

Pesticide Selection Subcommittee DRAFT Recommendation Outlines

The Pesticide Selection Subcommittee is sharing this living document of recommendation outlines for preliminary review by the Mosquito Control for the 21st Century Task Force. These topics represent an early snapshot of the subject of recommendations from the subcommittee. It is to be expected that topics will continue to be added and eliminated from this living document. Please note that the recommendation text presented here is still under development by the subcommittee and may not represent the ultimate majority opinion of the subcommittee.

Directive: (vii) promoting the use of the safest or minimum risk pesticides feasible and employing methods, including product disclosures or implementation of testing protocols and procedures, to avoid the use of pesticides containing per- and polyfluoroalkyl substances

- 1. Promoting Use of Safest or Minimum Risk Pesticides – Documenting and Implementing a Transparent Selection Process**
- 2. Promoting Use of Safest or Minimum Risk Pesticides – Enhancing Pesticide Selection and Consideration of Synergists**
- 3. Promoting Use of Safest or Minimum Risk Pesticides – Ensuring Selection Considers Potential Impacts to Drinking Water Quality**
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Directive: (ix) identifying known ingredients in pesticide products used for mosquito control, analyzing the ability, or lack of ability, to identify such ingredients, and making recommendations for determining such ingredients

- 5. Identifying ingredients – active ingredients**
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1. Promoting Use of Safest or Minimum Risk Pesticides – Documenting and Implementing a Transparent Selection Process

Recommendation

Formalized statement: Understanding that all pesticides used by the Commonwealth's organized mosquito control districts and the "SRB" are reviewed by EPA and are federally registered; and approved for use by the Commonwealth's Pesticide Board Subcommittee as outlined in M.G.L.c 132B and 333 CMR. Acknowledging concerns by stakeholders that these reviews are not sufficient, the "SRB" or a subcommittee established by the "SRB" will further review pesticide products used in the management of mosquito populations. This subcommittee should include DPH, DFW- NHESP Division, DEP, MDAR, DMF (Division of Marine Fisheries) and a representative from an MCD.

Once pesticide products are reviewed, SRB and MCDs will follow a guidance document, which specifies factors that are considered in the process of selecting pesticides used to control mosquitoes. The guidance document, list of approved products, and a summary of this process will be easily available and discoverable to any interested party on multiple websites such as but not limited to MDAR, SRB, DPH, Commonwealth organized mosquito control districts, and any local Board of Health or organization that requests the information. These websites will also contain a summary of the pesticide registration and approval processes of the EPA and Massachusetts Pesticide Board Subcommittee.

An outreach campaign may be conducted to promote and identify the location of the information to the public. This campaign may include but not be limited to blast emails to local organizations, local officials, list-servs, and state agencies. In the course of normal public relation activities such as newspaper, radio or television interviews, mention of this information will be delivered.

Recommendation Components Still Under Consideration

This draft recommendation was first presented to the PS Subcommittee on January 11, 2022. The entire PS Subcommittee has not yet reviewed this draft and will discuss it for the first time during the subcommittee meeting scheduled for January 25, 2022.

Background and Rationale

There seems to be a disconnect with stakeholders (including the public, elected officials, and environmental groups) regarding the pesticide selection process, which may lead to the perception that there is no scientific basis for pesticide selection. The risk of a pesticide depends on exposure and toxicity. Human and environmental health must be considered when selecting a pesticide for use. The biology and lifecycle of mosquitoes, as well as their habitat, spatial and temporal abundance, and their capacity to transmit pathogens must also be considered.

The existing active ingredients for mosquito control are quite limited. In relation to agriculture, mosquito control is a small market and new active ingredients are not often formulated or sold. This leaves mosquito control districts with limited options and therefore limited choices. Consistency across MCDs is important while balancing flexibility to meet individual needs.

While there is a formalized process for registering pesticides by the federal EPA and the Commonwealth of MA, many are not aware of these processes because the information is not centralized in one location, like a website. Stakeholders would need to search multiple sites to find the information necessary to understand the process. The current process after federal registration includes the Pesticide Board Subcommittee outlined in M.G.L.c 132B and CMR 333. The five member subcommittee is Chaired by the Director of the Division of Food Protection within the Department of Public Health with the other four members consisting of representatives of the Department of Agricultural Resources (MDAR), Department of Conservation and Recreation (DCR), Department of Public Health (DPH), and a Commercial Pesticide Applicator appointed by the Governor. The Subcommittee is responsible for registering all pesticides for use in the Commonwealth. The Massachusetts Pesticide Board Subcommittee is also responsible for reviewing new active ingredients and issuing all experimental use permits.

