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Vermont House Committee on Agriculture and Forestry
Testimony re: H688, an act relating to pollinator protection

Executive Summary

H.688 as written is a well-meaning piece of legislation that deserves several amendments to improve it as a mechanism to protect pollinator health while maintaining farm and landscape viability in the state. This bill obviously builds upon the work of the Vermont Pollinator Protection Committee, on which I served as chair during its existence in 2016-17. The report submitted by that committee in February 2017 was developed through substantial deliberations and consensus-finding among its members. As a result, this bill intended to protect pollinators in Vermont should address the complex issues surrounding the decline of some pollinators in the state, including habitat and forage loss; diseases, including those spread by managed honeybees; mite pests; climate change; and changes in land use patterns. I urge the committee to consider the broader landscape of pollinator protection and not focus almost solely on neonicotionoid insecticides for regulation. In this testimony I describe my reasoning behind suggesting the following changes:

1. Defer registration data to that analyzed by EPA or other qualified scientists unless specific issues with particular datasets arise. The VT Agency of Agriculture does not have expertise to conduct a re-review of pesticide chemistries above that of EPA.
2. Direct the majority of increased pesticide registration fees to research & education programs.
3. Loosen definition for “pollinator forage area” under §1101 or decouple the definition from restrictions of neonicotinoid uses under §1105c.
4. Allow applications of neonicotinoids in protected greenhouse environments and for invasive species management as outlined in the recommendation of the Vermont Pollinator Protection Committee.
5. Remove the restriction on neonicotinoid applications within 50 feet of a defined “pollinator forage area”.
6. Amend Section 7 to require that any formalized recommendation program involve appropriate scientific expertise, and provide funding to Vermont Agriculture Experiment Station and/or UVM Extension specifically to help generate recommendations.
7. Amend §1112 (d) to ensure that individual farm’s use of neonicotinoid-treated seeds is anonymized in reporting systems available to the public to protect from harassment or spurious litigation.
8. Commit substantive long-term funding to support the development and implementation of the Integrated Pest and Pollinator Management Program.

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Introduction

This testimony on H.688 is presented based on my history as a farmer, researcher, and educator for over 20 years. I have worked in the apple research and production industries since 1995. My teaching responsibilities at UVM include a suite of Diversified Management Planning, Operation, and Management courses modeled over a full season from January to December on an organic vegetable farm. That operation is co-located with both conventionally-managed and organic apple orchards, wherein the former we, like the majority of the fruit industry in the state, use neonicotinoid insecticides (NNI) to manage insect pests. I also teach courses in Orchard and Vineyard Production as well as Agriculture Policy and Ethics. Finally, I served as chair of the Vermont Pollinator Protection Committee in 2016-17, and have thoroughly reviewed both scientific literature and policy documents on the NNI and pollinator issues.

My points in detailing my background are two-fold: to highlight my experience with research and implementation of IPM programs in specialty crops in Vermont; and to highlight the already high rate of IPM adoption among growers in the state.

Experience with organic production systems

From 1999-2004, I helped conduct a multi-year research project with Dr. Lorraine Berkett on use of an insect management tool (formulated kaolin clay) that was developed as a replace for organophosphate insecticides in apple production. The results of that work indicated the kaolin could replace conventional insecticides but with substantially higher cost, lower efficacy against most pests, and substantial difficulty in application (Garcia, Berkett et al. 2002, Garcia, Berkett et al. 2003, Benedict 2004, Berkett, Garcia et al. 2005). Research at other institutions has presented similar results, and documented reductions in tree productivity and fruit quality as a result of its use. (Glenn, van der Zwet et al. 2001, Knight, Christianson et al. 2001, Glenn, Erez et al. 2003, Marko, Blommers et al. 2008).

