

Trunk injection of imidacloprid and oxytetracycline in young Valencia trees

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March 23, 2022

Funding

Development of an automated delivery system for therapeutic materials to treat HLB infected citrus

USDA-NIFA-SCRI #2019-70016-29096



United States Department of Agriculture
National Institute of Food and Agriculture

UF | IFAS
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Trunk injection

- Targeted delivery of crop protection materials into the stem or trunk of woody species as an alternative to spraying or soil drenching
- Injection occurs into the xylem; materials are then distributed through the plant with the transpiration stream



Trunk injection

- Precision delivery
- Eliminate spray drift
- Minimize run-off and environmental contamination
- Reduced risk of exposure for farmworkers
- Longer residual activity





Field trial

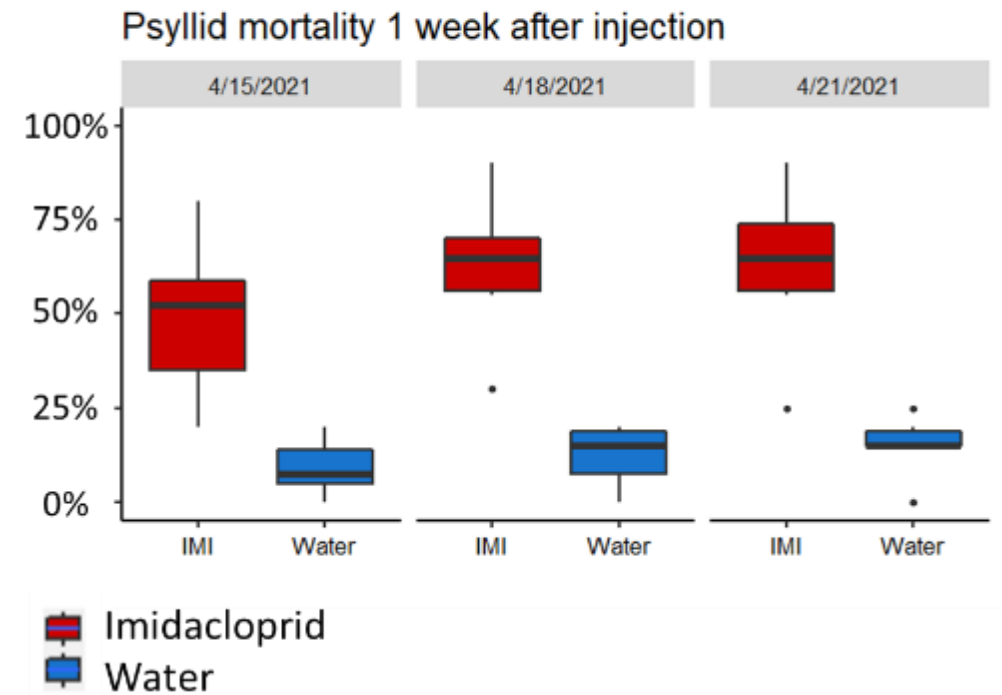
- Valencia sweet orange trees (5-year-old) on Kuharske rootstock
- Injections performed in Fall (October '20) and Spring (April '21)
 - Oxytetracycline
 - Imidacloprid
 - Water
 - No Injection
- Harvest data collected in February '21 and February '22

Injections performed at recommended label rates using Chemjet tree injectors (2 injectors per tree on opposite sides of the trunk)

