

FOUR PRINCIPLES TO HELP BEES AND BUTTERFLIES

Pollinator Conservation



Brown-bellied bumble bee (*Bombus griseocollis*), metallic green sweat bee (*Agapostemon splendens*) exiting ground nest, "Pesticide Free" garden, and pollinator habitat with sign.

The Importance of Pollinators

Pollinators are essential to our world. Bees, butterflies, hummingbirds, moths, wasps, flies, beetles, even a few bats are some of the animals that move pollen between flowers, enabling them to produce seeds.

The ecological service these pollinating animals provide is necessary for the reproduction of over 85% of the world's flowering plants. The resulting seeds and fruits provide food for countless other animals ranging from songbirds to grizzly bears.

Pollinators are also essential to human life. More than $\frac{1}{3}$ of the world's crop species, whose fruits and seeds together provide over 30% of the foods and beverages that we consume, require the presence of a pollinator. The United States alone grows more than 100 crop plants that need pollinators. Without pollinators, there would be no apples, pumpkins, blueberries, or many other fruits and vegetables. Only wind-pollinated crops such as corn and wheat would remain.

Bees are the primary pollinator for most wildflowers and crops in temperate North America. Worldwide, there are an estimated 20,000 species of bees, with over 3,600 species native to the United States and Canada. The non-native European honey bee (*Apis mellifera*) is the most common domesticated pollinator in the United States. However, native pollinators are often adapted for specific plants, resulting in more efficient pollination and the production of larger and more abundant fruits and seeds.

Pollinators at Risk

In many areas pollinators are in decline. The loss of honey bees due to pests, diseases, and other factors has been widely publicized in recent years.

While the loss of honey bees is alarming, many of our wild native bees are also disappearing. For example, in the mid-1990s, the yellow-banded bumble bee (*Bombus terricola*) was the most abundant bumble bee in northern Wisconsin. Ten years later it made up less than 1% of the state's bumble bees. In Oregon, Franklin's bumble bee (*B. franklini*) has likely gone extinct during the same period.

Pollinators are a keystone species group; the persistence of a large number of other species depends upon them. As pollinators disappear, the effect on the health and viability of crops and native plant communities can be disastrous.

**BRING BACK
The
POLLINATORS**
A Xerces Society Conservation Campaign

Our Bring Back the Pollinators campaign is based on four principles: grow pollinator-friendly flowers, protect bee nests and butterfly host plants, avoid pesticides, and spread the word. You can participate by taking the Pollinator Protection Pledge and registering your habitat on our nationwide map of pollinator corridors.

www.bringbackthepollinators.org

Four Principles To Help Pollinators

Protecting, enhancing, or providing habitat is the best way to conserve pollinators. Whether you tend a small flower box in the city or maintain a large rural garden, there are practical steps you can take to improve the health, abundance, and diversity of your local pollinators.

1. Create a Diversity of Bloom

Bees, butterflies, and other beneficial insects need abundant nectar and pollen sources throughout the growing season. Select native plants wherever possible. Cultivate a landscape with a diversity of flowering plants that are known to provide abundant pollen and nectar for pollinators.



Try to provide blooming plants from early spring to fall, with at least three species of flower in bloom each season. Note that some ornamental plants have been selected for traits that are attractive to people, rather than pollinators. Avoid pollenless cultivars and double-petaled varieties of ornamental flowers.

2. Protect Nests and Egg-Laying Sites

Native bees use untidy areas of the garden to nest such as open sandy ground, brush piles, and old tree stumps and snags. Consider leaving some of these for wildlife habitat. Supplement nesting opportunities with mason bee houses or bundles of hollow plant stems.



Butterflies often need specific host plants to feed on during their caterpillar stage. For example the caterpillars of monarch butterflies feed exclusively on the leaves of various milkweeds. Protect or plant the host plants of butterflies native to your area.

3. Don't Use Pesticides

Pesticides can be important tools for protecting crops and controlling invasive species, however most lawn and garden pest problems can be solved without such chemicals. Keep in mind that even "organic-approved" insecticides can harm pollinators and other wildlife.



Herbicides, while usually not directly lethal to insects, can reduce plant diversity, including the diversity of weedy, noninvasive wildflowers that provide essential pollen and nectar for bees, butterflies, and hummingbirds.

