Scientists Pioneer New Method to Classify Praying Mantises

Two scientists from the Museum have pioneered a new method to identify praying mantises. They described a new species of leaf-dwelling mantis by establishing a female genitalia character system.

The newly described species from Madagascar was named in honor of Ruth Bader Ginsburg, associate justice of the Supreme Court of the United States, for her relentless fight for gender equality. The newly named species made headlines across the globe.

Male genitalia characters have historically been a standard in classifying insect species. This is the first formal study to use female genital structures to delimit a new species of praying mantis. The study was published in the journal *Insect Systematics & Evolution*.

Lead author Sydney Brannoch and co-author Dr. Gavin Svenson, both of the Museum and Case Western Reserve University, named the new species *Ilomantis ginsburgae* (ill-oh-mantis ginnz-BURG-ee). The holotype specimen was collected in Madagascar in 1967 and is housed among the collection of the Muséum national d'Histoire naturelle of Paris, France.

"This species description of *Ilomantis ginsburgae* is novel since it relied heavily on the features of the female genitalia," said lead author Sydney Brannoch, a Case Western Reserve University Ph.D. candidate working under the direction of Svenson at the Museum. "As a feminist biologist, I often questioned why female specimens weren't used to diagnose most species. This research establishes the validity of using female specimens in the classification of praying mantises. It is my hope that our work not only sets a precedent in taxonomy but also underscores the need for scientists to investigate and equally consider both sexes in other scientific investigations."

The newly described *Ilomantis ginsburgae* looks similar to other leaf-dwelling praying mantises. They are green in color, have a flattened body, conical eyes and broad wings with venation that resembles the vein patterns on leaves. The authors also named the species for Ginsburg for her appreciation of the jabot, a decorative neck accessory, which resembles the neck plate of the insect.

For the study, the team examined 30 praying mantis specimens from three museums. They examined the geographic distribution, external features, and both male and female genital characters of the mantises. The scientists found that the female genital characters alone could define the species—and traditionally-used character systems corroborated their findings. Similarly, the researchers resurrected *Ilomantis* as a valid genus from the related genus *Nilomantis* due to character differences observed on the female genitalia, which again was supported by the other character systems.

"Defining or identifying insect species can be extremely difficult if we are limited to using one or a few poorly known characteristics," said co-author Dr. Gavin Svenson, the Museum's curator of invertebrate zoology and adjunct assistant professor at Case Western Reserve University. "Developing new characteristics, especially from female specimens, helps us not only test the validity of species, but makes identification much easier. Many praying mantis species have males and females that look very different. If a person finds one sex, they may only be able to identify the specimen if their specimen's sex matches what is known from previous research. Our work reduces this impediment by characterizing both sexes for praying mantis species."

This study was done as part of Svenson's broader research, which is focused on the evolutionary patterns of relationships, distribution and complex features of praying mantises. His current research project aims to align new sources of relationship evidence (DNA sequence data) with morphology and other features to create a new and accurate classification system for praying mantises that reflects true evolutionary relationships.

To view a video interview and photo gallery, visit www.cmnh.org/ginsburg.