BEE Protective Habitat Guide

BEYOND PESTICIDES
Protecting Health and the Environment with Science, Policy and Action
www.beyondpesticides.org

Acknowledgements

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About Beyond Pesticides

Beyond Pesticides is a 501(c)3 nonprofit organization headquartered in Washington D.C. Our directors and staff are experienced scientists, conservationists, and activists. We work to provide the public with useful information on pesticides and alternatives to their use. With these tools, people can protect themselves and the environment from the hazards pesticides pose to public health and the environment.

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Select Resources

Beyond Pesticides. BEE Protective: http://www.beyondpesticides.org/pollinators
Center for Food Safety. http://www.centerforfoodsafety.org
Honeybee Haven Pledge: http://www.honeybeehaven.org
Ladybird Johnson Wildflower Center. http://www.wildflower.org
Pesticide Action Network North America: http://www.panna.org
USDA Plant Hardiness Zone Map: http://planthardiness.ars.usda.gov/PHZMWeb
US Forest Service. Pollinators. http://www.fs.fed.us/wildflowers/pollinators
The Xerces Society for Invertebrate Conservation: http://www.xerces.org

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The Purpose of this Guide

This guide is designed to provide information on pollinators with resources on pollinator-friendly habitat, as well as pesticide use that contributes to declines in pollinator health. To that end, the wildflower section contains perennial species that are known to nurture bee populations in to the U.S. The guide is divided into several sections and is arranged by season of interest to encourage gardeners and land managers to plant flowers that will bloom all year round. Within each season, plants are arranged in alphabetical order by common name. Bloom months have been provided and are rated based on when they commonly begin to bloom in the Midwest. Some species may continue blooming later into the season depending on the location. Note that plant hardiness should be referenced against the USDA Plant Hardiness Zone Map, found at bit.ly/PlantHardiness.

While this guide provides botanical names for the flower species, often the entire genus or family is considered bee-friendly. For example, aromatic aster, *Symphyotrichum oblongifolium*, is bee-friendly along with almost all other asters.

The Importance of Pollinators

With one in three bites of food reliant on honey bee pollination, threats to pollinator populations affect the entire food system. While honey bees are perhaps the best known pollinators in the world and the primary domesticated pollinators, they are by no means solely responsible for the pollination of all flowering plants. In gardens, farms, and wild settings, native pollinators play an essential role in plant reproduction and food production.

Wild pollinators, including bees, wasps, beetles, flies, butterflies, moths, birds, bats, and even some non-flying mammals, have suffered due to human impacts, such as habitat destruction and fragmentation, pesticide use, land management practices, and the introduction of non-native species and pathogens. Meanwhile, heated debate surrounds the causes of so-called "Colony Collapse Disorder," a general term for bee disappearance, death, and the abandonment of hives.

A May 2012 study by Cornell University found that insect pollination results in a value of more than $15 million annually. A single beekeeper pollinating almonds, blueberries, pumpkins, apples, and cherries provides a total estimated $5 million annual value to the agricultural economy from pollination services and crop production.

U.S. Crops	Crop Value (2010)*	Pollinator Reliance**
Apples	$2.2 billion	100%
Almonds	$5.4 billion	100%
Avocados	$377 million	100%
Cherries	$736 million	90%
Nectarines and Peaches	$753 million	60%

FAO Stat (2010);Morse & Calderone (2000)*

Insect pollinator populations are in serious decline. With annual hive losses averaging over 30 percent since 2006, beekeepers, activists, and the public alike fear that the beekeeping industry is on the verge of collapse. Safe havens, like organically tended yards, gardens, parks, and landscapes, are needed now more than ever. This guide provides the tools you need to do just that and much more.

> *"A significant and constant decline in domestic honey bee colony numbers has been occurring during the past decades in North America ...with fewer managed pollinators than at any time in the last 50 years."*
> *-United Nations Environment Programme (2010)*

Colony Collapse Disorder and Pollinator Declines

Colony Collapse Disorder, or CCD, and its mysterious decline of honey bee populations around the world became widespread after the introduction of neonicotinoid pesticides. These systemic pesticides are taken up by the plant's vascular system and expressed through nectar, pollen, and guttation droplets (formed by xylem sap exuded from plant surfaces).

Each winter since 2006, one-third of the U.S. honey bee population has died off or disappeared (more than twice the normal rate). While CCD appears to have multiple interacting causes, including pathogens and parasites, a range of evidence points to sublethal pesticide exposures as an important contributing factor. Key symptoms of CCD include: 1) inexplicable disappearance of the hive's worker bees; 2) presence of the queen bee and absence of invaders; and 3) presence of food stores and a capped brood (developing bees).

