



Clearing the Air About Mosquito Fogging

by Mary Ellen Gadski

Have yet to meet anyone who wants to be bitten by mosquitoes, but do people who fall for a “family-friendly” mosquito spraying sales pitch understand the many possible harmful effects of commercial fogging to both the environment and their own health?

To start with the environmental effects, fogging with synthetic pyrethroids kills all insects, not just mosquitoes. Butterflies, caterpillars, honeybees, ladybugs, fireflies, and even certain earthworms all are killed by the sprays. Pesticide applicators may claim that their pyrethroid fogging doesn't harm bees, but this assertion doesn't hold true. Furthermore, predatory beneficial insects may be susceptible at a lower dose than the pest, which disrupts the natural predator/prey relationship.

Pyrethroids are moderately toxic to birds, but they are also indirectly affected because of the decrease in their food supply. Steve Holmer, Vice President for Policy at the American Bird Conservancy, stated in an email,

“The impact of reduced food sources is a cause for bird declines.”

Colin Purrington, professor of evolutionary biology at Swarthmore College from 1997 to 2011, explained that the population levels of swallows and flycatchers have dropped in the last several decades because there are fewer insects for them to eat. An article in Cornell Lab of Ornithology's magazine reviewed studies of the diets of hummingbirds and concluded that small arthropods (spiders) comprise a high percentage of their food, especially for their nestlings. Pyrethroids also kill arthropods.

Insects perform essential ecological roles, starting with pollinating 90 percent of all flowering plants. In recent years, the importance of pollinators has come to the forefront of American consciousness since so much of our food production depends on them. But more than that, insects are the basis of the food chain that supports all life.

At a virtual horticultural symposium hosted by Newfields in 2022, entomologist Douglas Tallamy of the University of Delaware lamented that mosquito fogging companies were reversing all the good work he's accomplished over the past 40 years in educating the public on the crucial role that insects play in nature. “We are winning the undeclared war against insects at our own peril.”

EFFECTS ON HUMAN HEALTH

To learn more about the health effects of synthetic pyrethroids, read the chemical WATCH factsheet produced by Beyond Pesticides of Washington, D.C. The introduction asserts:

Pesticide products containing pyrethroids are often described by pest control operators and community mosquito management bureaus as “safe as chrysanthemum flowers.” While pyrethroids are a synthetic version of an extract from the chrysan-

themum, they were chemically designed to be more toxic with longer breakdown times and are often formulated with synergists, increasing potency and compromising the human body's ability to detoxify the pesticide.

The factsheet goes on to say that tests of some pyrethroids on laboratory animals reveal striking neurotoxicity when administered by injection or orally. The World Health Organization explains that synthetic pyrethroids are neurotoxins that act on the axons in the peripheral and central nervous systems. The EPA classifies some pyrethroids as possible human carcinogens. Many have been linked to disruptions of the endocrine system, which can adversely affect reproduction and sexual development, interfere with the immune system, and increase chances of breast cancer. A 2015 research paper in the journal Environmental Health found an association between exposure to pyrethroids and ADHD. The active ingredients and formulations used by the various fogging companies vary, so if you are concerned about your possible exposure, find out which chemicals they use and research the compounds individually.

If you want to control mosquitoes in your yard, there are many alternatives to fogging. Purrington offers 10 practical suggestions, ranging from the ones we already know, like wearing long sleeves and pants when mosquitos are most active, to ones that came as a surprise to me, such as getting rid of those downspout extenders that pool stagnant water and provide breeding sites for mosquitoes. In Tallamy's most recent book, Nature's Best Hope, he outlines a simple, nontoxic alternative to fogging.

Contrary to what the fogger operator may have told you, the pyrethroid-based insecticides used by mosquito foggers indiscriminately kill all insects, not just mosquitos. Ironically, targeting adult mosquitos is the worst and by far the most expensive approach to mosquito control, because mosquitos are best controlled in the larval stage. Put a five-gallon bucket of water in a sunny place in your yard and add a handful of hay or straw. After a few days, the resulting brew is irresistible to gravid (egg-filled) female mosquitos. After the mosquitos have laid their eggs, add a commercially available mosquito dunk tablet that contains *Bacillus thuringiensis* (Bt), a natural larvicide, to your bucket. The eggs will hatch and the larvae will die. This way, you control mosquitos, and only mosquitos, without the use of harmful insecticides.

I'm old enough to remember the windshield of my parents' car being covered in squashed insects when we would take summer drives in the 1950s and 60s. With the global decline in insects since that time, we no longer have to scrub windshields of debris. That's visual proof of how far insect populations have dropped since then. We need to examine the heedless ways we are contributing to that decline and keep in mind the words of eminent biologist E.O. Wilson:

“If all mankind were to disappear, the world would regenerate back to the rich state of equilibrium that existed ten thousand years ago. If insects were to vanish, the environment would collapse into chaos.”

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State Regulators Take Action

Responding to increased public complaints about commercial mosquito control practices, the Indiana Pesticide Review Board (IPRB) formed a study commission in 2021 to look at revamping existing regulations. At its September 28, 2021 meeting, the study commission discussed a multi-faceted educational approach:

- include basic biology in applicators' training;
- consider weather's effect on application;
- take adjacent properties into account during site assessment;
- use application techniques that obtain greatest effectiveness while minimizing potential drift;
- time applications for optimal control;
- train applicators in proper use of equipment including personal protective equipment;
- inform public and applicators of what pesticides are being used.

Currently, applicators are included in Category 7a of the state's Continuing Certification Hour (CCH) system, a framework for certifying chemical applicators and for keeping applicators up-to-date on industry and regulatory changes. Category 7a comprises Industrial and Health-Related Pest Management – a category that includes human dwellings, offices, retail establishments, farm structures, restaurants, warehouses, institutional establishments, industrial facilities, and food processing facilities.

Study Commission members agreed that applicators should instead be included in Category 8, which includes governmental employees or other individuals, “using or supervising the use of pesticides for community-wide mosquito abatement.” In November, 2021, IPRB unanimously supported the adoption of draft rule revisions regarding applicator certification requirements, bulk material storage, definitions, and record-keeping requirements. Final recommendations were due in February, 2022 but were not posted at press time.

-TPH

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Mosquito Control: Get Rid of Mosquitoes at Home

- Dump standing water**
- Use screens on windows and doors**
- Cover trash cans and rain barrels**
- Treat standing water with larvicide**

Adapted from CDC materials