

# Vermont's Pollinator Protection Committee

REPORT TO THE VERMONT LEGISLATURE  
AS REQUIRED BY ACT 83 OF 2016 SESSION

| February 2017 |

## Committee Members

Katie Ballard - Ballard Acres Farm, Georgia, VT and Director of Research at W.H. Miner Institute

Eric Boire - Crop Production Services, Addison, Vermont and President of Vermont Tree Fruit Growers Association

Terry Bradshaw - Tree Fruit and Viticulture Specialist, University of Vermont, **Chair of the Pollinator Protection Committee**

Chris Conant - Claussen's Greenhouses, Colchester, Vermont

Ross Conrad - Dancing Bee Gardens, Middlebury, VT. Member of Vermont & Addison County Beekeepers Associations and a regular contributor to Bee Culture.

Cary Giguere - Agrichemical Program Manager and Chair of State FIFRA Issues Research and Evaluation Group (SFIREG)

John Hayden - The Farm Between, Jeffersonville VT

Mike Palmer - French Hill Apiaries, St. Albans, VT. Member of the Vermont Beekeepers Association.

Leif Richardson - Research fellow, Gund Institute, University of Vermont and research associate with the Vermont Center for Ecostudies

Jane Sorensen - River Berry Farm, Fairfax, Vermont. Also owns Northeast Pollinator Plants

*\*listed in alphabetical order*

## Foreword

During the 2016 session, the Vermont legislature approved House bill 539 forming a Pollinator Protection Committee. On May 4<sup>th</sup>, 2016 the Governor signed Act 83 into law, thereby enacting the Committee as described in House bill 539.

Act 83 tasked this Committee with 8 separate charges. Those charges, as well as the recommendations, of the Committee are provided in the following report. The contents of this report is based on technical documents, expert opinions of Committee members, and experts from whom the Committee took testimony. This report is not intended to provide a comprehensive literature review, but rather represent the Committee's findings and recommendations to strengthen Vermont's efforts to preserve and improve pollinator health.

Most states that are working on pollinator protection planning focus solely on managed honey bees. Vermont's Committee members, however, felt it important to acknowledge the significance and distinction of native pollinators in our state. Where possible in the recommendations and assessments, honey bees and native pollinators are identified.

In the timeframe allotted, the Committee was unable to complete the final charge of the legislation, the drafting of a State Pollinator Protection Plan. The Agency of Agriculture has identified that the Agency could serve as a writer of the plan, but would use the Committee member's expertise and stakeholder groups to develop and finalize the plan in the coming year.

The Committee would like to thank the numerous parties that participated in the meetings: invited speakers, stakeholders and members of the public. Their time, efforts, and input was greatly appreciated. The Agency of Agriculture, Food & Markets would also like to thank the Agency of Transportation and the Agency of Natural Resources for their participation and assistance.

## Table of Contents

Committee Members .....	ii
Foreword.....	iii
Meeting Schedule.....	1
Development of Recommendations & Voting Categories.....	2
Key Themes.....	3
Recommendations ( <i>by category</i> ).....	5
<b>Consensus</b> .....	5
<b>General Agreement</b> .....	10
<b>Split Opinion – Favorable</b> .....	10
<b>Split Opinion – Unfavorable</b> .....	10
Appendix A- Act 83 .....	A-1
Appendix B- Status of pollinators in Vermont .....	B-1
Appendix C- Meeting minutes with recommendations, as voted .....	C-1

## Meeting Schedule

The committee held five (5) of meetings. Below are dates and speakers.

- **September 15, 2016 –Statehouse Montpelier, Vermont**
  - Cary Giguere, Agrichemical Program Manager, Agency of Agriculture, Food & Markets
  - Dr. Leif Richardson, Research Fellow, Gund Institute for Ecological Economics
  - David Tremblay, State Apiculturist, Agency of Agriculture, Food & Markets.
  - Jeff Comstock, Soils Scientist, Agency of Agriculture, Food & Markets
- **October 12, 2016 –Statehouse Montpelier, Vermont**
  - Samantha Alger & Alex Burnham, Graduate students, University of Vermont
- **November 9, 2016 –Capitol Plaza Hotel Montpelier, Vermont**
  - Dr. Leif Richardson, Research Fellow, Gund Institute for Ecological Economics
  - Dr. Sid Bosworth, Agronomist, University of Vermont Extension
  - Dr. David Biddinger, Tree Fruit Specialist, Pennsylvania State University
  - Katie Ballard, Director of Research at Miner Institute and Ballard Acres Farm
  - Chris Conant, Owner of Claussen’s Greenhouse
  - Kevin Komer, Vermont Golf Course Superintendent’s Association
- **December 7, 2016 –Statehouse Montpelier, Vermont**
  - Toby Alexander, State Biologist, Vermont Natural Resources Conservation Service
  - Mike Kiernan, Owner, Bee the Change
  - Jarod Wilcox, Vegetation Manager, Green Mountain Power
- **February 2, 2017 – Dewey Building Montpelier, Vermont**
  - Alysha Kane & Jenn Callahan, VTrans
  - Maree Gaetani & Lily Myers, Vermont Community Garden Network
  - Linda McGinnis, Interim Director, Energy Action Network

All meetings were open to the public, meeting agendas and minutes were made available on the [Agency of Agriculture, Food & Markets web page](#). Also, all meetings were listed on the [Vermont Department of Libraries calendar page](#) and an electronic mail distribution list was maintained for those that requested direct notifications. Public comment was received by the Committee, both verbal and written. Written comments were posted on the Agency’s web site and provided to Committee members.

## Development of Recommendations & Voting Categories

Individual committee members submitted recommendations for consideration. The Committee also developed several through discussion at meetings and as a result of public input.

Any recommendation that had the support of at least two members is recognized in this report. The categories that had been used by the Oregon Pollinator Protection Committee were generally adopted for this Committee and described below.

Committee members voted in one of three ways: “for”, “opposed” or “abstain” for a proposed recommendation. A supporting vote was “for”; abstained or opposed did not count as votes in support.

### *Recommendation categories*

**Consensus:** recommendations received strong support from all

**General agreement:** recommendations received support from at least five members and no significant opposition.

**Split opinion (favorable):** recommendations were supported by 5 or more members and opposed by at least two members.

**Split opinion (not favorable):** recommendation supported by at least 2 to 4 members, but does not reach 5 votes of support.

### *Notes about votes*

Almost all recommendations of this Committee were voted by consensus or general agreement.

Many of the recommendations pertain to the Vermont Agency of Agriculture, Food & Markets’ pesticide regulations, as well as policies within the pesticide regulatory program. As the Agency is about to undergo an update of these regulations, the Agency will accept these recommendations as comments to its rule-making, where appropriate.

Recommendations that do not require rule-making will be used by the Agency to update its educational criteria. All recommendations are provided to the Legislature for their review, as required by Act 83.

A single recommendation pertained exclusively to beekeepers and their use of in-hive miticides. The Committee sought input from the Vermont Beekeeper’s Association and voted on that recommendation only after receiving the Association’s input.

As a result of a health emergency, one Committee member could not attend the final meeting and was unable to vote on several key recommendations. The remaining nine members of the Committee requested he be able to vote on the recommendations. This was not possible; in lieu the Committee member provided written comments. A synopsis

of those comments are provided at the end of the recommendations. Full votes are provided in the Appendices of this document.

For the purposes of these recommendations the term “highly toxic to bees” was defined by the Committee as those active ingredients classified as EPA Toxicity Category I, highly toxic to bees, and any other active ingredient that is so designated by the state regulatory agency and/or the Vermont Pesticide Advisory Council (VPAC).

## Key Themes

Upon meeting, the Committee identified that Vermont is already positioned ahead of many other states, in terms of pollinator health, having more research on native pollinators, more stringent pesticide regulations and policies and having far less monoculture in its agricultural portfolio. These were noted as positives, however the Committee members agreed that there was room to improve pollinator health and therefore developed Vermont-specific recommendations related to the charges of Act 83.

Key issues identified by Committee members were Varroa mites in managed honey bee hives, the loss of pollinator habitat and the potential for spillover of disease and pest pressures from managed honey bees hives to native and managed pollinators, whether a result of improper honey bee management or importation of other types of bees. Also of concern was the exposure of pollinators to pesticides, especially those that are highly toxic to bees. Thus, the recommendations address these themes.

### *Key themes from the Committee*

- Native pollinators are vital to Vermont’s agricultural systems, thus providing healthy habitats for managed and native pollinators should be considered wherever possible (rural, suburban, urban landscapes). The Natural Resources Conservation Services addresses this through some of their work, but other land managers and the public can provide additional habitat in Vermont.
- Improving and maintaining healthy populations of managed honey bees can protect native bees. This requires
  - providing proper education for beekeepers,
  - protecting honey bees from diseases, pests and other unfavorable traits that enter Vermont, and
  - limiting or eliminating exposures of pollinators to pesticides, especially those that are highly toxic to bees, or those that may have synergistic effects, such as when used in combination with other pesticides (certain fungicides).
- State lands can be used as a valuable resource to protect pollinators.
- Education and outreach about pollinator health are essential, not only to key stakeholders (pesticide applicators & sellers, organic and conventional farmers, local,

state and federal government land managers), but also to homeowners and the general public.

- Gaps exist in Vermont-specific data as related to pesticide usage (including miticides), pathogen and pest loads in Vermont pollinators, and economic thresholds of pests and pesticide use, especially related to treated corn and soybean seeds in Vermont's dairy systems. State-specific research and tracking should be enhanced.
- Funding should be earmarked for pollinator programs that would incentivize pollinator-friendly practices on farms and protect farmers from incurring any related economic loss.

## Recommendations *(by category)*

### CONSENSUS

#### *Education criteria & additional topics for pesticide applicators*

All pesticide applicators that are testing for certification in Vermont should receive specific educational materials related to pollinator health and impacts of pesticides on pollinators. These materials would be included with the CORE manual required for study for all certifications.

The Agency of Agriculture, Food & Markets should ensure that all CORE and private exams have appropriate questions about pollinator protection.

For applicators seeking commercial, non-commercial or government applicator certification in categories 1A-Agricultural Plant, 1B-Agricultural Animal, 2-Forest Pest, 3A-Ornamental & Shade Trees, 3B-Turf, 6-Right-of-way, 7A-Structural & Rodent Control, 7B-Mosquito & Biting Fly industry-specific educational materials with pollinator health & pesticides best management practices should be included in study materials.

The Agency of Agriculture, Food & Markets should ensure that all category-specific exams listed above have appropriate questions about pollinator protection and related best management practices for that industry.

The Agency of Agriculture, Food & Markets and the University of Vermont Extension should increase awareness of the potential synergistic effects of neonicotinoid pesticides and certain demethylating pesticides and promote strategies and practices to reduce potential impacts.

The Agency of Agriculture, Food & Markets should increase awareness of non-target impacts of the use of *Bti* products in mosquito control on other pollinating fly species.

The Agency of Agriculture, Food & Markets should increase awareness of non-target impacts (beneficial moths, butterflies) of the products used to control gypsy moth and agricultural moth/butterfly pests.

All pesticide dealers that are testing for licensure in Vermont should receive specific educational materials related to pollinator health and impacts of pesticides on pollinators. These materials would be included with the dealer manual required for study.

The Agency of Agriculture, Food & Markets should create a standard educational curriculum for bee keepers in the state. The curriculum would address pesticide use in the hives as well as the other pillars of pollinator health and best management practices. (This could be a certification program)

The Agency of Agriculture, Food & Markets should create a specific pesticide applicator category and certification process for applicators that wish to treat in managed honey bee hives that they do not own. (“Commercial application of hives.”)

Incorporate pollinator protection into the Agency of Agriculture, Food & Markets policy for credits/certification education units (CEUs) approval.

The Agency of Agriculture, Food & Markets should require specific pollinator-related certification education units (CEUs) for recertification.

The Agency of Agriculture, Food & Markets, the University of Vermont and the Agency of Natural Resources should provide more targeted trainings on pollinator protection, making it available for certification education units (CEUs) for recertification.

Include periodic educational articles about pollinator health research in the pesticide applicator newsletter distributed by the University of Vermont Extension and the Agency of Agriculture, Food & Markets to all certified applicators in the Vermont.

#### *Changes to the State pesticide regulations*

Vermont Regulations for the Control of Pesticides should specify: Apply pesticides that are highly toxic to bees when there is less chance for exposure to managed or native pollinators: early morning or late evening.

Vermont Regulations for the Control of Pesticides should specify: Applications of pesticides that are highly toxic to bees shall provide buffers to native pollinators. This should be accomplished by either: A fifty (50) foot buffer from pollinator foraging sites, such as natural and semi-natural areas or intentional pollinator plantings OR A twenty (20) foot width non-pollinator-attractive vegetative barrier higher than the spray release height with an established 60% plant density

Vermont Regulations for the Control of Pesticides should specify: Reduce drift by applying pesticides when winds are less than 9 mph and there is a low risk of inversion.

Vermont Regulations for the Control of Pesticides should specify: Avoid application of fungicides to plants attractive to pollinators when plants are in bloom.

Vermont Regulations for the Control of Pesticides should specify: Avoid the use of soil fumigants.

The Agency of Agriculture, Food & Markets should revise the Regulations for the Control of Pesticides, specifically identifying managed and native pollinators and their habitat as an environmental concern in the regulations and permit language.

### Data gaps & statewide goals

The Agency of Agriculture, Food & Markets should put in place a robust program to track the amount of pesticides being released within the state on a yearly basis (as many types and uses as possible, including treated articles) to assess if the amount released in Vermont's environment is growing, declining or remaining static.

Develop a state-wide goal of reducing the amount of pesticides that are highly toxic to bees that are released into the environment within the state each year. Success to be evaluated by monitoring of yearly use (see above item)

Develop a state-wide goal of reducing the amount of pesticides and their breakdown products that are found in bee hives (pollen, comb, honey etc).

Vermont should institute a statewide program of Integrated Pest and Pollinator Management (IPPM) through UVM Extension to gather and disseminate information on ways for producers across all agricultural sectors to limit wherever feasible, toxic pesticide use that may harm pollinators: The program should include efficiency (using only the amount needed to get the job done), conservation (not treating unless there is a verified problem), the prioritization of chemicals that have lower toxicity and/or lower persistence when it comes to pollinator health, and consider using non-toxic/non-chemical alternatives to pesticides whenever feasible.

The Agency of Agriculture Food & Markets should track all pesticide use and set goals for pesticide reduction.

The Agency of Agriculture Food & Markets should work with the UVM Extension program to set specific IPM thresholds before use of pesticides, identify less toxic options for farmers, and reduce overall use of pesticides.

### Neonicotinoid products

A statewide moratorium on applications to ornamental plants accessible to pollinators with neonicotinoid products, applied by soil drench, trunk injection, foliar and basal bark sprays, for three years or until such time research can demonstrate rates at which treatment can be safe for pollinators. Research and management and treatment of invasive species would be exempted. Specifics could include:

- A moratorium on trunk injection of imidacloprid for ornamental plants on plants attracted to pollinators;
- A moratorium on soil drenches of imidacloprid for ornamental plants;
- A moratorium on foliar applications of imidacloprid and dinotefuran on ornamental plants attractive to pollinators;
- A moratorium of foliar applications of clothianidin on turf unless mowing regiment can assure no exposure of flowers attractive to pollinators in the turf for one year past treatment;

- A moratorium on basal bark sprays of dinotefuran for ornamental plants attractive to pollinators.

The Agency of Agriculture, Food & Markets and University of Vermont researchers, or similar research groups, should track neonicotinoid treated-seeds planted in fields and study whether there is a correlation to pollinator decline, or other non-target population impacts.

The Agency of Agriculture, Food & Markets should look into Best Management Practices (BMPs) for planters of treated articles.

### *State land management & state outreach*

The Agency of Natural Resources, the Agency of Agriculture, Food & Markets, the Agency of Transportation should identify, evaluate, and support state land management practices in Vermont that promote pollinator habitat. These efforts should be coordinated with federal land agencies.

The Agency of Natural Resources, the Agency of Agriculture, Food & Markets, the Agency of Transportation should evaluate the impacts of terrestrial invasive plants as pollinator habitat and forage in state planning.

The Agency of Natural Resources should identify native pollinators most likely to be impacted by extreme weather/climate change and focus state efforts to conserve and improve their habitat in Vermont's long-term planning.

As extreme weather events disrupt and impact pollinators, local actions by Vermonters to limit climate change would improve opportunities for pollinator health. State outreach materials around climate change should reflect this impact.

The Agency of Natural Resources should follow the following recommendations in land use and planning:

- Land Use Management- Include pollinator habitat management in annual activities on Vermont Fish & Wildlife Department lands;
- Habitat Improvement-Work toward creating and improving habitat for a wide variety of animals important for pollination of native plants;
- Long-range wildlife management area (WMA) planning- Include pollinator habitat improvement and maintenance in long-range planning for Wildlife Management Areas around the state;
- Public relations- Encourage public recognition of the valuable ecological and economic services that pollinating animals provide.

### *Agricultural Practices & Incentives*

The Agency of Natural Resources, the Natural Resources Conservation Service (NRCS), the UVM Extension Service and the Agency of Agriculture, Food & Markets should promote establishment, enhancement, management pollinator habitats, in the buffers required by Act 64.

The Agency of Agriculture, Food & Markets and the Natural Resources Conservation Service (NRCS) should recognize and provide financial incentives and technical support for farmers who promote pollinator habitat on farms.

Research on agricultural practices that may be potentially destructive to pollinator habitat (e.g., hedgerow removal, tilling) and development of educational programs based on that research to limit impact to pollinator habitat should be promoted.

