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## **Why Beekeepers Need To Protect Bees From Pesticides**

Beekeepers value their relationships with agricultural producers and continually seek to maintain this vitally important connection for the sustainability of agriculture be it conventional, organic, or urban beekeeping. Unfortunately, too many agricultural producers and property owners are unaware of the hazards of pesticides, allowing the long-term chemical contamination of farmland, wild lands, waterways, and the ecosystem.

Research in *Nature GeoScience*, March of 2021, examined the “Risk of pesticide pollution at the global scale,” concluded pesticides are becoming “ubiquitous environmental pollutants, causing adverse effects on water quality, biodiversity and human health.” Sixty-four percent of “global agricultural land is at risk of pesticide pollution by more than one active ingredient, and 31% is at high risk.”

This research examined the environmental risks of the 92 “most used” active ingredients found in 59 herbicides, 21 insecticides, and 19 fungicides for their ecological risks to soil, surface water, ground water, and atmosphere. “Although protecting food production is essential for human development, reducing pesticide pollution is equivalently crucial to protect the biodiversity that maintains soil health and functions, contributing towards food security.”

Peer reviewed research across more than 20 years has shown us the damage being caused to honey bees, native pollinators, soil sustainability, water quality, and beekeeping by the “poster child” of pesticides: neonicotinoids.

The impact upon honey bees by neonicotinoid pesticides results in:

- A 24% decline in overwintering success of honey bee colonies
- Natural forage areas contaminated with bee toxic pesticides
- Reduced flight capacity in honey bees, decreasing food-collecting ability
- Impaired basic motor coordination of honey bees
- Toxic levels found in surface water after rain events, in wetlands, and in snowmelt killing invertebrates (A bee colony can use up to three gallons of water daily and be harmed by toxins in water.)
- Forage containing contaminated pollen and nectar in the hive leading to sub-lethal levels of toxins fed to honey bee larvae, and contaminating the beeswax
- Reduced reproductive capability in queens and drones

- Contaminated soil, water, and plant products which translocate into the pollen and nectar
- Synergism with other pesticides increasing the toxicity levels of herbicides, fertilizers, fungicides, adjuvants, and surfactants in the pesticide tank mix
- Wildflower contamination. 97% of neonicotinoids brought to the hive were collected from wildflowers, not crops, showing the drift through the soil, water, and air of these pesticides into natural forage areas
- Decreased immunocompetence of honey bees leading to impaired disease resistance
- The spread and abundance of pathogens and parasites among honey bees due to weakened immune systems

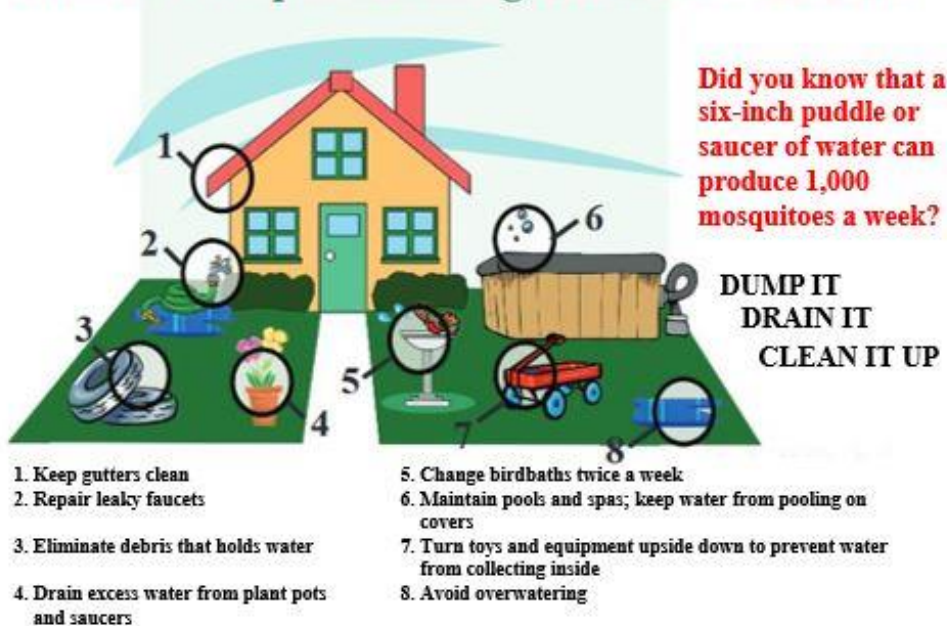
In January of this year Mead, Nebraska found itself to be at the center of the pesticide toxicity debate when neonicotinoid coated seeds were burned to make ethanol, and a mash/residue product was placed into lagoons. (<https://www.theguardian.com/us-news/2021/jan/10/mead-nebraska-ethanol-plant-pollution-danger>) The residents of the community reported a “stench of rotting, eye and throat irritation and nosebleeds, dying bees, birds and butterflies were disoriented, pet dogs were ill-staggering about with dilated pupils.” The waste product was too toxic to use as animal feed, and the resultant green mash being used as a “soil conditioner,” was polluting the water. Burning these seeds did not eradicate the pesticide ingredients.