Pesticides commonly found in lawn and garden products and used in agriculture are known to be hazardous to bees –some killing bees outright and others with subtle effects that reduce a bee's ability to thrive. Risk mitigation measures on pesticide product labels, which are intended by regulators to protect bees, fall short for managed bees as well as other pollinators, such as bumblebees, that have different foraging practices, social structures, and genetics.

Role of Pesticides in Pollinator Decline

Pesticides are an important contributor to the decline of pollinators because of their acute and chronic effects. Bees foraging and pollinating are exposed to pesticides as a result of direct application to crops and plants, drift from spraying and volatilization, and the uptake from treated seeds of toxic chemicals that move systemically through the plant. In addition to the contamination of pollen and nectar, the plants' guttation droplets, a source of hydration for bees, is another route of exposure. Regardless of the exposure pattern, residual pesticide contamination can persist for extended periods.

Effects, including impaired reproduction, compromised immune function, and degraded ability to forage and navigate, have been linked to low level pesticide exposure. The decline in honey bee populations has been exacerbated by pesticides that weaken the immune system of bees, making them more susceptible to bacteria, viruses, and mites that prey on them.

While many toxic pesticides are applied in chemical-intensive agricultural production to crops where commercial beekeepers have contracted their bees for the purpose of pollination, the exposure problem is equally problematic in non-insect pollinated crops. Pollinators are also exposed while foraging nectar or pollen from non-insect pollinated crops, such as corn, cotton, and soybeans. In these crops, pesticides are routinely applied as seed treatments, granular applications, and as foliar spraying during their growing season.

The pollinator decline from pesticides exemplifies deficiencies with the pesticide registration program overseen by the U.S. Environmental Protection Agency (EPA) under the *Federal Insecticide Fungicide and Rodenticide Act*, the nation's pesticide control law. The program's reliance on industry-funded science and the lack of attention to sublethal chronic exposure raises serious concerns, given independent scientific findings on pesticides' effects on bees.

The pesticides discussed below have been identified in the scientific literature as extremely hazardous to bees.

Pesticides Associated with Bee Declines

Many pesticides are not only considered highly toxic to bees, but some, such as neonicotinoids, are persistent in the soil and environment for days after application. While not an exhaustive list, the pesticides primarily responsible for bee poisoning are in the following chemical families:

1. **Neonicotinoids** are a relatively new class of insecticide used in agriculture, for indoor and outdoor insect control, home gardening and pet products. Studies show that neonicotinoids, such as imidacloprid, clothianidin, and thiamethoxam, produce sublethal effects in honey bees, including disruptions in mobility, navigation, reproduction, and feeding behavior.
2. **Synthetic pyrethroids** are considered highly toxic to bees, with demonstrable impacts that cause paralysis and eventually death. Sublethal impacts include impaired ability to learn, forage, and reproduce.
3. **Other active ingredients** that are dangerous to pollinator health and to the environment include: fipronil, a widely used ingredient in indoor and turf pest management; organophosphates, which are among the most widely used agricultural pesticides worldwide; and carbamates, which are also highly toxic to bees.

To report a suspected bee poisoning incident, contact your state Department of Agriculture or Department of Pesticide Regulation. They are in charge of investigating pesticide-related problems. Note that often state lead agencies do not relay bee kill information, so be sure to contact EPA as well at beekill@epa.gov. Finally, report the bee kill incident to the National Pesticide Information Center at 1-800-858-7378.

Active Ingredient	Effects	Sample Products
Imidacloprid	Neurotoxic, reproductive and mutagenic effects, toxic to bees, birds and beneficial insects	e.g. Merit® Insecticides, All-in-one Rose and Flower Care
Clothianidin	Neurotoxic, toxic to fish, highly toxic to bees	e.g. ALOFT® insecticides, ARENA® insecticides
Thiamethoxam	Reproductive effects, causing liver and kidney damage, toxic to bees	e.g. Flagship®
Fipronil	Possible carcinogen, hormone disruptor, neurotoxic, toxic to bees	e.g. Combat, Termidor

Regulatory Action on Pollinator Protection

Which regulatory agencies are working to protect pollinators? Broadly, the U.S. Department of Agriculture (USDA) leads the federal government response to Colony Collapse Disorder (CCD), while EPA's role is to keep abreast of and help advance research investigating pesticide effects on pollinators, and requiring restrictions in response. USDA, EPA, beekeepers, environmentalists, industry, and academia are working on different pieces of the bee decline issue. Critics of the regulatory process point to inadequate data on pesticide impacts on bees and the lack of meaningful field studies prior to a pesticide's use, and a lack of responsiveness to the independent science linking pesticides to declining bee health.