The Agency of Agriculture, Food & Markets should assess and promote the value of native pollinators in Vermont agriculture, reducing the need to import bees with unfavorable traits; this will benefit both honey bees and native pollinators.

The Agency of Agriculture, Food & Markets should provide financial allocations (grants, positions) to research institutions or beekeepers to develop and maintain Vermont honey bee genetics, as well as promote the benefits of Vermont-grown bees.

### *Beekeeper education & pest/pathogen reduction*

The University of Vermont should create a dedicated Pollinator Extension position to address data gaps in both native and managed pollinators in Vermont. This position should also serve as a resource to beekeepers and other stakeholders in the state (e.g., nurseries).

Educational curricula for beekeepers should be designed by UVM Extension, or other university researchers, and the Agency of Agriculture, Food & Markets and include identification of diseases, non-chemical management strategies of pests and pathogens, proper use of chemicals and thresholds, other good management practices that incorporate the 5 pillars of health, and the potential impacts of poor management on honey and native bees.

The Agency of Agriculture, Food & Markets and the UVM Extension Service should allocate increased resources to track and improve Vermont's pollinator pathogen and pest data.

Increased resources should be allocated to the Vermont Agency of Agriculture, Food & Markets to ensure compliance with current state apiary laws, including hive registration and inspections.

The Agency of Agriculture, Food & Markets should have expanded regulatory authority over honeybee or other bee imports.

The Vermont Agricultural and Environmental Laboratory should expand its analytical testing to all pesticides and breakdown products that research has previously identified in bee hives (over 170 compounds) in honey or native bees, brood, comb, pollen, or honey.

The Agency of Agriculture, Food & Markets should survey the use of in-hive miticides by beekeepers during annual apiary registration. Identify areas for reduction or education.

### **GENERAL AGREEMENT**

Pesticides used in Vermont should be based on need, not used prophylactically.

The Agency of Agriculture, Food & Markets should classify all pesticides with active ingredients that are highly toxic to bees restricted use products (Vermont Class A).

Vermont Agency of Agriculture, Food & Markets should not renew the special registration of coumaphos (Checkmite+) for the in-hive control of Varroa mites by beekeepers within the state of Vermont.

The Vermont Agency of Agriculture should explore creation of a POLLINATOR PROTECTION FUND and identify funding mechanisms that supports work to protect pollinator health and that do not have a negative impact to farmers in Vermont.

### **SPLIT OPINION – FAVORABLE**

The Agency of Agriculture, Food & Markets should classify all pesticides that contain neonicotinoid active ingredients as restricted use products (Vermont Class A). Exempt veterinary products, but we recommend research on the effects of these products on pollinators.

The Agency of Agriculture, Food & Markets will use its regulatory authority of treated articles to develop best management practices (BMPs) on planting neonicotinoid treated corn/soybean seed starting as soon as possible. They will not be permitted unless a quantifiable demonstrated need can be identified by scouting techniques.

### **SPLIT OPINION – UNFAVORABLE**

The Agency of Agriculture, Food & Markets should prohibit the application of systemic pesticides that are highly toxic to bees to accessible pollinator attractive plants until after flowering. Exemptions for research with demonstrated limited risk and for the management of invasive species when effective alternatives are unavailable.

-----

The Committee member who was unable to attend final meeting, has provided written comments. His comments were consistent with the recommendations in the categories above. His specific comments are provided at the end meeting minutes from February 2, 2017 in this document.

## Appendix A-Act 83

**No. 83. An act relating to establishment of a Pollinator Protection Committee.**

(H.539)

It is hereby enacted by the General Assembly of the State of Vermont:

Sec. 1. POLLINATOR PROTECTION COMMITTEE; REPORT

(a) Definition. As used in this section, “pollinator” means bees, birds, bats, and other insects or wildlife that pollinate flowering plants.

(b) Creation. There is created a Pollinator Protection Committee to:

(1) evaluate the causes and occurrences of reduced pollinator populations in the State; and

(2) recommend measures the State can adopt to conserve and protect pollinator populations.

(c) Membership. The Pollinator Protection Committee shall be composed of the following ten members:

(1) the Secretary of Agriculture, Food and Markets or designee;

(2) a person who is a beekeeper, appointed by the Governor;

(3) a dairy farmer, appointed by the Governor;

(4) a person representing a not-for-profit organization advocating the protection of pollinators, appointed by the Governor;

(5) a person who is a beekeeper, appointed by the Speaker of the House;

(6) a person who is a university employee with expertise in the protection of pollinators, appointed by the Speaker of the House;

(7) a tree fruit farmer, appointed by the Speaker of the House;

(8) a vegetable farmer, appointed by the Committee on Committees;

(9) a person licensed or certified to sell or apply pesticides, herbicides, or other economic poisons in the State, appointed by the Committee on Committees; and

(10) a person who owns or operates a greenhouse or plant nursery, appointed by the Committee on Committees.

(d) Powers and duties. The Pollinator Protection Committee shall:

(1) Evaluate the status in Vermont of the U.S. Department of Agriculture's five pillars of pollinator health. The five pillars of pollinator health are: pollinator biology; nutrition and habitat; pathogens and pests; pesticide use; and genetics and breeding.

(2) Evaluate the effectiveness of pesticide applicator licensing and other pesticide requirements in the State in protecting pollinator health.

(3) Evaluate other state or international pesticide regulations that are more protective of pollinator health than the pesticide regulations of Vermont or the U.S. Environmental Protection Agency.

(4) Study available education and outreach plans from other states that have been successful in increasing public awareness of pollinator health issues.

(5) Evaluate best management practices for application of neonicotinoid pesticides in a manner that avoids harm to pollinators.

(6) Identify possible sources of funds for use in the protection of pollinator health.

(7) Consider the requirements in 2015 Acts and Resolves No. 64 (State Clean Water Act) regarding buffers along State waters and whether and how areas in buffers or other areas that require perennial vegetation should be encouraged for use as pollinator forage zones or pollinator growing areas.

(8) Develop a State pollinator protection plan using the framework and critical elements from the Association of American Pesticide Control Officials Pollinator Protection Plan guidance.

(e) Assistance. The Pollinator Protection Committee shall have the administrative, technical, and legal assistance of the Agency of Agriculture, Food and Markets. Upon request of the Committee, the Department of Health, the State Toxicologist, the Agency of Natural Resources, the Agency of Transportation, the University of Vermont Extension, or the Department of Forests, Parks and Recreation shall provide technical or professional services related to performance of the powers and duties of the Committee. The Committee may request input or assistance from other stakeholders or organizations that have an interest in pollinator health or the use and regulation of pesticides in the State.

(f) Report. On or before December 15, 2016, the Pollinator Protection Committee shall submit a written report to the House Committees on Fish, Wildlife and Water Resources and on Agriculture and Forest Products and the Senate Committees on Natural Resources and Energy and on Agriculture with its findings and any recommendations for legislative action.

(g) Meetings.

(1) The Secretary of Agriculture, Food and Markets shall call the first meeting of the Committee to occur on or before September 1, 2016.

(2) The Committee shall select a chair from among its members at the first meeting.

(3) A majority of the membership shall constitute a quorum.

(4) The Committee shall cease to exist on February 15, 2017.

(h) Reimbursement. Members of the Pollinator Protection Committee shall not be entitled to compensation or reimbursement of expenses for participation in the Committee.

Sec. 2. EFFECTIVE DATE

This act shall take effect on passage.

Date Governor signed bill: May 4, 2016

## Appendix B- Status of pollinators in Vermont

*Evaluate the status in Vermont of the U.S. Department of Agriculture's five pillars of pollinator health. The five pillars of pollinator health are: pollinator biology; nutrition and habitat; pathogens and pests; pesticide use; and genetics and breeding.*

### *Vermont's pollinators & agricultural need for pollination*

Pollinators are diverse and complex animals, therefore assessing their health status requires a diverse and multifaceted evaluation. Pollinators in Vermont are generally divided into two categories, native pollinators and managed honey bees. The pillars of health and current status of these are described separately below.

### *Vermont native pollinators overview*

It is estimated that globally 88% of flowering plants are pollinated by animals, and about 10% of the total value of agriculture is due to pollination by animals, usually insects. This is important because plants are one of the pillars of healthy ecosystems. For example, hardwood forests in Vermont are dependent on the abundance and diversity of woody plants, including canopy trees, for their structure, and loss of tree species diversity can lead to reduced ecosystem service provision by forests. Pollination also contributes directly to the Vermont economy, as many of our most lucrative crops, among them apples, blueberry, tomato, and pumpkin, are dependent on insect pollinators for reproduction. Recent declines of some pollinator species raise the question of how Vermont's landscapes, farms, and economy might change with loss of this important ecosystem function. To address this question, it is important to consider which animals are pollinators, what are the threats to their persistence, and what is the evidence in Vermont and beyond for changes in their abundance.

For more than three centuries, the European honey bee has been managed in Vermont apiaries to produce honey and other products, as well as to pollinate crops. Increased threats to honey bees, including exposure to pesticides, migratory beekeeping, habitat loss, nutritional challenges, and parasitic mites and the viral diseases they transmit, have increased pollination costs for Vermont farmers, and raised concerns about agricultural sustainability. However, many types of native (wild) insects are also pollinators of our crops. In Vermont, the most important of these insects are bees, but other groups are also important pollinators, including flies, butterflies, moths, and beetles. In some cases, these insects are actually more efficient pollinators than honey bees. Moreover, recent research demonstrates that for many agricultural crops around the world, including some grown in Vermont, native insect species can be more important to yield than honey bees. While honey bees will remain an important component of Vermont's pollinator portfolio, it is important to assess the ecosystem service of pollination by native insects.

### *Native bees overview*

Bees are the most functionally important group of pollinators, there are greater than 20,000 species known worldwide. Around 4,000 of these are found in the US, with about

275 bee species reported for Vermont. These include familiar species such as bumble bees, but also many other types, including mason, mining, sweat, and plasterer bees. Some native species live in social groups with caste divisions, like honey bees, but many are solitary, with mated females laying eggs in nests without contact with other adult bees. Bees are dependent on flowering plants as virtually all of them use plant pollen as the only protein source for rearing their offspring. Many bees also eat other floral products, especially nectar. Bees have special adaptations for harvesting and carrying nectar and pollen, many of which increase the likelihood that flowers are pollinated when visited by bees. Many bees are generalists, meaning they collect pollen from a variety of plants, but about 20% of Vermont species are specialized to only use the pollen of one or a few types of plants. This specialization often means bees are better pollinators of the plants they visit, but it also places them at increased risk, given their dependence on these plants which may become rare.

A high abundance and diversity of native bee species may visit crop plants. For example, recent UVM research has shown that Vermont blueberry farms typically have greater than 40 species of bees that pollinate their crop, and together, about 90 species are known from blueberry in the state. While each bee species is far less abundant than the managed honey bees that are also commonly deployed for blueberry pollination, some native species are much more effective pollinators of blueberry, depositing up to four times as much pollen in each visit as honey bees do. This may be because honey bees usually collect only nectar at these flowers, while natives also collect pollen, or it could be due to differences in foraging behavior. For some crops, the monetary value of wild bee pollination has been assessed.

It is remarkable that farms receive such a large economic benefit in the form of bee pollination from nature, when they are not typically managed for pollinator habitat. However, some bee declines have been attributed to loss of habitat, so management of land on and around farms is important. For example, the Vermont blueberry study showed that farms with organic practices had higher bee visit frequencies than those with conventional practices, suggesting that exposure to conventional pesticides can harm native bees that visit farms. In addition, those researchers showed that pollination service by native bees was positively related to the proportion of natural cover types in the surrounding landscape, probably because bees need nesting, overwintering, and other habitats in the vicinity of the farms they visit. These results have been replicated with a variety of other crops outside of Vermont, and recent research indicates that farmers can increase the value of native bee pollination by adding buffer strips of flowering plants, retaining hedgerows between fields, and avoiding fragmentation of intact forest and other habitats around farms.

Like honey bees, native species face a variety of threats, and some species have been reported to be in decline, raising concern that both wild and cultivated plants will suffer

reduced pollination and fruit set. On multiple continents, there are documented strong declines of one of the most important classes of bee pollinators, bumble bees. In Vermont, a recent survey found that of 18 species historically documented, 44% had disappeared or become rare (5 species extirpated; 3 that declined). Some of the remaining species have filled the ecological niche left open by declining species and increased in abundance, but for others, the pattern was unclear. Beyond bumble bees, there is evidence that a few other species are declining, and that others remain common; however, for the vast majority of Vermont's 275 species, there is no information.

#### *Native butterflies and moths overview*

Most butterflies and moths feed on plants as larvae, where they may become serious agricultural pests. One example is the cabbage white butterfly, a very common pest of broccoli and other cole crops in Vermont. But many species of butterfly and moth sustain themselves with floral nectar as adults, and some are important pollinators in Vermont. Research has demonstrated that butterflies are pollinators of apple, cherry and sunflower crops. And moths are pollinators of some native plants, including lowbush blueberry. Vermont's butterfly diversity was assessed by the Vermont Center for Ecostudies in 2002-2007. The citizen science survey found approximately 100 native species of butterfly, and over 2000 native species of moths. It is difficult to estimate exactly how many of these may be pollinators as adults, and the overall abundance of these species is also unknown at this time.

Vermont's milkweeds are host plants to the northernmost migratory generation of monarch butterflies. The monarch caterpillars feed only on milkweed, while the adults gather nectar from a variety of flowers. The adults that develop in Vermont are the generation that migrate in the fall to the mountains of Central Mexico. They overwinter there, mate, and start the first generation on the early spring journey north. It takes three or four generations before the monarchs reach Vermont. Monarch populations are in serious decline throughout their range.

#### *Native flies overview*

Flies are a highly diverse insect Order, many of which feed on nectar and pollen as adults. Common examples of these insects are flower flies, bee flies, and tachinid flies. Flies are reported to be pollinators of a number of Vermont crops, including apple and strawberry. There is also evidence that some native plants rely on flies for pollination, but there is very little known about the taxonomic diversity and status of fly pollinators in Vermont. One study reported that globally, greater than 50 Families of flies have been identified as pollinators, and more than 15,000 species of flies in these families are found in the US. Not all of these insects are flower feeders, and not all occur in Vermont, but a conservative estimate suggests that there may be hundreds or thousands that pollinate in Vermont.

### *Declines in native bees*

Declines in native bees is usually associated with some combination of four threats: pesticide exposure, habitat loss, parasites and pathogens, and climate change. There is ample evidence that pesticides kill bees. This may be true when insecticides are applied foliarly (for example, in a recent bee kill in South Carolina, when an insecticide was aerially applied to control mosquitoes), and particularly when systemic insecticides such as neonicotinoids are applied to seeds or soil, rendering the plants toxic to chewing insects. A large body of evidence demonstrates that neonicotinoid insecticides present a major risk to bee pollinators, imposing direct mortality at very low doses, but also sub-lethal effects that render bees less able to forage, pollinate, and reproduce. Recent evidence shows that bees may also be endangered by some fungicides and herbicides, chemicals not usually thought of as dangerous to insects. In addition, certain mixtures of chemical compounds, whether combined intentionally in ‘tank mixes’ or accidentally through sequential application, have synergistic negative effects on bees, rendering them much more toxic than each is alone. Of particular concern in this respect are combinations of neonicotinoid insecticides and demethylation inhibitor (‘DMI’) fungicides. One challenge for understanding pesticide risks to native bees is that most toxicity testing is conducted on honey bees, and other bee species may have different responses. This can be due to differences in body size, life span, foraging behavior, sociality, and many other factors. There is a lot of information about the dangers of pesticides to honey bees, but little is known about the impacts on native bees in Vermont.

Bees require habitat for foraging, nesting, and overwintering. Forage plants are found in a variety of habitats, including both natural communities like forests and human-maintained habitats like old fields. Bees typically nest in cavities in soil and wood, either pre-existing or those excavated by the bees themselves. Overwintering may take place in nesting substrate and other similar locations. Many studies have shown that bee habitat quality declines with increasing urbanization, development, and fragmentation. For example, the Vermont Bumble Bee Survey found that certain declining species were rarely collected around human development, but were still moderately common in more intact habitats. As Vermont’s human population continues to increase, these negative impacts to bee pollinators are likely to increase.

For some declining bee species, there is evidence that parasites are one cause. These may include parasites with which the bees have a long history of coexistence, such as *Nosema bombi*, a parasite of North American bumble bees that may have contributed to the decline of many species. It may also include new pathogens and parasites spread by human transportation of commercial bumble bee colonies. In Chile and Argentina, the introduction of a European bumble bee species for pollination of berry crops led to accidental exposure of native species to a host of Old World bee diseases, and rapid collapse of native bee populations. There is limited evidence that this phenomenon is

occurring in Vermont. The National Honey Bee Survey has collected data on honey bee and bumble bee disease around the state for two years, and reports that native bees living near apiaries have higher viral loads than those farther from honey bees. The devastating effects of parasites and other disease agents on bees suggests that to achieve sustainable pollination in Vermont, increased surveillance for bee diseases in both managed and native bee populations may be necessary.

One additional threat to native bee persistence is competition with honey bees for resources. Individual honey bee colonies consist of thousands of worker caste bees, each of which may fly as far as 10 kilometers to collect nectar and pollen. It is estimated that in one season a single colony collects enough pollen to feed more than 100,000 solitary bee offspring. It is clear that beekeeping, while good for honey bees, can have strong impacts on landscape-level nectar and pollen availability for native species. Moreover, evidence is mounting that honey bee viruses and other pathogens are spreading to native bees through shared use of flowers. These diseases can have negative effects on their new hosts, such as bumble bees, who may also act as reservoirs for re-infection of clean honey bee hives in successive years. The nexus of honey bee and native bee interaction at flowers is an active area of research in Vermont and elsewhere, and additional funding will be necessary to understand these patterns.

