Planting for Pollinators A Guide for Eastern Georgian Bay

Pollination Explained

Flowering plants reproduce through a process called pollination. Flowers produce a powder-like material called pollen, which is produced in the anther of the flower. To produce a seed inside the plant, pollen must travel from the anther to the stigma. Some flowers can self fertilize whereas others need to cross pollinate with another plant.

The spread of pollen from other flowers can happen by wind, water, or animals called pollinators. Nectar is a sugary liquid produced by plants specifically to attract pollinators. Honeybees use nectar in honey production. When pollinators dine on nectar, they become covered in pollen. As they travel from plant to plant, they spread pollen. This process is called pollination, it is how plants reproduce and make fruit. Pollination is important for entire food webs, not just plants.

People depend on pollination to produce many different food crops, including favourites like strawberries, apples, cucumbers, and blueberries. One out of every three bites of food you take depends on pollinators doing their jobs! Native bees play an important role in this crop pollination, they can pollinate some crops more efficiently than honeybees.



A Reputation for Pollination

Any animal that moves pollen from plant to plant can be considered a pollinator! Here in eastern Georgian Bay, there are several types of pollinators that you can find.







1. Honeybees

The Western or European honeybee is not native to North America. The species was introduced by farmers to help in the pollination of their crops and to produce honey. Similar to other domestic animals, honeybees can play a productive role in food production but are also widely recognized for their reliability in pollination.

2. Native Bees

There are actually hundreds of different species of bees in Canada! Some broad categories include bumblebees, mason bees, leafcutter bees, sweat bees, and mining bees. Bumblebees in particular are known as excellent pollinators.

3. Butterflies & Moths

Butterflies are some of the best known pollinating insects. As large and showy insects, they get a lot of attention. They also pollinate in the daytime, making them hard to miss. Some species of moths are actually nocturnal pollinators – they collect nectar at night. New research shows that moths likely also play key roles in plant pollination.



4. Two-winged Insects

This group is comprised of many species of fly, mosquito, and gnat. While not all are pollinators, many of them do visit flowers for food, including some mosquito species.



5. Ants & Beetles

Just like bees, ants work together to communicate about collecting nectar. It is very common to see ants at flowers, such as trilliums and peony. Many beetle species are also known to crawl through a flower collecting nectar. Although they may not pollinate as many flowers as flying insects, they still contribute to pollination.



6. Hummingbirds

Around the world, hummingbirds are notorious for their pollination prowess. In eastern Georgian Bay, we only have one species, the ruby throated hummingbird. Some sources claim this species is on par with the honeybee when it comes to pollination.

Why are Pollinators in Trouble?

Keep in mind that there are thousands of pollinator species across Ontario, each with its own history, habitat needs, population dynamics, and vulnerabilities. The issue of pollinator and insect decline is complex, but several key points emerge.

1. Habitat Loss (Natural & Human-Caused)

Natural areas, including old farmland and meadows which provide habitat, are being developed by people. In addition, natural areas are transformed and used for conventional agriculture production and old fields are slowly succeeding back into forests. Agriculture can actually increase breeding and nectaring habitat, but only when habitat features are retained and pesticides are not used.

2. Extreme Weather & Climate Change

Climate change impacts ecosystems and species in numerous ways, pollinators and their habitats are no exception. For example, studies show that a change in weather patterns is altering the blooming dates for certain plant species. This in turn can affect nectar availability for pollinators and even their ability to successfully reproduce. Warmer winters can also affect the overwintering success of pollinating insects, in the event they emerge too early. Extreme weather events have the power to greatly disturb migrating insects.

3. Pesticide and Herbicide Use

With the introduction of Roundup Ready crops (soybean and corn), pesticide and herbicide use has increased in both the United States and Canada. Glyphosate, the herbicide that is applied to these crops, kills all other plants, including milkweed and other common native plants. This



impacts pollinator populations. For example, between 1999 and 2010, the significant increase in glyphosate use coincided with an 81% decline in Monarch production and a 58% decline in milkweed populations in the Midwestern U.S.

4. Parasites, Predation, & Disease

Parasites, predators, and various diseases and pathogens have always affected all pollinator species. However, as their habitats are altered and their populations become more vulnerable, the impacts from these pressures have become a more substantial issue. European honeybees provide an excellent example of the negative impacts disease can have, the vulnerable colonies can be completely wiped out by colony collapse disorder.

