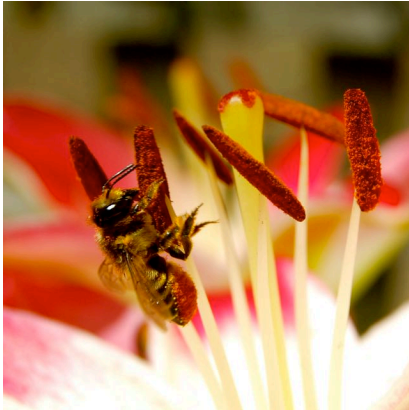




# Pollinator Gardens

## A Toronto Master Gardeners Guide



Bee collecting lily pollen

Photo: Helen Battersby

Embedded in the ground as they are, most flowering plants need help to reproduce. Over 80 percent of flowering plants need pollinators such as birds, bees, butterflies and other animals to develop seed or fruit. Having available pollinators is as essential to most flowering plants as light, water and good soil.

In fact most of the earth's ecosystems, including much of our food supply, are dependent on pollinators.

Any flower or edible garden with flowering plants is already a pollinator garden to some extent. Yet the vast decline of pollinators worldwide, with hundreds of pollinator species on the verge of extinction, makes it imperative to provide extra support to pollinators to ensure they have the habitat they need.

That's where a pollinator garden comes in.

A pollinator garden is a garden where the design and plant choices are focused on attracting pollinators – lots of pollinators. It's a garden where the gardener considers the pollinator potential of a plant before placing it in the garden and tries to maximize the opportunities for different types of pollinators. It's a garden that has a diversity of flowering plants – with an emphasis on native plants – and that is environmentally friendly as well as beautiful.

### Pollination Basics

Pollination is central to the reproduction of most flowering plants. It is the process of moving pollen from the male parts of flowers (anthers) to fertilize the female parts of flowers (stigmas). A few plants are capable of self-pollination, of moving the pollen from within a single flower or between flowers of the same plant (e.g., orchids, tomatoes and peas). Most plants, however, rely on cross-pollination between plants of the same species.

Flowering plants have evolved a number of ways to spread their pollen, including the wind (used by corn, wheat and rice as well as by conifers, grasses and sneeze-inducing ragweed). A few plants use water to spread their pollen (waterweeds and pondweeds). But the majority of flowering plants depend on insects, birds, bats and other animal pollinators. The plants use visual cues such as petal colour and design, or olfactory cues (scent), or both, to attract the pollinators.

Most flowering plants count on multiple pollinators. Some depend on a few specialized pollinators and a small group of flowering plants depend on only one species. But the more visits any of these plants get from the pollinators they need, the better their chances of reproduction.

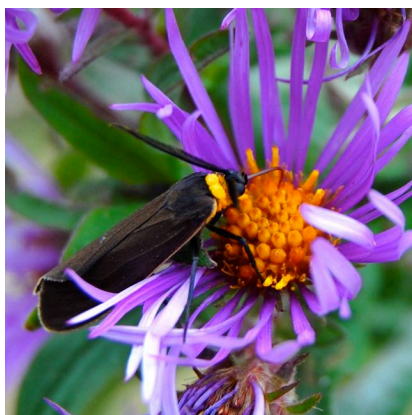
### Pollinators

Insects are by far the most important pollinators: bees and wasps, flies, butterflies and moths, and beetles. A few plants use bats (in the southern US,

bats pollinate giant saguaro cacti and agave) or hummingbirds or other birds or other small animals as pollinators.

Pollinators are after three main types of food: nectar (a source of energy), pollen (a source of protein for bee larvae) and a host plant to eat and lay their larvae in (for the caterpillars of butterflies and moths).

The most important pollinators are bees. Unlike other pollinators, bees deliberately collect pollen as food for their larvae. As they travel from flower to flower gathering pollen, a small amount rubs off their bodies and is deposited on the flowers they visit, resulting in cross-pollination. The fact that bees both collect and transfer pollen makes them more useful than pollinators like butterflies, flies and beetles that gather nectar and only inadvertently make contact with the pollen. Even so, their chance transmission of pollen makes them valuable pollinators.



Moths are pollinators, too. Here is a yellow-collared scape moth on a new-world aster flower (*Symphyotrichum*).

Photo: Helen Battersby

## Pollinator Decline

The numbers of pollinating insects have declined markedly over the past decade. In 2012 honey bees lost 38 percent of their colonies in Ontario. In June 2014 scientists making up the Task Force on Systemic Pesticides pointed to the pesticides neonicotinoids and fipronil – or neonids – as the culprit. Used on food crops, especially corn, neonids can cause bees to have problems with navigation, learning, food collection, disease resistance and reproduction.

