

EXPERIMENTAL ANALYSIS OF BIOLOGICAL PARAMETERS AND VECTOR ABILITY OF GLASSY-WINGED SHARPSHOOTERS FROM ALLOPATRIC POPULATIONS IN CALIFORNIA

Principal Investigator:

Rodrigo Krugner
Crop Diseases, Pests, & Genetics Unit
USDA, ARS
Parlier, CA 93648
rodrigo.krugner@ars.usda.gov

Co-Principal Investigators:

Mark S. Sisterson
Crop Diseases, Pests, & Genetics Unit
USDA, ARS
Parlier, CA 93648
mark.sisterson@ars.usda.gov

Hong Lin
Crop Diseases, Pests, & Genetics Unit
USDA, ARS
Parlier, CA 93648
hong.lin@ars.usda.gov

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ABSTRACT

The glassy-winged sharpshooter [GWSS; *Homalodisca vitripennis* (Germar)], is native to the southeastern United States and northeastern Mexico. It was detected in southern California in the late 1980s and in the San Joaquin Valley in 1999, where it transmits the bacterium *Xylella fastidiosa* (*Xf*) to grapevines and other crops. The transmission efficiency of *Xf* to grapevines and the reproductive success of hybrid and pure line GWSS from two allopatric populations in California (Riverside (RIV) and Bakersfield (BAK)) were evaluated under identical controlled conditions. To tests the effects of GWSS origin (RIV versus BAK), gender, and age on transmission, insects were given a 96h acquisition access period on infected grapevines and a 72h inoculation access period on healthy grapevines. At conclusion of the test, ~33% of test plants were infected, with no effect of GWSS origin, gender, or age on transmission, confirming that these factors do not affect transmission. Comparison of reproductive success based on origin found that the preoviposition period in both female generations was significantly shorter for RIV ($F_0 = 28.2$ days and $F_1 = 62.3$ days) than BAK females ($F_0 = 46.1$ days and $F_1 = 170.4$ days). There were no significant differences in fecundity and longevity among the F_0 and F_1 mating pair treatments. There was a gradual decrease in the number of viable eggs deposited by GWSS females, suggesting that females exhausted sperm reserves and that re-mating may be necessary to produce viable progeny. From a management perspective, delayed reproductive maturity and polyandry are weak links in GWSS's biology that may be exploited through mating disruption or insect sterilization strategies to reduce population growth and augment pressure by natural enemies.

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