

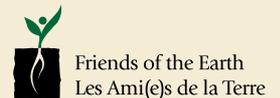
A FLOWER PATCH FOR THE RUSTY-PATCHED BUMBLEBEE:

CREATING HABITAT GARDENS FOR NATIVE POLLINATORS
IN THE GREATER TORONTO AREA



By Lorraine Johnson and Sheila Colla
With illustrations by Ann Sanderson

Published by
Friends of the Earth Canada in support of
Toronto's Pollinator Protection Strategy



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Yellow-banded bumblebee
(*Bombus terricola*) and
goldenrod (*Solidago* sp.)

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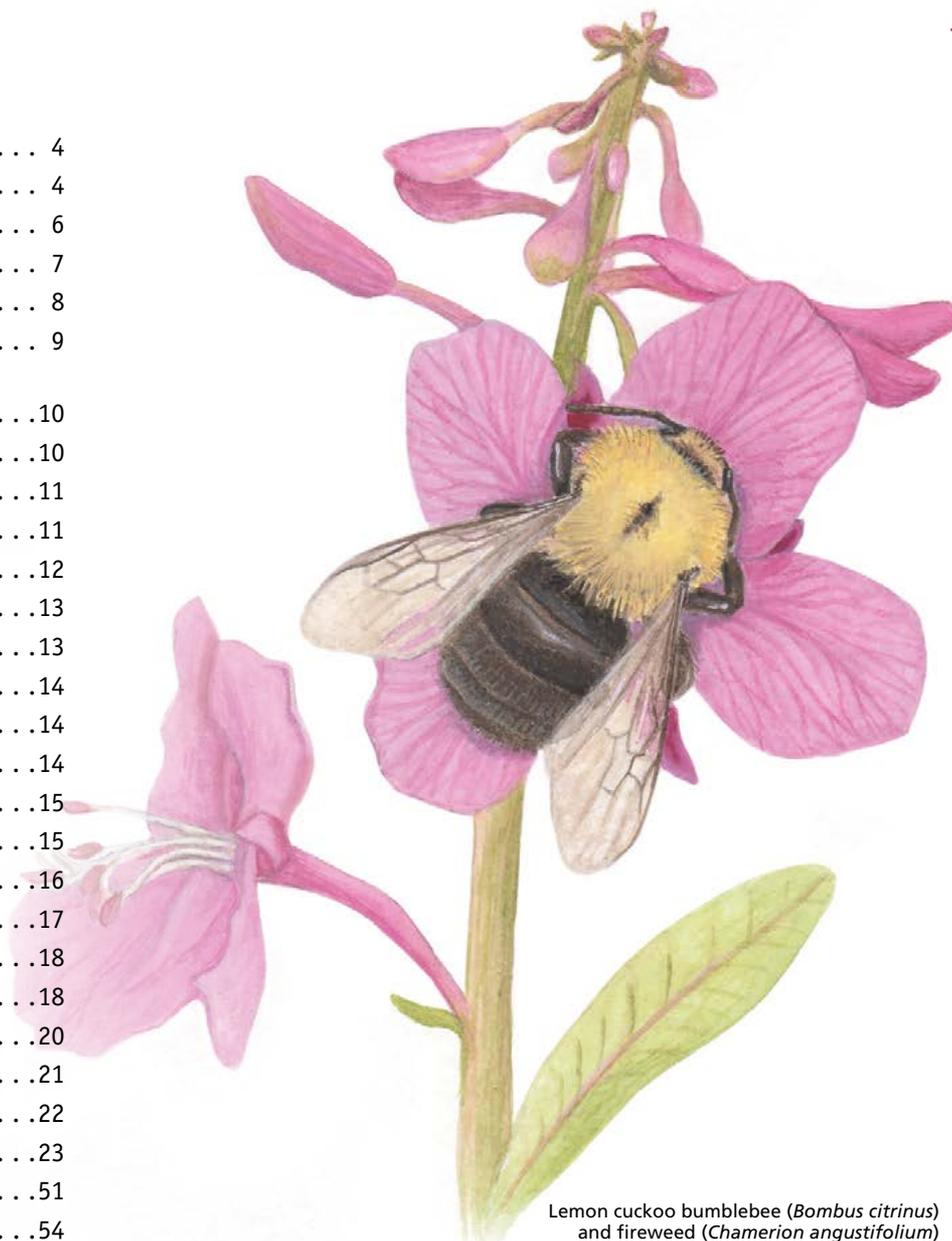
The City of Toronto's grant program PollinateTO (toronto.ca/services-payments/water-environment/environmental-grants-incentives/pollinateto-community-grants) funds pollinator habitat creation and projects that educate and engage the community. Up to \$5000 per project is available. For more information about the PollinateTO grants program, including application deadlines, visit livegreentoronto.ca.