From 2006-2013 I was part of a team that evaluated organic apple production in two orchard planting systems. Over the course of that project, the percent of fruit culled because of insect damage was as high as 63%, and was above typical commercial standards for profitable apple production in most years (Bradshaw, Berkett et al. 2013, Bradshaw, Berkett et al. 2016). In addition, crop yield was roughly half the commercial standard yield for orchards in the region (Bradshaw, Berkett et al. 2016), and economic return was minimal to negative in twenty year projections for 70% of orchard-variety combinations (Bradshaw, Parsons et al. 2016). Crop loss from insect damage was a major reason for this lack of profitability under organic management.

Integrated Pest Management

I have consulted with Vermont fruit growers as an assistant to Dr. Berkett for the beginning of my career, and since 2013 as Director of the UVM Fruit Program (Bradshaw 2017). My role includes providing direct consultations and recommendations on Integrated Pest Management (IPM) implementation in tree fruit and grapes, and I essentially serve in the role of (the sole) Extension educator for producers of those crops in the state. I am also co-author with Extension professionals from the six New England states on the New England Tree Fruit Management Guide (Bradshaw, Clements et al. 2017) and on recommendations for

regional grape producers since 2005 (Bradshaw and Berkett 2017). I am a member of the Northeast IPM Tree Fruit Working Group and attend 6-10 collaborative meeting a year with research and Extension faculty and consultants which allows me to keep abreast of developments in the IPM field. I am the state coordinator of the Vermont Network for Environment and Weather Applications (NEWA), managed by Cornell University IPM Program (Carroll 2013). The NEWA network provides site-specific and real-time weather and pest model information to best determine need for and time pest management practices on orchards, vineyards, and, to a lesser degree, vegetable crops.

IPM is the preferred, and in many crops, dominant paradigm for crop management to maintain crop quality while minimizing pesticide use. IPM is based on a substitution of knowledge of biophysical, economic, and ecological parameters of the agroecosystem (Gray, Ratcliffe et al. 2009). IPM systems assume that producers have knowledge of: crop condition; pest populations, and environmental conditions conducive to pest and disease damage. Ideally, IPM practices will prioritize physical, biological, and cultural control mechanisms before resorting to chemical interventions. With that said, many crops in commonly-grown commercial systems rely on chemical controls as a key management tool (Vandeman, Fernandez-Cornejo et al. 1994). Failure to manage pests, weeds, and diseases has substantial consequences, with 50-80% yield loss likely on many crops (Oerke and Dehne 2004). *The choice to not consider options for managing pests in modern crop production systems which supply the vast majority food is not an option.*

On-site pest monitoring improves the efficacy of NEWA outputs for optimizing pest management and reducing pesticide applications while protecting crop quantity and quality. In a recent survey I conducted of Vermont orchardists, 80% of growers monitor their orchards consistently for certain key pests (Bradshaw and Hazelrigg submitted 2018). In 2017, we began a multi-year, integrated monitoring and training program across ten Vermont orchards which is aimed at increasing adoption to better improve IPM practices in the state. *Vermont apple growers understand the need for pollinator protection.* Every fruit they produce is dependent on pollination; over 45% of growers rely solely on would pollinators for that service; all growers surveyed in 2017 reported knowledge of basic pollinator protection measures; 64% reported avoidance of all NNI uses and 100% reported avoidance of uses before bloom; and over 80% reported maintaining pollinator habitat on their farms. This is not an industry that needs further regulation, and the potential for responsible NNI use in orchards and maintenance of pollinator populations has been well-documented (Kennedy, Lonsdorf et al. 2013, Biddinger and Rajotte 2015, Kammerer, Biddinger et al. 2015, Joshi, Otieno et al. 2016, Campbell, Wilby et al. 2017).

