POLLINATORS & PESTICIDES

ONE OF EVERY THREE BITES of food we eat comes from a crop pollinated by bees. Yet over the past decade, honey bees and other pollinator populations have severely declined around the world. Beekeepers across America lost 44 percent of their honey bee colonies from April 2015 to April 2016,[1] and many beekeepers continue to report above average summer and winter hive losses, with some as high as 100%.[2]

An overwhelming number of scientific studies link bee declines to pesticide use and illustrate the far-reaching and long-term impacts that toxic pesticides have on a wide range of environments.[3] Numerous peer-reviewed studies indicate pesticides have significant adverse effects on not only honey bees, but also the roughly 4,000 species of native bees in this country—including bumblebees, squash bees, sweat bees, and carpenter bees. Unfortunately, since we do not regularly monitor these native bee species like we do with managed honey bees, harm to their population sizes and health is not as visible. One study by scientists at the U.S. Geological Survey (USGS) found pesticide residues in 70% of the native bees tested foraging on or near U.S. farmland, adding to the mounting pile of evidence that pesticides are indeed devastating to thousands of species of bees.[4] While certain other factors such as pathogens, parasites, poor nutrition, and habitat loss also play a role in declines, the toxicity of pesticides on pollinating species is undeniable.

FOOD SECURITY AT RISK

Food security is directly linked to pollinator health. Production of the majority of the fruits, vegetables, and nuts we eat every day depends on pollinators. In fact, without pollinators, 70% of plants would be unable to reproduce or provide food. According to the United Nations Environment Programme, of the 100 crop varieties that provide 90% of the world's food, 71 are pollinated by bees. In North America, honey bees alone pollinate nearly 95 kinds of fruits, such as almonds, avocados, cranberries, and apples, and support the livestock sector through alfalfa hay pollination.[5] While the honey bee is the primary pollinating species for our food crops, native species of bees and other insects are also essential. Pollination services are a core component of the global agricultural economy, valued at over $125 billion annually. In the United States, the value of pollination services is estimated to be $20-30 billion annually.[6]

Yet these critical pollinators are declining at alarming rates. The number of managed honey bee colonies in the United States dropped from roughly 6 million in 1947 to less than 2.5 million today.[7] These hive losses are severely crippling commercial beekeepers' ability to meet pollination demands for a variety of crops—particularly the almond industry, which requires the work of nearly two-thirds of the country's managed honey bees each season.

PESTICIDES LINKED TO POLLINATOR DECLINE AND WIDESPREAD ENVIRONMENTAL CONTAMINATION

The main pesticides linked to pollinator declines are a group of nicotine-based systemic insecticides called *neonicotinoids.* Neonicotinoids are the most widely used insecticides in the world and unlike many pesticides, which are typically applied to the surface of plants, neonicotinoids are systemic—meaning they are absorbed and transported

NEW BEE-TOXIC PESTICIDES ON THE MARKET

Due to their widespread use, neonicotinoids remain a major threat to pollinators; however, there are many new systemic insecticides that are now coming on the market which also threaten bees. These new pesticides can be equally as toxic to pollinators and pose similar environmental concerns.

through all parts of the plant tissue, thus rendering the entire plant toxic. Bees and other species are exposed to these toxic chemicals through pollen, nectar, dust, dew droplets on plant leaves, and in the soil (where many native bee species nest). Modeled after nicotine, neonicotinoids interfere with the nervous system of insects, causing tremors, paralysis, and eventually death.

Neonicotinoids are used in more than 120 countries for over 1,000 different applications.[8] They are used on crops via sprays, in the soil as treatments and granules, and as direct injections into tree trunks.[9] The largest single use of neonicotinoids is as a seed coating on major crops like corn and soybeans. But despite their prevalence in agriculture, research indicates that the prophylactic use (i.e., whether a pest problem exists or not) of neonicotinoids provides little to no benefit to crop yields. Findings from the U.S. Environmental Protection Agency (EPA), the agency charged with regulating these harmful chemicals, have echoed this.

One of biggest problems with neonicotinoid seed coatings is that they contaminate the environment. When used as a coating on seeds, less than five percent of the active neonicotinoid chemical applied actually enters the crop itself—leaving the remainder of the chemical coating to pollute the environment as it leaches into the soil, runs off into nearby water bodies, and is absorbed by other plants.[10]

Neonicotinoids have also been shown to have both additive and synergistic effects when mixed or used in combination with other pesticides such as fungicides, herbicides, and miticides. This is a problem given that regulatory risk assessments usually do not evaluate these effects, even though real life conditions expose pollinators to an assortment of chemicals. For example, most neonicotinoid coated seeds are also coated with fungicides—the combination of which has been shown to increase the toxicity of both chemicals to honey bees.[11]

The extreme persistence and mobility of neonicotinoids in the environment has caused contamination of surface water, groundwater, and soil, and as a result has endangered countless species that inhabit these ecosystems. In one nationwide study, neonicotinoids were found in 63% of the streams sampled across the United States.[12] The effects from this type of contamination are documented in aquatic and terrestrial invertebrates and real concerns exist with respect to long-term impacts on waterfowl, farmland birds, and other wild animals. One study demonstrated that a single corn kernel coated with a neonicotinoid is toxic enough to kill a songbird.[13] It is no surprise that many scientists and reporters describe this current situation as a 'second silent spring' and are calling neonicotinoids 'the new DDT killing the natural world'.[14]

Although pollinator declines are a complicated issue with various compounding factors, it is clear that the heavy use of pesticides—primarily systemic insecticides, like neonicotinoids—in both agriculture and home landscaping is a leading culprit in our current pollinator crisis. To find out more about pollinators and the actions being taken to protect them visit our website at:
www.centerforfoodsafety.org

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