How to Help

1. Choose No 'Cides!

Pesticides and insecticides do not only kill "bad bugs". Pesticides, such as neonicotinoids, are designed to kill all insects. Even "organic-approved" insecticides can harm pollinators and other wildlife. If you want to support pollinators, don't use these products. Many garden centres are supplied by large nurseries where pesticides are commonly used. Neonicotinoids are designed to remain on the plant for a long time, and therefore may end up in



your home or community gardens. If you are buying from a local garden centre, ask if they have plants that aren't treated with "neonics" and explain why it's important to you. Although herbicides are not directly lethal to insects, they do kill plants that pollinators rely on.



2. Opt for Native Plants

Native plants are the safest bet when it comes to creating habitat for pollinators. It's important to avoid "cultivars" of native plants, as they may not provide the same benefits to pollinators. There are several high quality native plant nurseries in Ontario that supply sustainably produced native plants. See the list on the back page!

3. Be a Citizen Scientist!

Recording your pollinator sightings through an established citizen science program provides meaningful information that is otherwise difficult for scientists and researchers to collect on a broad scale. There are dozens of options out there, iNaturalist is a great program to record all your sightings while others, such as Monarch Watch, are more specific to one species.

4. Limit Your Consumption of Avocados and Avocado Oil

There's a reason why avocado sales have exploded in Canada over the last ten years... they're delicious! But avocado demand is increasing illegal logging in Monarch overwintering habitat in Mexico. It will take many people to influence this issue, so spread the word!

5. Support Local, National, and International Research Efforts

There are many ways to spread the word about the plight of pollinators, whether you support an organization or school building habitat or start your own education initiative. For more ideas, visit contact the Biosphere!

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Make a Pollinator Garden in your Backyard or Community

We need to increase the amount of pollinator habitat in Ontario to help offset habitat loss. Many small habitat patches add up to a much larger amount!

The ideal pollinator garden site will be sunny. Most nectar-providing plants need at least 6 hours of sun (4 hours of afternoon sun), and the sun helps to warm up the butterflies! Your pollinator garden should also be sheltered from high winds. Windbreaks provide safer habitat for all pollinator life stages. You can use existing shrubs or trees to help provide a natural windbreak, or plant native shrubs to help create shelter.

Some pollinators such as butterflies will need logs and flat rocks to bask on and water to drink. If there isn't an adjacent waterbody, include a shallow bird bath or something to collect water for pollinators to drink from.

Site Preparation

Soil is important! To plant a successful garden, you'll need to find out what kind of soil you have (sand, clay, silt, loam, or a mix). Adding a good amount of compost when planting will help plants get established more quickly. If you have very sandy soil or heavy clay, you will need to add a large amount of compost in order to help your plants do well. If your site does not have good soil, you may consider building

"More than 2/3 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...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." ~Xerces Society raised beds. If you garden with raised beds, water them more frequently as they drain faster.

Start with Plants

It can be difficult to establish a native garden by seed. To start, use plugs or potted stock to create your garden. All of the plants listed on pages 12-15 are appropriate for the eastern Georgian Bay area. Select a variety of plants so that bloom times and colours are staggered throughout the season. These plants not only provide breeding habitat, but nectar from spring to fall. You may have some of these species growing naturally in your neighbourhood!

Native Plant Nurseries

The nurseries listed on the back page not only sustainably grow native plants, but provide a large variety of options. Some of them are quite small and not open to the public, so be sure to check their websites or call ahead. You can also purchase many of these species through local organizations' native plant sales in the spring.

See contact information on back cover.

How to Plant

Dig a hole for each plant that is double the diameter of the plug or container.

"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." ~Xerces Society

Loosen the soil around the bottom of the hole to make it easier for the plant roots to spread out. Carefully remove the plant from its container by placing your fingers gently around the stem and turning it upside-down. Place the plant in the hole and fill in around it with a mix of the existing soil and added compost, packing it tightly around the plant. Mixing in compost will help retain soil moisture. Fill high enough that no roots are showing but be careful to not bury the plant's stem. After watering, you may want to use natural mulch (natural wood chips or leaves) to discourage weed growth. Avoid using store bought coloured or black mulch as this has been treated with dyes and can affect plant growth.