Formalizing a selection process will promote and ensure consistency on how pesticide selection is carried out across all entities responsible for mosquito pesticide applications, including the SRB and MCDs in the Commonwealth. Currently the SRB relies on several state agencies to review and provide their opinion on products used for aerial adulticiding applications in the event of a declared public health emergency. These agencies include DPH, DFW- NHESP Division, DEP, MDAR and DMF (Division of Marine Fisheries). DFW- NHESP Division currently reviews and provides guidance on all pesticides used by MCDs in the Commonwealth within sensitive areas.

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2. Promoting Use of Safest or Minimum Risk Pesticides – Enhancing Pesticide Selection and Consideration of Synergists

Recommendation

To make pesticide selection for mosquito control a more formal process and address the potential ecological concerns of synergists in pesticide formulations, we recommend:

- 1) Formalizing the annual review of pesticide products used during aerial and truck-based spraying for mosquito control by the SRB.
- 2) Directing MassDEP to assemble existing insecticide sediment data from USGS and other published sources and collect additional data if needed to determine baseline levels of insecticides throughout the state.
- 3) Directing the SRB to review MassDEP data assembled in recommendation 2 and determine if synergism of insecticides already present in aquatic sediments is possible when considering the use of insecticide formulations that include synergists.

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Background and Rationale

Pyrethroid insecticides, while exhibiting relatively low mammalian toxicity, are responsible for increased invertebrate toxicity¹ and decreased aquatic macrobenthic species biodiversity.² The state of MA has approved several pyrethroid-based insecticide products for use in truck-based and aerial spraying for mosquito control. Many pyrethroid-based insecticide formulations also include a synergist, piperonyl butoxide (PBO). Although PBO is not an insecticide it causes insecticides to be more toxic to mosquitos and other invertebrates by inhibiting the metabolism of the insecticides. Their use is often preferred because lower concentrations of insecticides are needed to cause the same level of mosquito mortality.

There is limited scientific information on the toxic effects of insecticides to aquatic life after mosquito spraying and more data would be helpful in assessing the ecological risks. However, the few studies that have been done, published studies from California³⁻⁴ and monitoring reports conducted in MA⁵, suggest that the pyrethroids used for mosquito spraying are not detected in water bodies two days after spraying and there is limited detection of these pyrethroids in sediment samples (~5%) collected three days after spraying. This is likely due to the choice of insecticides used. For example, phenothrin, the insecticide used in MA since 2010, has a low vapor pressure and readily volatilizes from water.⁵

However, a concerning finding from previous studies was that insecticide formulations that include the PBO synergist can cause increased toxicity of pyrethroid insecticides already present in the receiving waters.³ This was the major finding of a 2006 study that sampled Sacramento, CA water and sediments following aerial application of pyrethrins + PBO. PBO persisted for at least 3 days post

spraying (extent of sampling) and the levels of PBO present synergized other pyrethroids including bifenthrin already present in the sediments. They concluded that regulatory agencies should consider the ability of PBO to make pyrethroids already present in urban/suburban areas more toxic.⁴ Pyrethroid insecticides have become ubiquitous in suburban and urban sediments due to their widespread occurrence in lawn and garden products and use by private applicators.⁷⁻⁹ There are many areas in Massachusetts where pyrethroids are present in sediments¹⁰ and PBO could make these sediments more toxic.

According to the MA Department of Public Health (DPH) Arbovirus Surveillance and Response Plan¹¹, product selection for mosquito control is reviewed by the State Reclamation and Mosquito Control Board (SRB). This process often occurs annually, but this appears to be discretionary. The SRB consists of members from other MA agencies, including the MA Department of Environmental Protection (MassDEP), MA Department of Agricultural Resources (MDAR), DPH, and others.

References cited:

¹ Schulz, R., Bub, S., Petschick, L.L., Stehle, S. and Wolfram, J., 2021. Applied pesticide toxicity shifts toward plants and invertebrates, even in GM crops. *Science*, 372(6537), pp.81-84.

² Stehle, S. and R. Schulz. 2015. Agricultural insecticides threaten surface waters at the global scale. *Proc Natl Acad Sci U S A* 112 (18):5750-5.

