

Attn: U.S. Environmental Protection Agency Docket ID No. EPA-HQ-OPP-2023-0420

Thom Petersen, Commissioner,
Minnesota Department of Agriculture
625 Robert Street North
Saint Paul, MN 55155-2538

February 09, 2024

The Honorable Michael Regan
Administrator, U.S. Environmental Protection Agency
U.S. Environmental Protection Agency Docket Center (EPA/DC)
1200 Pennsylvania Ave. NW
Washington, DC 20460-0001

Sub: The Minnesota Department of Agriculture comments on the U. S. Environmental Protection Agency's request for information and comment on Requirements Applicable to Treated Seed and Treated Paint Products in docket number EPA-HQ-OPP-2023-0420 located at www.regulations.gov.

Dear Administrator Regan,

Pesticide treated seed is widely planted in Minnesota, most notably for corn and soybean production. The Minnesota Department of Agriculture (MDA) is the lead state agency regulating pesticides under the state's [Pesticide Control Law](#). The MDA understands the importance of pesticide treated seeds in controlling pests and diseases. Under United States (U.S.) statute 40 CFR § 152.25, treated seeds are considered treated articles, which have historically not been part of the MDA's regulatory purview. However, in 2023, a new law was passed in Minnesota that states: "A person may not use, store, handle, distribute, or dispose of seed treated with pesticide in a manner that 1) endangers humans, food, livestock, fish, or wildlife, or 2) will cause unreasonable adverse effects on the environment" (Minn. Stat. Chapter 18B.075). This law authorizes the MDA to prevent unreasonable adverse effects of pesticide-treated seed on the environment, while still not classifying pesticide treated seed as a pesticide.

On October 11, 2023, the U.S. Environmental Protection Agency (EPA) announced it was seeking public comment about seed treated with pesticides registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and treated paint, to determine whether or to what extent more regulations were needed regarding the use and impacts of treated seed.

The MDA carefully reviewed the advanced notice of proposed rulemaking to provide the EPA with information and comments on the requested topics below.

1. How growers manage treated seed products, including how they store, plant, and dispose of these products

The Minnesota Seed Regulatory Program has regulatory authority covering the Minnesota Seed Law and associated rules ([Minn. Stat. 21.80 – 21.92](#), [Rules 1510](#)). The Minnesota Seed Regulatory Program does not track how growers store, plant, or dispose of treated seed products. In Minnesota, the seed labeler is responsible for putting required information on treated seed labels to inform the customer of what they are purchasing. This information must be truthful and is subject to inspections, including label inspection, sampling, and testing by the Minnesota Seed Regulatory Program.

The Minnesota Seed Law outlines the label requirements for all seeds sold in Minnesota, including treated seed. The content required on all labels identifies the seed labeler, provides tracking information for the seed lot, informs the consumer of what is in the container and the quality of the seed. Additional requirements for the labels of seed lots containing treated seed include the following.

1. A word or statement to indicate the seed has been treated
2. The commonly accepted, coined, chemical, or abbreviated generic chemical name of the applied substance
3. The caution statement “Do not use for food, feed, or oil purposes” if the substance in the amount present with the seed is harmful to human or other vertebrate animals
4. In the case of mercurial or similarly toxic substances, a poison statement and symbol
5. A word or statement describing the process used when the treatment is not of pesticide origin
6. The date beyond which the inoculant is considered ineffective if the seed is treated with an inoculant. It must be listed on the label as “inoculant: expires (month and year)” or wording that conveys the same meaning

Minnesota Seed Law does not include language on how to manage treated seed products, thus the Minnesota Seed Regulatory Program does not enforce the language on seed labels. Due to the “Treated Article” exemption, Minnesota has been unable to track the purchasing, use, storage, planting, or disposal of pesticide treated seed.

2. The extent to which treated seed products are used in the United States

Treated seed products are not tracked in Minnesota through any statute or regulatory requirements known to the MDA. To begin to address knowledge gaps, the Minnesota Seed Regulatory Program started taking photos of treated seed labels during inspections in recent years. As part of recent treated seed legislation, the Minnesota Seed Regulatory Program is now creating a dataset from photos of treated seed labels found during inspections. The Minnesota Seed Regulatory Program plans to extrapolate these data with sales report data for seed sales in the state to estimate the quantities of treated seed products sold in Minnesota. Creating this dataset is time-consuming, requiring manual data entry by staff.

The Minnesota Seed Regulatory program tracks sales of seed in Minnesota through a permitting system that only requires commercial labelers who sell over 50,000 pounds of seed annually to complete annual tonnage reports for seed sales. Data from retailers selling under this threshold will not be included in the dataset being worked on by the Minnesota Seed Regulatory Program, thus final seed estimates in Minnesota will undoubtedly be lower than actual seed use. Additionally, annual sales reports include the amount of each seed variety sold but do not include information on any potential treatments applied to the seed, requiring the MDA to approximate the amount of specific pesticide active ingredients to seed type (e.g., corn, soybean).

Another challenge to estimating treated seed use pertains to soybean. Labelers are only required to label seed up to the point of sale. Since soybeans are often treated following sale of seed, they would not be captured in the Minnesota Seed Regulatory Program estimates or be labeled with the treated seed labeling requirements. Since an estimated 44% of soybean planted in Minnesota (7,450,000 total acres in 2022) is thought to be treated with pesticides, soybeans will be a large gap in MDA’s tracking of treated seeds.

The MDA sees value in tracking treated seed purchased and planted and thus is working to estimate sales of treated seed in Minnesota. However, gaps in data collection will exist due to a limited ability for oversight and the lack of reporting requirements for treated seed. Creating a national program to track the extent to which treated seed products are used in the United States would provide useful data to the MDA and other stakeholders (see question 4 for more detail).

3. Whether or to what extent treated seed products are being distributed, sold, and used contrary to treating pesticide and seed bag tag labeling instructions

In Minnesota, treated seed labels are required to have the cautionary statement “Do not use for food, feed, or oil purposes” if the substance present on the seed in an amount considered harmful to humans or other vertebrates. During inspections, the Minnesota Seed Regulatory Program found that this language was missing on some seed labels and issued violations, where the corrective action was to re-label the seed lot with the cautionary statement.

The MDA recognizes the importance of this question but, unfortunately, is unable to provide extensive comments. Additionally, it is unclear who is responsible for monitoring the requirements listed on the seed bag label.

4. Whether those who manufactured treated seed should be subject to some registration and reporting requirements under FIFRA section 7 or other requirements (e.g., filling out a “notice of arrival” for all imported treated products)

The MDA is working to create a system to estimate the amount of treated seed sold in Minnesota. However, this dataset will only provide rough estimates by taking information from different programs. It also will take significant hours of manual data entry to produce. Federal registration and reporting requirements could provide standardized, accurate information on the amounts of treated seed products sold in a state. This would be beneficial for states like Minnesota where more than 17 million acres of soybean, corn, and wheat are planted annually, and the MDA is tasked with preventing unreasonable adverse effects to humans and the environment from pesticide treated seed.

