

Japanese tadpoles relax in hot springs

July 26 2016



Tadpoles of the Japanese stream tree frog can live in water the highest ever-recorded temperatures for any amphibian tadpole, 46.1°C (115°F), in the natural hot springs on Kuchinoshima, a Japanese island. The research from Hiroshima University directly connects the physical ability to adapt to environmental conditions and the ability to disperse over a wide geographic range. Credit: Image by Shohei Komaki.

Japanese tadpoles can live and grow in natural hot springs, or *onsen*, with water temperatures as high as 46.1°C (115°F). Living in *onsen* may benefit the tadpoles' immune systems, speed their growth, and allow the

tadpoles to survive on small volcanic islands where there are few other natural sources of fresh water.

Tadpoles of the same frogs were previously found living in hot springs in Taiwan and other Japanese islands, but this field study found tadpoles living in the hottest ever recorded temperatures for any amphibian tadpole. The research was completed by scientists at Hiroshima University with collaborators at SOKENDAI, The Graduate University for Advanced Studies.

Japan's *onsen* attract locals and visitors to relax in the hot water year round in bathhouses built to contain the water in public tubs. The *onsen* where researchers found the tadpoles were shallow mud pools in the forests of the small, subtropical island of Kuchinoshima, approximately 310 kilometers (192 miles) due South of Nagasaki in the East China Sea.

"Scientists have studied the distributions of organisms and their environmental adaptations since the era of Darwin and Wallace. Our report is one of the best examples of a direct connection between an animal's physical ability to tolerate diverse environmental conditions and the animal's success at colonizing diverse geographic areas," said Takeshi Igawa, Ph.D., Assistant Professor at Hiroshima University and last author of the current study.

The tadpoles are Japanese stream tree frogs, known to scientists as *Buergeria japonica*. Japanese stream tree frogs are the only native species of amphibian on the Tokara Archipelago, a chain of volcanic islands off the Southwest coast of Japan. The adaptation to survive in water too warm for other amphibians may have allowed these frogs to exploit new habitats and avoid competition from other species. Future research will focus on the details of the tadpoles' behavior in their habitat.

"I noticed [tadpoles](#) in the Seranma *onsen* during a field trip in June 2013,

so we went back to the same place in September 2015 to study them. Our goal is to understand the evolutionary processes that allow an animal to adapt to its environment," said Igawa.

Researchers did not find any adult frogs in the *onsen*, so the species may only be adapted to high temperatures during the early, tadpole stage of life.

Adult Japanese stream tree frogs generally live on the ground, have bumpy skin, and are about three centimeters (1.2 inches) long when fully grown, with females usually being larger than males. Their natural predators include snakes and birds. They are listed as "Least Concern" on the International Union for Conservation of Nature's Red List of Threatened Species.

More information: Takeshi Igawa et al, Living in a Japanese onsen: field observations and physiological measurements of hot spring amphibian tadpoles, *Buergeria japonica*, *Amphibia-Reptilia* (2016). [DOI: 10.1163/15685381-00003052](https://doi.org/10.1163/15685381-00003052)

Provided by Hiroshima University

Citation: Japanese tadpoles relax in hot springs (2016, July 26) retrieved 17 May 2024 from <https://phys.org/news/2016-07-japanese-tadpoles-hot.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.