

# American birds of prey at higher risk of poisoning from pest control chemicals

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A new study by scientists from Maryland and Colorado using American kestrels, a surrogate test species for raptorial birds, suggests that they are at greater risk from poisoning from the rodenticide diphacinone than previously believed. The research, published in *Environmental Toxicology and Chemistry*, considers the threat posed by diphacinone as its usage increases following restrictions on the use of similar pesticides.

"Recent restrictions on the use of some rodenticides may result in increased use of diphacinone," said lead author Dr. Barnett Rattner from the US Geological Survey. "Very few controlled studies have examined its toxicity in [birds](#) so it is important to determine how lethal this chemical is to wildlife."

Surveillance programs have reported detection of rates of rodenticide in birds of prey across France, Great Britain and Western Canada, revealing that several second-generation rodenticides can result in non-target deaths, with possible population-level implications.

However, the global magnitude of non-target poisoning through the routine use of rodenticide, or through targeted eradication programs remains unknown, partly because the indirect fatalities go largely unnoticed and unreported.

The team tested kestrels and discovered the effects of diphacinone and the quantity required for a lethal dose. The results showed that birds that had ingested greater than 300 mg per kilogram of body weight died

within 8 to 23 hours, while those ingesting a dose of 118.6 mg/kg survived 27 to 47 hours. At lower doses, nearly all of the birds survived.

Poisoned birds displayed some evidence of internal bleeding, although histological examination of internal organs revealed hemorrhaging over a wide range of doses. The results demonstrate that doses that reach or exceed 79 mg/kg body weight are lethal for kestrels.

"Our study, combined with previous research in hawk and owl species show that birds of prey are considerably more sensitive to diphacinone compared to species such as bobwhite quails and mallards," said Rattner. "Their protection requires more substantial safety margins than are afforded to species of game birds traditionally used in pesticide registration studies."

Using their results the team estimated how much poisoned prey a hawk or owl would need to consume before ingesting a lethal dose. Using a probabilistic risk approach, the team estimated that an endangered hawk or owl would be at risk if it consumed as little as 3 to 4 grams of liver from a poisoned rodent.

"Diphacinone was found to be considerably more toxic to American kestrels than previously reported in tests of other wildlife test species", concluded Rattner. "These data, in combination with similar measurements in Northern bobwhites, will assist in the development of a pharmacodynamic model and a more complete risk assessment of diphacinone for birds."

Provided by Wiley

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