

New 'tree of life' traces evolution of a mysterious cotinga birds

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They are some of the brightest, loudest, oddest-looking, least-understood birds on the planet. Some have bulbous crests, long fleshy wattles, or Elvis-worthy pompadours in addition to electric blue, deep purple, or screaming orange feathers. But thanks to a comprehensive new evolutionary "tree of life" generated for the tropical cotinga family of South America, the door is now open to new discoveries about the more than 60 species in this amazingly diverse group of birds.

"Our study provides comprehensive insight into how nearly all the cotinga species are related to each other going all the way back to their common ancestor," says lead author Jake Berv, a Ph.D. student in the Fuller Evolutionary Biology Lab at the Cornell Lab of Ornithology. "No previous attempts to understand the evolutionary history of this group have included genetic samples from nearly all the existing species."

Berv began sequencing DNA samples and compiling data in late 2010 while working as a lab technician at Yale University with co-author Prof. Rick Prum, a leading expert on cotingas. Understanding how one species is related to another within this group allows scientists to trace the evolution of specific traits and behaviors.

Berv and Prum have already started to do that. They wanted to learn if the evolution of differently-colored males and females in this bird group (sexual dimorphism) is directly linked to a breeding system in which males have multiple mates (polygyny). Darwin first theorized that the increased pressure of [sexual selection](#) in polygynous birds spurred the

development of color differences between the sexes. This appears to be true for many species—but not the cotingas. When Berv and Prum examined patterns of evolution for these two traits across their new tree of life, it turned out that they didn't perfectly match up. The statistics they calculated also supported the conclusion that these traits may be evolutionarily "de-coupled" in the cotingas.

Sexual selection appears to have played a role in the evolution of non-plumage gender differences in some cotinga species.

"In one case, the Screaming Piha, the males and females look alike but the male sings one of the loudest songs on the planet," says Yale's Rick Prum. "That means male-female plumage difference alone is not evidence for sexual selection because sexual selection is also driving other traits such as voice and behavior."

"One of the biggest analytical differences between what we've done and past work is that we used a '[species](#) tree' approach, which is potentially more accurate than what is typically applied to genetic data," Berv says. "We ran our data through more traditional types of analyses as well, and all of them strongly supported a consistent evolutionary 'tree of life.' We hope other scientists who are interested in these birds take our phylogeny and do all sorts of great things with it."

More information: www.sciencedirect.com/science/.../S1055790314003133

Provided by Cornell University

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