ANNUAL REPORT OF THE AGRICULTURAL INNOVATION BOARD

2021 Act No. 49, codified at 6 V.S.A. § 4964(c)(1)

Submitted to the:

General Assembly

By the:

Agricultural Innovation Board and the Vermont Agency of Agriculture, Food & Markets

January 15, 2025

6 V.S.A. § 4964(c)(1) Powers and duties of the Board.

"The Agricultural Innovation Board shall:

(1) issue a report annually to the General Assembly on or before January 15 that recommends policy solutions to assist farmers in:

(A) reducing the use of and exposure to pesticides; and

(B) the use of innovative or alternative practices[.]" (Emphasis added.)

Contents

Introduction

On June 1, 2021, Governor Scott signed Act 49 into law and the Agricultural Innovation Board (the Board or AIB) was created. The Board is tasked with thirteen separate charges (Table 1). The Board has input in five additional areas of potential rulemaking, centered on developing recommendations for regulations establishing best management practices (BMPs) for seeds treated with insecticides used in Vermont agriculture (Table 2). The establishment of the Board and its responsibilities are codified at 6 V.S.A. §§ 1105a and 4964(a)-(d).

Pursuant to the enabling legislation, the Board shall provide an annual report to the General Assembly that recommends policy solutions to help farmers reduce their use of and exposure to pesticides, and to encourage the utilization of innovative or alternative practices. Throughout 2024, the AIB addressed its responsibility to develop a policy recommendation for the Secretary of Agriculture, Food and Markets regarding BMPs for the use of neonicotinoid treated article seeds and neonicotinoid pesticides (6 V.S.A. § 1105a). This document is the Board's annual report containing this recommendation, as well as a description of the Board's work, and an outline of the planned work for the coming year.

Board Meetings

Pursuant to 6 V.S.A. § 4964(b)(4), the Board is required to meet at least four times a year. Board Meetings in calendar year 2024 were held on January 22, February 26, March 25, May 20, July 22, August 26, October 28, and December 9. Minutes, recordings and materials presented from these meetings are maintained by the Agency of Agriculture, Food & Markets (the Agency) and are available on the AIB Website under "Meeting Information" at this link:
Meeting Information | Agency of Agriculture Food and Markets (vermont.gov)https://agriculture.vermont.gov/public-health-agricultural-resource-management-division/pesticide-programs/agricultural-innovation

Work of the Board

The Agricultural Innovation Board (the Board or AIB) has maintained its focus on pollinator health, neonicotinoid treated article seeds, and neonicotinoid pesticides throughout 2024. With the passage of Act 182 banning the use of neonicotinoid treated article seeds and neonicotinoid pesticides, the Board addressed its formal responsibility to develop additional policy recommendations for best management practices for the use of neonicotinoid treated article seeds and neonicotinoid pesticides by hearing presentations by expert witnesses and obtaining information relevant to the required topics outlined in 6 V.S.A § 1105a. The presentations made to the Board are retained by the Agency and are available on the AIB Website (Meeting Information | Agency of Agriculture Food and Markets (vermont.gov)).

The Board met seven times since the Neonicotinoid Pesticide Bill was introduced during the Legislative session, and four times since June 2024 when the Bill was officially passed. During these meetings, AIB members heard, among other topics, about the status of pollinators in Vermont and agricultural practices to support pollinators in addition to updates on UVM neonicotinoid treated seed research and corn pest monitoring. The AIB considered the following topics when developing their recommendation:

(A) establishment of threshold levels of pest pressure required prior to use of neonicotinoid treated article seeds or neonicotinoid pesticides;

(B) availability of nontreated article seeds that are not neonicotinoid treated article seeds;

(C) economic impact from crop loss as compared to crop yield when neonicotinoid treated article seeds or neonicotinoid pesticides are used;

(D) relative toxicities of different neonicotinoid treated article seeds or neonicotinoid pesticides and the effects of neonicotinoid treated article seeds or neonicotinoid pesticides on human health and the environment;

(E) surveillance and monitoring techniques for in-field pest pressure;

(F) ways to reduce pest harborage from conservation tillage practices; and

(G) criteria for a system of approval of neonicotinoid treated article seeds or neonicotinoid pesticides.

Summary of Neonicotinoid Relevant Information Received by AIB

5/20/2024

- Vermont Wild Bee Report, pollinator surveys and protection recommendations and future projects – Spencer Hardy, Vermont Center for Ecostudies
    - Bumble Bee Survey in 2014 found that there has been a simplification of bumble bee fauna with fewer species overall
        - Rusty Patched Bumble Bee is a federally listed endangered species and has not been seen in VT since early 2000s. Its decline is likely due to multiple factors including pesticides, habitat, and parasite or pathogen introduction
        - Drastic decline in bumble bee species since 1990s is likely due to introduction of pathogen from commercial bumble bee hives
    - VT Wild Bee Survey (2019-2022) conducted with objective to find and identify all species of wild bees in Vermont – over 353 species were identified with 88% being ground nesting bees
    - Since pollinator surveys are relatively recent, it is hard to compare current populations to historical data
    - Recommendations to improve pollinator habitat included: establishing flowering shrubs in areas not in production; learning more about the impact of tillage and black plastic on ground nesting bees; and, avoiding pesticide sprays during crop bloom and when there are blooming crops in the surrounding areas

7/22/2024

- H. 706 / Act 182 An act relating to banning the use of neonicotinoid pesticides: Overview and AIB responsibilities - Morgan Griffith, Agency of Agriculture, Food & Markets
    - Reviewed details of Act 182 as passed and AIB responsibilities
- Neonicotinoid Best Management Practices (BMPs) Resources and Summary Chart
    - A comprehensive list of neonicotinoid treated seed BMPs and neonicotinoid pesticide BMPs provided and summarized

- BMPs for neonicotinoid pesticide use prioritization survey was distributed to AIB members for their input on BMPs to include in the Agency of Agriculture, Food and Markets rulemaking process relevant to use of neonicotinoid pesticides
    - Nine AIB members completed the BMP prioritization survey
    - BMPs that received high priority ranking from AIB members are recommended to be included in the draft rulemaking:
        - Use cultural, physical, and biological controls and select insect resistant/tolerant crop varieties to avoid or reduce pest risk.
        - Scout fields regularly and use economic thresholds to help determine if, when, and where to apply.
        - Use hot-spot spraying and banding where appropriate to reduce the amount of pesticide applied
        - Avoid a sequential foliar application of clothianidin/imidacloprid following a seed, soil, or foliar application of clothianidin/imidacloprid.
        - Consider using precision application technology (e.g., auto-steer, auto-boom shutoff, and variable rate sprayer) to avoid overspray, spray overlap, and higher than recommended application rates.
        - Avoid using pesticides or tank mixing pesticides and adjuvants that are known to synergize with each other creating a higher risk to pollinators
        - Use equipment appropriately (appropriate level of pressure on a well-calibrated and frequently maintained sprayer).
        - Use the coarsest droplet size possible without compromising the efficacy.
        - Monitor weather and apply during favorable conditions (wind speeds 3 to 15 mph, temperatures <85.F, relative humidity >50%, no temperature inversions).
        - Maintain at least a 25 ft spray buffer zone between the application area and surface water for ground applications and a 150 ft spray buffer zone for aerial applications.
        - Maintain a boom height no more than 4 ft above the canopy for ground applications and no more than 10 ft above the canopy for aerial applications.
        - Consider using drift retardants or spray additives within label guidance.
        - Consider using shielded sprayers if shields do not compromise uniform deposition.
        - Spray when wind direction is pointed away from non-target areas of concern, e.g. hives and pollinator habitat.
        - Use field buffers (i.e., beginning your application a certain distance from the edge of the field) as appropriate, especially if hives or plants that flower are close to the field being sprayed.
        - Mix and load pesticides away from waterbodies and ditches and use a designated spill containment surface. If a containment pad is unavailable, maintain a 25 ft distance from potential surface to groundwater conduits.