³ Phillips, B.M., Anderson, B.S., Voorhees, J.P., Siegler, K., Denton, D., TenBrook, P., Larsen, K., Isorena, P. and Tjeerdema, R.S., 2014. Monitoring the aquatic toxicity of mosquito vector control spray pesticides to freshwater receiving waters. *Integrated environmental assessment and management*, 10(3), pp.449-455.

⁴ Weston, D.P., Amweg, E.L., Mekebri, A., Ogle, R.S. and Lydy, M.J., 2006. Aquatic effects of aerial spraying for mosquito control over an urban area. *Environmental science & technology*, 40(18), pp.5817-5822.

⁵ MassDEP, 2020, Response to Eastern Equine Encephalitis Virus Mosquito Control Aerial Spray Events 2019: A Summary of the Surface Water Quality Sampling Operations. Available at, <https://www.mass.gov/doc/response-to-eastern-equine-encephalitis-virus-mosquito-control-aerial-spray-events-2019/download>

⁶ HSBD, <https://pubchem.ncbi.nlm.nih.gov/compound/4767>

⁷ Weston, D. P., R. W. Holmes, and M. J. Lydy. 2009. Residential runoff as a source of pyrethroid pesticides to urban creeks. *Environ. Pollut.* 157 (1):287-94.

⁸ Weston, D. P., R. W. Holmes, J. You, and M. J. Lydy. 2005. Aquatic toxicity due to residential use of pyrethroid insecticides. *Environ. Sci. Technol.* 39 (24):9778-9784.

⁹ Kuivila, K. M., M. L. Hladik, C. G. Ingersoll, N. E. Kemble, P. W. Moran, D. L. Calhoun, L. H. Nowell, and R. J. Gilliom. 2012. Occurrence and potential sources of pyrethroid insecticides in stream sediments from seven U.S. metropolitan areas. *Environ. Sci. Technol.* 46 (8):4297-303.

¹⁰ Hartz, K.E.H., Nutile, S.A., Fung, C.Y., Sinche, F.L., Moran, P.W., Van Metre, P.C., Nowell, L.H. and Lydy, M.J., 2019. Survey of bioaccessible pyrethroid insecticides and sediment toxicity in urban streams of the northeast United States. *Environmental Pollution*, 254, p.112931.

¹¹ Bharel and Cranston, 2021. Massachusetts Arbovirus Surveillance and Response Plan. Massachusetts Department of Public Health. Available at, <https://www.mass.gov/lists/arbovirus-surveillance-plan-and-historical-data>.

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3. Promoting Use of Safest or Minimum Risk Pesticides – Ensuring Selection Considers Potential Impacts to Drinking Water Quality

Recommendation

Massachusetts should continue the practice of not using products with chemicals on the Groundwater Protection List and should evaluate whether further controls are warranted on application of other pesticides near public and private drinking water sources.

Recommendation Components Still Under Consideration

This draft recommendation was first presented to the PS Subcommittee on January 11, 2022. The entire PS Subcommittee has not yet reviewed this draft and will discuss it for the first time during the subcommittee meeting scheduled for January 25, 2022.

Background and Rationale

Massachusetts has regulations protecting both surface and groundwaters of the Commonwealth. Additionally, the Pesticide Board Subcommittee maintains a Groundwater Protection List which documents chemicals that could potentially impact groundwater. Massachusetts does not currently use any pesticides in mosquito control that are on this list; however, there are no prohibitions on using chemicals not on that list in primary recharge areas.

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4. Promoting Use of Safest or Minimum Risk Pesticides – Avoiding Use of PFAS-Containing Pesticides

Recommendation

The initial brainstorming sessions identified the following issues that the PS Subcommittee will consider when developing recommendations:

- Consider developing a recommendation that not only will help avoid use of PFAS-containing pesticides, but can also be used to avoid use of pesticides that contain other emerging contaminants.
- The Subcommittee may develop a recommendation that calls for periodic testing to identify contaminants of concern. Subcommittee members acknowledged the challenge associated with testing for unknown contaminants.

- Recognizing the challenge of devising a testing protocol for unknown contaminants, another option is to deploy tests that look for formulation characteristics that are not desired. Examples of such characteristics included persistence and the potential to contribute to endocrine disruption. The Subcommittee may consider testing options that would look for these characteristics, even if the identities of the contaminants is not known.
- Another consideration is requiring manufacturers to certify their products as “PFAS-free,” though subcommittee members acknowledged potential difficulties with that certification option.

