UF/IFAS CITRUS STATE

Digging deeper for HLB answers

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When HLB arrived in Florida, scientists were finishing a 13-year billion-dollar effort to map the first complete set of human DNA. Today, it can be done for about $5,000.

Gene sequencing is still not cheap, for people or plants. But the declining costs of such technology and the increase in scientists' familiarity with it are good news as we look to the future of Florida agriculture.

It's allowing us to run experiments that just wouldn't have been feasible in 2005. Another promising development is a new crop of University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) researchers who have embraced these new tools.

Soil microbiologist Sarah Strauss is using sequencing technology to get huge data sets of the As, Cs, Gs and Ts in DNA samples and comparing those combinations to how citrus plants perform.

THE ROOT OF THE PROBLEM

Strauss arrived at the UF/IFAS Southwest Florida Research and Education Center in Immokalee two years ago, not long after the fight against HLB went underground — to the roots and into the soil.

Other UF/IFAS scientists discovered that the disease gained its purchase on a tree's roots long before symptoms appeared on the leaves or fruit. As a result, we've paid more attention to compromised root systems as a way to maintain the longevity and productivity of citrus trees. That made Strauss a particularly valuable addition to our scientific corps.

Sarah Strauss is studying the relationship between soil and citrus tree performance.

Strauss is exploring whether a citrus tree's defenses are shored up with more diverse bacteria and fungi in the soil around the roots. The hope is that we could draw on lessons learned from the benefits of eating Greek yogurt for our guts to better understand the relationship between citrus roots and soil. The basic approach is healthier soil = healthier trees and roots that can more easily absorb nutrients.

The vast challenge Strauss faces is that soil is a lot more complex than our guts. We know that there are about 500 kinds of microbes found in the guts of all 7 billion people on the planet. In soil, by contrast, we have no idea how many microbes are common to soil on the Central Florida Ridge versus soil on the Indian River — or even in two samples from the same place.

PUTTING TECHNOLOGY TO WORK

A decade ago, the cost of sequencing wasn't the only barrier to using it as a tool. There was also crunching the mountain of data mined from sequencing. Again, advancement in managing big data is a positive trend line.

Strauss is a case of right scientist, right tools, right time. One more thing is right about Strauss: her work ethic.

She has taken to the Extension portion of her job. Just in the past few months, she gave a talk at Citrus Expo, published some of her early observations in this magazine, and frequently communicated with individual growers.

With technology advancing and people like Strauss using it, we'll make it to a post-HLB era. That could mean slaying the dragon. Or, it could mean that the same thing happens to HLB management that happened to sequencing technology — it becomes so affordable that everyone can use it and continue making a living off citrus.

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