

1A



1B



Figure 1A (left): Field tree of HLB-tolerant Valencia RBA-22-29 planted at the Citrus Research and Education Center in Lake Alfred
 Figure 1B (right): Field tree of potentially HLB-tolerant OLL somaclone-derived nucellar seedling planted at Lee Family Groves in Saint Cloud

Juice for Florida's future

New sweet oranges and sweet orange-like hybrids could offer improved quality for growers.

By Jude Grosser and Fred Gmitter

It's no secret that the recent season in Florida was a disaster, with record low production and terrible fruit quality due to HLB. Juice Brix and soluble solids were so low that harvest was delayed in many groves, resulting in fruit on the ground, even with Valencia.

Most people have concluded that Hamlin has no future in Florida's future juice industry, but what is a viable replacement? How does the beloved Florida orange juice industry climb out of this hole? The citrus breeding team at the University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) Citrus Research and Education Center (CREC) believes that new scion and rootstock cultivars, combined with improved production systems and enhanced nutrition is the way forward. This article focuses on new sweet

orange and sweet orange-like selections in the UF/IFAS breeding pipeline with good potential to improve Florida juice products and help restore the industry.

REPLACING HAMLIN

Hamlin was generally harvested in Florida during November and December. Since HLB became endemic, its harvest period shifted to December and January, with most being harvested in January to attempt meeting maturity standards. Even before HLB, Hamlin produced lower quality juice that required blending with later-maturing varieties to achieve grade A color and good flavor.

UF/IFAS addressed the early-season juice-quality issue with the release of early Valencia cultivars EV-1 and EV-2, which produce quality juice beginning in November. Unfortunately, their HLB sensitivity is comparable to Hamlin. Thus, the industry desperately needs more robust sweet orange cultivars to produce grade A quality juice in December and January.

Vernia and Valquarius are mid-season oranges with Valencia-quality juice that can be harvested from mid-January to March, and both are more robust against HLB than Hamlin. Although some growers have reported Vernia fruit drop, this has not been observed in two UF/IFAS trials, where juice quality of Vernia and Valquarius has

remained excellent.

What can be offered that can be reliably harvested before these selections? Earlier-maturing clones of Vernia and OLL (Ori^e and Loui^se Lee) oranges have been identified in the UF/IFAS breeding pipeline. Two of the last experiments conducted with Florida Citrus Hall of Fame grower/researcher Ori^e Lee were planting populations of somaclone-derived nucellar seedling trees of both Vernia and OLL. More than 450 individual trees, some grafted and others own-rooted, were planted at Lee Family Groves in St. Cloud in 2012 and 2013 and grown with minimal psyllid control.

From Vernia, 10 clones were identified that have repeated (two or more seasons) for early maturity, with 15 ratios in early December. Juice color and flavor are good, and the trees appear much stronger than Hamlin trees. Several have been entered into the Parent Tree Program (PTP) to provide pathogen-free budwood for commercial propagation. The best selection is Vernia MB-25-7, because of higher Brix, soluble solids and larger size. Propagations are underway for advanced trials to determine which of these new Vernia clones is best to replace Hamlin.

For January harvest, new OLL clones show promise. OLL-4, OLL-8 and OLL-20 generally mature in the Valencia window, a few weeks earlier in some seasons. From this new population, a few clones have been identified as maturing much earlier, reaching ratios above 14 in mid-January. The best of these is OLL-FB-7-35, with exceptional juice color and flavor. This clone and two others were entered into the PTP and are also being propagated for advanced trials. These could be ideal to follow the early Vernia clones with harvest in January.

HLB TOLERANCE IN LATE-MATURING ORANGES

The sweet orange selection with the most well-documented HLB tolerance is RBA-22-29 Valencia (Figure 1A, page 22). This clone, from a budwood irradiation experiment and planted more than 20 years ago, produces typical Valencia juice quality and has shown improved HLB tolerance in replicated plantings. It is among the best of 30



Full-service Citrus Nursery, Blueberry and Blackberry plants and Peach trees



TAKING ORDERS FOR 2023 AND 2024

Containerized SMARTTREES®



AGROMILLORA FLORIDA | 9038 Co Rd 229, Wildwood | FL 34785, USA | info.fl@agromillora.com

Keep your investments growing!

NEW! **White Wraps**

Don't pay too much for tree bags. Call today for a quote.



BEST BAGS, BEST PRICE, BEST SERVICE

Mike Hurst Citrus Services, Inc. (863) 443-0531, hurstcitrus@gmail.com

Keep your **FREE** subscription to **Citrus Industry** magazine current!

Don't miss an issue! If you have a new mailing address or e-mail address, send your old and new addresses to Lisa@AgNetMedia.com to keep Citrus Industry coming.

