MAY 2024
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FACT SHEET

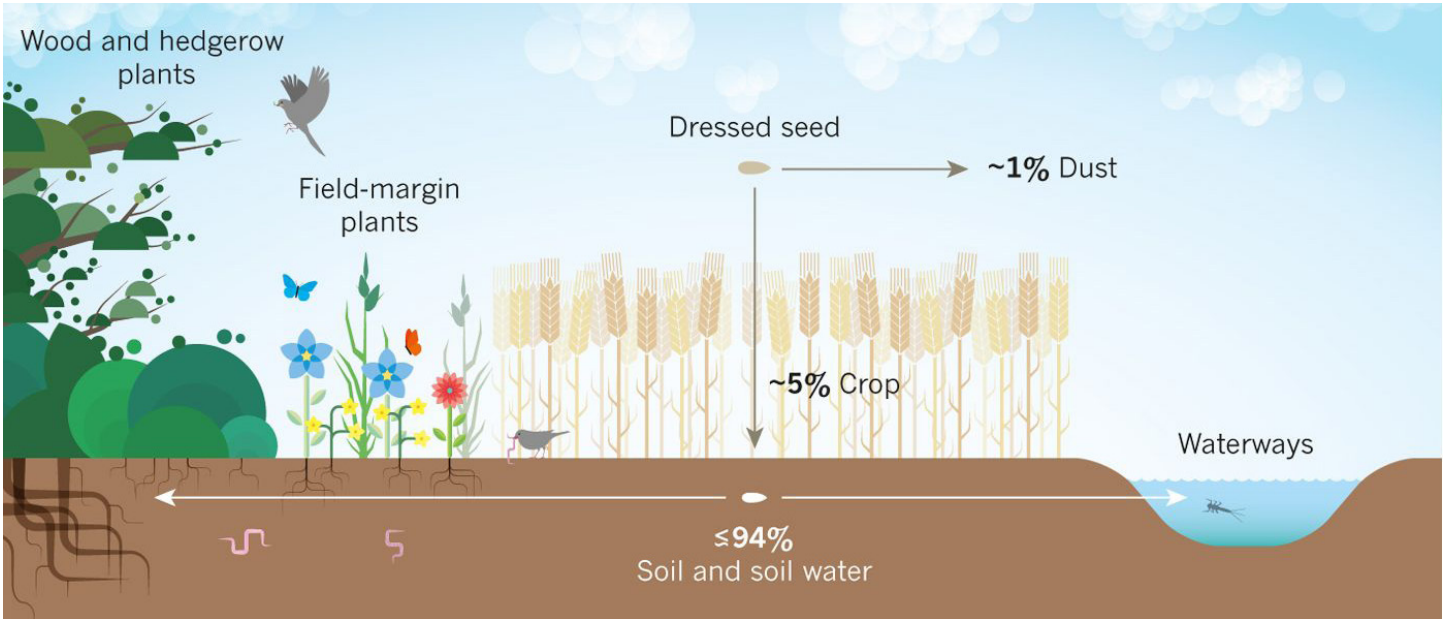
NEONICS: THE TOXIC TRUTH

PESTICIDES KILL BEES, POLLUTE WATER, AND THREATEN OUR HEALTH

The world's most widely used insecticides, neonicotinoids or "neonics," are neurotoxic chemicals linked to massive bee losses, vast water and soil contamination, ecosystem-wide harms, and human health concerns.[1] A growing body of research shows that the neonic uses in the United States that pose the greatest threats—from coating corn and soybean seeds to spraying gardens and golf courses—provide little to no benefits to users or are easily replaceable with safer alternatives.[2]

Neonics Are Toxic: Neonics kill insects by permanently binding to, overstimulating, and ultimately destroying their nerve cells.[3] Insects poisoned with neonics often begin twitching, become paralyzed, and die.[4] Even at minute doses, neonics weaken critical functions.[5] In fact, the thin neonic coating on just one small corn seed can contain enough active ingredient to kill a quarter million bees or more.[6]

Neonics Threaten Human Health: Research links neonics to neurological, developmental, and reproductive harms, including birth defects of the heart and brain.[7] This is deeply concerning because at least half of the U.S. population is regularly exposed to neonics, with children facing higher exposure rates.[8] In fact, a study of 171 pregnant women in the United States found that over 95 percent had neonics



Neonics spread, persist, and concentrate in soil and water, where they threaten insects and organisms and are taken up by wild plants, turning them toxic (reprinted by permission from Springer Nature: Dave Goulson, "Pesticides Linked to Bird Declines," *Nature* 511, no. 7509 (July 2014): 295-296, https://go.nature.com/2rNOZcK).

in their bodies, with the highest levels in Hispanic women, and detection levels were on the rise.[9] Standard drinking water treatment does not remove neonics from water, so households that cannot afford or do not have access to extra filtration devices face a greater risk of finding neonics in their tap.[10]

Neonics Are Persistent and Everywhere: Neonics are "systemic," so when applied around a plant's roots or as a coating on a seed, they are absorbed and permeate the entire plant as it grows—poisoning its nectar, pollen, and fruit. Neonics also persist, travel, and concentrate in soil and water, spreading the threats well beyond the original application site.[11] Over half of streams tested across the United States contain neonics, including in both urban and agricultural areas.[12]

