

# Early environment may be key to determining bird migration location

February 18 2008

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How young migratory birds choose the nesting location of their first breeding season has been something of a mystery in the bird world. But a new University of Maryland/National Zoo study of the American redstart suggests that the environmental conditions the birds face in their first year may help determine where they breed for the rest of their lives, a factor that could significantly affect the population as climate change makes their winter habitats hotter and drier.

“We found that where the birds go in their first winter, a process called natal dispersal, may determine the area, within several hundred miles, where they will breed over their lifetime,” said Colin Studds, the University of Maryland PhD student who led [C1]the study. “An important factor appears to be the availability of water in their winter habitat.”

The study appears in the February 18 issue of the *Proceedings of the National Academy of Sciences*. Co-authors of the paper are Peter Marra, of the Smithsonian Migratory Bird Center, and Kurt Kyser, of Queen’s University, Ontario.

## The Rich Get Richer

The American redstart is a warbler that migrates between breeding grounds in North America and winter spots in the Caribbean and South America. The team studied redstarts that winter over in Jamaica in two very different habitats that are right next to each other.

“One is a very lush mangrove with water and lots of insects for the birds to eat,” Studds said. “Right beside it is a fairly harsh dry habitat, with very little water and not as good a food supply.”

By studying the tail feathers of young redstarts between their first and subsequent summer nestings, the researchers found that the difference between wintering over in the lush mangrove or in the drier real estate next door may help set off a lifelong cycle of habitat location.

The mangrove birds leave earlier to breed, don’t migrate as far north, and return to the water and food-rich mangrove. The birds from the lower rent district leave later for breeding grounds, must migrate farther north, and when they return to Jamaica, the mangrove is occupied and they are, once again, scrabbling in the scrub.

## **The Cycle**

The cycle begins for the young redstart when it leaves its northern birthplace and migrates south for its first winter. Studds’ team measured a hydrogen isotope called deuterium, found in the fledglings’ tail feathers, an indicator of where the bird was hatched and, in subsequent summers, where it breeds. “Once the isotope in the feathers, it doesn’t change,” Studds says.

The isotope measurement showed that the birds that had the good fortune to spend their first winter in the mangrove stayed in the good life, while the birds that had wintered in the dry area usually had a harder life year round.

“The birds in the lush mangrove have access to more insects, which helps them maintain their weight,” says Studds. “This helps them to leave sooner on spring migration and arrive sooner in the more southern breeding areas, where spring is just beginning,”

The birds in the dry area, however, need about another seven days to bulk up, “a long time,” says Studds. The later start means that by the time they head north, the southern breeding habitat is already taken and the birds have to keep flying, some as far north as Canada, to find the right spring conditions for breeding.

Where a redstart spends its first winter also seems to be determined, in part, by its ability hold its territory. “About seventy percent of the birds in the mangrove are males,” Studds says. “In the harsh habitat, they were mostly females and young males.”

### **Climate Change and the Redstart**

While these redstarts appear to be thriving today, the research team says their findings point to the need to consider conservation measures in the winter habitat.

“The models predict increasing drought in the Caribbean,” says Studds. “Rain is very important to these birds. If their winter habitat gets drier and their departure dates get later, populations in southern areas could see big declines.”

The team next hopes next to research the redstart’s breeding grounds. “By analyzing isotopes in feathers of redstarts arriving to breed in Maryland, we plan to ask whether birds dispersing here from northern areas spent the winter in different habitats compared to birds dispersing from southern areas,” Studds says.

Source: University of Maryland

18) retrieved 27 March 2023 from <https://phys.org/news/2008-02-early-environment-key-bird-migration.html>

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