

Following a frog's evolutionary movements

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A common species of Asian tree frog may actually be two separate species according to new genetic data collected by an international group of scientists. If the two groups of frogs are confirmed to be different species, assigning their scientific names may require searching historical records of foreign explorers in Japan during the 1800s.

Before the frogs are officially recognized as two separate species, researchers will test if individual frogs from the two groups have unique physical or behavioral features and if they can produce healthy offspring.

The project began when researchers at European universities expanded their studies on [sex determination](#) and population dynamics in amphibians to include Asian species. The species of tree frog that they chose, *Hyla japonica*, is found throughout Japan, the Korean peninsula, eastern China, and eastern Russia. Collaborators around the world began sending genetic samples from local frog populations to discover their evolutionary relationships.

The data revealed evolutionarily distinct groups of frogs in Japan, the Korean peninsula, and eastern Russia. Ancestors of the modern frog populations likely traveled either into or out of Japan by two separate routes: from the North on a chain of islands between Russia and Japan, and from the South along a land bridge on the Philippine Sea Plate between South Korea and Japan.

Japanese *H. japonica* populations may have been isolated into separate

East and West groups. Researchers are exploring this possibility in more detail with an ongoing research project led by Ikuo Miura, PhD, an Associate Professor in Amphibian Research Center at Hiroshima University.

The same separation between East and West Japan is known in other species of frogs and skinks. Miura explains that the scientific community has no definitive information about exactly what caused the divide between East and West Japan, but suggests the possibility of the expansion of ancient basin associated with volcanic activity in central Japan.

Miura and Yuya Higaki, a fourth-year bachelor's degree student, are currently running genetic analysis on 50 populations of *H. japonica* from across Japan. They will present their preliminary results on November 26th at the annual conference of the Herpetological Society of Japan. This project is part of Miura's larger research interests in sex determination and its influence on speciation and evolution.

If *H. japonica* is recognized as two separate species, it will be challenging for researchers to decide which species should keep the original name due to the mystery surrounding which population of *H. japonica* was used for the original species characterization in 1858. The German-British naturalist Albert Gunther named *H. japonica* after examining a specimen collected years earlier, potentially in 1826, by Philipp Siebold and Heinrich Burger, German botanists and physicians who were among the first Westerners granted official access to Japan. The modern research team visited the British Museum of Natural History to inspect the original specimen, but the location of where Siebold and Burger collected the first *H. japonica* is recorded only as "Japan." For now, naming the [species](#) will remain a historical mystery secondary to the ongoing scientific questions.

The current research paper is published in the November 23, 2016 issue of *BioMed Central Evolutionary Biology*.

More information: Dufresnes C, Litvinchuk SN, Borzee A, Jang Y, Li J, Miura I, Perrin N, Stock M. Phylogeography reveals an ancient cryptic radiation in East-Asian tree frogs (*Hyla japonica* group) and complex relationships between continental and island lineages. *BioMed Central Evolutionary Biology*. 23 November 2016.

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