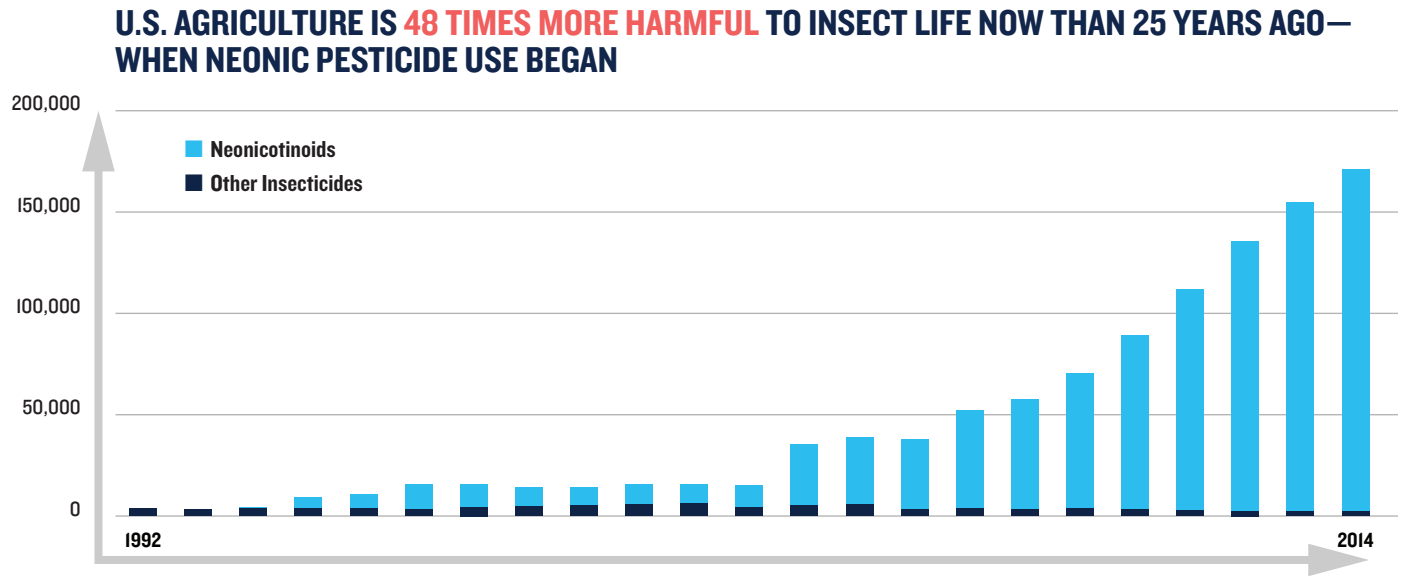
Neonics Kill Bees and Other Pollinators Essential for Food Production: Since their introduction in the mid-1990s, neonics have made U.S. agriculture 48 times more harmful to insects.[13] For over a decade, beekeepers have lost 30 to 50 percent of their bee colonies every year, and two decades of research have identified neonics as a leading cause of pollinator decline.[14] Many popular foods like nuts and berries rely on pollination by bees. A lack of pollinators is already linked to decreased food production, and further losses threaten the estimated $50 billion in pollinator-dependent crops grown in the United States each year.[15]

Neonics Kill Birds: Neonics are one of the critical factors driving mass loss of birds.[16] Eating just one neonic-coated seed is enough to kill some songbirds, and low doses of neonics can harm birds' immune systems, fertility, and navigation, and cause rapid weight loss—reducing birds' chances of surviving in the wild.[17] As neonics kill insect populations, birds also starve. In Europe, for example, researchers have linked declining populations of insect-eating birds to the introduction of neonics, even in areas with exceptionally low neonic levels in water.[18]

Neonics Debilitate Ecosystems: The U.S. Environmental Protection Agency predicted that continued, unchecked neonic use will likely push more than 200 threatened and endangered species toward extinction.[19] Neonics hollow out ecosystems by eradicating insect populations that birds, fish, amphibians, and other animals depend on for food. For example, a Japanese fishery collapsed within one year of the introduction of neonics in nearby agricultural fields. Neonic levels later measured at the site matched those commonly seen in U.S. waterways.[20]

Most Harmful Neonic Uses Are Unnecessary: Neonic corn and soybean seed coatings provide "no overall net income benefits" to most U.S. farmers, but they remain widespread, in part because of the influence of a few large corporations that produce both the seeds and the pesticides that coat them.[21] Further, research shows that neonics can actually decrease crop yields by killing pollinators or pest predators (i.e., "good bugs").[22] Similarly, lawn and garden uses pose some of the highest risks to pollinators but are likewise unneeded. In Quebec, where formal justification has been required for certain neonic uses since 2019, use of neonic seed coatings in corn and soybeans has been nearly eliminated, without negative impacts on crop yields or switching to more harmful alternatives.[23] Significant reductions in neonic use could also be achieved in the United States, and forward-looking policies to limit and improve transparency and oversight of neonic use can help us get there.

Total ACUTE Oral Insect-Toxicity LOAD of Insecticides in U.S. Agriculture by Year (in LD_{50}-days)



Data from Michael DiBartolomeis et al., "An Assessment of Acute Insecticide Toxicity Loading (AITL) of Chemical Pesticides Used on Agricultural Land in the United States," *PLoS One* (August 6, 2019).

Endnotes

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