"Globally, pollinator populations are decreasing; their declines endanger food production and threaten natural ecosystems. Many factors contribute to these declines, including habitat loss, climate change, predators and disease, poor nutrition, invasive species and chemical exposure." ~Monarch Joint Venture

Munching is Okay!

Host plants, such as native milkweeds, are meant to be food for caterpillars! Munch marks in plants can be a sign that the garden is doing its job.

Watering & Maintenance

The benefit of native plants is that they are very low maintenance. However, during the first year of planting, it is important to water your garden while plants get established. It may also be beneficial to water your garden during years of drought, to help your plants stay healthy.



Hold the Fall Cleanup!

Dead plant stalks, leaves, and other material provide important overwintering habitat for other beneficial insects and wildlife, such as birds. Mulch your garden with fallen leaves and wait to clean up until spring, when you see new growth beginning to emerge. You can add compost in the spring to help give your plants a nutritional boost!

More than Monarchs

Remember that planting a pollinator garden can help other species as well, including birds, small mammals, and even reptiles and amphibians! Pollinators are incredibly important; many other species depend on them, including native plants and two thirds of our agricultural products worldwide! The best way to protect pollinators is to restore and create habitat.

Leave a Messy Area

Sticks, brush piles, tree stumps, small bare patches of dirt in the garden, and low hanging shrub and tree limbs play important roles for pollinator habitat. Leave a small area "messy" to provide this crucial habitat, or incorporate it into your garden in a creative way.





"The Million Pollinator Garden Challenge (MPGC) is a nationwide call to action to preserve and create gardens and landscapes that help revive the health of bees, butterflies, birds, bats and other pollinators across America. We will move millions of individuals, kids and families outdoors and make a connection between pollinators and the healthy food people eat." ~National Pollinator Garden Network

Native Plant List

All of the plants in this list are appropriate for the eastern Georgian Bay area and not only provide breeding habitat, but nectar habitat from spring to fall. You may have some of these species growing naturally in your neighbourhood!

Common Name	Scientific Name	Bloom Colour & Timing (Apr to June) (June to Aug) (Aug to Oct)		
WILDFLOWERS		(June to Aug)		
Bearberry	Arctostaphylos uva-ursi			
Black Eyed Susan	Rudbeckia hirta			
Bloodroot	Sanguinaria canadensis			
Blue Flag Iris	Iris versicolor			
Blue Vervain	Verbena hastata			
Blue Violet	Viola sororia			
Blue-stem Goldenrod	Solidago caesia			
Bunchberry	Cornus Canadensis			
Butterfly Weed	Asclepias tuberosa			
Canada Goldenrod	Solidago Canadensis			
Cardinal Flower	Lobelia cardinalis			
Common Boneset	Eupatorium perfoliatum			
Common Milkweed	Asclepias syriaca			
Cup Plant	Silphium perfoliatum			
Dense Blazing Star	Liatris spicata			
Dutchman's Breeches	Dicentra cucularia			
Fireweed	Chamerion angustifolium			
Flat-topped Aster	Doellingeria umbellata			
Foamflower	Tiarella Cordifolia			
Foxglove Beardtongue	Penestemon digitalis			
Golden Alexander	Zizia aurea			
Great Blue Lobelia	Lobelia siphilitica			
Heath Aster	Symphyotrichum ericoides			
New England Aster	Symphyotrichum novae-angliae			
Pearly Everlasting	Anaphalis margaritacea			
Rough Woodland Sunflower	Helianthus divaricatus			
Rough-stemmed Goldenrod	Solidago rugosa			
Spotted Joe-Pye Weed	Eupatorium maculatum			
Swamp Milkweed	Asclepias incarnata			
Sweet Oxeye	Heliopsis helianthoides			
Tall Meadowrue	Thalictrum pubescens			
Turtlehead	Chelone glabra			
Wild Bergamot	Monarda fistulosa			
Wild Columbine	Aquilegia Canadensis			
Wild Strawberry	Fragaria virginiana			

