

# Tiny songbird discovered to migrate non-stop, 1,500 miles over the Atlantic

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Blackpoll warbler fitted with a miniaturized light-sensing geolocator on its back that enabled researchers to track their exact migration routes from eastern Canada and New England south toward wintering grounds. Credit: Vermont Center for Ecostudies

For more than 50 years, scientists had tantalizing clues suggesting that a tiny, boreal forest songbird known as the blackpoll warbler departs each fall from New England and eastern Canada to migrate nonstop in a direct line over the Atlantic Ocean toward South America, but proof was hard to come by.

Now, for the first time an international team of biologists report "irrefutable evidence" that the birds complete a nonstop flight ranging from about 1,410 to 1,721 miles (2,270 to 2,770 km) in just two to three days, making landfall somewhere in Puerto Rico, Cuba and the islands known as the Greater Antilles, from there going on to northern Venezuela and Columbia. Details of their study, which used light-level, or solar, geolocators, appear in the current issue of *Biology Letters*.

First author Bill DeLuca, an environmental conservation research fellow at the University of Massachusetts Amherst, with colleagues at the University of Guelph, Ontario, the Vermont Center for Ecostudies and other institutions, says, "For small songbirds, we are only just now beginning to understand the migratory routes that connect temperate breeding grounds to tropical wintering areas. We're really excited to report that this is one of the longest nonstop overwater flights ever recorded for a songbird, and finally confirms what has long been believed to be one of the most extraordinary migratory feats on the planet."

While other birds, such as albatrosses, sandpipers and gulls are known for trans-oceanic flights, the blackpoll warbler is a forest dweller that migrates boldly where few of its relatives dare to travel. Most migratory songbirds that winter in South America take a less risky, continental route south through Mexico and Central America, the authors note. A water landing would be fatal to a warbler.

In the recent past, DeLuca explains, geolocators have been too large and

heavy for use in studying songbird migration and the tiny blackpoll warbler, at around half an ounce (12 grams) or about as much as 12 business cards, was too small to carry even the smallest of traditional tracking instruments. Scientists had only ground observations and radar as tools.

But with recent advances in geolocator technology, they have become lighter and smaller. For this work, the researchers harnessed miniaturized geolocators about the size of a dime and weighing only 0.5g to the birds' lower backs like a tiny backpack. By retrieving these when the warblers returned to Canada and Vermont the following spring, then analyzing the data, DeLuca and colleagues could trace their migration routes.

For this work the scientists fitted geolocator packs on 20 birds in Vermont and 20 more in Nova Scotia. They were able to recapture three birds from the Vermont group and two from the Nova Scotia group for analyses.

So-called light-level geolocators use solar geolocation, a method used for centuries by mariners and explorers. It is based on the fact that day length varies with latitude while time of solar noon varies with longitude. So all the instrument needs to do is record the date and length of daylight, from which daily locations can then be inferred once the geolocator is recaptured. "When we accessed the locators, we saw the blackpolls' journey was indeed directly over the Atlantic. The distances travelled ranged from 2,270 to 2,770 kilometers," DeLuca says.

To prepare for the flight, the birds build up their fat stores, explains Canadian team leader Ryan Norris of the University of Guelph. "They eat as much as possible, in some cases doubling their body mass in fat so they can fly without needing food or water. For blackpolls, they don't have the option of failing or coming up a bit short. It's a fly-or-die

journey that requires so much energy."

He adds, "These birds come back every spring very close to the same place they used in the previous breeding season, so with any luck you can catch them again. Of course there is high mortality among migrating songbirds on such a long journey, we believe only about half return."

Chris Rimmer, an ornithologist at the Vermont Center for Ecostudies notes, "We've only sampled this tiny part of their breeding range. We don't know what birds from Alaska do, for example. This may be one of the most abundant warblers in North America, but little is known about its distribution or ecology on the wintering grounds in Venezuela and the Amazon. However, there is no longer any doubt that the blackpoll undertakes one of the most audacious migrations of any bird on earth."

DeLuca says, "It was pretty thrilling to get the return birds back, because their migratory feat in itself is on the brink of impossibility. We worried that stacking one more tiny card against their success might result in them being unable to complete the migration. Many [migratory songbirds](#), blackpolls included, are experiencing alarming population declines for a variety of reasons, if we can learn more about where these [birds](#) spend their time, particularly during the nonbreeding season, we can begin to examine and address what might be causing the declines."

As for why the blackpoll undertakes such a perilous journey while other species follow a longer but safer coastal route, the authors say that because migration is the most perilous part of a songbird's year, it may make sense to get it over with as quickly as possible. However, this and other questions remain to be studied.

Other researchers on the team besides those from UMass Amherst, the University of Guelph and the Vermont Center for Ecostudies, were from the Smithsonian Conservation Biology Institute, Acadia University, Bird

Studies Canada and the University of Exeter, U.K. Each contributed to funding the study.

**More information:** Transoceanic migration by a 12g songbird, *Biology Letters*, [rsbl.royalsocietypublishing.org ... .1098/rsbl.2014.1045](https://rsbl.royalsocietypublishing.org/doi/10.1098/rsbl.2014.1045)

Provided by University of Massachusetts Amherst

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