Friends of the Earth is the Canadian member of the world's largest grassroots environmental organization, Friends of the Earth International. With our counterparts in 75 countries, Friends of the Earth Canada works to halt and reverse environmental degradation and depletion of natural resources, nurture the earth's ecological and cultural diversity, and secure sustainable livelihoods. As part of its **Bee Cause** campaign, Friends of the Earth Canada is proud to support the publication of *A Flower Patch for the Rusty-Patched Bumblebee*, an important tool for the implementation of Toronto's Pollinator Protection Strategy.

Cover illustration: Rusty-patched bumblebee (*Bombus affinis*) and common milkweed (*Asclepias syriaca*)

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Lemon cuckoo bumblebee (*Bombus citrinus*)
and fireweed (*Chamerion angustifolium*)

Foreword by Friends of the Earth Canada

Friends of the Earth Canada is pleased to publish *A Flower Patch for the Rusty-Patched Bumblebee: Creating Habitat Gardens for Native Pollinators in the Greater Toronto Area*, working with authors Lorraine Johnson and Sheila Colla, illustrator Ann Sanderson, and the City of Toronto to make this resource available. This practical guide will give you lots of information and inspiration to plant and maintain habitat for native bees in Toronto—in yards, on balconies, on apartment and condominium grounds, in schoolyards, at community centres, in parks, on corporate grounds, at community gardens, at faith centres... In other words, in as many places as possible!

By creating habitat, you are helping native bees and supporting the biodiversity upon which all life depends.

Saving the bees resonates deeply with Canadians. Yet as revealed in a 2017 national poll by Friends of the Earth, Canadians are largely unaware of the importance of native bees and are instead focused on honeybees. Both are of critical importance and are threatened by pesticides, habitat loss, climate change, pests and diseases, and modern intensive agriculture. These threats to bees are all cause for urgent action.

A Flower Patch for the Rusty-Patched Bumblebee provides powerful tools for taking action to support and protect native bees by creating habitat where we live, work and gather as communities. There is much that needs to be done to protect bees, but growing a flower patch is one action we can all take now to make a positive difference.

If you would like to learn more about Friends of the Earth Canada's Bee Cause campaign to save the bees, please visit our website foecanada.org/the-bee-cause.

In the meantime, start planting!

Introduction

Native bees are some of the most misunderstood creatures around. Popular misconceptions are that they all make honey, they're all black and yellow, they all sting, and they all live in hives. But the vast majority of Ontario's native bees don't live in hives, are not black and yellow, do not sting, and none of them make honey.

There are approximately 850 different bee species in Canada, with more than 350 species in Southern Ontario. Types of native bees include bumblebees, sweat bees, mining bees, cuckoo bees, leafcutter bees and cellophane bees, among others. And there are more to discover. In 2010, Jason Gibbs of the University of Manitoba found a species—in downtown Toronto—that had never before been described to science. Consider that for a moment: a bee species found...in the middle of the largest city of the country...described to science for the first time...just ten years ago.

Urban habitats are, in some ways, quite hospitable for bees, with a diversity of plants for nectar and pollen, and an array of habitats for nesting, mating, and shelter. But some species of native bees are in trouble. Take the rusty-patched bumblebee, for example. As recently as the 1970s, it was abundant in Southern Ontario—the fourth most common bumblebee species in the region. Its extensive historical range spans from the eastern U.S. to the Dakotas, north to Southern Ontario and south to Georgia. However, by the early 2000s, it had all but disappeared from Canada and much of the U.S.

In 2012, the rusty-patched bumblebee had the unfortunate distinction of being the first native bee in Canada to be officially designated as endangered. One of the authors of this