Risk Assessment framework

I will begin my testimony by highlighting the need to use sound science and a risk management (RM) approach in making this policy that will affect both producers and consumers across the state. Most regulatory agencies in the world use RM in making decisions, and it is indeed the default system used for virtually all regulatory bodies in the U.S. (Foster, Vecchia et al. 2000). In contrast, the Precautionary Principle (PP) assumes that unknown hazards, regardless of likelihood, should hold greater weight than quantitative analysis of risks and benefits used in a RM approach. PP is the primary means for developing

policy in much of Europe, however, it is often criticized as a mechanism for overstating risks, distorting policy priorities, and justifying protectionist measures (Majone 2002, Starr 2003). Regulatory mechanisms used in the U.S., including in agrichemical testing and registration indeed include PP keys and goals within their systems (Applegate 2000, Stirling 2007). My point in highlighting this difference is to state that RM is a valid, and dominant methodology for developing policy in the U.S., and should not be discounted as inferior to PP when the committee weighs the merits of this bill.

Pesticide regulation in the U.S. is under the authority of the U.S. Environmental Protection Agency (EPA). Federal standards for pesticide regulation are significant, and have evolved under the Fungicide, Insecticide, and Rodenticide Act (FIFRA, 1972), Worker Protection Standard (WPS, 1995, 2015), Food Quality Protection Act (FQPA, 1996), and Pollinator Risk Assessment (PRA, 2012, (EPA 2012)). Under each of those standards, EPA is required to assess pesticides for human, non-target, and ecological harms using a quantitative, risk-based approach. Each iteration of the regulatory process has increased testing standards and reduced tolerances and acceptable uses for materials. NNIs are a key component of this overall system, as they have replaced older, more highly toxic (mammalian and, arguably, insect) organophosphate and organochlorine pesticides. Toxicity and overall environmental assessments of currently used insecticides (prominently including NNIs) compared to older legacy (pre-1990s) materials have shown substantial declines in use rates and non-target species (including human) toxicity (Benbrook 2012, Fernandez-Cornejo, Nehring et al. 2014). That is not to be taken lightly- a shift away from NNIs to older legacy materials will have substantial negative impacts on farmers, farmworkers, and the environment.

In no case during the deliberations of the VT Pollinator Protection Committee (VPPC) were experts with more substantial backgrounds in toxicology, ecological assessment, or pesticide chemistry thasn those used in the Federal registration involved in presented, nor was there any increased availability or scrutiny of data sources made above and beyond those at the federal level. This does not suggest that the members of the VPPC were not experts in their fields or did not expend their best efforts in their capacity, but it is important to recognize the limitations of the committee and its process. We discussed freely available evidence from scientific papers as well as some locally-derived datasets on water quality and pollinator abundance and diversity. We did not enter this process with any higher standard of data than regulatory agencies in other states and the federal government. Ours was a relatively short process, and was less involved than those conducted in other states (e.g., CA, MD, MN, NC). We are operating on no better data than the rest of the similar committees around the country doing the same job. This legislation needs to be considered in that light.

The weight of the evidence presented to the PPC and in my own reviews of the literature does not suggest that NNIs are the sole cause for pollinator decline in Vermont. The consensus among the entomology and apiary communities of the scientific evidence is that there are multiple stressors that impact both managed (primarily honeybee) and native pollinators, including: climate change (shift of flowering times and species distribution); invasive mites and other arthropod pests; diseases, including viruses and other

pathogens that may spread from honeybees to native pollinators; loss of habitat and forage due to changes in land use and climate; and pesticide exposure.

Specific Comments on H.688

§918. Registration

Pesticide registration is a two-tier system. Federal registration is performed by EPA and requires considerable quantitative risk assessment-based testing for multiple indicators of human (acute, chronic, teratogenic, mutagenic, carcinogenic, reproductive), environmental, and ecological health. Few states except possibly California and New York have the capacity to evaluate pesticides at greater levels of precision against clearly-defined RA thresholds. Those thresholds determine allowable crop uses, application methods, use rates, preharvest and worker protection reentry intervals, and resistance mitigation requirements. Federally-licensed pesticides are then licensed for use in each individual state- this mechanism is more regulatory than science-based and is typically used to track pesticide registrants and chemical usage in individual states, as well as to fund programs. States may choose to deny or require more restrictive uses for registration, but typically defer to federal standards.

