

Summary of Meeting Materials for Subcommittee

February 16, 2021

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1. IEc Literature Review

- Fall of 2019: November 12 – December 19
- IEc Team: Program manager and technical lead
- Approach:
 - Develop a literature/data review based on readily available documents describing the effects of neonicotinoid on pollinators
 - Products of review will include:
 - Introductory Memorandum
 - Annotated, filterable, bibliography (Framework)
 - Database containing full citations

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IEc Memorandum

December 2019

- Summarizes methods and results
- Associated with spreadsheet containing a systematic summary of key features of referenced documents (70)
- Provides a high-level characterization of information on effects of neonics on pollinators, emphasis on species relevant to MA

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IEc Memorandum and Framework

Document Identification and Characterization

- Journal articles
- Government reports and white papers
- U.S. EPA risk assessments of neonicotinoids
- Prioritized recent (2015 and later) documents

- Spreadsheet (Framework) entries characterize each document and its key findings
- Fields include: study type, species, exposed life stages and caste, landscape, plant/crop, region, exposure concentrations and duration

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IEc Memorandum and Framework

Document Identification and Characterization

- Most useful information appears in “Notes” and “Key Conclusions” fields
- Approach for EPA documents recognizes:
 - Large documents
 - Combination of registrant submitted data and open literature findings
 - Tiered approach in studies and assessments (lab, semi-field, field)
 - EPA’s use of most sensitive end-points
 - Consideration of studies classified as supplemental

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IEc Memorandum and Framework

Results

- Reviewed Documents include 66 journal articles and four EPA risk assessment documents.
 - Large part of studies are laboratory based (41%);
 - Semi-field (17%)
 - Field (10%)
- Species
 - Honey bee (63%)
 - Bumble bee (37%)

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IEc Memorandum and Framework

Results

- Neonicotinoids addressed in documents:
 - Imidacloprid (49%)
 - Clothianidin (40%)
 - Thiamethoxam (43%)
 - Acetamiprid (14%)
 - Dinotefuran (6%)

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IEc Memorandum and Framework

Results

- Assessment of neonics to *cause or to be associated with* one or more effects endpoints:
- Out of 43 documents, 42 identified at least one effect caused by or associated with neonic exposure
- Recognize broad-brush approach:
 - Potential bias due to higher publication rate for studies that identify effects
 - Not all effects were seen at field-realistic concentrations
 - Difference in effects between neonicotinoids

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IEc Memorandum and Framework

Results

- Listing some comprehensive reviews documenting the ability of neonicotinoids to adversely affect pollinators:
- Worldwide Integrated Assessment:
 - Research revealing new aspects of sub-lethal effects
 - Wild bee species
 - Mixture toxicity

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IEc Memorandum and Framework

Results

- Wood and Goulson:
- Evidence of effects on wild, non-target species
- New pathways of exposure:
 - Bee exposure through wild plants
 - Effects on wild bees under field conditions
 - Lab studies demonstrating negative effects on bee foraging and fitness at field-realistic concentrations

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IEc Memorandum and Framework

Results

- Cameron and Sadd:
- Use of neonics is problematic for wild and managed pollinators through sub-lethal effects of exposure to field-realistic doses

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IEc Memorandum and Framework

Concluding Remarks

- Many studies and reviews have documented that neonicotinoid exposure can have deleterious effects on pollinators
- Opposite conclusions of “minimal risk to honey bees” identified in review articles that adopt a “weight-of-evidence” approach; received funding from manufactures of neonicotinoids, and heavily relied on unpublished reports.