Legend - Plant Blossom Colour

White Pink Purple Blue Yellow Orange Red Green

Height	Soil Type	Light Requirements	Meadow	Shorelines & Wet Areas	Forest
15 - 30 cm	dry to moist, sand, loam, gravel	full to part sun			
30 - 50 cm	dry to moist, sand, loam	sun to part shade			
7 - 30 cm	moist to wet, sand, loam, clay	shade	_		
60 - 90 cm	moist, wet	sun to part shade			
60 - 180 cm	normal to wet, clay, loam, sand	sun to part shade			
7 - 20 cm	normal to moist, sand, clay, loam	sun to part shade			
30 - 90 cm	dry to normal, loam, humus	shade to part shade			
7 - 20 cm	normal to moist, sand, clay, loam, humus, acidic	sun to parth shade			
30 - 75 cm	dry to normal, sand, loam	sun to part shade			
30 - 120 cm	dry to normal, sand, clay, loam	sun to part shade			
60 - 120 cm	normal to wet, loam, humus	sun to part shade			
60 - 160 cm	wet to moist, clay, sand, loam	sun to part shade			
60 - 120 cm	dry to normal, sand, loam, clay	sun			
100 - 150 cm	normal to moist, sand, clay	sun			
30 - 180 cm	moist, sand, loam	sun			
10 - 30 cm	normal to moist, humus	part shade to shade			
60 - 180 cm	dry to moist, sand, loam	sun			
60 - 200 cm	normal to wet	sun			
15 - 30 cm	normal to moist, humus, loam, acidic	shade to part shade			
30 - 100 cm	dry to moist, clay, sand, loam, acidic	sun to part shade			
30 - 75 cm	dry to wet, clay, sand, loam	sun to part shade			
30 - 120 cm	normal to wet, loam, humus	sun to part shade			
30 - 90 cm	dry to moist, sand, clay, loam, humus	sun			
90 - 210 cm	dry to moist, sand, clay, loam	sun to part shade			
30 - 90 cm	dry, sand	sun			
40 - 150 cm	dry to normal, sand	sun to part shade			
30 - 80 cm	most to wet, sand	sun to part shade			
60 - 180 cm	normal to wet, clay, sand, loam, humus	sun to part shade			
30 - 150 cm	moist to wet, clay, loam	sun			
50 - 150 cm	dry to moist, sand, clay, loam	sun to part shade			
60 - 200 cm	moist, Ioam, acidic	part shade			
30 - 90 cm	moist to wet, acidic	shade, part shade, sun			
60 - 120 cm	dry to moist, sand, clay, loam, humus	sun			
30 - 90 cm	dry to moist, sand, loam	sun to part shade			
5 - 25 cm	dry to normal, clay, sand	sun to part shade			
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Common Name	Scientific Name	Bloom Colour & Timing (Apr to June) (June to Aug) (Aug to Oct)			
Yarrow	Achillea millefolium				
Zigzag Goldenrod	Solidago flexicaulis				
GRASSES					
Big Bluestem	Andropogon gerardii				
Canada Wild Rye	Elymus canadensis				
Indian Grass	Sorghastrum nutans				
SHRUBS					
Alternate Leaf Dogwood	Cornus alternifolia				
Bush Honeysuckle	Diervilla lonicera				
Buttonbush	Cephalanthus occidentalis				
Common Elderberry	Sambucus canadensis				
Highbush Cranberry	Viburnum trilobum				
Low Sweet Blueberry	Vaccinium angustifolium				
Meadowsweet	Spiraea alba				
Nannyberry	Viburnum lentago				
Ninebark	Physocarpus opulifolius				
Purple-flowering Raspberry	Rubus odoratus				
Pussy Willow	Salix Discolor				
Red Elderberry	Sambucus pubens				
Red Osier Dogwood	Cornus sericea				
Slender Willow	Salix petiolaris				
Smooth Rose	Rosa blanda				
Smooth Serviceberry	Amelanchier laevis				
Staghorn Sumac	Rhus typhina				
Swamp Rose	Rosa palustris				
Wild Red Raspberry	Rubus idaeus				
Winterberry	llex verticillata				
TREES					
Basswood	Tilia americana				
Black Cherry	Prunus serotina				
Black Spruce	Picea mariana				
Chokecherry	Prunus virginiana				
Eastern Hemlock	Tsuga canadensis				
Eastern White Cedar	Thuja occidentalis				
Pin Cherry	Prunus pensylvanica				
Red Maple	Acer rubrum				
Red Pine	Pinus resinosa				
Sugar Maple	Acer saccharum				
White Spruce	Picea glauca				
Yellow Birch	Betula alleghaniensis				

