

Researchers in the U.S. have found transgenic citrus trees with two spinach genes show immunity to Huanglongbing (HLB) disease, which has devastated growers in the Americas, Asia and parts of Africa at different times.

The research started seven years ago at Texas AgriLife Research under a three-year grant from the United States Department of Agriculture (USDA), with the original aim of finding resistance to citrus canker.

"But then citrus greening moved into Florida. Both are bacterial diseases, but citrus greening (HLB) devastated the industry far worse than canker did," says Texas AgriLife Research plant pathologist Dr. Erik Mirkov.



Dr Erik Mirkov

"Citrus greening is a bacterial disease that affects the vascular system of the tree, or phloem. It basically shuts off the tree's ability to take up and use water and nutrients, causing the tree to die.

"We were able to improve the transgenic trees by having the genes express themselves in the vascular system."

With funding from Florida citrus producer Southern Gardens Citrus, the researchers now have many lines of third and fourth generation trees that are immune to HLB. The trees include Rio Red and Ruby Red grapefruit, Hamlin and Marrs sweet oranges, and three rootstocks - Flying Dragon, C22 and Carrizo.

Mirkov says the fourth generation of trees will likely be taken through the lengthy and costly deregulation process that declares the fruit safe to eat.

"It's an expensive process that involves contracts with firms that do the actual testing with rats, bees, an aquatic invertebrate, maybe a songbird," he says.

"It could take three to four years to complete, but it's important to determine that the fruit produced from transgenic trees are safe to eat, especially by what are considered at-risk groups, which include infants, the elderly and those with compromised immune systems."

That is also the reason Mirkov works only with genes and proteins found in foods.

"I decided seven years ago when this program started that if the proteins were not commonly eaten, we wouldn't work with them."

Mirkov highlights that without immunity to the disease the world's entire citrus industry is at risk.

"Citrus greening is a citrus grower's worst nightmare because at this point, there is no cure. It can spread for years before it can be detected, so it's insidious, to say the least.

The news comes at a time when different industry and consumer groups are at loggerheads over genetically-modified organisms (GMOs), with proponents highlighting they can help feed the globe's population and critics protesting in relation to health-related issues.

The U.S. still does not have a law requiring GMO labels for transgenic food products, which has led to public outcry for consumers' rights to know what is in their food, so that they can make fully-informed decisions.

Total hectares of GMO crops grew by [8% in the year to October 2011](#).

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