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Neonicotinoid Pesticides: A Threat to Songbirds?

Tree Swallows
Photo by
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"In nature nothing exists alone."

— Rachel Carson, Silent Spring

What is a neonicotinoid?

Neonicotinoid describes a chemically related group of insecticides that became popular in the 1990's. Now, millions of pounds are used worldwide on food and ornamental crops. They were created to be chemically similar to nicotine, the tobacco plant's natural defense against insects. They work systemically; the pesticide is absorbed into the tissues of the plant. They kill insects by attacking their nervous systems. Some examples include imidacloprid, thiamethoxam and clothianidin. They can be found in a variety of common products for home and garden found in hardware stores and nurseries. While originally thought to be benign in comparison to other types of pesticides, a growing body of scientific evidence suggests that noenicitinoids may be harming the environment. In fact, some reporters have gone so far as to call the group of chemicals "the next DDT".

Neonicotinoids on the shelves of a popular grocery chain store.

Widespread in the Environment

Recent studies have found that certain noenicitinoids survive in the environment for months or longer after being sprayed or used as a seed coating. Further, they readily travel in water or snow that runs off fields or lawns and can end up in water bodies. A recent survey of streams throughout 24 states in the contiguous United States found that at least one neonicotinoid was detected in 53% of the 38 sites.

Beneficial species affected by pesticide use: mayfly (left), and wild bumblebee (right).

The **Rusty Blackbird**, an Audubon Watchlist species, could be exposed to noenicitinoids both in summer, where it feeds on aquatic insects and winter, where it forages near agricultural fields in the Southeastern US.

Threats to non-target Species

Unfortunately, neonicotinoids don't just kill the few types of insects that are pests. They kill or reduce the fitness of valuable insects and other invertebrate species. Notably bees and other pollinators are exposed by feeding on the pollen of a systemically treated plant. Once in a marsh, neonicotinoids can be a hazard to aquatic insects. Especially sensitive to these pesticides are mayflies, eaten by birds, and caddisflies, popular with fish and bats. Runoff into the ocean can even cause problems for invertebrates there, including economically important species such as crab and shrimp. Because of threats to non-target animals, the US Fish and Wildlife Service stopped use of noenicitinoids on wildlife refuges in 2016.

Danger to seed-eating birds

Toxicity studies have shown that birds who eat imidacloprid treated seeds can become sick, even die. Yet popular seed crops such as corn and canola regularly use the treatment over thousands of acres in the US and Canada. Seeds may be spilled or dug up, endangering birds.

The decline aerial insectivores

Aerial insectivores, birds like swallows that eat mainly high-flying insects, as a group, are considered to be of high conservation concern. Many species have had strong declines on Breeding Bird Survey counts.

For example, five Alaskan species showed significant declines between 1968 and 2006: Olive-sided Flycatcher, Black Swift, Western Wood-Pewee, and Barn Swallow. It may come as a surprise that the once abundant Barn Swallow has been listed as Threatened in Canada.

A recent study published in the journal *Nature,* positively linked use of imidacloprid in the Netherlands with declines 15 songbird species there.

Another recent study showed Tree Swallows that lived adjacent to agricultural areas spent more time away from the nest, probably because it took them longer to find enough food to bring back for their young.

Birds face a variety of threats, and pointing a finger at any one source is usually impossible. However, more and more scientists are concerned about any stressor that adds to the risks that we know birds face, such as habitat reduction. Food shortages, due to a reduction of insects, would certainly be a stressor for any bird, especially while nesting, when its need for protein is highest. "Better safe than sorry" is an approach being taken by conservationists.

Olive-sided Flycatchers have declined by an estimated 30% in recent decades. They eat large flying insects, including bees.

What can we do?

- Avoid chemical pesticides around the yard and garden, especially products containing noenicitinoids. Contact your local agricultural extension service or garden club to discuss less toxic alternatives. Request noenicitinoid-free options at your local nursery supply.
- Grow native plants. These are naturally resistant to most local pests, so pesticides are usually not necessity to grow them. And this will in turn encourage birds into the yard.
- Use consumer power to support organic farms. No pesticides are used on certified organic products. Organic labeling now goes way beyond fruits and vegetables. Look for organic seeds, and nursery plants, even clothing and bath products.
- Support bird population studies. We know about bird declines because every year thousands of professional scientists and citizens report their observations. The Breeding Bird Survey are the Christmas Bird Count are two well-known data sets, but there are others. For example, and the Institute for Bird Populations has a wide network of bird-banding stations.
- Support research on the effects of pesticides. There are many unanswered questions before a clear cause and affect can link bird populations to the use of noenicitinoids.
- Join a campaign to protect pollinators. For example, Friends of the Earth "Bee Action" has timely news, alerts, and tips for safe gardening. http://www.foe.org/projects/food-and-technology/beeaction

Baby **Barn Swallows.**, now listed as Threatened in Canada.

For more information

- Toxicity profile for several common neonicotinoids

http://edis.ifas.ufl.edu/pi117

- List of products that contain noenicitinoids

http://beyondpesticides.org/assets/media/documents/pollinators/documents/pesticide_list_final.pdf

- The Task Force on Systemic Pesticides, conclusions from an independent scientific panel

http://www.tfsp.info/worldwide-integrated-assessment

- A lengthy list of organic gardening resources

http://www.organicgardeningresources.com

- The Breeding Bird Survey explained

https://www.pwrc.usgs.gov/bbs/about

- Institute for bird populations

http://www.birdpop.org

- The American Bird Conservancy, Birds and Pesticides Program

https://abcbirds.org/threat/pesticides

Native wildflowers, like this fireweed in Southeast Alaska, can be beautiful and provide safe food for **Rufous Hummingbirds.**

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