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Morning Mix

Scientists discover new frog species small enough to sit on a fingernail

By Samantha Schmidt February 22

Hidden in marshes and under damp leaf litter in a remote rain forest in India, tiny frogs — some smaller than the average fingernail — can barely be heard making their distinct insectlike calls.

Five years of exploring the jungles of the Western Ghats mountain range have led scientists to discover seven new species of night frogs, four of which are among the smallest known frogs in India, at 12.2 to 15.4 millimeters (.40 inches to .60 inches) in length. The findings of their research, published Tuesday in the journal PeerJ, underscore the region's biodiversity and makes the Western Ghats the second-largest global amphibian "hot spot" after Brazil's Atlantic Forest.

"We were surprised by the high diversity of miniature forms, which had probably been overlooked because of their extremely small size, secretive terrestrial habitats and insectlike calls," Sonali Garg, a PhD student at the University of Delhi and the lead author on the paper, said in an interview on

the journal's blog.

Unlike larger frogs within the same genus — which run up to 77mm in length, live in forest streams, have large foot webbing and call loudly — the newly discovered miniature frogs lack webbing between the toes, are found in marshes and have cricket-like calls. Four of the seven newly discovered *Nyctibatrachus* species are small enough to sit on a coin. Six are known to be geographically restricted to low- and mid-elevation regions in the states of Kerala and Tamil Nadu, and the other likely resides in high-elevation mountain streams north of the gap in Tamil Nadu.

"Our discovery of several new species, particularly of easily overlooked miniaturized forms, reiterates that the known amphibian diversity of the Western Ghats of India still remains underestimated," the authors of the paper wrote.

Guided by Garg's mentor S.D. Biju, who has discovered over 80 species of frogs so far, the scientists conducted routine amphibian surveys by day and night in 2002 and between 2013 and 2016 in the Western Ghats — which runs parallel to the western coast of the Indian peninsula.

"During some of my first frog expeditions in the Western Ghats, I had a tendency to locate really tiny frogs, which to my disappointment most often turned out to be juveniles or subadults," Garg said in the journal blog interview. "It used to be a nice joke but I never thought we would actually discover four new species of miniature frogs several years later."

The discovery of these seven species of night frogs adds to a list of about 28 other night frog species identified so far. Night frogs are considered to be an ancient lineage of frogs that originated on the Indian landmass between the Cretaceous and Paleocene periods. Indian night frogs split off from other frogs about 70 to 80 million years ago, according to the paper.

This surge from 28 to 35 identified night frog species "clearly indicates that

several more species remain to be discovered and formally described," the authors of the paper wrote. Such rapid rates of species discoveries can be attributed to intensified explorations as well as the increased use of molecular tools.

The discovery of the night frogs also underlines the need to focus on conserving the species, Garg said. One-third of amphibians in the Western Ghats are already threatened, and even among the newly discovered species, at least four are facing serious anthropogenic disturbances.

Some of the frog species were found inside private or state-owned plantation areas facing threats such as habitat disturbance, modification and fragmentation.

"We are still far from having a near-complete amphibian inventory of this region," Garg said. "We need to take stock of how our actions may be leading to an irreversible loss of several smaller forms of life such as frogs."