Best practices for applying oxytetracycline by trunk injection

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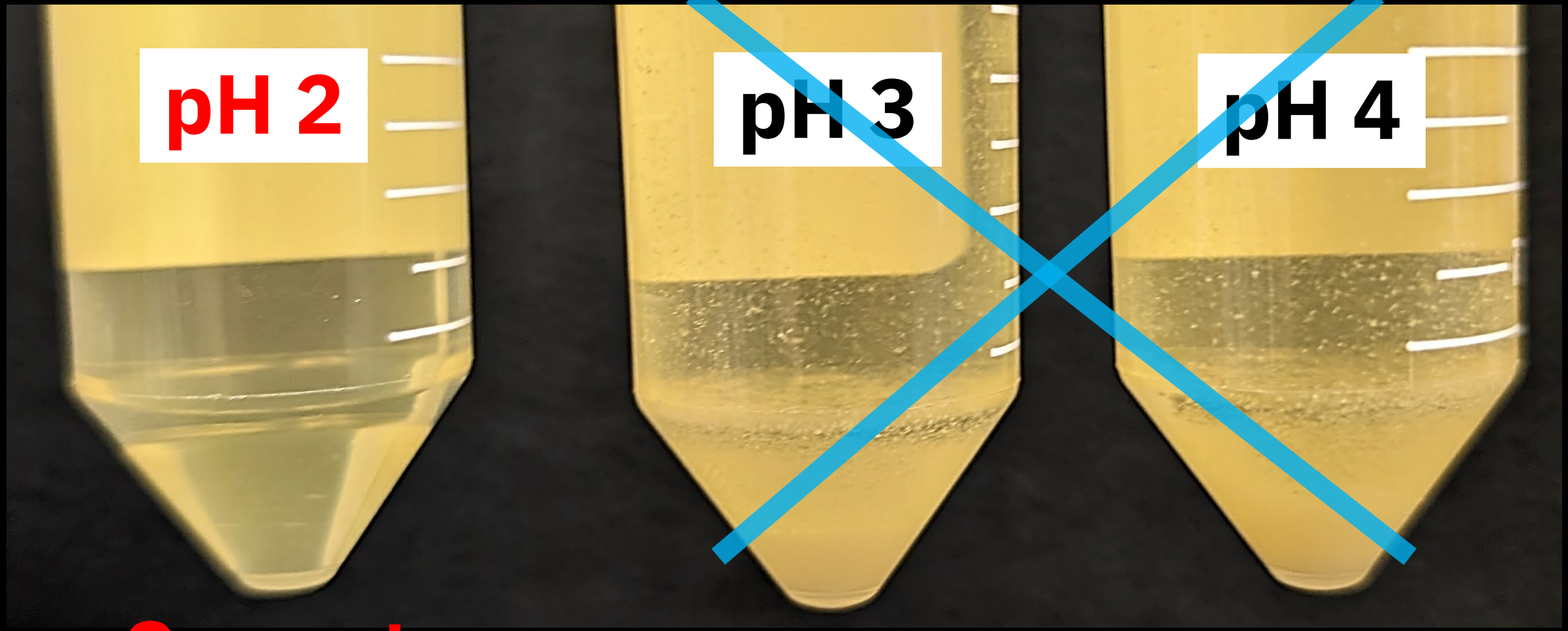
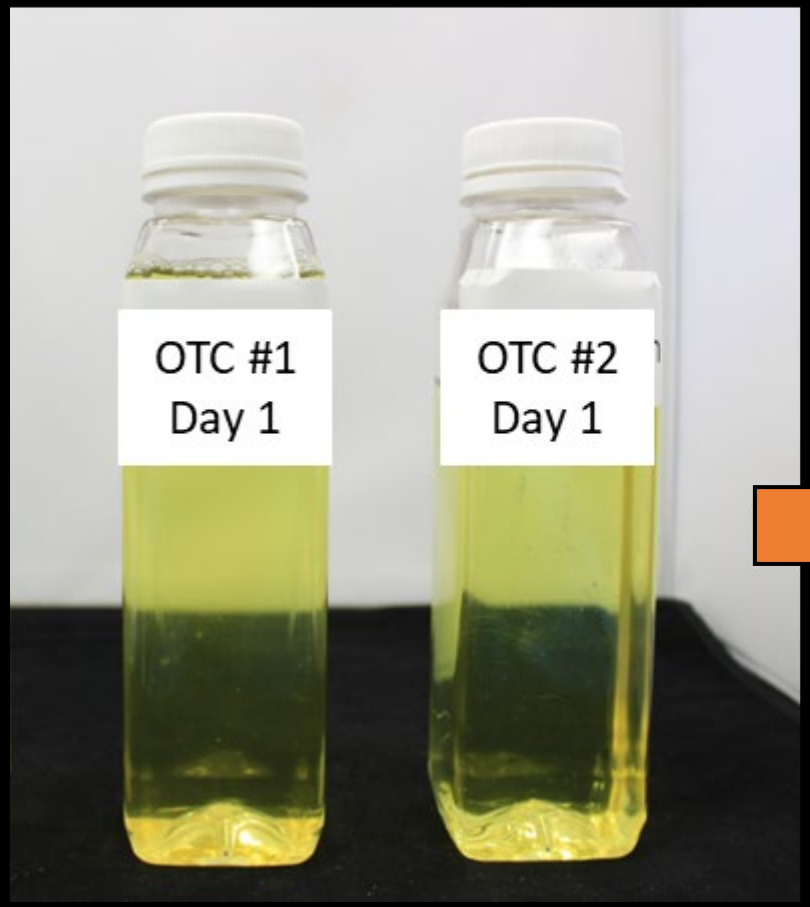
General good practices

