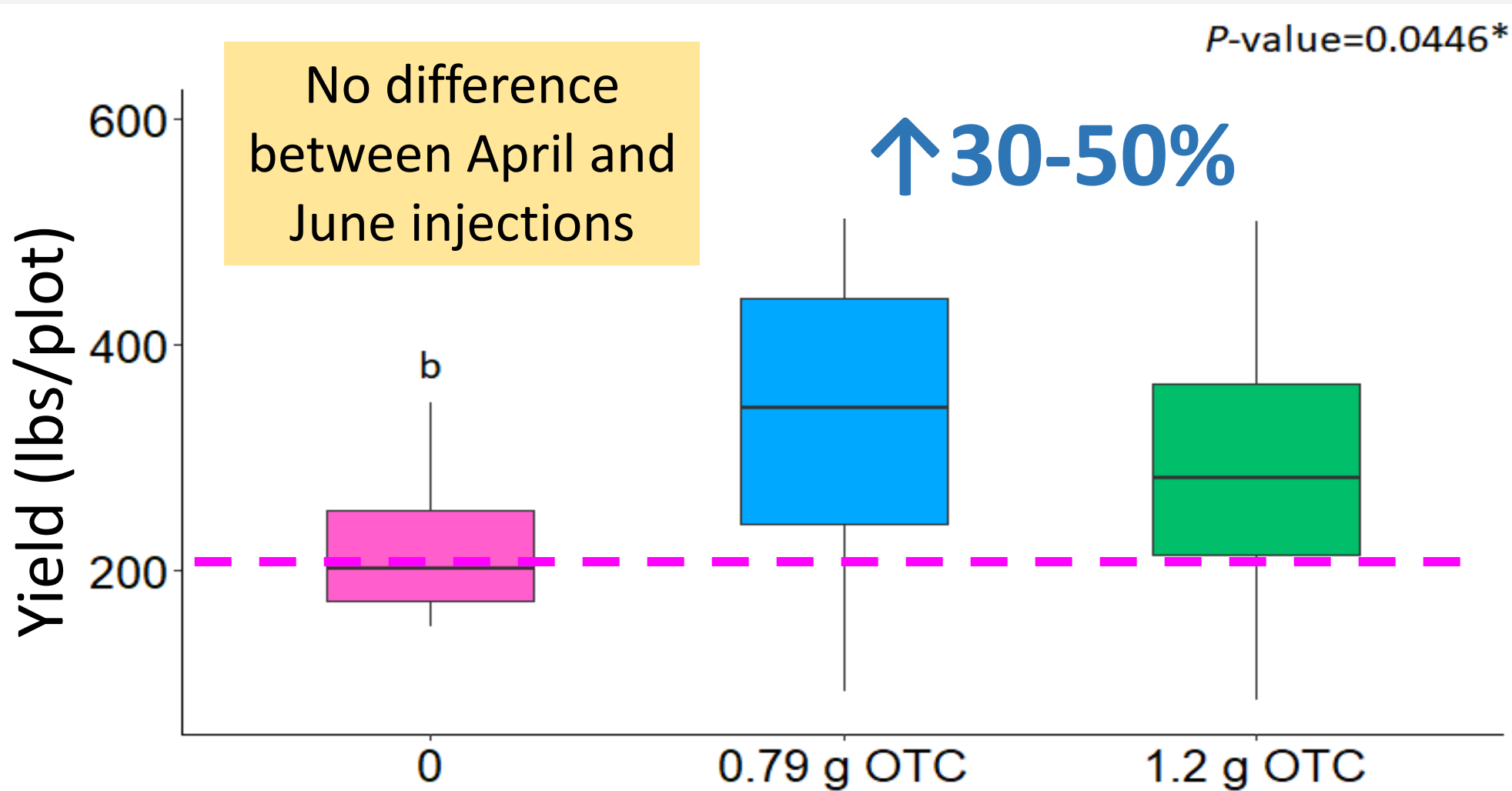


TREE HEALTH

But... results can be variable, even