PROTECTING POLLINATORS FROM PESTICIDES

Buying Bee-Safe Plants

Plants grown for sale in retail nurseries, even those marketed as "pollinator-friendly," are commonly treated with pesticides. Learning more about your local nursery's pest management practices and ensuring the flowering plants you purchase are free from harmful pesticides are important steps in protecting pollinators.

Pollinator gardening has skyrocketed in popularity. Increasingly, garden centers and nurseries are labeling plants as "pollinator-friendly," or adding bee or butterfly images to plant tags to denote their ability to attract these wonderful insects to the landscape.

Consumers may make the assumption that these images and phrases mean that these plants are safe for bees and that pesticides harmful to bees and butterflies were not applied during production. While this may be the case for some growers, don't assume it's so. Currently there is no legal or nursery industry standard definition or set of practices mandated for the use of terms such as "pollinator-friendly" or "bee-friendly."

Plants that attract pollinators should be free from harmful pesticide residues

In nursery production, plants—even those highly attractive to pollinators—are commonly treated with pesticides. Growers are very sensitive to consumer intolerance for plant damage, and sometimes states mandate pesticide applications to prevent the spread of certain pests. Consequently, it is no surprise that researchers are finding toxic levels of insecticides in nursery plants. So, remember that the bee and butterfly pictures on the plant tags only tell half the story—whether a plant is attractive to pollinators. You will still need to figure out whether a plant is free of harmful pesticides, a task that takes some time and effort.

In this factsheet, we provide tips on why and how to talk with nurseries about pollinator-friendly practices.

Consumer Requests Are Powerful and Can Transform Practices

While it may feel awkward to start the conversation with your retailer or nursery, consumer requests can transform nursery production practices and the purchasing behavior of retail plant buyers. By respectfully asking the questions outlined here, you will signal that customers are informed and care about the safety of bees. Your initiative will help nurseries understand your concerns, talk more deeply with their suppliers, and adopt valuable changes. Share this factsheet with friends and family and encourage them to also strike up a conversation the next time they buy plants.

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Ask for Organic Plants and Seeds

Let your local garden center or retail nursery know you want plants free of pesticides that may harm pollinators. One way is to ask for USDA Certified Organic plants and seeds, especially when purchasing plants known to be highly attractive to pollinators. Organic program guidelines prohibit the use of most synthetic pesticides, and provide recognizable labels. Organic ornamental plants are not often available, but worth requesting. You may be more likely to find organic plants at small local nurseries, native plant nurseries, or at a farmers market. Look for the USDA Certified Organic label, to ensure the plants have been grown according to federal organic rules.

Avoid Plants Grown with Neonicotinoids and Other Similar Insecticides

Neonicotinoid insecticides ("neonics") are toxic to bees. Fortunately, many retailers and wholesalers recognize the risk and have eliminated use of neonics. Before you shop, check the website for the store you plan to visit to see if they offer neonic-free plants. When shopping at a store, ask the sales agent to direct you toward their neonic-free plants. If they have none, you have the opportunity to urge them to procure plants friendlier to bees. In the meantime, consider shopping elsewhere. Many neonic-free nurseries (including small local native nurseries) can be found online.

Some nurseries that have transitioned away from neonicotinoids simply shifted to other systemic insecticides. Unfortunately, some of these insecticides are nearly as harmful as neonicotinoids (see Table 1).

While buying plants that are neonicotinoid-free provides some security, be aware that this does not guarantee your plants will be free of other pesticides that are risky for bees. (Photo: Xerces Society / Sharon Selvaggio.)

Table 1: Systemic Insecticides to Avoid

Systemic insecticides permeate plants and may contaminate nectar and pollen sought by foraging bees long after purchase. Table 1 includes some of the most bee-toxic and persistent of the systemic insecticides currently used in ornamental flowering plant production. Due to their risks, we urge consumers to avoid plants grown with these insecticides, especially when procuring flowering trees and shrubs. Systemic insecticides can reach high concentrations and persist longer in woody plants.

INSECTICIDE CLASS	ACTIVE INGREDIENT*
Neonicotinoids	Clothianidin
	Dinotefuran
	Imidacloprid
	Thiamethoxam
Butenolides	Flupyradifurone
Diamides	Cyantraniliprole

NOTES:

* Every pesticide product lists its active ingredient(s) on the label. People often use brand or "trade names" instead. Numerous trade names may exist for any particular active ingredient. A useful cross-reference is available at *A Pesticide Decision-Making Guide to Protect Pollinators in Landscape, Ornamental and Turf Management* (van Dyke et al. 2019).

With hundreds of pesticides available on the market, Table 1 does not include all pesticides that could harm pollinators. Rather, it prioritizes long-lived, highly toxic, systemic insecticides used in nursery production. We encourage you to probe more deeply into whether your plants have been grown with pollinator-friendly pest management practices, as outlined on the next page.

Grow Your Own Plants

Another way to ensure your plants are grown without pesticides is by propagating your own plants from seed. Plus, it can be fun to trade plants and seeds with friends and neighbors. There are many native and nonnative flowers and herbs that provide valuable nectar or pollen resources for pollinators and are easy to propagate from seeds, such as cosmos, sunflowers, basil, bee balm, and goldenrod.

Do You Already Have a Plant, but Don't Know How it was Grown?

For the first year, take steps to protect pollinators from pesticide residues. If not yet planted, discard the soil around the roots. By removing soil, you are also removing chemicals in the soil that could be absorbed into the plant. For perennials, consider removing blooms or covering the plants with netting to prevent both adult and larval feeding.

Shop at Nurseries that Practice Pollinator-Friendly Pest Management

Look for nurseries that actively prevent pest problems, which usually results in less reliance on pesticides.

