

Glass frogs living near roaring waterfalls wave hello to attract mates

January 15 2021, by Kara Manke



A UC Berkeley conservation ecologist has discovered that an elusive glass frog species (*Sachatamia orejuela*) uses both high-pitched calls and visual signaling — in the form of hand-waving, foot-waving and head-bobbing — to communicate near loud waterfalls. Credit: Rebecca Brunner

Most frogs emit a characteristic croak to attract the attention of a

potential mate. But a few frog species that call near loud streams—where the noise may obscure those crucial love songs—add to their calls by visually showing off with the flap of a hand, a wave of a foot or a bob of the head. Frogs who "dance" near rushing streams have been documented in the rainforests of India, Borneo, Brazil and, now, Ecuador.

Conservation ecologist Rebecca Brunner, a Ph.D. candidate at the University of California, Berkeley, has discovered that the glass [frog](#) *Sachatamia orejuela* can be added to the list of species that make use of visual cues in response to their acoustic environments. This is the first time a member of the glass frog family (Centrolenidae) has been observed using visual communication in this manner.

"A handful of other [frog species](#) around the world use visual signaling, in addition to high-pitched calls, to communicate in really loud environments," Brunner said. "What's interesting is that these species are not closely related to each other, which means that these behaviors likely evolved independently, but in response to similar environments—a concept called convergent evolution."

Sachatamia orejuela glass frogs are native to the rainforests of Ecuador and Colombia. They are especially unique because they are almost exclusively found on rocks and boulders within the spray zones of waterfalls, where rushing water and slippery surfaces offer some protection against predators, and their green-gray color and semi-transparent skin make them nearly impossible to spot. As a result, little is known about this species' mating and breeding behavior.

Brunner, who studies the bioacoustics of different ecological environments, was chest-deep in an Ecuadorean rainforest stream recording the call of a *Sachatamia orejuela* when she first observed this visual signaling behavior. As soon as she saw the frog repeatedly raising

its front and back legs, Brunner climbed a slippery rock face and balanced on one foot to get video footage of the behavior.

"I was already over the moon because I had finally found a calling male after months of searching. Before our publication, there was no official record of this species' call, and basic information like that is really important for conservation," Brunner said. "But then I saw it start doing these little waves, and I knew that I was observing something even more special."

While she filmed, the frog continued to wave its hands and feet and bob its head. She also observed another male *Sachatamia orejuela* glassfrog a few meters away performing the same actions.



Brunner's colleague captured a photo of her climbing a slippery rock face to film the glass frog. Credit: Rebecca Brunner



Glass frogs are named for their semi-transparent skin. Credit: Rebecca Brunner

"This is a really exhilarating discovery because it's a perfect example of how an environment's soundscape can influence the species that live there. We've found that *Sachatamia orejuela* has an extremely high-pitched call, which helps it communicate above the lower-pitched white noise of waterfalls. And then to discover that it also waves its hands and feet to increase its chances of being noticed— that's a behavior I've always loved reading about in textbooks, so it is beyond thrilling to be able to share another amazing example with the world," said Brunner.

Though the COVID-19 pandemic has put a pause on Brunner's fieldwork, she hopes to return to Ecuador soon to continue her research, which links bioacoustics and conservation.

"One of the best things about fieldwork is that nature is always full of surprises—you never know what discoveries you may happen upon," Brunner said. "I hope our findings can serve as a reminder that we share this planet with incredible biodiversity. Conserving ecosystems that support species like *Sachatamia orejuela* is important not only for our well-being, but also for our sense of wonder."

Juan M. Guayasamin, professor of biology at Universidad San Francisco de Quito, is a co-author of this research, which appears in the journal *Behaviour*. Brunner's fieldwork was supported by a National Geographic Explorer Grant (EC-57058R-19) and a National Science Foundation Graduate Research Fellowship.

More information: Rebecca M. Brunner et al. Nocturnal visual displays and call description of the cascade specialist glassfrog *Sachatamia orejuela*, *Behaviour* (2020). [DOI: 10.1163/1568539X-bja10048](https://doi.org/10.1163/1568539X-bja10048)

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