Reporting requirements would allow Minnesota to better understand the economic benefits and ecological risks of treated seed. Such information is crucial to developing economic thresholds or integrated pest management guidance to help make regional decisions on preventing potential unreasonable adverse effects of treated seed use in Minnesota.

The MDA supports subjecting treated seed to some registration and reporting requirements to better understand treated seed use in Minnesota.

5. Whether further regulatory or administrative measures are appropriate to ensure the safe use of treated seed

Due to concerns about the risks to pollinators, the MDA began a special registration review of neonicotinoid insecticides in 2013. The [2016 published report](#) illuminated the need for further regulatory or administrative measures regarding treated seed use and the impact of neonicotinoids on pollinator health. In December 2020, the MDA designated the neonicotinoid insecticides clothianidin and imidacloprid as “surface water pesticides of concern” in Minnesota because of their potential impacts on aquatic organisms at the levels found in Minnesota surface water. In 2023, the Minnesota

legislature passed a law preventing the use of treated seed in ways that endanger humans, food, livestock, fish, or wildlife or cause unreasonable adverse environmental effects ([Minn. Stat. Chapter 18B.075](#)). While neonicotinoid use is undoubtedly beneficial in the production of certain food crops, widespread prophylactic use of treated seed coupled with the lack of regulation, reporting, and enforcement requirements for treated seed has led the MDA to seek out additional information and data about the risks of current treated seed usage in Minnesota. While neonicotinoids are not the only pesticide used on treated seed, the inherent physio-chemical properties of the insecticide class (e.g., high water solubility) have necessitated the MDA's focus.

Due to the lack of treated seed use reporting, the environmental load of neonicotinoids and all potential-associated risks in Minnesota are reasonably unmeasurable. However, two routine environmental sampling programs carried out by the MDA have been able to characterize specific impacts. Appendix A and B detail significant relationships between the corn and soybean planting dates in Minnesota and surface water detections for neonicotinoids found on treated seed and the timing of bee kill investigations. The MDA has consistently (2018 – 2022) found a significant connection between the detection of clothianidin and imidacloprid in Minnesota rivers and streams at concentrations exceeding the EPA's chronic aquatic life benchmarks (ALB) for freshwater invertebrates and the statewide treated corn and soybean planting period. Additionally, co-occurrence, or the detection of more than one neonicotinoid in a surface water sample, at concentrations exceeding chronic benchmarks numerical values is consistently found during this period, suggesting that EPA's ALBs for individual active ingredients may underestimate the risk to aquatic life when multiple neonicotinoids are present in a waterbody. Furthermore, data from bee kill investigations (2015 – 2022) suggests off-target movement of clothianidin from treated seed to terrestrial environments used by pollinators for early season forage and has led to documented acute pesticide poisonings of honey bees. The MDA requests that the EPA consider Minnesota's extensive water monitoring and bee kill investigation data suggesting pesticide-treated seeds are the cause of elevated and concerning concentrations of imidacloprid and clothianidin in surface water and clothianidin in bee kill investigations. The MDA encourages the EPA to do more to mitigate the movement and risk of neonicotinoids from treated seeds to surface water and pollinators.

While unintended effects of necessary pesticide use are unavoidable, a balance must be struck to mitigate those impacts deemed unreasonable to human health and the environment, directions typically outlined and enforced by a pesticide label. The information on a treated seed label is not the same as what is found on the treating pesticide's pesticide label (regulated under FIFRA), and the lead regulatory authority for enforcement of treated seed labels is unclear. As pesticide labels are not provided to treated seed purchasers, the Minnesota Seed Regulatory Program is putting forth considerable effort to document the information getting into the hands of treated seed users. A juxtaposition of treated seed labels for sale in Minnesota and the pesticide label for the treating insecticide is detailed in Appendix C. Comparisons of pesticide treated seed labels and pesticide labels found differing advisories on water pollution and pollinator protection. While some pesticide risks associated with treated seed use may differ from other pesticide uses necessitating distinctive label language, Minnesota surface water detections of neonicotinoids, commonly used on treated seed during the planting season, at concerning concentrations along with bee kill data suggests current treated seed labels are inadequate at reducing aquatic and pollinator risk from neonicotinoid treated seed. While the MDA has language enforceability concerns, **the MDA encourages the EPA to strengthen**

treated seed label language to protect surface water and pollinators and ensure consistency of language across treated seed labels.

In addition to appropriate advisory statements on labels, increasing enforceable language and clear guidance on who is responsible for enforcing treated seed label language could enhance stewardship and lead to more judicious use of treated seed in Minnesota. The Federal Seed Act (FSA) requires accurate labeling and purity standards for seeds in commerce and prohibits the importation and movement of adulterated or misbranded seeds. However, pesticide related requirements listed on seed bags are not enforced under the FSA. Likewise, federal and state lead agencies regulating pesticides under FIFRA do not enforce these requirements because pesticide treated seeds are considered treated articles and not pesticides. Therefore, state lead agencies regulating pesticides and seed are left in a regulatory gap related to environmental protection, disposal, enforcement, complaints, questions, and potential lawsuits. **The MDA encourages the EPA to develop greater federal guidance on the regulatory authority for treated seed label language enforcement. Additionally, the MDA supports the addition of enforceable language on treated seed labels, where appropriate.**

Additional risks posed by current treated seed use are unknown, due in part to the MDA's inability to track the purchase, use, storage, or disposal of treated seed under FIFRA or state seed and pesticide laws. However, due to concern about the environmental impacts of treated seed, the MDA sees value in knowing this information. The MDA has initiated steps to address some of these concerns through a treated seed tag database from the Minnesota Seed Regulatory Program and future rulemaking on treated seed disposal by the Minnesota Pollution Control Agency. Despite these efforts, gaps in data collection will exist due to a limited ability for oversight and the lack of reporting requirements for treated seed. **The MDA supports creating registration and reporting requirements or other requirements for all seed treated within the state and all pre-treated seed imported from other states.** A federal database for pesticides used on treated seeds including information such as the amount of treated seed purchased and the identity of active ingredients, the amount planted, and the amount discarded at the end of the season would help Minnesota better assess the risk of pesticide treated seeds to the environment.

Thank you for the opportunity to comment. If you have questions, please contact us.