4. Spread the Word

Let your friends and neighbors know you're providing habitat with a pollinator habitat sign. Talking to your community will encourage more people to join this important effort, helping even more pollinators! You can also sign the Pollinator Protection Pledge at www.bringbackthepollinators.org.



Bees at a Glance

- ✦ Unlike honey bees which form large social units, the majority of our native bees live as solitary individuals, with each female constructing her own nest. She collects nectar and pollen to provision it with food for her offspring. The only native bees to form social colonies are bumble bees and a few species of sweat bees.
- ✦ Most native bees are usually very gentle and unlikely to sting unless grabbed or stepped on. Only honey bees, bumble bees, and a few of the social wasps such as yellowjackets (which are not significant pollinators) are likely to sting when their nests are disturbed.
- ✦ The economic value of pollinator-dependent crops in the United States was estimated to be between \$18–\$27 billion in 2003. If this calculation is expanded to include indirect products, such as the milk and beef from cattle fed on alfalfa, pollinators may be responsible for more than twice this dollar amount.



Solitary small carpenter bee (*Ceratina* sp.) nesting in blackberry cane.



Gentle cellophane bee (*Colletes* sp.) nest in the ground—often in lawns!

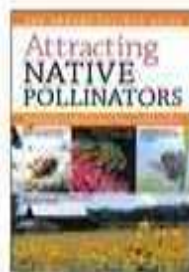


Mining bees (*Andrena* sp.) are important pollinators of apples and other crops.

Learn More

Attracting Native Pollinators

Our best-selling book highlights the role of native pollinators in natural ecosystems, gardens, and farms. This comprehensive guide includes information about pollinator ecology, detailed profiles of over 30 common bee genera, and habitat designs for multiple landscapes with over 50 pages of fully illustrated regional plant lists. Available in bookstores everywhere, and through www.xerces.org/books.



The Xerces Pollinator Conservation Resource Center

Our Pollinator Conservation Resource Center includes regional information on pollinator plants, habitat conservation guides, nest management instructions, bee identification and monitoring resources, and directories of native pollinator plant nurseries. www.xerces.org/pollinator-resource-center

Pollinator Plant Lists

Regional lists of plants that are attractive to native bees, bumble bees, honey bees, and other pollinators, that are well-suited for small-scale plantings in gardens, on business and school campuses, in urban greenspaces, and in farm field borders.

<http://www.xerces.org/pollinator-conservation/plant-lists>

Acknowledgements

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Butterfly Gardening

Pollinators are a vital part of a healthy environment.

Butterflies are a beautiful part of our gardens.

Flowers that provide nectar and caterpillar hostplants can be grown in almost any garden, and will help butterflies.



Western tiger swallowtail drinking nectar from milkweed.

Photograph © Russell Wood

Like beautiful flowers, butterflies are gems when you find them flying, feeding, or basking in your backyard. They come in a range of sizes and colors and, depending upon the species, show up at different times of year—even in the winter.

To create a landscape that is inviting for butterflies you should consider their life stories. They begin as eggs, hatch into caterpillars that eat plants, spend time as a chrysalis, and, eventually, transform into winged adults that flit around looking for food, mates, and places to lay new eggs. During each of these stages butterflies have very different needs. The more of these needs you can supply, the greater the chance that your backyard will become a home for butterflies.

This fact sheet will help you provide the nectar flowers and caterpillar hostplants that these beautiful creatures need. It also contains suggestions on what else you can do to make the landscape around us—from small urban backyards to large natural areas—better for butterflies.

For more information, visit our web site, www.xerces.org, where you will find other fact sheets and more detailed guidelines on how to enhance habitat for pollinators. You'll also find information about the *Pollinator Conservation Handbook* and *Butterfly Gardening. Creating Summer Magic in Your Garden*.

Written by
Mace Vaughan



The Xerces Society
for Invertebrate
Conservation

4828 SE Hawthorne
Blvd.,
Portland, OR 97215
503-232 6639

www.xerces.org

Caterpillar Food: Hostplants

The caterpillars of each species of butterfly has its own, limited menu of plants upon which it will dine. Female butterflies lay their eggs on or near these plants and will be attracted to your backyard if you supply their hostplants. To start with, grow hostplants for the more common butterflies you already see flying through your property and then branch out as you learn more. The list below includes native and non-native hostplants to consider planting in your garden.

