THESIS™

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THESIS INSIGHTS: Pollinator Health

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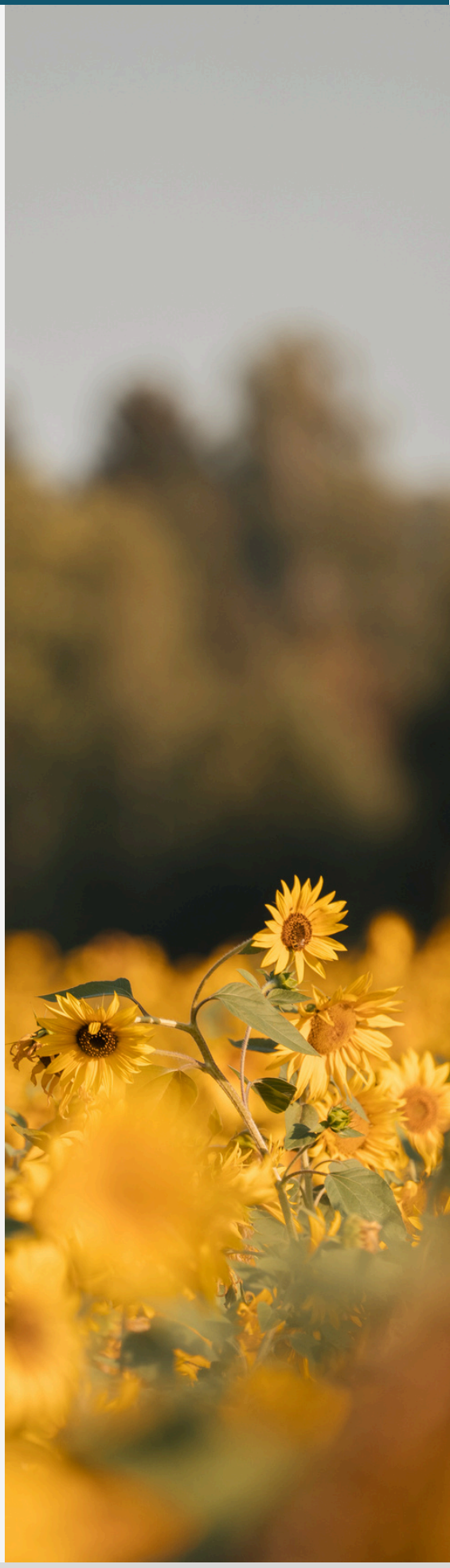
Contents



Executive Summary

Pollinators are vital for ecosystems and agriculture as they pollinate 75% of flowering plants globally. Despite their importance, pollinator populations are in decline due to habitat loss, pesticide use, and climate change, which threatens food security and ecological resilience.

The Sustainability Consortium (TSC) developed the Pollinator Health Assessment to help industries measure performance and improve practices related to pollinator health. This report presents key findings, challenges, and opportunities to support pollinator health, based on data collected between 2021 and 2023 from 56 companies in the food, beverage, and agriculture sector that produce fruits, vegetables, nuts, or potted and flowering plants.

AUTHORS:

Kevin Dooley (TSC)
Lead Author

Teresa Garcia Moore (TSC)
Emil Georgiev (TSC)
Contributing Authors

Myriam Fessi (TSC)
Analytics

Erin Killeen (TSC)
Editor

Megan Simone (TSC)
Nathan Bolivar (TSC)
Designers

1 Key Findings

Integrated Pest Management (IPM) Certification

- **60%** of the total growing acreage reported was covered by GLOBALG.A.P. certification, and 20% was covered by USDA Organic certification. All other IPM-benchmarked certifications covered less than 5% of the reported acreage.
- **67%** of suppliers had some or all their acreage covered by GLOBALG.A.P., and 67% of suppliers had some or all their acreage covered by USDA Organic.
- **38%** of suppliers had 100% of their acreage covered by GLOBALG.A.P., while only 2% of suppliers had 100% of their acreage covered by USDA Organic.

2 Pollinator Habitat

- Of the 44% (n=22) of suppliers who reported pollinator habitat acreage, a total of almost 18,000 hectares was habitat on their farms, and almost 4,000 hectares in their surrounding ecosystem.

3 Pesticide Use

- **68%** of suppliers reported using at least one of the five pesticides known to harm pollinators, though most used only one. The percentages of suppliers using a particular pesticide were chlorpyrifos (3%), clothianidin (12%), dinotefuran (9%), imidacloprid (45%), and thiamethoxam (18%).