Efficacy of injection: Imidacloprid

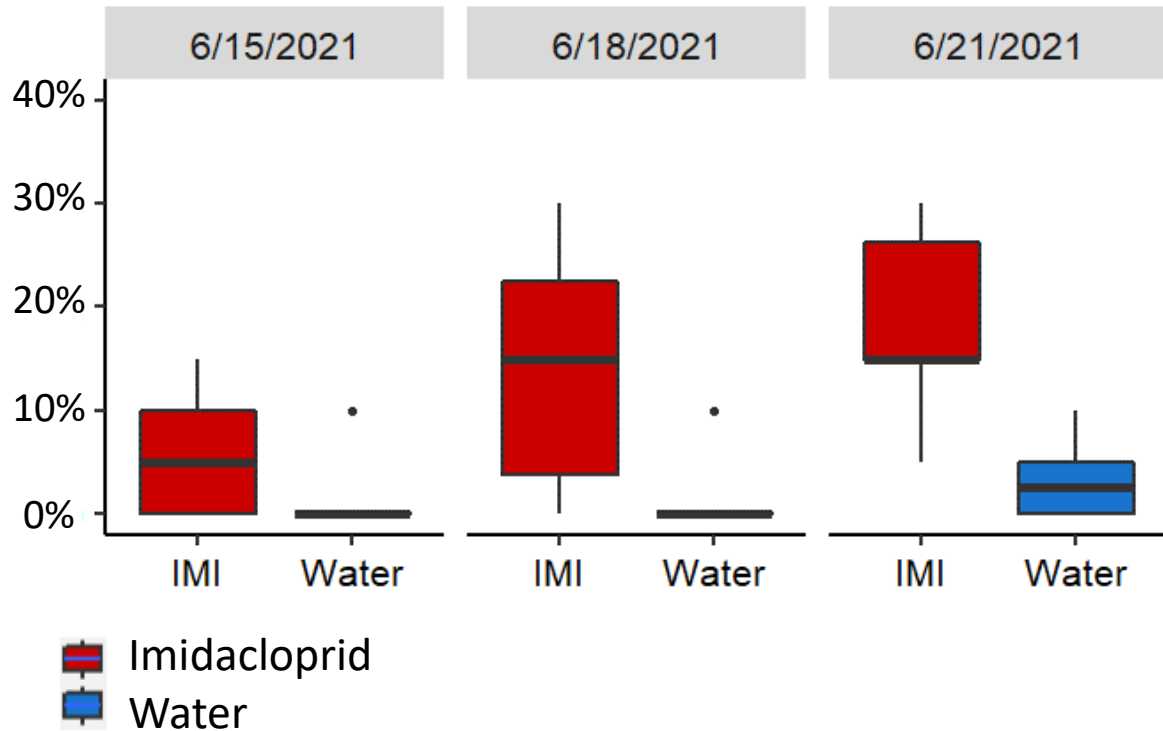


63% adult psyllid mortality **one week** after injection

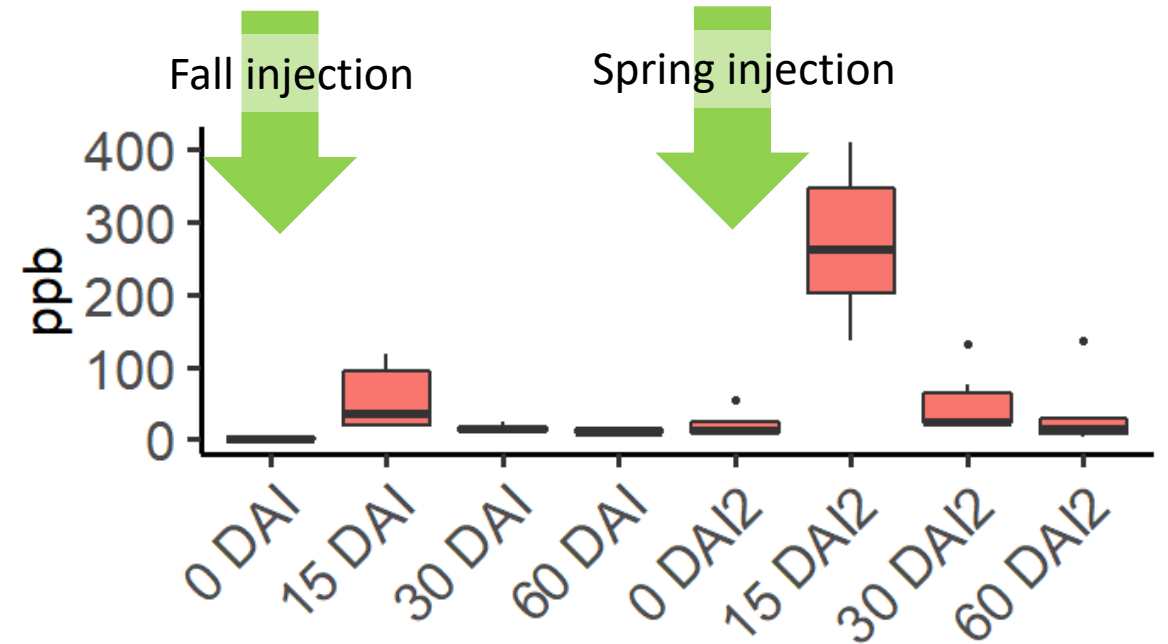