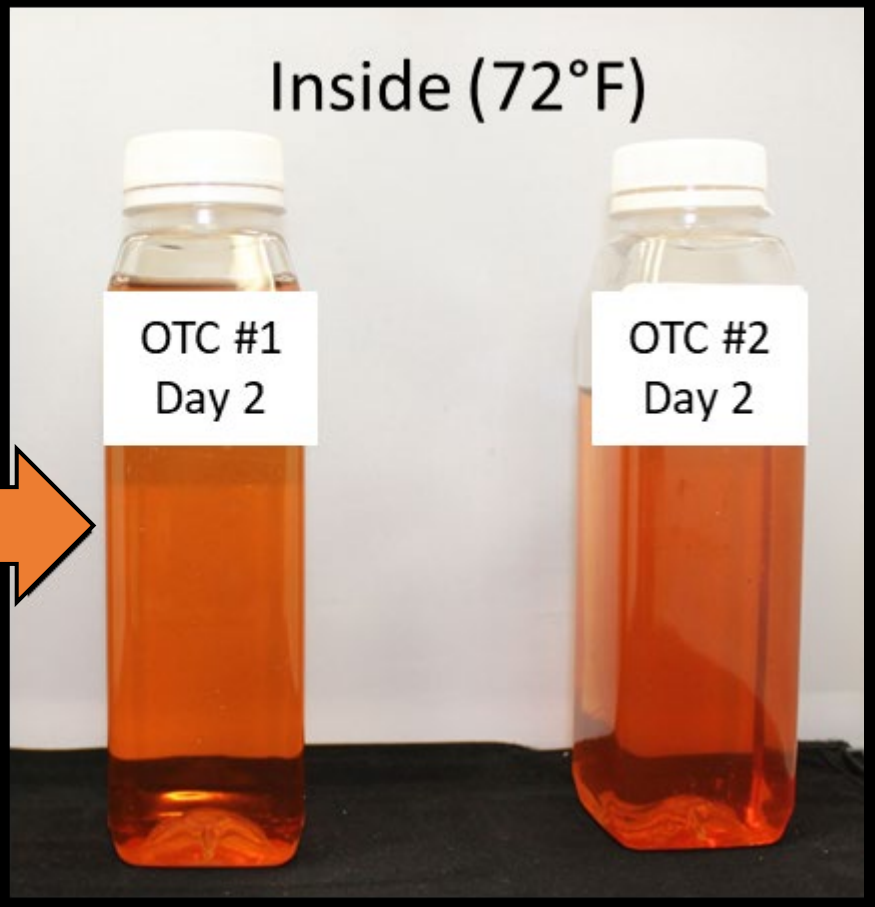
Acidify OTC solutions correctly

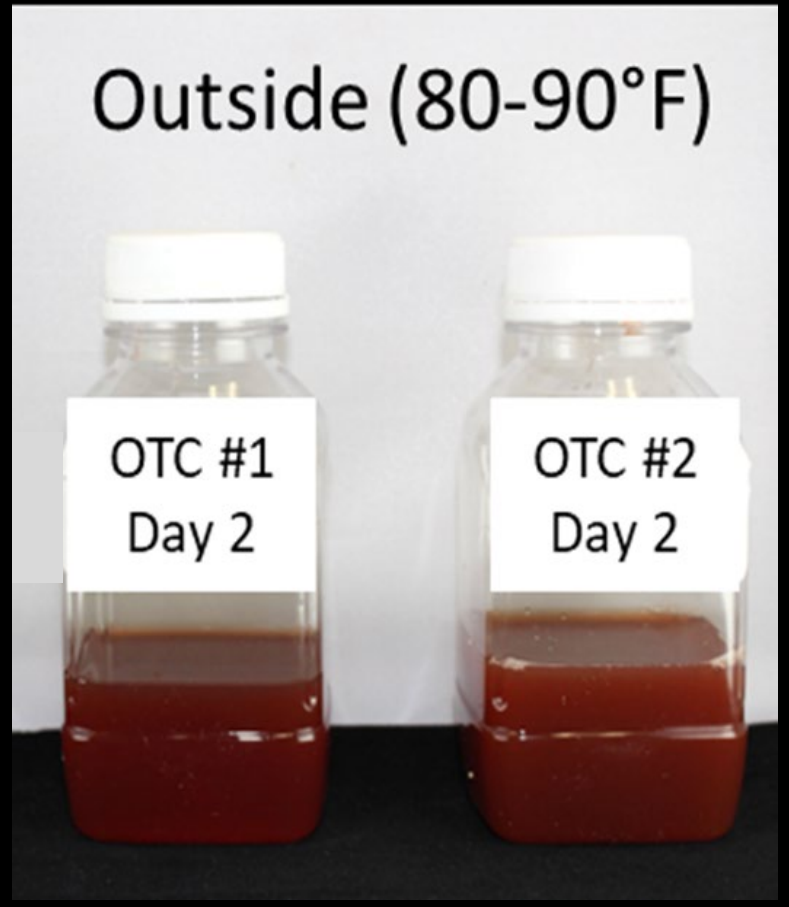


Correct

Use prepared solution promptly







OTC degrades quickly once in solution, especially under hot conditions


OTC solution should be prepared freshly on site
CHEMICAL CONTAINERS
AGITATION
FILL PUMP

Both OTC formulations produce similar effects

Treatment	2024		2025	
	Yield (lbs/tree)	TSS (Brix)	Yield (lbs/tree)	TSS (Brix)
No injection	16 b	8.5 b	45 b	9.3
OTC #1	36 a	10.1 a	68 a	10.3