TBD: The content listed above is based on an initial brainstorming session among PS Subcommittee members during the meeting on January 11, 2022. The PS Subcommittee will work on translating these brainstorming ideas into draft text during future meetings.

Recommendation Components Still Under Consideration

Other issues to consider when developing recommendations include:

- Limitations of analytical chemistry – the current approved laboratory analytical methods can identify a very small subset of the universe of PFAS compounds. Scientific advances in laboratory techniques will likely result in future methods being able to measure a broader range of PFAS.
- The recommendation may need to consider the possibility that some substances, after being released into the environment, can transform into PFAS compounds.
- The Pesticide Board Subcommittee is reportedly already looking at PFAS and may be making recommendations of its own related to these chemicals.

Background and Rationale

In 2020, Public Employees for Environmental Responsibility (PEER) reported that it had detected PFAS compounds in Anvil 10+10. This was an unexpected result because most product testing had previously focused on known ingredients. Further research has suggested that the PFAS contamination in this instance resulted from chemicals leaching from containers—not from the PFAS being in the original formulation. MDAR and EPA continue to examine the potential for product contamination and are considering other types of containers. While the 2020 incident pertained to PFAS, strategies may need to be put in place for identifying contaminants in pesticide formulations in the future, whether they be PFAS, other persistent compounds, or other contaminants.

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5. Identifying ingredients – active ingredients

Recommendation

The Subcommittee makes no recommendation relative to additional active ingredient disclosure beyond what is currently required. Subcommittee members unanimously agreed that the identity of active ingredients, including synergists, is adequately addressed through the current federal and state regulatory programs and processes.

Recommendation Components Still Under Consideration

Background and Rationale

Pesticide formulations generally consist of two types of ingredients: active ingredients and “inert” ingredients. Active ingredients are those chemicals in a formulation that have pesticidal action against a target pest. Pesticidal action may include killing the pest, repelling it, deterring feeding, or otherwise mitigating the pest. Synergists, a subcategory of active ingredients, enhance the pesticidal action of another active ingredient in the formulation. The synergist piperonyl butoxide (PBO) is a common ingredient in mosquito adulticide formulations containing pyrethroid or pyrethrum/pyrethrin ingredients.

Active ingredients, including synergists, are required by federal law to be listed on pesticide labels. The Subcommittee found no evidence of active ingredients not being identified on labels of registered pesticides.

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6. Identifying ingredients – inert ingredients – option #1

Recommendation

The Subcommittee makes no recommendations relative to inert ingredient disclosure. The majority of Subcommittee members felt that EPA review of inert ingredients was adequate.

Recommendation Components Still Under Consideration

Background and Rationale

Pesticide formulations generally consist of two types of ingredients: active ingredients and “inert” ingredients. Inert ingredients are those chemicals in a pesticide formulation without intended pesticidal action. They are sometimes referred to as “other” ingredients on pesticide labels. These inert ingredients may include adjuvants, drift retardants, solvents, fragrances, etc. Inert ingredients are not necessarily toxicologically inert, and may pose risks to human or ecological health. EPA categorizes inert ingredients based on their use and toxicological profile (<https://www.epa.gov/pesticide-registration/categorized-lists-inert-ingredients-old-lists>).

Inert ingredients are considered to be Confidential Business Information (CBI) and are often not listed on the label. In some situations, the disclosure of inert ingredients can be used by competitors to a given company to recreate a formulation. This creates an issue with regulatory/government review of pesticides as some agencies do not have the ability to protect submitted information from public records/freedom of information laws. While EPA has the ability to review inert ingredients as part of registration without disclosing CBI, this is not typically the case in Massachusetts. The Pesticide Board Subcommittee does not have the ability to protect CBI from public disclosure. The Massachusetts Department of Environmental Protection’s Office of Research and Standards reportedly does have this ability (still being verified).

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7. Identifying ingredients – inert ingredients – option #2

Recommendation

This recommendation is to update/amend the Massachusetts Pesticide Control Act (MPCA, Chapter 132B of the Massachusetts General Laws) to:

- Include the Massachusetts Department of Environmental Protection (MassDEP) on the Pesticide Board Subcommittee as MassDEP is the agency responsible for setting regulatory standards for surface and drinking waters and is responsible for regulating toxic substances.
- Require that pesticide registrants include information about inert ingredients and their percentages in their product registration applications. This information will be reviewed in a confidential manner by MDAR and MassDEP. These agencies will present only general information about the overall hazard assessments of the inert ingredients during an open meeting (i.e., “we deem that the inert ingredients [do/or do not] pose unreasonable risk under the product labeling”). If the Subcommittee needs additional information about the inert ingredients in order to make a decision on registration of the product, or how the product should be classified, the Pesticide Subcommittee can call a special session that is exempt from Open Meeting Law such that this discussion will protect the identity of the inert ingredients from Open Meeting Law.
- All information that is protected as confidential business information under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) will also be protected during the MA product registration process.