Efficacy of injection: Imidacloprid

Psyllid mortality 2 months after injection



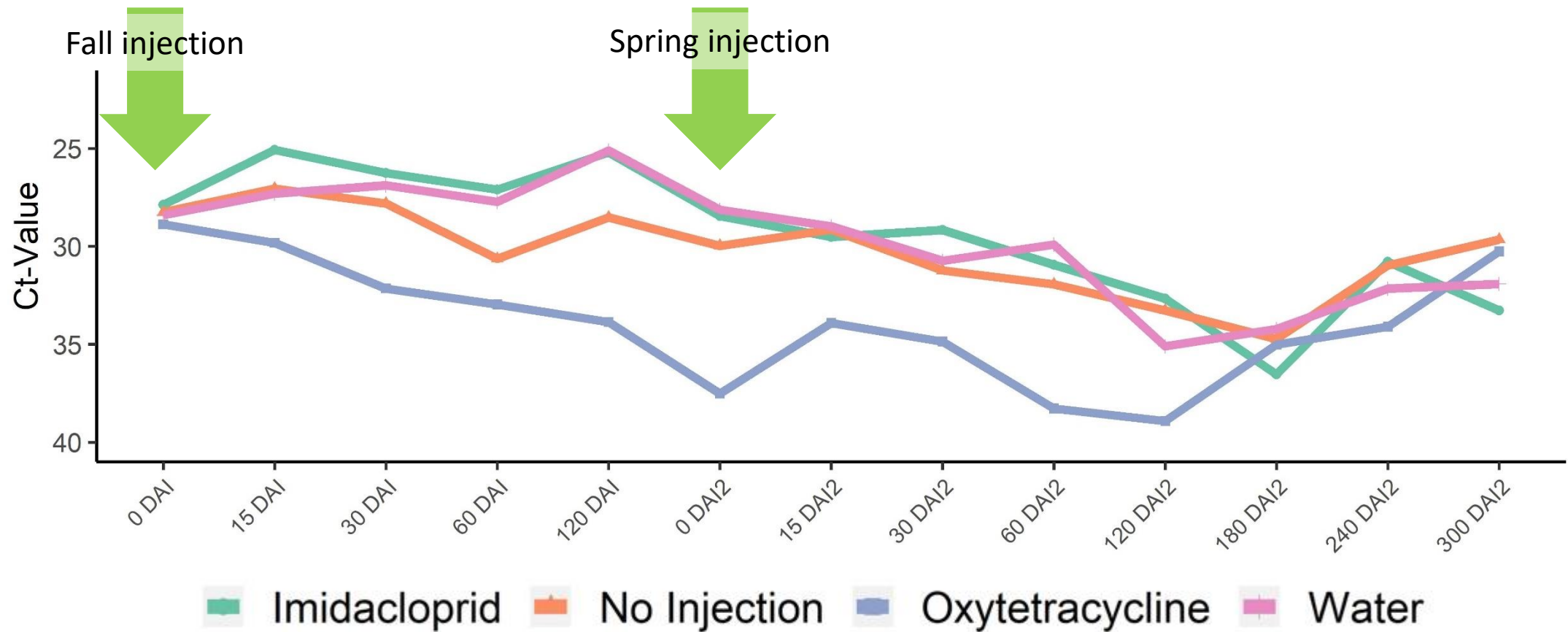
Leaf imidacloprid concentration



