

# Why more species live in the Amazon rainforests

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A treefrog (*Osteocephalus heyeri*) from the Amazonian rainforest. Credit: Dan Moen.

(PhysOrg.com) -- For more than two hundred years, the question of why there are more species in the tropics has been a biological enigma. A particularly perplexing aspect is why so many species live together in a small area in the tropics, especially at some sites in the rainforests of the Amazon Basin in South America.

New research on the evolution and ecology of treefrogs, to be published online this month in the journal *Ecology Letters*, sheds new light on the puzzle. The patterns found in treefrogs may also help to explain the high [species](#) richness of other groups of organisms—such as trees, birds and insects—in the Amazon rainforests.

The article, entitled “Phylogenetic Origins of Local-Scale Diversity Patterns and the Causes of Amazonian Megadiversity,” will be published [online](#).

“Treefrogs are a particularly important group to study for understanding amphibian diversity, because they can make up nearly half of all amphibian species in some [rainforest](#) sites,” says lead author John J. Wiens, an Associate Professor in the Department of Ecology and Evolution at Stony Brook University. “Treefrogs also offer a striking example of the high local-scale biodiversity in the Amazon. At some sites in the Amazon rainforest, there are more treefrog species in a small area than there are across all of North America or Europe.”

The researchers compiled data on the number of treefrog species at 123 sites around the world and analyzed the data with a new evolutionary tree (based on DNA sequence data) for 360 treefrog species. They discovered that the richness of treefrog species in the Amazon rainforest sites is not explained by wet, tropical climatic conditions alone.

“In fact, we found that many tropical rainforest sites that are outside the Amazon Basin have no more species than do some sites in temperate North America,” explains Dr. Wiens.

Instead, the researchers discovered that the high biodiversity of Amazonian sites is related to different groups of treefrogs occurring together in the Amazon Basin for more than 60 million years—since before most dinosaurs became extinct. In contrast, those sites in [tropical](#) rainforests that have relatively few treefrog species are in areas that were colonized by treefrogs much more recently.

These results also have important implications for humans. “The results suggest that the incredible biodiversity of amphibians in some sites in the [Amazon Basin](#) took more than 50 million years to develop,” says Dr.

Wiens. “If the Amazon rainforests are destroyed and the amphibian species are driven to extinction by human activities in the next few decades, it may take tens of millions of years for this incredible level of biodiversity to ever return.”

Provided by Stony Brook University

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