9.2 RNAi Strategy in Citrus Trees to Reduce Hemipteran Pests: Psyllids and Leafhoppers

Hunter, W.B.\textsuperscript{1}, Glick, E.\textsuperscript{2}, Bextine, B.R.\textsuperscript{3}, Paldi, N.\textsuperscript{2}

\textsuperscript{1}Subtropical Insect Research Unit, USDA-ARS, USHRL, Fort Pierce, FL, USA
\textsuperscript{2}Beeologics, Inc., LLC, Miami, FL, USA
\textsuperscript{3}Department of Biology, University of Texas-Tyler, Tyler, TX, USA

We demonstrate delivery of dsRNA constructs for RNAi to psyllids and leafhoppers through feeding on artificial diet, cuttings, and whole-plant systems (herbaceous plants, woody grapevine, and citrus seedlings and trees). Preliminary results indicated increased mortality by Asian citrus psyllid, \textit{Diaphorina citri}; the potato psyllid, \textit{Bactericera cockerellii}; and the glassy-winged sharpshooter, \textit{Homalodisca vitripennis}, using species-specific dsRNA’s. Treatments using citrus seedlings showed that dsRNA could be introduced into whole plant systems. Citrus trees which are ~2.5 m tall are currently being screened for dosage titers, uptake time, and persistence to calculate a cost/benefit ratio and effectiveness. The citrus trees are 6-year-old producing Mexican Limes, thus permitting examination for presence and/or persistence of dsRNA constructs in fruit and juice. RNA interference technology (RNAi) has been used successfully to silence endogenous insect genes through feeding, as shown with research on honey bee (Hunter et al., 2010). We propose that in the case of citrus pests (i.e., psyllids), specific psyllid transcripts may provide a natural specific treatment that can be used to reduce and suppress psyllids. RNAi strategies may one day be used across area-wide programs to suppress insect pests.