

The Scientist: NewsBlog:

Birds of a feather

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In the largest ever study of bird genetics, a five-year international collaboration has redrawn the avian family tree. The report, published in *Science* this week (June 27), proposes surprising new classifications and suggests that environmental adaptations arose multiple times in bird history.

"It's an important paper that represents a very comprehensive study," said [Larry Martin](#), Curator of the National History Museum at the University of Kansas, who was not involved in the research. A reliable avian family tree has remained elusive due to birds' reputed explosive divergence 150 million years ago. Competing morphologic, cladistic, and genomic studies have presented conflicting results, Martin noted. The new classification means "you pretty well have to re-do everything," he said. "But that's not necessarily a bad thing. It's nice to get something reasonably stable."

For their phylogeny, [Shannon Hackett](#), head of the Division of Birds at the [Field Museum](#) in Chicago, and colleagues collected specimens from around the world, then sequenced and analyzed their DNA across multiple chromosomes. The results challenge a major 2004 [study](#) that concluded the avian evolutionary tree was nothing more than a bush, an irresolvable mass of "extremely short (in some cases zero-length) branches" resulting from simultaneous radiation of multiple families. But, said Hackett, it is possible to recover early relationships. "It's time to look at birds in a new way," she remarked.

According to Hackett, the study differs from previous attempts to fill out the avian family tree by its scale of data gathering and sample choices. The team collected 32 kb of data from 169 bird species in order to map out 19 nuclear loci on 15 chromosomes. When selecting species to include, the team did not use traditional taxonomy, but rather the results of a 1990 DNA hybridization [study](#) that estimated relatedness based on DNA similarity. Hackett's team chose large quantities of species within particular families in a deliberate attempt to sample deep lineages.

More than any previous study, Martin pointed out, it demonstrates that adaptations in birds have evolved multiple times. The water-loving flamingo, for example, is not closely related to most other aquatic birds. Similarly, several lifestyle niches evolved more than once: bright, daytime hummingbirds evolved from dull, nocturnal nightjars. But as surprising as it is, the data fits the basic pattern of evolution, Martin said. "A normal pattern in evolution is for adaptive similarity to evolve multiple times in similar groups because of natural selection for particular ecologies."

The results may be controversial to some, Hackett admits. But she hopes that for others it will shed new light on current work as well as stimulate new research. "I think we've provided people with roots, a good trunk, and big branches," Hackett concluded. "Now they can leaf it out more effectively than they could in the past."