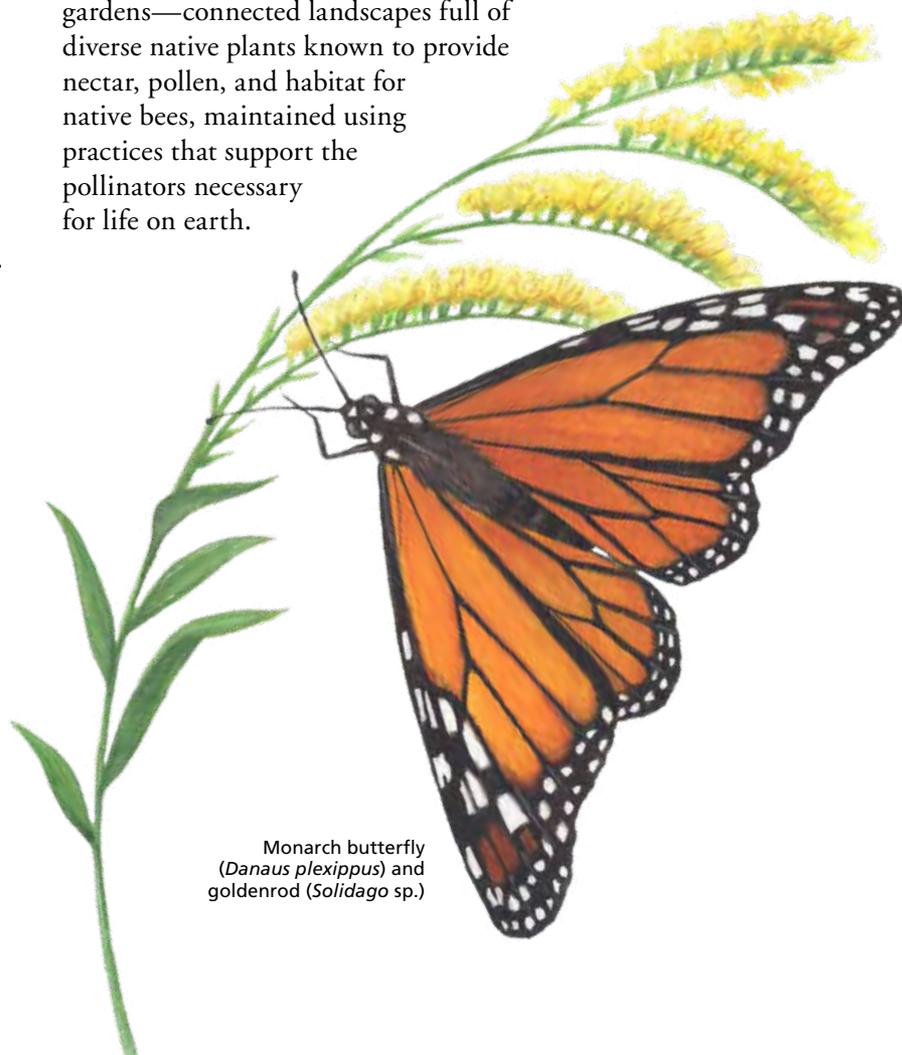
According to Toronto's Pollinator Protection Strategy, an average backyard garden may contain more than 50 species of bees.

book, Sheila Colla, was the last person in Canada to identify this bee in the wild, in 2009, by the side of a road in Pinery Provincial Park. Sheila had spent every summer since 2005 searching for the rusty-patched bumblebee in places where they had previously been recorded. On that summer day in 2009, she had found none and was on her way out of the park when, from the passenger window of the car, she spotted the distinctive rusty patch of a lone specimen. This sighting was the last known for Canada.

The causes of this bee's rapid and catastrophic decline have not yet been confirmed, but speculation centres on a number of negative factors: loss and fragmentation of habitat, including nesting and foraging opportunities; disease and competition from non-native honeybees and managed bumblebees in greenhouse and field crops; pesticides; and climate change.

The widespread loss of a formerly common species is a phenomenon echoing around the world. In Europe, approximately half of bumblebee species are in decline, and only a few are increasing. Of the 25 known bumblebee species in the United Kingdom, three are considered extinct and at least seven have undergone significant declines. In North America, there is evidence suggesting that one-quarter of the 46 native bumblebee species are at risk of extinction. For example, the abundance of the American bumblebee—a once common species—has fallen: the average population in the last decade is at 90 percent of the preceding 100-year average.

Reversing this trend will take committed action at all levels of government and by everyone. And one important place for individuals to start is by creating habitat gardens—connected landscapes full of diverse native plants known to provide nectar, pollen, and habitat for native bees, maintained using practices that support the pollinators necessary for life on earth.



Monarch butterfly
(*Danaus plexippus*) and
goldenrod (*Solidago* sp.)

Pollinators in the GTA

Bees are the main pollinators of flowering plants in this region, though wasps, flies, beetles, butterflies and moths are also pollinators. The pollination “services” these insects provide is in fact a by-product—a fortuitous accident, one could say—of an entirely different intention. These insects are visiting flowers in order to feed on or collect nectar and/or pollen and, in the process of foraging, pick up pollen, which sticks to their bodies and is transferred to the other plants they visit.