- Be prepared for potential spills by developing and maintaining an incident response plan.
- DO NOT pour leftover pesticide down a drain or in a single spot in a field.
- Avoid applying during rain or when soil is saturated which favors runoff. Avoid foliar applications if rain is predicted in the next 24 or 48 hours.
- Construct and maintain a vegetative filter strip at least 10 ft wide between the field edge and nearby down gradient aquatic habitat. Check product labels for exact width requirements, which may vary.
- Maintain grass or vegetation buffers near tile outlets, in drainage ways, and along field boundaries.
- Consider residue management practices such as adopting conservation tillage and planting a cover crop to help slow runoff.
- Use the lowest labeled application rate that will effectively control the pest. Recommended application rates vary with the target pest species. Avoid applying below labeled rates which can compromise efficacy and favor the development of insecticide resistance.
- Follow label restrictions for the maximum amount of clothianidin/imidacloprid allowed per acre, per application, per season, or per year. Pesticide applied as seed treatments counts toward maximum application rates.
- Always follow all label directions and adopt proposed risks mitigation practices when possible.
- Avoid applications during unusually low temperatures or when dew is forecast
- Leave a buffer strip of 2-3 feet between treated turf and the border of any landscape bed. This will minimize the potential for flowering ornamental roots to take up neonicotinoid insecticides
- Use perimeter trap crop treatments, refuge plantings, and other methods that prevent the entire field or population from being treated to help preserve susceptible individuals
- Time the application so that the most vulnerable insect life stage is exposed to the spray.
- choose the least toxic neonicotinoid without compromising efficacy
- Change crops in a sequence to disrupt pest cycles

- 2023 Seed Report – Jill Goss, Agency of Agriculture, Food & Markets
    - More compliance in seed reporting, many more dealers reported in 2023 compared to 2022
        - 39 seed distributers failed to file (last year 92 failed to file reports)
    - Over 2000 tons treated seed in all categories and about 1300 tons untreated
        - 37% untreated 78% treated
    - Single vs multiple treatment type distribution
        - 36% of treated seed reported didn't have treatment information
        - 50% had single treatment

            - Majority are fungicide treated
        - 14% had multiple treatments
    - Treatments in tons reported
        - 39% insecticide
            - Of the applied insecticides about 89% were neonics, and 11% were diamides
            - Clothianidin > thiamethoxam > chlorantraniliprole > imidacloprid
        - 31% fungicide
        - 26% nematicide

8/26/2024

Neonicotinoid Research Update - Heather Darby, PhD, Agronomic and Soils Specialist, University of Vermont Extension

- Repeated study comparing crop stands in treated and untreated seed plots saw far worse crop pest damage in 2024 than in 2023. Cold, wet spring delayed emergence and increased risk for pest damage.
- Preliminary data show that manure applications and standard tillage practices resulted in more pest damage, similar to previous published research that shows addition of organic matter and tillage increases pest incidence.
- Corn seed treatment trial preliminary data compared corn populations between untreated seeds, untreated seeds with bone meal added to increase risk of pest incidence, and seeds treated with spinosad, neonicotinoids, fungicide, or diamide.
    - Target corn populations were not reached with any treatment and saw significantly lower and unacceptable populations with the untreated control plots. There was no significant difference among the seed treatments
- Soybean seed treatment trial preliminary data showed the untreated seed with bone meal addition with significantly lower soybean populations than the untreated seed, diamide, and neonicotinoid treated seeds.
- Measured neonicotinoid levels in dust emitted during planting by placing slides varying distances from the planter to catch the dust potentially being emitted. As a positive control, a dust collection slide was also planted on the ground that the planter traveled over directly.
    - 2024 planting conditions were wet and not very windy. Only one out of five sites had detectable neonicotinoids, which were on the slide placed directly under the planter.
    - Dr. Darby has heard from colleagues and seed industry that seed treatments have changed since previously published dust-off research. This, in addition to the weather conditions during planting, could help explain the results.
- One more research trial to be conducted later in 2024 comparing talc and graphite to alternative fluency agents. Neonicotinoid levels in dust directly released from planter will be measured when seed is mixed with each fluency agent.

Farming Practices that Support Pollinators - Laura Johnson, University of Vermont Extension

- Laura Johnson, Pollinator Specialist with UVM Extension primarily works with vegetable and berry farms and has developed a Pollinator Support Plan resource to provide farmers guidance on production while supporting pollinators. A Pollinator Support Plan includes:

    - Farm information
    - Cover crop selection and management to choose varieties and practices that support and encourage pollinators
        - UVM Extension has asked farmers to collect pollinator health and abundance data
    - Established areas on farm as dedicated pollinator habitats
    - Mowing practices to improve food availability and pollinator refuge and habitats
    - Integrated pest management practices to protect pollinators while mitigating pests
    - Pollinator monitoring
    - Tillage practices that maintain soil-dwelling pollinator habitats
    - Water source management to maintain pollinator access to clean water
    - Managed pollinator practices that protect colony health and minimize threats to wild bee populations
- Pollinator Support Plan program in Vermont allows farmers to support pollinator protection efforts in the state
    - Welcome to Pollinator Support on Farms! | Vermont Vegetable and Berry Growers Association

Review of EPA Updated Occupational Exposure Assessment for Seed Treatment Uses for Three Neonicotinoids - Pam Bryer, PhD, Agency of Agriculture, Food & Markets

- Neonicotinoids currently going through registration review and on June 27, 2024, EPA Office of Pesticide Programs issued a memorandum updating the Occupational and Residential Exposure Assessment for Seed Treatment Uses
    - Human health risk assessment still stands from original 2017 publication
    - The changes stem from new information on exposure to humans while employed treating seeds
- Occupational handlers of neonicotinoids on-farm seed treatment with seed potatoes and occupational handlers cleaning seed treatment equipment identified as having exposures above level of concern while wearing currently required PPE.
    - There will be changes coming to pesticide labels, increasing required PPE, in response to these identified risks.
- EPA asking for more information from seed treatment companies and individuals
    - Type of equipment being used
    - Average rate of treatment on seed
    - Number of acres planted in one 8-hr day
    - What is the highest seeding density
- Currently AIB's BMPs focus on use and application

10/28/2024

2024 State/Federal Neonicotinoid Treated Seed Legislative/Administrative Activity - Gene Harrington, Senior Director, State Government Affairs, Agriculture & Environment, Biotechnology Innovation Organization

- Recent federal activity includes EPA issuance of advanced notice of proposed rulemaking for treated article seeds to solicit input on how EPA could more closely regulate treated seed

- Final interim decisions for registration review of neonicotinoid active ingredients are expected in 2025
- Recent state activity includes a new California law (California AB 1042) outlining labeling requirements for treated seed bag labels
    - Label must contain the signal word for the substance with highest level of toxicity
    - Beginning Jan 1, 2027, all pesticide treated seeds labels must include
        - EPA Reg No for each substance on treated seed
        - Quantity of each substance applied by weight or amount per seed
- On Oct 15, 2024, the Natural Resources Defense Council petitioned Minnesota Department of Agriculture (MDA) urging them to adopt rulemaking pertaining to regulation of neonic treated seed
    - MDA required to respond within 60 days
- Reviewed New York Birds & Bees Protection Act prohibiting certain uses of neonicotinoid treated seeds and neonicotinoid pesticides
- Washington became 13th state to restrict consumer/residential use of neonicotinoid pesticides

