

## VOLUME 19, NO. 4 Winter 2001

Student Research in French Guiana  
Heather Peckham

Waiting patiently, I settle against the buttressed root of a large canopy tree in French Guiana. The world is black from my perspective in the middle of a 34,722-square-mile (90,000 km<sup>2</sup>) lowland rain forest. I can see the faint outlines of canopy trees towering more than 160 feet (50 m) overhead as I am lulled by the night symphony. Squeaking bats zip down the trails as they hunt for insects, fruits, and nectar, while howler monkeys bellow in the distance.

Two hours after dusk, I finally hear angry squeaks coming from the general direction of a net and race toward the noise. With my gloved left hand, I grasp the hind feet of the captured bat, using my right hand to gingerly work the threads off its tiny body. As I continue to untangle this one, more are attracted by its distress cries. I have to untangle them quickly before they begin to defecate, because I need the precious seeds from their droppings to document the plants they are visiting. I carefully drop each disentangled bat into a numbered white cloth bag and tie the top. By midnight, I am satisfied by the string of bobbing, noisy bags hung between two trees. Bats are flying everywhere and night-blooming, bat-pollinated flowers are open, emitting their heady scents. With the bagged bats hanging from my waist, I follow the narrow trail down the ridge, across the stream, and back to camp. My night is far from over, however, because it will take two more hours to identify and release all the bats. I finally collapse into my hammock in the wee morning hours.

I wanted to understand why closely related bat species vary in their ability to eat fruit from disturbed versus undisturbed habitats. When areas are deforested, some species proliferate whereas others in the same genus disappear. I was specifically examining the diets of two pairs of closely related species, *Carollia perspicillata* and *C. brevicauda* (short-tailed bats) and *Sturnira lilium* and *S. tildae* (hairy-legged bats), in an attempt to understand this previously observed pattern. These four fruit-eating species are vital players in the regeneration of forests because they forage on plant species that are the first to grow in openings created by natural tree falls or human cutting. On severely degraded land, bat seed dispersal appears to be the most important source of the seeds needed to initiate forest regeneration.

Intrigued by my early findings, I applied for and received a student scholarship from BCI. As part of my thesis research, I wanted to determine bat diversity, abundance, and the dietary habits of small fruit-eating bats in undisturbed forest versus in an adjacent abandoned agricultural plot. I was especially interested in which bat species foraged in both habitats. I wanted to test the hypothesis that bats are particularly important to forest regeneration, because they transfer seeds from one stage to the next, increasing plant diversity throughout the succession process.

When BCI awarded me a second grant, which allowed me to return to French Guiana, I worked with another graduate student, Kisi Bohn, who had been previously funded by BCI for another project. Together, we spent our nights untangling monstrous beetles and wind-blown leaves and patiently untangling one bat after another. We worked hard into the



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daylight hours, collecting feces from bat bags, putting seeds in glassine envelopes for future identification of species, taking notes, and drying seed collections in the afternoon sun.

Through clues from fecal samples, it became evident that bats were carrying seeds back and forth between habitat types, not just contributing the new seeds essential to forest regeneration in clearings. Many plant species can survive only in the relatively hot, dry conditions found in forest openings, and their survival, as well as that of the bat species that feed on them, depends on continued openings, for example those created by storms or by human cutting. These plants are generally referred to as “pioneer” species. My study documents that even closely related bats may specialize on the fruits of pioneer over mature forest plants, but that both habitat types are essential to maintaining a complete fauna. In turn, a full complement of bat species is essential to long-term forest health. The pioneer plant specialists drop countless seeds from clearings as they return to roosts in large hollow trees deep within mature forests. This creates a “seed bank” that can lie dormant for many years, but that can germinate rapidly in response to damage that creates new openings.

Such discoveries emphasize the need to manage tropical forests in a manner that protects a balance of mature and disturbed areas, maximizing animal and plant diversity and ensuring the forest's ability to recover from storms, floods, fires, and logging.

### **We admit it, there is so much we still don't know about bats.**

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Heather Peckham is a Ph.D. student at Yale University in the School of Forestry and Environmental Studies. She will next investigate the role of frugivorous bats in reforestation of degraded areas in a dry tropical forest ecosystem of western Panama.

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