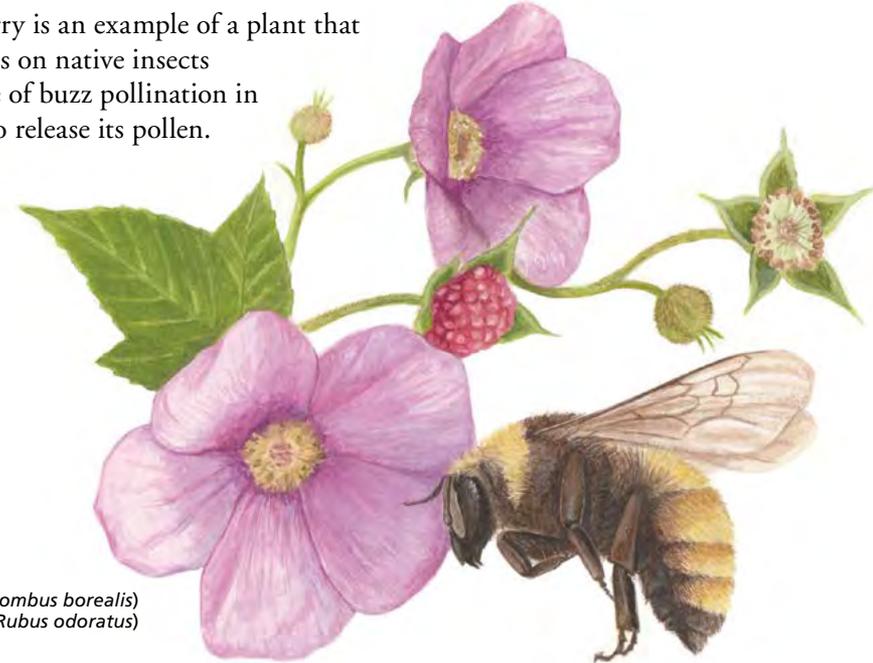


Honeybees are used in industrial agriculture to pollinate crops, but there are many foods, such as blueberries, tomatoes, melons, squashes, apples, cranberries, eggplants and peppers, that are best (and, in some cases, only) pollinated by native bumblebees and other types of bees, not honeybees.

Plants have evolved to attract pollinators in a number of different ways. Some plants have bright-coloured flowers. Some have landing platforms. Still others produce fragrance, in effect advertising their nectar rewards to insect visitors. Some plants have nectar guides—radiating lines, for example—that direct insects to the nectar source. These guides may be visible to the human eye or, in some cases, visible only to bees, flies or other insects that can see colour in the ultraviolet spectrum.

With their hairy bodies, bees are very effective pollinators. If you watch bees closely, you’ll be able to see, without need of a magnifying device, pollen grains covering their bodies, giving them a colourful glow. Many female bees also have something called a pollen basket on their hind legs, abdomens or stomachs in which they store pollen in order to transport it back to the nest.

Bumblebees, along with some mining, sweat and leafcutter bees, practise buzz pollination. Inserting its head into a flower and grasping the anthers (the part of the flower that contains pollen), or simply holding on to parts of the flower, the bee vibrates its thorax and shakes the pollen free. In this way, buzz pollination is a very efficient and effective way for bees to release large amounts of pollen from flowers. The native low-bush blueberry is an example of a plant that depends on native insects capable of buzz pollination in order to release its pollen.



Northern amber bumblebee (*Bombus borealis*) and purple flowering raspberry (*Rubus odoratus*)

Diversity, Diversity, Diversity

Different species of pollinators have differing food needs and habitat needs at various stages in their life cycles. Some native bees, such as the rusty-patched bumblebee, emerge very early in the spring looking for food and nesting sites, and continue to forage well into the fall. Other native bees, such as some of the spring Andrenids, are active for shorter periods, with a very small window of opportunity in which they need to find all their requirements to complete their life cycle. Thus, it's important to plant a diversity of native species with a continuous succession of blooming periods.

Another reason why planting a diversity of species in your garden is important, is that plants vary in the amount—and quality—of pollen and nectar they produce. By planting a diverse assortment and abundance of native plants, you'll be helping to ensure that bees have the nutritious food they need. As well, some native bees also collect leaves to build their nests, or oils, yeasts and microbes that native plants provide, so ensuring a diversity of plants serves these needs, too.

By planting a garden for pollinators, you will also be planting a garden for birds. Not only do birds eat the seeds and fruits that are the direct result of pollination, but they also consume vast quantities of insects, especially caterpillars—the same beneficial insects you are attracting to, or increasing in, your garden by creating pollinator habitat.



