Comments of Jennifer Sass, PhD

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To the New Jersey Senate Environment and Energy Committee

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Committee Room 6, 1st Floor, State House Annex, Trenton, NJ[1]

In support of S1016, which directs DEP to classify neonicotinoid pesticides designed for outdoor use as restricted use pesticides and bans non-agricultural uses

Thank you for the opportunity to provide public comments to support this important bill. I write in support of Senate Bill 1016 (S1016), which directs the state Department of Environmental Protection (DEP) to classify neonicotinoid insecticides (neonics) intended for outdoor use as restricted use pesticides (RUPs) and prohibits all outdoor non-agriculture uses (such as golf courses and landscaping) of this class of neurotoxic insecticides.[1] S1016 will provide the protections that people and pollinators of the Garden State require and deserve.

I have been a senior scientist with the Natural Resources Defense Council (NRDC) for two decades, during which time my work has focused on pesticides and industrial chemicals the science and policy relevant to federal agency actions. I also hold a part-time faculty position at George Washington University in the Environmental and Occupational Health Department of the GW Public Health School. I have published over four dozen articles in peer reviewed science journals relevant to environmental health, toxicology, and federal chemical policy. I serve on the Board of Science Counselors for the National Toxicology Program, National Institute of Environmental Health Sciences (NIEHS), a part of the National Institutes of Health (NIH). I have post-graduate degrees in anatomy and cell biology, with a

focus on neurodevelopmental and molecular biology – both of which are particularly relevant to neonicotinoid pesticides, as I will explain.

In addition to my professional interest as an environmental health scientist in protecting New Jersey (NJ) residents from harmful agrochemicals, most of my father's family live in NJ. My parents were married in NJ, and my father served portions of his military service here. So, thank you for taking on the task of protecting our families from neonic pesticides.

I am pleased to apply myself in these comments to the task of summarizing the scientific evidence that the neonicotinoid pesticides pose a human health risk – specifically through the combination of widespread exposure and certain toxicity. .New Jersey lawmakers must step in if the state's residents are to be provided some measure of protection.

Risk is a combination of both exposure and toxicity, or hazard. Neonic use patterns lead to plenty of both.

Exposure from contaminated foods –

Neonic pesticides applied on food crops (agriculture uses) and wind up as residues on foods. A 2019 collaborative effort led by Friends of the Earth sampled 132 foods from over thirty stores across the country including New Jersey, and found neonics in 80% of spinach and 73% of applesauce samples nationwide.[2] A published study by researchers at the University of Maryland analyzed neonic residue data on foods sampled between 1999 and 2015 by the U.S. Department of Agriculture, and reported neonic on many foods that are children's favorites such as apples, cherries, honey, strawberries, and baby food. [3] Because neonics are designed to work by making the plant poison to insects, the pesticide is systemic, permeating the plant tissue, cannot be removed by washing or peeling the produce before eating.

Exposure from drinking water –

Source water for drinking water is contaminated by neonics that runoff with rain into nearby waterways; both agriculture and urban uses on lawns and landscaping will wind up as water pollutants. A survey of 25 states and territories by the U.S. Geological Survey (USGS) detected neonics in over half of the streams tested, demonstrating widespread contamination of urban and rural surface waters, including drinking water sources.[4] [5] [6]

Unfortunately, conventional drinking water treatment systems are largely ineffective in removing neonics (although much can be removed by granular activated carbon filtration systems).[7] Now, studies not only document neonic contamination of tap water, but recent research suggests that chlorination during routine drinking water treatment could result in potentially much more toxic chlorinated-neonic compounds. [8] [9]

Acute health harms –

Non-agricultural uses of neonics have led to poisonings of people, including, but not limited to, the following adverse effects according to incident poisoning reports:[10]

- Clothianidin – numbness, chest pain, headache, muscle weakness and tremors, shortness of breath, sore throat, coughing, skin rash and itching, tachycardia (rapid heart rate), blurred vision, and abdominal pain;

- Imidacloprid – rash, muscle tremor, difficulty breathing, vomiting, wheezing, lock jaw, memory loss, and renal failure; and,

- Thiamethoxam – throat irritation, skin irritation and rash, fever, numbness, dizziness, diarrhea, and sweating (and note that the major metabolite of thiamethoxam is clothianidin).

These reports, which are consistent with the clinical signs and symptoms of poisoning from a neurotoxic agent, confirm that these products used in the real-world are poisoning people.

Chronic health harms -

A recent systematic review of publicly-available literature on unintentional human exposures to neonics (such as from agricultural uses or consumer products) reported a link between those exposures and elevated risk of developmental or neurological damage. Effects linked to neonic exposures include malformations of the developing heart and brain and a cluster of symptoms including memory loss and finger tremors.[11] While the authors note that the studies to date have limitations, they warn that, "[g]iven the widespread use of neonicotinoids in agriculture and household products and its increasing detection in U.S. food and water, more studies on the human health effects of chronic (non-acute) neonicotinoids exposure are needed."[12]

Wildlife studies also report neurotoxic effects, including developmental abnormalities. A recent study of white-tailed deer experimentally exposed to environmentally-relevant levels of imidacloprid in their water (0, 1.5, 3.0, 15 micrograms/L) exhibited hypothyroidism and lethargy, decreased body and organ weight, decreased jawbone length, and higher mortality rates for fawns.[13] This study also found levels of neonics in wild white-tailed deer that were higher than the experimental levels in the captive population, demonstrating contamination in foraging wildlife.