Height	Soil Type	Light Requirements	Meadow	Shorelines & Wet Areas	Forest
30 - 70 cm	dry to normal, clay, sand	sun			_
30 - 100 cm	moist, sand, loam, humus, acidic	shade to part shade			
90 - 250 cm	normal to moist, sand, loam	sun to part shade			
90 - 250 cm	dry to moist, clay, sand	sun, part shade, shade	- 22		
90 - 240 cm	dry to moist, sand, clay, loam	sun to part shade	- E.		
50 240 0m	di y to molot, band, oldy, loann	our to pur onduo			
4 - 8 m	normal to moist, humus, acidic	shade to part shade			
1 - 1.5m	dry to normal, sand, loam	sun to part shade			
1 - 3.5 m	moist to wet, clay, sand, loam	sun to shade			
1 - 4 m	moist to wet, sand, clay, loam	sun to part shade			
2 - 4 m	normal to moist, sand, loam	sun to part shade			
30 - 60 cm	dry to moist, sand, loam	sun to part shade			
1 - 1.5 m	normal to wet, sand, loam, clay	sun to part shade			
4 to 7 m	dry to moist, sand, loam, clay	sun to part shade			
2 to 3 m	dry to moist, sand, loam	sun to part shade			
1 - 1.8 m	normal to moist, sand, loam, clay	sun to part shade			
2 - 8 m	moist to wet, sand, clay, loam	sun			
2 - 5 m	moist to wet, sand, clay, loam	sun to part shade			
1.5 - 4 m	normal to wet, clay, sand, loam	sun to part shade			
1 - 8 m	moist to wet, sand, loam, clay	sun to part shade			
0.5 - 1.5 m	dry, clay, sand, loam	sun			
2 - 10 m	normal to moist, clay, loam, sand, humus	sun to part shade			
1 - 8 m	dry to normal, clay, loam, sand	sun to part shade			
0.5 - 2 m	moist to wet, clay, loam, sand	sun to part shade			
0.5 - 2 m	dry to moist, sand, loam, humus	sun to part shade			
1.5 - 2.5 m	normal to wet, sand, loam, clay, acidic	sun to part shade			
			_		
18 - 22 m	dry to moist, sand, loam	sun to part shade			
6 - 10 m	moist, clay, sand, loam	part shade			
12 - 25 m	moist to wet, clay, sand, loam, humus, acidic	sun to shade	_		
4 - 8 m	dry to moist, clay, loam, sand	sun to part shade			
6 - 30 m	normal to moist, sand, loam, acidic	shade to part shade			
9 - 16 m	dry to moist, clay, sand, loam	sun to part shade			
1 - 12 m	dry to moist, sand, loam	SUN			
12 - 25 m	moist to wet, loam, humus	shade, part shade, sun			
4 - 25 m	dry to moist, sand, loam, acidic	SUN			
20 - 35 m	normal to moist, sand, loam, humus	shade, part shade, sun			
20 - 30 m	normal to moist, sand, clay, loam	sun to part shade			
15 - 25 m	moist to wet, loam	part shade to shade			

THANK YOU FOR SUPPORTING THE GEORGIAN BAY BIOSPHERE!

Georgian Bay is part of Lake Huron and the Great Lakes Basin. It is known as Spirit Lake (Mnidoo-gamii) by the Anishinaabek peoples and was named a World Biosphere by the United Nations Education, Scientific and Cultural Organization (UNESCO) in 2004. The Georgian Bay Biosphere (GBB) is one of over 700 Biospheres globally and one of 19 Biospheres in Canada.

The GBB is a registered Canadian charity that works to protect the environment, create vibrant communities, and support a healthy economy. Working with many partners across the region, we rely on grants, contracts, memberships, and donations to do our work.

FOR INFORMATION ON PROGRAMS AND EVENTS, AND TO SUBSCRIBE TO OUR NEWSLETTER, VISIT GBBB.CA.



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