

April 26, 2019

Senator Robert Starr and Representative Carolyn W. Partridge
Vermont State House
115 State Street
Montpelier, Vermont 05633

I wish to thank you both for collaborating with Rural Vermont and NOFA and hosting the informal hearing yesterday for Vermont's Small Farmers. I had to leave early to help a friend move and did not get the opportunity to speak to your joint committee directly on April 25th, so I am taking this opportunity to provide this additional testimony and provide comments to you regarding the Evaluation of Neonicotinoid Seed Treatments in the Environment presentation presented by VAAFM.

A question was raised about the ability of higher order animal's to bio-accumulating neonicotinoids in their system. Your committees should be aware that a study published in Scientific Reports last month found that captive white-tail deer and their fawns suffered detrimental effects when exposed to levels of the endocrine disrupting pesticide Imidacloprid found at field relevant doses such as those reported by the VAAFM in their presentation.

Researchers found that:

- as imidacloprid increased in the spleen, fawn survival, thyroxine levels, jawbone lengths, body weight, and organ weights decreased
- Adult female imidacloprid levels in the genitals were negatively correlated with genital organ weight
- Behavioral observations indicated that imidacloprid levels in spleens were negatively correlated with activity levels in adult females and fawns.
- Results demonstrate that imidacloprid has direct effects on white-tailed deer when administered at field-relevant doses.

Interestingly, the **researchers also noted that imidacloprid was present in the organs of the control group, indicating background environmental contamination and exposure to the deer herd.** This study suggests that Vermont's deer herd may be harmed by the release of thousands of pounds of neonicotinoids into Vermont's landscape on a yearly basis.

This study also raises questions about the safety of neonics to mammals especially when we consider research on another mammal, bats, has found profound harm that can be caused by these systemic poisons. A 2016 study published in the journal Neuroreport, found the bats exposed to the chronic low-dose exposure levels such as those reported by the VAAFM, suffered flight patterns that were quite different from their originally learned paths. According to the paper the study provides, "direct evidence that pesticide toxicity causes a spatial memory disorder in echolocation bats. This implies that agricultural pesticides may pose severe threats to the survival of echolocation bats." Needless to say,

bats that suffer from echolocation impairment will have difficulty flying correctly and this may reduce their ability to catch insects on the wing and may negatively impact bat nutrition.

As I have noted to your committees in past testimony, researchers have established that there was a significant increase in the use of neonicotinoid treated seed in the U.S. from 2005-2007. (Douglas 2015) It is interesting to note that this time frame coincides with both the emergence of Colony Collapse disorder in honey bees and the appearance of deadly White Nose Syndrome in bats.

I would suggest that the VAAF focus on acute levels of neonicotinoid contamination in their data analysis may cause the agency to overlook the damage from the chronic, low-level exposure that Vermont's wildlife is being subjected to.

Thank you for your time and consideration in this matter.

Sincerely,

Ross Conrad, PO Box 443, Middlebury, Vermont 05753

References:

E H Berheim *et al*, (2019) **Effects of neonicotinoid insecticides on physiology and reproductive characteristics of captive female and fawn white-tail deer**, *Scientific Reports*, doi: 10.1038/s41598-019-40994-9

Douglas, M., Tooker. J.F. (2015) **Large scale deployment of seed treatments has driven rapid increase in use of neonicotinoid insecticides and preemptive pest management in U.S. field crops.** *Environmental Science & Technology*, 150320174253000 doi: **10.1021/es506141g**

C J Hsiao *et al*, (2016) **Imidacloprid toxicity impairs spatial memory of echolocation bats through neural apoptois in hippocampal CA1 and medial entorhinal cortex areas**, *Neuroreport*, Apr 13;27(6):462-8. doi: 10.1097/WNR.0000000000000562