

Tree age and yields: Implications for trunk injection

By Ariel Singerman

This article examines the impact of HLB and other factors on yield by tree age group in Florida using U.S. Department of Agriculture statewide average data from 1994 to 2021. To focus on the impact of HLB and other relevant lasting factors, seasons in which there were hurricanes or freezes are excluded.

YIELD REDUCTIONS

Figures 1 and 2 show yield by tree age group for Valencia and early and mid-season oranges, respectively, during three periods: before HLB (1994 to 2004), during HLB spread and progression (2008 to 2017) and during the combination of endemic HLB with other factors (2019 to 2021). The bottom and top of the bars in the graphs denote the 25th and 75th yield percentile, respectively, for each of the tree age groups and time periods. Note that Figures 1 and 2 exclude seasons 2005 to 2007 as well as 2018 due to the occurrence of weather events such as a hurricane or freeze.

Figures 1 and 2 show that, for all tree age groups, yield during the period from 1994 to 2004 (denoted by the red bars) was the highest. The figures also show, as one would expect, trees yielded more fruit as they became older.

However, Figures 1 and 2 illustrate that during the period from 2008 to 2017 (denoted by the green bars) yield decreased significantly in each of the tree age groups. Given that there were no significant weather events during

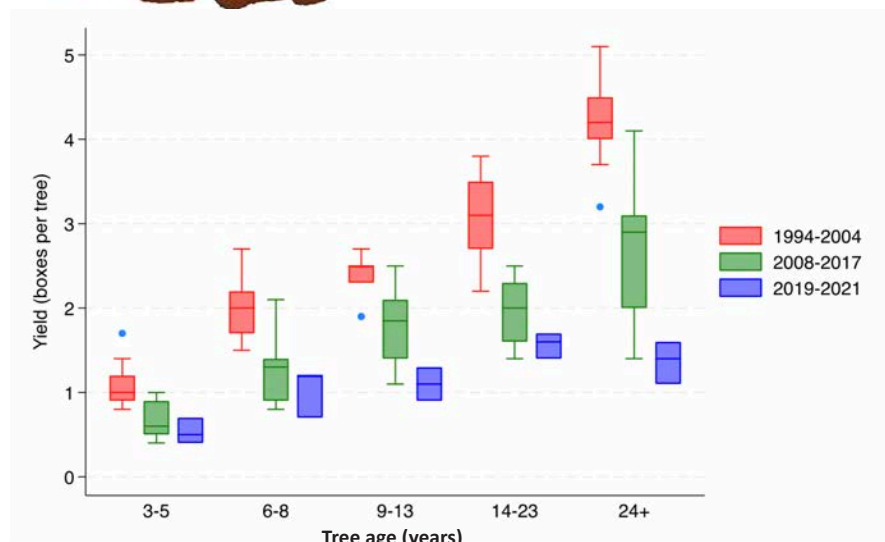


Figure 1. Valencia orange yield by tree age group

Source: U.S. Department of Agriculture National Agricultural Statistics Service and author's calculations

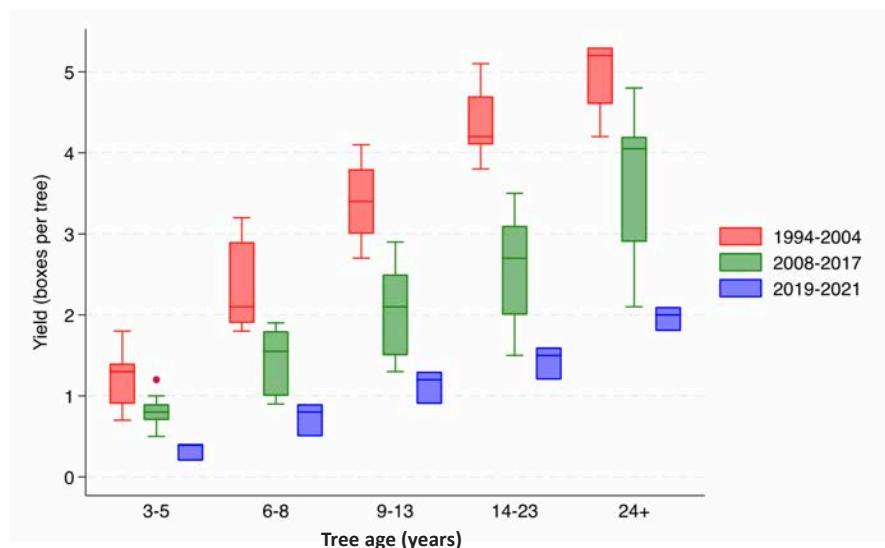


Figure 2. Early and mid-season orange yield by tree age group

Source: U.S. Department of Agriculture National Agricultural Statistics Service and author's calculations

this period, it can be sensibly argued that the decrease in yield was due to the spread and progression of HLB. Importantly, however, both figures also show that trees still yielded more fruit as they became older.