<u>EPA safe level of Parts Per Billion</u>	<u>At the Mead, Neb. ethanol plant</u>
Clothianidin 11 PPB	427,000 PPB
Thiamethoxam 17.5 PPB	85,100 PPB
Imidacloprid 0.358 PPB	312 PPB

It is imperative we work to save the biodiversity of all ecosystems linked to our vital food web. Research indicates that wild bees are at particular risk from insecticide applications at different times than managed pollinators. (Park, Mia, 2015) Wild pollinators are most affected by pesticides after plant bloom periods, as they continue to forage in and around pesticide-treated areas after managed colonies have been removed. Rundolf et al. (2015) reports that pesticide coated seed plantings reduce wild bee density, solitary bee nesting, and bumble bee colony growth and reproduction under field conditions.

Beekeepers and their honey bees in urban, non-agricultural areas are not safe from pesticides. LEAD for Pollinators has been part of the MassQuito Coalition (<https://www.nofamass.org/massquito/>) focusing upon the impact of mosquito “control” pesticides in Massachusetts.

## Eliminate Mosquito Breeding Sites Where You Live



Summit County Public Health • 2867 W. Market St • Alvin, OH 44115 • [www.scpbh.org](http://www.scpbh.org) • Mosquito Control Program (330) 926-3665 • Spray Schedule (330) 926-3667

To manage the impact of mosquito borne diseases requires science-based decision making, increased funding for mosquito monitoring and surveillance, and improved transparency and accountability. The MassQuito Coalition has worked to educate agencies and policy makers about the products and processes they have implemented:

- Products containing synthetic pyrethroids are not natural, they are synthetic chemical formulations that also contain other or “inert” ingredients. Neither Massachusetts agencies nor the Environmental Protection Agency test the health or environmental impacts of mixtures of active and inert chemical ingredients.
- Sumithrin™ can result in lung irritation, and has been documented to cause asthmatic responses in those exposed.
- Piperonyl-butoxide, a synergist intended to magnify the toxicity of synthetic pyrethroids, has not been tested in combination with these active ingredients, and is considered a possible human carcinogen by EPA.
- Ultra Low-Volume (ULV) applications of Resmethrin™ have been found to kill pollinators, particularly adult and larval monarch butterflies, of which Eastern monarch populations have declined by 80% since the 1990s.
- Bird populations have also declined by thirty percent since 1970, and scientists point to pesticides as a potential driver.
- Most ULV mosquito pesticides will not make contact with a target mosquito; the remaining pesticide will run-off into the environment and contaminate groundwater and local waterways.

As long-term bee health continues to suffer, along with the inability to reproduce sufficiently, compounded with the issue of more bees dying every winter due to sub-lethal levels of pesticides, crop yield and ecosystems will also suffer.

#### How Can Beekeepers Help Their Honey Bees, Native Pollinators, and Restore Bio-Diversity

- Change your comb/frames at least every three years to remove pesticide contaminated wax
- Reduce pesticide use around your own hives
- Read pesticide labels and do NOT apply or allow any pesticide to drift onto bee forage & water
- Support beneficial insects for pest control
- Educate family, friends, neighbors to reduce and cease pesticide use, including lawn chemicals
- Remove standing water where mosquitoes breed, so mosquito control pesticide use is reduced, and mosquito borne diseases are prevented
- Plant for pollinators and support biodiversity

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