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IEc Memorandum and Framework

Concluding Remarks

- The compiled information on effects of neonicotinoids on pollinators make it clear that such compounds can adversely affect a range of pollinators species important to MA
- It is beyond the scope of this effort to draw conclusions as to the probability or severity of such effects under Massachusetts-relevant field conditions, or
- to provide policy recommendations with respect to management, regulation, or use of neonicotinoids

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2. Summary of EPA Registration Review of Neonicotinoids

- Compilation of most relevant information relative to:
 - pollinator effects and risks assessments, and
 - proposed mitigation measures
- Facilitate the review of this information by the Subcommittee
- Relevance of EPA's review documents:
 - IEC review included EPA's preliminary pollinator risk assessments
 - EPA has released additional documents in 2020, including updated final pollinator risk assessments and proposed interim decisions for the neonicotinoids
 - EPA mitigation measures have relevance to uses in MA

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EPA's Registration Review

- Periodic Comprehensive Review
- Ensure adherence to current scientific and regulatory standards and policies
- Initiated in 2009 for imidacloprid, and in following years for other neonicotinoids
- Involves various divisions within EPA-OPP
- Typical timeline is 7-10 years
- Includes scoping documents, data call-ins, revising and updated risk assessments, public comment opportunities, interim decision documents, and final decision documents

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IEC review compared to EPA Registration Review

- IEC review:
 - Concludes that neonicotinoids *can* and have the *ability* to adversely affect pollinators
- This is consistent with EPA's risk findings for various uses of neonicotinoids on pollinators
- IEC review:
 - It is beyond the scope to draw conclusions as to the probability or severity of such effects under Massachusetts-relevant field conditions
- EPA's comprehensive risk assessments provide information that address the probability and severity aspects

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IEC review compared to EPA Registration Review

- IEC review:
 - Beyond the scope to provide policy recommendations with respect to management, regulation, or use of neonicotinoid
- EPA is required to manage risk, and, if needed, to consider and implement mitigation measures to prevent unreasonable risks

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EPA Review Documents and Subcommittee's Individual Review

- EPA's assessments for specific use patterns and crops can inform the evaluation of these use pattern in MA
- EPA's proposed mitigation measures may assist the evaluation of additional restrictions in MA

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EPA's Proposed Interim Decisions

- Released in January 2020 for public comment
- Additional supporting documents also released
 - Final bee risk assessments
 - Updated aquatic risk assessments
 - Responses to public comments
 - Updated open literature reviews
 - Benefits assessments
 - Proposed mitigation measures

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Updates and Risk Summaries

- Final bee risk assessments update the preliminary pollinator assessments
 - Incorporate additional information:
 - Residue data in nectar and pollen and other plant matrices
 - Higher tiered data: results from semi-field and field studies
 - Review of open literature studies

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Updates and Risk Summaries

- Consideration of risks to all pollinators, including non-*Apis* species (e.g., bumble bees, solitary bees)
- EPA's pollinator risk assessment framework indicates that honey bees are intended to be used as reasonable surrogate for other species
- Risk to non-*Apis* species was evaluated qualitatively, using weight-of-evidence approach

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Tier 1 Risk Estimates

- The four N-nitroguanidine neonics are classified as highly to very highly toxic on acute basis to adult honey bees
- Risk estimates (i.e., Risk Quotient values) were calculated based on toxicity endpoints and estimated exposure levels (acute and chronic)
- Risk estimates for many uses exceeded the level of concern

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Risk Estimates at the Colony Level

- Tier II studies involved the consideration of residues measured in pollen and nectar in various crops
- Tier III studies involved full field studies for certain neonic-crop combinations
- Tier III studies contained significant uncertainties and availability of data, limiting their utility

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Refined Risk Characterization

- Refined risk determinations were based on several lines of evidence:
 - Crop bee attractiveness
 - Agronomic practices (e.g., harvest time relative to bloom)
 - Comparing residues to adverse effect levels for entire hives
 - Major categories of incidents
 - Other factors that influence the strength and survival of bees

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Refined Risk Characterization

- For each neonicotinoid, findings of risk for application scenario (crop/plant, method, timing) were grouped in following categories:
- Strongest evidence of risk
- Moderate evidence of risk
- Weakest evidence of risk
- Low on-field of risks (based on agronomic practice; not bee attractive)

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Risks to Other Non-Target Organisms

- Aquatic invertebrates:
 - Risks of concerns were identified for both agricultural and non-agricultural uses
 - Risk assessments were refined based on new open literature data
- Mammals and Birds:
 - Acute risks from foliar and soil treatments appear to be low.
 - Seed treatments have somewhat higher risks in certain situations

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Proposed Interim Decisions

- Risk Mitigation and Regulatory Rationale
- Neonicotinoids provide key tools for growers and land managers
- Risks of concerns were identified, particularly to pollinators and aquatic invertebrates
- Among proposed mitigation measures, several are intended to reduce exposure to pollinators and aquatic invertebrates.
- Mitigations measures were developed in a manner to preserve the majority of the pest management utility, while also considering risk reductions to pollinators and other non-target organisms.