If you shop at a retail nursery, be aware that they often do not raise their own plants, instead sourcing from wholesale nurseries. Ask to speak with the plant buyer.

Start by letting them know that you would like to select plants grown using pollinator-friendly practices.

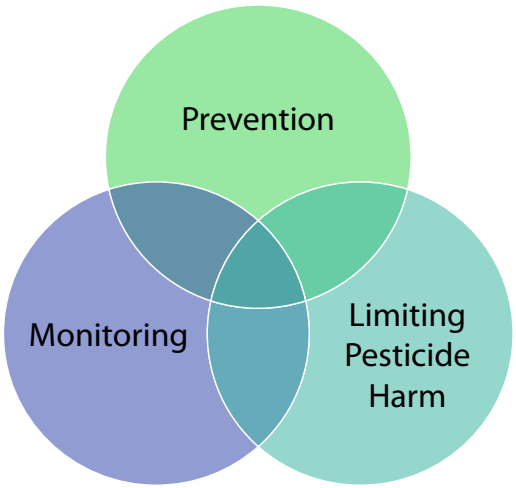
Be clear that you would like to learn more about the pest management practices used by their plant suppliers. Here are key questions to ask.

1. Which suppliers take steps to limit pesticide harm to pollinators? For example, do they halt insecticide applications at least four weeks prior to shipping to retail outlets?
2. Which suppliers practice effective non-chemical prevention methods to proactively reduce pest buildup?
3. Which suppliers monitor regularly for pests to catch outbreaks early? Ask if they have someone on staff dedicated to deliberately inspecting for pests during growing seasons.

Be prepared for answers slim on details. Sales staff may have limited knowledge. Even plant buyers may have limited information about the practices of their source nurseries. If the store doesn't verify suppliers' practices, urge them to take the time to find out more about how the plants they sell are grown.

Persevere, remembering that your inquiry is an opportunity for mutual learning. Starting this dialogue will plant a seed for more growers to produce plants that are both attractive to pollinators and free from harmful pesticide residues.

Talking to staff before buying plants is a great way to encourage nurseries to use pollinator-friendly practices. (Photo: Steve Debenport, iStock.)



Monitoring and non-chemical prevention are at the core of sustainable plant production, allowing nurseries to proactively avoid pest buildup while simultaneously reducing their reliance on pesticides. A final step is limiting harm from pesticides. (Figure: Xerces Society / Sharon Selvaggio).

Pollinator-Friendly Pest Management for Nurseries

Consumers can use these concepts in conversations with their nursery or garden center manager to explore and encourage use of pollinator-friendly pest management.

Prevention

Adhering to time-tested non-chemical prevention methods is an essential first line of defense, helping to increase plant vigor and stop pests before an outbreak occurs. The following are a few common preventative practices; more may be used.

Does the nursery:

- Maintain soil health?
- Remove diseased or infested plants?
- Sanitize pots and tools?
- Isolate new incoming stock for 2–3 weeks?
- Select pest- and disease-resistant cultivars? (Not appropriate for native plants)
- Exclude pests (weeds, insects) with appropriate methods?
- Ensure plants get the appropriate amount of water, light, nutrients, and space?
- Use "trap plants" to concentrate pests away from the crop or "indicator plants" for early warning of pest buildup?
- Encourage native beneficial insects to keep pest insects in check naturally (e.g., by placing habitat or insectary plants among ornamentals to enhance native beneficial populations)?
- Conduct other prevention practices? Ask for details.

Treating shrubs and trees with insecticides can result in long-lasting residues in nectar and pollen. Studies have detected toxic residues months to years after soil drench and trunk injection applications to woody species. (Photo: Xerces Society / Nancy Adamson.)

Monitoring

Monitoring, also known as scouting, is a deliberate allocation of time to inspect plants for insects and plant diseases. Meticulous attention to scouting allows nurseries to detect signs of an impending pest outbreak and is a critical step, because when detected early, pests can be more safely managed.

Does the nursery:

- Scout plants at pre-designated time intervals (such as weekly or biweekly) and keep written records of pest pressure and beneficial species counts?
- Train staff to become proficient at pest identification and prevention techniques—or contract with trained crop advisers to scout?
- Use diagnostic labs for expert help on diseases?

Limit Harm from Pesticides

Ideally, insecticides and fungicides would never be needed. However, when scouting and preventative measures are not enough, many nurseries do resort to pesticides. Harm from pesticides can be limited if the nursery carefully follows principles and guidelines designed to minimize risk to pollinators.

Does the nursery:

- Avoid routine use of pesticides, applying pesticides only if non-chemical measures have failed to keep pest populations below established thresholds?
- Treat only affected plants (i.e., spot treatment)?
- Select organic or least-toxic products?
- Avoid systemic insecticides that are highly toxic and persistent? (See list in Table 1).
- Avoid insecticide applications prior to and during plant bloom and when bees are active?
- Avoid insecticide applications at least 4 weeks prior to sale?

Considerations for the Very Hungry Caterpillar

Across the country, people are rallying to help monarch populations by growing milkweed—an essential plant for monarch caterpillars. Studies have raised concerns that milkweed treated with conventional pesticides could harm caterpillars feeding on the plant. Talking with nursery staff about their practices for butterfly host plants will encourage production of plants safer for monarchs and other butterflies.

Additional Resources

Black, S. H., B. Borders, C. Fallon, E. Lee-Mader, and M. Shepherd. 2016. *Gardening for Butterflies: How you can attract and protect beautiful, beneficial insects*. Timber Press.

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Lee-Mader, E., J. Fowler, J. Vento, and J. Hopwood. 2016. *100 Plants to Feed the Bees: Provide a Healthy Habitat to Help Pollinators Thrive*. Storey Publishing.

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