Inadequacy of Regulations

The disappearance of bees alerts us to a fundamental and systemic flaw in our approach to the use of toxic chemicals –and highlights the question as to whether our risk assessment approach to regulation will slowly but surely cause irreversible harm unless there is a meaningful change of course. While admittedly uncertain and filled with deficiencies, risk assessments establish unsupported thresholds of allowable chemical contamination of the ecosystem, despite the availability of non-toxic alternative practices and products. Why do we allow chemical-intensive agriculture and land management when organic practices, which eliminate the vast majority of hazardous substances, are commercially viable?

Action to Support Pollinators

To challenge government inaction, groups are joining together to educate and push for regulation to protect bees from pesticides. In alliance with beekeepers and concerned people, we have generated discussion, developed educational materials, sued EPA, and created model policies to provide a solution to the problem. The time for decisive action is now and we need your help! Ways to protect pollinators include:

1. Create a Pollinator Friendly Garden

Honey bees and wild pollinators desperately need a refuge to protect themselves from pesticide contamination: backyard pollinator-friendly gardens fill that role. But just like flowers, pollinators come in all shapes and sizes, using their specific traits, like tiny hairs or feathers, to transfer pollen grains from one flower to another.

To develop a pollinator-friendly habitat, consider the three basic needs of pollinators: protection from pesticides, a source of food and water, and a sheltered place to lay their eggs.

a. Eliminate the use of toxic pesticides. Pesticides kill beneficial organisms, like bees, that provide important ecosystem services. Use instead organic soil management, pest prevention, and least toxic practices. (See alternatives section.)

b. Plant a variety of flowers that bloom at different times. These flowers will provide nectar and pollen for pollinators that will sustain them throughout the year.

c. Support a range of nest sites. Butterflies lay eggs on food plants for their young, while wild bees often create nests underground.

Provide a variety of habitats to accommodate a range of pollinator tastes: hummingbirds, for instance, prefer tubular shaped flowers where they can take advantage of their long beak, while bees are attracted to yellow, blue, or white flowers. The table below of pollinator traits can be used to choose flowers for all types of pollinators.

2. Use Alternatives

Eliminating hazardous pesticide use is central to conserving pollinators. Before reaching for a toxic product, it's best to start with healthy soil. If you manage your garden organically, by incorporating compost and supporting soil microorganisms, you will be able to prevent major pest problems. For detailed information, see Beyond Pesticides' *Grow Your Own Organic Garden* at: bit.ly/GrowOrganic. Most pesticides, including neonicotinoids, can immediately kill bees or have sublethal effects that impact reproduction and foraging. Even least-toxic pesticides may impact bees, so proper timing and location of application is important. Particularly, they should not be applied while plants are blooming or during mid-day while pollinators are foraging. The following list includes pesticides that are considered least-toxic by Beyond Pesticides and acceptable for use as a last resort. It is important to remember that pesticides listed in this category still have the potential to harm the environment.

a. **Fatty acid soaps/ insecticidal soaps:** Commonly used soaps containing potassium and coconut oil are effective in controlling many soft-bodied insects, such as aphids, caterpillars, crickets, fleas, flies, and mites.
b. **Biological oils and herbal repellents:** These oils and extracts are effective in controlling aphids, adelgids, spider mites, mealy bugs, sawfly larvae, whiteflies, plant bugs, caterpillars, scales, and some plant diseases like rusts and mildews. Some materials in this category include garlic and pepper extracts, neem, sabadilla, and tea tree oil.
c. **Microbe-based pesticides:** Certain microbes are effective in controlling insect, fungus, and plant pest problems and are virtually non-toxic. Microbial pesticides contain living microorganisms or the toxins they produce as active ingredients. Examples include Bioblast, B.t./B.t.i. and milky spore disease.

For more information, visit Beyond Pesticides' *Least-Toxic Control of Pests in the Home and Garden* page at: bit.ly/LeastToxicPestMgmt.

3. Go Organic to Protect Pollinators

Protecting pollinators is just one of the many reasons to plant a garden and eat organic food. Beyond Pesticides' *Gateway on Pesticide Hazards and Safe Pest Management*, bit.ly/PesticideGateway details which pesticides are toxic to bees and other wildlife, providing another reason to grow, eat, and buy organically.

