Bat Pollinators and Pollen Movement in a Tropical Dry Forest Tree

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Tropical dry forests are one of the most threatened types of tropical forest due to their susceptibility to fire and their long history of use by humans. These seasonal forests are also home to many endemic species and critical ecosystem processes that sustain the local people living near them. I am interested in how land use change in the tropical dry forest may change species interactions, specifically pollination of tropical trees by bats. There is an untested assumption that bats may not be affected by changes to landscapes such as forest fragmentation due to their habit of flying long distances. My research focuses on this question by comparing bat abundance and diversity, and the patterns of pollen movement of a bat-pollinated tree, between continuous forest sites and sites surrounded by fragmented forest and pasture.

Left: View of a fragmented site, Arroyo Seco, Jalisco, Mexico. Right: A Leptonycteris yerbabuenae *bat covered in orange pollen.*

The open flowers of Crescentia alata *at nighttime. A snake waits for bat prey on the trunk.*

Last summer, I spent six weeks on the Central Pacific Coast of Mexico at the Chamela-Cuixmala Biosphere Reserve, in the state of Jalisco, identifying the locations of my focal tree species *Crescentia alata*. Bats are attracted to the flowers of this tree, which produce lots of nectar. Once the bats reach into the long flower tube to reach the nectar, pollen is deposited onto their head and shoulders. When the bats visit flowers on the next tree, they transfer pollen onto the stigmas of the those flowers, initiating reproduction. The fruit of *Crescentia alata* is a large gourd that is used in traditional Mexican medicine for cough and respiratory ailments.

During my field season, I collected leaves and fruits for genetic analysis from 168 trees I found at different sites. Using neutral genetic markers and statistical techniques, I will try to understand the connectivity of these sites through pollen movement. In this way I hope to track bat movement through these sites via pollen. I will also explore if there is a loss of connectivity of pollen flow to trees in fragmented sites; if true, this could have negative consequences for tree reproduction.

While working at the Biosphere Reserve, I captured 349 bats (from 15 different species) in fine mesh nets to assess differences in abundance and diversity between sites. Whenever possible, I collected pollen from the bats and am now identifying the pollen to the species level in the lab to see if there are foraging differences between sites. These data will help land managers in the area understand how bats are using the landscape and whether forest fragmentation affects pollination services by bats.

Left: Pam measuring the wing of a captured bat with digital calipers for identification purposes. Right: Pteronotus parnelli *bats flying as mist nets are set up for the night.*

Left: A bat being gently removed from a mist net by an undergraduate field assistant from Mexico. Right: Pam Thompson at her research site at the Chamela-Cuixmala Biosphere Reserve.

Photos were contributed by: Angela Price, Juan Cisneros Rodríguez, and Pamela Thompson.