



<https://www.nationalgeographic.com/environment/2019/09/widely-used-pesticide-makes-birds-lose-weight.html>

© 1996-2015 National Geographic Society, © 2015- 2019 National Geographic Partners, LLC. All rights reserved

ENVIRONMENT

Huge decline in songbirds linked to common insecticide

Neonics—pesticides introduced to plants at the seed stage—act like an appetite suppressant for birds, making them lose weight within hours.

BY STEPHEN LEAHY

PUBLISHED SEPTEMBER 12, 2019

The world's most widely used insecticide has been linked to the dramatic decline in songbirds in North America. A first ever study of birds in the wild found that a migrating songbird that ate the equivalent of one or two seeds treated with a neonicotinoid insecticide suffered immediate weight loss, forcing it to delay its journey.

Although the birds recovered, the delay could severely harm their chances of surviving and reproducing, say the Canadian researchers whose study is published today in *Science*.

“We show a clear link between neonicotinoid exposure at real-world levels and an impact on birds,” says lead author Margaret Eng, a post-doctoral fellow at the University of Saskatchewan Toxicology Center.

Spring bird migration occurs when farmers are planting, and most crops in the United States and Canada are grown with neonicotinoid-treated seeds. Birds may suffer repeated exposure at successive stopover sites where they rest and feed. That may extend migration delays and their consequences, the study concludes.

Neonicotinoids, introduced in the late 1980s, were supposed to be a safer alternative to previous insecticides. But study after study has found that they play a key role in insect decline, especially bees. The EU banned the use of the chemicals in 2018 because they were killing pollinators. This study is another link in the chain of environmental problems, one showing that the use of neonicotinoids is harming birds, and that bird populations are at risk as a result, Eng said in an interview.

It's the first proof of “behavioral effects in free-living birds as result of neonicotinoid intoxication,” says Caspar Hallmann, an ecologist at Radboud University in the Netherlands.

The results are likely to apply to other bird species that consume pesticide-treated grains, said Hallmann, who was not involved in the *Science* study. Hallman's own published research has linked widespread declines in insect-eating birds to neonicotinoid use.

The populations of more than 75 percent of songbirds and other birds that rely on agricultural habitat in North America have significantly declined since 1966. The new study reveals how neonicotinoids, also known as neonics, could be directly contributing to the die-offs. Just last month a comprehensive study concluded that the widespread use of neonicotinoids had made America's agricultural landscape 48 times more toxic to honeybees, and likely other insects, than it was 25 years ago.

([See incredible bird migrations in action.](#))

Skinny songbirds

To investigate the potential impacts on wild birds, researchers captured white-crowned sparrows during a stopover on their spring migratory route from the U.S. to the boreal region of Canada, which spans the top of the country. Individual sparrows were fed either one very small dose of the most commonly used neonicotinoid, called imidacloprid, or a slightly higher dose, or one with no insecticide.

Each bird was weighed and its body composition measured before and after exposure. Birds given a higher dose of the pesticide had lost 6 percent of their body mass when weighed again six hours later.

The high dose given is comparable to a bird eating one-tenth of a single sunflower seed or corn seed treated with imidacloprid, or three or more wheat seeds, says co-author Christy Morrissey, an ecotoxicologist at the University of Saskatchewan. "It's a minuscule amount, a tiny fraction of what these birds would eat daily," Morrissey said in an interview.

Imidacloprid, even at extremely low doses, has an appetite-suppressing effect on the sparrows. They were lethargic and not interested in eating, she said. "We saw the same thing with captive birds in a previous study."

That study was published in 2017 in [*Scientific Reports*](#).

This isn't surprising since neonicotinoids are chemically similar to nicotine and stimulate nerve cells, killing them at high doses. [Nicotine poisoning](#) in humans is rare because consuming too much usually makes people too sick to take more. At low doses nicotine suppresses appetite in humans. The same thing appears to be happening in birds.

Neonicotinoid hangover

The captured sparrows were released shortly after their second weigh in—and after a tiny tag transmitter was glued between their wings. The tag allowed tracking of their movements in the wild. The dosed sparrows didn't immediately continue their migration like the undosed ones. The high-dose sparrows hung around the stopover site for an extra 3.5 days recovering from their intoxication and regaining their lost weight, the study concluded.

Fortunately, imidacloprid metabolizes fairly quickly in birds. But an extra 3.5-day delay in migration can mean the sparrows might miss their chance to breed, says Morrissey. "Small birds may only breed once or twice in their lifetimes and missing out could lead to population declines."

"When birds migrate, they desperately need to gain weight at stopover points along the way to fuel their journey," says Steve Holmer of the [American Bird Conservancy](#).

The new study showed that sparrows lost crucial body fat amounting to an average of 9 percent for low-dosed birds and 17 percent for the birds that received higher doses. This exposure to a neonicotinoid may leave them without the "energy to successfully breed after flying to their breeding grounds," Holmer wrote in an email.

David Fischer, Chief Scientist for Pollinator Safety, Bayer Crop Science, the leading manufacturer of imidacloprid, says there is no

evidence that the dose levels administered in the study “are representative of exposures songbirds likely receive at real-world agricultural fields.”

Small songbirds like white-crowned sparrows are “incapable of swallowing large seeds such as corn or soybean,” Fischer wrote in an email.

However, Charlotte Roy recorded different species of sparrows and other birds along with mice, deer, and even black bears eating treated corn, soy, and wheat seeds in a [new study published Sept 10 in Science of The Total Environment](#). Roy, a wildlife ecologist at Minnesota’s Department of Natural Resources, says small birds cracked open large seeds and ate either what was inside or fragments of it.

“They don’t necessarily have to consume the whole seed to be exposed,” she said in an interview.

In her study Roy and colleagues simulated seed spills during spring planting to see if wildlife would be attracted to this food source. Birds found the spills within a day and half on average. They also found neonicotinoid-treated seeds on the soil surface in 35 percent of the 71 recently planted fields examined.

It was the first look at whether treated seeds were readily available to be consumed by wildlife in North America. “The rate of seed spillage was much higher than anyone expected,” she says.

Farmers are generally unaware of how bad these treated seeds are for wildlife, Roy says.

Editor's Note: This article originally misstated the species of sparrow. It is a white-crowned sparrow.



THE BEST OF NATIONAL GEOGRAPHIC DELIVERED TO YOUR INBOX

Sign up for more inspiring photos, stories, and special offers from National Geographic.

Enter your email



By signing up for this email, you are agreeing to receive news, offers, and information from National Geographic Partners, LLC and our partners. [Click here to visit our Privacy Policy](#). Easy unsubscribe links are provided in every email.



You have **3 free articles** left this month.



**Exploration is
just a click away.**

Subscribe to get unlimited access to
National Geographic and a free tote.

SUBSCRIBE NOW