	Bees	Birds	Bats	Butterflies	Moths
Color	Bright white, blue, or yellow	Scarlet, orange, red, or white	Dull white, green or purple	Bright with purples, reds	Pale and dull to dark brown & purple
Odor	Fresh, Mild	Absent	Strong, Musty	Faint but fresh	Strong, sweet
Nectar	Present	Ample	Ample	Ample	Ample
Pollen	Limited	Modest	Ample	Limited	Limited
Flower Shape	Shallow, with landing platform, tubular	Large funnel-like, strong perch	Regular, bowl shape	Narrow tube with spur, large pads	Regular, tubular without lip

4. Pledge Your Yard

By pledging your yard or park as a Pesticide Free Zone, you are showing your support for pesticide-free spaces that are important for human health, the environment, and bees. To pledge your land as a pollinator-friendly, pesticide-free zone, visit our website at: bit.ly/pollinatorPFZ.

5. Become a Beekeeper

There is also the option of keeping your very own colony of bees in your backyard. Although not all bees live in hives, honey bees are easily and safely kept in artificial hives for their shelter. This provides a safe haven for the bees while also allowing you a fresh and local supply of honey. If you are interested in keeping honey bees, find a local beekeeping club in your area. Most clubs either offer courses in basic beekeeping or can direct you to such courses. These are often given at the beginning of the year, in order to prepare people to start their hives in the spring.

6. Be an Activist in your Community

Organizing a campaign in your community is a forceful way to stand up for the rights of pollinators, and our right to a healthy environment. By reaching for support from family, friends and neighbors, you can involve them in the pesticide and pollinator conversation. Talk about the threats that pesticides pose to bees and to our food systems. Contact local groups that might be interested in your efforts, as well as those of beekeeping organizations, environmental groups, and garden clubs.

Other actions you can take include: community outreach, such as gathering signatures for a petition, distributing educational materials, tabling at community events at schools or religious institutions, developing a community report to provide evidence of the need for change; and proposing a policy with your research to your local elected officials and government. See model policy at www.BEEprotective.org.

7. Urge Your Representative to Act

Congress has the authority to exercise oversight over federal agencies like EPA. We will continue to pressure EPA to take action on pesticides that are hurting bees. Please contact your U.S. Representative and Senators and urge them to act to protect pollinators.

8. Demand that EPA Act

While EPA denied in 2012 the petition identifying the "imminent hazard" that bees face from the systemic pesticide clothianidin, we continue to seek the suspension of pesticides linked to declining bee health and CCD, with over one million citizen petition supporters worldwide. Inaction puts beekeepers, rural economies, and the food system at risk. With hives averaging losses over 30%, bees are crying out for help. Tell EPA to act now! Send an email to the current EPA Administrator following the formula: lastname.firstname@epa.gov.

Spring & Early Summer Pollinator-Friendly Flowers

Bring in the roses, cherry trees, and plum trees! Spring and early summer is when these plants are in full blossom, alerting bees and pollinators that winter is finally over. The first flowers to appear each spring are especially valuable since they help to establish a resident bee population that is needed throughout the growing season. The plants mentioned here are among the earliest blooming plants each spring. They are perennial and their flowers are small and clustered. Compact flowering plants, like golden currants or heather, can have scores of bees pollinating one plant all at the same time.

Karelj [Photographer] 2008. Flower Gaillardia aristata in Prague Botanic Garden, Prague, Troja. Available at: http://commons.wikimedia.org

IPFW. 2010. American Plum. Available at: http://www.ipfw.edu/native-trees/AmericanPlumIconGallery.htm

Da Keiki [Photographer]. 2009. California Poppy. Available at: http://simplify-your-life.com/blog/?p=469

Bud [Photographer]. American Vetch. Available at: http://askbud.ca

Oregon State University. 2003. Common Chokecherry. Available at: http://www.malag.aes.oregonstate.edu

Abbot, L. [Photographer] 2012. Clasping Coneflower. Available at: http://www.lucysinthegarden.com

Per's Wildflower Pictures. 2007. Foxglove Beardtongue. Available at: http://perverdonk.com

Brenan, L. [Photographer] 2008. Daisy Fleabane. Available at http://upload.wikimedia.org

Shock, C. [Photographer] 2008. Golden Currant. Available at: http://www.malag.aes.oregonstate.edu

Megan [Photographer]. 2010. Aristolochia california. Available at: http://www.faroutflora.com/

Gunnar, A. [Photographer]. 2012. Lyrate rockcress. Available at: http://www.projectnoah.org/spottings/10330452

