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Bats & Flowers in Ecuador

When a plant and its pollinator become tightly dependent on one another, the loss of one can be fatal to the other. And that fact has tremendous importance to conservationists. Such seems the case with the far-flung bellflower family of Latin American plants and a group of nectar-eating bats.

Nathan Muchhalla of the University of Miami (Florida) used a BCI graduate student research scholarship to examine that close relationship between these bats and flowers. His research was conducted in the high-country cloud forests of Ecuador, where spreading agriculture and livestock grazing, as well as the introduction of non-native commercial plants, are disrupting pollination systems. To deal with this loss of habitat, Muchhalla said, the relationship between pollinators and plants must be better understood.

His doctoral research involved the pollination of flowering Burmeistera plants. The 102 species of this genus are found from Guatemala south to Peru, mostly at elevations between 5,000 and 8,500 feet. Previous research suggested these plants are pollinated by both bats and hummingbirds.

Muchhalla and 11 undergraduate students from Ecuadorian universities worked in six cloud forest reserves. For 90 nights, they captured bats in mist nets, recorded 264 hours of video of Burmeistera plants and measured the amount of pollen left on the flowers during the day (when hummingbirds visit) and at night (when bats are on the wing). Pollen samples were also collected from captured bats and microscopically identified.

The video demonstrated that both hummingbirds and two species of Anoura bats (the Geoffroyâ€™s long-nosed bat and the tailed tailless bat) visited 10 of the 11 Burmeistera species. The exception was visited only by hummingbirds and apparently pollinated only by them.

For the other 10 species, however, bats were by far the most important pollinator, with nighttime pollination by bats 30 times more frequent than the hummingbirdsâ€™ rather rare daytime pollinations. Clearly, the Anoura bats and Burmeistera plants are highly specialized for each otherâ€™s survival.

The flowers attract both bats and hummingbirds, but only the bats effectively distribute pollen. Muchhalla theorizes that the shape of the flower makes the difference. To ensure a batâ€™s head will be dusted with pollen, a flower must be wide enough to fully accommodate the batâ€™s snout. But a wide flower also lets a hummingbird slip in for a taste of nectar without touching the pollen.

The Burmeistera flowers are intensely dependent on the bats for survival. But Muchhala said further research suggests that specificity is not shared by the bats, which are sometimes found in areas without Burmeistera plants. They can forage on other flowers and will even learn to take honey-water from artificial flowers.
You can support this kind of research around the world and help prepare a new generation of bat biologists by contributing to Bat Conservation Internationalâ€™s Graduate Student Research Scholarship program. Contact development@batcon.org or phone (512) 327-9721

All articles in this issue:

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