

The molecular clock of the common buzzard

October 23 2013



Thanks to information from amateur birdwatchers, biologists at Bielefeld University have been able to confirm which genes determine when young buzzards leave their parents' territory. Credit: Bernhard Glüer

Be it hibernation or the routes of migratory birds: all animal behaviour that is subject to annual rhythms is controlled by a molecular clock. Although this has been known for a long time, in many cases it is still unclear how far genes are involved in setting this internal clock. Up to now, this also applied to the common buzzard and its migration from

parental breeding grounds. Behavioural scientists in Professor Dr. Oliver Krüger's team at Bielefeld University's Faculty of Biology have now confirmed that a genetic clock determines when young buzzards leave their parents' territory. The key to these findings were observations from the general public who reported tagged birds to the researchers. The researchers have now published their study in the journal *Molecular Ecology*.

'There's a buzzard flying there with a label on its wing.' Krüger and his colleagues often get [phone calls](#) with messages like this. 'However, we are not interested in the tags as such, but the codes that are written on them,' says Krüger. 'They are the identity card that our research group gives to every buzzard in the Bielefeld region.' With the help of this code, the behavioural scientists can trace the migrations of individual [birds](#).

Krüger's colleague Nayden Chakarov has been wing tagging and ringing buzzards for years as part of his doctoral thesis. The procedure is no problem for the birds, he explains: 'The wing tags don't interfere with flying and the buzzards are already tagged as chicks.' He and his colleagues climb up to buzzard nests not only to tag the young birds but also to take blood from them. This means that a genetic sample is available for every young bird that is ringed. If someone spots the bird later and reports the code on the tag to the researchers, they can use the blood samples to gain matching information on certain genes. Phone calls from lay ornithologists do not just come from Bielefeld and the region in which the birds have been tagged but from as far as Belgium and the Netherlands. The researchers advertise their project with a website in several languages, a leaflet, and in web forums.



Behavioural scientist Nayden Chakarov climbing up to a buzzard nest to tag young birds and take blood samples. Credit: Bielefeld University /Martina Boerner

'Thanks to the help of numerous birders, we now have enough reports to draw first conclusions,' says Chakarov. For resighted buzzards the team analysed four genes that play a role in the [molecular clock](#). 'We managed to determine an effect of three of these genes,' the biologist explains. 'These allow us to predict the time point when young birds leave their parents' territory.' These same genes code the neurotransmitters which control migratory behaviour in songbirds. Moreover, the same genes may also influence the time of breeding and thereby contribute to adapting to

local climate conditions. In the next few years, Professor Krüger's team will be studying whether these [genes](#) also help the buzzards to adapt better to climate change. Here as well, the researchers will be depending on sightings of tagged birds.

More information: Chakarov, N. et al. Variation at phenological candidate genes correlates with timing of dispersal and plumage morph in a sedentary bird of prey, *Molecular Ecology*.

[dx.doi.org/10.1111/mec.12493](https://doi.org/10.1111/mec.12493) , published online on 7 October 2013.

Provided by University of Bielefeld

Citation: The molecular clock of the common buzzard (2013, October 23) retrieved 27 April 2024 from <https://phys.org/news/2013-10-molecular-clock-common-buzzard.html>

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