Finally, the blue bars in Figures 1 and 2 denote the period from 2019 to 2021, which depict another sizeable reduction in yield for all tree age groups. Such a decrease can be argued to be the compounding result of the impact on yield of the combination of HLB with other factors. These other factors include rock-bottom fruit prices in 2019–20, skyrocketing input prices in 2021–22 and the longer-term impact of Hurricane Irma due to the damage caused to trees' root systems from uprooting in some groves and flooding in others. An important insight that Figure 1 provides is that, in the last period, 24+ year-old Valencia trees no longer yielded more fruit relative to the younger 14- to 23-year-old trees.

The Valencia trees that suffered the highest impact from 2019 to 2021 were the 24+ year-old trees, with a percent decrease in yield of almost 50% relative to the previous period.

AGE MATTERS

To be able to make a fair comparison of the decrease in yield through time across tree age groups, the percent changes in yield across the time periods for the two orange tree varieties were computed. Figure 3 (page 16) shows the percent change in yield for Valencia trees. The green bars in that figure denote the impact of the spread and progression of HLB on each tree age group. The green bar for the tree age group 9 to 13 denotes a 25% decrease in yield during 2008–2017 relative to

1994–2004. Although such a decrease is significant, that bar is also the smallest among all groupings, denoting that, in terms of yield, those trees were the least impacted by the disease.

In contrast, the green bars corresponding to the 3- to 5-year-old trees and 24+ year-old trees are the largest, denoting that those trees suffered a decrease in yield estimated at 39% and 36%, respectively. The pink bars in Figure 3 denote the impact of the combination of endemic HLB with other

factors on each tree age group. Thus, the Valencia trees that suffered the highest impact from 2019 to 2021 were the 24+ year-old trees, with a percent decrease in yield of almost 50% relative to the previous period.

Figure 4 (page 16) shows the percent change in yield for early and mid-season orange trees. Clearly, the pattern in this figure is different relative to that shown for Valencia trees. As denoted by the green bars in Figure 4, the impact of the spread and progression of HLB



ONE STEP AHEAD OF THE UNPREDICTABLE

Built from the ground up by a hardworking farmer, Simplot Grower Solutions has delivered hands-on farming innovation for over 90 years. Even now, as a leading national ag retailer, we remain grower-focused, American-based, and family-run.

Our locally specialized teams help you maximize yields on every acre with personalized advice, agronomic expertise, and proven products and solutions ready for the unpredictable nature of farming.



COMING SOON TO WAUCHULA, FL

Connect with a crop advisor:

Lance Rowe (863) 843-5983

Ryan Richards (863) 673-4376

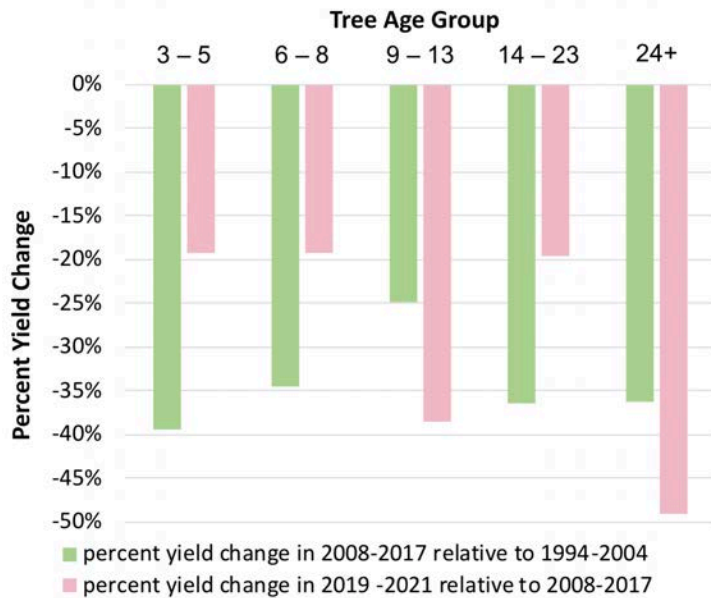


Figure 3. Valencia orange percent yield change between periods by tree age group
Source: Author's calculations

