

Oryx

Hope on the brink: two new populations of one of the world's most threatened bats discovered in Jamaica

By Phillip Oelbaum, Damion Whyte and Ronnie Hall, 15th January 2024

The Jamaican flower bat *Phyllonycteris aphylla* is categorized as Critically Endangered on the IUCN Red List, and with good reason: the species is among the most threatened bats in the world. It is believed there are fewer than 500 individuals remaining in the wild, and all are known from just a single site. Although other bats in the genus *Phyllonycteris* inhabit Cuba, Hispaniola and Jamaica, the Jamaican flower bat is endemic to its namesake island, and it is so rarely observed that it has been declared extinct not just once, but twice since the species was first described by Gerrit S. Miller in 1898. Other than subfossil remains found at Green Grotto Caves (then named Dairy Cave), no *P. aphylla* were observed until the species was re-discovered in 1957 at St. Clair Cave. Between 1957 and 1985, the bat was found frequently at St. Clair, as well as several other sites throughout the island. However, it then mysteriously disappeared from all its known roosts (including St. Clair) until 2010, when researchers from the National Environment and Planning Agency found what was presumed to be the last, remnant population at Stony Hill Cave. This rediscovery marked new hope for the conservation of this unique species and the cave was subsequently purchased by the Natural Resources Conservation Authority, in partnership with Bat Conservation International, to help protect the last stronghold of *P. aphylla*.



Phyllonycteris aphylla emerging from the Lake-Side Bat Exit, Green Grotto Caves, St. Ann Parish, Jamaica. The pale colour, pink forearms and legs are characteristic of the species. Photo: Sherri and Brock Fenton.

Not much is known about the ecology of these bats, but they are believed to be nectar feeders that may also occasionally snack on fruit and insects. Where roosts of the species have previously been found, there seemed to be significantly smaller populations than those often observed in other bat species: only around 75 individuals were found roosting in its first presumed stronghold of St. Clair Cave, whereas populations of other species can number in the hundreds to the hundreds of thousands! One reason the Jamaican flower bat is thought to be so rare and thus vulnerable to extinction is that it relies on so-called 'hot caves'. Such caves may not seem particularly comfortable environments to us: they are hot and stuffy, with poor air quality and temperatures often rising above 37 °C/100 °F, but these conditions and a particular suite of geological features make them ideal roosts for bats.



Left: Big hole, Rock Springs Cavern, St. Mary, Jamaica. Harp traps are seen at the lower, south-facing edge of the hole, and in the foreground an AudioMoth device is strapped to a tree to record calls of emerging bats. Right: Damion Whyte lies under a harp trap at Windsor Great Cave, Trelawny parish, to capture video footage of an endemic Jamaican boa *Chilabothrus subflavus* capturing an emerging bat. Bats filled the harp trap as Damion monitored the snake to ensure it did not approach the bag, and the snake successfully captured a Jamaican fruit bat *Artibeus jamaicensis*. Photos: Phillip Oelbaum.

During March–April 2023, a team led by Phillip Oelbaum of the Welch Lab at the University of Toronto Scarborough, Ronnie Hall of the Dumont Lab at University of California Merced and Damion Whyte of the University of the West Indies Mona, set out to survey bats at seven different cave roosts throughout Jamaica, assisted by Stefan Stewart of the Jamaican Caves Organisation. Most of these sites had historical records of the Jamaican flower bat, but no capture records appear in the literature after 1985.

At each site the researchers set up one or two harp traps to capture the bats. These traps are typically placed in areas where there are constrictions or other physical obstacles to ensure that bats fly towards them; vertical fishing lines hang along the metal frame (forming what looks like a harp) that the bats must pass through. While most bats make it through the first panel of string, an offset second panel catches them unaware and disrupts their flight, and they drop harmlessly into the bag below. In this bag, they often sit on the bottom or crawl upwards underneath a plastic guard where researchers can scoop them up and examine them. Once a bat is in hand, researchers place each individual into a cloth bag and hang them along a clothesline to await processing. When processing a bat, we take measurements such as the length of the forearm and mass of the animal, as well as assessing sex, reproductive status, age-class, and general health and behaviour prior to collecting any samples and release. These data provide vital insights into the ecology, behaviour and population size of the bats, helping us to effectively conserve them.



Left: Phillip Oelbaum (right) and Ronnie Hall (left) empty a harp trap full of *Erophylla sezekorni* (and the occasional *Phyllonycteris aphylla*) at Lake-Side Bat Exit, Green Grotto Caves, St. Ann Parish, Jamaica. Right: Phillip Oelbaum with a 'bat necklace' at Green Grotto Caves. Bats are placed in individual cloth bags once they are removed from harp traps to await processing. The researchers wear masks to protect the bats and prevent the potential spread of viruses, such SARS-CoV-2, from humans to bats. Photos: Damion Whyte.

Many of the bats collected in our harp traps were *Erophylla sezekorni*, the buffy flower bat. This species is morphologically similar to the Jamaican flower bat but is found across Jamaica, Cuba, the Cayman Islands, and the Bahamas, and is categorized as Least Concern on the IUCN Red List. The two species can be distinguished based on a slight difference in colouring, nose leaf shape and the size of their ears (see our video below for a detailed demonstration of the two bats). To our delight, we also found populations of both males and pregnant females of *P. aphylla* at two of the survey sites: Green Grotto Caves and Rock Spring Caverns. This exciting find indicates that these sites are used as maternity roosts for the species, making them critical habitats for one of the rarest bats in the world! At Rock Spring Caverns in particular, a site that had never before been the subject of any bat studies, the team captured 66 mature individuals in just 2 hours of netting, suggesting a massive population—possibly one of the largest—of the Jamaican flower bat.

Notably, neither Green Grotto Caves or Rock Spring Caverns are believed to be hot caves, as they both contain flowing or pooled water that moderates the temperatures within the caves. This leads us to believe that other caves may host colonies of *Phyllonycteris aphylla*, too, and more caves should be studied to investigate this.

The discovery of these two new, reproductive populations is an important one: it substantially alters what was previously known about this species and lends significant hope for the survival and conservation of this fascinating bat.

The article ['Reproductive populations of critically endangered *Phyllonycteris aphylla* discovered at](#)

[two new locations in Jamaica](#) is available open access in *Oryx—The International Journal of Conservation*.



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Damion Whyte is a PhD student at the University of the West Indies, Mona, Jamaica. He works on several vertebrates on the island and is also an advocate for the environment via various channels such as social media, radio and TV. Across the island, he helps people with environmental problems and carries out outreach projects with schools, church groups and environmental clubs.