

Influence of rootstock and OTC injection on Valencia yield

BY KIM D. BOWMAN, UTE ALBRECHT AND CAROLINE TARDIVO

Profitability of citrus in Florida has been severely reduced by the impact of huanglongbing disease (HLB). Previous studies have demonstrated that rootstock selection and injection of established trees with oxytetracycline hydrochloride (OTC) can both significantly improve the health, cropping and fruit quality of trees affected by HLB. However, neither a superior rootstock nor OTC injection can completely overcome the negative effects from HLB when used alone.

Combining multiple strategies would appear the best approach to combat HLB, but little information is available to compare some of the best and newest rootstocks with and without OTC. Furthermore, it is not clear whether all rootstocks will show a similar positive response to OTC. Of equal importance, it is critical to know whether the positive effects from an HLB-tolerant rootstock are additive to the positive effects from OTC. Will using the best rootstock and OTC injection together result in a more favorable improvement in tree performance than using either strategy alone?

FIELD TRIAL STUDY

A multiyear field trial was conducted in Florida's Saint Lucie County to explore the relative influence of rootstock and OTC trunk injection on Valencia tree performance, including fruit yield and fruit quality. The trial was established in 2014 at a planting density of 259 trees per acre and included Valencia 1-14-19 trees with 12 replications of 50 different rootstocks.

The trees were not planted with individual protective covers, so all trees became affected by HLB at a young age. Overall performance of the rootstocks in the trial prior to OTC injection has been previously documented (DOI: 10.3389/fpls.2023.1061663; DOI: 10.21273/HORTSCI18529-25). Three



Non-injected



OTC-injected

Non-injected and OTC-injected trees in March 2025

Photos by Ute Albrecht

rootstocks were officially released by the U.S. Department of Agriculture (USDA) based, in part, on superior performance in this trial (DOI: 10.21273/HORTSCI17466-23).

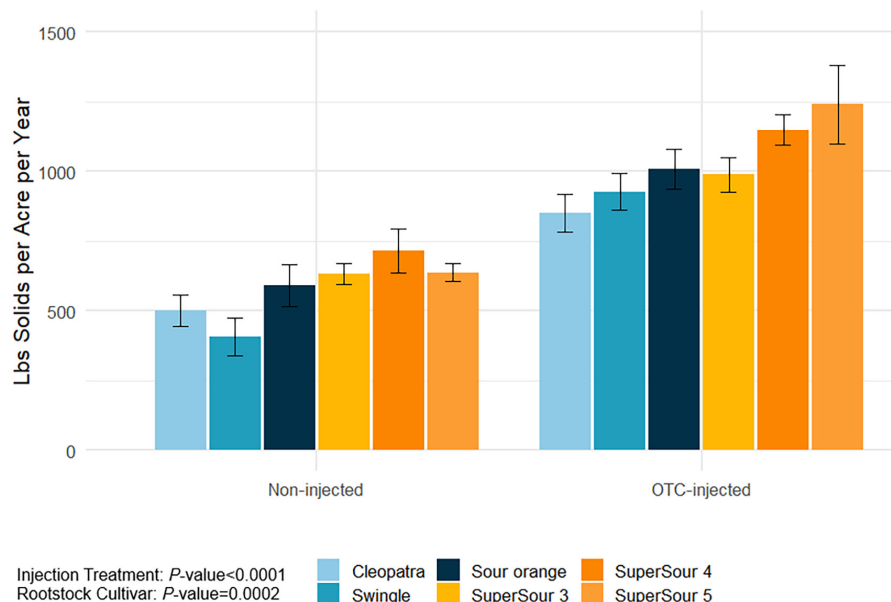
Beginning in 2023, half of the tree replications on each rootstock were injected with the OTC formulation ReMedium TI® once per year in July using FlexInject™ injectors. Each tree received 0.75 grams OTC dissolved in a volume of 75 milliliters (10,000 parts per million) at a single injection site each year. Injections were made on a

sunny day between 9 a.m. and 12 p.m.

Performance of the Valencia trees on the different rootstocks, and with or without OTC, was assessed in spring 2024 and 2025. A highly significant effect from both rootstock and OTC injection was observed on most measured traits in both 2024 and 2025, including amount of fruit and total soluble solids produced.

RESEARCH RESULTS

Not surprisingly, in general, both the superior rootstocks and OTC



The graph shows the influence of rootstock and OTC injection on Valencia annual yield. The bars represent annual pounds solids per acre averaged for the 2024 and 2025 seasons. Selected rootstocks are shown.

injection improved tree health and increased the production of fruit and total soluble solids per tree and per acre. Without OTC injection trees on the three new USDA rootstocks (SuperSour 3, SuperSour 4 and SuperSour 5) had an average annual yield between 634 and 715 pounds total soluble solids per acre per season. Trees on the standard rootstocks Cleopatra, standard sour orange and Swingle yielded between 407 and 592 pounds total soluble solids per acre.

When the trees were injected with OTC once each season, the general health and productivity of all trees increased by more than 70%. OTC-injected trees on SuperSour 3, SuperSour 4, and SuperSour 5 had an average annual yield between 988 and 1,240 pounds total soluble solids per acre per season. Trees on Cleopatra, standard sour orange and Swingle yielded between 850 and 1,008 pounds total soluble solids per acre.

Notably, all the rootstocks showed positive improvement in overall tree health, productivity and fruit quality from OTC injection. The new rootstocks that had been selected for superior performance in the absence of OTC continued to appear superior in performance as compared to the standard rootstocks after OTC injection was used. Of even greater relevance,

the benefits from superior rootstock and OTC injection appeared additive, as demonstrated by the much higher yield from trees with both the superior rootstock and OTC injection than from either strategy alone.

TAKE-HOME MESSAGE

Both selection of superior rootstocks and use of OTC trunk injection can significantly improve tree health, fruit and total soluble solids in trees affected by HLB. All rootstocks responded positively to OTC injection. Improved tree performance with superior rootstocks and OTC injection is additive. The combination of both strategies gives the highest increase in fruit and total soluble solids yield.

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Kim Bowman (kim.bowman@usda.gov) is a research geneticist at the USDA Horticultural Research Laboratory in Fort Pierce. Ute Albrecht (ualbrecht@ufl.edu) is an associate professor, and Caroline Tardivo is a postdoctoral associate, both at the UF/IFAS Southwest Florida Research and Education Center in Immokalee.



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