Neonicotinoid Treated Article Seeds and Neonicotinoid pesticides Best Management Practices Discussion and Recommendations

- Members provided initial comment and recommendations on draft BMP rule
    - Include tenets of IPM and reorder BMPs to reflect tenets of setting action thresholds, monitoring, using prevention or cultural methods first followed by pesticides if necessary.
    - Allow for flexibility for farmers within BMPs
    - Acknowledged lack of ornamental application expertise among membership

12/9/2024

Recommended Best Management Practices for Neonicotinoid Treated Article Seeds and Other Uses of Neonicotinoid Pesticides – Emily May, Agricultural Conservation Lead, Pesticide Program, The Xerces Society for Invertebrate Conservation

- Xerces Society's mission is to bridge science and practice to protect pollinators
- Compiled recommendations from numerous resources and experts
- Reviewed the comprehensive recommendation for BMPs for use of neonicotinoid treated seeds and neonicotinoid pesticides
    - Recommended BMPs built around basic IPM practices: monitoring, thresholds, and mitigating risks when neonicotinoids are used.
- Overarching idea is to identify what the minimum standards or practices that are enforceable with the indent to reduce the risk to pollinators
    - This document is a lot of detail and a lot of guidance, that doesn't necessarily have to be in rule
    - It makes sense to keep threshold levels and guidance that is subject to change outside of rule so that it can change as more research is conducted

AIB Recommendations

AIB members reviewed and recommended specific best management practices pulled from previously published neonicotinoid pollinator protection documents. Recommended BMPs for neonicotinoid

treated seed and neonicotinoid pesticides include Integrated Pest Management practices as well as practices that reduce the seed dust, spray drift and other potential non-target exposures:

- Use cultural, physical, and biological controls and select insect resistant/tolerant crop varieties to avoid or reduce pest risk.
- Scout fields regularly and use economic thresholds to help determine if, when, and where to apply.
- Use hot-spot spraying and banding where appropriate to reduce the amount of pesticide applied
- Avoid a sequential foliar application of clothianidin/imidacloprid following a seed, soil, or foliar application of clothianidin/imidacloprid.
- Consider using precision application technology (e.g., auto-steer, auto-boom shutoff, and variable rate sprayer) to avoid overspray, spray overlap, and higher than recommended application rates.
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- Use perimeter trap crop treatments, refuge plantings, and other methods that prevent the entire field or population from being treated to help preserve susceptible individuals
- Time the application so that the most vulnerable insect life stage is exposed to the spray.
- choose the least toxic neonicotinoid without compromising efficacy
- Change crops in a sequence to disrupt pest cycles

Members also reviewed recommended BMPs compiled by the Xerces Society developed with the support of local and regional experts in agriculture, entomology, and UVM Extension. Additional BMP recommendations include:

- Resistance management language including different modes of action in addition to different insecticide classes
- Exempt drone applications from any aerial application restrictions or prohibitions because of drone application ability to apply in a precise manner reducing likelihood of drift off target
- Increased communication among farmers, including land operators on leased land, and beekeepers with hives on premise: include communication from farmer/land operator to beekeeper as well as beekeeper to farmer/land operator
- Rule should be accompanied by a more comprehensive guidance document that includes more specific examples and can adjust with new research learnings. Guidance document can include information on creating pollinator habitat/

These recommendations are based on information gathered and presented to the Board. AIB members understand the legislative responsibility of the Agency of Agriculture, Food and Markets to adopt by rule BMPs for the use of neonicotinoid treated article seeds when used prior to the ban or under an exemption order and BMPs for the use of neonicotinoid pesticides when used prior to the ban, under exemption order, or when use is not otherwise prohibited. AIB has reviewed the rule drafted by the Agency and is in agreement that it includes their recommendations and fulfills the legislative charge.

Other Topics Discussed

In addition to addressing the responsibility of providing a recommendation of best management

practices for neonicotinoid treated seeds and neonicotinoid pesticides, the Board learned about potential future topics and other current legislative bills. The Board kept abreast of policy discussions and legislative actions concerning perfluoroalkyl and polyfluoroalkyl substances. The Board also heard presentations about microplastics research in VT, seed distributor reporting results in VT, and research relevant to agricultural pesticide applications by drone.

Agricultural Input Survey

6 V.S.A. § 4964(c)(3) states that the AIB shall "survey farmers from every county in the State to help better understand how agricultural inputs, such as pesticides, synthetic fertilizers, and plastics, are currently used as well as current challenges farmers face in reducing these inputs in order to better inform recommendations to be provided in the annual report required under subdivision (1) of this subsection." In 2024, AIB members decided to include a few survey questions about agricultural inputs as poll questions during the virtual Agricultural Pesticide Applicators Meeting in March 2024 as a way to potentially increase farmer participation. The Board received 55 responses, representing 10 counties. A summary of the responses can be found on the AIB website: Agricultural Innovation Board (AIB) 2024 Agricultural Inputs Survey Results (Round 1). Overall, when asked what environmental impacts are of concern when using agricultural inputs, respondents identified the following concerns (listed in order of most selected to least selected by participants); non-target pollinator exposure, disposal of farm materials that are no longer useful (tires, ag plastic, pesticides, etc.), non-target beneficials exposure, microplastics, PFAS (per- and polyfluoroalkyl substances), and non-target rodenticide exposure. The challenges to reducing use of agricultural inputs that cause environmental concern identified by most respondents are effectiveness and availability of alternatives, followed by cost and knowledge of alternatives.

These survey questions were also included in a larger survey disseminated by the UVM Entomology Research Laboratory to regional high tunnel growers and promoted at the New England Vegetable & Fruit Conference in December 2024. As of publication of this report, only five respondents were Vermont residents. The survey will remain open until late January/early February and more results are anticipated. Responses received to date represent three different Vermont Counties. All five respondents selected disposal of farm materials as a concern for impact on the environment and four out of five selected microplastics as an environmental impact of concern when using agricultural inputs. The lack of availability of alternatives and the lack of knowledge of available alternatives were selected by the majority of respondents as challenges faced when reducing agricultural inputs.

Taking these survey results into consideration, the Board will continue to learn and provide recommendations relevant to pollinator protection, in addition to introducing a new topic exploring disposal options for agricultural input waste and alternative agricultural inputs that have less environmental impact.

Board Work Plan for CY 2025

In addition to supporting the rulemaking process as needed for best management practices for the use of neonicotinoid treated seeds and neonicotinoid pesticides, the anticipated schedule of future issues

the Board will consider during the coming year is summarized in Table 2. This list does not include all the Board's charges. It will not be possible for the Board to develop policy recommendations for all issues within its purview during this next year.

The Board is comprised of many appointed volunteers who generously agreed to serve due to the importance of these topics to Vermont's agriculture and environment, and their dedication to serving the people of Vermont. These members have many other responsibilities, and it is necessary to annually prioritize the issues presented to them for consideration. The members must evaluate a considerable amount of information to enable the Board to develop any sound recommendations.

The menu of issues listed in Table 2 reflects these considerations as well as results from farmers surveyed. The Board will focus on the areas of concern that were identified through the surveys in CY 2025 to make effective progress toward fulfilling its many charges.

