Birds adjust their singing activity around airport noise

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Male chaffinches start singing several minutes earlier in the vicinity of Berlin airport. Credit: S. Greif

Scientists from the Max Planck Institute for Ornithology in Seewiesen have determined that birds near Berlin's Tegel airport, one of Europe's largest, start singing significantly earlier in the morning than their counterparts at quieter locations. What's more, they discovered that chaffinches stop singing when the noise from air traffic exceeds a threshold of 78 decibels (A).

Noise pollution caused by humans has been shown to have a negative impact on health and wellbeing - and criticism is frequently directed at the massive noise levels generated by air traffic in particular. However, noise pollution affects not only humans, also the acoustic communication that is so vital to birdlife can be lost in the din. Since the two most important functions of birdsong are territorial defence and the attraction of a mating partner, disturbances by noise can impair their reproductive success.

Scientists from the Max Planck Institute for Ornithology in Seewiesen have been investigating the effects of aircraft noise on the singing behaviour of ten species of songbirds. Berlin-Tegel airport operates between six a.m. and eleven p.m., with take-offs and landings about every two minutes. For this study, the team of behavioural biologists selected the Jungfernheide forest, immediately adjacent to the airport, along with a similarly structured area four kilometres away, the Tegeler forest. To avoid the influence of light pollution on singing activity, the dawn songs of the different species were recorded at locations a sufficient distance from the forest edge and at the same time they measured the noise levels in both areas. This method allowed the team to demonstrate, for the first time, a direct correlation between air traffic noise and changes in birdsong activity.

Redstart at Tegel Airport: The birds stop singing altogether if the noise level exceeds a certain threshold. Credit: S. Greif

Early singing increases mating success

The researchers found that there was no difference

in noise level between the two forest areas before the first take-off at six a.m. Even so, robins, blackbirds, blue tits, great tits, and chaffinches at the airport locations started singing five to ten minutes earlier than their conspecifics in the Tegeler forest. That doesn't sound like much, but, according to Henrik Brumm, head of the study: "Even small differences in the onset of the dawn song can lead to big differences in reproductive success". Other studies have revealed that birds that sing earlier find more mating partners and are more likely to have success in promiscuous mating.

Sound measurements taken for this study showed that the daytime noise level at the airport locations was an average of 30 decibels higher than at the control locations, with noise levels of up to 87 dB(A) recorded during take-offs and landings. "Our assumption is that the earlier onset of song in these birds has to do with the subsequent start of airport noise, which lasts throughout the day", says Henrik Brumm. Should this be the case, it would mean that the birds are able to anticipate the air traffic noise that starts at six a.m. and adjust their singing activity accordingly.

To find out whether birds keep singing through the peak noise levels of take-off and landing, the team recorded chaffinches in the immediate vicinity of the runways. They discovered that the chaffinches sang much less at those times, but only stopped singing completely when the noise amplitude rose above 78 decibels (A). "If you consider that it takes about 30 seconds for the noise to subside each time, this means that birds lose about a quarter of their available communication time while flights are operating", says Brumm. In that case, an earlier start in the morning is clearly worthwhile.

More information: Davide M. Dominoni et al. Airport noise predicts song timing of European birds, *Ecology and Evolution* (2016). DOI: 10.1002/ece3.2357