18% adult psyllid mortality **two months** after injection

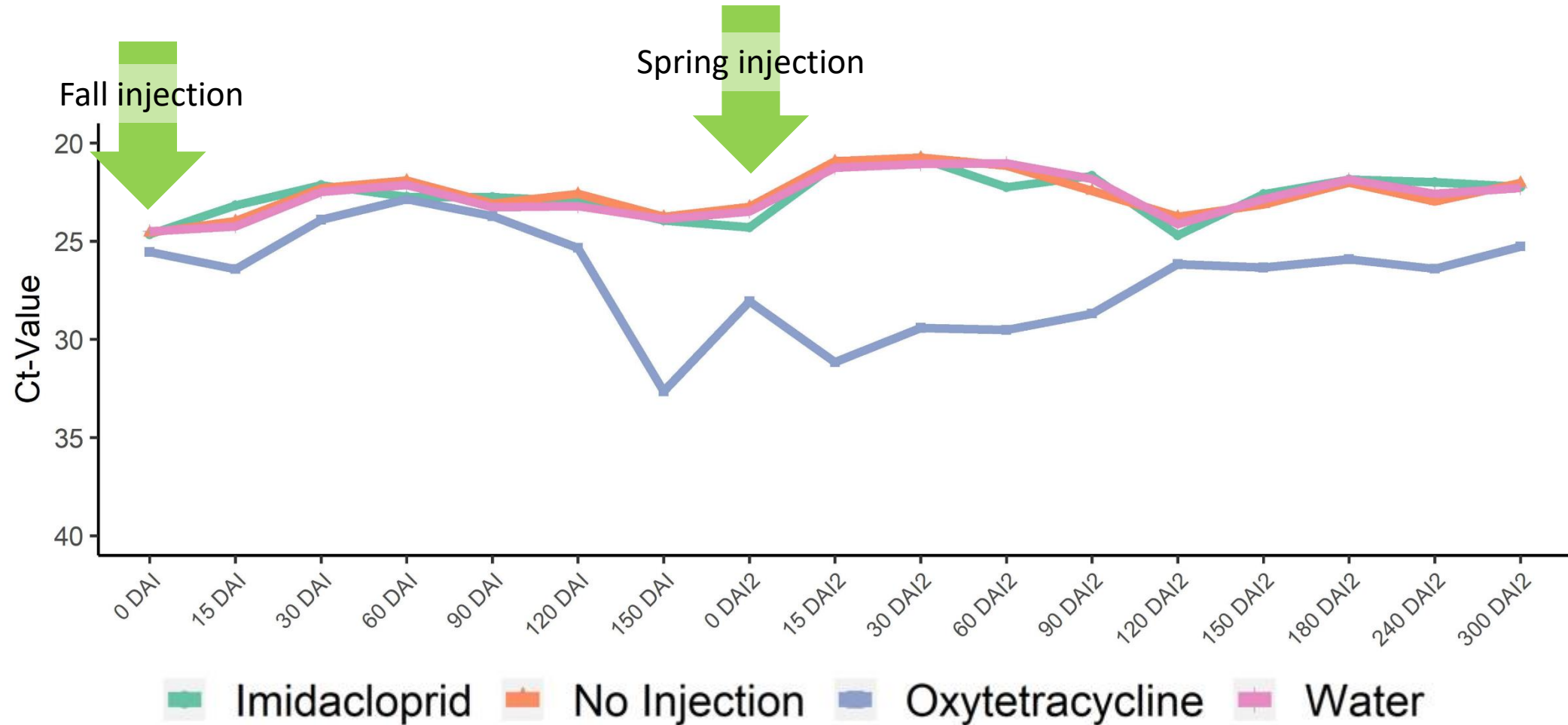
Efficacy of injection: Oxytetracycline

Roots: Ct-values

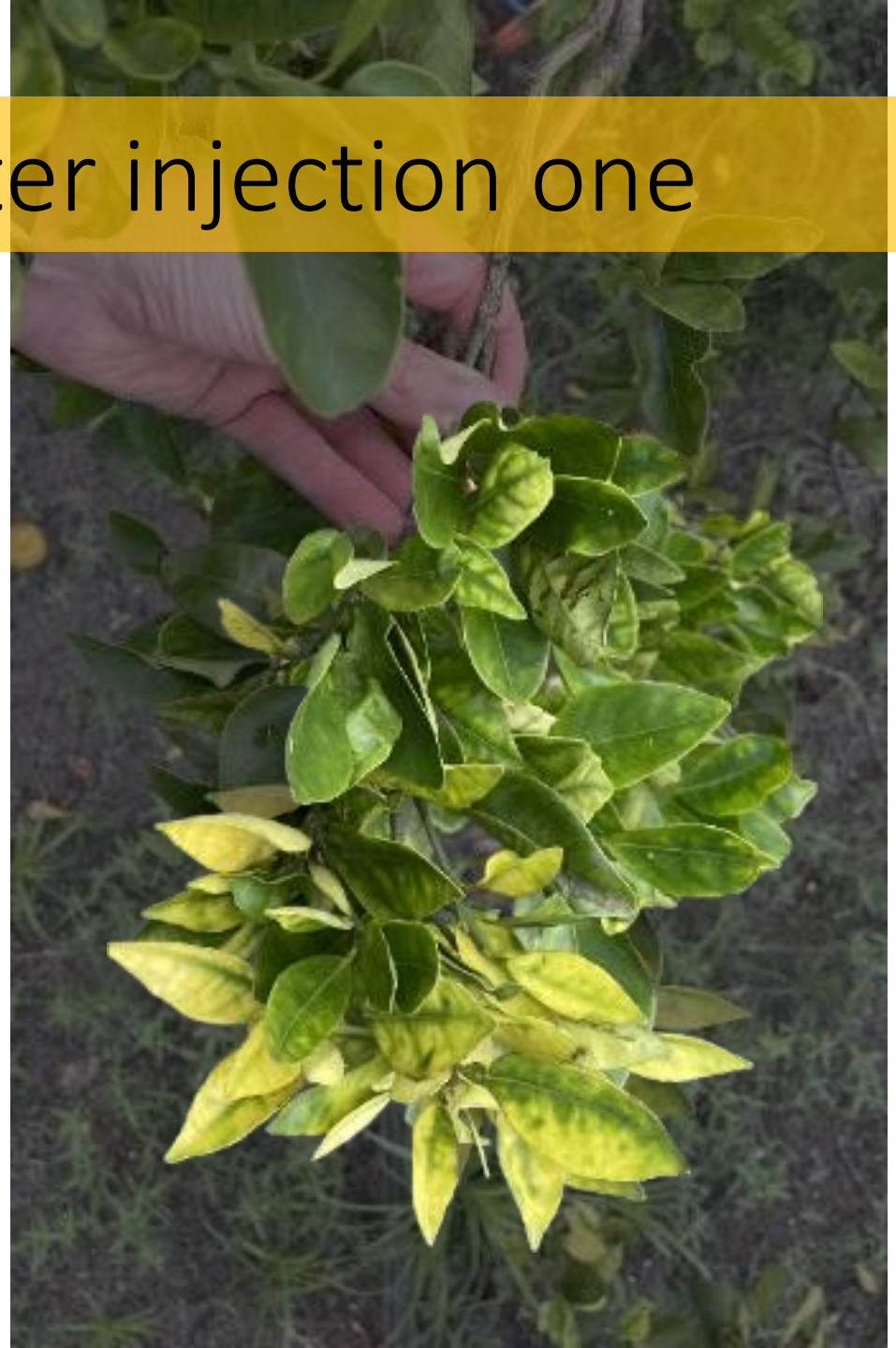


