

INVERTEBRATE SOUND & VIBRATION

16th International Meeting

September 14-17, 2017



at Castle Raulscholzhausen, Germany



Conference Organizers:
Manuela Nowotny & Reinhard Lakes-Harlan



Talk 5

Glassy-winged sharpshooter males deceive the rivals by mimicking female signals to challenge them

Mazzoni V (1), Nieri R (2), Gordon SD (3), Krugner R (3)

(1) Research and Innovation Centre, Fondazione Edmund Mach, San Michele all'Adige, Italy; (2) Agriculture Food and Environment Centre, University of Trento, Trento, Italy; (3) USDA-ARS, San Joaquin Valley Agricultural Sciences Center, Parlier, CA, USA

Glassy-winged sharpshooter (GWSS) is a grapevine pest in California where it represents a serious threat to viticulture as vector of *Xylella fastidiosa*, a pathogen bacterium that causes Pierce's disease in grapevines. It is important to better understand mating behavior of this species in order to develop novel mating disruption techniques based on this behavior. Mating communication in GWSS relies upon the establishment of a duet between a male and a female. This initial duet allows reciprocal identification, location, courtship and female acceptance.

Rivalry behavior through vibration is well documented in several leafhopper species and is mainly based on the emission of specific rivalry vibrational signals. Therefore, in this study we investigated the rivalry strategies of GWSS. We determined whether the occurrence of two males nearby a sexually receptive female could lead to the expression of rivalry behavior. Trios made of one female and two males were placed on potted okra plants and vibrational signals recorded using a laser vibrometer to detect the vibrational signals emitted by the individuals.

Here we provide the first report of such a behavior in both vibrational and acoustic communication in animals. GWSS showed a complex and unique rivalry system in which males can emit three different types of rivalry signals. The behavioral analysis used an integrated multivariate statistical approach. The analysis revealed that two of these signals specifically mimic female-specific signals. The first female-specific signal is associated to identification. The second female-specific signal is more often associated to long distance (i.e. different grapevine branches) communication and facilitates the location of females by males.

In practice, rival males mimic these two signals to establish a "fake" duet with the first male. When male-mimic signals result in ultimate contact between two male rivals, a ritual rivalry challenge is exhibited by the two rival males. During this phase the rivalry signals are now male-specific. These signals are stronger in intensity and are associated to abdominal arching. Whenever either male stops to show this behavior the winner goes ahead for several seconds more and then it re-establishes the mating duet with the female. This work reveals previously unknown behavioral characters of this species, possibly providing additional cues to better manage GWSS through mating disruption.