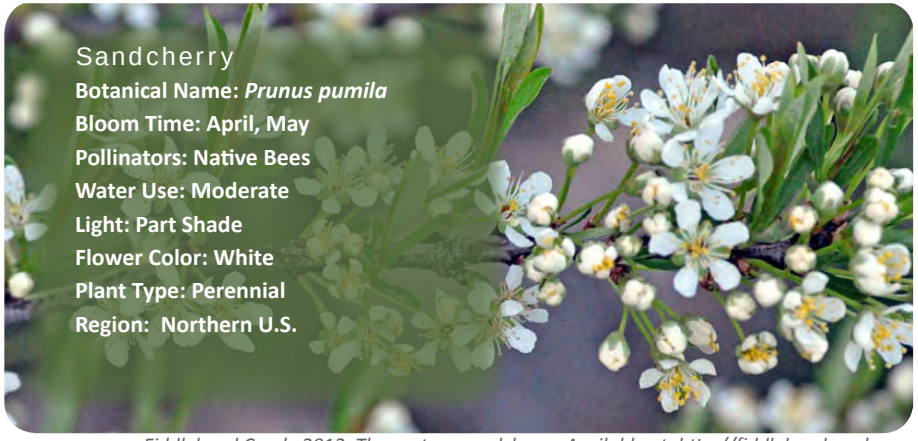
Turnbull, L. [Photographer]. Ohio Spiderwort. Available at: https://npsot.org/TrinityForks/TrinityForksWeb/Descriptions/Wildflowers/Ohio%20Spiderwort.html

Walter Siegmund [Photographer] 2008. Ribes sanguineum var. sanguineum. Available at: http://commons.wikimedia.org

Shepherd, A.J. [Photographer] 2010. Arkansas rose. Available at: http://aubreyshepherd.blogspot.com

Robertson, Clinton & Charles, [Photographers]. 2007 Rosemary, Texas A&M University Horticultural Garden, College Station, TX. 2007. Available at: http://commons.wikimedia.org

Fungus Guy [Photographer]. 2011. Wild Prickly Rose. Available at: http://upload.wikimedia.org



Fiddlehead Creek. 2012. The eastern sandcherry. Available at: http://fiddleheadcreek.com

Ghostdial Press [Unknown photographer] 2008.Guara. Available at: http://www.wildflowerchild.info

St. Charles, C. [Photographer]. 2011. Skunkbush Sumac. Available at: http://cynthia-stcharles.blogspot.com

Globemallow, Red False Mallow, Cowboy's Delight, Sphaeralcea coccinea. Available at: http://www.nps.gov

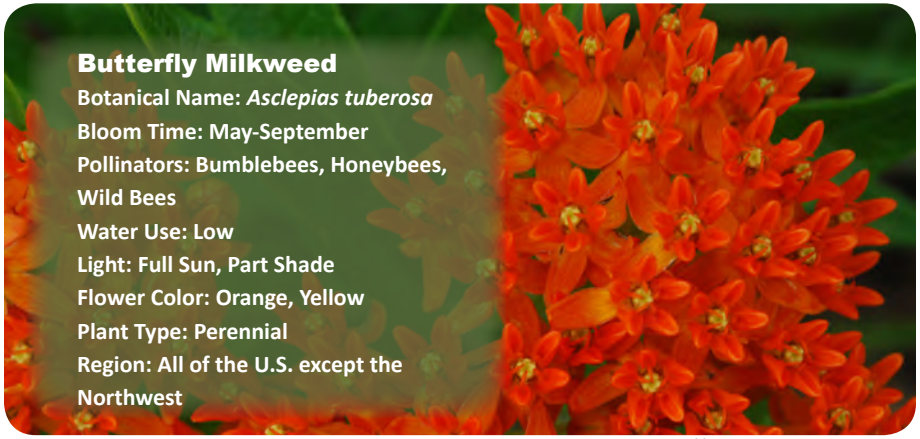
Ghostdial Press [Unknown photographer] 2008.Yarrow97. Available at: http://www.wildflowerchild.info/

JEllen. [Photographer]. 2010. [Untitled photo of large penstemon] http://jellenblackhills.blogspot.com

Mid-Summer Pollinator-Friendly Flowers

Bumblebees, one of the hardest working pollinators, collects food during mid-summer to produce a new queen in late summer. Unfortunately, a prolonged shortage of flowers, and thus food, commonly occurs during mid-summer, which drastically impairs the ability of the colony to produce queens. Farmers and gardeners can benefit from growing a succession of flowering plants throughout summer. Attention to planting flowers that last season-long will support bumble bee nutrition, increase queen production and, ultimately, improve the long term viability of pollinators. Mid-summer is the time to enjoy the conehead flowers, mints and herbs, daisies, and sunflowers.

