

THE WISCONSIN POLLINATOR PROTECTION PLAN

BEST MANAGEMENT PRACTICES FOR
Improving Pollinator Habitat in
Gardens & Lawns



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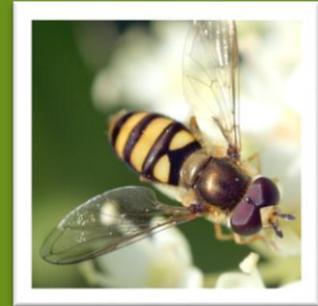
Flowering plants need pollinators and pollinators need flowers. Globally, an estimated 87% of flowering plants rely on animals—mostly insects—for pollination¹. Many of our favorite foods are partially or fully reliant on insect pollinators to produce fruit², including apples, almonds, strawberries, watermelon, tomatoes, sunflower seeds, coffee beans, and many others. In Wisconsin, high honey bee colony losses and concerns about declining wild pollinators highlight the importance of protecting pollinators from habitat loss, disease, pests and pesticides.

By planting a diverse array of flowers and undertaking other simple practices, your yard or garden can attract flower visitors including bees, butterflies, flower flies and hummingbirds. Bees in particular are superstar pollinators because they have special pollen carrying structures on their bodies. There are about 400 species of bee in Wisconsin³, and home and community gardens can be great places for them to find food and nesting sites.

Flower visitors vary in their effectiveness at pollinating. Bees are the most efficient.



Wild bees



Flower fly (Syrphidae)

David Cappaert, Bugwood.org



Honey bee



Butterfly



Ruby-throated hummingbird

Pollinator plantings

Regional pollinator plant lists and planting guidelines are available from The Xerces Society⁴, Pollinator Partnership⁵, and Michigan State University Extension⁶. To find a nursery or seed source, see lists provided by the Wisconsin Department of Natural Resources (DNR)⁷, Plant Native⁸ and The Xerces Society⁹.

The following are guidelines for choosing plants that will benefit pollinators:

- ☼ **Choose plants that suit your yard**, considering soil type, drainage, slope, and amount of available sunlight.
- ☼ Aim for at least three species of flowering plant in bloom at all times from early spring to late fall. Flowering plants include wildflowers, garden herbs and fruits/vegetables, and flowering shrubs and trees like redbud, American basswood, willows, and fruit trees.
- ☼ **Avoid invasive plants and noxious weeds**¹¹, which can crowd out other plants and reduce plant diversity, in turn reducing pollinator diversity.
- ☼ **Incorporate native plant species** into your garden. Gardens with native plants tend to attract more bee species^{12,13} and support more butterfly and bird species^{14,15} than those dominated by introduced ornamentals. Many native plants are drought tolerant and do not require fertilizer.
- ☼ **Provide flowering plants other than highly modified cultivars.** Whether native or non-native, flowering plants that have been highly modified through breeding have often lost pollen and nectar, or are too complex for bees to navigate. Some common garden plants like tulips, daffodils, petunias and ornamental roses are not typically visited by pollinators. Common garden herbs and wildflowers that do attract pollinators include mints, oregano, garlic, chives, parsley, lavender, zinnias, cosmos, and wild type sunflowers.
- ☼ **Choose a variety of flower colors.** Bees are most attracted to blue, white, yellow and purple flowers – they do not see red. Butterflies are drawn to orange, red, yellow and purple, while flower flies mainly visit white and yellow flowers. Hummingbirds are particularly attracted to red flowers.

Why plant milkweeds?

Monarch butterflies rely on milkweeds (genus *Asclepias*) to complete their life cycles, and monarch butterfly decline since the 1990s is closely correlated with a loss of milkweed plants. There are 13 species of milkweed native to Wisconsin¹⁰. Common milkweed (*Asclepias syriaca*) is known for its aggressive habit, but most milkweed species are not weedy and make beautiful and beneficial additions to gardens. Milkweeds don't just serve monarchs; they are attractive nectar sources for a wide range of pollinators. A directory of milkweed seed vendors is available through The Xerces Society⁹.



Whorled
milkweed
(*Asclepias
verticillata*)



Swamp
milkweed
(*Asclepias
incarnata*)



Butterfly
milkweed
(*Asclepias
tuberosa*)

Photos: Frank Mayfield

Garden cultivars that are “double flowered” with many petals frequently lack pollen or are too complex for bees to navigate. If it is difficult to see pollen-carrying anthers in the center of a flower, it may be a poor choice for bees.

✗ Poor choices for bees: ✗



✓ Examples of bee-attractive flowers: ✓



Silphium sp.

Monarda sp.

Gentiana sp.