OTC #2	34 a	10.2 a	61 a	10.3
P-value	*<0.0001*	*0.0013*	*0.0006*	*0.1027*

Valencia/X-639 (planted in 2017)

OTC effects on fruit quality depend on the month of injection

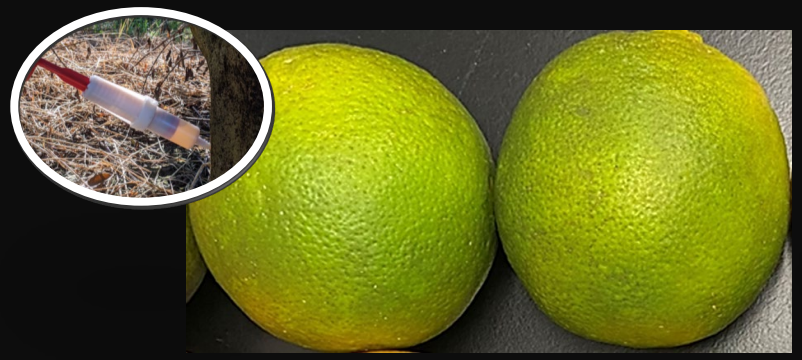
Fruit development (Valencia)

Stage I
Cell division

Stage II
Cell enlargement

Stage III
Maturation

Feb Mar Apr May Jun Jul Aug ~~Sep~~ Oct Nov Dec Jan



Fruit size ↑
peel color ↓, Brix ≈

Fruit size ≈
peel color ↑, Brix ↑

OTC residues: ↑

APR

OCT

NONE

High Brix but … high OTC residues!