#### *Other native pollinators status*

Flies have been monitored in other temperate areas, such as northern Europe, where there is evidence that flower-visiting species are declining. Studies have also shown that fly phenology is changing in response to climate change, and this could lead to mismatches in timing of flower and fly pollinator occurrence. Researchers also believe that fly pollinators are declining due to a combination of land use change and climate change. There is also evidence that pesticides can harm fly pollinators, especially those that feed at crop flowers. In addition, there are reports that neonicotinoid insecticides can repel flies from visiting flowers, which could reduce crop pollination by these insects.

A possible further threat to fly pollinators in Vermont is the large-scale application of *Bacillus thuringiensis* var. *israeliensis* ('Bt' or 'Bti') to control mosquitoes in western Vermont's mosquito control districts. This strain of *Bt* is harmless to vertebrates and many other insect groups, but highly toxic to flies, yet there is no monitoring of the effects of these applications on fly pollinators. Research in other areas has shown that some non-target organisms are affected by the spraying. Because mosquito control is likely to continue in Vermont, efforts should be made to assess what effect this has on these beneficial insects.

Pesticides are also documented as threats to butterfly pollinators. Because butterflies rely on plants as larval foods and also commonly as adult nectar sources, they may be especially prone to harm from pesticides. For example, at concentrations below those usually found in field situations, the neonicotinoid clothianidin has negative effects on

monarch butterfly larvae, causing developmental problems and increasing likelihood of mortality. Monarch butterflies are restricted to one type of host plant which commonly occur in open fields around agriculture, milkweed, so some scientists have proposed that the intensification of commodity crop production and use of neonicotinoids is partly to blame for the rapid declines in this species.

#### *Vermont honey bees overview*

Vermont has approximately one dozen commercial beekeeping operations along with two dozen more 'sideline' operations. Sideline beekeepers derive some sales income from the operation, but is not a full-time enterprise. There is no data on what proportion of managed hives these commercial enterprises represent. Most of these commercial beekeeping operations are located in the Champlain Valley. Commercial hives are generally co-located on dairy farms. These beekeepers produce not only honey, but many other value-added honey & bee products, as well as honey bees and queens for sale. Some Vermont beekeepers also provide pollination services in- and out-of-the state. The migratory (out-of-state) pollination beekeepers often take their hives, after pollination, to the southern United States for overwintering and return them to Vermont in spring. In-state pollination services are contracted for apples (highest), pumpkins, blueberries and other small fruits and vegetable crops. Written contracts for these services are rare in Vermont.

Vermont's honey production is economically significant; the most recent state production was valued at greater than \$850,000 according to National Agricultural Statistics Survey (2014 values released in 2016). This likely significantly underestimates the true economic value of honey in Vermont as few commercial beekeepers report to this survey. The tracking on the total volume of honey is also relatively unknown and underreported.

Backyard operations comprise the largest number of Vermont beekeepers, but are assumed to represent significantly fewer hives than the commercial & sideline operations. Backyard operations can be found in both rural and urban areas and hives may be located in backyards or on neighboring properties. Since 2006, with the identification of Colony Collapse Disorder (CCD) in the United States, there has been an anecdotally reported increase in number of backyard beekeepers in Vermont.

Honey bees may enter Vermont as live queens, packages of bees, nucleus colonies of four to eight frames, or migratory pollination hives returning to Vermont. Honey bees also enter Vermont on their own as swarms or during foraging.

#### *Vermont's apiary health program*

The Vermont Agency of Agriculture, Food & Markets is responsible for an apiary health program by [6 VSA §§ 3021-3035](#). The Agency maintains a registry of hive owners and locations throughout the state. The state apiculturist, which is a half-time position (0.5 FTE) at the Agency is responsible for many aspects of honey bee health, including

technical assistance, education & outreach, hive inspections for disease and pests, and issuing health certificates to beekeepers moving bees out-of-state. The state apiculturist may require the treatment or destruction of diseased or abandoned hives.

Each hive in Vermont is required to be registered. A fee of \$10 per hive location was established in 2015. The monies collected from this fee support the work of temporary summer apiary inspector. The database of registered beekeepers was not updated for many years, so the registry information is incomplete. The state apiculturist estimates 25-30% of beekeepers are not registered. Efforts are underway to validate and update the database.

#### *Nutrition & habitat for Vermont honey bees*

As with native bees, honey bees use pollen and nectar as food sources. Nectar is the primary source of carbohydrates for honey bees, while pollen provides proteins, lipids, vitamins and minerals. Honey bees need a diverse source of nectar and pollen, spring through autumn. Honey bees also need access to water and shade. To some extent, nutrition and habitat for honey bees may be managed for by a beekeeper as water, shade, and nutrition can be supplemented as needed.

As agricultural and other land uses have changed in Vermont over the past century, so has the available nutrition and habitat for honey bees. Economics and advances in cattle nutrition have resulted in new dairy farm management practices. Pastures are now often harvested before flowering, and acreage of land in corn has increased. Urbanization has also decreased the number of available farm fields as habitat.

As a way to ensure enough potential habitat and nutrition for large apiaries, under Vermont law, beekeepers may not locate an apiary of 10 or more hives within a two-mile radius of an existing, registered apiary of 15 or more hives. This radius is not always respected by beekeepers.

#### *Pathogens & pests of Vermont honey bees*

In Vermont, Varroa mites are currently recognized as the most serious pest of honey bees. However, diseases caused by bacteria, viruses, and microorganisms also pose significant issues for honey bees in Vermont. As diseases and pests may be transmitted from contact with shared flowers, contact with other diseased bees, contaminated feces, equipment, or parts of the hives, beekeepers that do not rigorously manage their hives, may further perpetuate disease and pest issues in both managed and native bee populations.

Pests and pathogens can be imported into Vermont from sales of bees, nucleus colonies, or queens from other areas of the United States, as well as from migratory pollinating bees returning to the state. Bumble bees, bought from companies in Michigan and Canada, and then used as pollinators in greenhouses and small fruits are known to have viruses and other pressures which may spill over into managed honey bees or native pollinators.

Historical data about pathogens and pests in Vermont honey bees is not well recorded. However, the state apiary program has conducted over 100 visits to beekeepers in 2016 and has observed high prevalence of Varroa mites, *Nosema*, and has condemned 20 live colonies from six different apiaries for American foulbrood. Other pathogens may not be readily visible (viruses) or masked by antibiotic treatments so determining those data is more difficult for the state apiculturist. In the past decade there has been an anecdotal decline in prevalence of tracheal mites in managed honey bee hives in Vermont, but actual data are unavailable.

Beginning in 2015, Vermont has been participating in a national USDA Honey Bee Survey to begin to better identify and track these pest and disease data. The University of Vermont has been sampling apiaries, both in-state stationary hives and migratory hives. The initial data from the 2015 collections indicate that Varroa mites are pervasive in Vermont hives, and that *Nosema* and viruses are also present. There appear to be differences in migratory and stationary beekeepers. This current pest and disease data set is limited to one year, but this data collection is expected to continue. A summary of this data, courtesy of the University of Vermont researchers is presented at the end of this document.

Winter losses of honey bees are known to occur in Vermont. Higher overwintering losses are expected for honey bee colonies that have more pest and disease pressures and/or have limited sources of nutrition throughout the winter. Weak colonies have an increased chance of loss over the winter. There is no statewide data on the amount of losses related to overwintering of honey bees in Vermont.

Colony Collapse Disorder is a syndrome identified by the abandonment of a honey bee colony by most or all of the worker bees, leaving behind the food supplies, the queen, and the young, immature bees. The exact cause of the worker bees leaving is unknown, but pest, pathogens and disease loads have been proposed as a contributing factor. To date, there have been no confirmed cases of Colony Collapse Disorder (CCD) in managed honey bee hives in Vermont.

#### *Pesticide use affecting Vermont honey bees*

In Vermont, managed honey bees can be exposed to pesticides in the environment: in pollen, guttation fluid, nectar, water, or as residues on soil or plant tissues. Managed honey bees may also be directly exposed to miticides or other treatments that are applied in the hives to treat for pests.

Pesticide exposure can result from applications by agricultural (both organic and conventional), forestry, structural, turf, and ornamental industries or from applications by homeowners. Outdoor applications of pesticides may be done as foliar and soil applications, tree injections or seed treatments. Both systemic and non-systemic pesticides are used in Vermont and may affect honey bees.

Pesticides can have different effects on honey bees. Bees may have acute effects, in that they have an immediate health effect (death or sickness) or there may be a chronic or sub-chronic effect (*e.g.*, weakness, behavioral impairment). Managed honey bees that bring pesticides back to the hive may expose younger, more sensitive bees or may concentrate the dose of pesticide, making this path of exposure a high concern. Additionally, hives that are already weak from other factors may be particularly susceptible to the effects of pesticides.

When evaluating exposure to pesticides, pollinators may be exposed to herbicides, fungicides, insecticides and miticides. Of highest concern for bees, are insecticides. However, fungicides, herbicides and miticides may also have an impact and/or have synergistic effects, which are not easily quantified.

In the past decade, the Vermont, the Agency of Agriculture, Food & Markets has responded to all reported incidences (about 12) of pesticide effects in bee hives. No correlation between pesticides and bee mortality has been found in the incidents investigated. It is important to note, that not all beekeepers would report potential incidents, and some beekeepers expect loss of bees from pesticide exposure as a result of pollinating crops, therefore this is likely an underrepresentation of pesticide incidents. It is expected that migratory hives, and in-state hives used for pollination services may be more likely to be exposed to pesticides depending on nearby land use.

In pollen surveys done by the Agency of Agriculture, Food & Markets, pesticide loads in Vermont hives were well below that of national data from the USDA honey bee surveys. Corn herbicides were detected the most frequently, followed by occasional detections of fungicides and neonicotinoid insecticides. This was a very limited survey conducted over 2 years. In samples tested after bee kill events, there have been no detections in the bees, or areas around the hives of insecticides not used in the hives.

#### *Genetics & breeding in Vermont honey bees*

Although commercial beekeepers in Vermont do not routinely see breeding issues in managed hives, it is recognized that there is a limited gene pool for honey bees, nationally and in Vermont. Importation of bees with ill-suited genotypes for Vermont can be problematic, by having genetic cross-over occur in the well-adapted Vermont native and managed bee populations. Queens raised in Vermont are generally considered to be better suited for Vermont's environment and may have less disease and pest pressures than imported queens and other honey bees.

#### *Data from National Honeybee Survey*

# 2015 National Honeybee Survey Figures

*P. Alexander Burnham & Samantha Alger*

*October 10, 2016*

## Metadata

**Author:** P. Alexander Burnham & Samantha Alger

**Date:** 13 June 2016

**Data Set:** These data were collected during the 2015 National Honey Bee Survey in Vermont by Samantha Alger and Alex Burnham with all testing is being done at the USDA Bee Research Lab in Beltsville Maryland and UMD.

**Data Source:** 2015 Vermont National Honey Bee Survey

**Funding Source:** United States Department of Agriculture (USDA), APHIS, Bee Informed Partnership

**Data Collection:** Collection methods are stipulated by the National Honey Bee Survey

**Columns:** (from left to right) Beekeeper last name, each virus has a 3 to 4 letter abbreviation followed by (PA=presence/absence) or (CPB=genome copies per bee) VarroaTHR\_PA is binary and consists of presence/absence above the threshold.

**Rows:** Data points for all columns in order from each collection event

**Missing values:** NA

## 2015 National Honey Bee Survey

### Objective:

The objective of this survey is to document which bee diseases, parasites, or pests of honey bees are present and/or likely absent in the U.S. Specifically, this survey will attempt to verify the absence of the parasitic mite *Tropilaelaps* and other exotic threats to honey bee populations (e.g., *Apis cerana* and Slow Paralysis Virus). To maximize the information gained from this survey effort, collected samples will be analyzed for other honey bee diseases and parasites known to be present in the U.S. This cross-country survey continues to be the most comprehensive honey bee pest and health survey to date, and provides essential disease and pest load base line information.

### Methods:

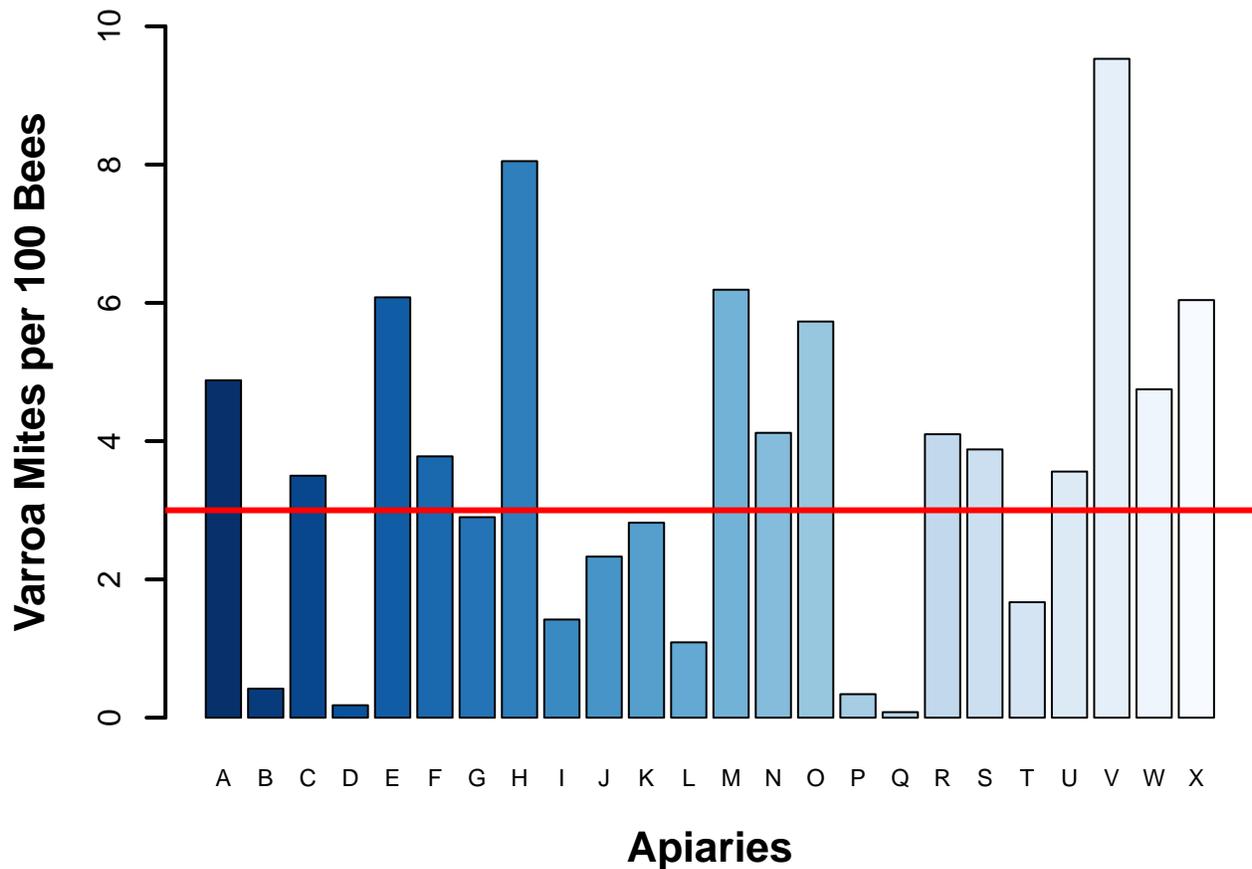
Twenty-four apiaries from 8 participating beekeepers were sampled in 2015. Of the apiaries sampled, 12 were stationary operations (colonies remained in Vermont throughout the year) and 12 were migratory operations (colonies are transported out-of-state for at least part of the year). A composite sample of adult bees was collected from 8 randomly selected colonies from each of 24 apiaries. For each colony, after performing a visual inspection, a frame containing young brood was removed to shake the adult bees into a washtub. Two ¼ cups of bees were collected and placed into a ventilated bee box and a bottle containing alcohol. The frame was then ‘bumped’ to dislodge *Varroa* and exotic *Tropilaelaps* mites and/or pests such as small hive beetle. The ventilated cardboard box was sent to USDA for analysis of viruses. The composite sample from the comb “bump” was filtered and placed in a small alcohol bottle and sent along with the adult bees preserved in alcohol to UMD where they will be analyzed for *Nosema* spores, mites and other pests. Sampling began when the bees were active in the spring with hive build up, and continued until all apiaries were sampled.