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Proposed Mitigation Measures

- Cancel certain uses (such as residential spray applications of imidacloprid to turf);
- Require additional PPE;
- Reduce maximum application rates or restricting applications during pre-bloom and/or bloom, targeting certain uses with potentially higher pollinator risks and lower benefits;
- Preserve the current restrictions for application at-bloom;

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Proposed Mitigation Measures

- Require advisory language for residential ornamental uses;
- Apply targeted application rate reductions for higher risk uses;
- Require additional spray drift and runoff reduction label language; and,
- Promote voluntary stewardship efforts to encourage employment of best management practices, education, and outreach to applicators and beekeepers.

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Appendices

- Appendix A1 – A4 list the proposed actions for the neonicotinoids
- Appendix B: Summary of Proposed Label Changes for the Neonicotinoids
- Appendix C: Selected responses from EPA to comments

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Summary of Proposed Label Changes for the Neonicotinoids					
	CLOTHIANIDIN	THIAMETHOX AM	IMIDACLOP RID	DINOTEFUR AN	ACETAMP RID
Update/Added Protective Equipment	X	X	X	X	X
Pollinator Specific Labeling	X	X	X	X	X
Delete residential spray use on turf			X		
Delete foliar spray and soil drench use on bulb vegetables			X	X	
Wind speed limits	X	X	X	X	X
Droplet size (medium to coarse)	X	X	X	X	X
Intended for professional use (Ornamentals ground cover & trees)	X	X	X	X	
Setbacks to water		X	X	X	X
Changes in label rates	X	X	X	X	
Vegetative buffer required for Ag. Foliar sprays	X	X	X	X	
Limit how outdoor non-ag use can be performed	X	X	X	X	
Turn off nozzle at end of row (Ag/Airblast)	X	X	X		
Drift Advisory Language	X	X	X	X	X

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3. MDAR review of Neonicotinoids in Massachusetts

- Provide an overview of neonicotinoids and their use in Massachusetts
- Neonics and pollinator health
- Federal and state regulatory actions
- MDAR activities to address neonicotinoids and pollinator health
- Survey and monitoring data

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Key Fact and Understanding

- Neonics have many uses:
 - Agriculture
 - Horticulture
 - Landscape management (lawn/turf, ornamentals, trees)
 - Invasive species management
 - Pets
 - Structural pest control

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Number of Registered Products in MA (January, 2021)

- Acetamiprid: 29
- Clothianidin: 36
- Dinotefuran: 31 *
- Imidacloprid: 223
- Thiacloprid: 1
- Thiamethoxam: 32 *