Efficacy of injection: Oxytetracycline

Leaves: Ct-values



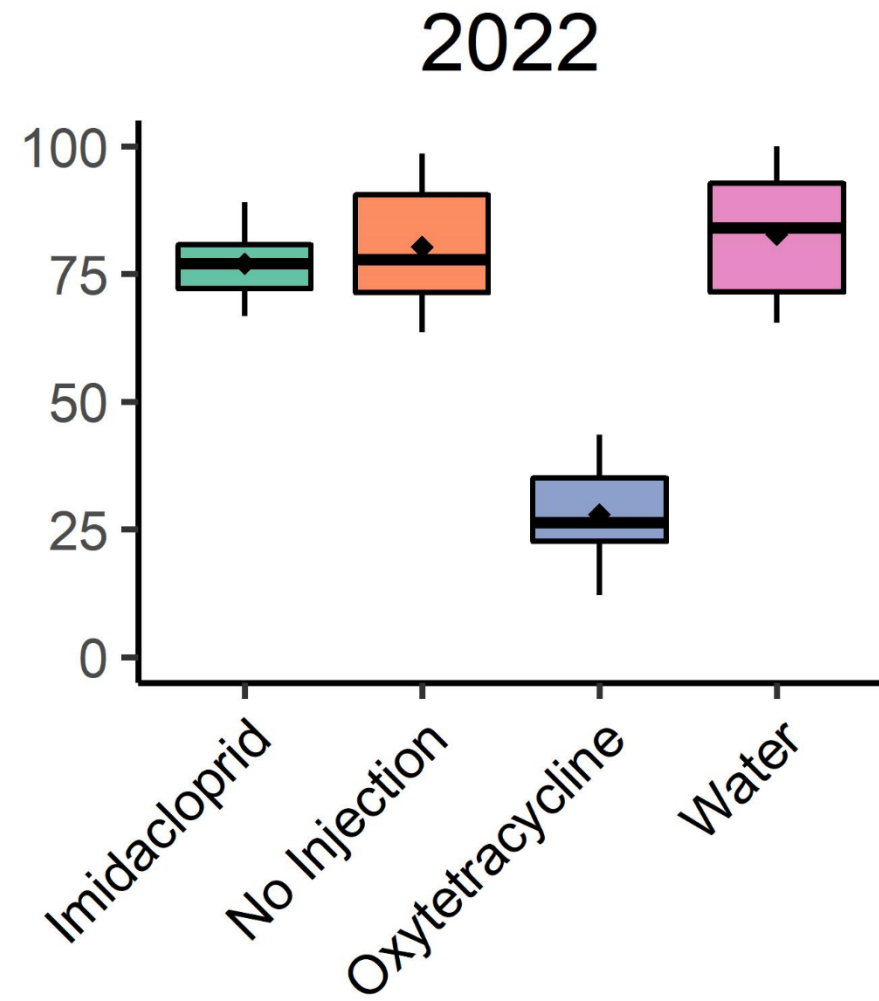
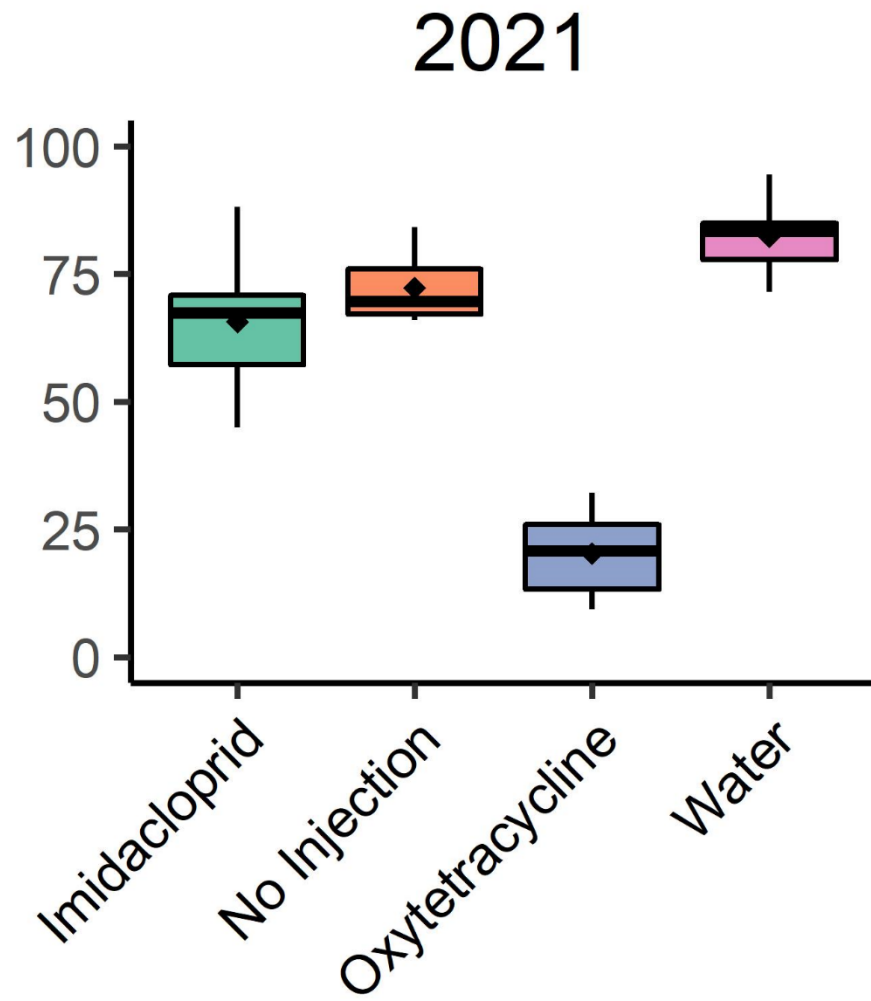
Efficacy: 6 months after injection one