### Benefits:

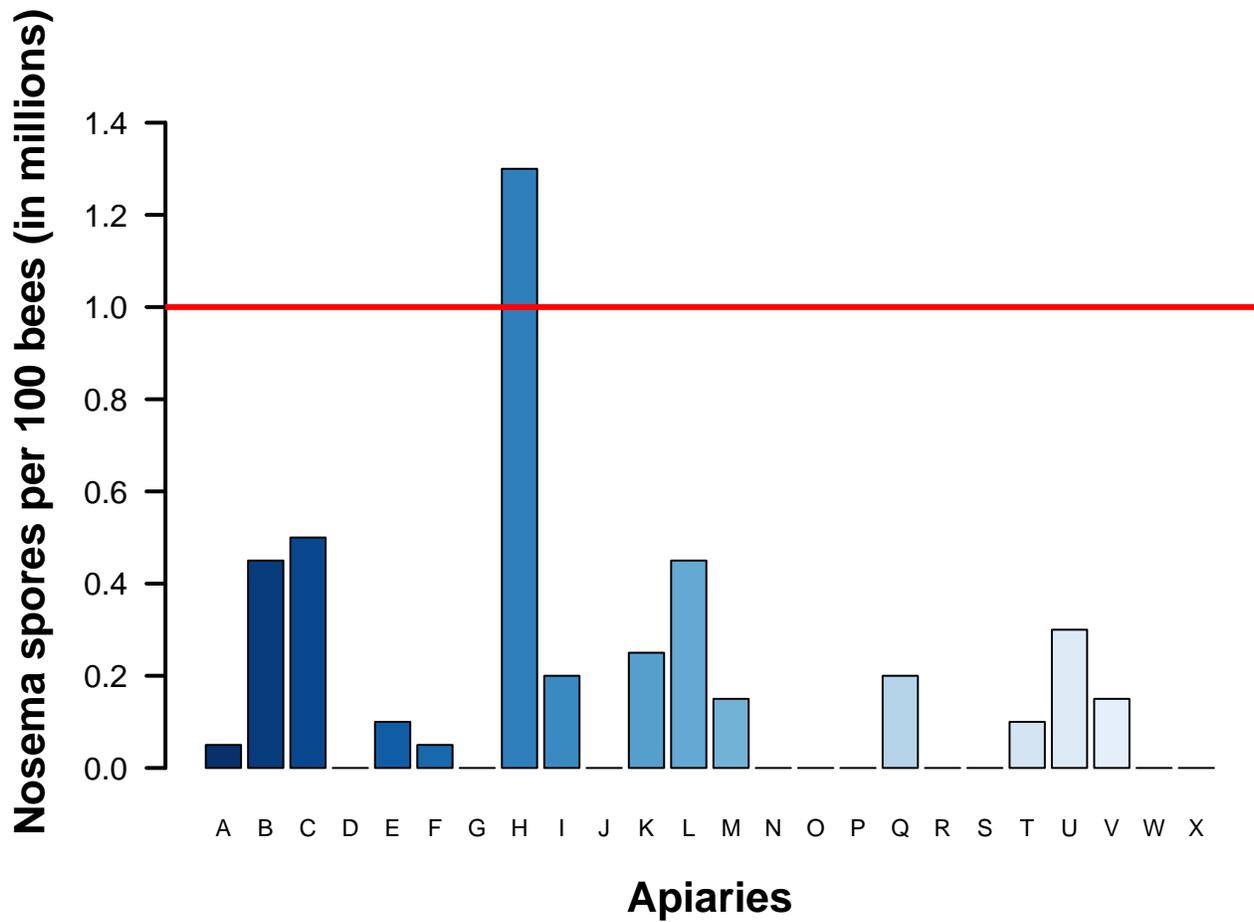
Honey bee health decline has been documented for years. The known negative honey bee health challenges are attributable to parasites, diseases and environmental toxins. This national honey bee health survey is being conducted to ascertain the scope of additional unidentified parasite, disease and pests that may have a negative impact on honey bee populations in the United States. Results will benefit the U.S. apiculture industry by providing baseline knowledge that can be used to inform and guide research of honey bee diseases and parasites as well as inform management decisions to mitigate bee diseases.

## Results:

## character(0)

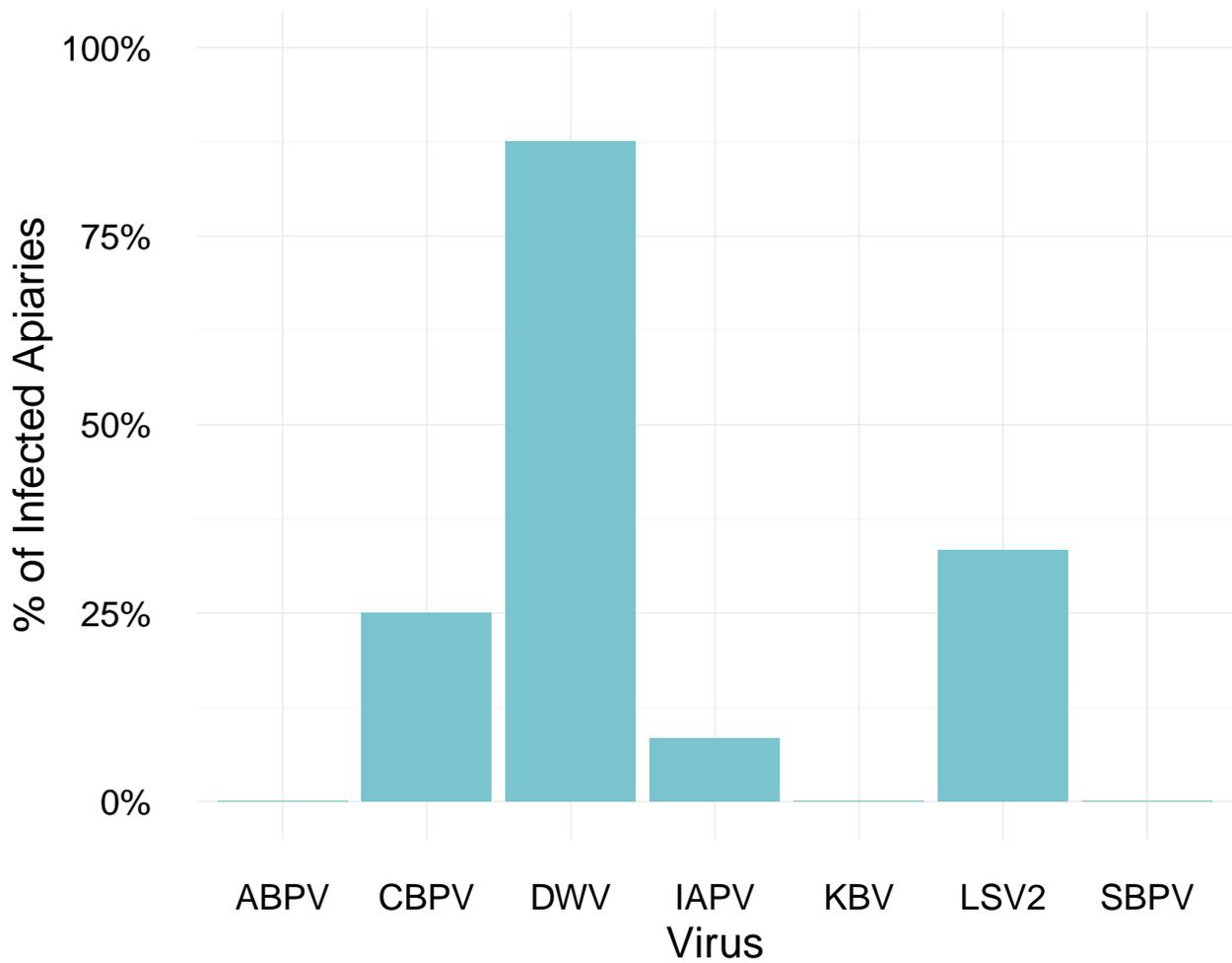


**Figure 1:** Mite load results for each of 24 apiaries sampled. All honey bee apiaries were positive for Varroa mites with 58% (14 of 24 apiaries) having mite loads above the threshold for safe mite levels, signified by red line (3 mites/100 bees).

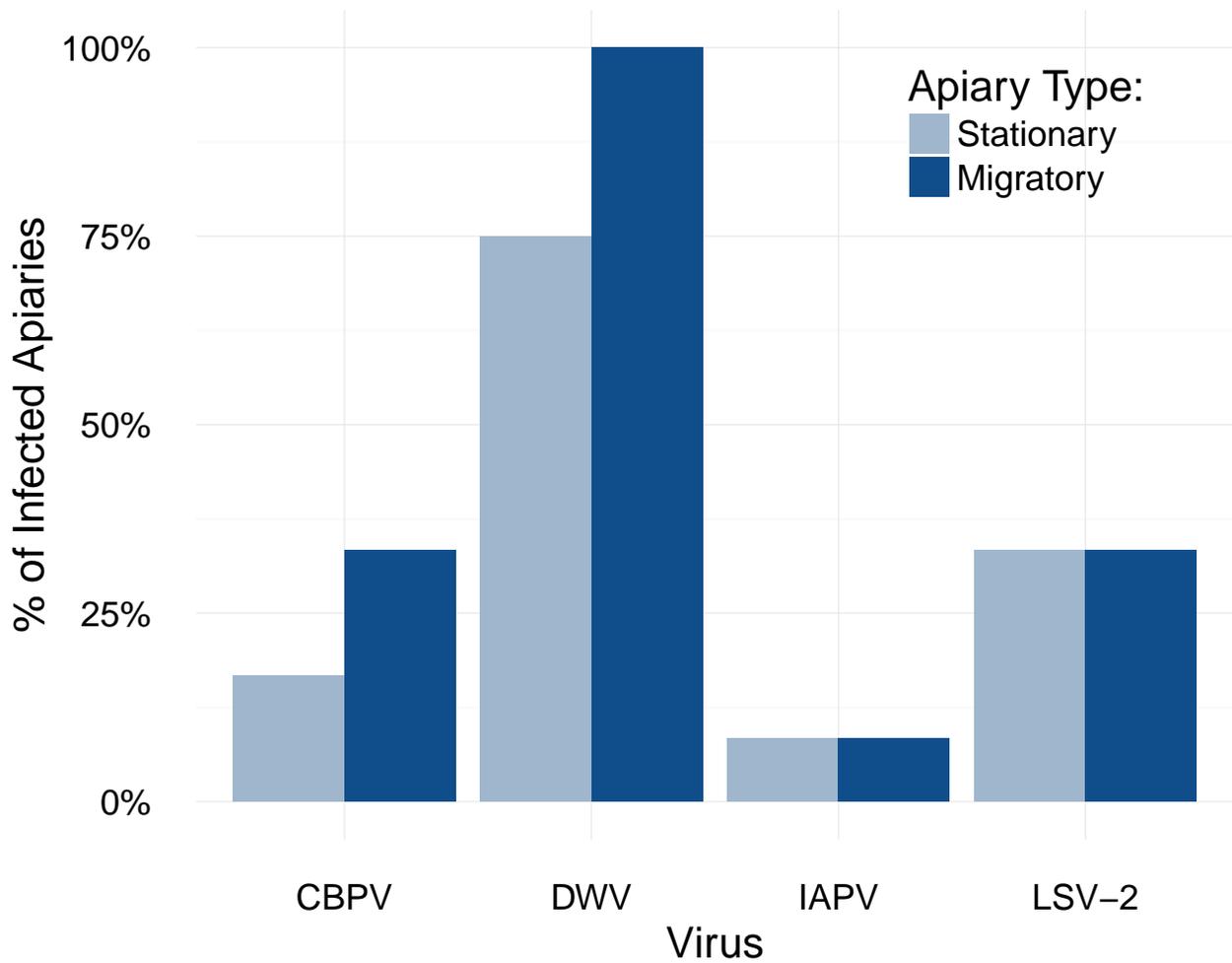


**Figure 2:** Nosema Load (million spores/100 bees) for each of 24 apiaries sampled. 14 of the 24 apiaries were positive for Nosema with only one apiary above the threshold for safe Nosema levels, signified by red line (1 million spores/100 bees).

```
## Virus VirusPrev
## 1 SBPV 0.00000000
## 2 ABPV 0.00000000
## 3 IAPV 0.08333333
## 4 DWV 0.87500000
## 5 LSV2 0.33333333
## 6 CBPV 0.25000000
## 7 KBV 0.00000000
```

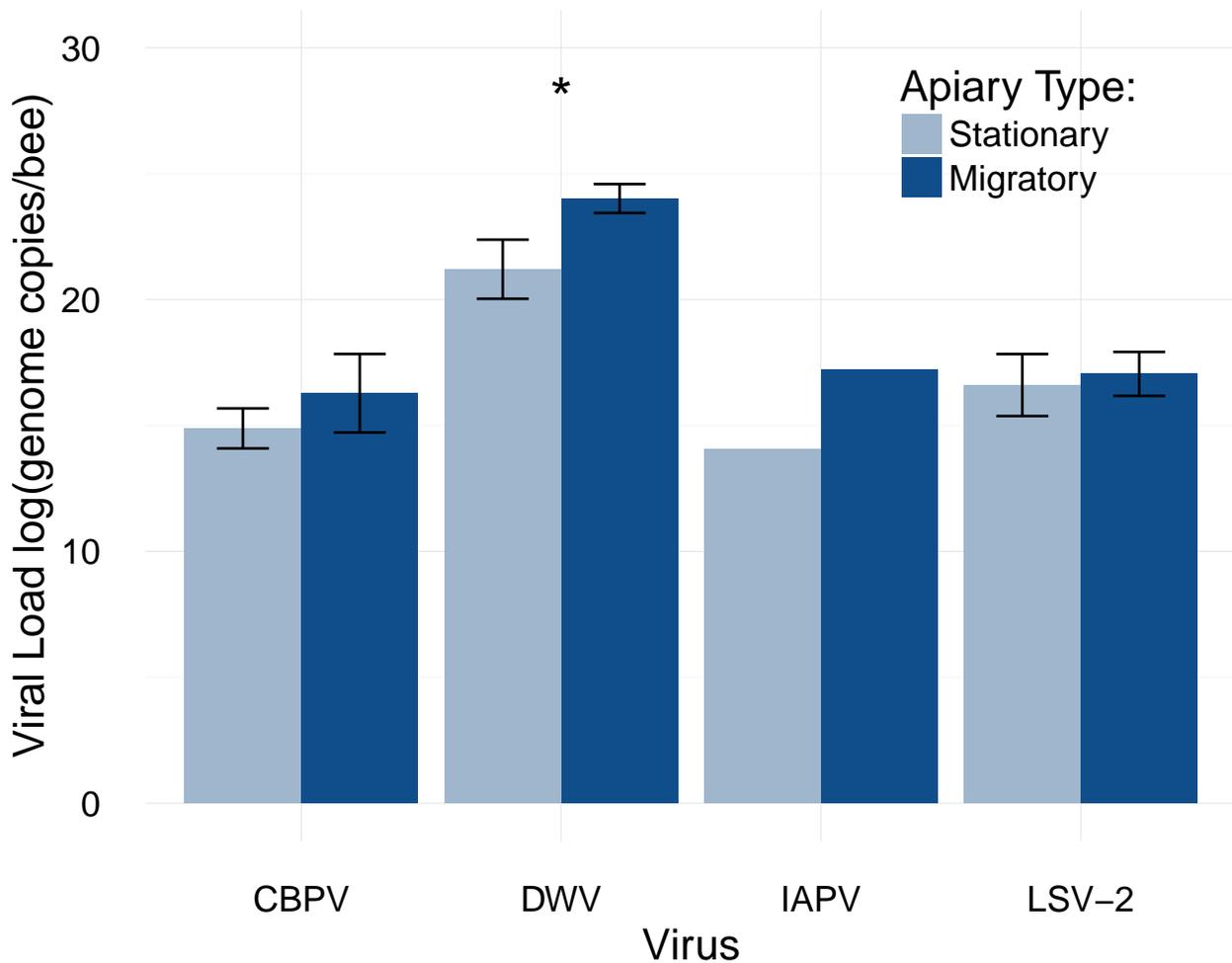


**Figure 3:** Apiaries were tested for 7 different RNA viruses. Figure shows the percentage of infected apiaries for RNA viruses: acute bee paralysis virus (ABPV), chronic bee paralysis virus (CBPV), deformed wing virus (DWV), Israeli acute paralysis virus (IAPV), Kashmir bee virus (KBV), Lake Sinai virus (LSV2), sac brood paralysis virus (SBPV). DWV was the most common virus detected (21 apiaries) followed by LSV (8 apiaries), CBPV (6 apiaries), and IAPV (2 apiaries). ABPV, KBV, and SBPV were not detected. Co-infections were common with 10 and 2 apiaries having 2 and 3 viruses detected, respectively. Eight apiaries had only virus detected and only 2 apiaries were negative for all viruses assayed.



**Figure 4:** Percentage of infected apiaries by type (migratory vs. stationary). Although not statistically significant, trends show higher virus prevalence for migratory apiaries for chronic bee paralysis virus (CBPV), deformed wing virus (DWV), and Lake Sinai virus (LSV2). Israeli acute paralysis virus (IAPV) was detected in one stationary and one migratory apiary.

