Responses to Chair Partridge's Questions Concerning H.626:

1) "Do we need research done by entities without a vested interest?"

Response: There is a large and growing body of independent research on neonicotinoids (neonics), their use and their effects on ecosystems, from which we in Vermont can learn and use to base our decisions. One comprehensive review by Lennard Pisa et al (2021) Neonic Effects on Organisms was shared with you on Feb. 8. Another important one by Yang et al (2012)* showed that exposure of bee larvae to low amounts of imidacloprid (2.5ppb) can affect their ability as adults to find food and return to the nest. Scientists in this country and around the world are publishing research on the adverse effects of neonics and their presence in the environment.*

(Pisa L et al, 2021. DOI 10.1007/s11356-017-0341-3 ; Yang EC et al, 2012. doi:10.1371/journal.pone.0049472).

2) "Companies that produce the pesticides have made improvements in the seed coatings, so they are more durable, but there is concern that they contain ingredients that aren't necessary for the conditions in Vermont. Why put stuff in the soil when it doesn't even help?"

Response: Good question. What are the unknown toxic ingredients in neonic coatings that make them more durable? You are right to question the use of any product that introduces chemical toxins to the soil, water and air.

3) "Some beekeepers blame their colony losses on neonics, but in some cases, when their hives are tested, there is little or no trace of neonics."

Response: Mr. Giguere's report from 2012-2013 on neonics in honeybee hives was based on samples before, during and after planting season. Corn plants had only been planted in May; no corn pollen was available until July or August. Detectable concentrations were actually found in hives adjacent to conventional corn fields: .7 ppb imidacloprid; .8 and 1.2ppb thiamethoxam; 6.2ppb clothianidin. The clothianidin is persistent and could have been there from the previous year. Sublethal amounts of imidacloprid can affect the later ability of adult worker bees to find food and to return to the colony, even though the larvae survive to adulthood. This reduction in the workers' ability to function can endanger the whole colony.

(Question 3 Response, cont'd)

The ability of bees to groom themselves and to remove mites from their bodies is adversely affected by exposure to sublethal concentrations of clothianidin, enabling disease to disable or kill them. (Morfin N et al, 2019. https://doi.org/10.1038/s41598-019-41365-0)

More important questions might be: From what substance in the hive was the pollen taken? from bees? from larvae? from the hive? As the test was done at time of planting, the pesticides could have come from the drift of neonic dust. The source of the pollen tested was not identified.

Further, there is no dose that does no damage - only non-lethal immediate damage. Since imidacloprid and other neonicotinoid insecticides cannot be broken down and detoxified by bees, they have time-dependent effects - and the risk of foraging worker bees consuming tiny residue levels becomes an issue that cannot be ignored. Researchers describe this paradigm shift in the field of toxicology this way: The dose response characteristics of neonicotinoid insecticides turn out to be identical to those of genotoxic carcinogens, which are the most dangerous substances we know. Such poisons can have detrimental effects at any concentration level. Current pesticide risk assessment procedures are flawed and have failed to protect the environment. Traditional approaches that consider toxic effects at fixed exposure times are unable to allow extrapolation from measured endpoints to effects that may occur at other times of exposure. Time-to-effect approaches that provide information on the doses and exposure times needed to produce toxic effects on tested organisms are required for prediction of toxic effects for any combination of concentration and time in the environment. ***Long term chronic low dose exposure does damage.*** *(Tennekes, 2010)*

4) "Do the seed coatings break down in the soil and migrate to flowering plants where the pollen can be picked up by pollinators?"

Response: a) Neonics are persistent in the environment. The half-lives of the 3 neonics under discussion: imidacloprid, 191 days; thiamethoxam, 50 days; clothianidin, 545 days. Clothianidin is a degradate of thiamethoxam. b) Neonics are systemic, meaning that if the seed of a plant is treated, the whole plant including pollen and nectar become toxic to bees. c) Neonic seed coatings drift as powder when seeds are planted, exposing bees, pollinators, birds, and beneficial insects. One treated seed was enough to kill one small bird.

5) "Do the neonic seed coatings migrate to water? When studies are done and testing is performed on cornfields in Vermont, why is no evidence of neonics found in the field, on the edge of field, or in the surrounding ditches?"

<u>Response:</u> Testing is only possible down to a certain level of contamination. There are likely neonics present that are simply below what testing can detect. Again, neonic seed coatings are persistent and mobile in soils, and are carried in storm runoff to surface waters where they can harm aquatic invertebrates at concentrations below the benchmarks currently used by VAAFM. If the detection limits of the lab are not low enough, the test results will not help us detect the chemicals in soil or in ditches. VAAFM should be using the No Observed Adverse Effect Concentration (NOAEC) for benchmarks rather than the Lowest Observed Adverse Effect Concentration (LOAEC) and to adjust laboratory protocol accordingly. In summary, these tests that cannot find the neonics at the low, subacute levels that do damage are essentially useless and even dangerous, as they create an inaccurate record of what is happening. We cannot rely on tests that are unable to detect neonics at the low levels that do damage.

6) "What about other environmental stressors on pollinators, like loss of habitat due to development, climate change, parasite pressure, and pesticides?"

<u>Response</u>: These factors can be cumulative for sensitive species. Pesticides undermine the immune systems of bees and make them less able to resist parasites. Fungicides and insecticides used together can have more toxic effects on pollinators than either alone. Loss of habitat is also a factor, but often is accompanied by more uses of pesticides. Climate change is human-induced, as are increased uses of pesticides used to deal with newly arriving insects.

7) "In Vermont, we have taken some significant steps to reduce the use of neonics. We banned the sale, possession, and use of products containing neonics for household purposes."

<u>Response:</u> Banning the use of neonics for household purposes is not significant enough. This constitutes less than 5% of the neonic usage in Vermont. We need to stop the agricultural and ornamental (golf course, etc.) use in order to stop the persistent and chronic damage to waterways and pollinator populations.

8) "It would be helpful to have additional studies done to determine what's actually happening. Are neonics really responsible for weakening and/or killing beehives?"

<u>Response</u>: The toxicity of neonics is well known - further studies are not necessary to prove that neonicotinoids are causing a problem. VAAFM has data that certainly indicates a problem, showing high neonic amounts in Jewett brook - some at the chronic level. Additionally, we can employ the Precautionary Principle which states that we must prevent harm even in the face of uncertainty. Further studies will certainly be helpful, but we need to act now to avoid more neonics getting into our waterways.

9) "Are there ways to use less treated seed? Several years ago, we required that any seed company selling treated seed would also have to make untreated seed available. ...Untreated seed needs to be ordered in September before the planting season. Is there a way we could implement something similar to what Ontario did, requiring farmers to make a case for the need to use treated seed? "

<u>Response</u>: Ontario and Quebec require that pest problems be verified before treated seeds are used. This concept is Integrated Pest Management, where pesticides are only used as a last resort. H. 626 requires AAFM to adopt rules for using treated seeds that require IPM. Based on a recent study, IPM could reduce treated seed use by 95%.

In Ontario and Quebec, this is done by scouting for pests or placing baits to attract potential pests and determining if pests are at a level that requires treated seeds. Studies in both Ontario and Quebec have shown that pests rarely reach a level where treated seeds are needed.

IPM is a critically important concept that should be embedded in all AAFM pesticide policies. Failure to adopt and implement this policy results in the needless contamination of our environment with toxic substances.