

Hawaiian honeyeaters' long-lost relatives found

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Despite appearances, Hawaii's five species of recently extinct songbirds known as honeyeaters bore no close relationship at all to the honeyeaters found in Australia and New Guinea, according to a genetic analysis reported online on December 11th in *Current Biology*, a Cell Press publication. Rather, similarities in the way the two groups of birds act and look – including their long bills and brush-tipped tongues specially adapted for gathering nectar – arose independently in the two geographical regions.

The unexpected discovery makes the two groups of honeyeaters a particularly striking example of convergent evolution, the researchers said. Indeed, the Hawaiian honeyeaters include three distinct "morphotypes," each of which is also represented by honeyeaters of Australasia. Convergent evolution refers to the evolution of similar traits in distantly related taxa as a result of common selective pressures imposed by their environments.

"Everybody assumed Hawaii's honeyeaters were the same as the ones in Australia and New Guinea," said Robert Fleischer of the Smithsonian Institution. "In fact, nobody had a clue who their relatives really were."

Fleischer said he initially began to look into the Hawaiian honeyeaters' evolutionary family tree some 10 years ago, using mitochondrial DNA isolated from museum specimens of the birds, but ran into trouble when the pieces didn't really seem to fit. Mitochondria are cellular components that carry their own DNA. More recently, he managed to piece together

enough nuclear DNA to study where the Hawaiian honeyeaters would fall in an evolutionary tree of songbirds reported recently by other scientists.

They now reveal that the Hawaiian honeyeaters don't fit anywhere near the Australasian honeyeaters. Instead, their closest relatives are waxwings, silky flycatchers, and palm chats, mostly fruit and insect feeders that do not resemble honeyeaters in any apparent way. The degree of genetic divergence between the Hawaiian birds and their newfound closest relatives was enough to warrant their designation as a new bird family, which the researchers named the Mohoidae. Fleischer said that the closest ancestor of the Hawaiian honeyeaters probably colonized the islands some 14 to 17 million years ago, before the current main islands even existed.

Sadly, Fleischer said, all of the members of the new Mohoidae family are now extinct. It's the only known case of an entire family of birds being lost in the last few hundred years, he said. The five species of honeyeaters all disappeared between 1850 and 1985, probably because of myriad factors, including the introduction of predators and avian disease to the islands and use of the birds for feather artwork.

Source: Cell Press

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