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First record of ultrasound communication in the mysterious Sunda colugo

by Shreya Dasgupta on 1 May 2018

- *Until recently, the Sunda colugo was known to only produce calls in the audible range. But scientists have now published the first-ever record of these animals producing ultrasound calls in the Penang Hill forests of Malaysia.*
- *Overall, the researchers recorded colugo ultrasound calls 16 times and spotted seven individuals likely associated with those calls.*
- *The team has yet to determine the purpose of the ultrasound calls.*

In October last year, a team of scientists were out on a night hike surveying bats in the forests of the Penang Hill in the Malaysian state of Penang when their microphone picked up some unusual ultrasound calls — calls that were very different from the ultrasound calls of bats that the scientists were out to record.

To the surprise of the researchers, the calls seemed to be coming from the Sunda colugo or the Sunda flying lemur (*Galeopterus variegatus*), a nocturnal mammal that's not a lemur and does not fly. Instead, this tree-dwelling mammal glides from tree to tree using a gliding membrane that extends across its body.

Until recently, the Sunda colugo was only known to produce calls in the audible range. But the calls recorded in the Penang Hill forests are the first record of ultrasound communication in these animals, researchers report in a new study published in *Bioacoustics* (https://www.tandfonline.com/eprint/utnnn33a7Nq4PVf4wBCj/full).

"At first, when we recorded the calls, we could not see which animal it was from," lead author Priscilla Miard of the University of Science, Malaysia, who was part of a 117-member team (https://news.mongabay.com/2018/01/new-ghost-scorpion-among-several-species-recorded-for-the-first-time-in-malaysian-rainforest/) that surveyed Penang Hill's biodiversity last year, said in an email. "One recording was really close to us and when I looked up I saw a colugo just a few meters in front of us on the tree trunk. After few seconds looking at it I understood the ultrasound was coming from this individual. I was amazed! It made a lot of sense but we needed more proof."

Colugo in Penang Hill. Image by The Habitat Foundation, Penang.

Other small nocturnal mammals in Southeast Asian forests, such as the tarsier and slow loris, are known to communicate using ultrasound frequencies. So to confirm the source of the calls that Miard's team recorded, the researchers repeated the night surveys. Whenever the team detected the same ultrasound call, they used a thermal night vision device to search for animals in the vicinity, and used the light from their head torch to confirm the animal's identity. The researchers then verified the source of the calls by repeatedly moving the ultrasound microphone toward and away from the animal to see if the volume of the calls varied proportionately with distance.

"This systematic experiment resulted in seven recordings of similar calls with direct sightings of Sunda colugos," said co-author Lim Lee Sim of the University of Science, Malaysia.

The team repeated the survey in Penang Botanic Gardens, a public park located in George Town, the capital of Penang state. Unlike Penang Hill, which is hilly and difficult to spot animals in, the botanic garden is mostly flat, making it easier to get closer to animals. Moreover, Miard had surveyed the park in the past and knew of at least three resident colugos there.

"It was a good location for recording as we observed different things," Miard said. "First, we observed two individuals in one tree and both of them used ultrasound when they saw us. Another time we recorded a female colugo with a baby on one side of the road with really faint ultrasound but when she glided to the other side of the road we could pick up the ultrasound calls clearly."

Overall, the researchers recorded colugo ultrasound calls 16 times and spotted seven individuals likely associated with those calls. Taking all these observations into consideration, the researchers are "confident the ultrasound calls are emitted by the Sunda colugos," Lee Sim said.

Researchers surveying colugos in Penang Hill. Image by The Habitat Foundation, Penang.

However, Dzulhelmi Nasir, author of the book "Natural History of the Colugo" who reported four types of audible colugo calls in a 2009 study (https://www.ums.edu.my/ibtpv2/images/publication/JTBC/JTBC-VOL-5/3-dzulhelmi.pdf), is not completely convinced.

"It does surprise me," Nasir, currently with the Biological Research Division of the Malaysian Palm Oil Board, told Mongabay.

The rainforest in the Penang Hill is very dense with tall trees, he said. So the ultrasound calls could be coming from the colugos, or the calls could be coming from other cryptic creatures, such as slow loris, tarsier or flying squirrels, that live high up in tree canopies with dense leaf cover, often in the vicinity of colugos.

These animals often remain unnoticed until they move or make some noise, he said, adding that he was also unsure of the extent to which the thermal device used by Miard's team was able to penetrate dense leaves, tree holes or tree branches high up in the canopy.

Nasir added that the research would be "very interesting and convincing" if the researchers had a larger sample size with many more ultrasound calls.

Sunda Colugo. Image by Didasteph via Wikimedia Commons (public domain).

Miard and Lee Sim's team has yet to determine the purpose of the colugos' ultrasound calls. But from their preliminary observations, the researchers speculate that the animals could be using ultrasound to raise alarm about the presence of people.

"Unlike bats, colugos are not capable of true flight," Lee Sim said. "Their night vision is excellent, and their diet is mainly plant-based. Thus, we assume Sunda colugos do not use echolocation. In fact, we did not detect ultrasound use by Sunda colugos while gliding (one observation) or feeding (three observations) during our experimental observation."

The team is currently waiting for some additional equipment to arrive that will enhance their ability to record both audible sounds and ultrasounds.

"There is a good saying that we should not look for what we can see but for what we cannot see. In our case it would be what we cannot hear and this is true in science in general," Miard said.

Citation:

Miard, P., Lim, L. S., Abdullah, N. I., Elias, N. A., & Ruppert, N. (2018). Ultrasound use by Sunda colugos offers new insights into the communication of these cryptic mammals. *Bioacoustics*, 1-7. DOI: 10.1080/09524622.2018.1463294 (https://doi.org/10.1080/09524622.2018.1463294)