Sincerely,



Thom Petersen, Commissioner
Minnesota Department of Agriculture

Appendix A

Water Quality

Almost all corn and soybean seeds planted in Minnesota are treated with one or more fungicide or insecticide. For instance, three of the five neonicotinoid insecticides currently registered by the EPA and the MDA in Minnesota, clothianidin, imidacloprid, and thiamethoxam, are routinely used as insecticide seed treatments (Mourtzinis et al. 2019). The MDA estimates that almost all corn seed (8,219,197 acres total, 2022) and approximately 44% of soybean seed (7,726,724 acres total, 2022) planted in Minnesota in recent years was treated with at least one neonicotinoid insecticide. While neonicotinoid products for urban, foliar, and soil applications are registered in Minnesota, the MDA estimates treated row crop seed accounts for most neonicotinoid use in the state.

The MDA has an extensive groundwater and surface water quality monitoring program, conducting over 800 sample collection visits annually and analyzing for more than 180 pesticide compounds, including several neonicotinoids. Ambient water quality monitoring is completed to evaluate the impact of routine agricultural chemical use on Minnesota's water resources. Surface water samples are collected primarily from rivers and streams and rainfall, with additional samples from lakes and wetlands in select years. Samples are analyzed using well-established methods at the MDA Laboratory Services Division, an ISO-accredited laboratory. The MDA's pesticide water quality monitoring efforts, along with the MDA Laboratory's analytical capability, are recognized as one of the most comprehensive programs in the nation. This program has detected neonicotinoids in rivers and streams, agricultural subsurface drainage tiles, urban stormwater ponds, rain, and groundwater in Minnesota.

Presuming producers in Minnesota adhere to current pesticide-treated seed labels, data collected from the MDA suggests seed label requirements are not adequately preventing clothianidin and imidacloprid from reaching surface water at concentrations above the numeric component of the applicable EPA chronic aquatic life benchmark (ALB) for freshwater invertebrates (**Appendix A Table 1**). Unless otherwise stated, data was screened to the numeric component of the ALB only and further evaluation would be required to assess duration. Extensive surface water monitoring efforts identified a consistent pattern (2018-2022) between statewide corn and soybean planting dates and clothianidin and imidacloprid presence in Minnesota rivers and streams near agricultural lands (**Appendix A Figure 1**). Thiamethoxam was also routinely detected in rivers and streams but at concentrations consistently below the EPA chronic benchmark.

Seasonality of Clothianidin, Imidacloprid, and Thiamethoxam in Streams and Rivers in Agricultural Regions

As with most pesticides detected in Minnesota streams and rivers, neonicotinoid detection frequencies vary across seasons and are highest soon after they are introduced into the environment. During the period outside the corn and soybean growing season (generally mid-September through mid-April), clothianidin, imidacloprid and thiamethoxam detection frequencies in rivers and streams were 11%, 7% and 3%, respectively (2018 – 2022, n=70, **Appendix A Figure 1**). However, during the corn and soybean planting period plus the month following planting (generally late April to mid-July), detection frequencies in rivers and streams increased to 39% for clothianidin, 27% for imidacloprid, and 11% for thiamethoxam (2018 – 2022, n=808, **Appendix A Figure 1**). Concentrations also increased during this period with 22% of the samples detected above the clothianidin ALB (50 ng/L) and 18% of the samples above the imidacloprid ALB (10 ng/L), before accounting for duration (**Appendix A Figures 1 – 2**). An

extra month is included within this period to account for post planting runoff events that would be associated with seed treatment related transport to rivers and streams. In the later growing season when most neonicotinoid foliar applications occur (generally mid-July to mid-September), detection frequencies for all three neonicotinoids dropped below 11%, with less than 5% of samples above the clothianidin or imidacloprid ALBs (2018 – 2022, n=408; **Appendix A Figure 1**). The start and end of each planting season were determined based on actual NASS planting progress data for the year in which the water samples were collected.

In **Appendix A Figure 1**, bars represent the positive detection frequency for all samples collected while the darker regions represent the percentage of samples detected above the ALBs. Statistical comparison (chi-square test followed by a post-hoc pairwise comparison of proportions with a Bonferroni correction) found significantly higher surface water detection frequencies between the Non-Growing Season and the Planting and Early Growing Season for clothianidin ($p = 9.50E-05$) and imidacloprid ($p = 0.0016$) and between the Planting and Early Growing Season and Late Growing Season for clothianidin ($p = < 2.0E-16$), imidacloprid ($p = 2.50E-08$), and thiamethoxam ($p = 4.80E-05$). While no significant differences in detection frequencies existed between the Non-Growing Season and Late Growing Season for clothianidin ($p = 0.62$), imidacloprid ($p = 0.9615$), or thiamethoxam ($p = 1.0$). Additionally, positive detections of clothianidin and imidacloprid at concentrations above the freshwater invertebrate ALB's numerical component were significantly higher during the Planting and Early Growing Season compared to Non-Growing Season ($p = 0.028, 0.0096$, respectively) and the Late Growing Season ($p = 3.40E-15, 8.20E-10$, respectively). The significantly higher neonicotinoid detection frequencies in surface water samples collected during the Planting and Early Growing Season implicate seed treatment as the likely source of contamination in Minnesota streams and rivers near agricultural watersheds.

Neonicotinoid detections occurred more frequently in samples collected after rainfall events (storm flow). Storm flow samples accounted for 85% of the clothianidin, 84% of the imidacloprid, and 92% of the thiamethoxam detections from 2018 through 2022. Due to high solubility and mobility, neonicotinoids are transported into rivers and streams in surface runoff (overland flow) and subsurface drainage tile flow following the planting of treated seeds. The increased detection frequency coinciding with the corn and soybean planting each year, followed by reduced detection frequencies and lower concentrations later in the growing season and in the non-growing season strongly suggests that neonicotinoids from seed treatments are the primary source of detections and are rapidly transported to rivers and streams after planting.

Co-occurrence of Neonicotinoids

Laboratory studies have documented a synergistic effect of exposure to multiple neonicotinoids on invertebrates (Maloney et al. 2018, Macaulay et al. 2021). A recent study suggested that a synergistic relationship between pesticides in streams, dominated by clothianidin and imidacloprid, led to losses in aquatic invertebrate abundance, biomass, species richness, and emergence (Schmidt et al. 2022). These data suggest that EPA's ALBs for individual active ingredients may underestimate the risk to aquatic life when multiple neonicotinoids are present in a waterbody. In Minnesota, co-occurrence of neonicotinoids in specific samples is highest in the Planting and Early Growing Season period. During this time, 17% of samples had a single neonicotinoid detected, 16% of samples had two neonicotinoids detected, and 10% of samples had three neonicotinoids detected (**Appendix A Figure 3A**). In the Late Growing Season and Non-Growing Season, no more than 12% of samples had more than one neonicotinoid detected in an individual sample.