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Suggested Use Pattern of Injectable Antimicrobials for Huanglongbing (HLB) Management (March 2025)

U. Albrecht, O. Batuman, and M.M. Dewdney[1]

This document is a suggested use pattern of injectable antimicrobials in Florida citrus. This is not an official University of Florida recommendation. Information is based on FIFRA Section 24(c) Special Local Need Label for ReMedium TI ®(10/28/2022) and Rectify™ (01/30/2023).

Antibacterial Product Application Schedule

The application schedule should be adjusted based on expected harvest time and flowering. The red boxes indicate the possible timing of injection. Only one application per year is allowed for bearing trees, but non-bearing trees can be injected twice annually with a 4-month interval.

Citrus Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Early Season Varieties (Ex. Hamlin, Navel, Fallglo)			■	■	■	■						
Mid Season Varieties (Ex. Murcott, Pineapple, Midsweet)			■	■	■	■	■					
Late Season Varieties (Ex. Valencia)			■	■	■	■	■	■				
Grapefruit (Ex. Ray Ruby, Flame, Ruby Red)			■	■	■	■						

The latest possible injection application should be determined based on the 180-day PHI from the expected harvest date.
The colors indicate the most desirable (dark red) and less desirable (light red) injection time.

Application

- DO NOT apply during bloom.
- DO NOT apply during leaf flushing.
- Recommended to apply when leaves are fully expanded for efficient uptake and distribution.
- Trees should be well-watered before and at the time of application.
- DO NOT apply during drought conditions.
- Leaf yellowing (phytotoxicity) may occur on the side of injection.
- ONLY inject once the product is fully dissolved.
- ONLY use freshly prepared solution.

Injection Sites

- Do not re-use injection sites.
- The rootstock is the recommended location for injection, but scion injections are also effective.
- Subsequent injections should be above or below the initial site by 2 inches and on the opposite side, or to the right or left by 2 to 3 inches.
- Do not use any post-wounding treatments as these may interfere with wound healing.



Other considerations

- Injection into the trunk can cause significant damage to the tree.
- Trees with a trunk diameter of less than 2.5 inches are prone to more damage.
- Minimizing the hole size by using a smaller injector tip will minimize tree damage.

THE LABEL IS THE LAW!
Refer to the label for additional information. This guide does not supersede the label.

ANTIBACTERIAL PROGRAMS DO NOT REPLACE ASIAN CITRUS PSYLLID MANAGEMENT PROGRAMS.

1. U. Albrecht, associate professor, Department of Horticultural Sciences, Southwest Florida Research and Education Center, O. Batuman, associate professor, Department of Plant Pathology, Southwest Florida REC, and Megan M. Dewdney, associate professor, Department of Plant Pathology, Citrus REC; UF/IFAS Extension; Gainesville, FL 32611.

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Suggested Use Pattern of Injectable Antimicrobials for Huanglongbing (HLB) Management (March 2025)