## Warning: Removed 2 rows containing missing values (geom\_errorbar).



**Figure 5:** Mean viral load (virus genome copies/bee) by apiary type (migratory or stationary). Bars represent mean standard error. Deformed wing virus (DWV) load was significantly higher in migratory than in stationary apiaries ( $p = 0.04$ ). Although not statistically significant, viral loads for chronic bee paralysis virus (CBPV) and Lake Sinai virus (LSV2) were also higher for migratory apiaries. Israeli acute paralysis virus (IAPV) was detected in one stationary and one migratory apiary. Asterisk represents statistical significance at the 0.05 level.

```
##
## Welch Two Sample t-test
##
## data: VirusSplit$DWV$GeekGasm by VirusSplit$DWV$MigBinary
## t = -1.9081, df = 10.882, p-value = 0.04155
## alternative hypothesis: true difference in means is less than 0
## 95 percent confidence interval:
##      -Inf -0.1624788
## sample estimates:
## mean in group 0 mean in group 1
##      21.20614      24.01335

## Warning in chisq.test(splitVDF$DWV$VirusPA, splitVDF$DWV$MigBinary): Chi-
## squared approximation may be incorrect

##
```

```

## Pearson's Chi-squared test with Yates' continuity correction
##
## data: splitVDF$DWPV$VirusPA and splitVDF$DWPV$MigBinary
## X-squared = 1.5238, df = 1, p-value = 0.217

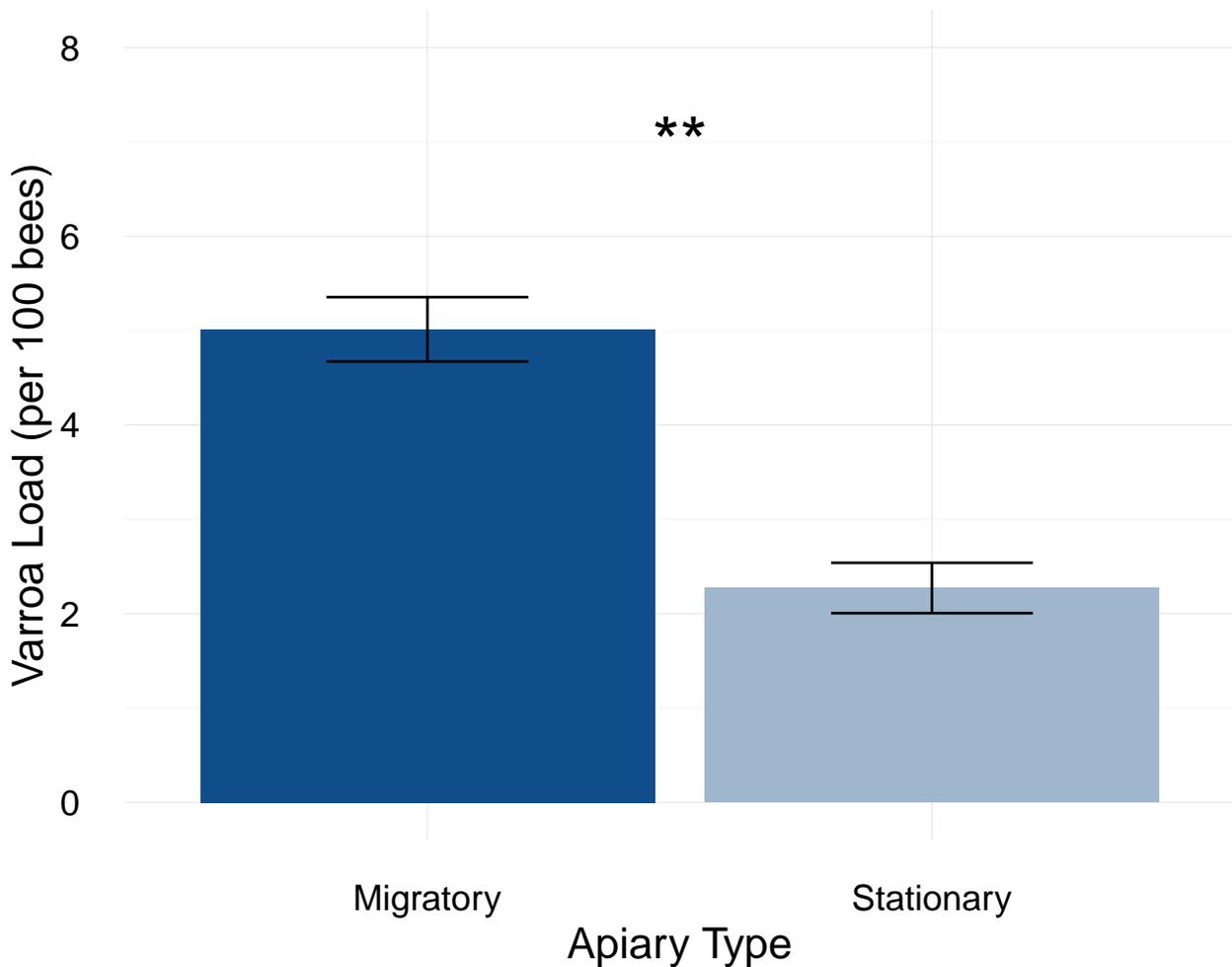
## Warning in chisq.test(splitVDF$CBPV$VirusPA, splitVDF$CBPV$MigBinary): Chi-
## squared approximation may be incorrect

##
## Pearson's Chi-squared test with Yates' continuity correction
##
## data: splitVDF$CBPV$VirusPA and splitVDF$CBPV$MigBinary
## X-squared = 0.22222, df = 1, p-value = 0.6374

## Warning in chisq.test(splitVDF$`LSV-2`$VirusPA, splitVDF$`LSV-2`
## $MigBinary): Chi-squared approximation may be incorrect

##
## Pearson's Chi-squared test
##
## data: splitVDF$`LSV-2`$VirusPA and splitVDF$`LSV-2`$MigBinary
## X-squared = 0, df = 1, p-value = 1

```

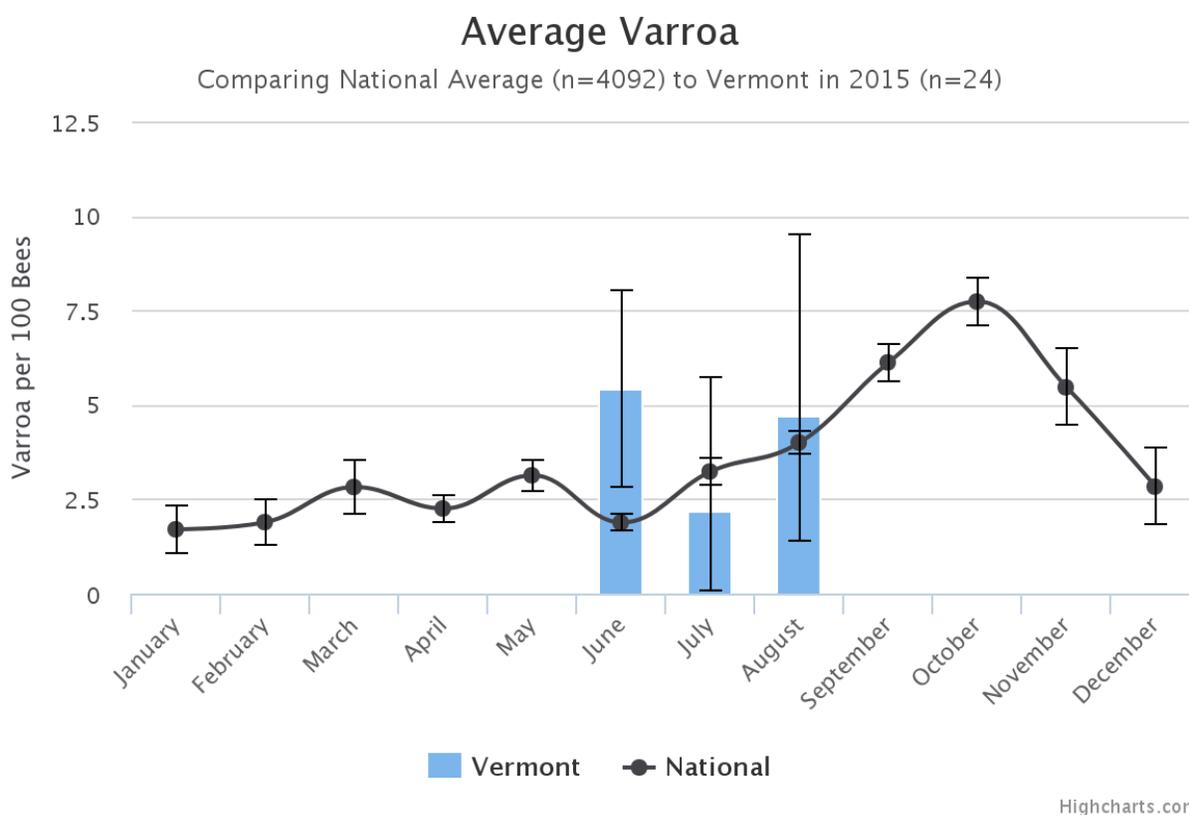


**Figure 6:** Mite loads (mites/100 bees) by apiary type. Migratory apiaries had significantly higher mite loads than stationary apiaries ( $p = 0.004$ ). Asterisks represent statistical significance at the 0.01 level. Bars represent mean standard error.