From 2018 through 2022, the MDA detected clothianidin and imidacloprid co-occurring over their respective numerical component of freshwater invertebrate ALB in 19% of samples collected during the corn and soybean planting period and the month following (**Appendix A Figure 3B**). While in 2.8% of samples when clothianidin and imidacloprid were both detected, one of the insecticides was over their applicable ALB (not shown in graph). During the other sample collection periods (Non-Growing Season, Late Growing Season), no more than 4% of samples had more than one neonicotinoid detected over their respective ALB numerical component for freshwater invertebrates.

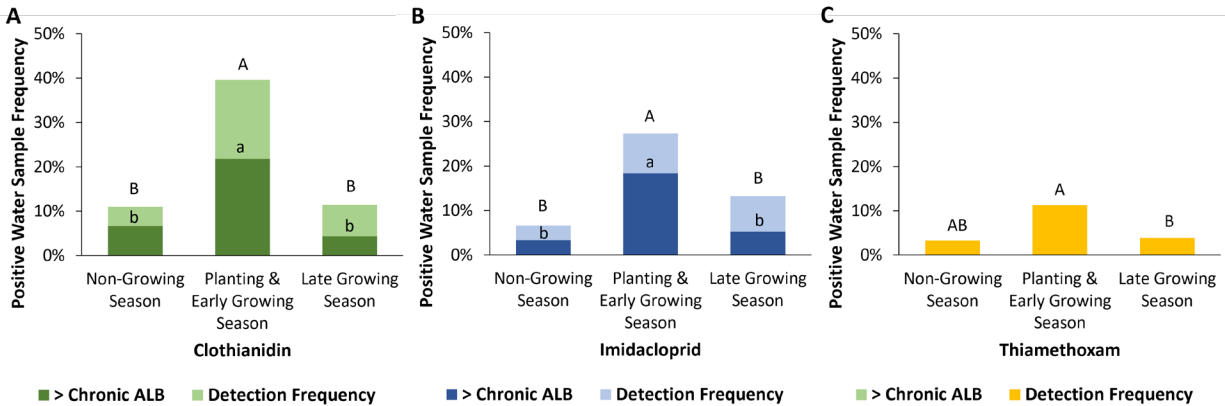
21-Day Average Concentrations of Clothianidin and Imidacloprid in Rivers and Streams

As the EPA’s ALBs are chronic, the presence of neonicotinoids in surface water were evaluated for 21-day intervals. At each of the approximately 40 river or stream stations the MDA monitors for the neonicotinoids, eight to fourteen grab samples are collected from May through August every year. Using these data, the MDA estimated 21-day average concentrations to directly compare to EPA’s ALB for freshwater invertebrates. Across western and southern Minnesota rivers and streams (2018 – 2022) it was common to have at least one, and up to nineteen, instances of a 21-day average concentration of clothianidin and/or imidacloprid over the EPA’s chronic ALB for freshwater invertebrates (See maps in **Appendix A Figure 4 – 5**). This analysis strongly suggests that clothianidin and imidacloprid concentrations over the EPA’s chronic ALB are sustained for periods more than 21 days in rivers and streams across western and southern Minnesota.

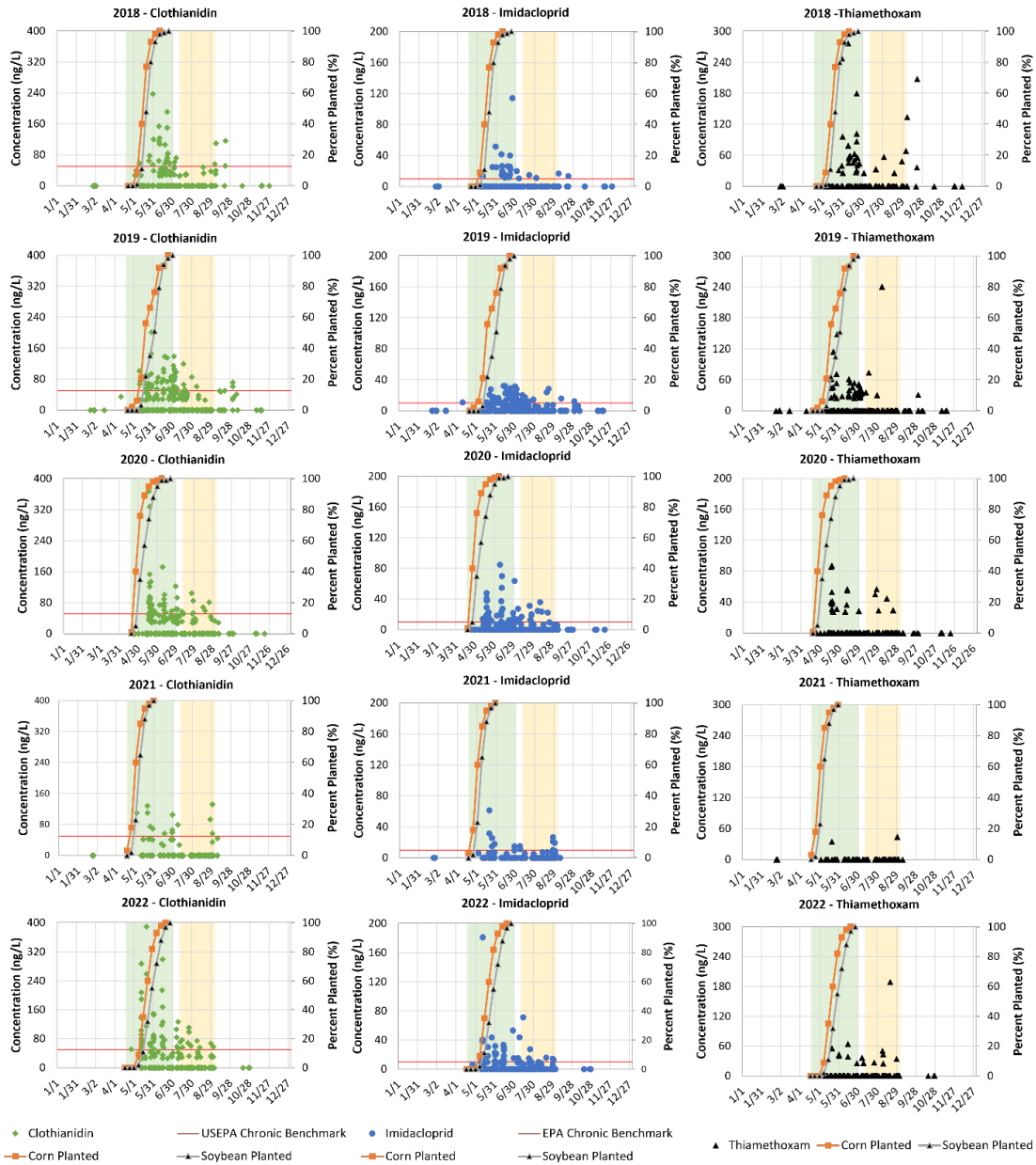
Appendix A Table 1. Maximum acute concentration (ng/L) of select neonicotinoids in Minnesota surface water samples from 2018 – 2022. Red text indicates the detection was above the numeric component of the applicable EPA chronic aquatic life benchmark (ALB) for freshwater invertebrates.

