

Simple, sensitive test helps monitor bats and protect biodiversity

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Each and every biological organism has an important function in creating a healthy ecosystem, which is why conservationists everywhere encourage protecting biodiversity. However, monitoring wildlife health

is an ongoing challenge. A new article in *Environmental Toxicology and Chemistry* explores the use of a simple, inexpensive, and minimally invasive technique referred to as 'micronuclei detection' to assess genetic toxicity (genotoxicity) in free-ranging bats in areas of varying agricultural activity.

Bats play a vital role in our ecosystems and economies as natural pest control agents, seed dispersers, and pollinators. Bats are susceptible to [pesticide exposure](#), especially if they forage near agricultural lands and prey on contaminated pests. Additionally, [pesticide applications](#) often take place at dusk when [bats](#) are most active.

To evaluate the potential effects of pesticides on bats, Author Natalia Ivone Sandoval Herrera and colleagues collected blood samples from 35 bats across three roosting caves in Mexico that were surrounded by different levels of agricultural activity. They examined the occurrence and magnitude of damage to genetic material (genotoxicity) in bat cells by measuring the frequencies of micronuclei in the bats. Micronuclei frequency is an index of accumulated genetic damage during the life span of the cells, so higher frequency levels would be expected in bat populations inhabiting areas with more intensive agriculture. In fact, that is exactly what the authors found. The bats roosting in sites surrounded by agricultural lands presented higher frequency of micronuclei compared with bats inhabiting sites with lower agricultural activity. The work showed that this [testing method](#) can have wide applications as an inexpensive and minimally [invasive technique](#) to evaluate genotoxicity in animals and monitor wildlife health.

Biodiversity is decreasing world-wide, and it is likely due to anthropogenic activities. It is critical to have methods to monitor wildlife population health, because protective and remedial measures are better for maintaining biodiversity than post-mortem assessments. Micronucleus testing does not require expensive equipment and training.

Additionally, while there are more sophisticated methods to evaluate genotoxicity, they are not necessarily more sensitive. When asked why we should be paying attention to this testing method, Sandoval Herrera said, "Access to resources might be limited for institutions with less financial support such as conservation NGOs and researchers in developing countries. The use of early warning biomarkers such as genotoxic effects are most needed in these regions, where the use of pesticides is extensive and there is high biodiversity. This test as a logistically simple, sensitive, and robust method for biomonitoring genotoxic effects in wild bat populations."

More information: Natalia Sandoval-Herrera et al, Micronucleus Test Reveals Genotoxic Effects in Bats Associated with Agricultural Activity, *Environmental Toxicology and Chemistry* (2020). [DOI: 10.1002/etc.4907](https://doi.org/10.1002/etc.4907)

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