



**Tarsiers are big-eyed but lack many adaptations to see at night. They may use their ears to hunt for insects.**

Meet the world's tiniest cryptographers.

Philippine tarsiers (*Tarsius syrichta*), primates native to Southeast Asia that are often no bigger than a human hand, pass messages using an unbreakable code: ultrasonic sounds.

A new study shows that these tree-dwellers emit squeaky calls well above the vocal range of any known monkey or ape, perhaps to dodge eavesdropping predators.

Like any good code, ultrasound works because it's rarely used.

Few land mammals — bats and kittens are exceptions — coo or call at frequencies above the normal range of human hearing (about 20 kilohertz).

That's largely because ultrasonic waves, unlike other sound waves, spread out quickly; that makes it harder for animals to pinpoint the locations of faraway calls, says study co-author Marissa Ramsier, an anthropologist at Humboldt State University in Arcata, California.

The first clue that tarsiers use ultrasound came from observing an odd behavior.

The big-eyed, nocturnal creatures occasionally open their mouths as if ready to shout, but no sound humans can hear comes out.

On a whim, co-author Sharon Gursky-Doyen, a biological anthropologist at Texas A&M University in College Station, brought a microphone used for recording bat chirps to a Philippine jungle frequented by the primates.

The animals, it turns out, are boisterous — just not to human ears.

“Philippine tarsiers have often been described as quiet,” Ramsier says.

But “they’re screaming and talking away, and we just didn’t know it.”

To dig deeper into tarsier communication, Ramsier and colleagues trapped and sedated six tarsiers in the wild.

Using a technique first employed to test hearing in newborn babies, the team monitored the brainwaves of the dozing creatures as noises played on a speaker.

The primates, the group reports online in *Biology Letters*, could register sounds up to 90 kilohertz (slowed down in the accompanying audio), double the upper limit of any primate studied to date.

The team also listened in on the nighttime back and forth between tarsiers.

Their calls closely resembled the vocalizations of similar primates: dominated by a single tone followed by several trills.

Except they were much higher, fluctuating around 70 kilohertz.

Tarsiers use their savvy for hearing and speaking in ultrasound to eat and to keep from being eaten, Ramsier suggests.

The primates dine exclusively on small insects such as moths and katydids, which also frequently communicate in ultrahigh frequencies.

Because tarsiers' perky ears are so sensitive, they may be able to intercept this chatter at night — then zoom in for the kill.

But they may just as much want to avoid being eavesdropped on.

Their nails-on-a-chalkboard trills are too high-pitched for predators such as birds to notice,

letting mothers and infants talk without drawing the attention of the entire forest.

Ramsier thinks that hidden communication may be more common than many researchers suspect.

Scientists, she says, rarely think to listen for ultrasonic noise.

“I want everyone to go out with their bat detectors.”

“It’s a neat paper,” says Mark Coleman, who studies primate hearing at Midwestern University in Glendale, Arizona.

But he’s not convinced that ultrasonic communication is so underappreciated in primates.

Based on the shapes of their inner ears, early mammals likely vocalized a lot using ultrasonic frequencies, the better to hide from hungry dinosaurs, he suggests.

Tarsiers, unlike most other primates, may be one of the few species to have retained this ability.

“They’re kind of a holdover from this really ancestral mammal...where high-frequency communication was the norm.”