Laboratory studies also support a link between neonic exposures and adverse systemic effects, including on the neurological, reproductive, and immune systems.[14]

The concordance of effects – particularly to the nervous system in adults and during early life development – across a wide range of exposure levels, study types, and biological systems raises a red flag about the human toxicity of neonic insecticides.

Neurodevelopmental harm –

In 2013, the European Food Safety Authority concluded that neonicotinoids may adversely affect the development of neurons and brain functions like learning and memory, based on evidence in cellular (in vitro) studies that acetamiprid and imidacloprid caused damage to critical cells of the brain and nervous system.[15] At the time, this may have seemed precautionary. However, a review of registrant-sponsored generational rodent studies confirms not only that neonics are brain-toxic, but also that exposures during early life development may interfere with the structure and function of the brain and nervous system.

The registrant, Bayer, submitted rodent studies to EPA in which pregnant rat dams are dosed with the pesticide each day during pregnancy, and then the offspring and the treated mother are examined for both physical and functional effects. In the study with thiamethoxam, the offspring had several adverse effects at the mid- and-low-doses at which the adult mother did not show effects; these included a thinner brain cortex, altered auditory startle reflexes, delayed reproductive development (delayed preputial separation) in males, and an increase in stillbirths.[16] EPA considered all these effects in offspring to be statistically significantly different from control group offspring that were not exposed to the pesticide. The industry-sponsored two-generation reproductive study of clothianidin also was considered by EPA to show that the young offspring were more susceptible than adults to the toxic effects of the pesticide. [17]

These studies, all sponsored by neonic manufacturing companies, demonstrate that the pesticides can move from an exposed pregnant animal to the developing fetus, and that, once in the fetal circulation, the chemicals will disrupt development of the brain and nervous system. These data are consistent with scientific reports discussed above of developmental damage to wildlife exposed in the field, [18] and with epidemiologic reports of nervous system effects in exposed people. [19] Under the law, pregnant women and children are identified as vulnerable populations deserving additional protections from pesticides like the neonics that can cause developmental harm.

EPA fails to apply FQPA child protection factors -

In 1996 the U.S. Congress unanimously passed the Food Quality Protection Act (FQPA), aimed to provide an extra measure of protection for children from pesticides. This was in response to the 1993 National Academies report on Pesticides in the Diet of Infants and Children. The report concluded that exposures during early childhood can be much more harmful than during adulthood, and that the harm can be long-lasting or even permanent:

> "Profound differences exist between children and adults. Infants and children are growing and developing. Their metabolic rates are more rapid than those of adults. There are differences in their ability to activate, detoxify, and excrete xenobiotic compounds. All these differences can affect the toxicity of pesticides in infants and children, and for these reasons the toxicity of pesticides is frequently different in children and adults....The committee found both quantitative and occasionally qualitative differences in toxicity of pesticides between children and adults. Qualitative differences in toxicity are the consequence [20]of exposures during special windows of vulnerability—brief periods early in development when exposure to a toxicant can permanently alter the structure or function of an organ system."[21]

Data from over 3,000 individuals included in the 2015–2016 government National Health and Nutrition Examination Survey (NHANES) reported that roughly half of the U.S. population 3 years of age and older is regularly exposed to neonicotinoids.[22] Young children had higher levels than adults, likely due consuming more food and water per body weight than adult, and engaging in behaviors such as mouthing objects and playing on lawns that may be treated with pesticides. Transfer of neonic pesticides from a pregnant mother to her developing fetus is also a concern, as demonstrated by a recent study measuring a metabolite of acetamiprid in the urine of newborn babies. Maternal-to-fetal transfer is also demonstrated in the developmental neurotoxicity rodent studies discussed above, submitted to EPA by Bayer showing that exposing pregnant rats to thiamethoxam or clothianidin led to adverse effects in the offspring. [23]

Despite acknowledging risks to human health in its most recent neonic assessments, EPA has failed to take appropriate steps to protect vulnerable populations, like children and farmworkers, from neonics.[24] Moreover, EPA underestimates these risks; EPA has failed to invoke any additional protections for pregnant women and children, as required by the FQPA. EPA is also evaluating the neonics as if we are exposed to only one, instead of the risks from the cumulative exposure to all of them, as required by FQPA, and as occurs in the real world. In short, EPA is protecting the agrochemical industry, not the public.

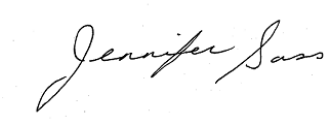
Conclusion –

Experts recently reported in the journal Nature that agriculture was increasingly more toxic, "This pattern varied markedly by region, with the greatest increase seen in Heartland (121-fold increase), likely driven by use of neonicotinoid seed treatments in corn and soybean. In this 'potency paradox', farmland in the central US has become more hazardous to bees despite lower volumes of insecticides applied, raising concerns about insect conservation and highlighting the importance of integrative approaches to pesticide use monitoring".[25]

In short, we are awash in harmful agrochemicals, used on our food crops, around our homes, and on our parks and school grounds. Our overuse of agrochemicals has poisoned the places that we live, learn, work, and play. And, it's getting worse as agrochemical corporations shift to chemicals that are longer-lasting, and more toxic to insects. [26] New Jersey has an opportunity to change the outcome, reduce the over-use of neonic pesticides, and protect its wildlife and families.

Thank you for the opportunity to submit these comments for your consideration.

Respectfully,



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[1] See Committee calendar for more information: https://www.njleg.state.nj.us/BillsForAgendaView.asp

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