Information the Board needs for its discussions is also noted in the table. It should be recognized that some important information may still be in development over the next year and the Board will have to consider these deficits when evaluating policy recommendations and best management practices.

Public Participation with the Board

Pursuant to 1 V.S.A. §§ 310-314, and in compliance with Vermont's Open Meeting Law, Board Meetings are open to the public and are noticed by posting meeting information on the Agency of Administration's Department of Libraries public meeting calendar for State Agencies, as well as the Agency of Agriculture, Food and Markets' AIB Website, at least two weeks prior to each scheduled meeting. Information pertaining to any special meetings will be publicly posted at least 24 hours in advance of the Board's meeting. Meeting time, location, call-in number, and video meeting link are provided in the notices and agendas are both provided to members and posted publicly to the AIB Website at least 48 hours in advance of regular meetings and 24 hours in advance of special meetings. Time is allotted at each meeting for public comments. Interested persons are invited to attend the meetings as noticed.

Public comments received are included in the meeting minutes and written comments received have been posted on the AIB Website. In 2024, the Board received written public comment from The Xerces Society recommending best management practices for the use of neonicotinoid treated seeds and neonicotinoid pesticides.

Table 1. Agricultural Innovation Board Legislative Charges / Reporting Requirements as established in 6 VSA § 4964 (a) through (d).

Item	Responsibility/Charge
1	Review historic recommendations for pesticide reduction in the State and coordinate with existing work groups to avoid submitting to the General Assembly conflicting policy recommendations on the regulation of pesticides and farming.
2	Recommend practices that reduce the use of and exposure to pesticides and synthetic fertilizers in order to protect soil biology, human health, and environmental health, including recommended targets to achieve the State goal of an overall reduction in the use of pesticides consistent with sound pest or vegetative management practices.
3	Advise the Executive Branch and the General Assembly with respect to legislation concerning the use of agricultural pest control measures and integrated pest management.
4	Recommend to the Secretary of Agriculture, Food and Markets policies, proposed rules, or legislation for the regulation of the use of treated articles when the Board determines that use of a treated article will have a hazardous or long-term deleterious effect on the environment in Vermont, presents a likely risk to human health, or is dangerous. (Note: amended by Act 145, 2022; see Table 2).
5	Recommend practices to reduce the use and generation of waste associated with plastic in farming.
6	Incentivize farming practices that are looking to reduce the use and dependence on pesticides in their practices.
7	Advise the Agency with regard to the regulation of plant biostimulants.
8	Recommend studies necessary for the performance of its functions as established under this section.
9	Explore methods and standards for transitioning farmers to practices that reduce pesticide usage.
10	Explore methods and standards for farmers to engage in carbon sequestration or mitigation.
11	Review the seed traits of a new genetically engineered seed proposed for sale, distribution, or use in the State.
12	Study and issue recommendations regarding the feasibility of the use of biodegradable plastics in agriculture and the promotion of the use of and production of biodegradable plastics and similar products in Vermont.
13	Seed review. The Agricultural Innovation Board shall advise the Secretary regarding the sale, distribution, or use of genetically engineered seed in the State and may recommend to the Secretary limits or conditions on the sale, distribution, or use of a genetically engineered seed or seeds or recommend a limited period of time for sale of a genetically engineered seed or seeds.
	REPORTING
1	Issue a report annually to the General Assembly on or before January 15 that recommends policy solutions to assist farmers in: (A) reducing the use of and exposure to pesticides; and (B) the use of innovative or alternative practices.
2	Propose an annual budget report that provides ideas for funding sources for any new programs recommended in the annual report.
3	Survey farmers from every county in the State to help better understand how agricultural inputs, such as pesticides, synthetic fertilizers, and plastics, are currently used, as well as current challenges farmers face in reducing these inputs in order to better inform recommendations to be provided in the annual report required under subdivision (1) of this subsection.

Table 2. Agricultural Innovation Board Work Planned Focus Areas for CY 2025 (not necessarily in priority order).

Item	Responsibility/Charge	Informational Needs
1	Consult with Agency of Agriculture, Food & Markets and General Assembly through development and finalization of BMP rule for neonicotinoid treated seeds and neonicotinoid pesticides	Input from interested parties that are potentially impacted by proposed Neonicotinoid BMP Rule.
2	Recommend practices that reduce the use of and exposure to pesticides and synthetic fertilizers in order to protect soil biology, human health, pollinators and other beneficials, and environmental health, including recommended practices to achieve the State goal of an overall reduction in the use of pesticides consistent with sound pest or vegetative management practices.	Research and demonstration projects involving agricultural impacts and landscape management impacts on areas of AIB concern.
3	Recommend practices to reduce the use and generation of waste associated with plastic in farming.	Information relevant to agricultural plastic use within state, available alternatives, disposal options, and previous research and recommendations.
4	Advise the Executive Branch and the General Assembly with respect to legislation concerning the use of agricultural pest control measures and integrated pest management.	Legislation concerning the use of agricultural pest control measures and integrated pest management introduced in the 2024/2025 Legislative Session.
5	Recommend studies necessary for the performance of its functions as established under this section.	Studies needed to provide information not currently available to better understand: status of pollinators in VT; effective and available alternatives to neonicotinoids; and, pest risk assessment program development to determine treatments needed on seed.
6	Survey farmers from every county in the State to help better understand how agricultural inputs, such as pesticides, synthetic fertilizers, and plastics, are currently used, as well as current challenges farmers face in reducing these inputs in order to better inform recommendations to be provided in the annual report required under subdivision (1) of this subsection.	Results of the survey of farmers conducted per 6 VSA §4964 (c) 3.
7	Review historic recommendations for pesticide reduction and agricultural waste disposal in the State and coordinate with existing work groups to avoid submitting to the General Assembly conflicting policy recommendations on the regulation of pesticides and farming.	Recommendations from other extant groups evaluating pesticides, agricultural waste, and related issues in Vermont.

Appendix A: Board Members

Wendy Sue Harper, Ph.D. - Soil Biologist, Professor Emeritus, Prescott College, University of Vermont [AIB Role Fulfillment: Soil Biologist]

Amanda St. Pierre - Dairy Farmer, Pleasant Valley Farms [AIB Role Fulfillment: an active farmer who is a member of an organization representing the conventional dairy industry in Vermont]

Fitzroy Beckford, Ph.D. - Associate Dean and Director of UVM Extension in the College of Agriculture and Life Sciences [AIB Role Fulfillment: a member from the University of Vermont Center for Sustainable Agriculture]

Ann Hazelrigg, Ph.D. - Extension Associate Professor, Department of Plant and Soil Science / Director, Plant Diagnostic Clinic, UVM [AIB Role Fulfillment: an active farmer who is a member of an organization representing fruit and vegetable farmers in Vermont]
Appointment concluded March 28, 2024

Nathan Nourse – Crop Consultant, blueberry farmer [AIB Role Fulfillment: an active farmer who is a member of an organization representing fruit and vegetable farmers in Vermont]
Appointment commenced March 28, 2024

Jonathan Chamberlin - Ag Retail/Crop Consultant, Bourdeau Brothers [AIB Role Fulfillment: a certified crop consultant]

Abbi Pajak - Environmental Analyst, Department of Environmental Conservation, Agency of Natural Resources [AIB Role Fulfillment: the Secretary of Natural Resources or designee]