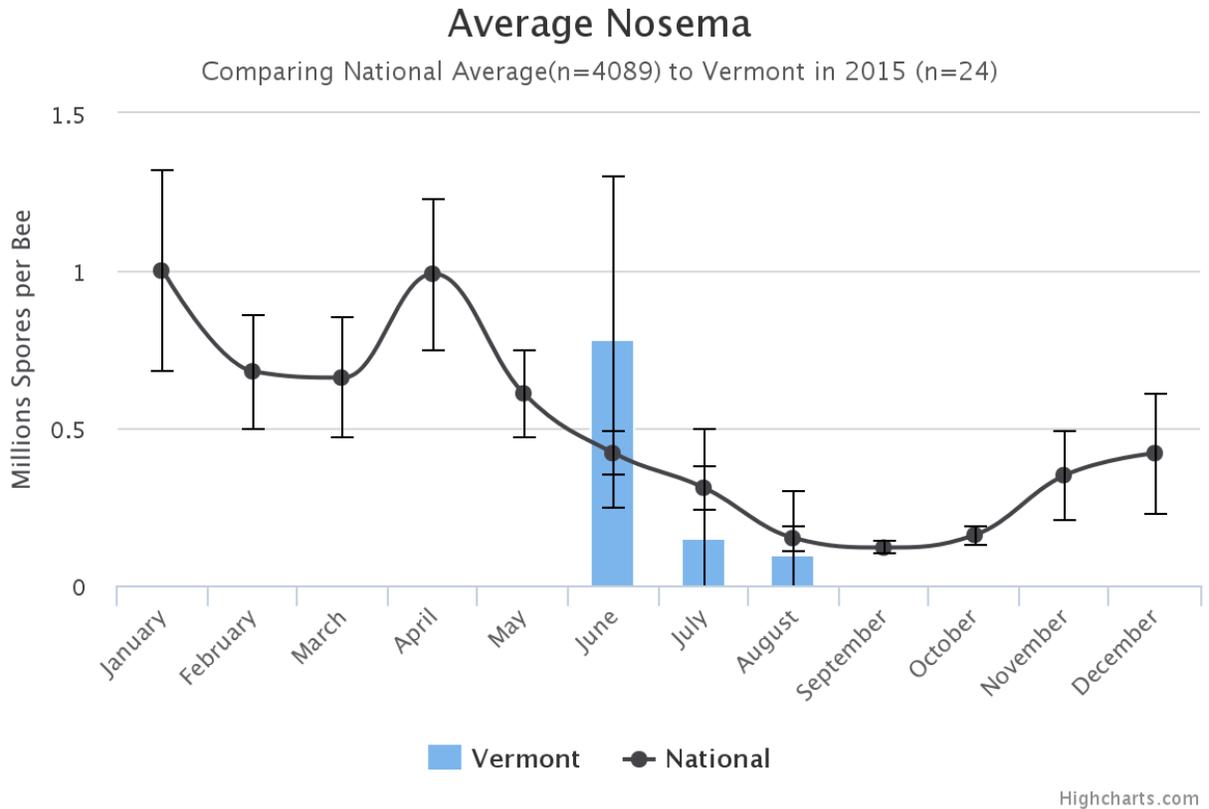
```
##                Df Sum Sq Mean Sq F value Pr(>F)
## NHBS_DF$Migratory 1  45.10   45.1    10.01 0.00449 **
## Residuals        22  99.09    4.5
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

**Figures 7-9 are from the National Honey Bee Survey State Report:**

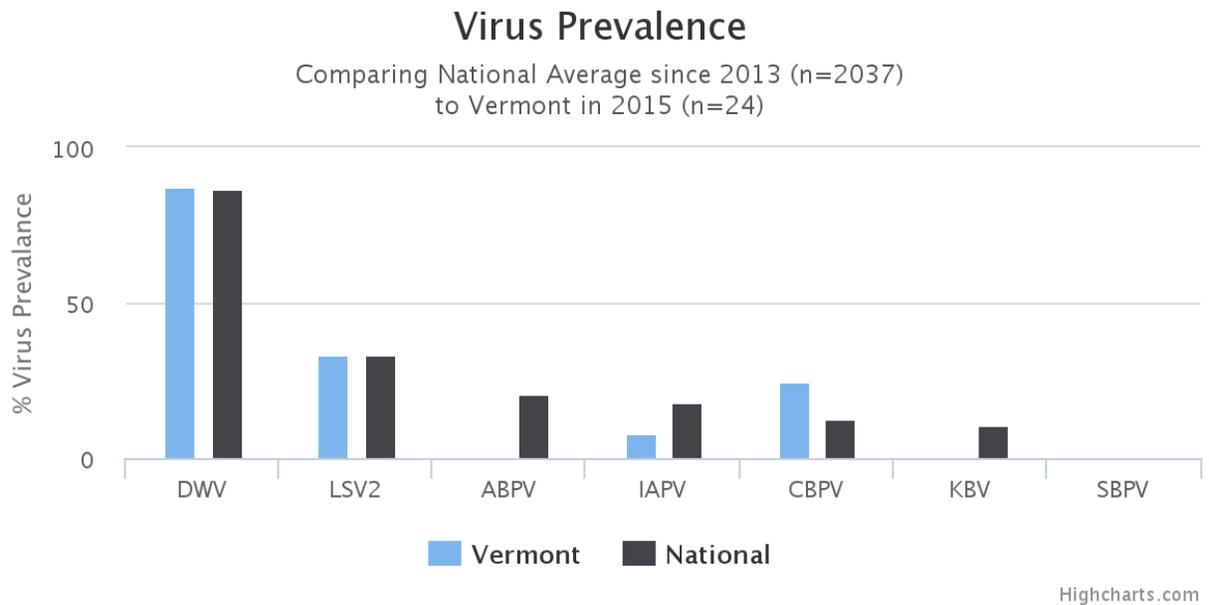
[https://bip2.beeinformed.org/state\\_reports/](https://bip2.beeinformed.org/state_reports/)



**Figure 7:** The “Average Varroa” chart shows the national monthly average varroa level based on all samples and all years in the APHIS survey, charted as a line. The error bars are based on the 95% confidence interval which represents the range that 95% of all samples are within. The columns represent the average varroa level in samples collected in the state Vermont during the year 2015. The error bars for the state monthly average represent the minimum and maximum varroa levels found. Months without columns have no samples taken during those months.



**Figure 8:** The “Average Nosema” chart shows the national monthly average nosema level based on all samples and all years in the APHIS survey, charted as a line. The error bars are based on the 95% confidence interval which represents the range that 95% of all samples are within. The columns represent the average nosema level in samples collected in the state Vermont during the year 2015. The error bars for the state monthly average represent the minimum and maximum nosema level found. Months without columns have no samples taken during those months.



**Figure 9:** The virus prevalence chart shows the percentage of samples with each virus found to be positive

Nationally compared to this state and year. The National prevalence uses data since 2013 only, due to improvements made to the molecular techniques used to determine if the virus is present. This gives us a National average that is considered to be most accurate. For data collected previous to 2013, we still show the prevalence of these samples per state and those are still compared to improved (>2013) molecular data.

Appendix C- Meeting minutes with recommendations, as  
voted

## Pollinator Protection Committee Meeting Minutes: FINAL

September 15, 2016-Vermont Statehouse Room 11

Committee members present

- Leif Richardson (LR)
  - Cary Giguere (CG)
  - Chris Conant (CC)
  - Mike Palmer (MP)
  - Ross Conrad (RC)
  - Eric Boire (EB)
  - Terry Bradshaw (TB)
  - John Hayden (JH)
  - Jane Sorensen (JS)
  - Katie Ballard (KB) (joined by phone)
- 

1. Meeting convened at 9:03 AM. Jim Leland, Director Agriculture Resource Management Division from the Agency of Agriculture, welcomed the group. Committee members introduced.
2. Linda Boccuzzo, Agency of Agriculture, reviewed her role as assigned to the Committee.
3. Cary Giguere, Agrichemical Program Manager, Vermont Agency of Agriculture, presented on the development of Act 83 and the charges associated with the Act (pptx).
4. Leif Richardson, Postdoctoral Research Fellow, Gund Institute for Ecological Economics, presented an overview of native pollinators in Vermont. (pptx).

*Discussion after/during presentation:* JH: Asked about disease screening of purchased and imported bees (bee boxes) and their effect on native bees. LR: Noted difficulty of his fellow researchers in obtaining disease-free colonies for research. TB: Asked if there was a change in abundance of Vermont pollinators, not just decline in species. LR: Relatively unknown at this point, but could be measured. JS noted lack of information/baseline data on native pollinators, asked if other states in the Northeast/Mid-Atlantic had additional information or projections. LR: Limited surveys similar to Vermont. Species declines and persistence have been demonstrated elsewhere. JH: Why has US been so slow to adopt similar EU/Ontario regulations with regard to neonicotinoids? LR: Data on treated seeds shows a rapid increase since the 1990s. There is a question if pesticides are being deployed on an as needed basis following IPM techniques or more of a prophylactic use.

5. David Tremblay, State Apiarist, Vermont Agency of Agriculture presented on status of beekeeping in Vermont. 2016 was an excellent year for honey production in Vermont. Overall status in Vermont is good. 700 registered beekeepers ≈ 7400 hives. 250 beekeepers have not re-registered from 2015. Bears continue to cause issues. Between 2 apiarists (DT and temporary position) at Agency of Agriculture, over 100 beekeepers have been visited this year. Reasons for visits ranged from: swarms, odd bee behavior, aggressive hives, queen concerns (none or multiple) and required

inspections. Concerns of beekeepers: loss of forage, varroa mites, lack of areas to start operations because of “2-mile radius” requirements.

In Vermont this year 6 cases of European Foul brood, 4 cases of American Foul Brood. 18 colonies/hive equipment have been burned. Vermont is still importing nucs (hive “starter kits”) from the South. There are concerns over quality of imported nucs.

Vermont has ≈ 40 commercial beekeepers, most others are backyard operations. Successful operations all use different management strategies.

*Discussion after/during presentation:* TB: What is the 2-mile regulation and is it followed? DT: If a beekeeper has more than 15 colonies, the beekeeper has a 2-mile buffer from additional commercial (15+) operations (unless on their own property) There are some exemptions. MP/RC indicated that it is somewhat respected, but not always and beekeepers unlikely to report. KB: Is there any geographic relationship to disease/pest issues? DT: Not really. RC: Management of hives is a strong correlator of hive health. Discussion about mite/disease management practices and differences between commercial and backyard beekeepers. Role of state apiarist in containing disease outbreaks was reinforced. Need for training of beekeepers (backyard/new) was identified as a definite need. Significant increase in number and diversity of backyard beekeepers in Vermont since 2006. Questions about disease spread between native and managed bees were discussed. LR: Varroa mites do not affect native bees, but other diseases can be. Flowers visited by both types are pollinators can be reservoirs for diseases and pests. Other vectors can travel between pollinators. DT noted that New Hampshire has no apiary program and New York has limited program, making disease and pest pressure in Vermont more challenging. JS: What are top 3 things the Apiary Program needs? DT: more staff for inspections/increased outreach, better oversight of sales/imported nucs, increased forage/habitat.

Discussion about feral/abandoned hives. Beekeepers indicate that not as common as it used to be. MP unaware of any continuously feral hives.

Discussion over compliance rate for registration of hives and fines for unregistered hives. Agency can fine \$250; this has never been done. Registration of hives has been required for a long time, but the \$10 fee only went into effect 14-16 months ago. So that is new for beekeepers. When \$10 fee was implemented, 50% of previously registered apiaries did not register. Some may have been closed for a while and never updated information with the Agency, other beekeepers are choosing not to register.

6. Cary Giguere, presented on current state and federal status of pesticide regulations. (pptx).

*Discussion after/during presentation:* JS: What is a treated article? CG: An article treated with a pesticide to protect the article itself e.g., utility poles, treated seeds. RC: Is a plant that has been treated a treated article. CG: will look into. TB: How often are acute/pesticide bee kills in Vermont? MP: In orchards has seen in his own hives—not reported. Currently does not see pesticide loss in his own hives which are all located in corn fields. RC: Noted difficulty in seeing effects from systemic. MP noted he sees no effect and had minimal overwintering loss. Before he talks to field owners about their management practices (use of treated seed) wants proof/data. KB: Are neonicotinoids only used in treated seeds? CG: Other industries and uses exist—ornamental, lawn care, golf courses,

orchards all use. MP: Do fungicide products have pollinator protection language on the label? CG: Some do, some don't. There are some fungicides on the EPA's 76 highly toxic to pollinators active ingredient list that are currently being evaluated specifically for pollinators.

CG mentioned aerial mosquito spraying in South Carolina (for Zika) which had made news because of resultant bee kills. Vermont's Arbovirus Surveillance & Response Plan prevents a similar thing from happening in Vermont (products allowed to be used, notifications of beekeepers all different than South Carolina.) MP noted that previous Vermont aerial applications for EEE resulted in no bee loss. State Entomologist (Alan Graham) in the room, identified as a resource.

7. Jeff Comstock, Soil Scientist, Agency of Agriculture, past president of AAPCO, presented on the guidance document for the framework and critical elements of State Pollinator Protection Plans developed by the national working group, in coordination with the US EPA (pptx).

*Discussion after/during presentation:* Committee identified issues of how to incorporate native pollinators into this state format plan. All noted it could be challenging, but is something to consider.

8. General discussion:

Committee noted a significant time and commitments are required by the Act. General consensus that having a pollinator protection plan finalized by January is unlikely, better goal was a framework or draft plan which members could then present to respective organizations in winter/spring meetings. This would require extension of Committee's timeline. CG thinks legislature likely amenable to that. Jim Leland noted that the report in January to the legislature could include a recommendation to extend the deadline for that deliverable. Committee had a general consensus that obtaining many stakeholder's (public & industry) input are essential and part of their charge.

9. Nomination of Chair discussion.

Eric Boire nominated Terry Bradshaw. Jane Sorenson seconded the motion. All committee member voted in favor, including Katie Ballard via phone.

Next steps discussed. Inquiry about open meeting laws, CG said Agency of Agriculture will get those questions answered for Committee. December meeting will need to be rescheduled. Statehouse venue agreed upon. No comments from the public.

10. Mike Palmer made a motion to adjourn meeting. Eric Boire seconded. All committee member voted in favor, including Katie Ballard via phone

**Meeting adjourned at 12:11.**

- Submitted LAB 9/16/2016, edited 10/11/16; approved w/edits 10/12/2016

#### Others attending

- Jim Leland, Agency of Agriculture
- Linda Boccuzzo, Agency of Agriculture
- Jeff Comstock, Agency of Agriculture
- Margaret Laggis, lobbyist
- Robert Koethe, EPA R1
- David Tremblay, Agency of Agriculture
- Anna Smith, Agency of Agriculture
- Craig Di Giammarino, VTrans
- Jarod Wilcox, Green Mountain Power
- Nat Shambaugh, public
- Chris O'Keefe, Vermont Farm Bureau
- Kevin Komer, Vermont Golf Course Superintendents Association
- Andrea Stauder, Rural Vermont
- Debra Marckres, public
- Robb Kidd, Sierra Club
- Bethany Creaser, Agency of Agriculture
- Alan Graham, Agency of Agriculture
- Matt Wood, Agency of Agriculture
- Doug Johnstone, Agency of Agriculture
- Dave Huber, Agency of Agriculture
- Anne Macmillan, Agency of Agriculture

## Pollinator Protection Committee Meeting Minutes

October 12, 2016-Vermont Statehouse Room 10

Committee members present

- Katie Ballard (KB)
- Eric Boire (EB)
- Terry Bradshaw (TB)-Chair
- Chris Conant (CC)
- Ross Conrad (RC)
- Cary Giguere (CG)
- John Hayden (JH)
- Mike Palmer (MP)
- Leif Richardson (LR)
- Jane Sorensen (JS)

Linda Boccuzzo-administrative (LB)

1. Meeting convened at 9:33 AM.
2. Motion to review/approve meeting minutes; Cary Giguere made motion to approve; Chris Conant seconded. Minutes were approved unanimously.

TB proposed his format for the meeting agendas. Each meeting agenda will have a review of the status of the charges. He hopes to be able to complete a few charges each meeting.

Discussion around how to handle documents. LB will serve as document manager and track version control.

TB asked that new work done by the Committee be sent out at least 10 days prior to next meeting, and all comments, edits, changes be sent back to LB 7 days before next meeting. LB will consolidate comments/edit documents and send back out 2 days prior to the next meeting. LB will identify any unresolved/conflicting items for attention to TB, so that they can be addressed at the meeting.

3. Leif Richardson, gave an overview of the work he and some of the committee members had done regarding the first charge of the legislation. His overview highlighted the status of native pollinators (bees, butterflies/moths and flies) and possible reasons for decline. MP, RC, LR & Dave Tremblay (state apiarist) have worked on some initial recommendations for the Committee.
4. Samantha Alger & Alex Burnham presented pathogen and mite data (and interactions) from bees collected in Vermont during 2015 as part of the National Honey Bee Survey. They highlighted potential impacts of migratory vs. stationary hives in Vermont. They also discussed some of their own UVM research looking at potential pest and pathogen interactions between native and managed honey bees in Vermont.

*Discussion after presentation:* JH asked about impact of purchased and imported bumble bees (bee boxes) and their effect on native bees. Ms. Alger responded that she believed they could have a negative impact as they can often have many diseases and pests that can spill over into the native bees. She noted that there are only 2 sources for these bee boxes. One of the sources incorporates management practices to reduce disease pressures (*e.g.*, gamma irradiates pollen)—when she gets bees from this facility, the diseases are noticeably lower. These types of bee boxes are believed to be used by hothouse tomato and berry growers in Vermont. Secretary Ross, commented on the amount of data

gaps identified for pollinators in Vermont. He asked when the collection of meaningful data about pollinators, both native and managed, began. Committee members indicated that there are significant data gaps, but that Vermont is unique in having some data on native pollinators. Archived insect collections at UVM exist, but are not specific to pollinators. David Tremblay reported that hive data reported by previous state apiculturist is thought to be biased high. However, current hive data is likely biased low due to incomplete registration of the hives. Baseline data collection for pollinators began mostly in the 2000s in the state. A possible recommendation from Committee will be to address these data gaps.

Review/evaluation of MP/RC/LR/DT recommendations and documents by 10/26/2016. Submit comments to LB.

#### 5. Discussion/ review of remaining charges:

Discussion on Vermont's pesticide regulations & certification procedures. CG reviewed some of the Agency's current processes and regulations. The Vermont pesticide regulations were last updated in 1991 and likely to be updated soon, but two federal rules—which will affect Vermont's—are being revised by the USEPA (the Worker Protection Standard and the Applicator Certification & Training Rule). CG described the product registration process at the federal level. He noted the reevaluation of the 76 active ingredients identified as acutely toxic to pollinators is ongoing and that no additional conditional registrations for insecticides are allowed (lawsuits). Vermont also registers products and conducts a limited assessment at that time. Vermont does state-restrict (classify products as "restricted use", that the EPA has identified as general use) some products. Private applicators/commercial applicator certification process was described. Private applicators (farmers, greenhouses) take CORE exam for use of restricted use products (RUP). Commercial applicators take CORE exam and a specific category exam for the use of general and/or restricted use products on properties owned by others. Continuing education credits (CEUs) must be obtained in 5-year period. Commercial applicators renew and report use annually. Sales & storage of RUPs is reported by dealers, this is used as a surrogate for private applicator use.

EB noted that educational component for homeowners seemed very important. A discussion about homeowner pesticide product use ensued.

Questions and proposals about CEUs specific to pollinators were discussed. Is it possible to create a sub-category for pollinator specific education for applicators? It would require computer updates and a new tracking system, but could be done.

Are pollinators a specific consideration for restricting a product in Vermont? CG answered that it is not specifically identified. Environmental considerations and use patterns are a factor for classifying and registering products in Vermont.

MP asked about the concept of a "certificate of need" being required prior to purchasing an RUP. Conversation about IPM, known pest thresholds, and Ontario's strategy followed. Public commented on seed treatment as a lack of IPM. Availability of un-treated seeds was unknown, but likely limited in Vermont. CG pointed out that need/IPM for some industries was already regulated by economics or permits (e.g. golf courses)

Are toxicity studies only done on honey bees? CG answered that although most studies were on honey bees, there are a few bumble bee studies. MP noted that the Managed Pollinator Protection Plans from South Dakota and Georgia seemed more like “ways to keep your bees alive” and not a plan for pollinator protection. CG noted that the national focus on managed pollinators was partially related to the difficulty with identifying metrics for native pollinator health. RC & CG also pointed out that this may be related to the economic benefits associated with honey bees. LR noted that emphasizing the economic impacts of native pollinators to farmers is important.

CG noted that the 76 active ingredients under review by EPA as acutely toxic to bees contain 5 of the very few active ingredients available for organic growers and that neonicotinoids were registered to replace organophosphate insecticides.

A group was designated to review and make recommendations about pesticide applicator certification and regulations available for next meeting. Group to be led by **Eric Boire**, with **Cary Giguere**, **Terry Bradshaw**, **John Hayden** and **Jane Sorensen**.

JH asked about the process for regulating treated articles under new legislation. CG answered that Secretary of Agriculture would task the Vermont Pesticide Advisory Council to provide him/her with a recommendation regarding treated articles. Management could be enacted under the Secretary’s authority. There could be a separate recommendation from this Committee. There was discussion around what is a treated article and why it is exempt from FIFRA. JH noted he heard a lot of research on the impacts of treated seeds, but wanted to know if there were studies on the advantages to farmers. KB noted that there were definite benefits. She noted that in some places where treated seeds are banned, there are now pest/crop issues. MP added that he knew some overseas beekeepers that had issues related to the treated seed ban (resulting in increased foliar applications of pyrethroids). KB will present information at next meeting. TB will discuss neonicotinoids in apple industry at the next meeting. TB noted the need to solicit feedback from industry on pesticides, specifically neonicotinoids. He will do. The Committee also discussed looking into the science around the possible accumulation of neonicotinoids in the environment. Nat Shambaugh, a member of the public, introduced himself and offered to present on neonicotinoids. Kevin Komer, representing the Vermont Golf Course Superintendent’s Association introduced himself to the Committee and described the documents for the best management practices for neonicotinoids on golf courses. He also mentioned the using golf courses as a place to develop and plant beneficial habitat.

Habitat questions for AOT and NRCS arose. LB has been in touch with Toby Alexander (VT-NRCS) and he hopes to be able to attend the next meeting.

Secretary Ross tasked the Committee with a thorough evaluation of all of the factors affecting pollinator health. He stated that any request to the Secretary of Agriculture needed to be based on scientific evidence and considerate of the social, environmental, and economic implications for the state.  
*(Secretary Ross departed)*

Discussion continued on Managed Pollinator Protection Plans and notifications of applicators to apiarists. Moving/covering hives is not always feasible, particularly for large apiaries. Registration of hives is very important. Early communication between applicators and beekeepers is also important.

It was noted that Connecticut and Maryland had classified neonicotinoid products as RUPs. Treated seeds and actions in Canada and Minnesota were generally discussed. Most Vermont farmers do not use type of seed planters that caused large bee kill in Canada (from seed dust off). Fluency agents added to reduce seed dust off reductions are now required in Canada. Label language around foliar applications of neonicotinoids when “not in bloom” was discussed. Pre-bloom applications may still have residual when bloom occurs. The EU allows for foliar “post-bloom” applications.

CC noted that the key component to all of these regulations and plans was education and that needed to be a key recommendation from the Committee. KB asked if the Committee would prioritize the recommendations based on criticality or highest impact? If Varroa mites & habitat are the largest problem in both managed and native bees, should recommendations related to those be ranked and prioritized in the Committee’s recommendations?