for the same tree



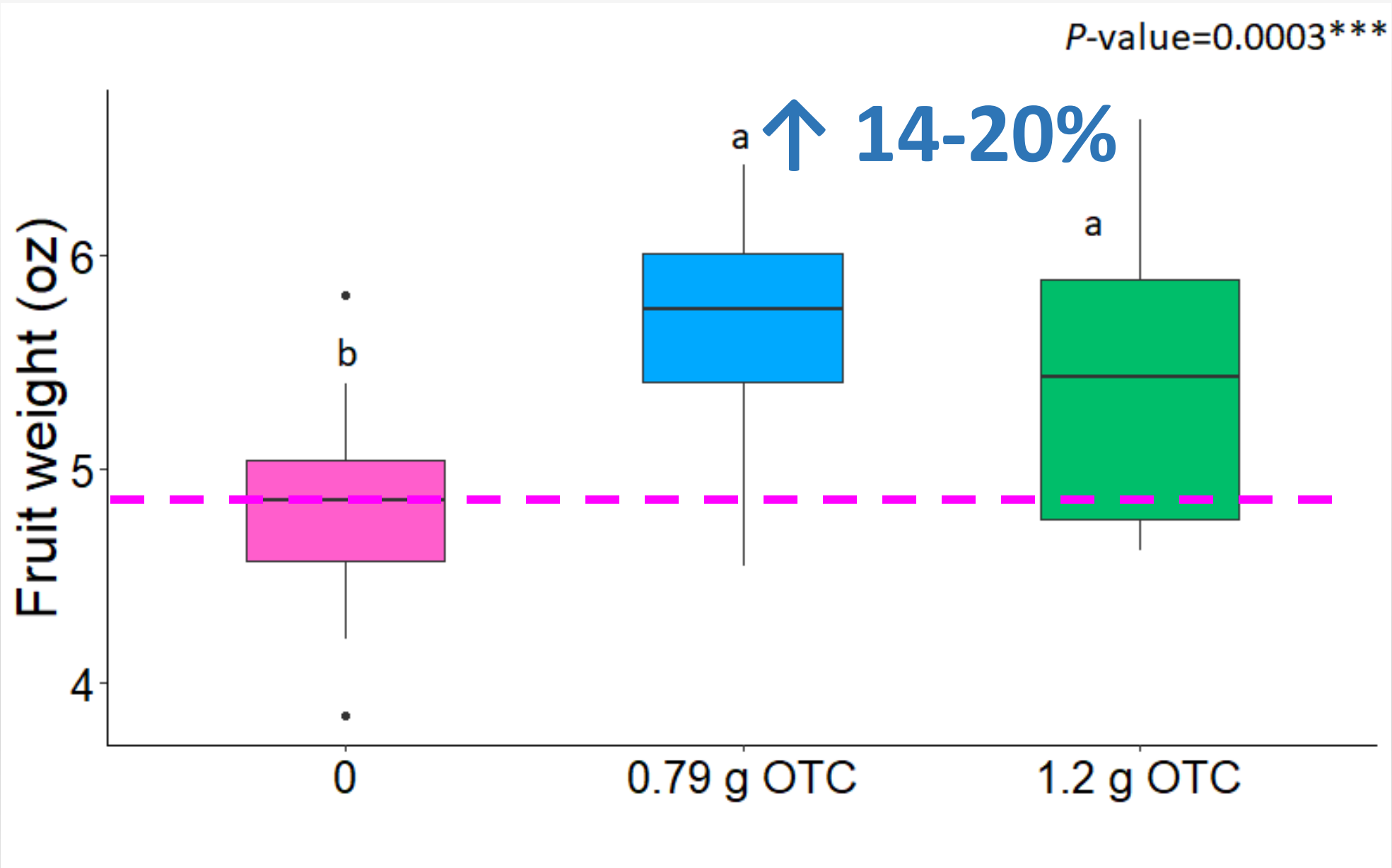
YIELD (7 March 2023)