Earl Ransom - Organic Dairy Farmer, Rockbottom Farm [AIB Role Fulfillment: an active farmer who is a member of an organization representing the organic farming community]
Appointment concluded September 6, 2024

Brian Kemp – Manager, Mountain Meadows Farm [AIB Role Fulfillment: an active farmer who is a member of an organization representing the organic farming community]
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Ryan Rebozo, Ph.D. - Director of Conservation Science, Vermont Center for Ecostudies [AIB Role Fulfillment: a member of an environmental organization that advocates for policy regarding the management or reduction of toxic substances in the State]

Steven Schubart - Grass-fed beef operation owner, Grass Cattle Company [AIB Role Fulfillment: an active farmer who is a member of an organization representing grass-based, non-dairy livestock farming in Vermont]

Sarah Owen, Ph.D. - State Toxicologist, Department of Health, Agency of Human Services [AIB Role Fulfillment: the Commissioner of Health or a designee with expertise in the effects of pesticides on human health]
Appointment concluded October 7, 2024

Pamela Wadman - Senior Environmental Health Risk Assessor, Environmental Health Division, Vermont Department of Health [AIB Role Fulfillment: the Commissioner of Health or a designee with expertise in the effects of pesticides on human health]
Appointment commenced October 7, 2024

Laura DiPietro - Director, Water Quality Division, Agency of Agriculture, Food & Markets [AIB Role Fulfillment: the Director of the Agency of Agriculture, Food and Markets, Water Quality Program or designee]

Morgan Griffith - Agrichemical Program Manager, Public Health and Agricultural Resource Management Division, Agency of Agriculture, Food & Markets [AIB Role Fulfillment: the Director of the Agency of Agriculture, Food and Markets, Agrichemical Program or designee]

Steven Dwinell - Director, Public Health and Agricultural Resource Management Division, Agency of Agriculture, Food & Markets [AIB Role Fulfillment: the Secretary of the Agency of Agriculture, Food and Markets or designee]

Appendix B: Agricultural Innovation Board Recommendations Regarding Best Management Practices (BMPs) For Neonicotinoid Treated Article Seeds

AGRICULTURAL INNOVATION BOARD RECOMMENDATIONS REGARDING BEST MANAGEMENT PRACTICES (BMPs) FOR NEONICOTINOID TREATED ARTICLE SEEDS

2022 Act No 49, codified at 6 V.S.A. § 1105a (c)
Submitted to the:

Secretary of Agency of Agriculture, Food and Markets

By the:

Agricultural Innovation Board

January 2, 2024

6 V.S.A. § 1105a (c) (1)-(2) Treated articles; powers of Secretary; best management practices

(c)(1) Under subsection (a) of this section, the Secretary of Agriculture, Food and Markets, after consultation with the Agricultural Innovation Board, shall adopt by rule BMPs for the use in the State of neonicotinoid treated article seeds. In developing the rules with the Agricultural Innovation Board, the Secretary shall address:

(A) establishment of threshold levels of pest pressure required prior to use of neonicotinoid treated article seeds;

(B) availability of nontreated article seeds that are not neonicotinoid treated article seeds;

(C) economic impact from crop loss as compared to crop yield when neonicotinoid treated article seeds are used;

(D) relative toxicities of different neonicotinoid treated article seeds and the effects of neonicotinoid treated article seeds on human health and the environment;

(E) surveillance and monitoring techniques for in-field pest pressure; (F) ways to reduce pest harborage from conservation tillage practices; and (G) criteria for a system of approval of neonicotinoid treated article seeds.

(2) In implementing the rules required under this subsection, the Secretary of Agriculture, Food and Markets shall work with farmers, seed companies, and other relevant pares to ensure that farmers have access to appropriate varieties and amounts of untreated seed or treated seed that are not neonicotinoid treated article seeds.

Contents

Introduction

The Agricultural Innovation Board (the Board or AIB) is an independent group of interested pares created by Legislature in 2021. The members are charged to use their diverse set of experience and knowledge to review, explore, and make recommendations on pest management practices and policy in Vermont.

Throughout 2022 and 2023, the AIB addressed its responsibility to develop a policy recommendation for the use of neonicotinoid treated article seeds by hearing from expert witnesses and obtaining information relevant to the required topics outlined in 6 V.S.A § 1105a. The presentations made to the Board available on the AIB Website (Meeting Information | Agency of Agriculture Food and Markets (vermont.gov)).

The Board met 17 times since February 2022 and members reviewed relevant literature and research on their own between meetings. The Board invited researchers, industry representatives, agricultural service providers, and subject mater experts to present their findings and answer questions from the Board to inform their recommendation for best management practices for the use of neonicotinoid treated seeds in Vermont. Each of the following topics were addressed:

(A) Establishment of threshold levels of pest pressure required prior to use of neonicotinoid treated article seeds
(B) Availability of nontreated article seeds that are not neonicotinoid treated article seeds
(C) Economic impact from crop loss as compared to crop yield when neonicotinoid treated article seeds are used
(D) Relative toxicities of different neonicotinoid treated article seeds and the effects of neonicotinoid treated article seeds on human health and the environment
(E) Surveillance and monitoring techniques for in-field pest pressure
(F) Ways to reduce pest harborage from conservation tillage practices
(G) Criteria for a system of approval of neonicotinoid treated article seeds

Key Takeaways by Topic

AIB members worked together after hearing from 14 external subject matter experts and presentations from six Board members and/or Agency staff to summarize what they had learned and if there were any gaps or outlying questions to address. The following points were agreed upon by all members as the summary of what members heard relevant to each required topic included in 6 V.S.A. § 1105a. The boldfaced headings align with the statutory charge enumerated in 6 V.S.A. § 1105a(c)(1).

(A) Establishment of threshold levels of pest pressure required prior to use of neonicotinoid treated article seeds (E) Surveillance and monitoring techniques for in-field pest pressure

- Seed purchasing occurs months ahead of the season (September – November prior to April/May planting). Therefore, scouting the field for pests in the current year cannot influence what type of seeds to purchase and plant. Also, the previous year's pest pressure levels are not a clear indicator of pest levels in the current year.
- Few methods are available for scouting for corn seed maggot and no economic thresholds are established for this pest.

- It is very challenging to monitor soil pests to determine if threshold values are exceeded within the window of time prior to planting in Vermont.
- Monitoring the emergence of corn seed maggot flies through in-field scouting and growing degree day calculators offers growers an option to time planting between emerging fly generations to reduce risk of crop damage.
    - There can be multiple generations of corn seed maggot in VT, but the first generation causes the most significant damage, especially when the corn is slow to germinate.
- Corn seed maggot is unpredictable. It can appear before or after planting. Corn is vulnerable to corn seed maggot damage 7-30 days from planting, and there is no insecticide rescue treatment.
- Wireworm bait traps within field help scout for pest and have an established economic threshold of an average of 1 wireworm per bait station for the whole field.
    - Ideally scouting should be done in fall when temperatures are above 45°F.
- The use of genetically engineered (GE) corn seed to reduce corn borer has reduced overall population of corn borer moth, which is well documented in the literature. The use of this technology has benefited farms that do not use GE corn because of overall population reduction.
- Relevant AIB meeting presentations and discussions

    3/27/2023

    Vermont Corn and Soybean Pest Pressures, IPM and Neonicotinoid Treated Seed Research and Availability - Dr. Heather Darby, UVM Extension

    6/26/2023

    Seed Corn Maggot, Stand Losses and the Need for Insecticide Seed Treatments - Elson Shields, Cornell University

    7/24/2023

    Neonicotinoid Treated Seed and IPM in PA - Dr. John Tooker, Professor of Entomology / State IPM Coordinator, Penn State College of Agricultural Sciences

    8/28/2023

    Stoner, K. Best Management Practices for Farmers Using Seeds Treated With Neonicotinoid Insecticides, Connecticut Department of Agriculture online publication

(B) Availability of nontreated article seeds that are not neonicotinoid treated article seeds

- There is limited availability of untreated corn seed, and there are limited untreated varieties and maturities offered.
- Untreated seed orders add complexity to seed demand planning for the seed industry and therefore orders for untreated seed must be made even earlier.
    - Untreated seed must be ordered in Sept/Oct for the next planting season. However, the ability to switch maturities, hybrid varieties or from grain to silage closer to the planting season depending on conditions adds extreme complexity for the seed industry.
        - It is relatively common for farmers to need to switch maturities or hybrids depending on growing season conditions.
        - That flexibility is not available when a farmer purchases untreated seeds.
- Adding a fungicide-only or non-neonic treated seed option would create exponential complexity within the seed industry since seed production is a multistep and multiyear process.