What Pollinators Need



Areas with diverse flowering plants, from spring to fall, with accessible pollen and nectar



Plants on which to lay their eggs or nesting areas in which to lay their eggs



Areas that are free of pesticides



Patches of bare ground in which to burrow and build their nests



A diverse array of landscape features, such as rocks, deadwood and dead stems, that support the various habitat needs of diverse pollinator species

A Primer on the Pollination of Flowering Plants

In order for flowering plants to reproduce, pollen (the plant equivalent of sperm) must move from the male part to the female part of the flower. Some plants have the male and female parts within the same flower; some have separate male flowers and female flowers on the same plant; and some have male flowers and female flowers on separate plants. Some can fertilize themselves, while others need another mate nearby.

When fertilized, the female part produces seeds, which, after dispersal, germinate to produce new plants.

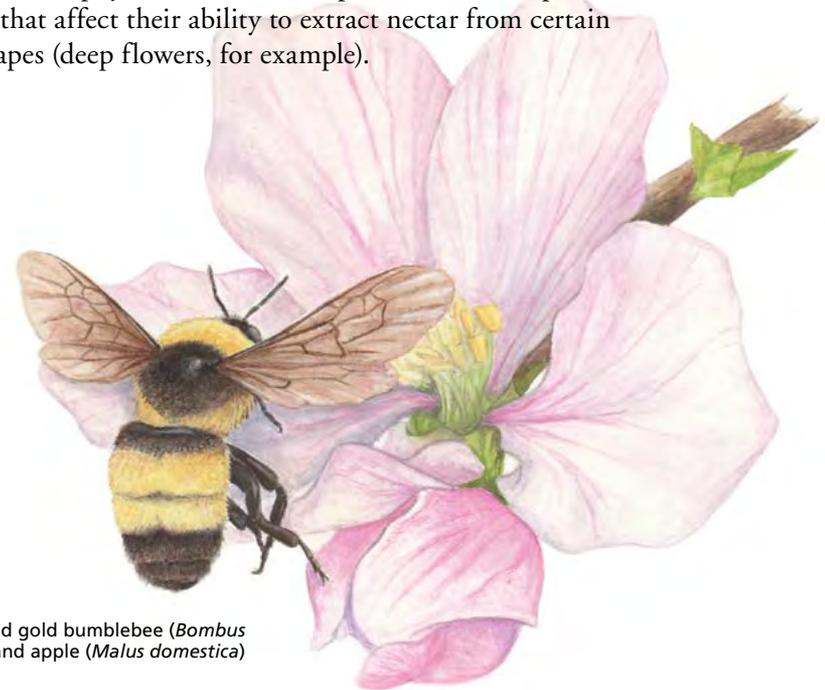
Some plants (conifers and grasses, for example) are wind-pollinated—that is, the pollen moves from the male part to the female part by wind. The pollen-like structures in moss may be transferred in water. But the majority of plants—approximately 75 percent—need animals to move the pollen.

Native bees are highly efficient and effective pollinators. Indeed, some native bee species are actually more efficient and effective pollinators, on a bee per bee basis, than non-native honeybees. Due to their hairiness, and often electrostatic charges, pollen collects on bees and is transferred to the flowers they visit while foraging. As well, bees exhibit a trait known as floral constancy, which means that they tend to repeatedly visit a particular species of plant on their individual foraging trips and, hence, efficiently cross-pollinate that species.

Although some male bees feed on pollen, it is only female bees that gather pollen in order to take it back to provision her nest, where she lays her eggs and where the developing larvae will feed. Female bees mix pollen and nectar into a loaf called “bee bread,” which the larval bees eat.

Many species of bees restrict their pollen foraging to one plant genus or family. (Such bees are called pollen specialist species, or oligoleges.) Interestingly, while a particular bee species might depend on the pollen of a particular plant genus, it doesn't necessarily mean that the plants themselves depend on that bee species for pollination. Other, generalist bee species—those that collect pollen from a broad range of species—can also pollinate the plant.

Bees utilize a wider variety of plant species for nectar than they do for pollen. There are no documented examples of bee species that depend on only one species of plant for nectar, but there are bee species with physical traits (the shape of their mouthparts, for example) that affect their ability to extract nectar from certain flower shapes (deep flowers, for example).