Native plant photos: Frank Mayfield

Nesting habitat for bees

Beekeepers provide honey bee colonies a home in hive boxes, but all the other species of bee found in Wisconsin nest in the wild. Bumble bees are social and nest in small colonies, but most other species of bee are solitary and do not form colonies. Small-bodied bees may only travel 200 yards or less from their nests, so it is important that nesting habitat be located near pollinator-attractive flowers. Some tips for providing nesting habitat:

- ✿ **Leave some areas undisturbed.** Most solitary bee species nest in the ground, in bare patches of semi-loose soil. Deep or frequent tilling can disturb nests.
- ✿ **Plant native bunch grasses such as little bluestem.** Bumble bees and solitary bee species will nest at the bases of bunch grasses.
- ✿ **If local ordinances allow it, leave things a little messy.** Bumble bees tend to nest in old rodent burrows, cavities, abandoned bird nests, and brush piles. Solitary bee species nest in hollow or pithy plant stems, downed logs, leaf litter, or old beetle holes.
- ✿ **Avoid disturbing existing bee nests.** Ground nests can resemble ant hills. Take time to observe and identify their inhabitants before assuming nests are homes for nuisance species. Solitary bees are docile and rarely sting unless handled.
- ✿ **Use homemade “bee hotels” with caution.** Homemade bee nests are often colonized by wasps, and can harbor predators and pathogens if not properly cleaned and maintained¹⁶. Wooden bumble bee boxes tend to have very low success rates¹⁷. For more information see “Providing Nest Sites for Pollinators”¹⁸ from The Xerces Society.

Blooming “bee lawns”

- ✿ If local ordinances allow it, let dandelions, clover and other flowering lawn plants bloom. These can provide important early season pollen and nectar sources when other floral resources are sparse.
- ✿ Before applying an insecticide to treat lawn pests, mow to remove any clover or dandelion blooms that might attract pollinators. By the time flowering lawn plants regrow, insecticides will be less present in nectar and pollen¹⁹.

Pesticide use

Pesticides are one of many tools available to manage lawn and garden pests. When using pesticides follow the label directions exactly -- the label is the law. Before using any pesticide on lawns or gardens:

- ✿ Identify the pest and assess the damage. Many plants can tolerate insect damage and no action may be necessary. The UW-Extension Horticulture diagnostics lab²⁰ can help identify insect damage or disease.
- ✿ If pest damage is extensive, explore and understand options for management. Choose methods that minimize harmful effects on pollinators and beneficial insects that prey on pests^{21,22}. A helpful [online tool](#)²³ ranking pesticides by bee toxicity is available from the University of California Statewide Agricultural & Natural Resources Integrated Pest Management Program (UC IPM).
- ✿ Understand the difference between systemic and non-systemic insecticides. Systemic insecticides migrate throughout the whole plant, including pollen and nectar²⁴, and may persist in soil for weeks to months²⁵. When purchasing plants, ask nurseries if flowering plants have been treated with systemic insecticides.
- ✿ Avoid applying insecticides to flowering plants or to areas pollinators may be nesting.
- ✿ Rotate pesticide types and modes of action to avoid pesticide resistance. Repeated use of the same pesticide increases the likelihood of pesticide resistance, eventually rendering treatment ineffectual.

Swarm and nest management

Honey bees swarm when a queen leaves the hive and moves to a new location with a group of worker bees. Do not confuse a honey bee swarm with a wasp nest; wasps do not swarm, though they may feed in groups or congregate if they are blocked from entering their nests. If you see what looks like a swarm:

1. Verify the insects are honey bees and not wasps²⁶.
2. If what you have is a honey bee swarm, a local beekeeper will often be willing to remove it. Beekeepers can be found through Bee Removal Source²⁷ or Wisconsin Honey Producers²⁸.
3. If swarm removal is not possible or if you have wasps, the Wisconsin Pest Control Association website²⁹ has a list of businesses that may offer assistance.
4. If the swarm or nest was found in a building, make repairs after the insects are removed to prevent pests from reentering the structure.



Yellow jackets and other wasps typically have less hair and skinnier legs than bees.



Photo: Richard Bartz



Photo: Andy Murray

Get Involved and Spread the Word

The more neighbors using best practices for pollinators, the greater the potential impact on pollinator health. Here are a few ways you can help spread the word on pollinator protection:

- ✿ Participate in the Million Pollinator Garden Challenge: <http://millionpollinatorgardens.org/>
- ✿ Advertise your pollinator friendly lawn: <http://www.xerces.org/nrcs-pollinator-habitat-sign/>
- ✿ Get involved in prairie restoration projects through Friends groups or other local organizations
- ✿ Become adept at distinguishing honey bees, solitary bees, wasps and flies³⁰
- ✿ Get involved in citizen science:
 - Bumble Bee Watch: www.bumblebeewatch.org
 - The Great Sunflower Project: <http://www.greatsunflower.org/>
 - Monarch Watch: <http://www.monarchwatch.org/tagmig/tag.htm>