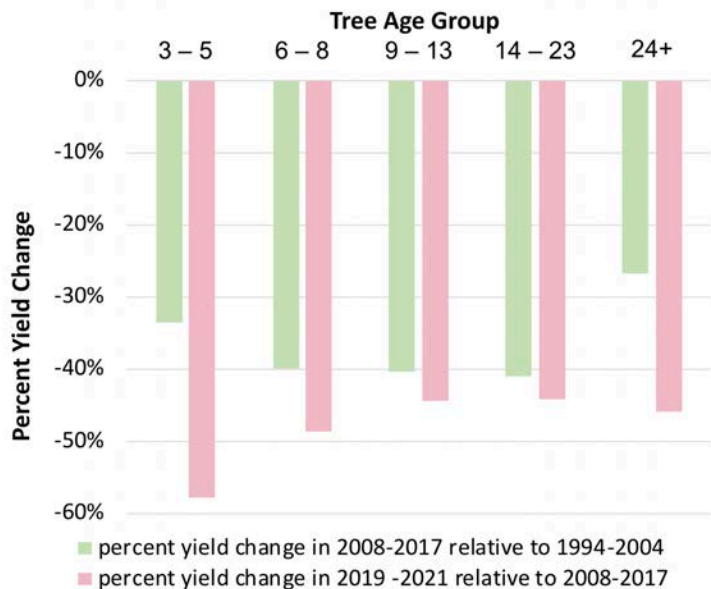


Figure 4. Percent of yield change for early and mid-season oranges between periods by tree age group
Source: Author's calculations

was the largest in percentage terms on the yield of tree age groups 6 to 8, 9 to 13 and 14 to 23; they all decreased by approximately 40%.

Contrastingly, the yield of 3- to 5-year-old trees decreased by 34% and that of 24+ year-old trees decreased by the smallest percentage, 27%. The pink bars in Figure 4 show that from 2019 to 2021, the 3- to 5-year-old trees were the ones that suffered the highest impact (58%) among early and mid-season orange trees, while the yield of the rest of the tree age groups decreased by a range between 44% and 49%.

WEIGHING WHETHER TO INJECT

The patterns found by analyzing statewide yield data based on tree age groups can be used to exemplify the kind of questions that growers might want to consider when evaluating whether to apply OTC trunk injections to their trees. A key question is whether they would make a profit as a result of the applications to a particular tree age group. For example, the data for Valencia shows that 24+ year-old trees had a decline due to HLB of 36% from 2008 to 2017 and then, starting in 2019, there was a further decline of 49%. Such a cumulative decline, along with the finding that those trees no longer produce more than 14- to 23-year-old trees, suggest that, even with a treatment, it would be difficult for those trees to recover.

Unlike their Valencia counterparts, 24+ year-old early and mid-season trees have not declined as much and still produce more than the younger tree age group. Thus, investing in a treatment to improve their health and yield may be worth it. Regarding 3- to 5-year-old trees, growers should be aware that they are unlikely to obtain a short-term return from a treatment because those trees will not produce enough additional yield to pay for the treatment cost while trees are so young. Instead, the cost of a treatment could be regarded as an investment so as to give those trees a better chance to be more productive in the future. 🍊

Ariel Singerman is an associate professor at the University of Florida Institute of Food and Agricultural Sciences Citrus Research and Education Center in Lake Alfred.

FOUR GENERATIONS of FLORIDA CITRUS NURSERIES



Now accepting orders for 2024/2025 delivery

EXCLUSIVE LIFETIME REPLACEMENT POLICY.
Every tree is hand nurtured and inspected.
We have all available greening tolerant rootstocks, UF varieties, USDA varieties as well as all old varieties.

Call Chris at (407) 404-0355

BLUE HERON NURSERIES
WINTER GARDEN, FLORIDA

www.blueheronnurseries.net

Reg. #48006420