

Birds' DNA yields 'startling' find

Canadian-led study finds 15 provisional new species

Randy Boswell

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A Canadian-led study of the biodiversity of North American birds has yielded astonishing DNA evidence of 15 new species, including genetically distinct specimens of familiar birds such as the common raven and eastern meadowlark.

"People have watched birds for so long we might think every different tweet has been heard, every different colour form observed," said Paul Hebert, head of the Biodiversity Institute of Ontario at the University of Guelph and co-author of a research paper appearing in the journal *Molecular Ecology Notes*.



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The "deep divergence" detected within species such as the common raven appear to signify extended periods of "reproductive isolation" -- a key criterion for distinguishing one species from another, Hebert told CanWest News Service on Sunday.

An owl...

He said the DNA analysis showing extremely strong genetic similarities between certain gull species, for example, suggest they "should be merged as a single species."

Hebert added the genetic profiling of species is transforming taxonomy -- traditionally based on "visual and sonic cues" from animals observed -- into an exciting new digital age, comparable to the difference between the age of "star navigation" and the modern era of GPS devices.

The project, part of a larger Canadian-led effort to create a DNA "barcode" profile of every living thing on Earth, involved the collection of thousands of individual specimens and the creation of genetic portraits for each of 643 bird species between the Canadian Arctic and the Florida Keys -- nearly the entire inventory of 690 known breeding species in Canada and the U.S.

Work continues on compiling DNA profiles of the remaining 47 birds, as well as several extinct species available only from museum collections.

Other genetically distinct individuals, described as "provisional new bird species," were found among the following species: northern fulmar, solitary sandpiper, western screech owl, warbling vireo, Mexican jay, western scrub-jay, mountain chickadee, bushtit, winter wren, marsh wren, Bewick's wren, hermit thrush and curve-billed thrasher.

Describing their findings as a "startling discovery," the scientists noted the genetic variety detected in DNA sampling revealed differences "nearly indistinguishable to human eyes and ears and consequently overlooked in centuries of bird studies."

Perhaps equally surprising, the study also showed a number of birds now classified as separate species are so genetically similar to related specimens that they could be considered varieties of the same species.

These "lumps" of "virtually identical" species included the snow goose and Ross's goose; the black, mallard and mottled ducks; the blue-winged and cinnamon teal; the king and common eider; the western and Clark's grebe; the laughing and Franklin's gull; the California, herring, Thayer's, Iceland, lesser black-backed, western, glaucous-winged and glaucous gull; the red-naped and red-breasted sapsucker; the black-billed and yellow-billed magpie; the American and northwestern crow; the Towns-end's and hermit warbler; the golden-crowned and white-crowned sparrow; the dark-eyed and yellow-eyed junco; the snow and McKay's bunting; the great-tailed and boat-tailed grackle; the common and hoary redpoll.

The scientists note that "even though birds may appear very similar to human observers, a species with a distinct DNA barcode very rarely interbreeds; they literally find birds of a feather as mates."

But the 15 birds described in the study as separate species have not yet officially been given unique identities. That, the researchers acknowledge, is "the subject of scientific discussion and debate." A statement from the research team notes: "there is no universal scientific agreement on what defines a species."

A separate, but complementary Canadian study of 87 separate species Guyanese bats identified six apparent new species.

Hebert's co-authors on the bird study were: Mark Stoeckle of New York's Rockefeller University, Carla Dove and Lee Weigt of the Smithsonian Institution, National Museum of Natural History, Washington, D.C., Kevin Kerr of the University of Guelph and Charles Francis of the Canadian Wildlife Service in Ottawa.

Herbert co-authored the bat study with: University of Guelph's Elizabeth Clare, and Burton Lim, Mark Engstrom and Judith Eger of the Royal Ontario Museum in Toronto.

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