Optimal Bt Toxins and Gene Silencing RNAs for Management of ACP to Mitigate the Impact of HLB

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Currently, HLB is managed primarily by using pesticides to control the vector of HLB, the Asian citrus psyllid (ACP). Traditional pesticides are expensive for growers, harmful to beneficial insects, and may contaminate the environment. In addition, ACP is becoming resistant to many of the most widely used pesticides, rendering them ineffective. Therefore, new approaches to managing ACP are sought. In this project, we aim to combine RNA interference technology (RNAi) with *Bacillus thuringiensis* (*Bt*) bioinsecticidal proteins to gain a new and efficient method of control for ACP. The pesticidal proteins produced by *Bt* have been widely used for crop protection in agricultural commodities such as corn and cotton for many years without harm to humans, domestic animals, or beneficial insects. However, their use in ACP control has been challenging. RNA interference (RNAi) is the application of exogenous double-stranded RNAs (dsRNA), that interfere with targeted genes such as detoxification enzymes or genes controlling the immune response, to reduce their activity in the insect. The targeting of sucrose hydrolase and aquaporin genes to disrupt sugar and water metabolism in ACP is currently being tested. The use of both RNAi and *Bt* pesticidal proteins in combination may be more effective in reducing ACP survival, than use of either technology alone. The study of different combinations of RNAi gene targets and *Bt* proteins will reveal the best combinations for deployment against ACP, and provide growers with an eco-friendly alternative to pesticide use for psyllid management.

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