HO13 Ecology and behaviour of bats in tropical cloud forests, Honduras

Bats comprise a quarter of all mammals and are extremely ecologically diverse, yet our understanding of chiropteran behavior and ecology is largely based on short-term studies, conducted only once or over short windows of time. Thus, how short and long term variation in abiotic factors affect chiropteran community structure is not well studied and becoming more and more crucial for understanding the potential effects of climate change. One of our main goals at Cusuco National Park is to understand how abiotic and biotic factors affect chiropteran abundance and diversity.

Bats have been monitored between June and August each year since 2006 using mist net surveys at various locations across Cusuco National Park that vary greatly in elevation, temperature and rainfall resulting in a wide range of habitats. Over 60 species of bats have been captured at Cusuco including insectivores, nectarivores, frugivores, carnivores and sanguivores. We have observed immense variation in annual bat abundance and diversity over seven years of mist netting at seven sites on an elevational gradient in the neotropics. Three abiotic factors likely contribute species abundance and diversity across seasons: precipitation, temperature, and human disturbance. Within seasons, lunar phase may also play a role in bat abundance. Student research projects could focus on annual, seasonal or nightly variation in abiotic factors and how they affect species abundance and distribution across different elevations.

A second, yet related, area of research is bat demography. In 2014 we will initiate using passive integrated transponders (PIT tags) to identify individuals we have captured. Bats are exceedingly difficult to band and track and so this will become one of the largest demographic data sets on bats in the neotropics. Students can estimate population sizes using recapture data to compare across species and potentially determine the geographic range for individuals of the most common species.

A third area for research will be based on using high frequency microphones (bat detectors). One main project will compare and contrast echolocation recordings with mist netting studies. Students working on this project will help develop a library of species' calls and determine which species are over or under represented by mist netting. Additionally, students may choose to use high frequency microphones to examine nightly activity patterns of mormoopid species or social communication calls of *Molossus sinaloe* at a known roosting location.

Recommended Readings

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Lang, Alexander B., et al. "Activity levels of bats and katydids in relation to the lunar cycle." Oecologia 146.4 (2006): 659-666.

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McCain, C. M. 2007. Could temperature and water availability drive elevational species richness patterns? A global case study for bats. Global Ecology and Biogeography 16:1-13.

Presley, S. J., L. M. Cisneros, B. D. Patterson, and M. R. Willig. 2012. Vertebrate metacommunity structure along an extensive elevational gradient in the tropics: a comparison of bats, rodents and birds. Global Ecology and Biogeography 21:968-976.