	Surface Water Detections		
	Clothianidin	Imidacloprid	Thiamethoxam
<i>ALB¹</i>	<i>50 ng/L</i>	<i>10 ng/L</i>	<i>740 ng/L</i>
2018	237	114	277
2019	201	32	241
2020	367	85	87
2021	132	61	44
2022	389	181	189

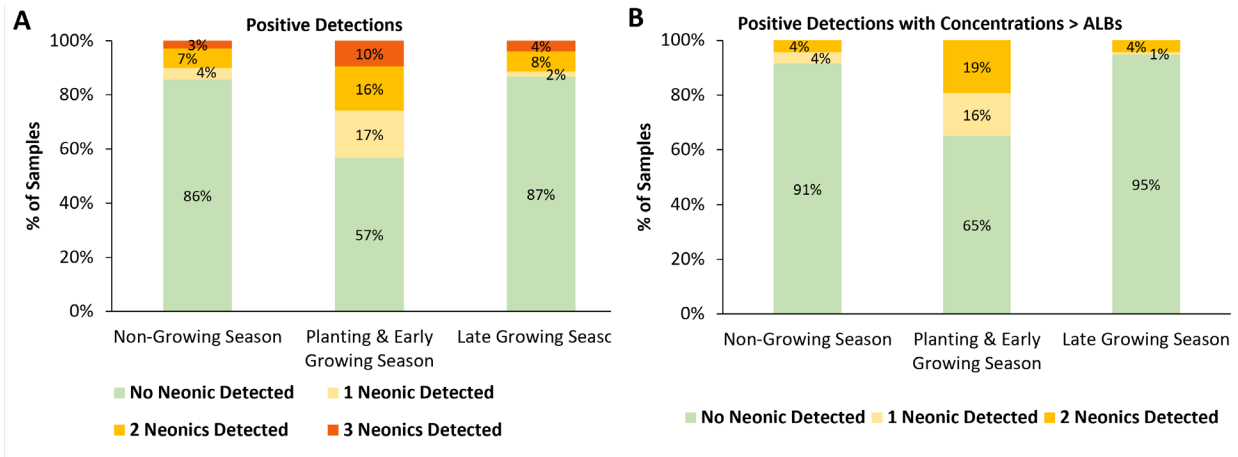
¹Concentration detected above the numeric component of the applicable EPA chronic aquatic life benchmark (ALB) for freshwater invertebrates. An evaluation of duration is presented below in **Appendix B Figure 4 – 5**.



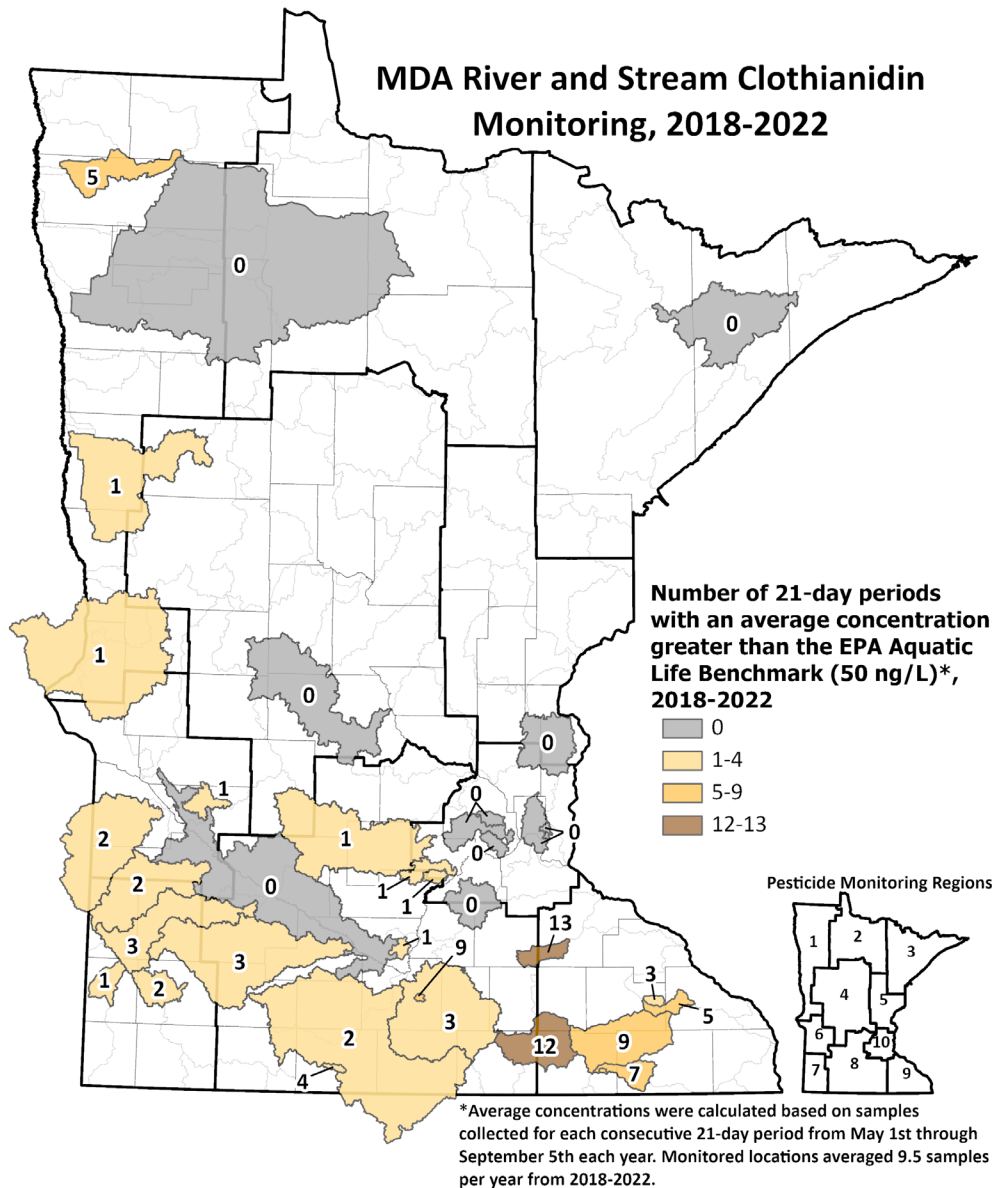
Appendix A Figure 1. Minnesota river and stream detection frequencies for (A) clothianidin, (B) imidacloprid, and (C) thiamethoxam relative to corn and soybean seed planting windows (2018 – 2022) in agricultural regions. The start and end of each planting season was determined based on actual NASS planting progress data the year in which the water samples were taken. Samples were generally collected mid-September of the previous year to mid-April (Non-Growing Season) late-April to early-July (Planting & Early Growing Season), and mid-July to mid-September (Late Growing Season). Top of bars represent the total frequency of positive detections for each insecticide, darker sections represent the frequency of samples that were above the numeric component of the EPA chronic benchmark for freshwater invertebrates. Capital letters indicate statistical significance between Non-Growing Season, Planting & Early Growing Season, and Late Growing Season detection frequencies ($p < 0.05$). Lower case letters indicate statistical significance between Non-Growing Season, Planting & Early Growing Season, and Late Growing Season detection frequencies of samples with concentrations exceeding the numerical component of the EPA’s chronic ALB’s for freshwater invertebrates ($p < 0.05$).



