Paratransgenesis for Reducing Transmission of Vector-Borne *C*Las

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The overall objective of this research is to discover a novel, biological control-based tool for decreasing pathogen transmission by harnessing native psyllid microbial flora to reduce psyllid populations and/or pathogen prevalence. One strategy for stopping pathogen spread is to manipulate vector populations by replacing wild populations with altered populations that are unable to transmit a pathogen. The ACP harbor several symbiotic bacteria, including Wolbachia. Because these bacteria are present in all ACP and are not seemingly impacted by the presence of Liberibacter (Las), they provide good candidates for a bacterial symbiont strategy, paratransgenesis. Paratransgenesis involves genetic manipulation of symbiotic bacteria commonly found in pathogen-transmitting vectors to export anti-pathogen molecules into the host vector. This offers several advantages over the alternative approach, i.e. modification of the vector genome, which involves insertion of novel genes into the heritable genetic material of the vector.

In this project, we developed Wolbachia as a driver system for paratransgenesis. We demonstrated that Wolbachia can be used to introduce a phenotype-altering transgene into *D. citri*. Wolbachia cell lines were developed that expressed several unique genes. Paratransgenic transformation of *D. citri* with a gene needed for Las transmission reduced *C*Las plant infection, as well as acquisition, suggesting that the paratransgenic Wolbachia may be a useful tool for disrupting of insect-transmitted pathogens.

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