

Mercury exposure found to alter the migration behavior of birds

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Yellow-rumped warbler Credit: Pixabay.com

Mercury pollution is a global problem caused by coal combustion, gold mining, and other human activities, and has myriad adverse impacts to

biodiversity. A new study by researchers at the Great Hollow Nature Preserve & Ecological Research Center (New Fairfield, CT, USA) and Western University (London, ON, Canada) has shown for the first time that exposure to methylmercury – the highly toxic form of mercury that most readily bioaccumulates up food webs – significantly alters the migration behavior of birds.

Using miniature radio-tags and a cooperative network of automated radio-telemetry stations throughout eastern North America, the researchers tracked the spring [migration](#) of yellow-rumped warblers that had either been experimentally exposed to methylmercury or had nearly undetectable levels of methylmercury in their bodies in order to investigate whether [mercury](#)-exposed [birds](#) can orient properly and otherwise exhibit normal migratory behaviors.

Following release of the radio-tagged warblers at a simulated migration stopover site in Ontario, the researchers observed starkly different [behavior](#) between the two study groups, with mercury-exposed birds departing the site significantly sooner than birds that were relatively free of mercury (1.5 vs. 6 days on average). In addition, fewer than half as many mercury-exposed as mercury-free birds were ever detected anywhere beyond the release site, which could indicate that mercury-exposed birds have lower chances of surviving the arduous challenge that is migration.

However, of the warblers whose migration paths the researchers were able to track, all flew in seasonally appropriate, northerly directions regardless of whether or not they had been exposed to methylmercury. This suggests that the birds' orientation abilities weren't disrupted by [methylmercury](#) exposure, although the researchers caution that the study had less ability to detect birds flying in "incorrect" directions because of the lower number of receiver stations that exist to the south, east, and west of the study area.

"We believe that the rapid departure of the mercury-exposed birds away from the simulated stopover site indicates an important and yet-unknown impact of [mercury pollution](#) on the neurological and/or physiological mechanisms that control the migratory behaviors of birds," said Great Hollow's executive director and the lead author of the study, Chad Seewagen. "Lab studies have found that mercury can cause restlessness as well as a decrease in social dominance that can limit a bird's ability to compete with others for food, which we think might explain why the mercury-exposed warblers showed such different departure behavior than the others," said Dr. Seewagen.

By altering the timing and pace of migration, this hyperactive and submissive behavior could have important consequences for birds not only throughout their migration, but during the subsequent breeding or overwintering period as well. The authors of the study call for additional research to advance the very limited understating of the threats posed to migrating birds by global mercury pollution. Uncovering the impacts of mercury pollution to fish and wildlife has been and will continue to be a critical driver of improved mercury emissions regulations around the world.

More information: Seewagen, C.L. et al. Stopover departure behavior and flight orientation of spring-migrant yellow-rumped warblers (*Setophaga coronata*) experimentally exposed to methylmercury. *Journal of Ornithology* (2019) [DOI: 10.1007/s10336-019-01641-2](https://doi.org/10.1007/s10336-019-01641-2).

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