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# Inga Geipel, Dr. rer. nat.

Ecology

## Smithsonian Tropical Research Institute, Panama

Born in 1980 in Aurich, Germany

Studied Biology at Georg-August-Universität Göttingen and the University of Ulm

FELLOWSHIP
College for Life Sciences

PROJECT

## Sensory Ecology and Cognition in Foraging Bats: the Role of Learning

Most bats use echolocation to navigate through dark environments, avoid obstacles, and find prey. Echolocating bats produce ultrasonic signals, which are reflected by objects in their surrounding, and then listen for the returning echoes. Several bat species, called gleaning bats, forage for food on vegetation or the ground. Such gleaning is a difficult task for echolocators, because echoes from nearby backgrounds can cause severe masking effects, making it difficult to discriminate prey from background. To compensate, gleaning bats often listen for acoustic cues produced by the prey (such as the footsteps or mating calls of insects or frogs). However, I previously demonstrated that at least one bat species is capable of using echolocation alone to find motionless and silent prey on leaves - a task previously believed to be a sensory impossibility.

This finding leads to questions about the role of learning in acquiring complex foraging strategies. Specifically, how much of bats' foraging strategy and echolocation skill is innate, socially learned, or self-acquired? In this same species, I previously showed that mothers feed their pups with captured prey for several months after they have been weaned. This suggests that mothers might facilitate learning by pups. The production of echolocation in bats is innate, but it is unclear to what extent young bats need experience to make sense of returning echoes and to use these echoes for successful hunting.

The combination of a difficult foraging strategy and the extensive maternal care in this bat leads to questions about how different bats acquire and perfect their foraging strategies, especially in acoustically complex environments, and the extent to which innate or learned behaviors underlie their strategies. During my time at the Wissenschaftskolleg I will focus on the question of how learning plays a role in sophisticating foraging strategies and develop a research program to address my questions.

Recommended Reading

Geipel, I., Jung, K., and Kalko, E. K. V. (2013). "Perception of silent and motionless prey on vegetation by echolocation in the gleaning bat Micronycteris microtis." Proceedings of the Royal Society B: Biological Sciences 280, 1754.

Geipel, I., Kalko, E. K. V., Wallmeyer, K., and Knörnschild, M. (2013). "Postweaning maternal food provisioning in a bat with a complex hunting strategy." Animal Behaviour 85, 6: 1435-1441.

PUBLICATIONS FROM THE FELLOWS' LIBRARY

Geipel, Inga (Cambridge, Mass.,2019)

Bats actively use leaves as specular reflectors to detect acoustically camouflaged prey
https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1682041964

Geipel, Inga (Oxford,2019)

Does bat response to traffic noise support the misleading cue hypothesis?
https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1680733834

Geipel, Inga (Cambridge,2019)

Noise as an informational cue for decision-making : the sound of rain delays bat emergence
https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1048342492

Geipel, Inga (Cambridge,2018)

Low-cost synchronization of high-speed audio and video recordings in bio-acoustic experiments
https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1016206275

Geipel, Inga (2017)

Environmental conditions limit attractiveness of a complex sexual signal in the túngara frog
https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1006739963