

Evaluating Vector Potential of Haplaxius Crudus and Idioderma Virescens

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ABSTRACT

Lethal bronzing disease (LBD) is a lethal phytoplasma infection of various ornamental palms in the state of Florida. Of paramount importance is identifying the insect vector of this pathogen so that appropriate management protocols can be developed for nursey personnel to implement and reduce the impact of LBD. Following one year of preliminary data collection, the planthopper

Haplaxius crudus was identified as a vector candidate due to the isolation of the phytoplasma from insects collected in the field. In addition, specimens of the treehopper *Idioderma virescens* tested positive. Both species had salivary glands tested and only *Haplaxius crudus* salivary glands tested positive for the phytoplasma, indicating that it is the likely vector of the pathogen.

OBJECTIVES AND METHODS

1. Screen salivary glands of *Haplaxius crudus* for the 16SrIV-D phytoplasma
2. Screen salivary glands of *Idioderma virescens* for the 16SrIV-D phytoplasma

Insects were collected from areas where disease was actively spreading and frozen directly until processing. Specimens had salivary glands dissected in 10X PBS with 1% toluidine blue for staining. Salivary glands were subsequently processed by extracting total DNA using the Qiagen Blood and Tissue kit following the manufacturer’s instructions. dPCR assays were performed on samples processed to detect and quantify phytoplasma levels. Parameers for the dPCR assay are those presented by Bahder et al. (2018). Data was collected and analyzed using the Quantstudio 3D analysis suite available at the ThermoFisher website.

RESULTS

A total of 28 specimens of *Haplaxius crudus* were collected from diseased palms and 8 specimens of *Idioderma virescens* were also collected. Of the specimens of *H. crudus* tested, 4 individuals had the salivary glands test positive for phytoplasma (**Figure 1**) while all specimens of *I. virescens* tested negative (**Figure 1**). Blue pixels in dPCR assays represent positive wells while yellow represent negative wells.

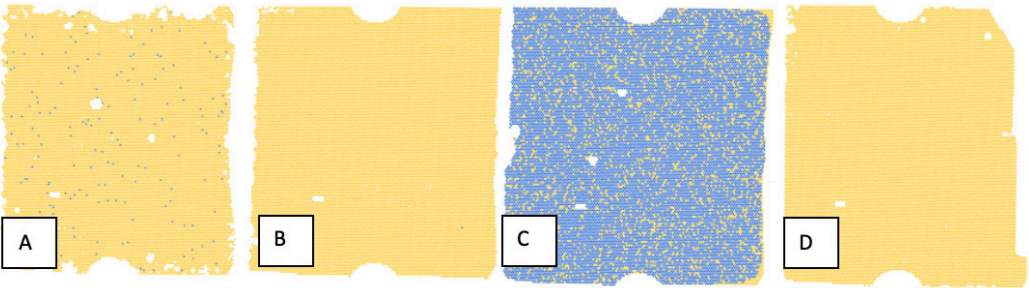


Figure 1. Digital PCR chip data representing positive salivary glands from *H. crudus* (A), negative salivary glands from *Idioderma virescens* (B), positive control (C), and negative control (D).

CONCLUSIONS

These results provide the first data that support *H. crudus* as a vector of the LBD phytoplasma. While it is clear that any insect with a pathogen in the salivary glands is a competent vector, the efficacy of the *H. crudus* to transmit the pathogen in the field remains unknown and is the subject of future studies. This study only included two species and provided evidence that one (*H. crudus*) is the vector while the other (*I. virescens*) is not. While other species still are of interest in their potential role to transmit the phytoplasma, based on the pilot study that found the phytoplasma in only these two species, the emphasis was on species that had been demonstrated to carry the phytoplasma. Based on these results, it is believed that *H. crudus* is the vector of the LBD phytoplasma in Florida and is currently the focus of future research efforts.