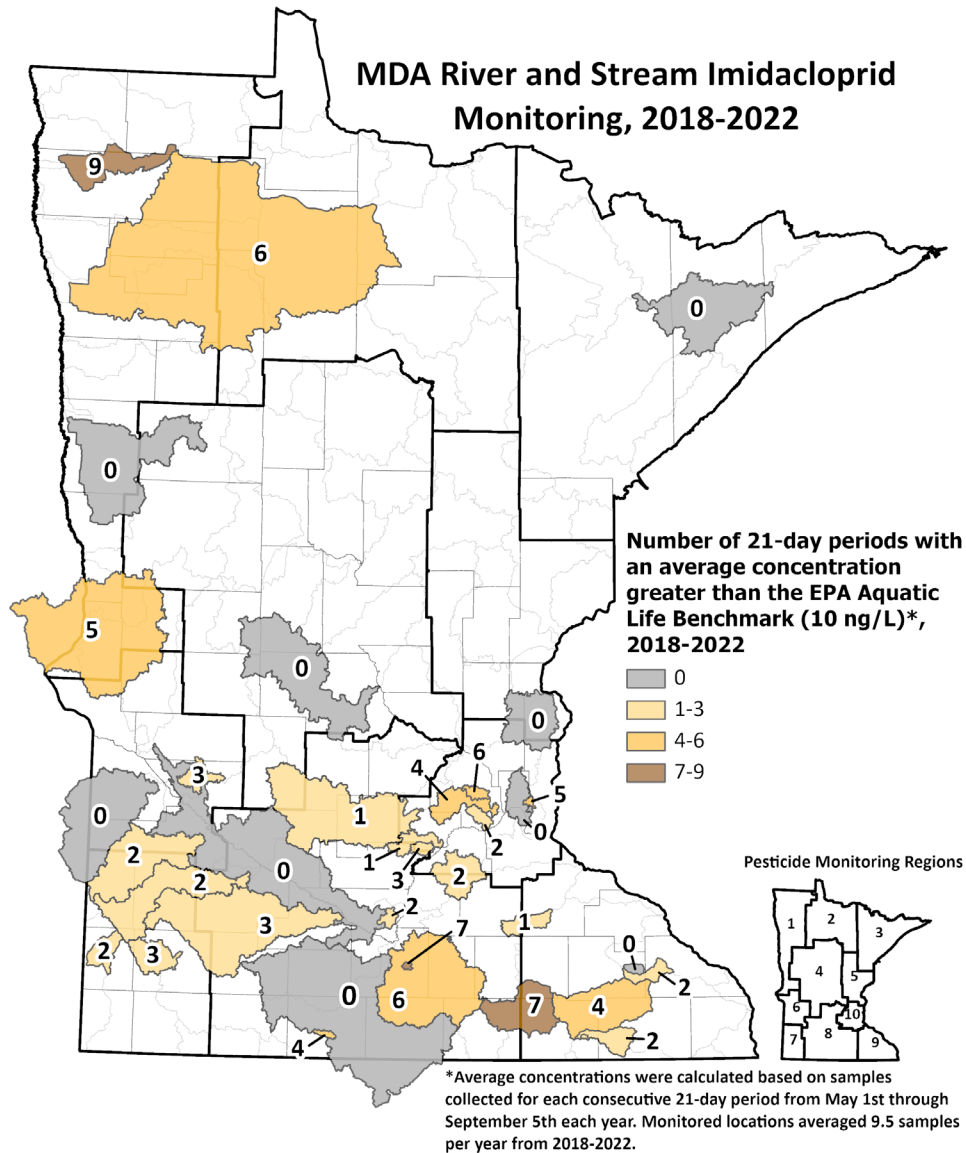
Appendix A Figure 2. Concentration of clothianidin, imidacloprid, and thiamethoxam detections in agricultural watersheds compared to statewide corn and soybean planting progress in Minnesota (2018 – 2022). Orange (corn) and grey (soybean) lines represent the percent of corn and soybean seed planted by date in Minnesota. The green shaded areas represent the seed planting window, the yellow shaded region represents the possible foliar application window in Minnesota. Green (clothianidin), black (imidacloprid), and blue (thiamethoxam) markers denote concentration of those pesticide analytes in water samples. Clothianidin concentrations over 50 ng/L and imidacloprid concentrations over 10 ng/L are above the numeric component of the EPA’s chronic aquatic life benchmark (ALB) for freshwater invertebrates (red line). No detections of thiamethoxam were detected over the number component of the EPA’s chronic ALB (740 ng/L).



Appendix A Figure 3. Frequency of neonicotinoid insecticide co-occurrence in Minnesota agricultural region river and stream samples (2018 – 2022). (A) Frequency of water samples with positive neonicotinoid detections. (B) Frequency of water samples with a neonicotinoid detection(s) at concentrations exceeding the numeric component of the EPA’s aquatic life benchmarks (ALB) for freshwater invertebrates (only clothianidin and imidacloprid, as no sample exceeded thiamethoxam ALB). Samples were assigned to a sample collection category based on actual corn and soybean planting dates for each year (“Non-Growing Season” was used for samples collected outside of the growing season; “Planting & Early Growing Season” was assigned for samples collected during and one month after planting was completed; “Late Growing Season” was assigned for samples collected one to three months after planting was completed when other foliar uses occur).



Appendix A Figure 4. Total number of 21-day average concentrations of clothianidin above the clothianidin EPA chronic benchmark (50 ng/L), 2018 through 2022. To calculate 21-day average concentrations, the MDA integrated grab samples collected each year from May through August and extended the concentrations to the midpoint of the previous and following sample. Every location had six 21-day average concentrations calculated for each monitoring season including May 1st through May 22nd, May 23rd through June 13th, June 14th through July 4th, July 5th through July 25th, July 26th through August 16th, and August 17th through September 5th each year. Each of these six 21-day average concentrations were compared to the USEPA chronic aquatic benchmark for invertebrates.



