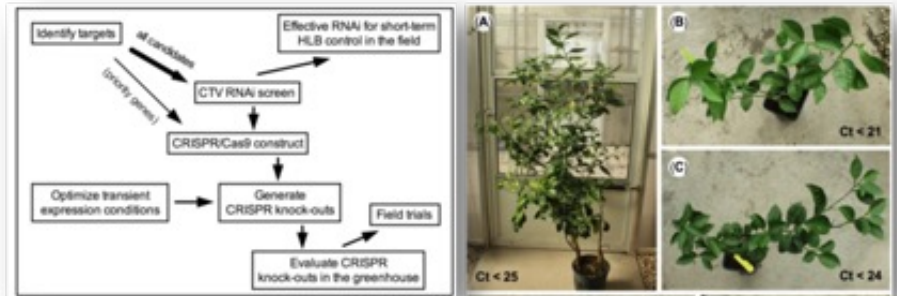


Novel Strategies for Huanglongbing Resistance or Tolerance in Citrus by Gene Editing

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Take Home Message:

- We are studying the interactions between HLB and citrus trees in molecular levels to create resistant citrus trees.
- This project will create non-GMO HLB-resistant trees that can directly go to commercial production.
- Another product of this project is HLB-resistant rootstocks that can readily be grafted with various scions.

Summary: This research aims to produce non-transgenic huanglongbing (HLB)-tolerant citrus trees by editing or silencing citrus plants' promising negative immune

regulators. These plant immune regulators make citrus plants resistant or susceptible to many diseases, including HLB. We have already identified several such regulator genes in citrus that might allow us to manipulate them through new genetic improvement techniques, such as gene editing, to make citrus plants more tolerant or resistant to the HLB disease. We are also using another new strategy called intragenic microRNA (miRNA) to create HLB-tolerant trees that produce non-genetically modified organism (non-GMO) products. This strategy complements gene editing and uses a citrus DNA-based (intragenic) vector

to create miRNA in the rootstock. Because miRNA can make a root-to-shoot long-distance movement, making more of this miRNA in the rootstock (for example, in Swingle or US-942) can silence target genes and induce HLB tolerance in the scion (for example, in 'Valencia' and 'Hamlin'). As rootstocks can be used for different scions, intragenic rootstocks are particularly valuable in California and Florida, where many scion cultivars are used. This project will create two important products, non-GMO trees that can directly go to commercial production, and intragenic rootstocks that can readily be grafted with various scions.

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