Neonicotinoids

Use

- **Neonics are the most widely used class of insecticides worldwide.** They are used on more than 140 crops from apples and almonds to rice and soybeans.
- **Neonic seed coatings provide little to no benefit to farmers.** While neonics can be applied as sprays, soil drenches and trunk injections, the primary use is as a seed coatings for annual field crops such as corn, soy, canola and wheat planted on at least 150 million acres across the U.S. Neonic-coated corn seed is the most extensive use of an insecticide on any crop in the nation, affecting close to 90 million acres of farmland, along with the broader environment. For nearly all uses, neonics are replaceable — with the best and most cost-effective alternative often being nothing. Neonic corn and soybean seed treatments provide little to no benefits to farmers, and common neonic treatments may actually *decrease* yields in some cases by killing pollinators and crop pest predators (i.e., "good bugs").

Active ingredients allowed in U.S. agriculture

Acetamiprid, clothianidin, dinotefuran, flupyradifurone, imidacloprid, sulfoxaflor, thiacloprid, thiamethoxam

Pollinators & environment

- **Neonics kill bees.** There is scientific consensus that neonics are a leading cause of pollinator declines. An international panel of experts concluded that neonics represent a major worldwide threat to biodiversity and ecosystems and called for an immediate end to agricultural use. They are among the most acutely toxic pesticides to bees. And many of the more than 4,000 species of native bees that live in the U.S. are even more vulnerable to neonic exposure than honeybees.[i] Even low levels of exposure can impair bee's foraging abilities and navigation; disrupt learning, communication and memory; reduce fecundity and queen production; and suppress the immune systems of bees leading to bee deaths from pathogens and parasites.[ii] Neonics can act synergistically with the nutrient-poor diet bees experience in intensive farming systems to increase their likelihood of death by 50%.
- **Neonics have caused an explosion in the toxicity of U.S. agriculture for insects.** U.S. agriculture has become 48 times more toxic to pollinators and other insects since use of neonicotinoids began 25 years ago.
- **Neonics kills birds.** They are linked to bird declines; research has found that a single neonicotinoid-coated corn seed can kill some songbirds.[iii]
- **Neonics harm many species.** Along with pollinators, neonics harm many organisms essential for natural pest control and sustainable food production, including birds, bats, butterflies, dragonflies, mayflies, lacewings, ladybugs, earthworms, small mammals, amphibians, aquatic insects and soil microbes — putting food production and the environment in jeopardy.[iv,v,vi,vii,viii,ix,x,xi,xii] Neonics have also been associated with harm to white tailed deer.
- **Neonics create compounding toxicity in the environment.** They persist in the environment creating long-term toxicity in ecosystems.
- **Neonics contaminate the nation's water.** They are water soluble and readily carried into waterways by rain or irrigation water. The U.S. Geological Survey has found that neonicotinoids contaminate lakes and rivers nationwide, often at levels that harm critical aquatic insects and other wildlife.[v] They have been linked to fishery collapse.[v]

Human health

- **Neonic residues cannot be washed off food.** Residues on food cannot be washed off because the pesticides are "systemic," meaning they dissolve in water and are taken up into the tissue of plants. At least half of Americans are exposed to neonics on a regular basis Friends of the Earth found neonics in store brand foods from Walmart, Kroger, Costco and Albertsons.
- **Neonics are found in infant food.** They are among the most commonly reported pesticide residues in infant and toddler foods.
- **Neonics contaminate our tap water.** Neonics are found in drinking water. Research shows that chlorination, a common water treatment approach, can result in byproducts that are over 300 times more toxic to mammals than the original neonic compounds.
- **Neonics are associated with harm to human health.** Emerging research suggests that exposure in the womb or early in life could be linked with developmental defects, autism, heart deformations, muscle tremors and memory loss. Neonics have also been associated with endocrine disruption.
- **Organic diets reduce exposure to neonics**. Levels of the neonicotinoid clothianidin dropped up to 83% after six days on an organic diet in peer-reviewed research co-authored by Friends of the Earth.

Policy leadership

- **European Union and Canada:** Top three most concerning (imidacloprid, clothianidin, thiamethoxam) banned for outdoor use in the European Union and restricted in Canada.
- **States:** Consumer use banned in Maryland and Connecticut.
- **Cities and universities:** Restricted by more than 115 U.S. cities and universities.
- **Proposed U.S. legislation:**
  - Saving America's Pollinators Act (Rep. Blumenauer)
  - Save Our Refuges Act (Rep. Velazquez)

Organophosphates

Use

Organophosphates are used extensively in fruit and vegetable production as well as wheat, corn and other commodity crops.

Active ingredients allowed in U.S. agriculture

Acephate, chlorpyrifos, chlorpyrifos-methyl, diazinon, dichlorvos, dicrotophos, dimethoate, disulfoton, ethoprop, fosthiazate, malathion, naled, phorate, phosmet, pirimiphos-methyl, tetrachlorvinphos, trichlorfon

Pollinators & environment

- **Organophosphates kill bees.** Chlorpyrifos is one of the most acutely toxic pesticides to pollinators.
- **Organophosphates threaten endangered species.** Chlorpyrifos and malathion jeopardize the existence of approximately 1,200 endangered species.
- **Organophosphates are toxic to many species.** They have been found to be toxic to wildlife, including birds and aquatic organisms.