References

- ¹ Ollerton, J., et al. 2011. "How many flowering plants are pollinated by animals?." *Oikos* 120.3: 321-326.
- ² Klein, Alexandra-Maria, et al. 2007. "Importance of pollinators in changing landscapes for world crops." *Proceedings of the Royal Society of London B: Biological Sciences* 274.1608: 303-313.
- ³ Ascher, J. S. and J. Pickering. 2015. Discover Life bee species guide and world checklist (Hymenoptera: Apoidea: Anthophila). www.discoverlife.org
- ⁴ The Xerces Society pollinator plant lists: <http://www.xerces.org/providing-wildflowers-for-pollinators/>
- ⁵ Pollinator Partnership regional planting guides – use the “Eastern Broadleaf Forest Continental” guide for southern Wisc. and the “Laurentian Mixed Forest” guide for northern Wisc. <http://pollinator.org/guides.htm>
- ⁶ Michigan State University Extension. October 2015. “Bees of the Great Lakes Region and Wildflowers to Support Them.” Guide for identifying bees and wildflower planting guidelines. http://shop.msu.edu/product_p/bulletin-e3282.htm
- ⁷ Wisconsin DNR list of native plant nurseries: <http://dnr.wi.gov/files/pdf/pubs/er/er0698.pdf>
- ⁸ Native plant nursery finder: <http://www.plantnative.org/>
- ⁹ The Xerces Society list of vendors providing milkweed seed: <http://www.xerces.org/milkweed-seed-finder/>
- ¹⁰ Wisflora: Wisconsin Vascular Plant Species: <http://www.botany.wisc.edu/herb/>
- ¹¹ The Wisconsin Dept. of Natural Resources list of invasive plant species: <http://dnr.wi.gov/topic/Invasives/species.asp?filterBy=Terrestrial&filterVal=Y>
- ¹² Tonietto, R., et al. 2011. "A comparison of bee communities of Chicago green roofs, parks and prairies." *Landscape and Urban Planning* 103.1: 102-108.
- ¹³ Frankie, G., et al. 2005. "Ecological patterns of bees and their host ornamental flowers in two northern California cities." *Journal of the Kansas Entomological Society* 78.3: 227-246.
- ¹⁴ Tallamy, D., and K. Shropshire. 2009. "Ranking lepidopteran use of native versus introduced plants." *Conservation Biology* 23.4: 941-947.
- ¹⁵ Burghardt, K.T., et al. 2009. "Impact of native plants on bird and butterfly biodiversity in suburban landscapes." *Conservation Biology* 23.1: 219-224.
- ¹⁶ MacIvor, J. Scott, and Laurence Packer. 2015. "'Bee hotels' as tools for native pollinator conservation: a premature verdict?." *PloS one* 10.3: e0122126.
- ¹⁷ Lye, G.C., et al. 2011. Assessing the efficacy of artificial domiciles for bumble bees. *Journal for Nature Conservation* 19: 154-160.
- ¹⁸ The Xerces Society guide for providing nesting habitat: <http://www.xerces.org/providing-nest-sites-for-pollinators/>
- ¹⁹ Larson, J., et al. 2013. “Assessing insecticide hazard to bumble bees foraging on flowering weeds in treated lawns.” *PloS One*. DOI: 10.1371/journal.pone.0066375
- ²⁰ University of Wisconsin – Extension Horticulture. Diagnostic lab and identification tools: <http://hort.uwex.edu/diagnostic-labs-and-identification-tools/>
- ²¹ EPA data on residual time to 25% bee mortality (RT25): <http://www2.epa.gov/pollinator-protection/residual-time-25-bee-mortality-rt25-data>
- ²² The Xerces Society list of garden products containing neonicotinoid insecticides: <http://www.xerces.org/wings-magazine/neonicotinoids-in-your-garden/>
- ²³ University of California Statewide Integrated Pest Management Program. “Bee precaution pesticide rating” online tool: <http://www2.ipm.ucanr.edu/bee-precaution/>
- ²⁴ Krischik, Vera A., et al. 2007. "Soil-applied imidacloprid is translocated to nectar and kills nectar-feeding *Anagyrus pseudococci* (Girault)(Hymenoptera: Encyrtidae)." *Environmental Entomology* 36.5: 1238-1245.

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- ²⁵ Goulson, Dave. 2013. "Review: An overview of the environmental risks posed by neonicotinoid insecticides." *Journal of Applied Ecology* 50.4: 977-987.
- ²⁶ See the University of Minnesota Bee Lab's document "Bothered by Bees or Wasps?": http://www.beelab.umn.edu/sites/beelab.umn.edu/files/bothered_by_bees_wasps.pdf
- ²⁷ List of bee removal experts in Wisconsin: <http://www.beeremovalsource.com/bee-removal-list/wisconsin/>
- ²⁸ Wisconsin Honey Producers list of beekeepers: <http://www.wihoney.org/member-services>
- ²⁹ Wisconsin Pest Control Association: <http://wisconsinpest.com/>
- ³⁰ To distinguish among various kinds of bee, wasp, and fly, refer to the "Streamlined Bee Monitoring Protocol" from The Xerces Society: www.xerces.org/streamlined-bee-monitoring-protocol