

Migrating birds detect latitude and longitude, but how remains a mystery

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Eurasian reed warblers captured during their spring migrations and released after being flown 1,000 kilometers to the east can correct their travel routes and head for their original destinations, researchers report online on January 31st in *Current Biology*, a publication of Cell Press.

The new evidence suggests that the birds have true navigation, meaning that they can identify at least two coordinates that roughly correspond to geographic latitude and longitude.

The findings challenge the notion held by some that birds might be limited to navigation in the north-south direction. But scientists still don't know how they do it.

“We have experimentally shown beyond reasonable doubt that long-distance, intercontinental avian migrants can correct for east-west displacements during their return migration in spring,” said Nikita Chernetsov of the Biological Station Rybachy at the Zoological Institute in Russia. “This means that they can determine geographic longitude, even though we do not currently know how they do it.”

Latitude, which defines the location north or south, may be relatively easily defined from the position of the sun at midday or through the use of geomagnetic information, Chernetsov explained. Experimental studies by others have strongly suggested that geomagnetic cues are indeed used by avian migrants for this purpose, he said, although other cues might also be important.

Longitude is trickier. Migrants could perhaps deduce their longitudinal location from the rotational phase of the starry sky, but experimental data do not support that idea, he said. Migrating birds might use a dual time-sense, relying on two internal clocks, one set to their “home time” and the other to their wintering grounds. They might also rely on geomagnetic information, but in some parts of the world that doesn’t vary with longitude, Chernetsov said.

“Consequently,” the researchers wrote, “our knowledge about the spatiotemporal navigation strategies of experienced migrants in spring is very sparse and rather speculative. Do birds on return migration in spring perform true navigation towards a specific goal area?”

The answer, for the reed warblers at least, is yes. After the researchers dropped the migrants off many kilometers to the east, the birds corrected for their displacement by shifting their orientation from the northeast at the capture site to the northwest, the researchers reported. That new direction would lead the birds to their expected breeding areas.

“Our results suggest that Eurasian reed warblers are able to determine longitude and perform bicoordinate navigation,” the researchers concluded. “This finding is surprising and presents a new intellectual challenge to bird migration researchers, namely which cues enable birds to determine their east-west position?”

Source: Cell Press

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