

Unique songbird diversity of Eastern Himalayas documented

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The Himalaya golden-spectacled warbler (*Seicercus burkii*) lives in the Eastern Himalayas. There are several closely related species of the same genus in Central and South China. They can be distinguished by their vocalizations and genetic makeup. Credit: © Jochen Martens, JGU

The Eastern Himalayas are home to more than 360 different songbird species, most of which are to be found nowhere else on the planet. This makes the region extending from eastern Nepal to the borderlands of China, India, and Myanmar unique and one of the most important hot spots for biological diversity in the western hemisphere. A recent research paper describes how this impressive bird community came about millions of years ago, emphasizing both the uniqueness and biological significance of this remote area.

"As the Himalayan mountain range was formed, a profusion of completely different ecological niches were created," explains Professor Jochen Martens of Johannes Gutenberg University Mainz (JGU). "A wide variety of different songbird [species](#) were able to colonize these niches. The majority of these species did not evolve there but emigrated from the eastern and south-eastern regions of the Himalayas." Martens has been conducting research in the Himalayas for 45 years and is the co-author of the article "Niche filling slows the diversification of Himalayan [songbirds](#)" published in the eminent scientific journal *Nature*.

The team of researchers from India, the US, Germany, and Sweden was able to sample and analyze the DNA of all songbirds found in the Himalayas. Team members such as Martens compiled some of the genetic material over the course of decades; some was found in old collections in European and North American museums or was taken from individual feathers collected by field workers. The scientists were surprised at the relatively large differences in the genetic makeup even between species which are apparently closely related and that often have an extremely similar appearance. On average, each bird species separated from their closest relative six to seven million years ago. The time is roughly equivalent to the period separating human beings from chimpanzees, the animal most closely related to humans.

Over the past million years, new bird species have evolved such as those

found in Southeast Asia, China, and Siberia. However, almost none of these have emigrated to the Eastern Himalayas. The team of researchers headed by Professor Trevor Price of the University of Chicago and Dhananjai Mohan of the Indian Forest Service believe that emigration has not taken place because of the difficulty of integration into the already tightly packed bird communities of the Eastern Himalayas.

"The capacity for [new species](#) to evolve appears to depend to a large extent on whether enough room for colonization is available," explains Martens. The Eastern Himalayas offered unique conditions for the development of an enormous diversity of songbird species. The research team concluded that the habitats have since been saturated so that barely any new niches were available for new species.

The findings from the DNA analyses essentially confirm those made by Martens after his many years spent examining bird songs. The various types of song show how acoustic properties, usually in the form of dialects, contribute to species evolution and how the individual species are distributed in an area with extreme elevation stratification, such as the Himalayas. Over the years, Martens has recorded more than 10,000 individual sounds from numerous species for his research, which he compiled in Europe and many parts of Asia.

Martens and his international research colleagues agree that the Eastern Himalayas on the borderlands of India, China, and Myanmar is an area of unique genetic diversity with regard to birds. They hope that their findings on songbirds will help stimulate research into other groups of animals, such as reptiles and mammals, in this impressive location. "It will only be possible to protect this natural heritage once it has been researched as thoroughly as possible," adds Martens.

More information: Trevor D. Price et al. Niche filling slows the diversification of Himalayan songbirds , *Nature*, 30 April 2014. [DOI:](#)

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