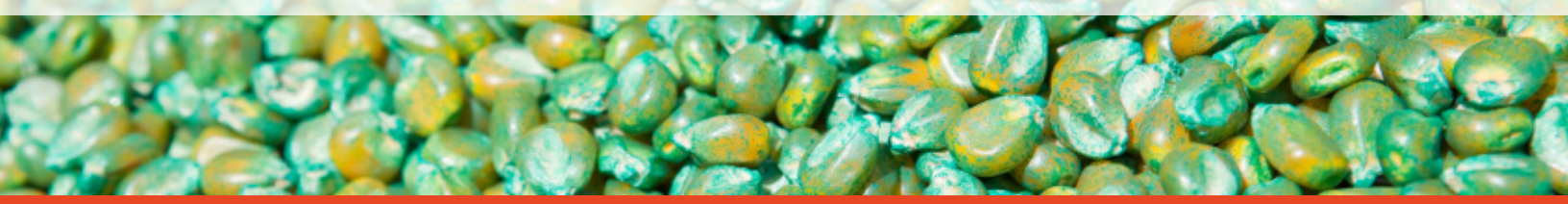


HIDDEN COSTS OF TOXIC SEED COATINGS

Insecticide Use on the Rise

Scientists have identified pesticides—specifically a group of insecticides called neonicotinoids (abbreviated as "neonics")—as likely to be an important cause of declining pollinator populations and poor pollinator health. Neonics are the most widely used insecticides in the world, and have been repeatedly shown to have lethal and sub-lethal effects on beneficial insects.[1] Neonics are also persistent in soil and are mobile in water. Recent monitoring by the US Geological Survey found neonics in most samples of Midwest streams.[2] In addition to harming pollinators, the large and growing body of research on neonics raises concerns about adverse impacts on aquatic invertebrates,[3] birds, and insects that protect our crops.[4]

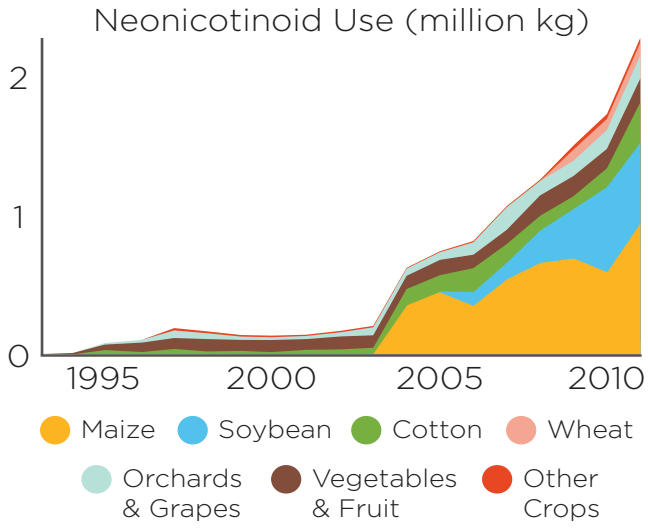
Despite their importance, the main use of neonics, as crop seed coatings, is not included in official government pesticide use data. Claims by the pesticide industry that insecticide use has dropped in the United States exclude the most widespread use of neonics. This leaves a gaping hole in our pesticide data, and greatly underestimates harm to the environment. That is because the planting of seeds coated with a neonic, or other pesticides (such as fungicides), are not considered to be a pesticide application by EPA, unlike pesticides sprayed on a crop. The USDA and EPA have excluded data on seeds coated with pesticides despite their use on more than a hundred millions acres.

New research from scientists at Pennsylvania State University has largely filled the gap in U.S. insecticide data, and the results have troubling implications for our environment.[5]

Between 79 and 100 percent of corn seed and 34 – 44 percent of soybean seed is coated with neonics (and other pesticides). These are our two most widely planted crops. Other major-crop seed, including cotton and wheat, are also commonly coated with neonics. This means that, conservatively, over 100 million acres of cropland, about 57% of the total for these crops—and area the size of California—are directly exposed to neonic insecticides from corn, soybeans and cotton alone.