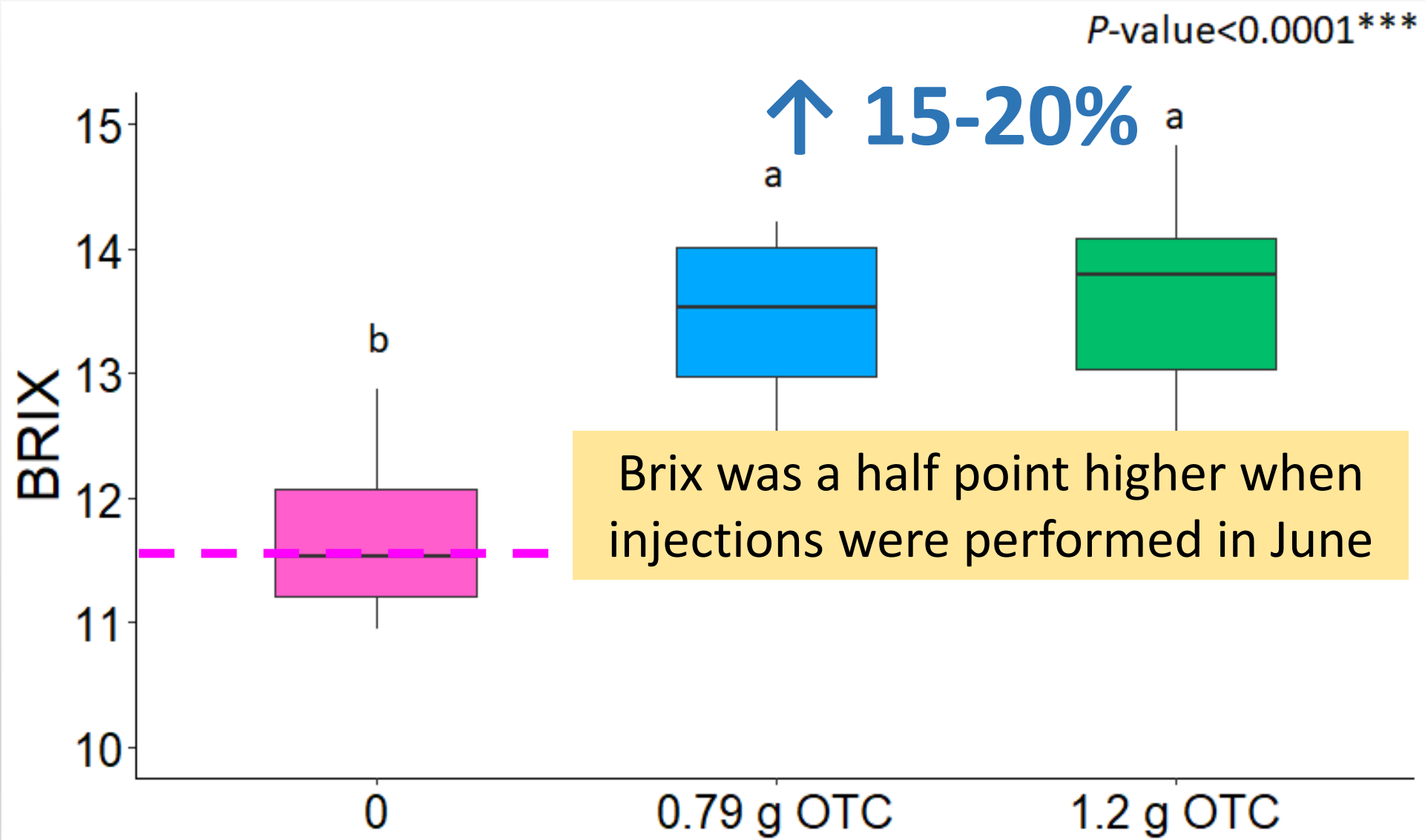
FRUIT QUALITY



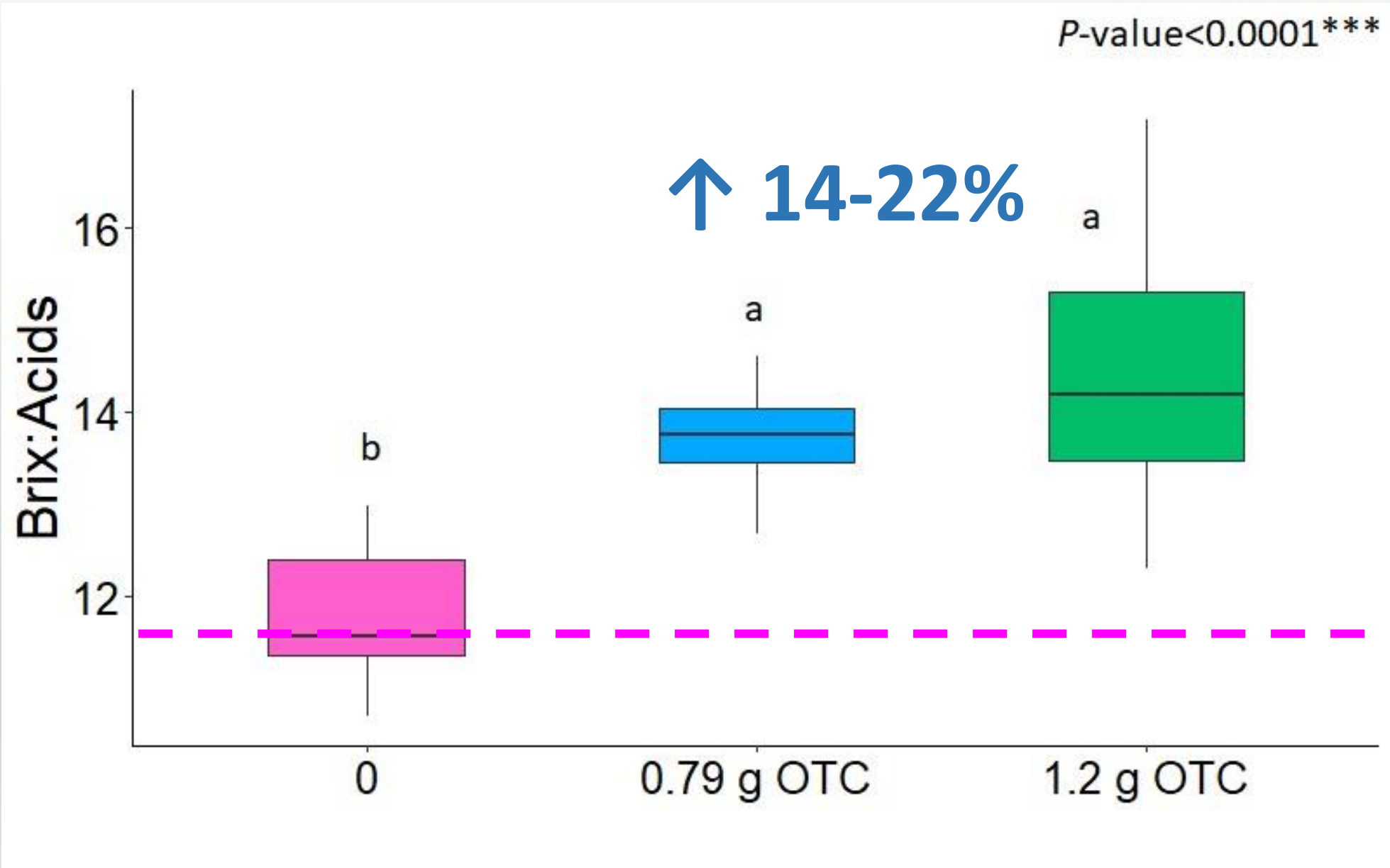
FRUIT SIZE / WEIGHT



JUICE BRIX



BRIX:ACID RATIO



YOUNG TREE STUDY - EAST COAST



YOUNG TREE STUDY - EAST COAST



Valencia/X639

Planted in 2018

Av. Trunk diam. - 3.0"