Oregon’s Task Force recommendation scheme was noted as a possible template. LR noted that he would like to see all recommendations in the final report, whether unanimous or not. This was generally agreed upon.

Public education and outreach were discussed. Wisconsin’s web site was noted as good. Industry specific BMPs may be necessary as each industry interacts with pollinators differently. Perhaps Committee could recommend a current web site with outreach materials that were agreed upon, so the state did not have to generate its own materials.

Funding Brainstorm ideas:

Tax return check-off boxes for pollinators? Part of non-game fund monies? License plates? Pesticide taxes? (all, acutely toxic to pollinators? Point-of-sale tax?) Approach federal delegation? Rusty patch bumble bee campaign? Local food movement/Made in VT branding? Kickstarter? USDA money? Ms. Alger noted that University of Minnesota funds its own bee lab through research/testing revenues and corporate funding/sponsorship of apiaries. Feel good corporate initiatives? Pesticide registration fees? Several committee members noted that some smaller pesticide companies will not register a product in Vermont due to the registration cost. Vermont’s pesticide product fees were just raised from \$125 to \$175 on 7/1/2016.

Others noted that it may be possible to partner for funding with existing sources and ongoing work: VTrans (mowing), US Forest Service (habitat), Northeast SARE grants etc. No additional comments from the public were received.

Motion to adjourn the meeting by Jane Sorensen, and seconded by Ross Conrad. Motion approved unanimously. **Meeting adjourned at 12:47 PM**

**Submitted LAB 10/14/2016; edited & approved 11/9/2016**

Others attending

- Chuck Ross, Secretary of the Agency of Agriculture
- Jim Leland, Agency of Agriculture
- Alex Burnham, UVM
- Samantha Alger, UVM
- Jeff Comstock, Agency of Agriculture
- Margaret Laggis, CropLife America
- Robert Koethe, EPA R1
- David Tremblay, Agency of Agriculture
- Craig Di Giammarino, VTrans

- Jarod Wilcox, Green Mountain Power
- Nat Shambaugh, public

- Kevin Komer, VT Golf Course  
Superintendent's Ass'n

## Pollinator Protection Committee Meeting Minutes: FINAL

November 9, 2016-Ethan Allen Room Capitol Plaza, Montpelier, VT

Committee members present

- Katie Ballard (KB)
- Eric Boire (EB)
- Terry Bradshaw (TB)-Chair
- Chris Conant (CC)
- Ross Conrad (RC)
- Cary Giguere (CG)
- John Hayden (JH)
- Mike Palmer (MP)
- Leif Richardson (LR)
- Jane Sorensen (JS)

Linda Boccuzzo-administrative (LB)

1. Meeting convened at 9:37 AM.
2. Past meeting minutes were edited to clarify the importation of “bee boxes” refers to bumblebees, not honey bees. Eric Boire made motion to approve; Ross Conrad seconded. Minutes, with edits, were approved unanimously.
3. Discussion around how to collate and present recommendations. Categories/guidelines similar to Oregon Pollinator Task Force Report was suggested: general consensus, general agreement, split opinion. If there is enough time to review prior to next meeting, post, and begin discussion and voting next meeting.

#### 4. *Presenters:*

*Leif Richardson* discussed the peer-reviewed scientific studies done related to neonicotinoid pesticides and native pollinators. Leif will write up his summary and send to the Committee members.

*Dr. Sid Bosworth* (via phone) UVM Extension agronomist discussed field crops, pest pressures, insect damage and the use of neonicotinoid treated seed in Vermont. Discussion followed after about old versus new seed treatment insecticide applications and risks (acute, or otherwise) to humans and pollinators from each method.

*Dr. David Biddinger* (via phone) Penn State University discussed: the value of native pollinators in small orchards, pests & IPM practices for insect pests in apple orchards, impacts of new/old pesticide chemistries for orchards, and the concept of Integrated Pest & Pollinator Management. Would like Committee members to be aware of this paper:

<http://ento.psu.edu/pollinators/publications/integrated-pest-and-pollinator-management-2014-adding-a-new-dimension-to-an-accepted-paradigm>

Discussion followed after about the high application rates of homeowner tree fruit neonicotinoid products.

*Katie Ballard* discussed the use of neonicotinoid treated seeds on her family’s farm in Georgia, Vermont and some of the potential impacts that may be associated with the loss of them. She also discussed the balance of multiple regulatory initiatives and economics. Yield losses would likely result in the planting of more acreage in corn on the farm.

Discussion on finances/yield losses for dairy farms followed. Crop insurance only covers a county-wide situation and usually requires a 20% loss. Ways to find provide financial incentives, not harm for dairy farmers was noted. Lack of specific yield research data on corn grown as silage (not grain) with treated seed was stated. Benefits and limitations of cover crops in dairy farms were mentioned.

*Chris Conant* discussed the use of neonicotinoid pesticides in the nursery/greenhouse industry. He had spoken with many of his Vermont constituents and provided the thoughts from those conversations. He also provided background information on the industry in Vermont. He noted that the alternatives to neonicotinoid or other products (e.g., biocontrol) may not be cost-realistic for a commercial enterprise. A loss of neonicotinoid pesticides would likely result in a return to older more human-toxic products. The goal is to limit his worker and consumer exposures, as well any environmental effects—and neonicotinoids are a part of that toolbox. *Jane Sorensen* mentioned that in her landscape/bedding plant business, she has little insect pressure—part of that she attributes to landscape in which her business is located-an organic vegetable farm. A lack of data about neonicotinoids in annuals and other landscape plants was noted.

*Kevin Komer*, representing the Vermont Golf Course Superintendent's Association, discussed the use of neonicotinoids on golf courses in Vermont. There are approximately 65 golf courses in Vermont. Neonicotinoids are used primarily for control of white grubs. Treatments occur only on greens, tees and fairways, usually in the 1<sup>st</sup> week of July. Grubs eat the roots of the turf and are hard to detect until the damage shows. The presence of grubs also brings a secondary pest: skunks. Skunks then eat the grubs and can do significant damage to the turf. An alternative to neonicotinoids are about 3x the cost or are much older chemistries.

#### 5. General discussion:

The attractiveness of corn to bees was questioned. It was indicated that honey bees are not really attracted to corn; sweet corn is slightly more attractive than field corn. However, in an area where there is no other forage and/or limited water, both pollen and guttation fluid they will become more likely as forage.

Neonicotinoid recommendations need to be developed from the information received. Cary Giguere will compile. All Committee members should send recommendations to him by **Monday, November 14<sup>th</sup>**. Cary will compile recommendations and text by the 17<sup>th</sup> (hopefully) and get back out to the Committee. Cary would like input from all the Committee members.

The concept of UVM developing research to address some of the data gaps, and develop best management practices that could be used by all growers (nurseries, farmers etc) to allow for more understanding of the impacts to finances, the environment and human health.

Discussion about the draft environmental data collected by the Agency. Mike Palmer offered up more pollen for testing, if it was helpful to the Agency of Agriculture. Previous pollen data was presented in the Agency's report on neonicotinoids.

A motion to extend the meeting was made by Jane Sorensen, seconded by Chris Conant. Members unanimously approved.

Discussion on possible route forward for Vermont Pesticide Advisory Council, the Legislative requirements etc. Cary will notify the legislature that the Committee and/or timeline for report may need to be extended.

Mike Kiernan introduced himself and his business of planting habitat in solar farms.

Linda will send out suggestions for scheduling of a January meeting.

Motion to adjourn the meeting by Eric Boire, and seconded by Leif Richardson. Motion approved unanimously. **Meeting adjourned at 13:27 PM**

**Submitted LAB 11/10/2016**

Others attending

- Chuck Ross, Secretary of the Agency of Agriculture
- Jim Leland, Agency of Agriculture
- Margaret Laggis, CropLife America
- David Tremblay, Agency of Agriculture
- Craig Di Giammarino, VTrans
- Jarod Wilcox, Green Mountain Power
- Nat Shambaugh, public
- Kevin Komer, VT Golf Course Superintendent's Ass'n
- Judy Bellairs, Sierra Club
- Mike Kiernan, Bee the Change
- Andrew Bahrenburg, Rural Vermont

## **Pollinator Protection Committee Meeting Minutes: FINAL**

**December 7, 2016-Room 11, Statehouse Montpelier, VT**

Committee members present

- Katie Ballard (KB)
- Eric Boire (EB)
- Terry Bradshaw (TB)-Chair
- Chris Conant (CC) by phone
- Ross Conrad (RC)
- Cary Giguere (CG)
- John Hayden (JH)
- Mike Palmer (MP)
- Leif Richardson (LR)
- Jane Sorensen (JS)

Linda Boccuzzo-administrative (LB)

1. Meeting convened at 9:35 AM.
2. Past meeting minutes were edited slightly. Eric Boire made motion to approve; Ross Conrad seconded. Minutes, with edits, were approved unanimously.
3. Linda provided a brief overview of how the Oregon Task Force conducted their voting process and categories provided for this Committee.
4. February 2<sup>nd</sup> 2017 was decided as the next meeting date. It was the next date that worked for all Committee members. Linda will reserve a conference room in Montpelier.
5. The document of pesticide recommendations was discussed. The date on the version was 11/30/2016.

CG made a motion to vote on all the recommendations in the categories designated “VAAFAM Should update study materials and exams by appropriate industry, VAAFAM should create new pollinator specific applicator categories/educational curricula for pollinators, VAAFAM pollinator CEU credits and specific changes to Vermont Control of Pesticide Regulations or other Agency programs”. LR seconded.

General discussion about the recommendations. Most of the recommendations were directed at the Agency of Agriculture and would be sent to the Agency, but also included in the final report to the Legislature. Edits were made to the language of the proposed recommendations. A definition of “highly toxic to bees” will be provided in the report. In the recommendations, when the term ‘highly toxic to bees’ is used it will be defined as those active ingredients that are classified by as EPA Toxicity Category I, highly toxic to bees, and any other active ingredient designated by the state regulatory agency and/or Vermont Pesticide Advisory Council. A duplicative recommendation was removed. Recommendations as voted on are attached. JH made a motion to close discussion and vote. EB seconded. All members voted in favor of the recommendations to be sent to the Agency of Agriculture, Food & Markets from the Committee. (see attached)

JS made a motion to vote on “apiculture specific pesticides concerns” as a whole. MP seconded. Discussion. JS withdrew her motion.

Motion to vote on the 3<sup>rd</sup> box in the “apiculture specific pesticides concerns” by TB, seconded by KB. CG provided background about what a “section 18” is and how they are currently regulated. Industries within a state, tribe or territory petition the pesticide agency in the state, indicating that they need a specific pesticide, as there is no other viable option. The pesticide lead agency reviews the request, with

assistance from Extension or other research/technical staff and then petitions the EPA for the exemption. Discussion followed. JH made a motion to end discussion and vote. RC seconded. All members voted opposed to the recommendation.

A motion to vote on box #1 in the “apiculture specific pesticides concerns” was made by RC, seconded by MP. Discussion around changing the language to “sale and use” of the products identified. Members mentioned that coumaphos is not used by beekeepers due to detrimental effects in the hives. In the past some hives in Vermont have had resistance with fluvalinate. David Tremblay indicated he was unaware of anyone using either compound routinely in their hives. This item was motioned to be tabled, until the Vermont Beekeeping Association could weigh in after their annual meeting in January. (Motion JS, seconded KB-all members voted in favor of the motion to table).

A motion to vote on box #2 & 4 in the “apiculture specific pesticides concerns” was made by JS, seconded by RC. Edits to language were made to box 4 (shown as attached). JS made a motion to close discussion and vote. Seconded by RC. All members voted in favor.

CG provided the VAAFMM proposal for Committee members to review.

Presentations:

1. Toby Alexander from VT NRCS presented on habitat and NRCS work about pollinator habitat. He noted that the habitat in Vermont is currently good for pollinators, although there are some areas of the state where there is a high intensity of row crops. VT NRCS has some planting guides for pollinator-friendly native northeastern plants. In general, the VT-NRCS when working on improving habitat is looking at multiple animal habitats (*e.g.*, songbirds, pollinators) and not only pollinators, unless that is the specified need on/near the farm. VT NRCS is planting pollinator habitat in the buffers required by the Act 64 on the farms they are working with. Plantings differ on whether the buffer strip is to be harvested or not.
2. Mike Kiernan from Bee the Change presented on work his company does on solar panels farms.
3. Jarod Wilcox’s submittal to the Committee was identified.

Motion to extend the meeting to 1PM was made by JS, seconded by KB. All voted in favor. After voting, CC had to leave the meeting.

Discussion of plans for the February 2<sup>nd</sup> meeting. Linda has contacted the Agency of Natural Resources for their habitat recommendations. Request for a slight extension of Committee will be needed. CG to contact legislature. Habitat and remaining pesticide recommendations to be discussed/voted on at the next meeting.

Motion to close meeting by JS, seconded by EB. Motion approved by TB, RC, MP, LR, KB, JH, JS, EB, CG. CC absent. **Meeting adjourned 12:56PM**

### **Submitted LAB 12/9/2016**

Others attending

- Toby Alexander, VTNRCS
- Mike Kiernan, Bee the Change
- Margaret Laggis, CropLife America
- David Tremblay, Agency of Agriculture
- Craig Di Giammarino, VTrans
- Nat Shambaugh, public
- Anne Cary Dannenberg
- Mike Kiernan, Bee the Change

**Recommendations APPROVED on 12/7/2016**

Used in these recommendations "highly toxic to bees" means those active ingredients classified as EPA Toxicity Category I, highly toxic to bees, and any other active ingredient designated that is designated by the state regulatory agency and/or Vermont Pesticide Advisory Council (VPAC).

<p>Apiculture specific pesticides concerns</p>	<p>The Vermont Agricultural and Environmental Laboratory should expand its analytical testing to all pesticides and breakdown products that research has previously identified in bee hives (over 170 compounds) in honey or native bees, brood, comb, pollen, or honey.</p> <p>The Agency of Agriculture, Food &amp; Markets should survey the use of in-hive miticides by beekeepers during annual apiary registration. Identify areas for reduction or education.</p> <p>All pesticide applicators that are testing for certification in Vermont should receive specific educational materials related to pollinator health and impacts of pesticides on pollinators. These materials would be included with the CORE manual required for study for all certifications.</p> <p>The Agency of Agriculture, Food &amp; Markets should ensure that all CORE and private exams have appropriate questions about pollinator protection.</p> <p>For applicators seeking commercial, non-commercial or government applicator certification in categories 1A-Agricultural Plant, 1B-Agricultural Animal, 2-Forest Pest, 3A-Ornamental &amp; Shade Trees, 3B-Turf, 6-Right-of-way, 7A-Structural &amp; Rodent Control, 7B-Mosquito &amp; Biting Fly industry-specific educational materials with pollinator health &amp; pesticides best management practices should be included in study materials.</p> <p>The Agency of Agriculture, Food &amp; Markets should ensure that all category-specific exams listed above have appropriate questions about pollinator protection and related best management practices for that industry.</p> <p>The Agency of Agriculture, Food &amp; Markets and UVM Extension should increase awareness of the potential synergistic effects of neonicotinoid pesticides and certain demethylating pesticides and promote strategies and practices to reduce potential impacts.</p> <p>The Agency of Agriculture, Food &amp; Markets should increase awareness of non-target impacts of the use of Bti products in mosquito control on other pollinating fly species.</p> <p>The Agency of Agriculture, Food &amp; Markets should increase awareness of non-target impacts (beneficial moths, butterflies) of the products used to control gypsy moth and agricultural moth/butterfly pests.</p> <p>All pesticide dealers that are testing for licensure in Vermont should receive specific educational materials related to pollinator health and impacts of pesticides on pollinators. These materials would be included with the dealer manual required for study. Topics described in word document.</p> <p>The Agency of Agriculture, Food &amp; Markets should create a standard educational curriculum for bee keepers in the state. The curriculum would address pesticide use in the hives as well as the other pillars of pollinator health and best management practices. (This could be a certification program)</p> <p>The Agency of Agriculture, Food &amp; Markets should create a specific category and certification process for applicators that wish to treat in managed honey bee hives that they do not own. ("Commercial application of hives.")</p>
<p>VAAFM Should update study materials and exams by appropriate industry</p> <p>VAAFM should create new pollinator specific applicator categories/educational curricula for pollinators</p>	<p>Incorporate pollinator protection into the Agency of Agriculture, Food &amp; Markets policy for credit approval.</p>

<p>VAAFM pollinator CEU credits</p>	<p>The Agency of Agriculture, Food &amp; Markets should require specific pollinator-related CEUs for recertification.</p> <p>The Agency of Agriculture, Food &amp; Markets, UVM and the ANR should provide more targeted trainings on pollinator protection, making it available for CEUs for recertification.</p> <p>Include periodic educational articles about pollinator health research in the pesticide applicator newsletter distributed by the University of Vermont Extension and the Agency of Agriculture, Food &amp; Markets to all certified applicators in the Vermont.</p> <p>Vermont Regulations for the Control of Pesticides should specify: Apply pesticides that are highly toxic to bees when there is less chance for exposure to managed or native pollinators: early morning or late evening.</p> <p>Vermont Regulations for the Control of Pesticides should specify: Applications of pesticides that are highly toxic to bees shall provide buffers to native pollinators. This should be accomplished by either: A fifty (50) foot buffer from pollinator foraging sites, such as natural and semi-natural areas or intentional pollinator plantings OR A twenty (20) foot width non-pollinator-attractive vegetative barrier higher than the spray release height with an established 60% plant density</p> <p>Vermont Regulations for the Control of Pesticides should specify: Reduce drift by applying pesticides when winds are less than 9 mph and there is a low risk of inversion.</p> <p>Vermont Regulations for the Control of Pesticides should specify: Avoid application of fungicides to plants attractive to pollinators when plants are in bloom.</p> <p>Vermont Regulations for the Control of Pesticides should specify: Avoid the use of soil fumigants.</p> <p>The Agency of Agriculture, Food &amp; Markets should revise the Regulations for the Control of Pesticides, specifically identifying managed and native pollinators and stheir habitat as an environmental concern in the regulations and permit language.</p>
<p>Specific changes to Vermont Control of Pesticide Regulations or other Agency programs</p>	<ol style="list-style-type: none"> <li>1. The Agency of Agriculture, Food &amp; Markets should put in place a robust program to track the amount of pesticides being released within the state on a yearly basis (as many types and uses as possible, including treated articles) to assess if the amount released in Vermont's environment is growing, declining or remaining static.</li> <li>2. Develop a state-wide goal of reducing the amount of pesticides that are highly toxic to bees that are released into the environment within the state each year. Success to be evaluated by monitoring of yearly use (see item #1)</li> <li>3. Develop a state-wide goal of reducing the amount of pesticides and their breakdown products that are found in bee hives (pollen, comb, honey etc).</li> <li>4. Vermont should institute a statewide program of Integrated Pest and Pollinator Management (IPPM) through UVM Extension to gather and disseminate information on ways for producers across all agricultural sectors to limit wherever feasible, toxic pesticide use that may harm pollinators: The program should include efficiency (using only the amount needed to get the job done), conservation (not treating unless there is a verified problem), the prioritization of chemicals that have lower toxicity and/or lower persistence when it comes to pollinator health, and consider using non-toxic/non-chemical alternatives to pesticides whenever feasible.</li> </ol>

