THE SCIENCE IS CLEAR: NEONICS HARM BEES

In 2014, an international meta-analysis of approximately 1,121 peer-reviewed studies on the impact of systemic pesticides, conducted by the International Union for the Conservation of Nature, known as the Task Force on Systemic Pesticides found that:

- Neonics are present in the environment “at levels that are known to cause lethal and sublethal effects on a wide range of terrestrial (including soil) and aquatic microorganisms, invertebrates and vertebrates.”
- The active ingredients persist, particularly in soils, with half-lives of months and, in some cases, years, and they accumulate. This increases their toxicity by increasing the duration of exposure of non-target species.
- The weight of the published evidence is very strong that the acute and chronic effects pose a serious risk of harm to colonies/populations of honey bees, bumblebees and other pollinators.

A soon-to-be-published study conducted by Professor Hartmut Doebel at George Washington University/Department of Biological Sciences concluded that “non-lethal doses of neonics alter the cognitive ability of honeybees; our results are evidence that bee behavior may be altered in ways that foraging in honeybees is impaired. This change in cognitive behavior may have profound consequences and may detrimentally change bee and colony behavior.” Dr. Doebel submitted testimony regarding his work to the committee.

The European Food Safety Authority determined that the most widely used neonics (imidacloprid, clothianidin and thiamethoxam), pose unacceptable hazards to bees, prompting the European Union to suspend their use on agricultural crops in 2013. This agency also published an opinion report linking two neonics to adverse effects on the developing human nervous system. According to the report, data suggests that the neonic chemicals (imidacloprid, acetamiprid) under review are responsible for the excitation or desensitization or both of nicotinic acetylcholine receptors (nAChRs), which may affect the developing mammalian nervous system, as is known to occur with nicotine. The agency concludes that the two neonicotinoid compounds may affect neuronal development and function.

In recognition of the long-term impacts systemic pesticides have on the environment, the U.S. Fish and Wildlife Service (FWS) announced in June 2014 its decision to phase out neonicotinoid use.

Systemic pesticides like neonics have been shown, even at low levels, to impair foraging, navigational and learning behavior in bees, as well as suppress their immune system to the point of increasing their susceptibility to pathogens and disease such as the varroa mite.

A 2015 study confirms previous findings that the levels of neonics bees are likely to encounter in the environment impair their brain cells, resulting in poor navigation and foraging, and eventually colony declines.

Similarly, University of Minnesota entomologist Vera Krischik, PhD, in a coming paper, found in her research that butterfly larvae feeding on neonic-contaminated milkweed plants died soon thereafter. Dr. Krischik notes that neonic-treated plants in backyards near milkweed plans

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1 http://www.tfsp.info/worldwide-integrated-assessment/
create serious potential risks to monarchs and other butterfly species. Butterflies like the North American Monarch butterfly saw population declines by 90 percent in the past 20 years, dropping from a high of approximately one billion in the mid-1990s to fewer than 35 million butterflies in the winter of 2013-2014 – the lowest number ever recorded.

- Concentrations of neonics in soils, waterways, field margin plants and floral resources overlap substantially with concentrations that control pests in crops and commonly exceed levels that are known to kill beneficial organisms. Because these chemicals are broad-spectrum insecticides, victims of these systemic chemicals include beneficial soil-dwelling insects, benthic aquatic insects, grain-eating vertebrates and pollinators.

- Birds are also at risk from neonics, as one study demonstrates that a single corn kernel coated with a neonic is toxic enough to kill a songbird.

- Further, research from the Netherlands has showed that the most severe declines in bird population occurred in areas with the highest levels of neonic pollution.

- The U.S. Geological Survey (USGS), documents similar risks from neonics in the rivers and streams of the Midwest. Recently, Morrissey at al. confirms in a review that neonicotinoid concentrations detected in aquatic environments pose risks to aquatic invertebrates and their ecosystems.

- Dr. Lu’s studies are part of a large body of scientific literature that identify neonicotinoid insecticides as a key contribute to declining bee and pollinator health and associated environmental degradation. While the Lu studies are certainly not the only science that supports the need for SB 163, they offer important information on the contribution of neonics to declining bee health.
  - The very low concentrations of neonics used in Dr. Lu’s 2014 study (0.74ng/bee (2014)) show that even at low levels, neonics can lead to adverse impact on long-term survivability and health of bee colonies. The concentrations used in Dr. Lu’s study are far lower amounts than found in flowers analyzed in real-world surveys and USDA research.
  - Further, none of hives died during the 13 weeks of neonic dosing, so the claim of astronomically high levels of dosing did not see evidence of bee deaths at the hive, but only the symptoms of colony collapse disorder (CCD), which is characterized by abandonment of the hives by those bees that were exposed to the neonicotinoids.
  - Dr. Lu’s study (2014) shows the varroa mite is not a major factor in CCD. The dose/bee used in study was below the current LD50 value for imidacloprid. The dose that bees were exposed to is not 10 fold higher than what is to be expected in the environment as Bayer claims (0.74 ng/bee.)

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The Smart on Pesticides Maryland coalition works to protect Marylanders and the natural systems we depend upon from the toxic impacts of pesticides. The coalition includes more than 55 organizations, and institutions representing communities, businesses, health care providers, farmers, environmentalists, Waterkeepers, interfaith congregants as well as environmental justice, public health and wildlife advocates.

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