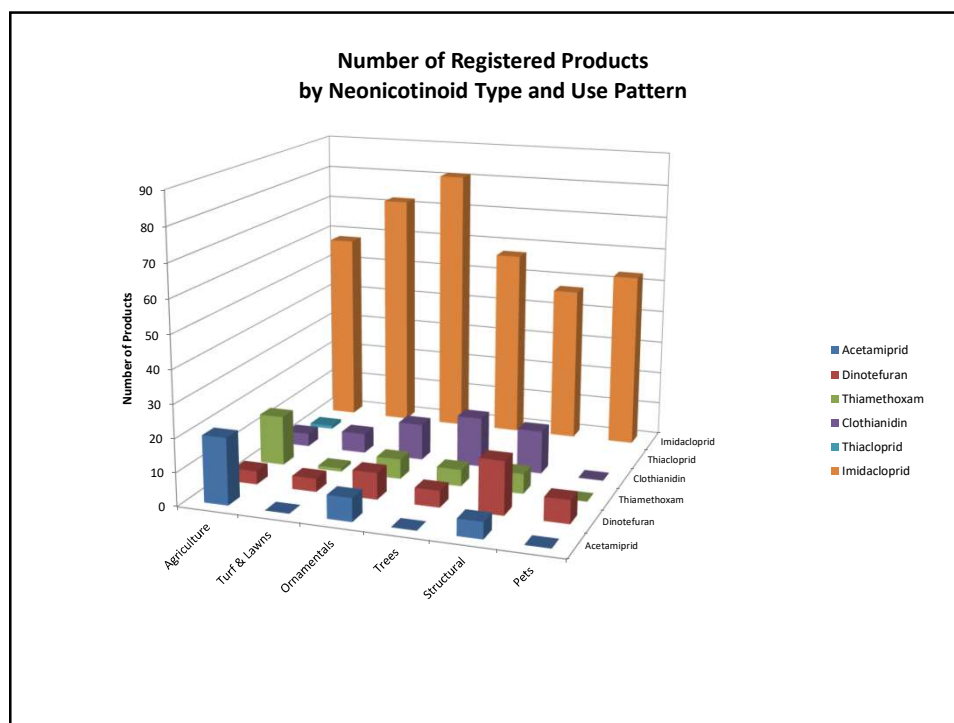
* State-restricted use based on groundwater protection

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Neonicotinoid Profile

- Systemic in plants; provide extended activity against pests
- Highly toxic to insects
- Less toxic to mammals and birds
- As part of IPM, may reduce the use of other pesticides
- Can occur in pollen and nectar
- Longer residence time in the environment

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Pollinator Health

- Many factors play a role, including:
 - Beekeeping practices,
 - loss of habitat and forage
 - Parasites, such as Varroa mites
 - Diseases and Pests
 - Pesticides

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Neonicotinoids and Pollinator Health

- Attention to Neonicotinoids
- Considerable increase in research on potential for effects and risks to pollinators
 - Various aspects (acute, sub-chronic, chronic)
 - Laboratory and field studies
 - Field exposures and routes of exposure
- Challenges with integrating all the information to assess risks in a true field situation
- Scientific understanding is evolving

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Federal and States Actions

- White House Memorandum (2014)
 - Comprehensive plan to address pollinator health
 - Collaboration with various stakeholders
 - Reduce pesticide exposure
- EPA:
 - New labeling (“Bee box”)
 - Additional honey bee studies
- States:
 - Pollinator Plan (MA in 2017)
 - Scale up of Apiary Services

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Honey Survey Data

- USDA-APHIS Honey Bee Health Survey
- 2017 and 2018:
 - No detection of neonics in wax samples from 40 colonies
- 2016:
 - 1 bee bread pollen sample with a trace level of clothianidin representing samples from 80 colonies
- 2012:
 - 1 bee bread pollen sample with thiamethoxam representing samples from 80 colonies

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UMass Hobby Beekeepers Survey

- 2018: 160 samples (wax and pollen)
- 52 samples (33% of all samples) tested positive for at least one neonicotinoid
- Most frequently detected:
 - Imidacloprid (19.4%)
 - Acetamiprid (6.9%)
 - Clothianidin (3.1%)
 - Thiamethoxam (2.5%)
 - Dinotefuran (0.6%)

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MDAR Bee Kill Investigations

- 34 bee kill complaint investigations over 4 years
- No neonicotinoids detected in samples from investigated hives (bees, honey/nectar, wax, pollen bee bread)

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National Monitoring Data (USDA)

- 2011-2016: Apiary samples (bee bread/pollen)
- Most prevalent detections:
- Miticides to treat hives:
 - Amitraz: 44.5% ;Fluvalinate: 37.4%; Coumaphos (31.2%); Thymol (21.5%)
- Other pesticides:
 - Insecticides (Chlorpyrifos, fenprothionate);
 - Fungicides, such as azoxystrobin and chlorothalonil;
 - Herbicides, such as atrazine and pendimethalin;
 - Neonicotinoids were detected in 0.4-1/9% of samples

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