

Variety in the migratory behavior of blackcaps

November 5 2020, by Maren Lehmann



Scientists attach geolocators to the backs of blackcaps to record the light intensity at any time of day. In this way, hiking trails can be precisely determined. Credit: MPI f. Evolutionary Biology/ Liedvogel

Many species of birds have always migrated south in the fall to spend the winter there, including the small blackcap, which often weighs only a

few grams and yet covers thousands of kilometers. However, changes in our landscapes and climate change are not leaving migratory birds unaffected. They change their behavior, the destinations of their journey, the time of their departure or even the decision whether to fly away at all. So far, these habits have been studied either experimentally with birds in captivity or by irregular recaptures of ringed birds.

A group of international researchers led by Miriam Liedvogel from the Max Planck Institute for Evolutionary Biology in Plön has now for the first time conducted a large-scale study with geolocators. These are ultra-light, tiny devices that are attached to the backs of free-flying [birds](#) and record the [light intensity](#) with exact time data. After the birds have been caught again, the respective flight route can be calculated exactly. Altogether the scientists could document and analyze the migrations of 100 individual birds.

Different migration destinations depending on the breeding area

It was already known beforehand that there is a migration divide in Europe: east of this imaginary line, the blackcaps migrate southeast in the fall, and west of this line, they move southwest. Through targeted breeding experiments, it was already successfully shown in the 1990s that the direction of migration is inherited by the parents. These experiments also showed that offspring crossed in captivity between western- and easterly blackcaps show an intermediate orientation, i.e. they migrate exactly in the direction of the south. The assumption was that this would be avoided in nature, since the southern route would lead the birds over the Alps, the Mediterranean and possibly over the Sahara desert.

The scientists were now able to show that this intermediate orientation

direction does indeed occur in nature and that the birds that choose this migratory direction also successfully return to their breeding areas despite the ecological barriers they have to overcome in this way. The area in which the orientation preference changes is surprisingly narrow and covers only 27 kilometers.

Some birds move north

Another exciting finding from the data obtained concerns a group of birds which, at the end of the year, do exactly the opposite of what one would expect: they do not migrate to the warm south but northwards and spend the [winter](#) in Great Britain. Since the 1960s, there has been a steady increase in the number of blackcaps that choose this strategy, probably due to milder winters and the winter feeding in English gardens. The new investigations show for the first time that these birds come from brood-areas scattered over whole Europe. Why do they not let themselves be dissuaded from this strategy by uncomfortable winters?

On the basis of the evaluated data it was to be recognized that these birds returned in the spring approximately ten days earlier to their breeding places than those which spent the winter in the south. The hibernators from Great Britain possibly had an advantage in the search for breeding places. For the evolutionary scientists, these findings are only a beginning. Bird [migration](#) behavior is largely genetic, and this study now lays the groundwork for finding the genes that control where birds migrate and when they fly.

More information: Kira E. Delmore et al. Individual variability and versatility in an eco-evolutionary model of avian migration, *Proceedings of the Royal Society B: Biological Sciences* (2020). [DOI: 10.1098/rspb.2020.1339](https://doi.org/10.1098/rspb.2020.1339)

Provided by Max Planck Society

Citation: Variety in the migratory behavior of blackcaps (2020, November 5) retrieved 14 July 2024 from <https://phys.org/news/2020-11-variety-migratory-behavior-blackcaps.html>

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