Black and gold bumblebee (*Bombus auricomus*) and apple (*Malus domestica*)

Native Plants Matter

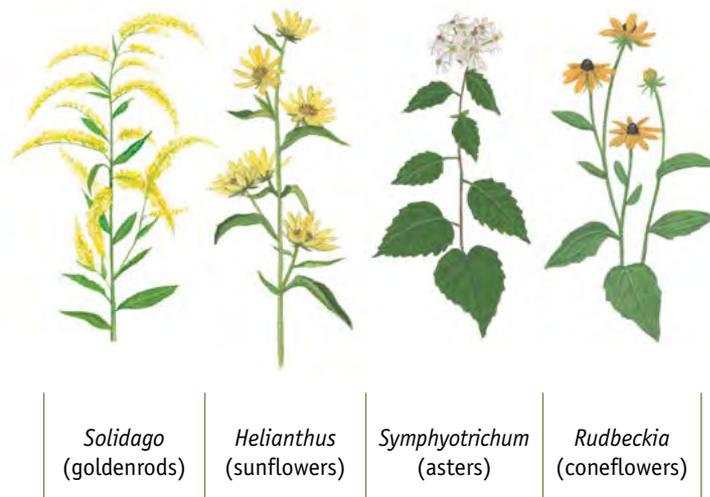
All of the plants in this publication are native to Ontario, and the majority of them are native to the GTA.

Native plants are generally defined as those plants that have evolved in an area over thousands of years with other plants, animals, climate, geological features, etc. of a region. These plants have, over this long-term, evolutionary time-scale, developed associations and interrelationships, networks and interactions with living and non-living features of the region that function together in a myriad of crucial ways.

Many plants and animals have been introduced to the region, particularly since the beginning of colonization, and many have naturalized in the wild. In general, these introduced species (also called non-native species) have not developed complex webs of interactions and functional relationships within the ecosystem. Some introduced species, such as dog-strangling vine, European buckthorn, garlic mustard and Japanese knotweed, have become invasive, outcompeting native species and dramatically altering ecosystems and habitat functions, in many cases leading to monocultural stands of these introduced plants. At the same time, habitat loss and fragmentation have increased exponentially, contributing to many native plants and animals in the region becoming endangered. Some introduced species, such as dandelions and mullein, though not as invasive in natural areas, are considered “weeds” in gardens.

There is much about the natural world that science has yet to discover and understand, but one thing we *do* know is that native plants and native pollinators form systems of association that are vital to supporting all life on earth. When we plant native plants, we are supporting and strengthening this web of connections—supporting and strengthening ecological relationships that have functioned for millennia.

According to Jarrod Fowler and Sam Droege, the following are among the top herbaceous plant genera to support pollen specialist bees:



Starting Your Flower Patch for the Rusty-Patched Bumblebee and Other Native Pollinators

Your planting will provide a home and food for many different species of pollinators and other insects including native bees, beetles, native wasps, flies, butterflies and moths.

Site Preparation

- **Your flower patch can be anywhere in the yard**—a sunny spot, a shady spot, a dry spot, a wet spot, or anywhere in between.
- **Plan on an area** of at least one metre by one metre for your flower patch, though if you have the space, consider creating a larger patch. Bigger is, indeed, better!
- **Prepare the planting bed** by removing any unwanted existing vegetation. An easy way to get rid of grass is to cover it with uncoated cardboard (or layers of black and white newspaper pages) and mulch, such as wood chips, for at least one growing season, which will smother the grass and contribute decomposed organic material to the soil. Another way of doing this is to cover existing vegetation with leaf bags/paper, pile soil on top and then plant into the new soil. You can also “solarize” the bed by covering the area with black plastic for at least two summer months, which will heat up the soil and kill plants and weed seeds. (This process will also affect the microorganisms in the soil, but it’s temporary, as they will be replenished by the surrounding soil.) Another method, which takes a bit more work, is to dig up all the vegetation, whether it’s grass or other plants, ensuring that you remove all roots.
- **Remove any rocks** from the soil, and try not to compact the soil by stepping on it too much. The goal is to have loose, crumbly soil in which to plant. (Rocks can be useful as pollinator sunning spots, and some bees nest under them, so consider setting rocks aside and redistributing them in the garden.)

- **If your area is shady**, add compost or well-rotted manure to the soil and mix it in, because most native woodland plants need rich, humusy soil full of organic matter.
- **If your area is sunny**, you probably don’t need to add any amendments to the soil, because native meadow and prairie plants do well in nutrient-poor soil.
- **If you have clay soil**, or very sandy soil, in sun or shade, add compost to improve the soil’s texture.
- **Once the bed is prepared**—all unwanted existing vegetation gone and the soil amended, if necessary—**you’re ready to plant.**

If you live in an apartment building or condominium and have a balcony, you can still create habitat for pollinators by planting native species in containers. See the plant list for containers on page 52.

If you don’t have access to a yard, consider starting a pollinator patch at a local school, library, faith centre, community centre, park, apartment or condominium grounds, or other public, private or corporate spaces where the owners, administrators or land managers might be willing (or can be encouraged) to consider a habitat-creation project.