Another pollinator in huge decline is the monarch butterfly, whose milkweed habitat in eastern North America has been largely depleted over the last few years.

All most pollinators need is a place full of flowers to forage in, suitable host plants where they can lay their eggs, and a pesticide-free environment. Even the smallest change we make to enhance the habitat of pollinators will be of benefit, not just to the bees and the butterflies, but to all of us, to our own habitat and our food supply.

## Creating a Pollinator Garden

The first step in creating a pollinator garden is to assess the garden you already have. Look at your soil, light conditions and exposure. Depending on where you live in the Greater Toronto Area (GTA), you may have very sandy soil or heavy clay – both of which can be improved by the addition of organic matter such as compost.

Most GTA gardens have a mixture of light conditions. The majority of flowering plants prefer sunny locations, so the sunnier the better – but some pollinator plants do well in shade or partial shade (highlighted in the table below).

Exposure is also a consideration. Some plants do not grow well in a windy location and some are particularly susceptible to salt, so should not be placed close to a city street.

The next step is to make a list of plant choices for each of the growing seasons. What plants do you already have that are attracting pollinators? Add plants from the suggested list to provide additional blooms or as host plants for pollinator food and shelter.



A Monarch butterfly (male; note the two wing spots) sipping from goldenrod flowers

Photo: Helen Battersby

## Key Elements of a Pollinator Garden

A pollinator garden can be big or small – planted in a large empty urban lot or in small pots and containers on a balcony. What is key to attracting pollinators is imitating nature. Aim to:

- Offer a diversity of plants to attract a diversity of pollinators.
- Use plants of different heights – trees, shrubs, vines and plants – to effect a layered canopy, even in a small container garden.
- Use enough of a single plant (massing them, if possible) to minimize pollinator search time and allow them to collect pollen and/or nectar more efficiently.
- Provide a sequence of bright-coloured and fragrant blooms from spring to the end of fall.
- Use chiefly native plants, which link up directly to native pollinators' needs (native plants are four times more likely to attract native bees than non-natives). This may mean reassessing plants such as goldenrod (*Solidago canadensis*), which provides pollen and nectar late in the season.
- When using non-native plants that attract pollinators – herbs such as parsley, basil and sage, or flowers such as alyssum, calendula or cosmos – try to plant heirlooms, which have more accessible nectar and pollen than hybrids.
- Do not use pesticides.
- Offer shelter and nesting sites to pollinators by allowing some parts of the garden to be a little “wild.”
- Provide fresh water in bird baths or other containers for pollinators of all types.

## Attracting Pollinators to your Balcony

The key principles of a pollinator garden apply equally to a balcony pollinator garden. In fact it is even more important for balcony gardeners than gardeners planting at ground level to attract pollinators, because pollinators are less likely to appear many storeys up unless there is plenty of nectar and pollen on offer. Non-pollination is more common on balconies, where gardeners report such problems as having lots of squash flowers but no fruit. Rather than turning to self-pollination – by brushing the flowers daily to help the pollination process, as recommended by some gardening books – why not entice pollinators to the balcony and let them do the work.

Balcony pollinator gardens are most successful if they're sunny and sheltered from wind. Creating a windbreak using a trellis or screen or native shrubs like juniper or viburnum will help shield plants from the wind. If the balcony is heavily shaded, choose shade-loving pollinator plants such as hostas, columbines, lady's mantle and bowman's root, along with ferns.

Even the smallest of balconies should aim for a diversity of plant material. Using plants of varying heights, including annuals, wildflowers, flowering vines and potted shrubs and trees is most effective. To save space, herbs such as thyme and oregano can be planted around your potted shrubs and trees to act as mulches as well as food for pollinators.

A balcony pollinator garden should also focus on native plants, which are first choice for native pollinators. In addition, native plants need less water, a boon on a balcony where watering is often difficult. Silvery-leaved non-natives like rosemary, lavender and sage are also relatively drought-tolerant and valuable in attracting pollinators.

Like a pollinator garden at ground level, a balcony pollinator garden aims to ensure that every plant functions as a pollinator as well as a decorative element or vegetable or mulch.

