Peptide Holds Promise

By Rick Dantzler, CRDF chief operating officer

The day news broke in July that Hailing Jin of the University of California, Riverside had discovered a gene associated with disease resistance in finger limes that had inhibited *Liberibacter crescens*, a relative of *C*Las that can be grown in culture, I contacted her. We arranged a conference call that week between Pat Ouimet, chair of the Citrus Research and Development Foundation (CRDF) Research Management Committee and Bill Dawson, an expert in peptides who CRDF had just brought on to help us in exactly these kinds of matters.

We learned several encouraging things from Jin. First, though, what is it that she has discovered?

Jin was studying how the gene sequence of the finger lime, a citrus variety which has shown tolerance to HLB, differed from the gene sequence of citrus varieties susceptible to HLB. She noticed that a gene associated with resistance in finger lime had only a partial protein — called a peptide — and not a completely intact protein. This anomaly caused her to wonder if it was this peptide that was inhibiting *Liberibacter crescens* (not *C*Las). Consequently, she tested this peptide against *Liberibacter crescens*, and sure enough, it inhibited its growth. She then tested the peptide against potatoes that had been infected with the potato liberibacter, and it greatly inhibited the growth of that bacterium as well.

Next came tests on citrus infected with HLB. Since HLB is not in commercial citrus groves in California, Jin had only plants in a biocontainment facility to work with, which were few. She inoculated the plants with the peptide, which resulted in symptomless plants with no *C*Las. Jin says her data suggest the peptide works in two ways: by directly reducing the bacteria and by inducing increased resistance in infected plants.

She has already produced the peptide, an important step in scaling up any naturally occurring compound for commercial use. The peptide also appears to directly kill the bacterium and not just reduce the plant's resistance, another benefit. Finally, the road to Environmental Protection Agency registration should be relatively quick because the peptide comes from a naturally occurring product that humans have been consuming for hundreds of years.

A week later, we had a second conference call, this time with more scientists, to determine what needed to be done to get to the bottom of what Jin had discovered and if CRDF could help. The game plan is still evolving, but Megan Dewdney (University of Florida Institute of Food and Agricultural Sciences) and Greg McCollum (U.S. Department of Agriculture Agricultural Research Service) are working with Jin. Next steps will include applying the peptide to HLB-infected Hamlin trees of fruit-bearing age to see if it has therapeutic value and further testing the peptide on greenhouse trees and other dependable assays.

Are there reasons to be cautious? Yes. The peptide has been tested on relatively few citrus plants, and there is still a lot to learn. Also, field trials in commercial environments have yet to be conducted. Nevertheless, it is encouraging.