



# AMERICAN MUSEUM OF NATURAL HISTORY

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## RESEARCH IDENTIFIES DRIVERS OF RICH BIRD BIODIVERSITY IN NEOTROPICS

### FINDINGS CONTRADICT LEADING MODEL, LINK SPECIATION TO BIRD MOVEMENT ACROSS LAND BARRIERS

An international team of researchers is challenging a commonly held view that explains how so many species of birds came to inhabit the Neotropics, an area rich in rain forest that extends from Mexico to the southernmost tip of South America. The new research, published today in the journal *Nature*, suggests that tropical bird speciation is not directly linked to geological and climate changes, as traditionally thought, but is driven by movements of birds across physical barriers such as mountains and rivers that occur long after those landscapes' geological origins.

"The Neotropic zone has more species of birds than any other region on Earth," said Brian Smith, lead author of the publication and an assistant curator at the American Museum of Natural History who started this work as a postdoctoral researcher at Louisiana State University. "The unanswered question has been – how did this extraordinary bird diversity originate?"

In the Neotropics, bird speciation – the process by which new species are formed – is usually linked to changes in Earth's landscape over time. When rivers change course, mountains rise, and continents drift, a once-continuous population can be divided into two or more smaller populations that eventually become different species. But an alternative model attributes Neotropical bird speciation to the movement of the animals across these geographical barriers, not necessarily linked to a change in landscape.

To examine these two models, the scientists compared genetic patterns among a diverse array of bird lineages that occur in the Neotropics. Each of the 27 lineages analyzed contained populations situated on the opposite side of large dispersal barriers, and with

genetic data the scientists were able to estimate the time that the populations became isolated from one another. They found that most speciation occurred in the Pleistocene, which began about 2.6 million years ago, long after the origin of the Andes Mountains and the Amazonian river system, aligning with the alternative speciation model. Under this model, bird lineages with a longer occupation of the landscape have a higher likelihood of moving across geographical barriers and diversifying.

“It may be only in birds that the genetic sampling is sufficiently dense to examine how interactions between the landscape and natural populations of birds influence the speciation process,” said Louisiana State University professor Robb Brumfield, lead investigator on the project. “The thousands of samples used in the study represent the culmination of over 30 years of field expeditions led by generations of LSU students and scientists, plus similar work done by ornithologists at other research collections. Biological research collections such as these are priceless.”

Other institutions involved in this research include City College of New York; Museu Paraense Emílio Goeldi (Brazil); Universidad de los Andes (Colombia); Universidad Central de Venezuela; Colección Ornitológica Phelps; University of California, Los Angeles; and the University of Georgia, in Athens.

#### **AMERICAN MUSEUM OF NATURAL HISTORY (AMNH.ORG)**

The American Museum of Natural History, founded in 1869, is one of the world's preeminent scientific, educational, and cultural institutions. The Museum encompasses 45 permanent exhibition halls, including the Rose Center for Earth and Space and the Hayden Planetarium, as well as galleries for temporary exhibitions. It is home to the Theodore Roosevelt Memorial, New York State's official memorial to its 33rd governor and the nation's 26th president, and a tribute to Roosevelt's enduring legacy of conservation. The Museum's five active research divisions and three cross-disciplinary centers support 200 scientists, whose work draws on a world-class permanent collection of more than 32 million specimens and artifacts, as well as specialized collections for frozen tissue and genomic and astrophysical data, and one of the largest natural history libraries in the world. Through its Richard Gilder Graduate School, it is the only American museum authorized to grant the Ph.D. degree. In 2012, the Museum began offering a pilot Master of Arts in Teaching program with a specialization in Earth science. Approximately 5 million visitors from around the world came to the Museum last year, and its

exhibitions and Space Shows can be seen in venues on five continents. The Museum's website and collection of apps for mobile devices extend its collections, exhibitions, and educational programs to millions more beyond its walls. Visit [amnh.org](http://amnh.org) for more information.

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