

More than ruffled feathers: Mockingbirds show heightened aggression after lead exposure

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Mockingbirds exposed to sub-lethal levels of lead in urban areas display significantly heightened aggression, said Morris Animal Foundation-

funded researchers at Tulane University. The team said their findings highlight the possibility that sub-lethal lead exposure may be common among other wildlife living in urban areas and more work is needed to better understand its full effects. Their study was published in *Science of the Total Environment*.

"There's considerable lead contamination in soils around the world and that means literally billions of animals, both urban wildlife and pets, are likely exposed at sub-lethal levels," said Dr. Jordan Karubian, Associate Professor at Tulane University's Department of Ecology and Evolutionary Biology. "The levels aren't killing them, but they may affect their behavior or physiology. Heightened aggression among mockingbirds may just be the tip of the iceberg."

For the study, the team used simulated territorial intrusion on dozens of northern mockingbirds in urban New Orleans neighborhoods with either low or high levels of lead in the soil. Researchers placed a taxidermized [mockingbird](#) on a tripod, 25 feet away from nests that pairs of mockingbirds were constructing, a situation in which the birds act most territorial. The researchers also played recorded songs of singing males to alert the mockingbirds and make the intrusions more realistic.

In the neighborhoods with low lead levels, the mockingbirds responded to the threat somewhat conservatively, with scolding call vocalizations, raised-wing displays or fly-bys. In high-lead neighborhoods, though, the mockingbirds responded far more aggressively, attacking the perceived intruder and even ripping out its feathers. Researchers learned quickly they had to place the fake bird in a cage to continue the study and protect it from damage.

The team focused on mockingbirds because they are common to urban and suburban areas in many cities. Also, their territorial behavior during breeding season provided researchers easily observable protective

behavior to compare in areas with low- and high-lead soil concentrations.

"This is an issue that definitely deserves more attention as lead is still so commonplace in our environment, despite efforts to remove lead from products such as paint. Studies like these are important to raise awareness that lead is still a major problem," said Dr. Kelly Diehl, Morris Animal Foundation Interim Vice President of Scientific Programs.

This is believed to be among the first studies to evaluate the effect of lead exposure on wild animals. Sub-lethal exposure to lead in humans has been linked to increased aggression, with people who grow up in high-lead neighborhoods having a higher probability to be incarcerated for violent crime. They also tend to score lower in standardized tests.

Lead pollution, despite reductions in use, remains a global issue, persisting in urban environments from the once-common use of leaded gasoline and lead paint. Residual dust remains in the soil, and lead continues to enter ecosystems through removal of paint during renovations. Those particles are ingested by insects and worms, which are then eaten by birds. It's not yet known how pets, such as dogs or cats, might be affected.

More information: Stephanie C. McClelland et al, Sub-lethal exposure to lead is associated with heightened aggression in an urban songbird, *Science of The Total Environment* (2018). [DOI: 10.1016/j.scitotenv.2018.11.145](https://doi.org/10.1016/j.scitotenv.2018.11.145)

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