Songbirds may have 'borrowed' DNA to fuel migration

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This is an Audubon's warbler. Credit: David Toews, UBC

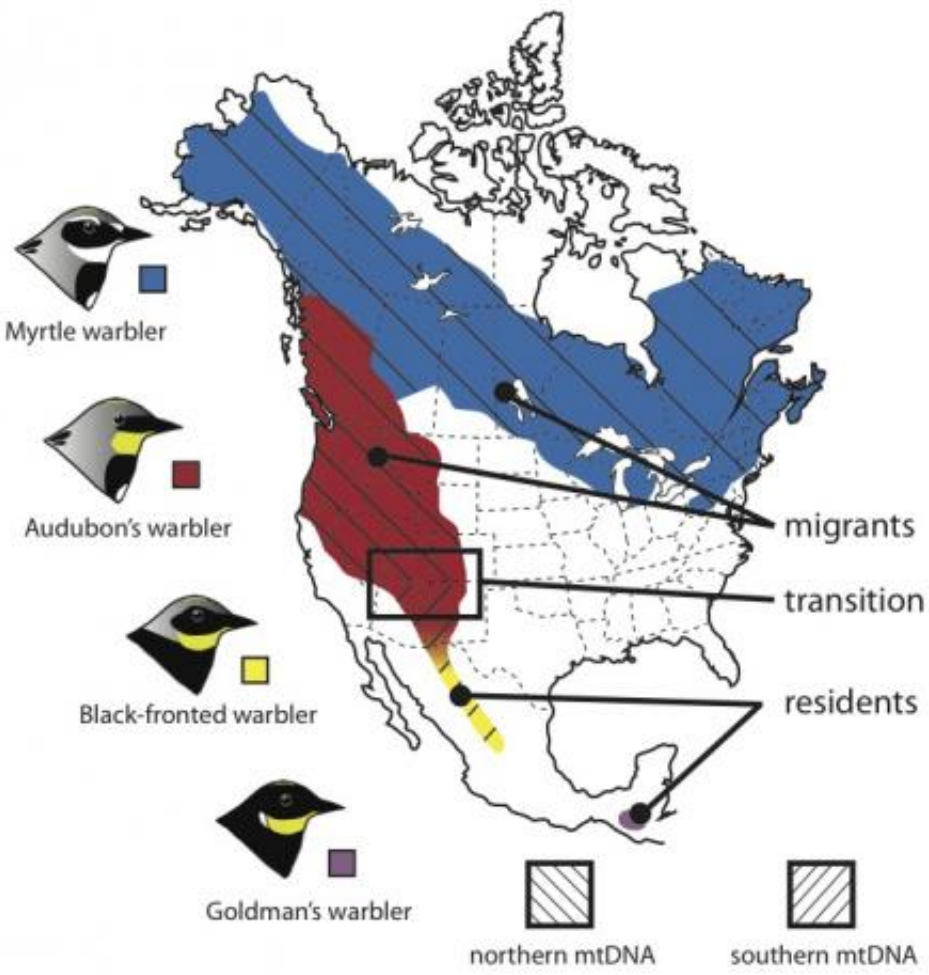
A common songbird may have acquired genes from fellow migrating birds in order to travel greater distances, according to a University of British Columbia study published this week in the journal *Evolution*.

While most birds either migrate or remain resident in one region, the

Audubon's warbler, with habitat ranging from the Pacific Northwest to Mexico, exhibits different behaviours in different locations. The northern populations breed and migrate south for the winter, while southern populations have a tendency to stay put all year long.

Evolutionary biologists have long been puzzled by research that indicates some Audubon's warblers share the same mitochondrial DNA (mtDNA) with myrtle warblers – a different species of songbird that migrates annually to the southeastern U.S., Central America and the Caribbean – even though they look dramatically different.

"Mitochondria are only passed down from mothers to their offspring," says David Toews, a PhD candidate in UBC's Department of Zoology. "So it's a very useful marker for differentiating species. In this case, finding two species of songbirds sharing the same mtDNA is very surprising, so we set out to find out why."



This is a map showing the breeding ranges, migratory behavior and distribution of mitochondrial DNA (mtDNA) in four groups of yellow-rumped warblers. New data from Toews and colleagues demonstrates that the area where there is a transition in mtDNA is also home to a shift in migratory behavior, from residents to migrants. Credit: Toews, et al. UBC.

By analyzing genetic data and stable isotopes in feathers, and by measuring oxygen consumption of the mitochondria in their flight muscles, Toews and fellow researcher Milica Mandic pinpointed the precise geographical location near the Utah-Arizona border where the

myrtle warblers' "wanderlust" genes displace the Audubon warbler's ancestral mitochondria. This region happens to also be the transition zone where we see a change in the migratory behaviour of Audubon's warblers.

"Because of its prominent role in reconstructing evolutionary relationships, people often forget that mitochondria actually have a very important function as the main energy generator of cells," says Toews. "Our findings suggest that over generations, the Audubon's warbler may have co-opted the myrtle's mitochondria to better power its own travels."

Provided by University of British Columbia