

# Consequences of Continued Neonicotinoid Use for Songbirds

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**P**esticides are common in our everyday lives and one particular group of pesticides, known as neonicotinoids or neonics, have become widely used across the world. Although they were initially hailed for their effectiveness and targeted action, understanding of their risks and damaging effects has since made neonicotinoids a highly controversial topic.

## History

Development of neonicotinoids began in the late 1900s, with the first patented neonic, imidacloprid, entering the market in 1990. These pesticides were proclaimed to be selective, targeting insects without harming most larger animals, and were even suggested to kill pests without damaging beneficial insects. They are highly water soluble, easily applied to leaves or soils, meaning a single application could place the pesticide in every part of the plant. In 2014, the market for neonics exceeded US \$3 billion and accounted for 25 percent of the global pesticide market. Pre-treating seeds with neonicotinoids became widespread, and use of the pesticides expanded beyond agricultural use to include garden applications, flea treatments and pest control.

But the first warnings were already emerging. Insect populations began to decline rapidly, and not only in targeted pests. In 2012-2013, massive deaths of bees were reported near neonicotinoid-treated crops, drawing attention to the plight of pollinators. These deaths, and those of many other non-target insects, were soon linked to neonic use. Governments in many countries, including Canada, promised greater regulation and even banning of neonicotinoid use. These promises have yet to be fulfilled.

## Songbird Decline

The severe decline in insects is having far-reaching effects as they provide several essential functions in an ecosystem. Insects are the most diverse of all animal groups and involved in everything from decomposition to seed dispersal. They are vital in cycling nutrients and keeping soil fertile, as well as pollination for agriculture and a food source for a variety of birds.

Recently, songbird populations have been in steep decline. In North America, there has been an estimated 30 percent loss since 1970, translating to 2.9 billion breeding adult birds. As many of these disappearing songbirds are insectivores, some of this decline can be attributed to the pesticide-driven deterioration in insect populations and the resulting inadequate food source.

Neonicotinoids can also harm songbirds more directly. Birds mainly come into contact with neonics through feeding on insect prey, which can carry the pesticide in their tissues, or by eating neonic-treated seeds. Neonics are less toxic to birds than to insects but are not harmless. They were found to reduce growth and impair breeding, as well as weakening immune systems and causing birds to be more susceptible to disease. Migrating birds that consumed neonic-treated seeds suffered severe weight loss and delayed departure, which can lower chances of survival, decrease the number of chicks born, and cause long-term population decline.

## Regulation and Efficiency

In 2016, amidst mounting evidence against neonicotinoids, Health Canada's Pest Management Regulatory Agency (PMRA) proposed phasing out the agricultural use

of the pesticide. Health Canada released a draft risk assessment for imidacloprid which acknowledged that "Based on currently available information, the continued high-volume use of imidacloprid in agricultural areas is not sustainable." However, in 2021, Health Canada backtracked on an outright ban, only imposing a few new restrictions on neonicotinoid use.

While the ban was debated, the usefulness of the pesticide was brought into question. Research on neonicotinoid benefits in crops found they generally failed to increase production yield. Reports started appearing of resistant insect populations, and the decreasing efficiency of neonic application. Simultaneously, evidence of the danger posed by the pesticide grew. Eighty percent of neonicotinoid seed treatments were found to persist in soils for years and could disperse to and contaminate untreated areas. Repeated and long-term exposure to the pesticide was suggested to adversely affect the health of birds, fish and mammals, including humans. Proof of the consequences of neonic use piled up, while evidence of their benefits remained lacking.

Canada currently has three main neonics approved for use: imidacloprid, clothianidin, and thiamethoxam. PMRA is responsible for their regulation, and directs appropriate uses. In recent years, PMRA has restricted treatment application methods, reduced application rates and times, and increased spray buffer zones. Yet, despite the growing awareness of the risks and the lack of any proven benefit, neonicotinoids continue to be widespread in Canada's agriculture, and Health Canada refuses to impose a real ban. 🍀