The total acreage of corn treated with insecticides is now 3 times higher than it was prior to neonic seed coatings. For example, about 30 percent of corn acres/year were estimated to have been treated with applied insecticides during the decade prior to the introduction of neonic seed coating in the mid-2000s. Now, about 80-100 percent is exposed.

USDA incorrectly reports a reduction in corn acreage treated with insecticides. The agency's estimates, made without counting neonic seed coatings, incorrectly claimed that corn area treated with insecticides had decreased in recent years. This has been attributed mainly to adoption of genetically engineered Bt traits that control some pests previously treated with applied insecticides. USDA incorrectly determined that only 12% of corn acres were treated with applied insecticides in 2010, when in fact, as noted above, about 80 to 100 percent were actually treated.



Source: Douglas & Tooker, 2015.

RECOGNIZING HARM TO POLLINATORS AND OTHER BENEFICIAL SPECIES

Considering the area exposed to pesticides, rather than just the amount used, is important. This is because area often better reflects how likely it is for beneficial organisms to come into contact with the pesticide. As an illustration, a highly toxic poison would cause no harm locked in a secure facility, while it could be dangerous if widely distributed in our food, water or air in concentrations that are harmful.

There are several reasons that beneficial species are being exposed to and harmed by neonics:

- They are highly toxic to insects in very small amounts
- They are more persistent than most insecticides,[6] and so remain longer and even may accumulate in the environment. This means that residual levels of neonics could be present in a field even if a farmer doesn't plant coated seeds that season.
- They are also very soluble, and hence mobile, in water that runs off of farm fields into streams. This also means that the area over which beneficial organisms are exposed spreads well beyond the farm, and more so than for some other insecticides.
- Neonics are also systemic, which means that some of the insecticide is absorbed into the plant, exposing insects through pollen, nectar, crop tissues and residues, roots, and droplets produced by leaves. Most other insecticides are not systemic.

Another important consideration for determining real-world harm, as opposed to harm in lab experiments, is whether the amount of these insecticides in the environment is high enough. Several studies have shown that neonic concentrations in the environment are often high enough to harm bees (pollinators),[7] beneficial insects that protect crops,[8] and aquatic organisms.[9] Many scientists therefore agree that it is likely that neonics are causing extensive harm to the environment.

Neonics also indirectly harm the crops they are supposed to protect by killing insects that boost crop productivity through consumption of crop pests.[10] Seed coatings have already been shown to result in lower crop productivity in experiments with soybeans because of harm to protective insects.[11] It is also likely to be causing other indirect harm, such as to farmland birds through loss of insect food sources.[12]

FARMERS DON'T NEED NEONIC-COATED SEED: ALTERNATIVES EXIST

Research shows that neonic seed coatings usually are not needed and are not cost effective. The extensive use of neonic seed coatings by farmers is greatly encouraged by limited availability of uncoated seed from major seed companies that control most of the market for major crops.[13] Uncoated corn seed is reportedly often not even sold by these companies. Seed companies also provide crop insurance incentives with purchase of coated seed. High sales should not be conflated with efficacy.

For major soybean-growing regions of the U.S., neonic seed treatments have been shown to rarely be worth their cost, and they do not even protect the crop from its most pervasive pest, the Asian soybean aphid.[14,15] This is usually also the case for corn, where the minor pests that are the target of seed coatings usually do not cause significant harm. When minor corn insect pests occasionally cause problems, better and economically viable alternatives exist.[16] By ending the unnecessary prophylactic use of neonic seed coatings through the use of ecological farming principles that reduce pest levels, and treating only when necessary, insecticide use can be greatly reduced. Therefore, there is no adequate justification for continued use of neonic seed coatings.

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