- For the 24 suppliers who also responded to the assessment in 2021, 2022, and 2023, those using no pesticide increased from 29% (2021) to 33% (2022) to 42% (2023). Those in this sample who did not use chlorpyrifos increased from from 83% in 2021 to 96% in 2022, and to 100% in 2023, likely due to the EPA's 2021 ban. The U.S. courts repealed this ban in late 2023, so usage may increase.

4 Insecticide Seed Treatment

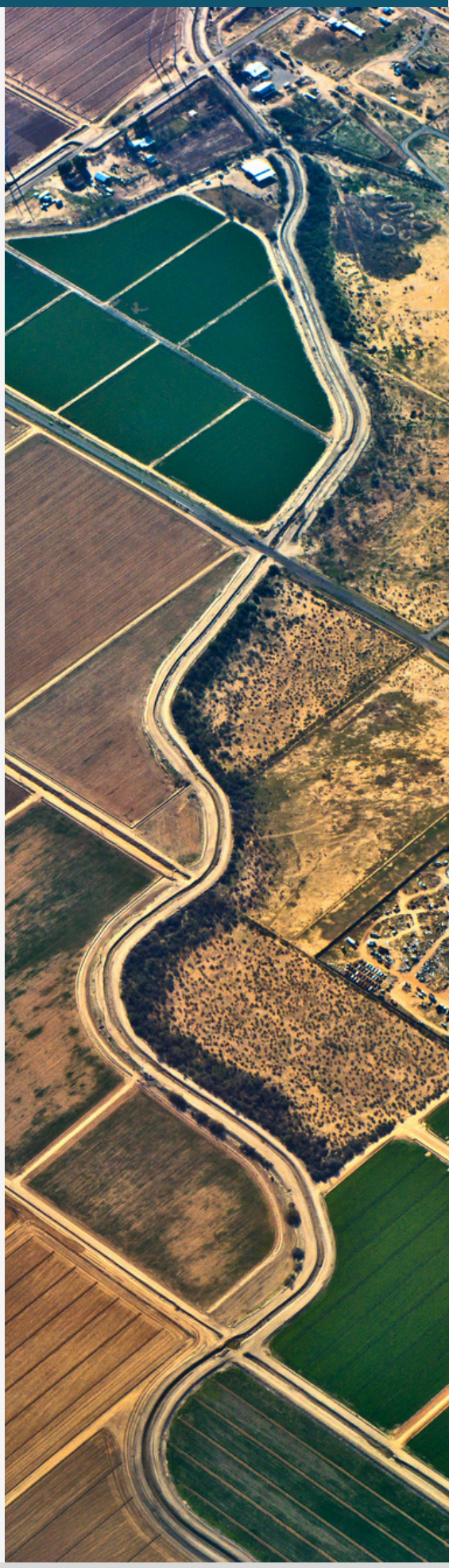
- No suppliers have reported using chlorpyrifos or clothianidin for insecticide treatment of seeds. Only 2% reported using imidacloprid, and 4% using thiamethoxam.

5 Responsible Pest Management (RPM)

- **50%** of suppliers report having practices related to pest management record-keeping and review, using results to inform decisions, and sharing data and information with stakeholders. 10% report only being in legal compliance.

6 Overall Trends

- Except for the trends noted regarding pesticide use, there was very little change in the reported data between 2021 and 2023.



Challenges

- While IPM-benchmarked certification is more common than not, neither it nor the amount of land set aside for protected pollinator habitat have increased in the past three years.
- Future relaxation of relevant regulations could cause fertilizer and insecticide seed treatment to increase.

Opportunities

To address these challenges, stakeholders must:

1. **Enhance Habitat Conservation:** Protect and restore more acreage of pollinator habitats.
2. **Reduce Reliance on Pesticides:** Maintain insecticide use at threshold levels even if regulatory boundaries change.
3. **Strengthen Sustainable Practices and use of Certification:** Integrate IPM data into planning and decision-making. Suppliers can also expand use of IPM certifications.

By prioritizing these actions, industries can protect pollinator populations, promote biodiversity, and ensure sustainable agricultural systems, securing long-term food security and ecological health.

The Sustainability Insight System (THESIS) Insights: Pollinator Health

Pollinators, including honeybees and diverse native insects like mason bees, leafcutter bees, beetles, moths, and hoverflies, play a crucial role in the health of both ecosystems and food systems. These creatures pollinate approximately 75% of flowering plants worldwide, supporting many crops that sustain us (Klein et al., 2007; Potts et al., 2016). Unlike managed honeybees, local pollinator species have adapted to pollinate specific plants in their habitats, making them indispensable for maintaining local biodiversity and productive agriculture. For instance, mason bees are remarkably efficient in pollinating fruit trees, while leafcutter bees are vital for alfalfa, a key crop for livestock (Bosch & Kemp, 2002; Garratt et al., 2014; MacIvor et al., 2022).