U. Albrecht, O. Batuman, and M.M. Dewdney[1]

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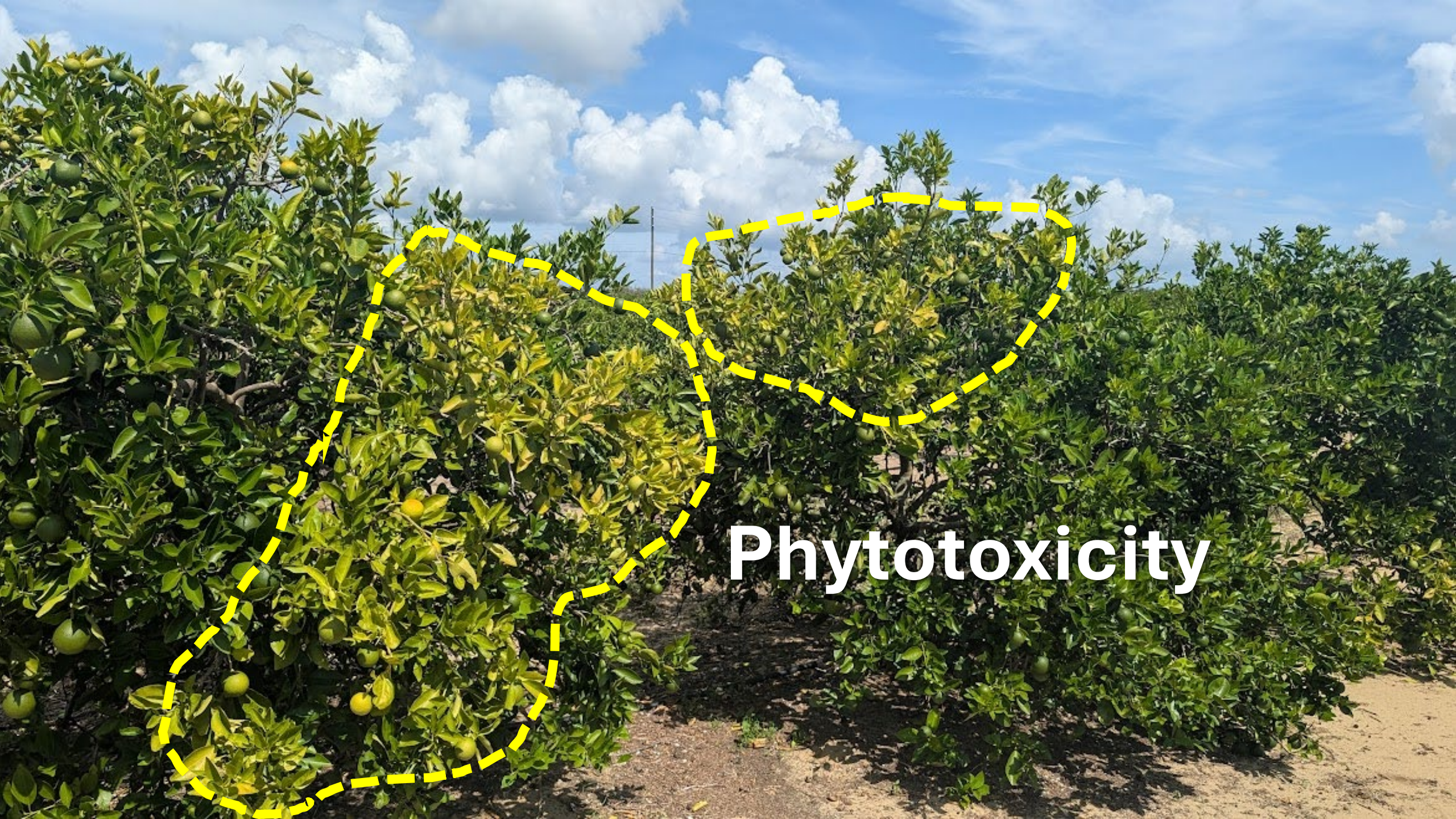
OTC is not equally distributed within the tree


Sectoring


Phytotoxicity

Two injection sites are better than one

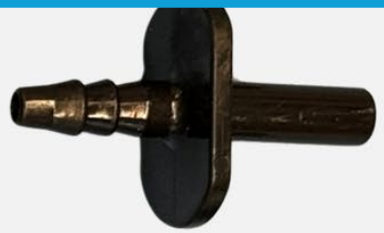
OTC injections cause trunk injury

Adjust applicator size based on trunk diameter

Small trees

11/64”

13/64”



7/32”

Large trees

17/64”

Higher OTC rates are usually more effective

VALENCIA/SOUR ORANGE (planted in 2013)

Cumulative improvements after two consecutive years of injection

OTC rate	Boxes/ acre	Lbs solids/ acre	
YEAR 1			
Non-injected	57 b	274 b	
5,500 ppm	75 a	408 a	49%
11,000 ppm	95 a	543 a	98%
YEAR 2			
Non-injected	101 b	541 b	
5,500 ppm	173 a	1066 a	97%
11,000 ppm	223 a	1385 a	156%

290 trees /acre

Integrate OTC injections with other practices

Individual protective covers (IPCs)

