

als wesentliche Bestandteile der hochgradig artspezifischen Wehrsekrete. Diese neuen Daten haben das Potenzial, das traditionelle Bild zur Wehrsekretchemie der Juliformia grundlegend zu verändern und erstmals chemotaxonomische Studien mit Sekretprofilen der Julida zu ermöglichen. Außerdem stellen sie ein neues Set an Merkmalen dar, um die interne Phylogenie der Cylindroiulini anhand der Evolution der Wehrsekrete in dieser Gruppe zu beleuchten und damit integrative taxonomische und phylogenetische Studien innerhalb der Diplopoda zu betreiben.

### Literatur

EISNER T., ALSOP D., HICKS K. & J. MEINWALD (1978): Defensive secretions of millipedes, pp 41-72. — In BETTINI S. (ed.), Arthropod venoms, Handbook of experimental pharmacology, vol. 48. Springer-Verlag, Berlin.

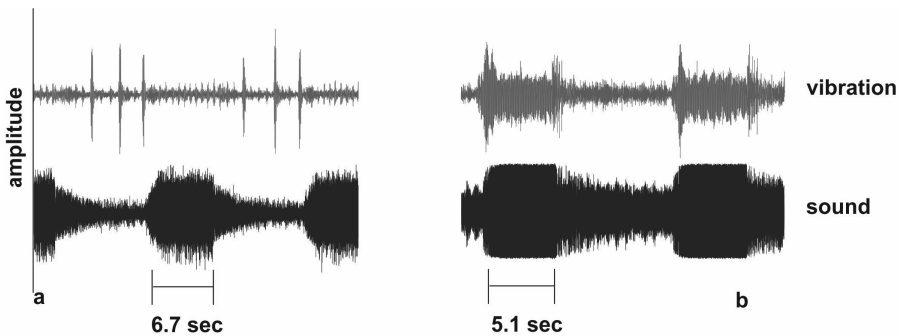
Anschrift der Verfasser: Bakk.<sup>a</sup> rer. nat. MSc. Michaela BODNER  
Priv.-Doz. Dr. Günther RASPOTNIG  
Forschungsgruppe Biodiversität und Evolution  
Forschungsbereich Chemische Ökologie  
Institut für Zoologie, Karl-Franzens Universität  
Universitätsplatz 2, 8010 Graz, Austria  
E-Mail: michaela.bodner@edu.uni-graz.at  
guenther.raspotnig@uni-graz.at

## **Multi-modal signalling in a tropical bushcricket: substrate-borne vibrations and calling songs**

### **Multimodale Kommunikation einer tropischen Laubheuschreckenart: Substratschall und komplexe Gesänge**

B. ERREGGER, H. RÖMER & M. HARTBAUER

Males of a trilling species of the tropical katydid in the *Mecopoda elongata* complex produce ear-deafening air-borne sound signals to attract females from a distance. In addition, signalers produce substrate vibrations by shaking their body (tremulation) or by front leg tapping. Calling songs of this species consist of an amplitude-modulated part, which is followed by a trill of variable duration. In this study we investigated air-borne sound signals and substrate vibrations in males advertising themselves on bird-of-paradise plants (*Strelitzia reginae*). To study the difference between calling songs and courtship songs males were either singing in isolation or on the same plant with a female.



**Fig 1:** Multi-modal signals of a courting *Mecopoda* male: substrate-borne vibrations and air-borne sound. **(a)** Vibration pulses generated during the soft song-segment. **(b)** Sound produced at the beginning and the end of the loud song-segment.

Tremulatory signals of males exhibit a rather variable temporal structure. They can be classified into five different types: 1) Longer lasting tremulation signals preceding male calling songs. 2) A train of vibration pulses generated during the soft part of the amplitude-modulated motif of the calling song (see one example in figure 1). 3) Vibrations introducing the beginning of loud song segments of the AM-motif or vibratory accentuations at the end of this song element. 4) Some males also produced a train of brief vibration pulses with regular temporal structure immediately after they ceased singing. 5) Front leg tapping occurred infrequently either during singing or when males were silent. The vibratory signals of individual males were high variable. Songs and vibrations produced by isolated males were not significantly different compared to males singing in the proximity of a female regarding bout duration, vibration period of vibration pulses produced during soft segments of the AM-motif, duration of vibrations preceding song production.

We conclude that males make use of an unusual high repertoire of vibratory and sound signals for mate attraction, whereby there is not much difference between advertisement and courtship. We suggest that active production of species-specific vibrations facilitate species recognition and localization of males by females in a complex structured habitat. In addition we analyzed the metabolic rate of the triller species via measuring their  $\text{CO}_2$ -production rate and changes in body temperature during singing. Results of these experiments show that advertisement signals are energetically expensive and likely convey information about the quality of senders.

The research was funded by the Austrian Science Fund (FWF): P21808-B09.

Das Thema wurde im Rahmen einer Diplomarbeit bei Dr. Manfred Hartbauer bearbeitet.

Anschrift der Verfasser: BSc. Bettina ERREGGER  
 O.Univ.-Prof. Dr. Heinrich RÖMER  
 Assoz.-Prof. Mag. Dr. rer.nat. Manfred HARTBAUER  
 Forschungsgruppe Neurobiologie und Verhalten  
 Institut für Zoologie, Karl-Franzens-Universität  
 Universitätsplatz 2, A-8010 Graz  
 E-Mail: bettina.erregger@gmail.com

# ZOBODAT - [www.zobodat.at](http://www.zobodat.at)

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Entomologica Austriaca](#)

Jahr/Year: 2014

Band/Volume: [0021](#)

Autor(en)/Author(s): Erregger Bettina, Römer Heinrich [Heiner], Hartbauer Manfred

Artikel/Article: [Multi-modal signalling in a tropical bushcricket: substrate-borne vibrations and calling songs Multimodale Kommunikation einer tropischen Laubheuschreckenart: Substratschall und komplexe Gesänge 225-226](#)