Can a new species of frog have a doppelganger? Genetics say yes

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This frog, described by University of Kansas student Chan Kin Onn, was discovered in the central Malay Peninsula. Credit: KU News Service/University of Kansas

Recently, Malaysian herpetologist Juliana Senawi puzzled over an unfamiliar orange-striped, yellow-speckled frog she'd live-caught in swampland on the Malay Peninsula.

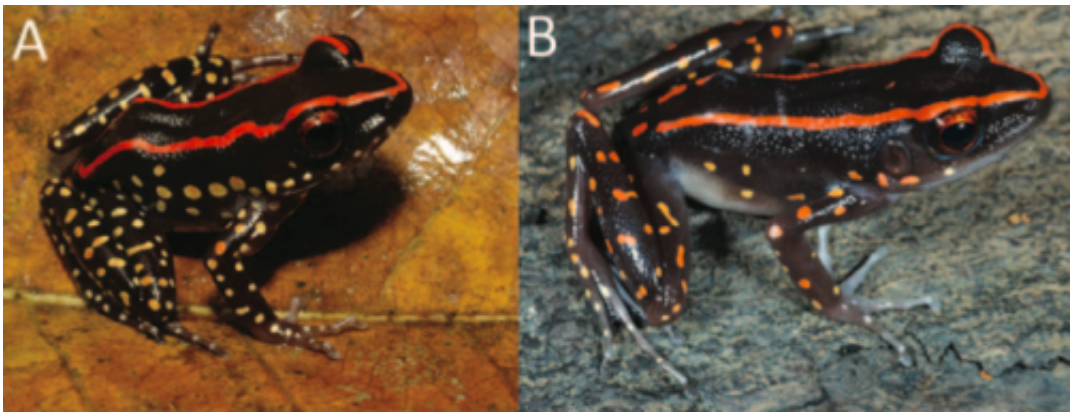
She showed the frog to Chan Kin Onn, a fellow herpetologist pursuing his doctorate at the University of Kansas. They wondered—was this striking frog with an appearance unlike others nearby in the central peninsula an unidentified species?

Poring over records to find out, the researchers saw that a comparable frog had been collected in the area 10 years earlier, but written off then as a species from an Indonesian island about 450 miles to the west. The distance and geography between the two habitats made them suspect their frog might have been formerly misidentified.

"The frog was originally confused with the Siberut Island Frog, which is a species that occurs on Siberut Island off the western coast of Sumatra, Indonesia, due to their similar appearance in color-pattern," Chan said.

They wondered if genetic code from the exact same frog species could have jumped eastward from a remote island across 150 miles of Indian Ocean—then over the whole of Sumatra—then across the Strait of Malacca into the Malaysian interior?

"Despite their similarities, we had a strong suspicion that the frog from Malaysia wasn't the Siberut Island Frog," Chan said.



The new species from the central Malay Peninsula (A) and its look-alike from Siberut Island (B). Credit: KU News Service/University of Kansas

Later, extensive genetic analysis performed in the lab of Rafe Brown, curator of herpetology at KU's Biodiversity Institute, would determine whether the Malaysian frog was indeed new to science—genetically distinct from its doppelgänger on Siberut Island.

"The lab is very high-tech and is able to run a number of different types of genetic analyses," Chan said. "It's also able to run the latest in cutting-edge genetic analysis called Next Generation Sequencing, which a lot of researchers are currently utilizing. We also have a very powerful bioinformatics lab that can analyze extremely large and computationally expensive datasets. The great thing about the lab is that we have the equipment and expertise to run everything from initial DNA extractions to the final data analyses without having to rely on any outsourcing."

When testing was complete, the first hunch of the Malaysian team proved right: "Sure enough, results from Rafe's genetic analysis showed that the frog from Peninsular Malaysia was genetically too distant from the Siberut Island Frog to be considered the same species, so we decided to describe it as a new species."

As lead author, Chan published the team's findings in a recent issue of the journal *Herpetologica*.

"We decided to call it '*Hylarana centropeninsularis*' because it's currently only known from central Peninsular Malaysia," he said. "The name is constructed from the Latin word 'centro' that means center and 'peninsularis,' in reference to Peninsular Malaysia."

To date, Chan has described seven species of frogs and three species of lizards, all from Peninsular Malaysia, that are new to science.

Born and raised in Malaysia, Chan took interest in nature as a child, interacting with jungle plants and animals—then keeping snakes and lizards as pets.

"At one point, I had as many as 25 species of pet snakes in my room," said the KU researcher.

At the National University of Malaysia, Chan found himself under the tutelage of herpetologist Norhayati Ahmad and Lee Grismer of La Sierra University, California, a world-renowned herpetologist with research interests in Malaysia.

"I knew about Rafe Brown and KU through their research and publications and first met him at a conference in Borneo," Chan said. "My research interests aligned well with Rafe—we both work on frogs in Southeast Asia and are generally interested in answering the same type of questions."

For would-be herpetologists looking to follow in Chan's species-finding footsteps, the KU researcher had words of advice: "Do it the old-fashioned way. Wade through the mud and get dirty!"

Provided by University of Kansas