

Sparrow in a lead mine—birds adapt to life in contaminated areas

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Female House Sparrow, Bairnsdale Australia. Credit: Wikipedia.

A new study of house sparrows' genes has found the first evidence of animals adapting to lead contamination in heavily polluted areas of Australia.

House sparrows have been in the mining towns of Broken Hill, NSW and Mount Isa, Queensland for around 100 and 50 years respectively,

providing a unique opportunity to examine how the introduced species has adapted to these environments.

Led by researchers from Macquarie University, the study compared the genomic data of sparrows from these areas of high lead concentrations with sparrows from other regional and urban centres.

The study found 12 genetic variants in the birds from the mining areas that have been previously associated with lead exposure in laboratory studies.

The presence of these outlier [genes](#) suggests the sparrows in Broken Hill and Mount Isa have adapted to avoid the uptake of lead into the body and to counter its negative impacts on neural and bone development.

This can be achieved by down-regulating the lead transporters on the surface of the body to reduce the amount of lead absorbed or by preventing it accumulating in the organs.

These genes and their associated pathways provide targets for observing how well other animal species are adapting to lead contamination.

"Adaptation to pollutants is vital to the future health of ecosystems in areas affected by human activity like mining, but we currently have very limited understanding of how animals can evolve to mitigate the negative impacts," said lead author Samuel Andrew.

"House sparrows generally live in areas with humans, and have been in some [mining](#) towns for up to 50 generations, so they're a perfect example to start analysing how wildlife more generally might be changing to cope with a contaminated environment".

"We found clear indications of similar genetic adaptation in two separate

populations in Broken Hill and Mount Isa, showing parallel evolution even after this relatively short period of time."

More information: Samuel C. Andrew et al. Signs of adaptation to trace metal contamination in a common urban bird, *Science of The Total Environment* (2018). [DOI: 10.1016/j.scitotenv.2018.09.052](https://doi.org/10.1016/j.scitotenv.2018.09.052)

Provided by Macquarie University

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