Threats to Pollinator Populations

The decline of pollinator populations significantly threatens food security and ecosystems (Van der Sluijs & Vaage, 2016). Driven by habitat destruction, pesticide use, and climate change, the loss of these essential species endangers agricultural productivity and ecological resilience. In response to the decline of pollinators, many retailers and suppliers are implementing policies to protect and promote pollinators' health. These initiatives focus on creating safer environments for pollinators by reducing pesticide use, supporting habitat restoration, and fostering sustainable agricultural practices that benefit biodiversity and food production (Giant Eagle, n.d.; Walmart, 2021; Whole Foods Market, n.d.).

Pollinator Health THESIS Performance Assessment

With pollinator health recognized as critical for sustainable agriculture, The Sustainability Consortium’s (TSC) Pollinator Health Assessment provides a structured approach for evaluating and improving industry practices. Launched in 2021, the Pollinator Health Assessment includes key performance indicators (KPIs) addressing the main areas impacting pollinator populations. These KPIs include certification programs, pollinator habitat, pesticide use and exposure management, and responsible pest management practices.

This THESIS Insights report provides an overview of sustainability performance related to pollinator health within the food, beverage, and agriculture sectors. Utilizing THESIS response data from 2021 to 2023, which includes data shared by 56 companies across various crop categories, including fruits, vegetables, nuts, and potted and flowering plants, this report highlights key opportunities, challenges, and best practices to address pollinator health.

Methodology Notes

This report uses a dataset comprised of 56 suppliers in the food, beverage, and agriculture sectors. Not all suppliers responded to every question. Only 2023 data is summarized. The total acreage of each supplier was not requested, but 48% of the suppliers reported annual revenue over $100M USD. We checked trends using suppliers who responded in 2021, 2022, and 2023. Only significant trends are reported; most data did not change significantly. All statistics presented throughout this report are rounded to their nearest whole number, and a 5% margin of error should be considered.

Supplier Progress

Responsible Pest Management Practices

Building upon TSC's Responsible Pest Management Framework (RPM), the RPM Practices KPI evaluates pest management practices and decisions that reflect basic, medium, and high levels of leadership. The basic level emphasizes farm-level record-keeping, while the medium level incorporates non-chemical methods alongside record review. The high level indicates influence beyond one's farm, the application of diverse methods, regular monitoring for success, inspiring others, and sharing information.

Table 1 shows the percentage of suppliers who responded to each KPI response. In 2023, 50% of suppliers report having practices related to pest management recordkeeping and review, using results to inform decisions, and sharing data and information with stakeholders, while only 10% reported only being in legal compliance.

Practices	RPM Level	Percent of Growers
Only compliant with laws and regulations	-	**10%**
Pest management recordkeeping	**Basic**	**10%**
Pest management recordkeeping, review, and use of results to inform decisions	**Medium**	**30%**
Pest management recordkeeping, review, use of results to inform decisions, and sharing of data and information with stakeholders	**High**	**50%**

Table 1

Integrated Pest Management (IPM) Certification

Certification programs are essential for pollinator health because they promote sustainable agricultural practices that protect habitats and reduce pesticide risk. These programs, such as Integrated Pest Management (IPM) certification, encourage farmers to adopt pest prevention practices, implement scouting and economic thresholds to inform pest management decisions, use non-chemical interventions (e.g., cultural, biological, physical), and assess and reduce pesticide risks. In addition, IPM certification programs establish guidelines for biodiversity conservation and habitat management to support environments where pollinators can thrive.

As measured by the percentage of crop hectares certified by different certifications, 60% was covered by GLOBALG.A.P. and 20% by USDA Organic (Table 2).

Certification	Percent of total growing region covered
Bee Better Certified	0%
Equitable Food Initiative	1%
Fairtrade International – Hired Labor	0%
Fairtrade USA Year 6 and beyond	3%
GlobalG.A.P.	60%
LEAF Marque	0%
Rainforest Alliance	1%
Sustainable Food Group Sustainability Standard	4%
Sustainably Grown	2%
USDA Organic	20%

Table 2

Of additional note:

- 67% of suppliers had some or all their acreage covered by GLOBALG.A.P., and 67% of growers had some or all their acreage covered by USDA Organic.
- 38% of suppliers had 100% of their acreage covered by GLOBALG.A.P., while only 2% of suppliers had 100% of their acreage covered by USDA Organic.

