

# Cities change the songs of birds

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By studying the songs of a bird species that has succeeded in adapting to urban life, researchers have gained insight into the kinds of environmental pressures that influence where particular songbirds thrive, and the specific attributes of city birds that allow them to adjust to noisy urban environments. The findings, reported by Hans Slabbekoorn and Ardie den Boer-Visser of Leiden University, appear in the December 5 issue of *Current Biology*.

In the new work, the researchers studied songs of the great tit (*Parus major*), a successful urban-dwelling species, in the center of ten major European cities, including London, Prague, Paris, and Amsterdam. The researchers then compared these songs to those of great tits in nearby forest sites. The results of the comparison showed that for songs important for mate attractions and territory defense, the urban songs were shorter and sung faster than the forest songs. The urban songs also showed an upshift in frequency that is consistent with the need to compete with low-frequency environmental noise, such as traffic noise.

## **Anthropogenic Impact on Signals Used by Wild Birds**

Earlier work, from Dr. Slabbekoorn and another coauthor, had shown that songs of individual birds were adjusted to local traffic noise conditions. The researchers had shown that great tit males in territories with loud low-frequency noise used fewer low-frequency song notes compared to nearby individuals in quieter territories. That single-population study, in Leiden, The Netherlands, included only urban birds, but territory conditions ranged from very quiet to very noisy. The earlier

study predicted the possibility that in general, great tits in noisy cities sing higher than great tits in quieter forests: In other words, songs undergo a habitat-dependent acoustic shift in cities that is driven by traffic noise.

With the new findings, Slabbekoorn and den Boer-Visser confirm this prediction and also identify several additional acoustic features that have diverged between city and forest birds. The findings also offer strong support for a theory known as the acoustic-adaptation hypothesis, which states that some aspects of the vocal variety of animal communication sounds are shaped by the environment. The authors point out that song divergence within a species as a result of such “environmental shaping” could potentially play a crucial role in the process of speciation, although it is not at all clear whether urban and forest populations of great tits are on such a path.

## **Conservation Implications: Adjust or Leave**

Speciation takes place over long, evolutionary time scales, but major shifts in a region’s bird population, including extinction, can take place here and now. Urbanization typically leads to a turnover in species composition such that those species occurring in the original habitat are replaced by those that cope well with urban conditions. Many species do not live in cities and do not breed close to highways, and indeed the birds of urbanized areas are highly similar: The same few species become common everywhere, while the area’s original species variety is lost. The new study, which focuses on an urban “survivor,” provides some insight into the mechanism behind the homogenizing impact of the urban environment. The capacity of great tits to sing within a relatively wide frequency range, and the ability to adjust songs by leaving out lower frequencies, seems critical to the bird’s ability to thrive despite urban noise. Species without these capacities may have no other choice than to escape city life.

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