Citrus
INDUSTRY

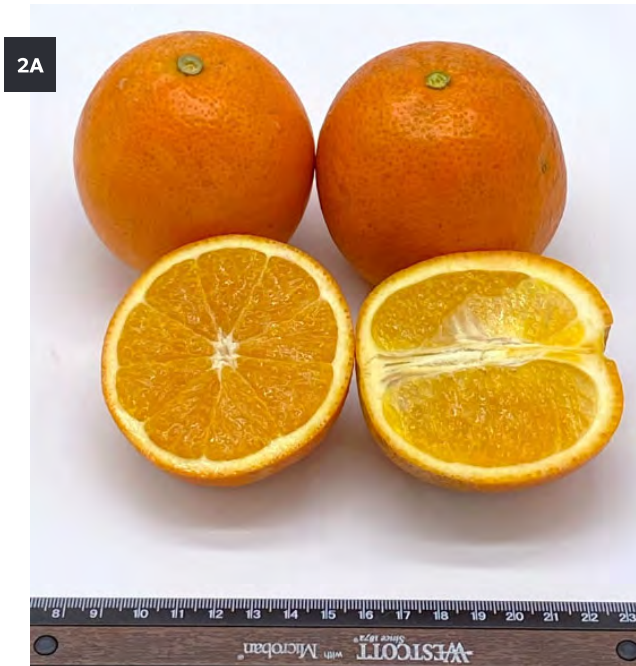


Figure 2A (left): Sweet orange-like selection 1859. Figure 2B (right): Sweet orange-like selection C7-11-7

scions selected for HLB tolerance (from UF/IFAS CREC and U.S. Department of Agriculture citrus breeding programs) in a Polk County trial.

More HLB-tolerant trees are also being found in the OLL somaclone-derived nucellar seedling population mentioned earlier (Figure 1B, page 22). During the past season, nine clones produced fruit with Brix higher than 12, and three clones had soluble solids higher than 7 pounds per box. The best clone this season was FB-R4-T4 with 13 brix and 7.22 pounds solid. This is remarkable for juvenile trees approaching nine years of age, grown without psyllid control. UF/IFAS graduate student Maria Brenelli is working hard to characterize this population. She is quickly selecting the best clones for advanced trials to validate the putative HLB tolerance.

PROMISING SWEET ORANGE-LIKE HYBRIDS

Several sweet orange-like hybrids have been identified in the UF/IFAS breeding pipeline, as well. Two of the more interesting hybrids are 1859 and C7-11-7. These two selections are both seedless triploids, with Sugar Belle as the mother and sweet orange as part of their respective pollen parents.

Selection 1859 produces beautiful fruit that has exceptional deep orange external and internal color (Figure 2A).

The juice is sweet and described to have a floral, aromatic and slightly tropical flavor. Fruit can be harvested from late November through January (the current Hamlin harvest period!). Last season, the Brix measured 14 with a 17.5 ratio and 37 color score in January.

The original selected tree has exhibited strong HLB tolerance, with nearly 20 years in the field. Very few symptomatic fruit have been observed on 1859. It has been through the PTP. The selection has good potential for both processing and the fresh market. Based on its high degree of HLB tolerance and unique fruit quality, 1859 was recently approved for release as a Fast Track selection by the UF/IFAS Cultivar Release Committee.

Selection C7-11-7 also produces beautifully colored fruit on the tree (Figure 2B). Juice from the current season fruit harvested in mid-January had 13.87 Brix, 15 ratio, a 39.3 color score and a whopping 8.31 pounds solid per box. This is partially driven by a high juice content of 60%. HLB tolerance also seems better than standard sweet orange, and like 1859, few symptomatic fruit have been observed on C7-11-7. This selection was recently entered into the PTP.

Thus, these sweet orange-like selections have clear potential to address the low Brix, poor fruit-quality problem becoming increasingly important to

the industry. It is possible that these selections might be classified as sweet oranges, if the effort to shift the regulatory definition of sweet orange, to be based on juice biochemistry/organoleptic quality rather than parental genetics, is successful.

In conclusion, the UF/IFAS citrus breeding team is developing a portfolio of new sweet orange and sweet orange-like cultivars that offer improved juice quality and enhanced HLB tolerance, across the entire Florida harvest season. The team is engaged with nursery growers, commercial growers and processors to expedite delivery of these new selections to the industry. Trialing these selections on new, more HLB-tolerant rootstocks, and growing the trees with optimized nutrition should lead to a sustainable, profitable orange juice business in Florida. 🍊

Acknowledgments: The authors thank Lee Family Groves for continuing field support as well as New Varieties Development and Management Corp. and the Citrus Research and Development Foundation for grants supporting this research.

Jude Grosser (jgrosser@ufl.edu) and Fred Gmitter (fgmitter@ufl.edu) are professors at the UF/IFAS CREC in Lake Alfred.