Barotz, S., and Bilodeau, C. [Photographers]. 2004. Black-eyed Susan. Available at: http://www.bio.brandeis.edu



Mayer, J. [Photographer]. 2011. Butterfly Milkweed. http://commons.wikimedia.org

Lorenzos Seeds. Black Samson. http://www.lorenzsokseedsllc.com/perennials-the-backbone-of-your-garden

Whittemore, J. [Photographer]. 2011. Candle Anemone. Available at: http://ecologyofappalachia.blogspot.com

IPFW. 2010. Blue Vervain. http://www.ipfw.edu/native-trees/images/Verbena,%20Blue,%20Flower78.JPG/

MillbornSeeds. 2012. Canada Milkvetch. http://blog.millbornseeds.com/

WackyBadger (Photographer). Canada tick-trefoil (Desmodium canadense). Available at: http://www.photoree.com/photos/permalink/9401921-8584048@N05

BotBln. 2011. Heliopsis helianthoides. Available at: http://commons.wikimedia.org

Llewellyn, P. [Photographer]. 2011. Common Evening Primrose. http://www.thewildflowersociety.com

Williams, H.B. 2011. Dwarf Fireweed. Available at: http://vevelshemor.com

Vannette, R. [Photographer] 2011. A common milkweed in flower. Available at: http://www.ns.umich.edu

Jeannelle [Photographer]. 2010. Grayhead Coneflower. Available at: http://midlifebyfarmlight.blogspot.com

Quick Growing Trees. 2012. Great Blue Lobelia. Available at: http://www.gonative.4t.com

Hellen [Photographer]. 2011. Lanceleaf Coreopsis. http://middlewoodjournal.blogspot.com

Mayer, J. [Photographer] 2011. Hoary Vervain aka Verbena stricta Available at: http://commons.wikimedia.org

Percy, I. [Photographer] 2010. Lemon beebalm. Available at: http://floreznursery.blogspot.com/2010/12/monarda-citriodora-lemon-beebalm.html

Dehaan [Photographer] 2008. Illinois bundleflower (Desmanthus illinoensis) inflorescence. Available at: https://commons.wikimedia.org

Miggel, C. [Photographer]. 2012. The Linden Realm. http://cathelijnemiggelbrink.blogspot.com/

Sandia Net. 2007. Pale Purple Coneflower. Available at: http://www.sandianet.com

Nebraska Pheasants & Quail Forever. 2012. Penstemon & cudweed. Available at: http://www.nebraskapf.com

Lewis, C. [Photographer] 2007. plains Coreopsis. Available at: https://commons.wikimedia.org

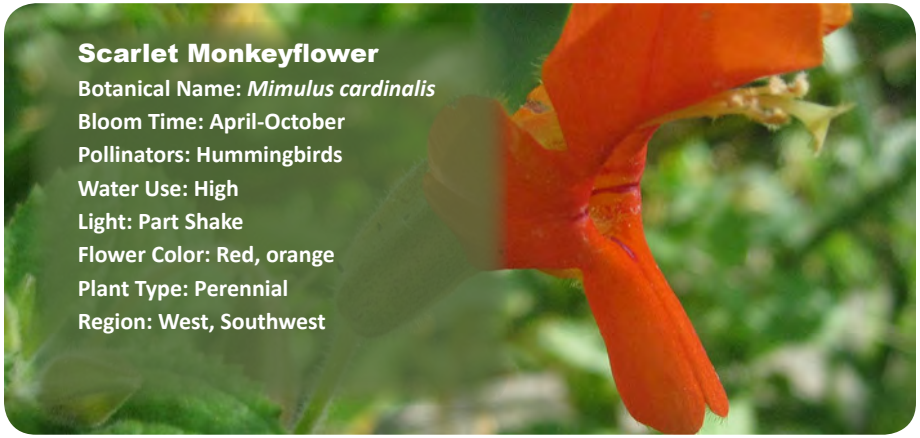
Hansel, B. [Photographer]. 2005. Prairie Clover. Available at:http://en.wikipedia.org

Gorman, P. 2010. Prairie Cinquefoil. Available at: http://swbiodiversity.org/seinet/imagelib/imgdetails.php?imgid=294481