Pollinator Habitat

Dedicated pollinator habitats are essential for ecological health, agricultural productivity, and economic sustainability. Pollinators provide vital ecosystem services as three-fourths of the world's flowering plants and 35% of the world's food crops depend on pollinators to reproduce (USDA, n.d.). Dedicated pollinator habitats provide not only protection from pesticides toxic to pollinators and diversity of floral and nesting resources throughout the season, but also contribute to the general protection of wildlife biodiversity, population enhancement of other beneficial insects, improved soil and water quality, and enhancement of rural aesthetics (Wratten et al., 2012).

In agricultural production, there are two main ways in which pollinator habitat land can be established, restored, or protected: 1) Dedicated pollinator habitat at growing operations used for growing crops delivered to market or processors, or 2) Dedicated pollinator habitat in sustainable landscapes or communities where growing operations are located.

Of the 44% (n=22) of suppliers who reported pollinator habitat acreage, a total of almost 18,000 hectares was habitat on their farms and almost 4,000 hectares in their surrounding ecosystem. This total amount of acreage did not significantly change from 2021 to 2023. As natural habitat decreases (Erickson et al., 2022; Sáenz-Ceja, Sáenz-Reyes, & Castillo-Quiroz, 2022), it highlights the need for continued conservation efforts and sustainable land management practices by growers on their farms and in their surrounding ecosystems.

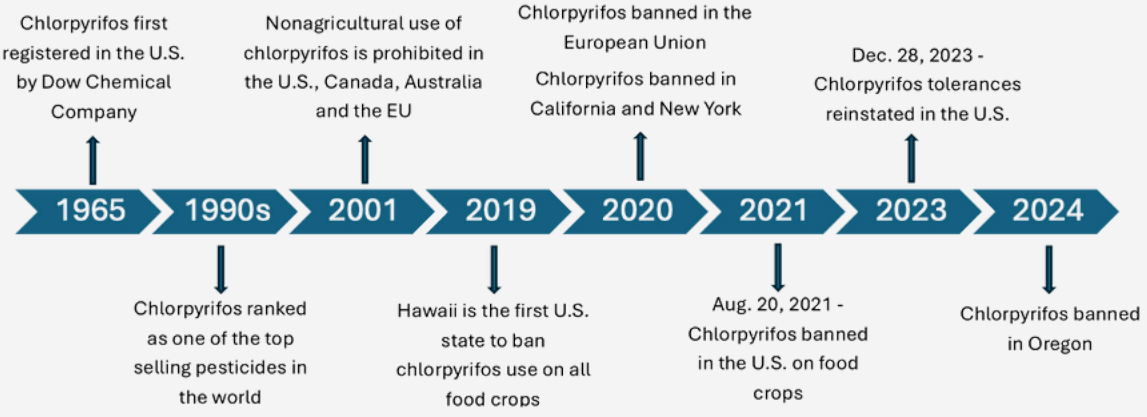
Pesticide Use

TSC's assessment collects data on five pesticides: chlorpyrifos, clothianidin, dinotefuran, imidacloprid, and thiamethoxam.

Chlorpyrifos

Chlorpyrifos is an organophosphate insecticide, acaricide, and miticide primarily used in agriculture to control foliage and soil-borne insect pests (U.S. EPA, n.d.). In 2023, only 3% of growers used Chlorpyrifos. Additionally, for the 24 growers who also responded to the assessment in 2021, 2022, and 2023, those using no chlorpyrifos increased from 83% to 96% to 100%, likely due to the U.S. EPA's 2021 ban. The U.S. courts repealed this ban in late 2023 (EPA, 2024a), so usage may increase in the future. A timeline of chlorpyrifos regulation is shown in Figure 1.

Figure 1. Chlorpyrifos: Regulatory and Policy Timeline



Neonicotinoids

Neonicotinoid pesticides are a class of chemicals that act as insecticides by exerting neurotoxic effects via irreversible binding to specific insect receptors. In the 2010s, scientific research emerged linking the use of neonicotinoids to negative impacts on pollinators. Studies suggested these chemicals could contribute to colony collapse disorder in bees, leading to heightened public concern and regulatory discussions. In response to ongoing concerns, the U.S. EPA implemented label changes in 2017, including more stringent application guidelines aimed at minimizing exposure to bees and other beneficial organisms. Neonicotinoids are classified as highly toxic to pollinators, and the EPA plans to re-evaluate the registration of neonicotinoids as part of its broader efforts related to pesticide risk management (EPA, 2024b).