Appendix A Figure 5. Total number of 21-day average concentrations of imidacloprid above the clothianidin EPA chronic benchmark (10 ng/L), 2018 through 2022. To calculate 21-day average concentrations, the MDA integrated grab samples collected each year from May through August and extended the concentrations to the midpoint of the previous and following sample. Every location had six 21-day average concentrations calculated for each monitoring season including May 1st through May 22nd, May 23rd through June 13th, June 14th through July 4th, July 5th through July 25th, July 26th through August 16th, and August 17th through September 5th each year. Each of these six 21-day average concentrations were compared to the USEPA chronic aquatic benchmark for invertebrates.

Appendix B

Pollinators

Minnesota is an important location for U.S. honey bees during the spring and summer, ranking seventh among states for honey production (NASS 2023). The MDA supports beekeepers within the state by administering a comprehensive bee kill investigation program. The [bee kill investigation program](#) determines when an acute pesticide poisoning has occurred and includes a corresponding compensation program for beekeepers. Pesticide and colony health (e.g., mite and virus levels) information and data are collected to characterize the reason for observed symptoms and losses. During investigations dead bees, and live bees when available, and vegetation samples are collected and sent to two International Organization for Standardization (ISO)-accredited laboratories (MDA Laboratory Services and USDA National Science Laboratories-Gastonia, NC) to test for pesticides. Between the two labs, over 200 pesticide analytes are tested for.

Seasonality of Neonicotinoid Related Bee Kills

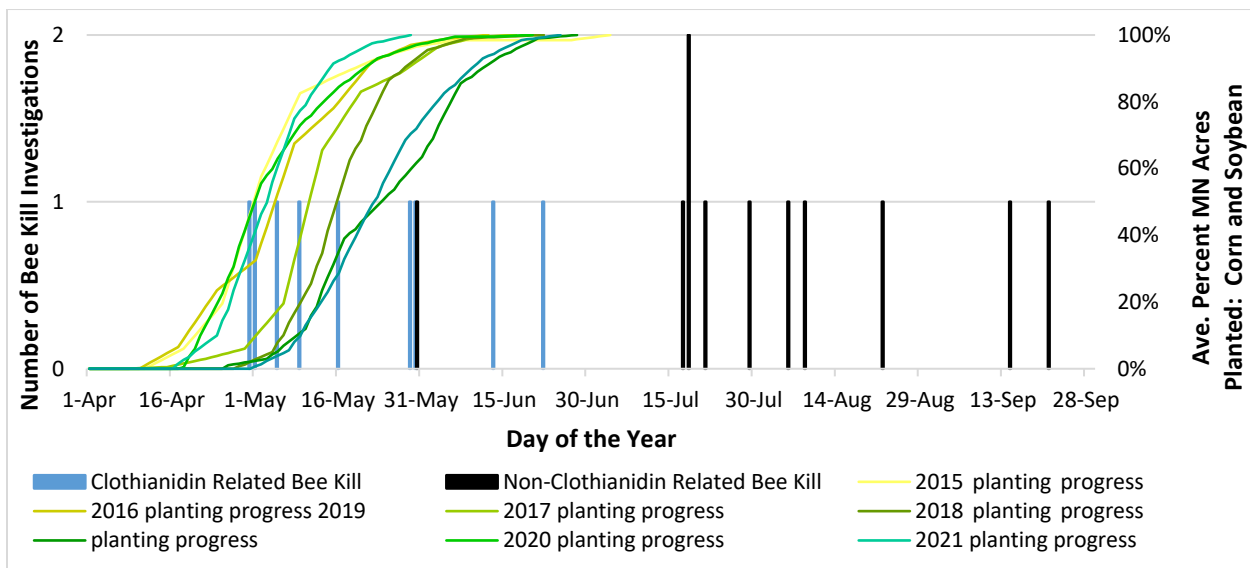
Data from the MDA's bee kill investigation program (2015 – 2022) were compiled for all cases located within three miles of significant agricultural areas (i.e., non-urban incidents). Data shows that clothianidin was only detected in bee kill investigations during, or shortly after, statewide planting of corn and soybean (generally mid-April to mid-June based on field conditions; **Appendix B Figure 1** and **2**). Investigators only identified an application of a pesticide containing clothianidin in one of the cases, wherein clothianidin had been recently applied to a nearby apple orchard. Of the nine investigations where clothianidin was detected, six were determined to be acute pesticide poisonings (i.e., the pesticides found likely directly contributed to colony losses).

Other insecticides and fungicides are commonly used as seed treatments in Minnesota. However, despite their common use, no other pesticide active ingredient used as a seed treatment is found as frequently as clothianidin in bee kill investigations. Imidacloprid has never been quantified in bee kill samples above the detection limit and thiamethoxam has only been found once in bee kill samples at a very low concentration. These findings support the need to collect more information during investigations to better understand why clothianidin, and no other pesticides used as seed treatments, is found in bee kill investigations in spring and early summer. Information that could be gathered through a new registration and reporting requirement for all seed treated with pesticides would be very useful for future bee kill investigations.

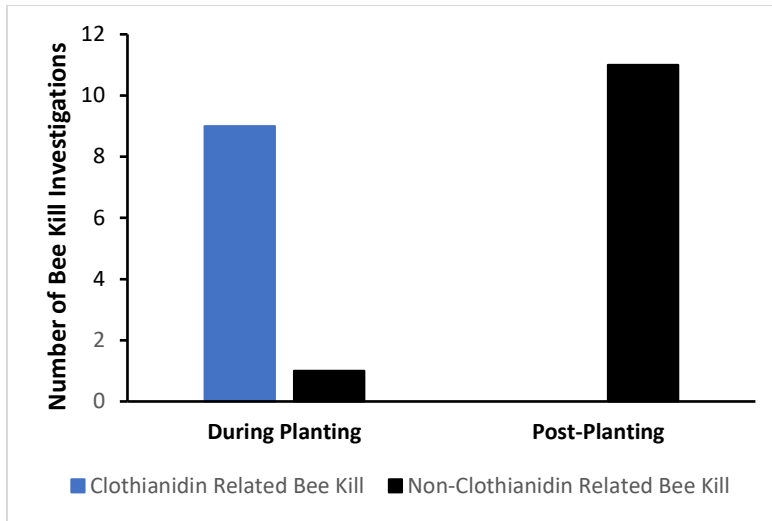
The MDA relies on beekeepers to observe and report suspected symptoms of honey bee poisonings to initiate an investigation. Often this leads to some amount of time passing between the bees' pesticide exposure and pesticide sample collection. Depending upon the pesticide, delays in pesticide sampling likely result in environmental and metabolic degradation of pesticides. The MDA, therefore, assumes that quantified pesticide concentrations from bee kill investigations likely underestimate initial exposure concentrations. Additionally, it is known that beekeepers do not always report suspected pesticide poisonings to the MDA, and thus data from this complaint-driven investigation program likely underestimates the occurrence of actual honey bee acute pesticide poisonings.

