Orange You Glad that Researchers Made a “Sweet” Discovery for the Citrus Industry?

ARS scientists made a “sweet” discovery that may be important to solve a major problem within the citrus industry.

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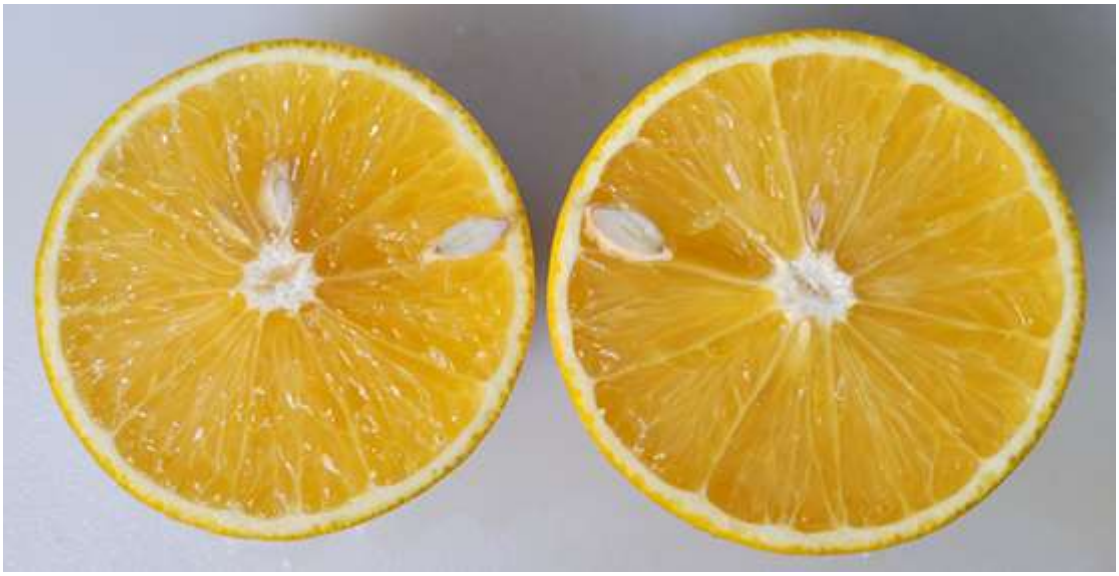
Huanglongbing (HLB), also known as citrus greening disease, poses a serious threat to the Florida citrus industry. HLB is associated with tree infection by its presumed causal agent *Candidatus Liberibacter asiaticus* and is spreading to many citrus-growing areas worldwide. In Florida, HLB has caused about 90% of citrus production losses since it was first detected in 2005.



An orange from a Donaldson tree. (Photo by Giancarlo Buzzi, ARS)

ARS scientists at the U.S. Horticultural Research Laboratory in Fort Pierce, FL, assessed citrus trees with oranges that could be potentially used for commercial production of orange juice. During their assessment, the scientists found a sweet orange tree named “Donaldson” at the A.H. Whitmore Citrus Research Foundation Farm in Groveland, FL. This tree is a selection from the USDA-ARS variety collection that represents over 100 years of USDA-ARS research on citrus in Florida.

“The Donaldson sweet orange tree stood out as being exceptionally healthy compared to the industry-standard trees that were planted close by and were in decline or had died,” said Matt Mattia, a research geneticist. “The Donaldson tree also tested positive for the presence of *Candidatus* Liberibacter asiaticus, one of the presumed causal agents of HLB. This indicates that the tree may have tolerance to the disease.”

The Donaldson orange tree. (Photo by Giancarlo Buzzi, ARS)

Historical records show that the Donaldson tree was first planted on the farm over 30 years ago. Another tree type named “Hamlin,” which has been ravaged by HLB, was also planted around the same time. Hamlin and Donaldson are early season trees that mature from December to January. While Hamlin has been used in commercial orange juice production for years, Donaldson has remained only on the farm.

Researchers assessed if Donaldson oranges could substitute Hamlin oranges for juice production. In the study, researchers conducted taste tests to study the differences between orange juice blends using Hamlin and Donaldson oranges.

“The taste testers noted that there was a difference between the two juices,” said Mattia. “However, those differences may be explained by the lower acidity in fruits from young Hamlin trees.”

According to Mattia, Donaldson oranges could replace Hamlin oranges for commercial production, maturing in the early season and presenting good orange flavor. However, future research should explore whether Donaldson fruit could replace Hamlin fruit in juice by comparing fruits from trees of the same age.

More research is underway to determine if the Donaldson trees have long-term tolerance to HLB and if citrus growers can successfully plant these trees to meet the demands of commercial production. ARS researchers plan to work with research collaborators and industry partners to assess Donaldson's tolerance to HLB in field trials and study the possible underlying genetic mechanisms responsible for tolerance.

The study was published in *HortScience*. The research done by ARS was in collaboration with researchers at the University of Florida Institute of Food and Agricultural Sciences' Horticultural Sciences Department.

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