There are four neonicotinoids that are covered in TSC's assessment: clothianidin, dinotefuran, imidacloprid, and thiamethoxam. The percentage of growers using each specific insecticide were: clothianidin (12%), dinotefuran (9%), imidacloprid (45%), and thiamethoxam (18%). These percentages were relatively stable from 2021-23.

In the European Union, the use of neonicotinoids was severely restricted in 2013 based on a risk assessment conducted in 2012 by the European Food Safety Authority (EFSA), which identified risks posed to bees by these pesticides (Figure 2). In 2018, The European Commission banned all outdoor use of several neonicotinoids, including imidacloprid, thiamethoxam, and clothianidin, due to the threat they pose to pollinators (European Commission, n.d.).

Insecticide Seed Treatment

Despite the importance of seed treatment to protect seeds from pests and diseases, certain seed treatments, especially those containing chlorpyrifos and neonicotinoids, can negatively impact pollinators. Studies have indicated that these insecticides persist long enough in the environment to be present in pollen and nectar that bees and other pollinators collect (Main, 2021). Due to their impact on pollinators and overall biodiversity, the use of chlorpyrifos and neonicotinoids as seed treatment is banned in many European countries, including the United Kingdom, Germany, France, Italy, Spain, and the Netherlands. This section analyzes the use of chlorpyrifos and neonicotinoids as seed treatment in the produce industry.
In 2023, no suppliers reported using chlorpyrifos or clothianidin for insecticide treatment of seeds. Only 2% reported using imidacloprid and 4% using thiamethoxam for this purpose.

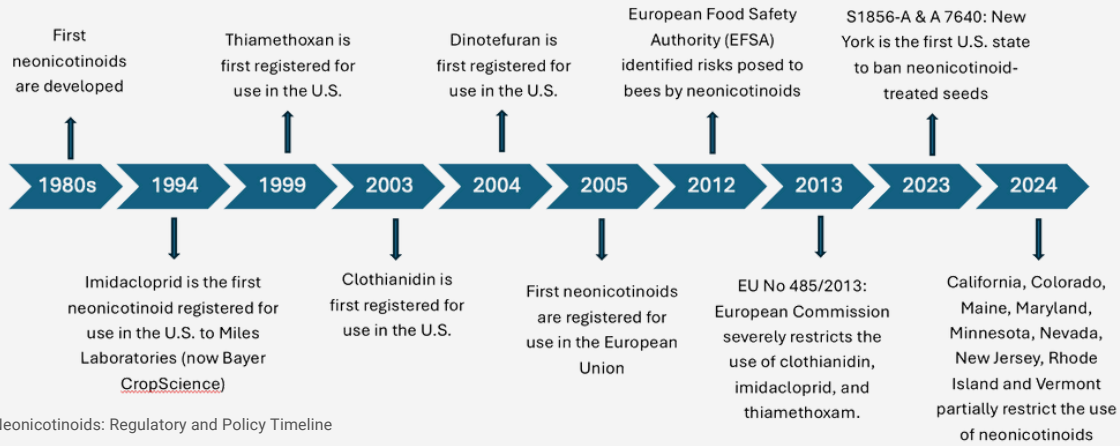


Figure 2. Neonicotinoids: Regulatory and Policy Timeline

Conclusion

The decline in pollinator populations in recent years has been driven by factors such as habitat loss and reduced nutritional resources, pesticide exposure, and pollinator management practices (USDA, 2012). This THESIS Insights report highlighted key policies and practices impacting pollinator health in fruits, vegetables, nuts, and flower crops supply chains, as reported in THESIS from 2021 to 2023.

While there has been progress in the adoption of practices that benefit pollinator health and increased supply chain transparency, important challenges remain. The lack of increased dedicated pollinator habitats requires urgent attention and action, as these habitats are essential for providing the resources and conditions necessary for pollinator survival and effective pollination.

To foster healthier ecosystems and protect pollinator populations, stakeholders across supply chains for fruits, vegetables, nuts, and flower crops must enhance their commitment to pollinator health. This includes prioritizing habitat conservation, actively reducing reliance on chlorpyrifos and neonicotinoids, and embracing IPM principles and Responsible Pest Management (RPM) practices including certification. By prioritizing these areas, produce suppliers and growers can fulfill their essential role in promoting pollinator health and advancing sustainable agricultural practices.

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