INVERTEBRATE SOUND & VIBRATION

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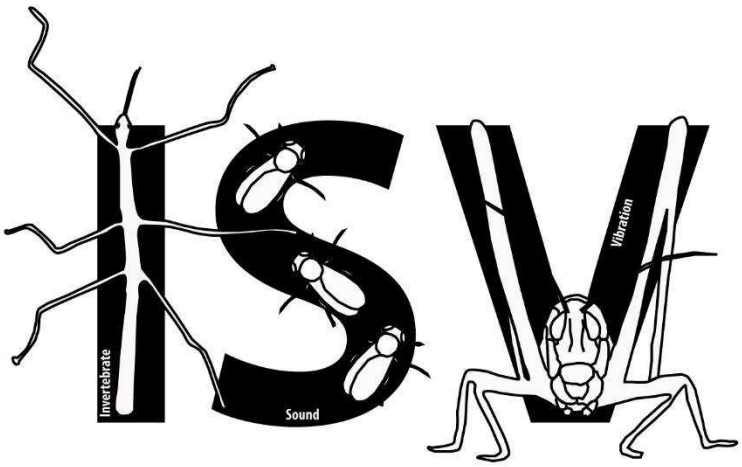

at Castle Rauischholzhausen, Germany

Conference Organizers:
Manuela Nowotny & Reinhard Lakes-Harlan

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Talk 44

Open-field vibrational mating disruption: The effect on leafhopper pests and vineyard ecosystem

Nieri R (1), Mazzoni V (2)
(1) Agriculture Food and Environment Centre, University of Trento, Trento, Italy; (2) Research and Innovation Centre, Fondazione Edmund Mach, San Michele all'Adige, Italy

Vibrational mating disruption is a newly-relevant and sustainable alternative to pesticide control of leafhoppers. This method proved to significantly reduce *Scaphoideus titanus* mating in semi-field conditions. Since this initial success, additional leafhopper pests have been studied in order to decode and disrupt their communication and to see if this technique can be applied to other economically-damaging insect species. The definitive applicability of this technique is however only possible by trialing open-field mating disruption. Little is known of the ecological impact of mating disruption on non-target species. Several beneficial arthropods are known to use vibrations to detect their prey or host. These may include parasitoids and spiders, known to contribute to help control leafhopper populations. The efficacy of mating disruption was therefore determined in order to manage populations of two co-occurring leafhopper species populations (*S. titanus* and *Empoasca vitis*). We additionally evaluated the potential side-effects of mating disruption on beneficial arthropods. A trial vineyard was set up where the appropriate vibrations were created in order to disrupt behavior of these two species. The 'vibrational vineyard' i.e. vibrated plants on a continuous surface of about 1 ha was located at the Fondazione Mach, Italy. The vines were Cabernet Franc, spurred cordon trained, and planted from 2002-2004. The vineyard was divided in two plots of about 1 ha each (i.e. treated and control plot). In the treated plot, a disruptive signal (DS), which was previously synthetized to disrupt the mating communication of both *E. vitis* and *S. titanus*, was transmitted to the plants by means of electro-magnetic shakers attached to the poles of each row. The shakers were positioned up to 25 m from the end of each row depending on the length of the row. There was a gap of 50 m between shakers. The DS was transmitted from July to September. The signal emission quality of each shaker has been tested by means of a laser vibrometer every two weeks.

Populations of leafhoppers were manually sampled by surveying 34 plants (20 leaves per plant) per plot. Sampling was conducted weekly, before applying the DS (from May 9th to July) to assess the initial population density, and continued until the end of September. The potential side effects on beneficial arthropods were and will be monitored during May 9th through the end of September by assessing the population trend of spiders and parasitoids. Similar trials are planned for the summer of 2018.

In conclusion, the 'vibrational vineyard' will enable us to assess if open-field studies are applicable and help to determine the ecological impact using this novel method.