Acquisition of *Candidatus* liberibacter asiaticus in the Asian citrus psyllid (*Diaphorina citri* Kuwayama)

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Currently, the California Department of Food and Agriculture requires confirmation of *Candidatus* liberibacter asiaticus (*C*Las) in a citrus tree as the legal basis prompting regulatory action, such as mandatory tree removal or expansion of the huanglongbing quarantine boundary. However, confirmation of *C*Las infection in trees is difficult due to a lack of visual symptoms, non-uniform distribution of the pathogen throughout the tree, and the low probability of selecting the infected tissue for analysis (Gottwald, Graca, and Bassanezi, 2007). This low-likelihood of *C*Las detection, combined with the requirement of confirming infection before regulatory actions can take place, is allowing *C*Las-infected trees to remain in the ground in Southern California and contributing to the spread of *C*Las over a rapidly expanding geographic area.

One possible solution could help address this problem: allow the find of an Asian citrus psyllid (ACP) nymph infected with *C*Las to provide an alternative prompt for regulatory action.

Currently, detection of an infected adult ACP on a citrus tree, although a cause for alarm, does not prompt regulatory tree removal. The mobility of adult ACP is the key rationale for this. An adult could have acquired the bacterium in a different location than where it was captured; additionally, if it has not fed (or possibly, oviposited- Halbert and Manjunath, 2004) then it has not yet had a chance to infect the tree it was found on. In contrast, nymphs cannot fly, are reported to move only when disturbed or over-crowded (Tsai and Lui, 2000), and are unlikely to walk between trees. Because of this, the only mechanism by which a nymph can acquire *C*Las is via feeding on the tree where it is found, or from an infected parent.
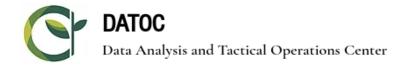
Current scientific consensus appears to be than the most probable method of *C*Las-acquisition by a psyllid is via feeding on infected tissue, and that transovarial transmission of *C*Las from adult to progeny occurs with such negligible frequency as to be irrelevant for management considerations. Pelz-Stelinski et al. (2010) conducted a robust study using modern methodology and determined transovarial transmission to occur in 2-5% of offspring. Another study by Mann et al. (2011) also observed low numbers of infection in offspring. In that study, 5% of eggs produced by infected adults tested positive for *C*Las by PCR, and only 0.8% of adult offspring produced from *C*Las+ males mated with *C*Las- females. It is most likely, therefore, that an infected nymph acquired the bacterium from the tree it is found on.

References

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