Gloria [Photographer]. 2011. Rattlesnake Master. Available at: http://pollinators-welcome.blogspot.com

Shock, C. [Photographer]. Rocky Mountain Beeplant. Available at: http://www.malag.aes.oregonstate.edu/wildflowers/images/RockyMountainBeeplantCleomeSerrulata15Aug06MalheurRivPlainOR_07.JPG

Wolf-Root, D. [Photographer]. 2013. Sensitive Briar. Available at: http://www.worldisround.com/articles/369337/photo6.html



Soleau, T [Photographer]. 2011. Scarlet Monkey Flower. Available at: http://westernwilds.blogspot.com/

Crazytwoknobs [Photographer] 2008. Partridge Pea, Schaumburg IL. Available at http://en.wikipedia.org

Lavin, M. [Photographer] 2007. Asclepias speciosa. Available at: https://commons.wikimedia.org

Lavin, M. [Photographer]. 2004. Helianthus pauciflorus. http://commons.wikimedia.org

Upright Prairie Coneflower
Botanical Name: *Ratibida columnifera*
Bloom Time: May-October
Pollinators: Honeybees, Butterflies, Insects
Water Use: Moderate
Light: Full Sun
Flower Color: Orange, Yellow, Brown
Plant Type: Perennial
Region: All of the U.S.

Stickpen [Photographer]. 2009. Ratibida columnifera. Available at: http://en.wikipedia.org/

Western Sunflower
Botanical Name: *Helianthus occidentalis*
Bloom Time: June, July
Pollinators: Native Bees, Birds, Butterflies
Water Use: Moderate
Light: Full Sun
Flower Color: Yellow
Plant Type: Perennial
Region: Southwestern U.S.

Hess, D. [Photographer]. 2006. Helianthus occidentalis. Available at: http://www.cas.vanderbilt.edu

Virginia Mountain Mint
Botanical Name: *Pycnanthemum virginianum*
Bloom Time: July-August
Pollinators: Bumblebees, Honeybees
Water Use: Moderate
Light: Part Shade
Flower Color: White
Plant Type: Perennial
Region: Eastern and Central U.S.

Shiela [Photographer]. 2011. Virginia Mountain Mint. Available at: http://greenplace-chapelhill.blogspot.com

Wholeleaf Rosinweed
Botanical Name: *Silphium integrifolium*
Bloom Time: July-September
Pollinators: Native Bees, Bumblebees
Water Use: Moderate
Light: Full Sun
Flower Color: Yellow
Plant Type: Perennial
Region: Central U.S.

IPFW. 2008. Rosinweed. Available at: http://www.ipfw.edu

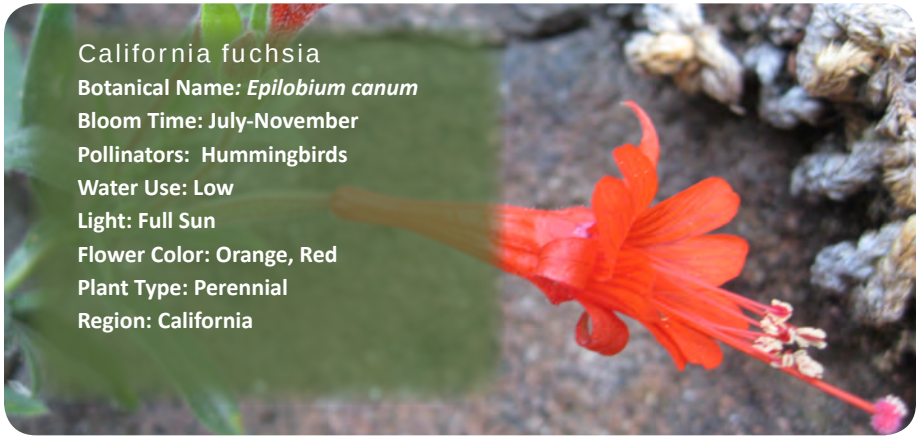
Western Ironweed
Botanical Name: *Vernonia baldwinii*
Bloom Time: July-November
Pollinators: Bees, Birds, Butterflies
Water Use: Low
Light: Full Sun
Flower Color: Pink, Purple
Plant Type: Perennial
Region: Central U.S.

Indiana Department of Natural Resources [Photographer]. 2011. Ironweed at Clifty Falls State Park. Available at: http://bit.ly/13NTKNW

Wild Bergamot, Bee Balm
Botanical Name: *Monarda fistulosa*
Bloom Time: May-September
Pollinators: Bees, Bumblebees, Butterflies
Water Use: Moderate
Light: Full Sun, Part Shade
Flower Color: Purple, Pink, White
Plant Type: Perennial
Region: All of the U.S.