Efficacy: 6 months after injection one



Percent Fruit Drop

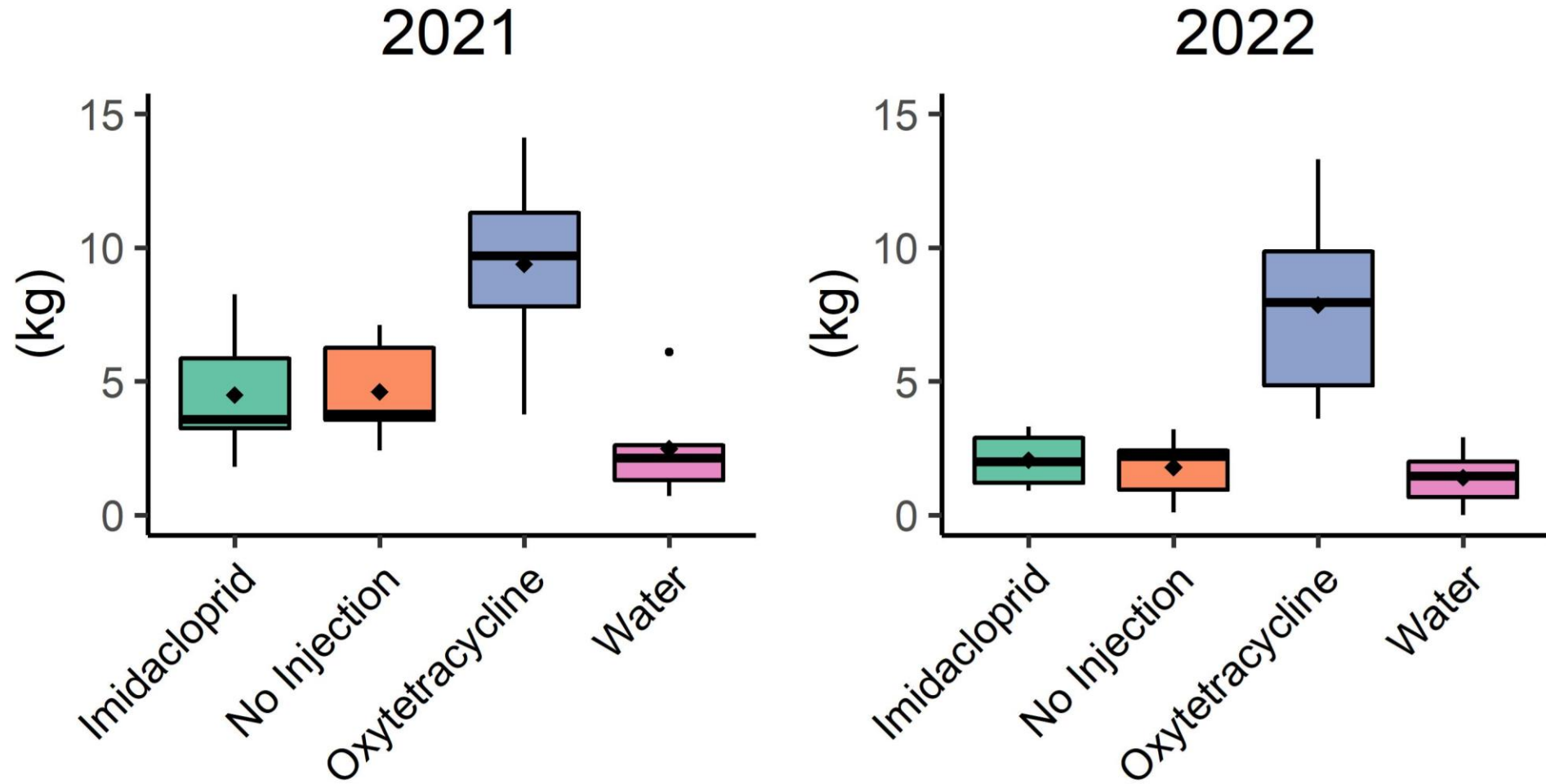




OTC-Injected

Water-Injected

Yield



Fruit quality after fall injection



Control



Oxytetracycline

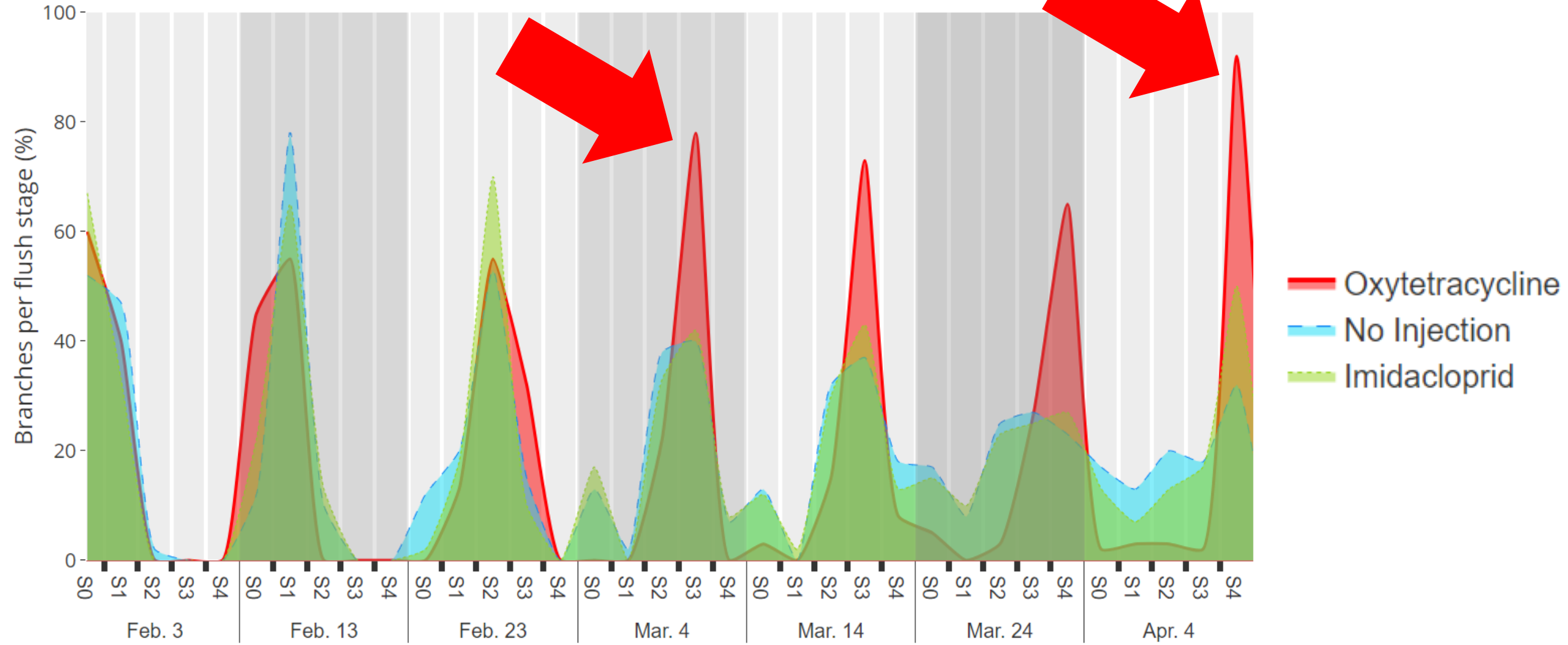
