

Bat Study in the Cayman Islands

-by Livia Loureiro and Burton Lim

My name is Livia Loureiro and I am doing my Ph.D. at the University of Toronto with Dr. Burton Lim who is the Assistant Curator of Mammalogy of the Royal Ontario Museum also in Toronto, Canada.

In April, 2016, we started our field trip to the Cayman Islands with the help of our local partners, the National Trust and the Department of Environment. We packed all our heavy equipment and flew from Toronto to Grand Cayman and our goal was to catch bats!

Bats are the most diverse group of mammals in the Caribbean, representing about 80%, with most endemic to the region. Caribbean biodiversity has been much studied, however, a biogeographic debate still continues on how to explain the distributional patterns and species diversity found on these islands.

The Cayman Islands have nine species of bat, including five insect-eating species that consume about half their body weight in invertebrate prey every night! Three are fruit-eating species that are great seed dispersers because they don't eat their food at the parent tree, and one is a nectar-feeding species which also pollinates flowers as it laps up the sweet reward.

Although the current diversity is well known, there have been few published studies based on genetic analysis or acoustic monitoring.

Therefore, our goals were to establish a DNA reference collection and an echolocation call library from the Cayman Islands in order to access the genetic and behavioral variation among Caribbean bats and to explain the biogeographical patterns across the New World tropics.



A Triple High Net is being used to capture the bats as they forage at night. Photo by Livia Loureiro.



During ten days of fieldwork in April 2016, we used mist nets, harp traps, and hand nets to survey bats in various habitats, such as forest, clearings, caves, and urban areas.

We spent six nights in Grand Cayman and four in Cayman Brac which resulted in the capture of five of the nine species known from the country! The most common species on Grand Cayman is the velvety free-tailed bat (*Molossus molossus*), which roosts in buildings, trees, and bats houses that were erected throughout the island beginning in 1990's through the National Trust.

However, this species was caught on only our last night in Cayman Brac. The most widely occurring species was the Jamaican fruit-eating bat (*Artibeus jamaicensis*). It was caught at most of our study sites and in caves as well as forest and urban areas.

By contrast, the Antillean fruit bat (*Brachyphylla nana*) does not seem to be very common, and the only place that we caught it was in a residential area of Bodden Town. The Buffy Flower Bat (*Erophylla bombifrons*) was caught in both islands, however, only from a few places.



Livia Loureiro releasing an *Artibeus jamaicensis* in Barker's National Park.



The highest number of individuals of this species was at Great Cave, which is also used as a roost for the Jamaican fruit-eating bat and Big brown bat (*Eptesicus fuscus*), which was only documented in Cayman Brac.

The other four species of bats, Brazilian free-tailed bat (*Tadarida brasiliensis*), Red bat (*Lasiurus borealis*), white-shouldered bat (*Phyllops falcatus*), and Waterhouse's leaf-nosed nat (*Macrotus waterhousii*) weren't caught during our survey, indicating that they are probably rare in the islands. However, we have not had a chance to review the gigabytes of acoustic recordings, so the 3 insect-eating species that have strong echolocation signals may have been also been documented.

Research will focus on analyzing the DNA samples derived primarily from wing punches and the echolocation calls from Cayman Islands to compare with other Caribbean and mainland populations. Molecular and acoustics techniques have transformed the ability of scientists to describe and define biological diversity and discriminate otherwise indistinguishable species.

Differences in genetic variation will help in identifying cryptic species in the Caribbean and for understanding the diversity of bats as well as the biogeographic patterns in the Neotropics. In addition, an echolocation call library will be established that will be useful for long-term monitoring and conservation of bat populations.



Above: Nets were erected in known bat locations to optimize sampling success. Below: Fruit bats “hanging out” in caves.