Nevertheless, the observed temporal overlap of clothianidin detections in bee kill investigations, the planting of treated corn and soybean seed in Minnesota, and the resulting colony losses due to acute pesticide poisoning illustrate the potential risk pesticide treated seeds pose to honey bees, an important

pollinator and livestock animal. Given these documented impacts from treated seed uses, the MDA encourages the EPA to further evaluate the risk of treated seeds to livestock and wildlife and the potential to cause unreasonable adverse effects on the environment. Additionally, the MDA would like to point out that pesticide treated seed labels do not always contain the same pollinator protection language as their corresponding pesticide product labels. For example, a liquid formulation of clothianidin may carry a pollinator protection box, explaining how long the product will be toxic to bees once applied and may carry statements related to drift onto pollinator attractive plants. In contrast, pollinator-related language on treated seed labels is variable or may be absent, may lack reference to the insecticide’s bee toxicity, may not contain information related to dust-off concerns, and does not suggest the use of seed lubricants where it may be needed. Depending on the crop, treated seed labels may not provide sufficient dust reducing mitigation measures to prevent active ingredient abrasion leading to off-target movement to soil, plants, air, and water.



Appendix B Figure 1. Bee kill investigations by the Minnesota Department of Agriculture located within three miles of significant agricultural activities compared to statewide corn and soybean planting progress in Minnesota (2015 – 2022). Blue bars represent investigations where clothianidin was detected. Black bars represent investigations with non-clothianidin pesticides present. Shaded yellow and green lines indicate average corn and soybean planting progress by year. Average corn/soybean planting and bee kill investigation are temporally displayed along the x-axis for comparison across years.



Appendix B Figure 2. Total number of bee kill investigations by the Minnesota Department of Agriculture located within three miles of significant agricultural activities (2015 – 2022). Blue bars represent investigations where the insecticide clothianidin was detected, black bars represent investigations where no clothianidin was detected, but other (non-neonicotinoid) pesticides were present. Investigations are categorized as either during planting (occurring during or soon after corn and soybean planting in Minnesota) or post-planting.

Appendix C

Treated Seed Label Requirements

As previously mentioned, the MDA is collecting the information included on treated-seed labels for treated seeds sold in Minnesota to gain a better understanding of the information provided to purchasers. In addition to a better understanding of the content included on pesticide treated seed labels, greater clarity from EPA on who the lead regulatory authority for enforcement of pesticide treated seed labels would be beneficial to the MDA. To address EPA’s question regarding the need for “further regulatory or administrative measures to ensure the safe use of treated seed,” the MDA examined treated seed labels for limitations and omissions regarding protecting water quality.

In response to The Center for Food Safety’s 2017 “Citizen Petition to the U.S. Environmental Protection Agency Seeking Rulemaking or a Formal Agency Interpretation for Plant Seeds Coated with Systemic Insecticides,” the EPA acknowledged, “the seed bag tag labeling is the primary means by which instructions are communicated to downstream distributors, sellers, and users” (EPA-HQ-OPP-2018-0805). Since pesticide treated seeds are exempt from FIFRA regulation, labeling requirements for the final treated article product differ from the labels for the pesticides that the seeds are treated with. Examination of four randomly selected treated seed labels registered in Minnesota (treated with clothianidin: Lumisure1250, Poncho 600; or imidacloprid: Attendant 600, Gaucho 600) identified six water advisory statements in total, as stated below.

- “Do not contaminate water bodies when disposing of planting equipment wash waters.” (All)
- “Do not use in areas where rice/crawfish aquaculture practices are in place or in or near fish farms, shrimp, prawn or crab pond or nursery operations.” (Lumisure, Poncho)
- “The seed treatments applied to this seed are known to leach through soil into groundwater under certain conditions as a result of label use.” (Lumisure)
- “This chemical may leach into ground water if used in areas where soils are permeable, particularly where the water table is shallow.” (Lumisure)
- “This product is toxic to aquatic invertebrates.” (Attendant)
- “Leftover treated seed may be buried away from water sources in accordance with local requirements.” (Attendant)

While the EPA-approved pesticide labels for the products (Lumisure1250, Poncho 600, Attendant 600, Gaucho 600) on those seeds contain additional or different water advisory statements, as stated below.

- “Do not apply directly to water or to areas where surface water is present or to intertidal areas below the mean high-water mark.” (All)
- “This product is toxic to aquatic invertebrates.” (Gaucho, Lumisure)
- “Do not apply where runoff is likely to occur.” (Lumisure, Poncho)
- “Drift and runoff from treated areas may be hazardous to aquatic organisms in water adjacent to treated areas.” (Lumisure, Poncho)
- “This chemical has properties and characteristics associated with chemicals detected in ground water.” (Poncho)
- “Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge.” (Attendant)
- “Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional office of the EPA.” (Attendant)

The MDA acknowledges that pesticide treated seeds and pesticides pose different risks, and thus appropriate label requirements may differ. However, surface water and bee kill investigation data presented in this letter indicate that either pesticide treated seed labels are insufficient at mitigating the risk of neonicotinoids in Minnesota or there is widespread lack of adherence to the pesticide treated seed labels. Minnesota’s surface water detections of neonicotinoids commonly used on treated seed during the planting season and the exclusion of seven water advisory statements on seed labels reviewed by the MDA (e.g., “do not apply where runoff is likely to occur” and “drift and runoff from treated areas may be hazardous to aquatic organisms in water adjacent to treated areas”) suggests more could be done to reduce clothianidin and imidacloprid runoff into Minnesota water bodies from treated seed. While statements directing users to plant at specific depths to reduce runoff were present, these advisories may be insufficient to protect surface water from contaminated tile flow, or from pesticides leaching into groundwater (data not shown).

The MDA supports the recommendations outlined in the EPA’s January 2020 proposed interim registration review of clothianidin and thiamethoxam (EPA-HQ-OPP-2011-0865) to add three advisory statements to clothianidin and thiamethoxam treated seed to mitigate avian and mammalian risk:

“cover or collect treated seeds spilled during loading and planting in areas,” “dispose of all excess treated seed by burying seed away from bodies of water,” and “do not contaminate bodies of water when disposing of planting equipment wash water.” The interim registration review expected these additions to benefit aquatic organisms by reducing neonicotinoid loading in aquatic systems. All three advisory statements were found on the four seed labels examined. Despite these modifications, clothianidin detections in surface water in Minnesota have continued to exceed the EPA’s ALB chronic components for freshwater invertebrates (**Appendix A**).

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