    - GE technologies require the application of an insecticide to protect industry traits, therefore some trait seeds would not be available in a fungicide-only treatment.
- Limiting seed options for VT farmers would put them at a disadvantage in terms of having options and flexibility in seed performance, seed choices, and would make it more difficult for farmers to adapt to climate change.
- Untreated soybean seed is slightly more common with higher sales in VT.
    - Soybean is more likely to be treated downstream by an in-state seed dealer who is certified to apply a pesticide to the seed.
- Planting a seed without insecticide treatment is considered a liability.
    - Crop insurance premiums could increase because of the increase in perceived risk to the crop.
- Fungicide-only treated seeds are difficult to obtain.
- There are no price savings for untreated seeds.
- Diamide (neonicotinoid alternative) treated seeds are available and commonly/exclusively used in Canada because of regulations.
    - Diamide treated seeds are more expensive than neonicotinoid treated seeds
    - Diamide's relative toxicity to bees is less than neonicotinoids, but toxicity to aquatic invertebrates is similar
    - i.e. Fortenza (cyantraniliprole) registered in 2015
    - i.e. Lumivia (chlorantraniliprole) registered in 2016
- Cimegra is an alternative insecticide (active ingredient broflanilide) that is recently available as in-furrow treatment for soil insects in field crops.
    - 20-26 days after plant protection
    - The majority of planters used do not have the capability to make this type of application since the introduction of treated seed.
    - This insecticide has toxicity to bees similar to the neonicotinoids.
- Relevant AIB meeting presentations and discussions

  1/23/2023

  Seed Sales in VT Update - Vermont Agency of Agriculture, Food and Markets

  2/27/2023

  Update on 2022 Treated and Untreated Seed Reporting - Vermont Agency of Agriculture, Food and Markets

  3/27/2023

  Vermont Corn and Soybean Pest Pressures, IPM and Neonicotinoid Treated Seed Research and Availability - Dr. Heather Darby, UVM Extension

  4/24/2023

  2022 Seed Report Update - Jill Goss, Vermont Agency of Agriculture, Food and Markets

  6/26/2023

  Treated Seed Availability and Sales Logistics (Corteva Agriscience) – meeting minutes

  6/26/2023

  Ontario Neonicotinoid Treated Seed Regulations and Related Research - Tracey Baute, Ontario Ministry of Agriculture, Food and Rural Affairs

(C) Economic impact from crop loss as compared to crop yield when neonicotinoid treated article seeds are used

- Research comparing fungicide-only treated seed to neonicotinoid and fungicide treated seed shows inconsistent yield differences, if any. No clear trend for increased yield with neonicotinoid treated seeds compared to untreated or fungicide-only treated seed is evident from the sources reviewed.
- Smith, Baute, Schaafsma, 2020 Ontario study found a significant difference in "vigor" with neonicotinoid treated corn seed compared to fungicide only, but did not translate to a significant yield increase.
    - Chance of cost recovery of neonicotinoid treated seed use occurred in < 50% of study sites
    - Early season soil insect pests were not uncommon ○ Poor relationship between insect incidence and yield loss
    - Early season insect pests found in Ontario are generally minor, causing sub-economic injury
- Shields 2022 research at Cornell University showed the assumed cost of yield loss seen in research plots planted with corn seed without insecticide exceeded the cost of the corn seed maggot seed treatment (the yield loss is greater than the cost of the treatment). It makes sense for farmers to use the seed treatment as an insurance policy because there is no additional cost to the farmer to use.
    - When corn seed maggot is a problem in the field the losses are catastrophic, resulting in having to replant
- There would not be an immediate increase in insurance premiums if growers choose to plant non-neonic treated seeds, however, if there is a change to growers' choices that leads to consistent increases in losses then there may be increases in premiums in future years with a demonstrated loss.
    - An increase in premiums has a regional effect
- There is opportunity to learn economic impacts of using untreated seed and planting later in the season to avoid peak pest pressures.
    - A shorter maturity (approx. 75-day) silage corn exists, but it may not be what VT farmers need or want for optimal feed production.
- Relevant AIB meeting presentations and discussions

    6/26/2023

    Efficacy and Economic Benefits of Neonicotinoid Seed Treatments - Christine Hazel, Corteva Agriscience

    6/26/2023

    Seed Corn Maggot, Stand Losses and the Need for Insecticide Seed Treatments - Elson Shields, Cornell University

    6/26/2023

    Ontario Neonicotinoid Treated Seed Regulations and Related Research - Tracey Baute, Ontario Ministry of Agriculture, Food and Rural Affairs

8/28/2023

Neonicotinoids in NY State: Economic Benefits and Risks to Pollinators - Dr. Scott McArt, Associate Professor of pollinator health, Department of Entomology, Cornell University

9/25/2023

UVM Neonicotinoid Treated Seed Research Update – Dr. Heather Darby, UVM Extension – meeting minutes

11/13/2023

Potential impact of non-neonicotinoid treated seeds to crop insurance discussion – Alexander Sereno, Regional Director USDA Risk Management Agency – meeting minutes

(D) Relative toxicities of different neonicotinoid treated article seeds and the effects of neonicotinoid treated article seeds on human health and the environment

- Review of EPA human health risk assessment for imidacloprid
    - Residue on food crop from neonicotinoid seed treatment use is negligible; therefore, food crops grown from treated seeds are unlikely to present a health risk.
    - Very little risk for exposure to the farmer when seed is purchased already treated
    - Neonicotinoids have favorable human health profile compared to the organophosphate insecticides they replaced.
- Review of EPA ecological risk assessment of neonicotinoid ○ Most likely risk of concern for mammals and birds is from chronic consumption of treated seed
    - Imidacloprid, clothianidin and thiamethoxam are classified as highly toxic to honeybees (acute and chronic toxicities)
        - Neonicotinoids can have sublethal impacts on honeybee physiology, reproduction and behavior
    - Proposed mitigation measures relevant to treated seed include proposal of additional seed bag label language
        - "Cover or collect treated seeds spilled during loading and planting in areas (such as in row ends)."
        - "Dispose of all excess treated seed by burying seed away from bodies of water."
        - "Do not contaminate bodies of water when disposing of planting equipment wash water."
    - EPA stated "These risk mitigation measures were considered with the understanding of the high benefits associated with seed treatment uses, which through their use, have the potential to reduce overall neonicotinoid exposure and offer a lower overall ecological risk compared to foliar uses."
- Neonicotinoids are highly water soluble and persist in the soil.
- Fate and transport of neonicotinoids on the treated seed
    - 2-20% taken up by the target plants (protect from soil pests for up to 3 weeks)
    - 2-3% lost as dust during planting