	<p>The Agency of Agriculture Food &amp; Markets should track all pesticide use and set goals for pesticide reduction.</p> <p>The Agency of Agriculture Food &amp; Markets should work with the UVM Extension program to set specific IPM thresholds before use of pesticides, identify less toxic options for farmers, and reduce overall use of pesticides.</p>
--	--

Recommendations that were not approved -status in parentheses at the end	
Apiculture specific pesticides concerns	Cancel the registration of pesticide products that contain tau-fluvalinate (Apistan) and Coumophos (Checkmite+) for the control of Varroa mites by beekeepers within the state of Vermont. (TABLED) Ban the use of pesticides approved by the EPA under Section 18 Emergency Exemption until studies are conducted and enough data collected to verify the pesticide's approved use is safe for pollinators when used as directed by the product label. (OPPOSED)

## Pollinator Protection Committee Meeting Minutes

February 2, 2017 Dewey Conference Room, 1 National Life Drive Montpelier, VT

Committee members present

- Katie Ballard (KB)
- Terry Bradshaw (TB)-Chair
- Chris Conant (CC)
- Ross Conrad (RC)
- Cary Giguere (CG)
- John Hayden (JH)
- Mike Palmer (MP)
- Leif Richardson (LR)
- Jane Sorensen (JS)

Committee members absent Eric Boire (EB)

Linda Boccuzzo-administrative (LB)

1. Meeting convened at 9:30 AM.
2. RC made a motion to approve the meeting minutes from December as written; seconded by JH. Minutes were approved unanimously.
3. Anson Tebbetts gave welcoming remarks to the Committee.
4. Discussion about where the recommendations from the December meeting should be directed. It was decided that the recommendations should be sent to the Legislature (per the charge of Act 83), and to the Agency of Agriculture.
5. Public comment from Nat Shambaugh, Mike Bald, Judy Bellairs (Sierra Club). Ms. Bellairs presented a signed petition for the Committee's consideration.
6. Discussion began on the document of remaining recommendations (dated 2.2.2017) and how to approach EB's absence. The Committee members felt it was important to include EB's vote on final wording of recommendations, if possible. LB will investigate. May change voting category of the recommendations, but *not* whether the recommendations are provided to the Legislature. Discussion on recommendations. (See attached)

--Lunch break--

Presentations:

1. VTrans (Jenn Callahan and Alysha Kane presented on AOT's mowing and herbicide practices.
2. Maree Gaetani and Lily Myers presented on Vermont Community Garden Network's "Wild for Pollinators Initiative"
3. Linda McGinnis, Energy Action Network presented on solar arrays and pollinator habitat.

Continued discussion of wording of recommendations followed.

Discussion of reports to be written. State Pollinator Protection Plan will be developed by the Agency of Agriculture, and the Committee members will serve as an advisory group to that. Report to the Legislature will be drafted by the Agency of Agriculture, members will have an opportunity to review.

A motion to extend the meeting to 4PM was made by JS, seconded by RC. All voted in favor.

Motion to close meeting by CC, seconded by LR. Motion approved unanimously. **Meeting adjourned 3:46PM**

**Submitted LAB 02/06/2017**

Others attending

- Anson Tebbetts-VAAF
- Jeff Comstock--VAAF
- Matt McMahon-MMR
- Margaret Laggis
- Lily Myers-Wild for Pollinators
- David Tremblay, VAAF
- Mark Ferguson, VT F&W
- Nat Shambaugh, public
- Anne Cary Dannenberg, public
- Isaac Behrens, public
- Michael Bald, public
- Judy Bellairs, Sierra Club
- Samantha Algers, UVM
- Jennifer Findley
- Madison Monty -NOFA

**consensus:** recommendations received strong support from all

**general agreement:** recommendations received support from at least five members and no significant opposition.

**split opinion (favorable):** recommendations were supported by 5 or more members and opposed by at least two members.

**Split opinion (not favorable):** recommendation supported by at least 2 to 4 members, but does not reach 5 vote of support.

----

If a vote is unanimous, no roll call. Any vote that is not, roll call.

**Options for votes are: for, opposed, abstain**

A supporting vote is “for”; Abstained or opposed are not votes are counted as votes in support.

----

No discussion during voting

reference number	Vote (for-opposed-abstain)	Pollinator Protection Committee Recommendation
1	9-0-0	A statewide moratorium on applications to ornamental plants accessible to pollinators with neonicotinoid products, applied by soil drench, trunk injection, foliar and basal bark sprays, for three years or until such time research can demonstrate rates at which treatment can be safe for pollinators. Research and management and treatment of invasive species would be exempted. Specifics could include: <ul style="list-style-type: none"> <li>· A moratorium on trunk injection of imidacloprid for ornamental plants on plants attracted to pollinators;</li> <li>· A moratorium on soil drenches of imidacloprid for ornamental plants;</li> <li>· A moratorium on foliar applications of imidacloprid and dinotefuran on ornamental plants attractive to pollinators;</li> <li>· A moratorium of foliar applications of clothianidin on turf unless mowing regiment can assure no exposure of flowers attractive to pollinators in the turf for one year past treatment;</li> <li>· A moratorium on basal bark sprays of dinotefuran for ornamental plants attractive to pollinators.</li> </ul>
1.5	8-1-0	Pesticides used in Vermont should be based on need, not used prophylactically.
2	7-2-0	The Agency of Agriculture, Food & Markets should classify all pesticides that contain neonicotinoid active ingredients as restricted use products (Vermont Class A). Exempt veterinary products, but we recommend research on the effects of these products on pollinators.
3	8-0-1	The Agency of Agriculture, Food & Markets should classify all pesticides with active ingredients that are highly toxic to bees [1] restricted use products (Vermont Class A).
5	4-1-4	The Agency of Agriculture, Food & Markets should prohibit the application of systemic pesticides that are highly toxic to bees to accessible pollinator attractive plants until after flowering. Exemptions for research with demonstrated limited risk and for the management of invasive species when effective alternatives are unavailable.
6 and 7	6-2-1	The Agency of Agriculture, Food & Markets will use its regulatory authority of treated articles to develop best management practices (BMPs) on planting neonicotinoid treated corn/soybean seed starting as soon as possible. They will not be permitted unless a quantifiable demonstrated need can be identified by scouting techniques.
10	9-0-0	The Agency of Agriculture, Food & Markets and UVM researchers, or similar research groups, should track neonicotinoid treated-seeds planted in fields and study whether there is a correlation to pollinator decline, or other non-target population impacts.
11	9-0-0	The Agency of Agriculture, Food & Markets should look into BMPs for planters of treated articles.
14	9-0-0	The Agency of Natural Resources, the Agency of Agriculture, Food & Markets, the Agency of Transportation should identify, evaluate, and support state land management practices in Vermont that promote pollinator habitat. These efforts should be coordinated with federal land agencies.
15	9-0-0	The Agency of Natural Resources, the Agency of Agriculture, Food & Markets, the Agency of Transportation should evaluate the impacts of terrestrial invasive plants as pollinator habitat and forage in state planning.
16	9-0-0	The Agency of Natural Resources, the Natural Resources Conservation Service (NRCS), the UVM Extension Service and the Agency of Agriculture, Food & Markets should promote establishment, enhancement, management pollinator habitats, in the buffers required by Act 64.

17	9-0-0	The Agency of Agriculture, Food & Markets and the Natural Resources Conservation Service (NRCS) should recognize and provide financial incentives and technical support for farmers who promote pollinator habitat on farms.
18	9-0-0	Research on agricultural practices that may be potentially destructive to pollinator habitat (e.g., hedgerow removal, tilling) and development of educational programs based on that research to limit impact to pollinator habitat should be promoted.
19	9-0-0	The Agency of Agriculture, Food & Markets should assess and promote the value of native pollinators in Vermont agriculture, reducing the need to import bees with unfavorable traits; this will benefit both honey bees and native pollinators.
20	9-0-0	The Agency of Agriculture, Food & Markets should provide financial allocations (grants, positions) to research institutions or beekeepers to develop and maintain Vermont honey bee genetics, as well as promote the benefits of Vermont-grown bees.
21	9-0-0	The Agency of Natural Resources should identify native pollinators most likely to be impacted by extreme weather/climate change and focus state efforts to conserve and improve their habitat in Vermont's long-term planning.
22	9-0-0	As extreme weather events disrupt and impact pollinators, local actions by Vermonters to limit climate change would improve opportunities for pollinator health. State outreach materials around climate change should reflect this impact.
23	9-0-0	The University of Vermont should create a dedicated Pollinator Extension position to address data gaps in both native and managed pollinators in Vermont. This position should also serve as a resource to beekeepers and other stakeholders in the state (e.g., nurseries).
24	9-0-0	Educational curricula for beekeepers should be designed by UVM Extension, or other university researchers, and the Agency of Agriculture, Food & Markets and include identification of diseases, non-chemical management strategies of pests and pathogens, proper use of chemicals and thresholds, other good management practices that incorporate the 5 pillars of health, and the potential impacts of poor management on honey and native bees.
25	9-0-0	The Agency of Agriculture, Food & Markets and the UVM Extension Service should allocate increased resources to track and improve Vermont's pollinator pathogen and pest data.
26	9-0-0	Increased resources should be allocated to the Vermont Agency of Agriculture, Food & Markets to ensure compliance with current state apiary laws, including hive registration and inspections.
27	9-0-0	The Agency of Agriculture, Food & Markets should have expanded regulatory authority over honeybee or other bee imports.
28	8-0-1	Vermont Agency of Agriculture, Food & Markets should not renew the special registration of coumaphos (Checkmite+) for the in-hive control of varroa mites by beekeepers within the state of Vermont.
29	8-0-1	The Vermont Agency of Agriculture should explore creation of a POLLINATOR PROTECTION FUND and identify funding mechanisms that supports work to protect pollinator health and that do not have a negative impact to farmers in Vermont.
30	9-0-0	The Agency of Natural Resources should follow the following recommendations in land use and planning: Land Use Management- Include pollinator habitat management in annual activities on Vermont Fish & Wildlife Department lands; Habitat Improvement-Work toward creating and improving habitat for a wide variety of animals important for pollination of native plants; Long-range wildlife management area (WMA) planning- Include pollinator habitat improvement and maintenance in long-range planning for Wildlife Management Areas around the state;

		Public relations- Encourage public recognition of the valuable ecological and economic services that pollinating animals provide.
--	--	---

reference number	Vote (for-opposed-abstain)	Pollinator Protection Committee Recommendation – <i>With Comments from EB (unable to attend last meeting)</i>
1	9-0-0	<p>A statewide moratorium on applications to ornamental plants accessible to pollinators with neonicotinoid products, applied by soil drench, trunk injection, foliar and basal bark sprays, for three years or until such time research can demonstrate rates at which treatment can be safe for pollinators. Research and management and treatment of invasive species would be exempted. Specifics could include:</p> <ul style="list-style-type: none"> <li>· A moratorium on trunk injection of imidacloprid for ornamental plants on plants attracted to pollinators;</li> <li>· A moratorium on soil drenches of imidacloprid for ornamental plants;</li> <li>· A moratorium on foliar applications of imidacloprid and dinotefuran on ornamental plants attractive to pollinators;</li> <li>· A moratorium of foliar applications of clothianidin on turf unless mowing regiment can assure no exposure of flowers attractive to pollinators in the turf for one year past treatment;</li> <li>· A moratorium on basal bark sprays of dinotefuran for ornamental plants attractive to pollinators.</li> </ul> <p><i>I vote in favor.</i></p>
1.5	8-1-0	<p>Pesticides used in Vermont should be based on need, not used prophylactically.</p> <p><i>I would vote in favor of this recommendation. Integrated Pest Management should be the foundation of any grower program regardless of crop. Demonstrating a need for a pesticide application does not have to be some great endeavor or burden for a grower. They should be able to articulate that need and have a record of their specific pest pressures for that growing year.</i></p>
2	7-2-0	<p>The Agency of Agriculture, Food &amp; Markets should classify all pesticides that contain neonicotinoid active ingredients as restricted use products (Vermont Class A). Exempt veterinary products, but we recommend research on the effects of these products on pollinators.</p> <p><i>I would vote in favor. I believe that neonicotinoids are not inherently more dangerous to pollinators than the other powerful chemistries on the market; however, they still can be hazardous. If a grower wants access to these products they should get their applicators license. Restricting the use of all neonicotinoids will allow the State of Vermont to better track and analyze their use and allow for future studies of their impact to be more comprehensive.</i></p>
3	8-0-1	<p>The Agency of Agriculture, Food &amp; Markets should classify all pesticides with active ingredients that are highly toxic to bees [1] restricted use products (Vermont Class A).</p> <p><i>Abstain. When I agreed to be on this board my hope was to find a balance between the need to increase Vermont’s measures toward protecting pollinators as they relate to pesticide use and the need to limit the burden of these protection measures on our farming and business communities. This recommendation would effectively clear the shelves of all Class B&amp;C pesticide dealers. While at the same time, I have absolutely no problem asking people who want to use these chemistries to get an applicators license or hire a licensed professional to apply them. This measure, in my opinion, would go too far, too fast. It would need to be implemented in stages or introduced over time. My concern is that when our lawmakers look at</i></p>

		<i>a recommendation like this it will trigger some of them to dismiss our entire body of work and the opportunity to positively impact our pollinators will be missed.</i>
5	4-1-4	<p>The Agency of Agriculture, Food &amp; Markets should prohibit the application of systemic pesticides that are highly toxic to bees to accessible pollinator attractive plants until after flowering. Exemptions for research with demonstrated limited risk and for the management of invasive species when effective alternatives are unavailable.</p> <p><i>Opposed. This recommendation is too vague. It would need to be crop by crop and chemical specific. There are way too many “what if” scenarios that could be problematic to growers in any given crop and pest year.</i></p>
6 and 7	6-2-1	<p>The Agency of Agriculture, Food &amp; Markets will use its regulatory authority of treated articles to develop best management practices (BMPs) on planting neonicotinoid treated corn/soybean seed starting as soon as possible. They will not be permitted unless a quantifiable demonstrated need can be identified by scouting techniques.</p> <p><i>In favor. IPM and BMPs should be the cornerstone of growing any crop.</i></p>
10	9-0-0	<p>The Agency of Agriculture, Food &amp; Markets and UVM researchers, or similar research groups, should track neonicotinoid treated-seeds planted in fields and study whether there is a correlation to pollinator decline, or other non-target population impacts.</p> <p><i>In favor.</i></p>
11	9-0-0	<p>The Agency of Agriculture, Food &amp; Markets should look into BMPs for planters of treated articles.</p> <p><i>In favor.</i></p>
14	9-0-0	<p>The Agency of Natural Resources, the Agency of Agriculture, Food &amp; Markets, the Agency of Transportation should identify, evaluate, and support state land management practices in Vermont that promote pollinator habitat. These efforts should be coordinated with federal land agencies.</p> <p><i>In favor.</i></p>
15	9-0-0	<p>The Agency of Natural Resources, the Agency of Agriculture, Food &amp; Markets, the Agency of Transportation should evaluate the impacts of terrestrial invasive plants as pollinator habitat and forage in state planning.</p> <p><i>In favor.</i></p>
16	9-0-0	<p>The Agency of Natural Resources, the Natural Resources Conservation Service (NRCS), the UVM Extension Service and the Agency of Agriculture, Food &amp; Markets should promote establishment, enhancement, management pollinator habitats, in the buffers required by Act 64.</p> <p><i>In favor.</i></p>
17	9-0-0	<p>The Agency of Agriculture, Food &amp; Markets and the Natural Resources Conservation Service (NRCS) should recognize and provide financial incentives and technical support for farmers who promote pollinator habitat on farms.</p> <p><i>In favor.</i></p>
18	9-0-0	<p>Research on agricultural practices that may be potentially destructive to pollinator habitat (e.g., hedgerow removal, tilling) and development of educational programs based on that research to limit impact to pollinator habitat should be promoted.</p> <p><i>In favor.</i></p>
19	9-0-0	<p>The Agency of Agriculture, Food &amp; Markets should assess and promote the value of native pollinators in Vermont agriculture, reducing the need to import bees with unfavorable traits; this will benefit both honey bees and native pollinators.</p>

		<i>In favor.</i>
20	9-0-0	The Agency of Agriculture, Food & Markets should provide financial allocations (grants, positions) to research institutions or beekeepers to develop and maintain Vermont honey bee genetics, as well as promote the benefits of Vermont-grown bees. <i>In favor.</i>
21	9-0-0	The Agency of Natural Resources should identify native pollinators most likely to be impacted by extreme weather/climate change and focus state efforts to conserve and improve their habitat in Vermont's long-term planning. <i>In favor.</i>
22	9-0-0	As extreme weather events disrupt and impact pollinators, local actions by Vermonters to limit climate change would improve opportunities for pollinator health. State outreach materials around climate change should reflect this impact. <i>In favor.</i>
23	9-0-0	The University of Vermont should create a dedicated Pollinator Extension position to address data gaps in both native and managed pollinators in Vermont. This position should also serve as a resource to beekeepers and other stakeholders in the state (e.g., nurseries). <i>In favor.</i>
24	9-0-0	Educational curricula for beekeepers should be designed by UVM Extension, or other university researchers, and the Agency of Agriculture, Food & Markets and include identification of diseases, non-chemical management strategies of pests and pathogens, proper use of chemicals and thresholds, other good management practices that incorporate the 5 pillars of health, and the potential impacts of poor management on honey and native bees. <i>In favor.</i>
25	9-0-0	The Agency of Agriculture, Food & Markets and the UVM Extension Service should allocate increased resources to track and improve Vermont's pollinator pathogen and pest data. <i>In favor.</i>
26	9-0-0	Increased resources should be allocated to the Vermont Agency of Agriculture, Food & Markets to ensure compliance with current state apiary laws, including hive registration and inspections. <i>In favor.</i>
27	9-0-0	The Agency of Agriculture, Food & Markets should have expanded regulatory authority over honeybee or other bee imports. <i>In favor.</i>
28	8-0-1	Vermont Agency of Agriculture, Food & Markets should not renew the special registration of coumaphos (Checkmite+) for the in-hive control of varroa mites by beekeepers within the state of Vermont. <i>Abstain. This is for the Vermont Agency of Agriculture and the beekeeping community to decide.</i>
29	8-0-1	The Vermont Agency of Agriculture should explore creation of a POLLINATOR PROTECTION FUND and identify funding mechanisms that supports work to protect pollinator health and that do not have a negative impact to farmers in Vermont. <i>In favor.</i>
30	9-0-0	The Agency of Natural Resources should follow the following recommendations in land use and planning: Land Use Management- Include pollinator habitat management in annual activities on Vermont Fish & Wildlife Department lands; Habitat Improvement-Work toward creating and improving habitat for a wide variety of animals important for pollination of native plants;

		<p>Long-range wildlife management area (WMA) planning- Include pollinator habitat improvement and maintenance in long-range planning for Wildlife Management Areas around the state;</p> <p>Public relations- Encourage public recognition of the valuable ecological and economic services that pollinating animals provide.</p> <p><i>In favor.</i></p>
--	--	---