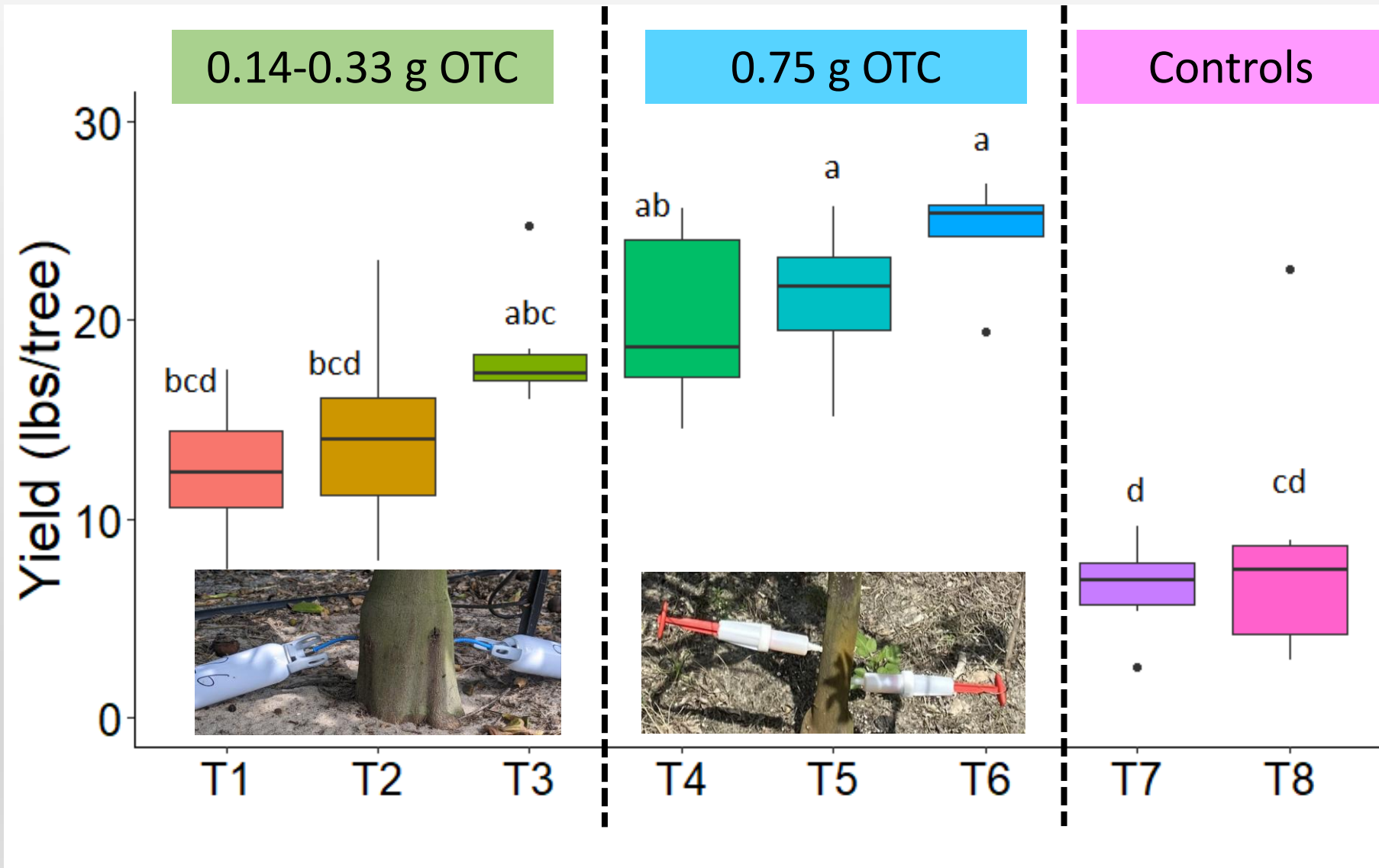
INJECTORS: Chemjets or Invaio System

INJECTION TIME: **May** and/or **August**

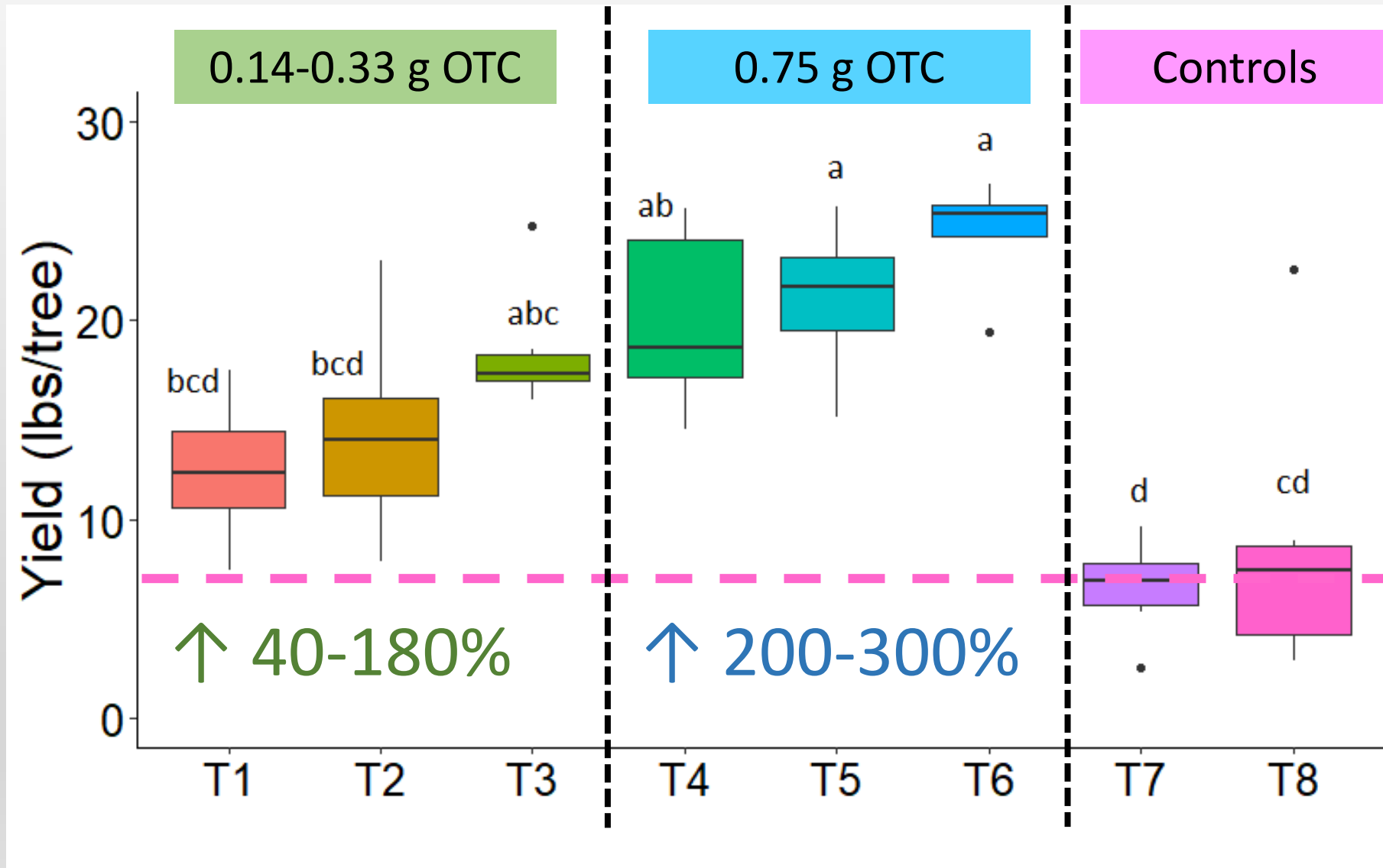
OTC DOSE: **0.14-0.75 g** a.i. per tree

START: 2022

YIELD (20 March 2023)



YIELD (20 March 2023)



YIELD (20 March 2023)