Combining IPCs and OTC injection

Trees planted: May 2023

↓ 18 months

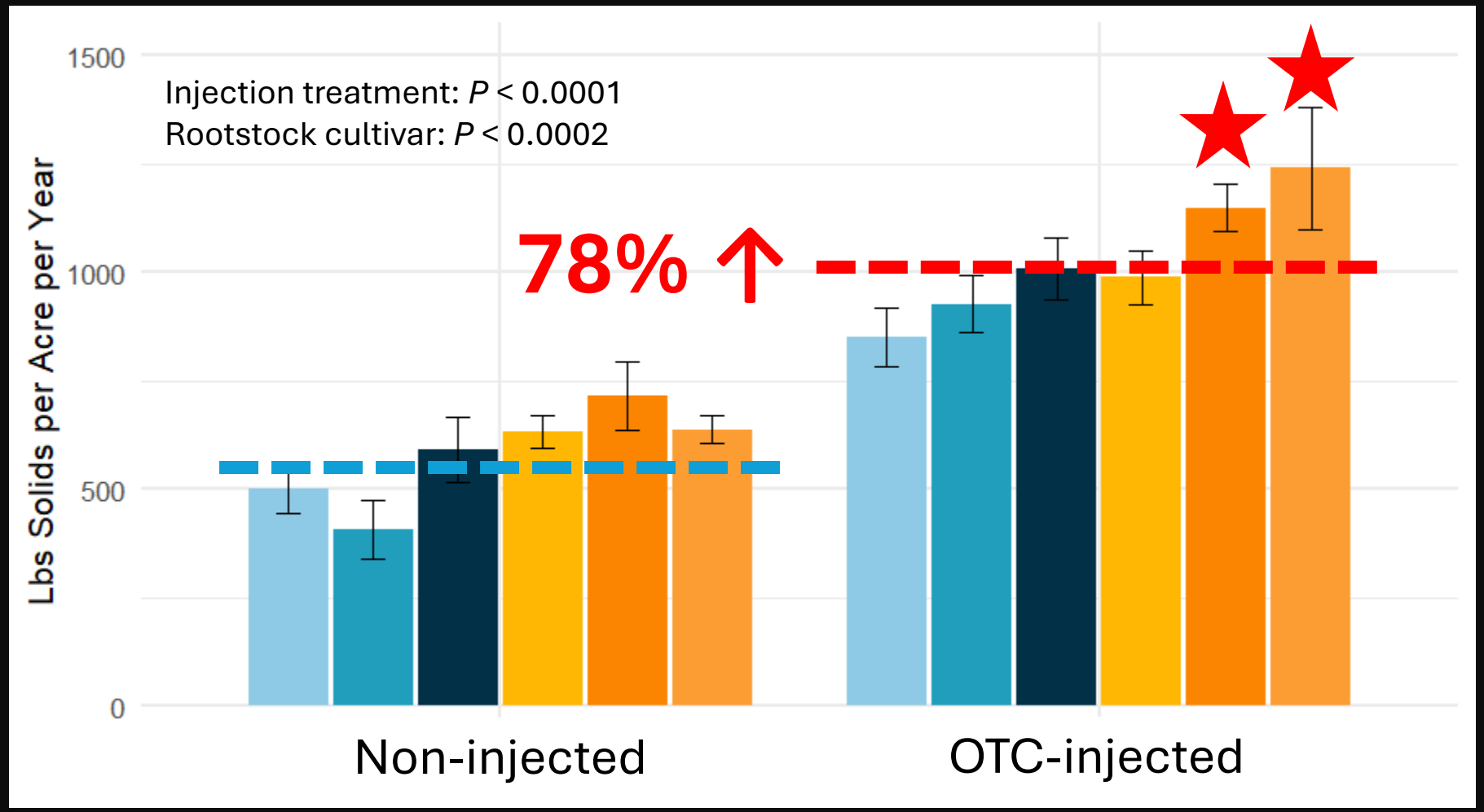
IPCs removed: Nov 2024

↓ 6 months

First Injection: May 2025

11/64”

Combining genetics and OTC injection



Rootstocks

- Cleopatra
- Swingle
- Sour orange
- SuperSour 3
- SuperSour 4
- SuperSour 5

Scion: Valencia

Collaborator : Dr. Kim Bowman, USDA

UNTIL WE HAVE THE "TREE OF THE FUTURE"…

- ✓ Optimize OTC injections
- ✓ Integrate OTC injections with other practices (IPCs, rootstock, PGRs, and **vector control**)
- ✓ Continue with good grove care (good nutrition, irrigation, etc.)

THANK YOU

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