FATE OF *XYLELLA FASTIDIOSA* IN THE FOREGUT OF GLASSY-WINGED SHARPSHOOTERS FED ON TWO HOST PLANTS

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ABSTRACT
Here we test to see the influence that feeding on citrus might have on the infection rate in an adult glassy-winged sharpshooter (GWSS) population that has been pre-exposed to *Xylella fastidiosa* (*Xf*). A GWSS population that was pre-exposed to *Xf*-infected grapevines remained infective for at least 12 days after feeding in either grapevines or citrus host plants. Infection rate was about 65% in the population of sampled GWSS after 12 days with no differences between the groups feeding on citrus or grapevines.

INTRODUCTION
The GWSS is one of the main vectors of *Xf*. It is a xylophagous insect that has a wide array of host plants, including many ornamental and crop plants (Purcell and Hopkins 1996, Purcell and Saunders 1999). Among its hosts, citrus has been found to be one of the preferred reproductive and overwintering host plants (Blua et al. 1999). In some cases citrus groves are grown adjacent to vineyards, and given *Homalodisca coagulata*'s capability of dispersion (Redak et al 2004), this sharpshooter moves within and between these two crops readily. A study conducted by Perring et al (2001) found citrus influencing Pierce's disease (PD) incidence and an increase of disease severity in vines growing adjacent to citrus.

Although *Xf* has been found to survive and form clumps in a media containing citrus xylem fluid (Toscano et al. 2004), it is still unknown how the switching of host plants, from grape (suitable for *Xf*. growth) to citrus, affects the growth of *Xf* inside the foregut of GWSS once the insect acquires this bacterium. Understanding this question can be useful for elucidating the fate of *Xf* or retention of infectivity in sharpshooters moving back to citrus and for those overwintering in citrus and then potentially moving back to dormant grapevines.

OBJECTIVES
1. Track the fate of *Xf* in a population of GWSS, *Homalodisca coagulata*, when fed on citrus and grape host plants.
2. Quantify *Xf* titers in sharpshooters feeding in these two host plants.

RESULTS
GWSS adults were collected from citrus groves in Riverside and allowed to feed on *Xf*-infected grapevines. After an acquisition access period (AAP) of 48 hours they were transferred to either *Xf*-free grapevines (var. Chardonnay) or sweet orange plants. Grapevines and citrus seedlings, as well as a group of 30 sharpshooters, tested negative for the presence of *Xf* prior to the start of the experiments. Subsequently, a pool of 50 sharpshooters was collected at 0 hrs. post-AAP and 15 sharpshooters were collected from each host plant and replicate at days 4, 9 and 12 post-acquisition (Figure 1). Sharpshooters collected were stored at -80^{o}C until processed.

Following a standard surface sterilization procedure, the head and eyes of each sharpshooter was removed and DNA extracted using the DNeasy Tissue Kit (Qiagen Inc.). Detection and quantization of bacterial cells was done using a TaqMan-based real-time PCR assay that included 5 ten-fold dilution points (from about 1100000 to 10 copies/ul of sample) that served as standards for our quantification purposes.

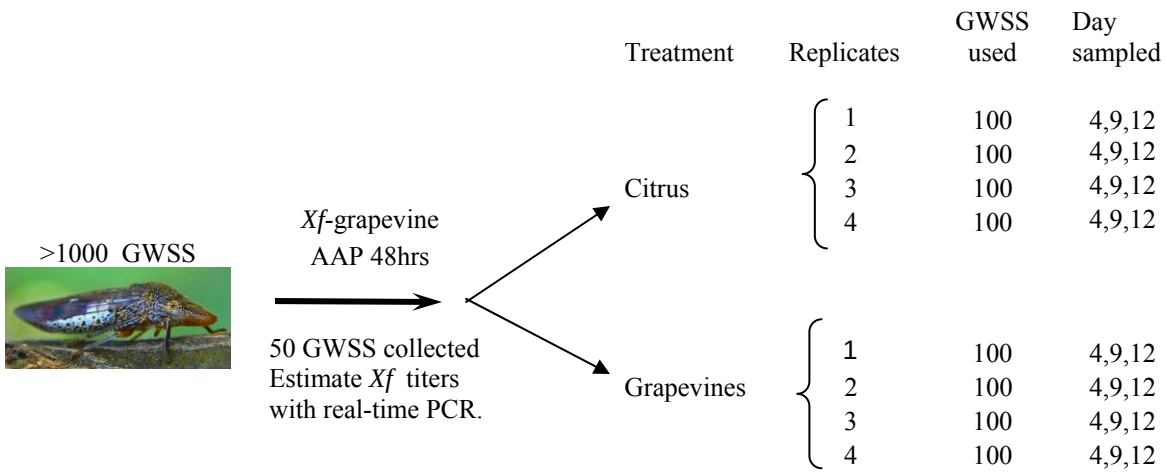

Figure 1. Partial diagram of the experimental procedure.

Quantification of bacterial loads after a 48 hr. acquisition period showed that GWSS acquired from an estimated 50 to 95,000 *Xf* bacterial cells per sharpshooter head. We observed similar bacterial load ranges in GWSS sampled for each post-acquisition sample period. By the 12th day, some sharpshooters contained an estimated 930,000 bacterial cells/head.

Infection rate was about 86% at 0 hrs. post-acquisition, declining slightly over the next sampled days but staying at about 65% in the population of sampled GWSS after 12 days. There were no differences of infection rate in the population of GWSS feeding on grapevines or citrus.

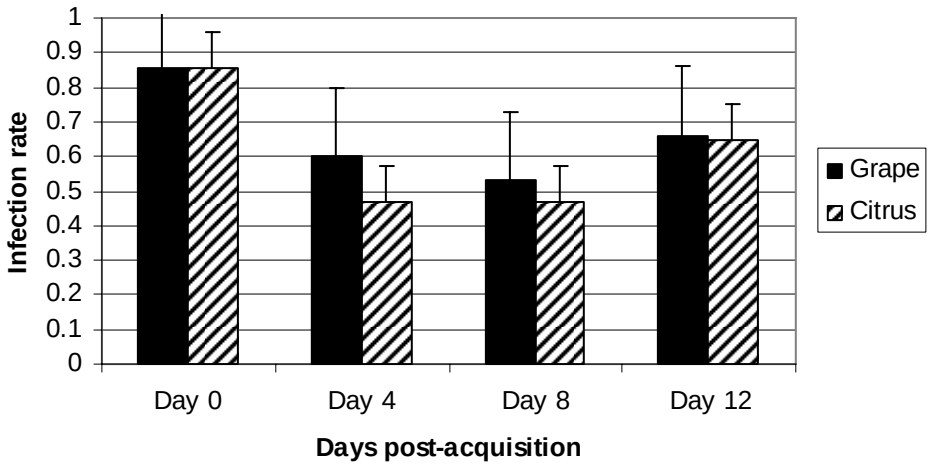

Figure 2. Infection rate of sharpshooters by *Xylella fastidiosa* fed on citrus and grapes during a 12 day period

CONCLUSIONS

H. coagulata population remained infective for at least 12 days after feeding in either grapevines or citrus host plants. This suggests that feeding on citrus plants does not result in loss of infection in a population of GWSS that have pre-acquired this bacterium. This does not tell us yet if transmission of this plant pathogen by GWSS is affected by citrus xylem and studies currently are under investigation to test this hypothesis. Further analyses of the data collected in the present study are still being conducted and they will be presented at the symposium.

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