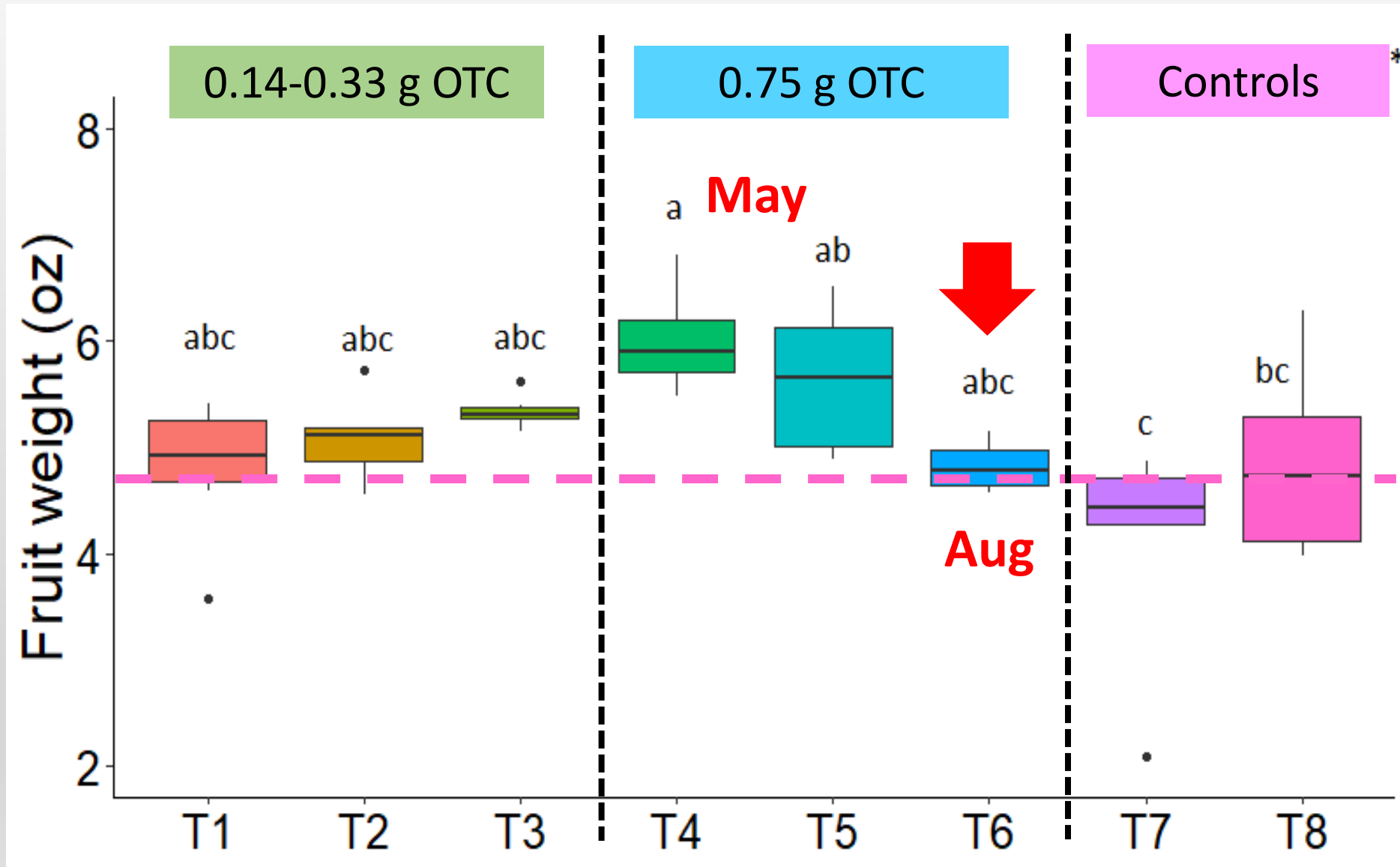
Control



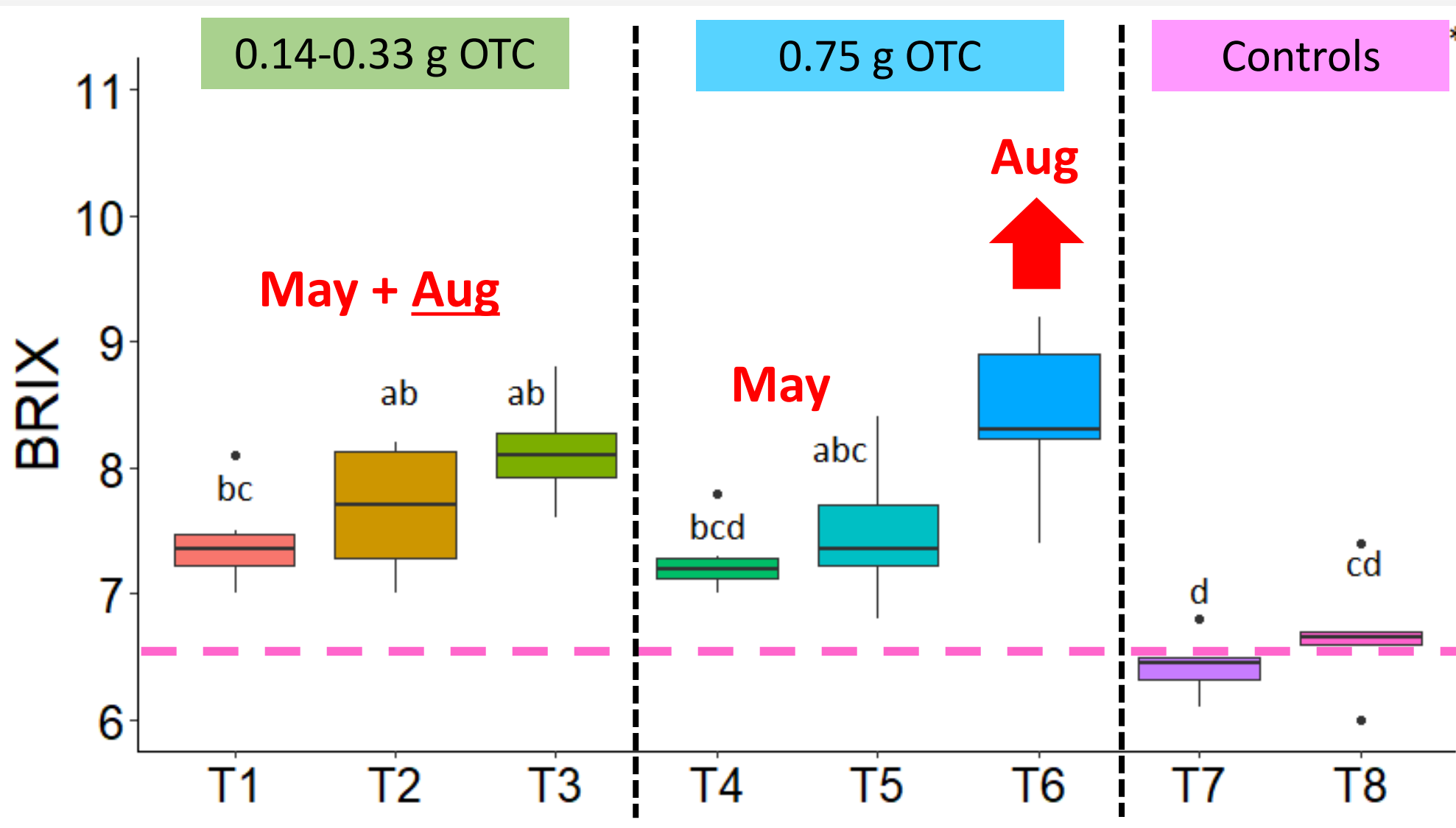
Fruit OTC residues
were below 0.01 ppm

0.75 g OTC

FRUIT WEIGHT/SIZE



JUICE BRIX



FRUIT SIZE



Larger fruit after spring injection than after summer or fall injection

OTC RESIDUES

- Per the EPA, the currently allowed residue level for fruits is **0.01 ppm (10 ppb)**
- A person weighing 100 kg would need to consume **more than 1,600 whole fruits*** **per day** to exceed the ADI (acceptable daily intake for total tetracycline residues: 25 $\mu\text{g}/\text{kg}$ of body weight)

*assuming a fruit weight of 156 g (5.5 oz)





Take-Home Messages

- ❖ Replicated field studies show consistent increases in yield and fruit quality (Brix, weight, and color) after injecting OTC, if done properly
- ❖ Responses are variable and depend on tree age, time of injection, and other factors
- ❖ OTC injections are no replacement for psyllid control

Thank You

USDA-NIFA 2019-70016-29096

USDA-NIFA 2021-70029-36056

CRDF 22-001, 23-002, 23-005

Grower Collaborators





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Institute of Food and Agricultural Sciences
Southwest Florida Research and Education Center