Fruit quality after spring injection

Control



Oxytetracycline

Flush timing



Stage 0 (S0) = No flush

S1 = Feather

S2 = Elongation

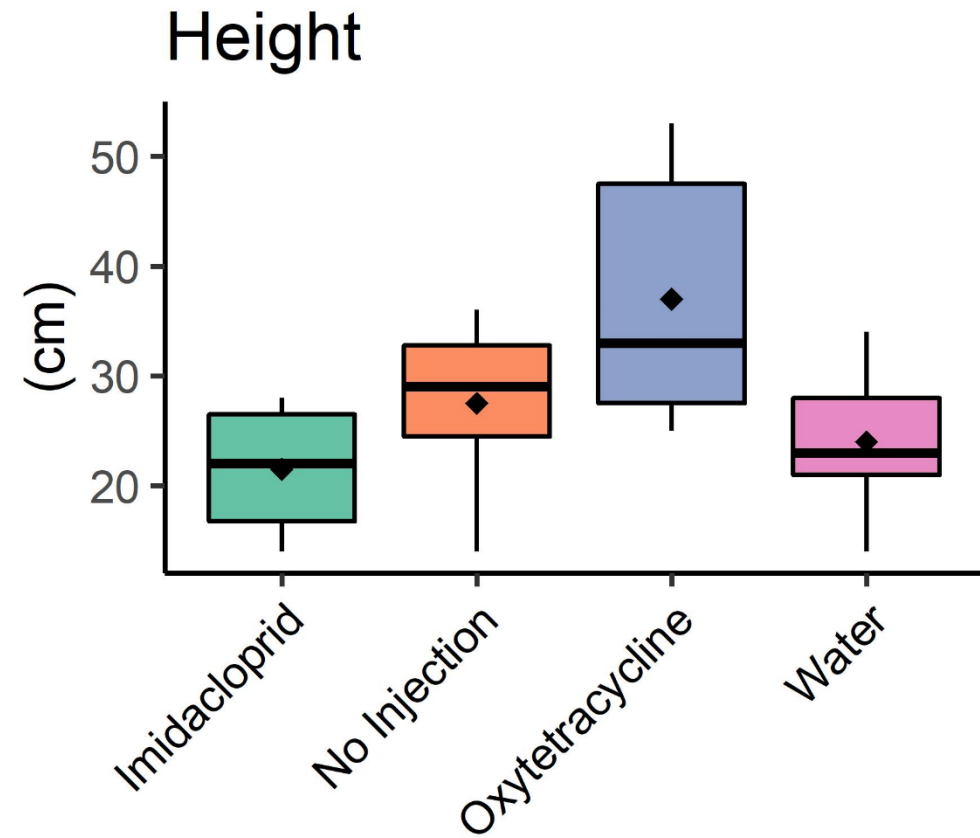
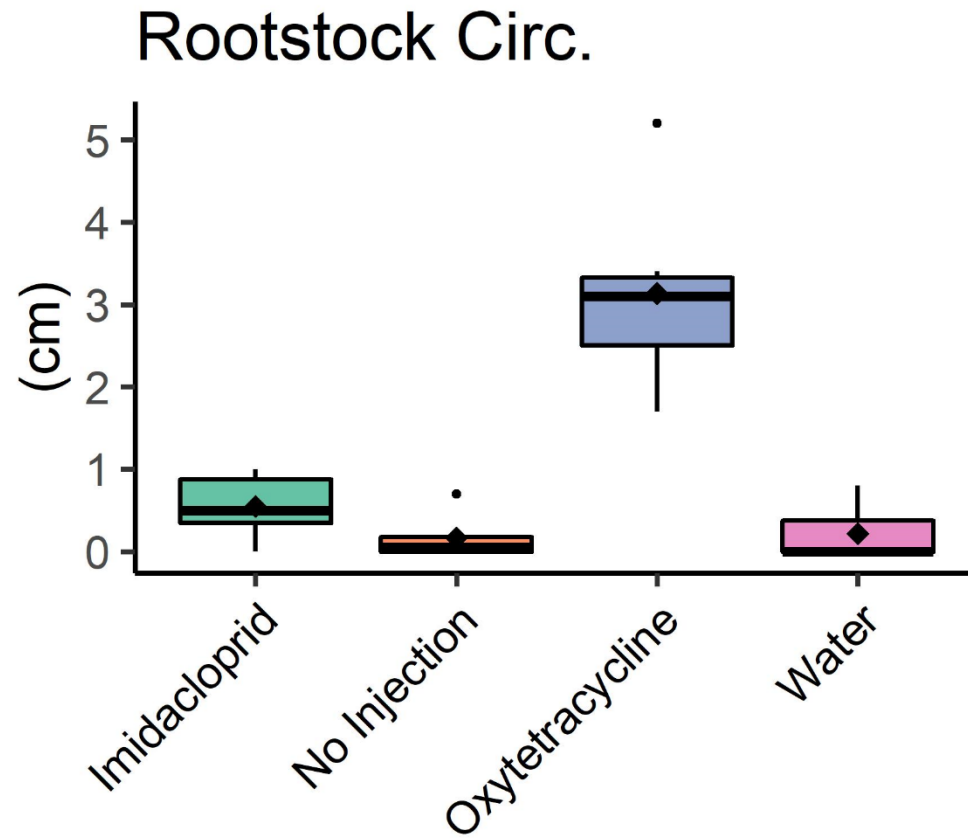
S3 = Leaf Expansion

