

Study reveals impact of habitat fragmentation on migrant birds

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Robin Whytock Credit: University of Stirling

Experts at the University of Stirling have shed new light on the impact of habitat fragmentation on migrant birds.

Scientists used audio technology to analyse the behaviour of willow warblers, after spring migration, in 23 woodland patches across Scotland and England. While the patches were of a similar size, the landscapes in which they were located had differing amounts of available [habitat](#).

Significantly, the study found that migrant male willow warblers arrived earlier in woodland patches when there was less habitat in the surrounding landscape, within a 2km radius.

The team also found that an individual's decision to remain in a [patch](#) after initial colonisation depended on patch quality, as measured by vegetation characteristics. In particular, birds preferred to stay in woodlands with a relatively open understorey, also known as undergrowth.

Robin Whytock, of the Faculty of Natural Sciences, led the work as part of his Ph.D. alongside colleagues at the University, Professor Kirsty Park, Dr. Elisa Fuentes-Montemayor and co-supervisor Dr. Kevin Watts at Forest Research.

"Habitat fragmentation and loss has changed how animals move through landscapes and use the remaining habitat," Dr. Whytock said. "Whether an animal colonises a fragmented habitat patch—for example, a small woodland—depends on a variety of factors, including the content of the surrounding landscape and the quality of the patch itself.

"This study gives a valuable insight into how [habitat fragmentation](#) affects the behaviour of even very mobile species, such as [migrant birds](#).

"Our results support prior research in aquatic study systems that have looked at colonisation of artificial reefs and ponds—and, as far as we know, this is the first time that the patterns observed in our study have been observed over such large spatial scales and with such a highly

mobile species."

The scientists conducted the study in spring 2016 to focus on the spring migration of the willow [warbler](#), which migrates bi-annually between northern Europe and sub-Saharan Africa.

They combined the latest bio-acoustic technology—which recorded the first song dates of male willow warblers—with Stirling's unique Woodland Creation and Ecological Networks (WrEN) project to test how the amount of habitat in a regional landscape affects colonisation timing of isolated woodland patches.

On analysing the audio data, the team found first song dates were on average five days earlier in patches with five percent woodland cover in the [landscape](#), when compared to patches with around 30 percent cover.

Dr. Whytock added: "These findings are particularly interesting when you consider that previous research has suggested this species benefits from large expanses of woodland during migration. Therefore, it's surprising that individuals should choose to settle earlier in isolated woodlands."

He said further work is now required to examine whether this has consequences for the survival and reproduction of [willow](#) warblers.

More information: Robin C. Whytock et al, Context-dependent colonization of terrestrial habitat 'islands' by a long-distance migrant bird, *Proceedings of the Royal Society B: Biological Sciences* (2018). [DOI: 10.1098/rspb.2018.1490](https://doi.org/10.1098/rspb.2018.1490)

Provided by University of Stirling

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