Invertebrate Sound and Vibration 2013

Glasgow ~ Scotland

XIV International Conference on Invertebrate Sound and Vibration

ISV 2013

University of Strathclyde, Glasgow, United Kingdom
July 23-26 2013

Conference Chair:

Dr James Windmill

Co-organiser:

Dr Shira Gordon

Supported by:

Department of Electronic and Electrical Engineering
Faculty of Engineering, University of Strathclyde

The organisers would also like to thank all the members of the
Centre for Ultrasonic Engineering at Strathclyde for their help and support.

First description of substrate-borne signals emitted by males of *Macrolophus pygmaeus*

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Vibrational communication is widespread in insects where it represents the main communication channel for more than 70% of families. The sexual behaviour of numerous species is characterized by the use of substrate-borne signals. In Heteroptera the vibrational communication has been deeply investigated in the Pentatomidae family, but very little is known about other families, including the Miridae for which olfaction has always been considered the main intraspecific communication channel.

Macrolophus pygmaeus (Rambur) (Hemiptera: Miridae) is an economically relevant species for the biological control of several pests in the Mediterranean region. In Europe, it is commercially reared for biological control of whiteflies *Trialeurodes vaporariorum* (Westwood) and *Bemisia tabaci* (Gennadius) (Sternorrhyncha: Aleyrodidae) in tomato greenhouses.

In the present study we investigated the ability of *M. pygmaeus* males to produce substrate-borne signals during mating behaviour. Two different experiments were carried out using a laser vibrometer. The first one aimed to record the vibrational signals produced by a male on a tobacco leaf in three situations: male alone, male with a female, and male with another male. The second experiment used a minishaker to playback male signals to evaluate if they affect the behaviour of conspecifics.

3- Male of *M. pygmaus.* Photo by G. Baldo

The results showed that males of *M. pygmaeus* can emit two different substrate-borne signals that we onomatopoeically called "roaring", a long broadband signal and "yelping", a train of short repeated signals with harmonic structure. We also found that the playback of "roaring" modifies the behaviour of receiver males, in terms of increased locomotion. "Yelping", instead, did not induce any significant variation either in listening males or females. This signal, however, was always recorded in test 1 before mating attempts. This suggests that "yelping" would function as stimulus of male acceptance from a female.

In conclusion, this is the first report of the use of substrate-borne vibrational signals by a mirid species for mating behaviour and a contribution to better understand its reproductive biology.