    - > 90% moves into soil, water, non-target plants
- 1-3% of the acreage treated with a neonicotinoid (clothianidin or thiamethoxam) is treated by foliar or in-furrow treatments, the remainder is through seed treatments.
- The amount of active ingredient per seed is considerably less than in-furrow treatments.
- Seed treatment is considered an Integrated Pest Management (IPM) strategy by the seed industry because of lower usage rates and targeted treatment to the seed.
- Canada's PMRA investigated honeybee mortalities and found that exposure to neonicotinoids in dust generated during planting of treated corn or soybean seed with vacuum planters contributed to the mortalities observed.
    - Resulting regulation prohibits the use of talc and graphite as seed lubricants in vacuum planters. Recommend using a dust-reducing fluency agent.
    - UVM evaluated seed lubricants available in VT, most growers use talc or graphite, but a dust-reducing fluency agent was available at the local dealer.
- Sources of neonicotinoid exposures to non-target species come from:
    - Exhausted dust from vacuum planters
    - Farmers treating their own seed.
    - Soil dust carried over from previous season moved by any activity in the field and by also contributing to abrasion of seed
    - Surface water after rain event within fields and adjacent to fields from fugitive dust
    - Residues blown onto flowering resources including weeds and tree blossoms
- 98% of abrasion comes from soil through the intake of vacuum planters – the solution is to prefilter followed by post-filter BUT planter modification is not a viable option for VT growers at this time.
- Dust exhausted from vacuum planters that is directed back towards the soil is harmful to ground-dwelling beneficial invertebrates.
    - Dust contains protein and therefore can be attractive to pollinators
- Current UVM studies by Heather Darby are looking at the impact of neonicotinoid treated seeds on plant stands and pest populations. They are monitoring soil and surface water runoff for neonicotinoid levels.
    - Pest levels were low overall across both neonicotinoid treated seed and fungicide only treated seed treatments.
    - Still collecting yield data, but no significant differences across treatments to date and little to no pest incidence data.
    - Only one year of a two-year study has been completed.
- Relevant AIB meeting presentations and discussions

  5/23/2022

  Pollinator Protection Efforts in VT – Dr. Terence Bradshaw, Assistant Professor, Plant & Soil Science, UVM

  3/27/2023

  Environmental Impact of Neonicotinoid Treated Seeds Literature Review - Vermont Agency of Agriculture, Food and Markets

  3/27/23

Environmental Impact of Neonicotinoid Treated Seed Annotated Bibliography

3/27/2023

Literature review of risk assessment of neonicotinoid treated seeds on human health – Sarah Owen, Toxicologist, Vermont Department of Health – meeting minutes

4/24/23

Impact of Neonicotinoid Treated Seed on Pollinator Health - Andrew Munkres, Vermont Beekeepers Association

4/24/23

Summary EPA Neonicotinoid Ecological Risk Assessment - Morgan Griffith, Vermont Agency of Agriculture, Food and Markets

5/22/23

Review of Treated Seed Dust-Off Research - Jill Goss, Vermont Agency of Agriculture, Food and Markets

5/22/23

Dr. Schaafsma Planter Modifications Resources and Summary - Jill Goss, Vermont Agency of Agriculture, Food and Markets

6/26/2023

Natural Resources Defense Council Public Comment and References - Lucas Rhoads, Natural Resources Defense Council

7/24/2023

Neonicotinoid Treated Seed and IPM in PA - Dr. John Tooker, Professor of Entomology / State IPM Coordinator, Penn State College of Agricultural Sciences

8/28/23

Neonicotinoids in NY State: Economic Benefits and Risks to Pollinators - Dr. Scott McArt, Associate Professor of pollinator health, Department of Entomology, Cornell University

9/25/2023

UVM Neonicotinoid Treated Seed Research Update – Dr. Heather Darby, UVM Extension – meeting minutes

(F) Ways to reduce pest harborage from conservation tillage practices

- Conservation tillage practices can reduce corn seed maggot populations because plant residues occur mainly on surface of the soil rather than being incorporated into the soil where decomposition occurs.
    - No-till conservation tillage practices are less attractive to corn seed maggot because organic matter isn't exposed
    - Corn seed maggot populations are generally higher after a legume crop is incorporated into the soil than where grass is incorporated
    - Greatest wireworm damage occurs in crops planted in fields following grass sod
- No-till practices provide habitat for beneficial organisms and increased predator populations decreases pest problems (supported by Penn State research and widespread practice amongst PA growers)

- There is a relationship between type of tillage practice and resulting pest pressures.
    - The situation is complex in VT because manure and cover crop incorporation are common and recommended practices.
    - More research is needed on this relationship in Vermont.
        - Relevant AIB meeting presentations and discussions

        3/27/2023

        Vermont Corn and Soybean Pest Pressures, IPM and Neonicotinoid Treated Seed Research and Availability - Dr. Heather Darby, UVM Extension – meeting minutes

        7/24/2023

        Neonicotinoid Treated Seed and IPM in PA - Dr. John Tooker, Professor of Entomology / State IPM Coordinator, Penn State College of Agricultural Sciences

(G) Criteria for a system of approval of neonicotinoid treated article seeds

- Canada has federal-level prohibition of talc and graphite as seed lubricants to reduce the risk of neonicotinoid seed treatments abrading off of the seeds during planting.
    - Published Best Management Practices for Protecting Pollinators When Using Treated Seed
    - Requirement when using Treated Corn/Soybean Seed
- Ontario
    - Provincial regulations require IPM certification (one time, no expiration date) and Pest Assessment Report (formalized scouting report, one time, no expiration) used to gain access to neonicotinoid treated seeds on entire farm property.
    - requirements placed on farmers and technical service providers by provincial regulations were too burdensome to administer the program and therefore were scaled back.
    - transitioned to diamide treated seed
        - Saw 35% reduction in neonic treated corn by 2018, 43% reduction in neonic treated soybean planted in Ontario by 2018 (based on vendor sales reports sent to MECP)
        - Ontario yields for corn and soybean did not see significant changes 2015-2022
        - Neonicotinoid treated seed is still being used on a portion of the planted acreage
- Quebec
    - Requirements placed on farmers to obtain agronomic justification and prescription from certified agronomist following an agronomic assessment.
        - Assess soil type, geographic region, organic matter, tillage practices, crop rotation, pest pressure and assign low, moderate or high risk. Neonicotinoid seed treatments are only justified on farms assessed as high risk.
        - Prescription only valid 1 year

- Requirements are burdensome have a high impact on resources (growers, government and agronomists) resulting in dramatic reduction of use of neonicotinoid treated seeds.
- Neonicotinoid treated corn seed use in Quebec has dropped to 0.5% by 2021 (from 100% in 2015)
- Transitioned to diamide treated seed