Under subheading (4), the proposed legislation authorizes the VT Secretary of Agriculture to review primary data prior to making registration decisions. However, despite the bright minds present now and in the future at the VT Agency of Agriculture, Food, and Markets (VAAFM), it is unlikely that they will ever have greater professional expertise than U.S. EPA in making registration decisions. Furthermore, that data is freely available on the U.S. EPA website already.

(b)Registration fees

The fees assessed under (4)(b) seem arbitrary and irreflective of addressing the actual concerns heard by VPPC. The funding formula on lines 1-13, page 7, is unclear, and the distribution of funds does not add up to the total registration amount proposed. The majority of pesticide registration fees appear to be designated to be placed into a fund to compensate beekeepers a Pollinator Damage Conservation Fund. However, the VPPC, in our report to the legislature, identified research and education as primary areas prioritized for funding from revenues generated by legislation.

(f) Restricted use

I support the required designation of NNIs as restricted use products in Vermont.

§930 Pollinator Damage Conservation Fund

This component of the legislation is not clear as to intent to address harms presented to the VPCC, nor are the mechanisms that will be used evaluate damages and award funds clearly stated. As I previously stated, the stressors to bees are many, and assigning responsibility for any particular hive loss to a NNI application is potentially capricious or inexact in many cases. It is normal even in healthy apiaries to have a certain amount of hive loss- how will NNI-attributed losses be determined, and how will they be valued?

I propose that the majority of funds raised be directed toward improved research and education programs, and the standards for dispensation from this fund be clearly outlined.

§1101 (11) Definition: "Pollinator foraging area"

This definition essentially defines all areas with any flowering plant cover as a pollinator foraging area, which will essentially define the vast majority of the state as such. This designation may not be substantial on its own, but coupled with restrictions discussed below would result in a *de facto* ban of NNI uses on most crops in Vermont. Such a move would consist of legislative trickery- if NNIs are to be banned in Vermont (which I do not support), then they should be banned expressly and not by backhanded definitions and restrictions.

§1105b: Retail sales of NNIs

I support this provision of the bill. Requiring users of NNIs top hold valid a pesticide applicators license ensures that users will be held to a regulated standard and will be subject to education requirements.

§1105c: Application of neonicotinoid insecticides

(a) The VPPC discussed the use of NNIs on ornamental plants at length, and suggested a ban on such uses with two important conditions that should be preserved in the final legislation. First is use in protected environments, e.g., screened greenhouses where no foraging pollinators have access. Second is for management of invasive species. The removal of NNIs for management of invasive insect species (e.g., Asian longhorn beetle, emerald ash borer, hemlock wooly adelgid, and brown marmorated stinkbug) will be disastrous to many agricultural and forestry industries in the state. The dangers from those pests are well-known and documented, and cannot be discounted when evaluating the impact of this bill.

(b)The restrictions on applying NNIs within 50 feet of a "pollinator protection area" under §1101 would effectively end applications of NNIs on most agricultural crops in the state. The implications of that would be huge- either massive crop damage or resumption of uses of older chemistries including organophosphates and organochlorines which both have substantially greater human and environmental toxicity. Responsible, IPM-based NNI use and maintenance of managed and unmanaged pollinator populations is supported by the scientific literature (Kennedy, Lonsdorf et al. 2013, Biddinger and Rajotte 2015, Kammerer, Biddinger et al. 2015, Joshi, Otieno et al. 2016, Campbell, Wilby et al. 2017) and was summarized by Dr. David Biddinger, Penn State University, to the VPPC at the 11/6/2016 meeting.

