



Seewiesen Colloquia

Speaker invited by: Humboldt Research Group "Comparative Gestural Signalling"

Thursday, March 26, 2015, 13:00 h, in House 4, Lecture Room

From uni- to multimodal signaling: towards an integrative view on anuran communication

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Undeniably, acoustic signals are the predominant mode of communication in frogs and toads. Acoustically active species are found throughout the vast diversity of anuran families. However, additional or alternative signal modalities have gained increasing attention. In several anurans seismic, visual and chemical communication has convergently evolved due to ecological constraints such as noisy environments. The emphasis of a visual cue, such as the inevitably moving vocal sac of acoustically advertising males, is facilitated by conspicuously coloured throats. Striking visual signals independent of vocalizations are limb movements with the dynamic display of bright colours. In some multimodal anuran communication systems the acoustic component acts as an alert signal, which alters the receiver attention to the following visual display. Recent findings of colourful glands on vocal sacs, producing volatile species-specific scent bouquets suggest the integration of acoustic, visual and chemical cues in species recognition and mate choice. The combination of signal components allows for a broadened display repertoire in challenging environmental conditions. Thus, frogs and toads may possess more complex communications skills than science previously has given them credit for.

Who is Walter Hödl?

- 1974 PhD Zoology/Botany University of Vienna, Austria
- 1976- yearly research and teaching visits to the tropics (f.e. Brazil, Peru, French Guiana, Tanzania, Borneo etc.)
- 1994 Guest Professor at USP (University of São Paulo)
- 1997- Assoc. Professor University of Vienna, Austria

Selected publications:

- HÖDL (submitted): Herpetologische Forschung der Universität Wien in der Neotropis (1974-2014). *Mertensiella* 21: 30-35 (download on homepage.univie.ac.at/walter.hoedl/Hoedl_Mertensiella_2014.pdf)
- STARNBERGER I., PREININGER D., HÖDL W. (2014): From uni- to multimodality: Towards an integrative view on anuran communication. *J. Comp. Physiol.* 200: 777-787
- STARNBERGER I., PREININGER D., HÖDL W. (2014): The anuran vocal sac: A multimodal signalling tool. *Anim. Behav.* 97:281-288
- PREININGER D., STIEGLER M.J., GURURAJA K.V., VIJAYAKUMAR S.P., TORSEKAR V.R., SZTATECSNY M., HÖDL W. (2013): Getting a kick out of it: Multimodal signaling during male-male encounters in the foot-flagging frog *Micrixalus aff. saxicola* from the Western Ghats of India. *Current Science* 12/2013 (105), 1735-1740
- STARNBERGER I., POTH D., PERAM P., SCHULZ S., VENCES M., KNUDSEN J., BAREJ M., ROEDEL M.-O., WALZL M., HÖDL W. (2013): Take time to smell the frogs - Vocal sac glands of reed frogs (Anura: Hyperoliidae) contain species-specific chemical cocktails. *Zool. J. Linn. Soc.* doi: 10.1111/bj.12167
- PREININGER D., BOECKLE M., SZTATECSNY M., HÖDL W. (2013): Divergent Receiver Responses to Components of Multimodal Signals in Two Foot-Flagging Frog Species. *PLoS ONE* 8(1): e55367. doi:10.1371/journal.pone.0055367
- PREININGER D., BOECKLE M., FREUDMANN A., STARNBERGER I., SZTATECSNY M., HÖDL W. (2013) Multimodal signaling in the Small Torrent Frog (*Micrixalus saxicola*) in a complex acoustic environment. *Behav. Ecol. Sociobiol.* 67: doi:10.1007/s00265-013-1489-6
- SZTATECSNY M., PREININGER D., FREUDMANN A., LORETTO M., MAIER F., HÖDL W. (2012): Don't get the blues: conspicuous nuptial colouration of male moor frogs (*Rana arvalis*) supports visual mate recognition in large breeding aggregations. *Behav. Ecol. Sociobiol.* 66: 1587-1593
- SZTATECSNY M., STRONDL C., BAIERL A., RIES C. & HÖDL W. (2010): Chin up - are the bright throats of male common frogs a condition-independent visual cue? *Anim. Behav.* 79: 779-786.
- DE LUNA G., HÖDL W. & AMÉZQUITA A. (2010): Colour, size, and movement: the role of visual stimuli in species recognition by males of the frog *Allobates femoralis*. *Anim. Behav.* 79: 739-745.
- PREININGER D., BÖCKLE M. & HÖDL W. (2009): Communication in noisy environment II. Visual signaling behavior of male foot-flagging frogs *Staurois latopalpmatus*. *Herpetologica* 65: 166-173.
- BÖCKLE M., PREININGER D. & HÖDL W. (2009): Communication in noisy environment I. Acoustic signals of *Staurois latopalpmatus* Boulenger 1879. *Herpetologica* 65: 154-165.