

Metal exposure – a factor in bat population decline

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Scientists at the University of York have led the first full-scale national assessment of metal contamination in bats, showing that many bats in the UK contain levels of metals high enough to cause toxic effects.

With bat species across the world in decline, exposure to chemicals is one of many potential threats to the species, along with urbanisation, loss of habitats, decline in food and water, agricultural intensification and climate change.

Metals are present in a wide range of habitats, with a large number of land sites in the UK remaining contaminated since the industrial revolution. Records show areas that were once extensively mined, such as the Pennines, still contain high concentrations of metal deposits.

Soil-associated metals are accumulated by invertebrates and plants which then move along the food chain into the [bat species](#). However, the potential risks of metal in [bats](#) has, until now, been poorly understood.

Beatrice Hernout, who recently received her PhD from York's Environment Department, studied metal [levels](#) in 190 common pipistrelle bats, found dead in locations across England and Wales.

Bat organs and tissues were analysed for a range of metals and the results compared to levels known to cause toxic effects in mammals.

Approximately 21 percent of bats sampled contained residues of at least

one metal at concentrations high enough to elicit [toxic effects](#), such as kidney damage. Lead was found to pose the greatest risk, as seven to 11 percent of bats sampled had levels of lead above the toxic threshold for this metal in small mammals.

Copper, zinc and cadmium was also prevalent in bat tissue, with levels often above the upper levels measured in other mammal species.

Professor Alistair Boxall, who supervised Dr Hernout, said: "The percentage of bats in which concentrations of metals exceeded toxic thresholds suggest that a significant proportion of the [bat population](#) in England and Wales may be affected by metal exposure.

"As bats are exposed to a wide range of environmental stressors, a better understanding of stressor interactions would be beneficial to bat conservation. Further studies could investigate whether different sources of [metal](#) pollution in habitats, such as water and sediments, affect accumulation, and further research into how metals interfere with the immune system could be carried out."

More information: Béatrice V. Hernout et al. A national level assessment of metal contamination in bats, *Environmental Pollution* (2016). [DOI: 10.1016/j.envpol.2016.04.079](https://doi.org/10.1016/j.envpol.2016.04.079)

Provided by University of York

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