## Pollinator Garden in GTA: Suggested Native Plants

Type of Plant	Spring-blooming	Summer-blooming	Fall-blooming
Native Trees & Shrubs	Serviceberry ( <i>Amelanchier canadensis</i> or <i>A. spp.</i> )	Pagoda Dogwood ( <i>Cornus alternifolia</i> )	
	Elderberry ( <i>Sambucus nigra</i> )	Eastern Ninebark ( <i>Physocarpus opulifolius</i> )	
	Willow ( <i>Salix spp.</i> )	Highbush Cranberry ( <i>Viburnum trilobum</i> )	
	Crabapple ( <i>Malus spp.</i> )	American Basswood ( <i>Tilia americana</i> )	
Native Vines		Carolina Rose ( <i>Rosa carolina</i> )	
			Trumpet Vine ( <i>Campsis radicans</i> )
Native Plants			Virgin's Bower ( <i>Clematis virginiana</i> )
	Bloodroot ( <i>Sanguinaria canadensis</i> )	Blue Wild Indigo ( <i>Baptisia australis</i> )	Joe Pye Weed ( <i>Eupatorium purpureum</i> )
	Solomon's Seal ( <i>Polygonatum commutatum</i> )	Columbine ( <i>Aquilegia canadensis</i> )	New England Aster ( <i>Symphyotrichum novae-angliae</i> , or other native Asters)
	Foamflower ( <i>Tiarella spp.</i> )	Geranium ( <i>Geranium maculatum</i> )	Black-eyed Susan ( <i>Rudbeckia hirta</i> )
	Wild Strawberry ( <i>Fragaria virginiana</i> )	Spiderwort ( <i>Tradescantia virginiana</i> )	Canada Goldenrod ( <i>Solidago canadensis</i> ) or Stiff Goldenrod ( <i>Solidago rigida</i> )
		Butterfly Milkweed ( <i>Asclepias tuberosa</i> )	
		Smooth Penstemon ( <i>Penstemon digitalis</i> )	
		Bowman's Root ( <i>Gillenia trifoliata</i> )	
		Bee Balm/Bergamot ( <i>Monarda didyma</i> )	
		Culver's Root ( <i>Veronicastrum virginicum</i> )	
		Purple Coneflower ( <i>Echinacea purpurea</i> )	
Highlighting indicates plants that do well in shade or partial shade.			

## Pollinator Garden in GTA: Suggested Non-Native Plants

Type of Plant	Spring-blooming	Summer-blooming	Fall-blooming
Non-Native Trees & Shrubs	Fothergilla ( <i>Fothergilla spp.</i> )	Rose of Sharon ( <i>Hibiscus syriacus</i> )	
Non-Native Vines		Scarlet Runner Beans ( <i>Phaseolus coccineus</i> )	
Non-Native Plants	Bleeding Heart ( <i>Lamprocapnos spectabilis</i> )	Lady's Mantle ( <i>Alchemilla vulgaris</i> )	Autumn Joy Sedum ( <i>Sedum spectabile</i> )
	Puschkinia ( <i>Puschkinia spp.</i> )	Zinnia ( <i>Zinnia peruviana</i> )	Japanese Anemone ( <i>Anemone x hybrida</i> )

	Hellebores ( <i>Helleborus</i> spp.)	Nasturtium ( <i>Tropaeolum majus</i> )	Monkshood ( <i>Aconitum carmichaelii</i> 'Arendsii')
	Crocus ( <i>Crocus</i> spp.)	Hosta ( <i>Hosta</i> spp.)	
		Russian Sage ( <i>Perovskia atriplicifolia</i> )	
		Lavender ( <i>Lavandula</i> spp.)	
		Alliums ( <i>Allium</i> spp.)	
		Calendula ( <i>Calendula officinalis</i> )	
		Parsley ( <i>Petroselinum crispum</i> )	
		Sage ( <i>Salvia officinalis</i> )	
		Oregano ( <i>Origanum vulgare</i> )	
		Thyme ( <i>Thymus vulgaris</i> )	
		Rosemary ( <i>Rosmarinus officinalis</i> )	
		Catmint ( <i>Nepeta racemosa</i> )	
		Borage ( <i>Borago officinalis</i> )	
		Squash ( <i>Cucurbita</i> spp.)	
Highlighting indicates plants that do well in shade or partial shade.			

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Produced by the Toronto Master Gardeners, these Gardening Guides provide introductory information on a variety of gardening topics.

Toronto Master Gardeners are part of a large, international volunteer community, all committed to providing the public with horticultural information, education and inspiration. Our goal is to help Toronto residents use safe, effective, proven and sustainable horticultural practices to create gardens, landscapes and communities that are both vibrant and healthy.

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