Recommendation Components Still Under Consideration

- The PS Subcommittee discussed options for which state body should review inert ingredients if this recommendation moves forward. One concern was that the Pesticide Board Subcommittee might not have adequate resources to review inert ingredients. Another concern was that details of this recommendation might need to be revised pending the outcome of deliberations by other MCTF subcommittees (e.g., another subcommittee may recommend a very broad SRB with multiple subcommittees, including one that focuses entirely on issues specific to mosquito control).
- The PS Subcommittee discussed whether this application should apply to the subset of pesticide products reviewed for mosquito control (<15 per year) or to the broader universe of pesticides that MDAR reviews annually (which number in the thousands). There were different opinions on this issue.
- The PS Subcommittee also discussed the pros and cons of state agencies “jumping ahead” of federal agencies (EPA) on environmental regulations. Some viewed this as an advantage, as states can take the lead on issues that the federal government does not act on; but others noted that differences between state and federal regulations can present challenges to certain stakeholders.
- There was some concern that this recommendation replaces one “black box” review (i.e., EPA’s review of inert ingredients) with two “black box” reviews (i.e., an added review by a Massachusetts state agency) – and that adding a state agency review was unnecessarily duplicative. Some subcommittee members thought people who are distrustful of EPA might also be distrustful of a state agency review board. On the other hand, some subcommittee members

said a state agency review board is needed because federal agency reviews may be more/less protective on environmental issues under certain administrations.

Background and Rationale

There are currently 4,555 chemicals or substances (e.g., “lemon peel”) approved as inert ingredients by the U.S. Environmental Protection Agency (EPA) for “Food and Nonfood Use” or “Nonfood Use Only” (EPA InertFider; <https://ordspub.epa.gov/ords/pesticides/f?p=INERTFINDER:1:0::NO:1::>). These lists contain substances reviewed by the EPA Integrated Risk Information System (IRIS) and found to be carcinogenic, compounds that are regulated by the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA), and compounds subject to the Massachusetts (MA) Toxic Use Reduction Act. It also contains fluorinated compounds such as para-chlorobenzotrifluoride (a compound designated by the state of CA, but not the EPA, to cause cancer).

The state of Massachusetts regulates several chemicals under the CWA and the SDWA at more stringent levels than EPA guidelines. These include two chemicals with lower (more stringent) drinking water maximum contaminant Levels (MCLs) compared with EPA guidelines and at least 24 chemicals that have lower (more stringent) water quality standards for surface water contamination compared to EPA guidelines. In addition, MA recently began regulating six PFAS chemicals that the EPA has not yet set drinking water standards for. The EPA has set health advisory levels for these PFAS chemicals at over three times the MCLs established by the state of MA. These examples provide evidence that the Commonwealth of MA takes additional considerations into account when setting chemical regulations compared with the EPA. With this in mind, the state of MA should not defer to EPA’s approval when it comes to the over 4,500 inert ingredients currently registered for use in the U.S.

Currently the MA Pesticide Board, Pesticide Subcommittee, established by the Massachusetts Pesticide Control Act of 1978, reviews pesticide products for registration in MA. This Subcommittee consists of the following members: MDAR (MA Department of Agricultural Resources), MD CR (MA Department of Conservation and Recreation), MDPH (MA Department of Public Health), the Director of Division of Food and Drug (within MDPH), and a commercial applicator appointed by the governor. This board is a public body and subject to Open Meeting Law. Therefore, there is concern that if pesticide registrants include inert ingredient lists and percentages in their applications, the identities of inert ingredients would be made public. However, applications are sent to MDAR which initially reviews the application for administrative and technical aspects. It does not appear that MDAR’s technical review is subject to Open Meeting Law; only the information that is presented to the Subcommittee is. It could be possible for MDAR or another body to review the inert ingredients for toxicological considerations and keep CBI confidential. They would only be able to present general information to the Subcommittee, such as a general decision on whether the inert ingredients were safe or not safe for application according to the label.