Designing Your Patch

- **Choose native plants** according to your conditions: sun, partial sun/shade, or shade; moist, regular or dry soil. The illustrations of garden designs in this book include plant suggestions and combinations for particular conditions.
- **Plan to have a diversity** of continuous and overlapping blooming periods, from early spring to late fall, with three species in bloom at any one period. The illustrations of garden designs in this book provide suggestions for continuous bloom.
- **Include a variety** of flower colours and flower shapes—for example, tubular blooms, cup-shaped blooms, etc.
- **Consider the eventual height, spread, and flower colour** of each plant, and decide on a design that appeals to you. There are suggestions of attractive plant combinations in the illustrated garden designs and in the extended plant descriptions for those designs.
- **Design in groups** with three to five plants of each species, in clusters, to produce abundant foraging opportunities.
- **Space the plants** roughly 1 to 2 feet apart, depending on the mature size of the species, because many native plants will greatly expand in size over their first few years of growth and will crowd each other if planted too closely together. Note that this spacing is greater than the spacing generally recommended for traditional ornamental, non-native annuals, in particular.

Planting Your Patch

- **Dig holes for each plant**, matching the size of the hole with the size of the pot the plant is in.
- **Gently tease the plant** out of the pot and place the plant in the hole. Spread the roots out if they are tightly root-bound.
- **Use the excavated soil** to fill around the sides of the hole.
- **Press the soil gently** to ensure that the plant is securely in place, then water the plant slowly around the base. Give the new planting a good soak with water, and keep it well watered for the first growing season.



Starting a garden from seed is also an option—and is cheaper than buying plants—but requires more maintenance, ground preparation and weeding. When seeds have newly germinated, weeding is especially important but it is often difficult to distinguish between desired plants and weeds at this stage. Some species are very difficult to grow from seeds. As well, seeds can be eaten by animals before the seeds have the chance to germinate. Buying plants can be more reliable. As well, patience is required because many species grown from seed do not germinate immediately or produce more than small leaves in the first year of growth. It is important not to weed out your baby native plants!

Maintaining Your Patch

- **Keep your newly planted patch well-watered** for the first growing season—especially during periods of drought. In the following years, you will only need to water during extended periods of drought when the plants are showing signs of water-deficiency, such as wilting. Keep in mind, though, that some wilting during hot summer days is to be expected, and plants will bounce back.
- **Remove any unwanted plants** (for example, aggressively spreading non-native plants) as soon as they appear, and be careful not to pull out young volunteer seedlings of native plants.
- **Mulch your plants** to help control weeds and retain soil moisture, but ensure that your patch includes some areas of bare soil for ground-nesting bees.
- **Consider deadheading** spent blooms to encourage more flowering—and thus more nectar and pollen for pollinators.



Many native meadow and prairie plants grow quite tall. Cup plant, for example, can reach up to eight feet or more. If you prefer shorter plants, one technique that is useful for late-summer blooming plants, such as goldenrods and asters, is to cut them back to about half their height in early to mid-summer. They'll still flower in late summer, but on a bushier, shorter plant.

RELAX THE TIDY!

Traditional garden practices can be tweaked in small, simple ways to enhance the pollinator value of your planting. For example, instead of cutting down dead stalks in the autumn, leave them standing to provide excellent habitat for overwintering bees and other beneficial insects. Instead of raking up all dead leaves, use them as mulch, which will decompose and improve the soil's nutrient content, texture, and moisture-holding capacity. Include small logs and decorative pieces of wood in your yard as nesting sites for pollinators—these can be wonderful ornamental additions to the garden and provide important habitat for beneficial insects. As well, large rocks, tiles, and stones, either piled in decorative arrangements or placed on the soil surface, provide excellent habitat for bees in sunny, open gardens.



- **Don't use pesticides** (they are toxic to bees and other creatures). In Ontario, the cosmetic use of pesticides (which includes herbicides and fungicides) is banned.
- **In the fall and winter, leave stems and dead stalks on plants rather than removing them**, as they provide habitat for overwintering bees. In the spring, it is best to wait until there have been two or three weeks of warm daytime temperatures (above 10 C) before cutting back stalks, to give bees time to emerge. But if you decide to cut the stalks before then, cut them only to about 30 cm (12 in) to 40 cm (15 in) tall.
- **If you do remove stems and stalks in the fall, bundle them up** and keep them in an out-of-the-way place as overwintering habitat. Do the same with stems and stalks you remove in the spring, as bees might not yet have emerged following winter.