Otsego Conservation. 2008. Wild Bergamot. Available at: http://www.otsego.org

Shebs, S. 2006. "Eriogonum fasciculatum" Available at: http://commons.wikimedia.org/



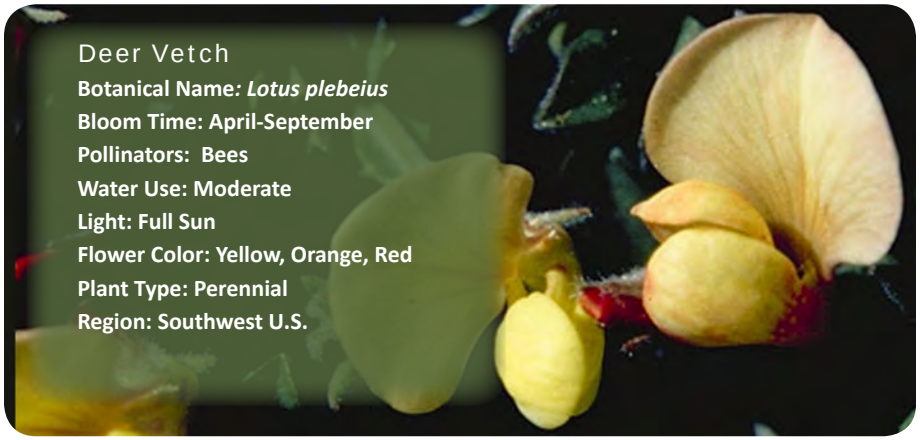
Ben [Photographer]. 2012. Epilobium canum. http://nativehorticulture.com/

Late Summer and Fall Pollinator-Friendly Flowers

The late summer and fall season seems to indicate a slow-down for bees. In fact though, autumn flower gardens can continue to provide food and shelter for bees, pollinators, and wildlife at a time when it may be otherwise scarce. Several flowers, like asters, echinacea, goldenrod, and even sunflower, continue to bloom right up through the end of October, giving bees a good supply of pollen and nectar during the cold winter weather.

Cressmoor Prairie Nature Preserve. 2011. Compass Plant. Available at: http://www.heinzetrust.org

Barnes, T. 2009. Aromatic Aster. Available at: http://upload.wikimedia.org



Flaigg, N. 1990. Lotus plebeius. http://www.wildflower.org/gallery/result.php?id_image=8765

Kleinman, R. [Photographer] 2008. Mirabilis oxybaphoides. Available at: http://www.wnmu.edu/

Wilder Kaiser [Photographer]. 2008. Jerusalem Artichoke. http://commons.wikimedia.org

North Dakota Parks. 2011. Golden Alexander.Available at: http://www.parkrec.nd.gov

IPFW. 2008. Late Goldenrod. Available at: http://www.ipfw.edu

Hough, C. [Photographer]. 2007. Heath Aster (Symphyotrichum ericoides) http://commons.wikimedia.org

Cresmoore Heinz Land Trust. 2009. Prairie Gentian, New England Aster, CompassPlant. Available at: http://www.heinzetrust.org

[Unknown Photographer]. 2012. Salvia azurea Blue sage. Available at: http://commons.wikimedia.org

Transformational Gardening. 2010. Roundhead Bush Clover (Lespedeza capitata) http://www.transformationalgardening.com/forage/plants/lespedeza-capitata-images.html

Mongo [author]. 2007. Plains sunflower (Helianthus petiolaris). Available at: http://commons.wikimedia.org

Trigg, R. 2009. Goldenrod. Available at: http://www.heinzetrust.org

Kojian, R. [Photographer]. 2011. Artemisia ludoviciana. Available at: www.gardenology.org

Mongo. [Photographer]. 2011. Sawtooth Sunflower. Available at: http://upload.wikimedia.org

Have an Organic Garden?
...let us know!

Pesticides are hazardous to health and the environment, and are toxic to bees and other beneficial insects. They are also unnecessary to have a beautiful yard and landscape. You can adapt an organic soil fertility program, eliminate pesticides and create a pollinator friendly landscape.

Pledge your yard, park, garden, or other community or business-managed green space as organically managed and pollinator-friendly. Indicate how many acres (or what fraction of an acre) you can declare as organic and how many acres of pollinator habitat you create!

Go to **http://bit.ly/LawnDeclaration**
to read the pledge and sign the declaration.