S4 = Leaf Hardening



Efficacy: 1 year after injection one

Change in tree size: October 2020 – March 2022





Trunk injection: Risks

- Wounding and internal injury associated with drilled injection ports
- Phytotoxicity associated with therapeutics

Water

Oxytetracycline



Water



Oxytetracycline



Water



Oxytetracycline

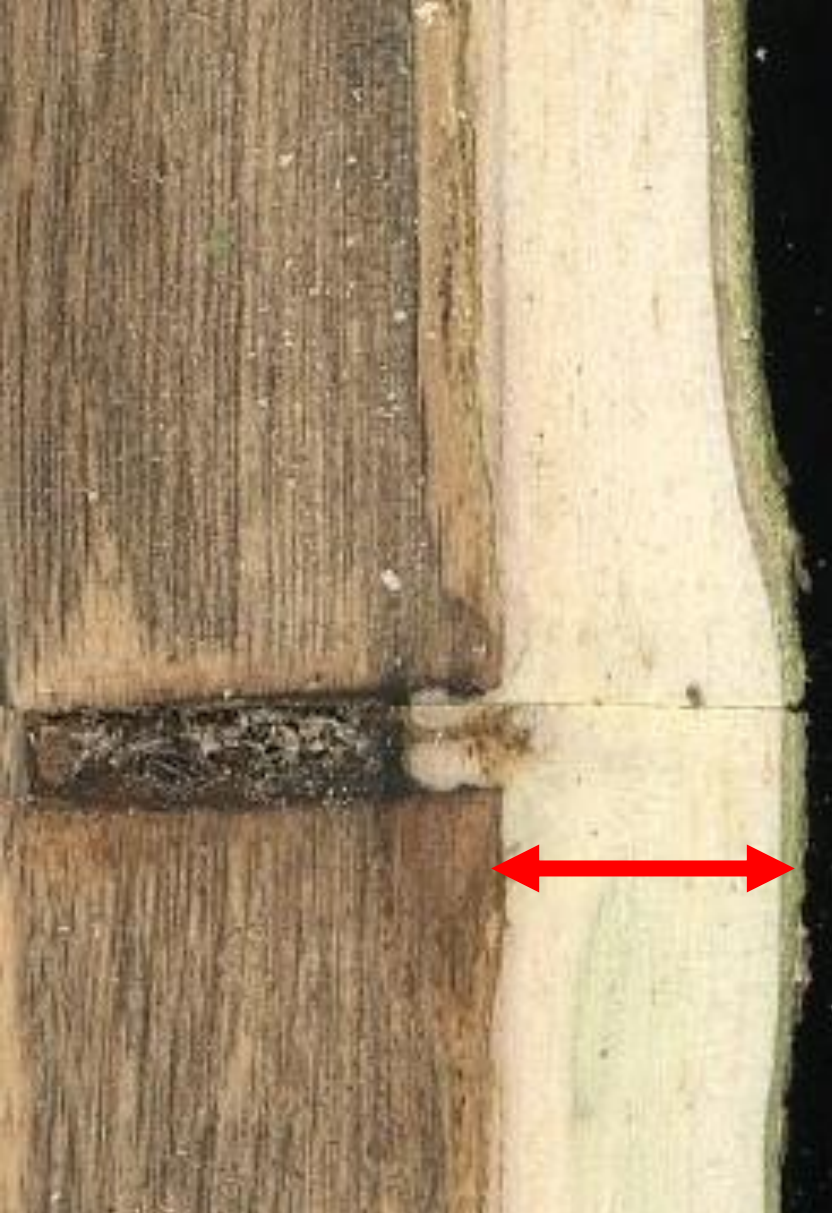




Oxytetracycline

Imidacloprid

Water



Oxytetracycline



Imidacloprid



Water

None

Summer

Spring



None Summer Spring



Summary

- Trunk injection can effectively deliver crop protection materials to target pests and diseases of citrus
- The efficacy of imidacloprid injection diminished within 2 months
- Oxytetracycline injection reduced bacterial levels in HLB-affected trees
- The long-term effects of trunk injection on tree health still need to be determined