Human health

- **Organophosphates are nerve poisons.** They were developed during World War II as toxic nerve agent weapons.
- **Organophosphates harm children's brains.** They are associated with reduced IQ, attention disorders, delayed motor development, increased risk of learning disabilities, autism spectrum disorder, Alzheimer's, Parkinson's, hormone disruption and cancer.
- **Scientists have called for a ban.** Organophosphates are so toxic to developing brains in utero and childhood, even at extremely low levels of exposure, that scientists have called for a complete ban of this class of pesticides.
- **Chlorpyrifos should be banned immediately.** According to the U.S. Environmental Protection Agency (EPA), children ages 1 to 2 are exposed to chlorpyrifos in food and water at levels 140 times higher than levels deemed to be safe. EPA called for a ban on chlorpyrifos in 2016 and found that there was no safe level of exposure due to harm to children's developing brains.
- **Organophosphates are commonly found as food residues.** Friends of the Earth found organophosphates in store brand foods from Walmart, Kroger, Costco and Albertsons.
- **Organic diets reduce exposure to organophosphates.** Levels of organophosphates dropped up to 95% after six days on an organic diet in peer-reviewed research co-authored by Friends of the Earth.

Policy leadership

- **European Union:** Chlorpyrifos, malathion and diazinon are among the organophosphates banned for agricultural use in the European Union that are still widely used in the U.S.
- **United States:** Parathion is banned for agricultural use in the U.S. Chlorpyrifos was banned for home and garden use in the U.S. in 2000 due to overwhelming science on neurotoxic harm to children. The 1996 U.S. Food Quality Protection Act aimed at protecting children from harm associated with pesticide exposure has led to reduced use of organophosphates in U.S. agriculture.
- **States:** Chlorpyrifos is banned for agricultural use in California, Hawaii and New York.
- **Proposed U.S. legislation**
  - Ban Toxic Pesticides Act (Rep. Velazquez)
  - National Protect Children, Farmers and Farmworkers from Nerve Agent Pesticides Act (Sen. Udall)

Glyphosate

Use

- **Glyphosate is the most heavily-used agricultural chemical in the history of the world.** It is the active ingredient in the herbicide Roundup© manufactured by Bayer-Monsanto.
- **The majority of GMO crops are engineered to be used with glyphosate.** A full 98.1% of all engineered crops grown in the U.S. are designed to withstand the application of herbicides. Since Monsanto's GMO Roundup Ready© corn, soy, cotton and canola were introduced in the 1990s, use of glyphosate has increased over 600%. Ninety percent of U.S. soybeans and 70% of U.S. corn is Roundup Ready.
- **Glyphosate is used in orchards**. Glyphosate use in orchards leads to residues in products like orange juice.

Pollinators & environment

- **Glyphosate is decimating Monarch butterfly populations**. Extensive use of this herbicide has virtually wiped out the milkweed plants that Monarch young depend on along the butterflies' migration route throughout the plains and Midwest. Monarch populations have dropped more than 90% over the last two decades.
- **Glyphosate harms bees.** It has been associated with disruption of the bee gut microbiome, linking it to declines in bee populations.
- **Overuse of glyphosate has led to resistant "superweeds."** Glyphosate-resistant superweeds now plague more than 60 million acres of U.S. farmland. This has perpetuated a toxic treadmill with increasing use of other toxic herbicides 2,4-D and dicamba to manage the resistant weeds.

Human health

- **Glyphosate is a probable human carcinogen.** It is listed as a probable carcinogen by the World Health Organization and California Office of Environmental Health Hazard Assessment.
- **Glyphosate is associated with other health harms.** It is linked to DNA damage, endocrine disruption, shortened pregnancy, and liver toxicity.
- **Farmers and groundskeepers are suing because of high rates of non-Hodgkins lymphoma.** More than 50,000 farmers and groundskeepers exposed to glyphosate are suing Bayer-Monsanto due to their illness. Bayer has been ordered to pay tens of millions in damages.
- **Certain uses of glyphosate lead to high levels of food residues.** Certain packaged foods – like bread, dried beans, crackers and oat-based cereals and snack bars – have particularly high levels of glyphosate residues because it is used as a pre-harvest desiccant. Friends of the Earth found glyphosate in store brand foods from Walmart, Kroger, Costco and Albertsons.

Policy leadership

- **Banned in 13 countries:** Germany, France, Austria, Vietnam, Malawi, Oman, Saudi Arabia, Kuwait, United Arab Emirates, Bahrain, Qatar, Bermuda, St Vincent and the Grenadines.
- **Restricted in eigth countries and hundreds of locations**: Belgium, France, Denmark, Italy, The Netherlands, Czech Republic, Brazil, Sri Lanka and hundreds of locations worldwide.
- **Proposed U.S. legislation**
  - Keep Food Safe From Glyphosate Act (Rep. Delauro)