Sec. 7. Treated Article Seeds

The ubiquitous nature of NNI-treated crop seeds and lack of non-treated alternatives for farmers to use, if desired, is a concern to me and was discussed in the VPPC recommendations. The use of prophylactic NNIs on field crops goes against core IPM principles and changes should be made to encourage other practices before wholesale application of NNIs indirectly to soils via treated seeds. Data presented to the VPPC by Nat Shambaugh showed considerable levels of NNIs detected in waterways surrounding treated fields from surveys in Vermont. A recent survey conducted in the Great Lakes region in a similar landscape to the Champlain Valley with similar crop production indicated presence of NNIs in streams running

through agricultural areas (Hladik, Corsi et al. 2018). However, presence at levels detectable using highly precise modern instrumentation and methods does not immediately suggest toxicity, and the levels detected in the Great Lakes region were mostly below EPA-established acute toxicity levels. The presence of NNIs at levels within an order of magnitude of those levels and their year-round presence does raise concerns that methods for acute toxicity may not be appropriate, and the sensitive nature of the aquatic ecosystem with multiple non-target and non-studied species of concern suggest that caution should be applied when faced with this data.

H. 688 section 7 calls for the Secretary of Agriculture to make agronomic recommendations to various state agencies on best practices for managing pests using NNI seeds. This type of information is typically provided by Extension personnel or private consultants, and the bill should be amended to ensure that professional expertise is sought in determining those recommendations. The reasoning given behind the development of the recommendations follows basic IPM principles, which makes sense from a general stewardship standard. It is unclear what the intent of this reporting to state agencies is, and may open farmers up to litigation based on a set of 'approved' recommendations if they are not followed on individual farms. This effectively legislates IPM systems that have typically been under the authority of trained, independent, public scientists. This shift in policy could have wide-ranging ramifications to politicize the scientific and educational process presently implemented by the Agriculture Experiment Station and Extension systems. The bill should be amended to ensure that appropriate scientific expertise is sought and included in making recommendations, and that flexibility is maintained in adapting recommendations to changes in practices as they develop. This bill must also provide some level of funding to University scientists with the Agriculture Experiment Station and/or Extension for their work on this effort.

§1112: Licensing

I agree with the basic provisions for licensing in (a)-(c) of the bill, in fact these appear to be the standards that are presently in-place. The individual farmer reporting requirement under (d) is a new break from traditional policy where individual private pesticide applications are not reported at the farm-level, but records are required to be maintained for three years and offered for inspection if a problem arises. My concern with this provision is that it may create a list of farmers who use particular practices and potentially subject them to harassment or spurious litigation. I understand the treated articles are not considered a pesticide application under present rules, so simply requiring that they be recorded as such by growers and those records subject to the same inspection clauses will serve the same purpose of identifying potential pesticide misapplications. If reporting is desired in order to generate use data, which was identified by VPPC as a missing piece of data, then the records must be taken at the county or other level that would anonymize individual farmer uses.

I agree with section (e) to require education for applicators of NNIs and other pesticides. Funds from the licensing, registration, or another mechanism should be provided to develop and implement those programs.

§650: Seed supply

I agree with the requirement for sellers of treated seeds to offer non-treated versions of the same or equivalent seed. A reasonable time period must be allowed for seed companies to comply with this provision, since many seed treatment activities occur well-before the sale of that product.

Section 11: Integrated Pest and Pollinator Management Program

I strongly support this provision of the bill. Over the past twenty years, Extension funding has been decreasing nationwide, and positions supporting IPM have deceased at every institution, including UVM. For example, Extension IPM for apple and grape growers was eliminated completely in 2011, and I have funded my program from competitive grant funds since then. My program is also a fraction of the size of that even twenty years ago, and I am performing some version of the duties of four predecessors (and not providing the same level of service). Support for other crops has also declined, and every program is facing greater need to self-fund via grants which are short-term, limited in scope, and substantial drains on faculty time and ability to conduct research and deliver programming. The addition of a specific Pollinator Protection Program is welcome, but in the present funding environment, is highly unlikely to happen without substantial state support. Support for such a program must include funding for one new, full-time pollination specialist, some funding for coordination with other existing programs, and a commitment to support IP(P)M programming by the state for the foreseeable future.

It is critical that the House Committee on Agriculture and Forestry get this legislation right to ensure the goals of protecting pollinators while preserving a working landscape in Vermont. The implications from well-intentioned but scientifically inappropriate regulations are many, and I thank the committee for considering this testimony in crafting the best pollinator protection bill possible at this time.

Sincerely,

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