- New York passed the Birds and Bees bill in 2023. Prohibits the sale, distribution or purchase of corn, soybean or wheat seeds treated with clothianidin, imidacloprid, thiamethoxam, dinotefuran or acetamiprid starting January 1, 2027, but it appears it will be revised to 2029 following an agreement with the Governor.
  - Authorizes the commissioner, after consultation with the commissioner of agriculture and markets, to temporarily suspend the prohibition if there is an insufficient amount of commercially available seed to adequately supply ag market that is not treated with neonics, or if purchase of seed that complies with these requirements would result in undue financial hardship to ag producers.
  - By Oct 1 each year the commissioner shall publish written directive as to whether there is a temporary suspension for the forthcoming year.
  - Prohibition shall not apply when commissioner determines there is an environmental emergency and no less harmful pesticide would be effective.
  - NY Department of Environmental Conservation shall conduct study with NY Department of Agriculture and Markets, New York state's land grant university and State University of New York College of Environmental Science and Forestry, to identify practicable and feasible alternatives to neonics and submit results of study to legislature and governor and post online by Jan 1, 2026.
- Relevant AIB meeting presentations and discussions

  5/22/23

  Review of State Neonicotinoid Use Laws and Regulations - Gene Harrington, Biotechnology Innovation Organization

  State Neonic Laws & Regs Summary Table – AIB Sharepoint

  6/26/23

  Ontario Neonicotinoid Treated Seed Regulations and Related Research - Tracey Baute, Ontario Ministry of Agriculture, Food and Rural Affairs

  7/24/23

  A Perspective on Provincial Regulatory Approaches to Neonicotinoid Seed Treatments - Émilie Bergeron, Vice President Chemistry, CropLife Canada

  7/24/23

  Overview of Health Canada's Pest Management Regulatory Agency Neonicotinoid Regulations - Morgan Griffith, Vermont Agency of Agriculture, Food & Markets

AIB Recommendations

In the current seed market, neonicotinoid treated seeds are an inexpensive form of insurance, and alternative options are very limited for farmers. Because of the unavailability of non-neonicotinoid treated seeds within Vermont that allow for the necessary flexibility of variety choice and exchanging

seed to adjust for planting conditions closer to planting me, the Board's recommendations focus on research and education. The Board recommends actions to further understand the issues within Vermont, help educate growers about practices to limit pest pressure or reduce non-target exposure, and promote ongoing or planned research. Board members unanimously supported efforts to increase pollinator habitat without impacting agricultural production. There is some member support for monetary programs to mitigate any potential losses from use of non-neonicotinoid treated seeds, although evaluation of total pesticide exposure should be considered for monetary programs to support food crop use of non-neonicotinoid treated seed.

These recommendations are based on information gathered and presented to the Board. AIB members understand the toxicity of neonicotinoid insecticides on non-target insects and organisms up the trophic ladder. The Board understands the potential risk for pollinator exposure, and exposure to small mammals, birds, and amphibians, from the use of neonicotinoid treated seeds. In addition, the Board understands that previous research evaluating the impact on corn yield of neonicotinoid treated seeds compared to non-neonicotinoid treated seeds has found inconsistent and/or no significant differences in yield. However, it is unknown how past use of neonicotinoid treated seed has affected the pest populations and pressures throughout agriculture. This halo, or legacy effect, is not well understood and has the potential to influence research studies and therefore should be evaluated.

AIB members reached consensus on the following recommendations:

1. Support additional research:
    a. Study the impact of halo or legacy effect on pest populations from the almost universal use of neonicotinoid treated seeds since 1990
    b. Non-target dust movement with new seed treatment technology that reduces abrasion of seed treatment during handling and planting
    c. Effectiveness, unknown limitations, and market availability of seed lubricant alternatives to talc and graphite
    d. Impact of managing/mowing buffers at planting time of treated seeds
        i. Reducing pollinator habitat in areas at risk of exposure from planting treated seeds may conflict with other conservation programs or not be feasible for farms
    e. Support research and development of neonicotinoid alternatives and sustainable crop protection strategies specifically tailored to Vermont agricultural landscapes
2. Education and training
    a. Develop IPM guidance for growers for how to reduce environmental impact of neonicotinoid treated seeds
        i. Develop information (in collaboration with University of Vermont) on toxicity and potential risk to pollinators decision making, scouting, types of pests, and management practices
        ii. Develop regional monitoring reports that track the prevalence of pests
    b. Ensure growers receive updates on relevant research through workshops (developed in collaboration with UVM)
        i. Seed treatment technology innovations to reduce dust/abrasion

ii. Seed lubricant alternatives
iii. Impact of past use of neonicotinoid treated seeds on present pest populations
iv. Local data on feasibility of VT corn crops without neonicotinoid seed treatment
(plant stand, yield, economic impact, cultural pest management practices)

c. Educate growers about seed label language and how to follow the label

3. Support and promote efforts to increase pollinator habitat without impacting agricultural production.
4. Important to build in a mechanism for review and reevaluation of recommendations, so guidelines can adjust to incorporate knowledge from research.
    a. Revisit policy recommendations after a defined period of time and evaluate based on measurable metrics

AIB Members

Wendy Sue Harper, Ph.D. - Soil Scientist, Retired Associate Faculty, Prescot College [AIB Role Fulfillment: Soil Biologist]

Clara Ayer - Dairy Farmer, Fairmont Farm [AIB Role Fulfillment: an active farmer who is a member of an organization representing the conventional dairy industry in Vermont] Appointment concluded April 11, 2023

Amanda St. Pierre - Dairy Farmer, Pleasant Valley Farms [AIB Role Fulfillment: an active farmer who is a member of an organization representing the conventional dairy industry in Vermont] Appointment commenced April 11, 2023

Fitzroy Beckford, Ph.D. - Associate Dean and Director of UVM Extension in the College of Agriculture and Life Sciences [AIB Role Fulfillment: a member from the University of Vermont Center for Sustainable Agriculture]

Terence Bradshaw, Ph.D. - Assistant Professor, Department of Plant and Soil Science / Director, Horticultural Research and Education Center, UVM [AIB Role Fulfillment: an active farmer who is a member of an organization representing fruit and vegetable farmers in Vermont] Appointment concluded July 1, 2023

Ann Hazelrigg, Ph.D. - Extension Associate Professor, Department of Plant and Soil Science / Director, Plant Diagnostic Clinic, UVM [AIB Role Fulfillment: an active farmer who is a member of an organization representing fruit and vegetable farmers in Vermont] Appointment commenced July 1, 2023

Jonathan Chamberlin - Ag Retail/Crop Consultant, Bourdeau Brothers [AIB Role Fulfillment: a certified crop consultant]

Clarice Cutler - Environmental Analyst, Department of Environmental Conservation, Agency of Natural Resources [AIB Role Fulfillment: the Secretary of Natural Resources or designee]

Appointment concluded October 11, 2023

Abbi Pajak - Environmental Analyst, Department of Environmental Conservation, Agency of Natural Resources [AIB Role Fulfillment: the Secretary of Natural Resources or designee] Appointment commenced November 6, 2023

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Sarah Owen, Ph.D. - State Toxicologist, Department of Health, Agency of Human Services [AIB Role Fulfillment: the Commissioner of Health or a designee with expertise in the effects of pesticides on human health]

Laura DiPietro - Director, Water Quality Division, Agency of Agriculture, Food & Markets [AIB Role Fulfillment: the Director of the Agency of Agriculture, Food and Markets, Water Quality Program or designee]

Morgan Griffith - Agrichemical Program Manager, Public Health and Agricultural Resource Management

Division, Agency of Agriculture, Food & Markets [AIB Role Fulfillment: the Director of the Agency of Agriculture, Food and Markets, Agrichemical Program or designee]

Steven Dwinell - Director, Public Health and Agricultural Resource Management Division, Agency of

Agriculture, Food & Markets [AIB Role Fulfillment: the Secretary of the Agency of Agriculture, Food and Markets or designee]