Aspen, poplar (<i>Populus</i>)	many species	Rose (<i>Rosa</i>)	mourning cloak
Bleeding heart (<i>Dicentra</i>)	Parnassians	Sagebrush (<i>Artemisia</i>)	swallowtails, painted lady
Clover (<i>Trifolium</i>)	sulphurs, blues	Snowberry (<i>Symphocarpus</i>)	checkerspots
Globemallow (<i>Sphaeralcea</i>)	painted ladies, skippers	Spirea (<i>Spirea</i>)	many species
Grasses and sedges	skippers	Thistle (<i>Cirsium</i>)	painted ladies, crescents
Lupines (<i>Lupinus</i>)	blues	Violets (<i>Viola</i>)	fritillaries
Milk vetch (<i>Astragalus</i>)	blues, hairstreaks	Vetch (<i>Vicia</i>)	sulphurs, blues
Milkweed (<i>Asclepias</i>)	monarch	Wild lilac (<i>Ceanothus</i>)	hairstreaks, duskywings
Oak (<i>Quercus</i>)	hairstreaks, duskywings	Willow (<i>Salix</i>)	many species
Penstemon (<i>Penstemon</i>)	checkerspots, buckeye	Yellowrocket (<i>Barbarea</i>)	orange tips, whites

Adult Food: Nectar, Fruit, and Sap

Adult butterflies need sugar to fuel their search for mates and egg-laying sites. The main source of sugar is nectar from flowers. However, some butterflies, such as the mourning cloak, also get sugars from rotten fruit or the sap leaking from wounded trees. By providing flowering plants or plates of rotting fruit (like peaches, melons, or bananas) many of these beautiful insects will be attracted to your yard. Here is a selection of plants to consider growing in your garden.

Aster (<i>Aster</i>)	Milkweed (<i>Asclepias</i>)
Bee balm (<i>Monarda</i>)	Penstemon (<i>Penstemon</i>)
Beggar-ticks (<i>Bidens</i>)	Pincushion flower (<i>Scabiosa</i>)
Black-eyed Susan (<i>Rudbeckia</i>)	Purple coneflower (<i>Echinacea</i>)
Daisies (<i>Chrysanthemum</i>)	Sagebrush (<i>Artemisia</i>)
Elderberry (<i>Sambucus</i>)	Spirea (<i>Spirea</i>)
Goldenrod (<i>Solidago</i>)	Stonecrop (<i>Sedum</i>)
Joe-pye weed (<i>Eupatorium</i>)	Sunflowers (<i>Helianthus</i>)
Lavender (<i>Lavandula</i>)	Thistle (<i>Cirsium</i>)
Blazing-star (<i>Liatris</i>)	Yarrow (<i>Achillea</i>)

Adult butterflies need to be warm in order to fly. Therefore, nectar flowers and larval host plants should be grown in an open, sunny area that is protected from the wind by large shrubs, a hedgerow, a fence, or some other windbreak. You also could provide butterflies with large, flat rocks placed in the sun. These rocks will soak up the sun's heat and give the adult butterflies a place to warm themselves.

Hiding Places for Pupae and Other Useful Things

Pupation sites. The transformation from caterpillar to adult, the phase called pupation, is done within the protection of a chrysalis. Before building a chrysalis, however, a caterpillar wanders in search of a safe site. Depending upon the species, this haven could be a bush, tall grass, or piles of leaves or sticks. If you leave these features in your yard, you will encourage butterflies to stay around and drink the nectar you provide.

Overwintering sites. Depending upon the species, butterflies may overwinter (hibernate) as eggs, larvae, pupae, or even adults. You might find them on plants around the garden, under leaf litter, under loose bark, or in piles of logs and other debris. To help these hibernators, a little untidiness goes a long way. Two or three weeks before the severe cold of winter sets in, clean up only the leaves and garden debris that you must and pile up some logs or leaves around the edge of your yard.

Do not use insecticides in your garden. Finally, don't use pesticides in your garden. Alternative methods for controlling specific garden pests without using chemicals are available, but even these should be used with caution and keeping in mind the various life stages of butterflies.

For more pollinator conservation information, go to www.xerces.org