Native Bees and Nesting Habitat

	UNDERGROUND: bumblebees (in pre-excavated holes), sweat bees, digger bees, squash bees, leaf-cutter bees, plasterer (aka cellophane) bees, mining bees
	TREE CAVITIES: bumblebees
	DENSE THATCH OR LEAF LITTER: bumblebees, mining bees
	DEAD WOOD OR BRANCHES: leaf-cutter bees, mason bees, large carpenter bees, sweat bees
	HOLLOW STEMS: mason bees, yellow-faced bees, leaf-cutter bees
	PITHY STEMS: small carpenter bees
	UNDER ROCKS: leaf-cutter bees, bumblebees
	IN SNAIL SHELLS: one species of mason bee

What to Expect

- **Your flower patch will need at least one growing season** to become established, but will fill in well over time, rewarding you—and native bees—with beautifully blooming habitat.
- **Native woodland plants in shady gardens** tend to take longer to spread and fill in than do sun-loving native meadow and prairie plants.
- **Spend some time observing the pollinators that visit your patch!** Note the plants that seem to attract the greatest numbers and varieties of insect visitors. Send information about your sightings to citizen science projects such as e-butterfly.org, bumblebeewatch.org, and inaturalist.org.



Fernald's cuckoo bumblebee (*Bombus flavidus*) and aster (*Symphyotrichum* sp.)

Pollinator Garden Designs

The plants in these sample pollinator garden designs are profiled in detail on pages 23 to 51. Additional plant suggestions are included in the lists on pages 51 to 53.

Balcony Garden

This sample design, for a sunny to part-sunny balcony, is based on native plants that do well in containers and that will, when combined, provide continuous bloom for pollinators throughout the growing season.



SPRING BLOOMING:

Prairie smoke
Wild geranium
Wild columbine
Wild strawberry

SUMMER BLOOMING:

Nodding wild onion
Pearly everlasting
Lance-leaved coreopsis
Black-eyed Susan
Hoary vervain
False sunflower

FALL BLOOMING:

Heath aster
New England aster

Community Garden

Adding native plants to community food-growing plots encourages bees and other pollinators to visit the garden, which will enhance fruit and vegetable production. The following sample design is for a sunny area.



SPRING BLOOMING:

Wild strawberry
Prairie smoke
Hoary puccoon
Downy yellow violet
Golden alexanders

SUMMER BLOOMING:

Giant blue hyssop
Pearly everlasting
Swamp milkweed
White turtlehead
Sweet Joe-pye weed
Bee balm
Cup plant
Early goldenrod

FALL BLOOMING:

Fireweed
Cardinal flower
Great blue lobelia
Rough-stemmed goldenrod
New York aster

Public Patch

An important consideration for public pollinator patches—at community centres, libraries, parks, or semi-public gathering places such as faith centres, for example—is that the plants need to be tough and able to withstand periods of drought, people traffic and, possibly, irregular maintenance. In these types of public projects, it's a good idea to have a committed group of volunteers to spearhead the effort. The following design, for a sunny spot, features the hardiest of the hardy.



SPRING BLOOMING:

Prairie smoke
Sweet cicely
Ohio spiderwort
Kinnikinnik

SUMMER BLOOMING:

Butterfly milkweed
Pale purple coneflower
False sunflower

SUMMER BLOOMING

CONTINUED:

Spotted Joe-pye weed
Culver's root
Shrubby St. Johns-wort
Blue vervain
Evening primrose
Wild bergamot
Black-eyed Susan

FALL BLOOMING:

Maximilian's sunflower
Tall goldenrod
Rigid goldenrod
Calico aster
New England aster
Large-leaved aster
Woodland sunflower

High Density Residential

Along with balconies, there are many opportunities on the grounds of apartment complexes, condos and co-op buildings to plant a pollinator garden. With a group of residents close by to do regular maintenance, there is a wide palette of plants that will thrive. The following design is for a sunny to part-sunny area.



SPRING BLOOMING:

Kinnikinnik
Hairy beardtongue
Downy phlox

SUMMER BLOOMING:

Canada anemone
Nodding wild onion
Swamp milkweed
Boneset
Black-eyed Susan
False sunflower
Dense blazing-star
Wild bergamot
Hoary vervain

FALL BLOOMING:

Grass-leaved goldenrod
Maximilian's sunflower
Heath aster
Large-leaved aster
Woodland sunflower

Residential Garden

Whether your yard is in sun or shade, there are many plants to choose from, and the design can be formal or informal—whatever style appeals to you. The following two sample designs are for common conditions found in urban yards: one design is for a sunny garden and one is for a shady garden.



SPRING BLOOMING:

Blue-eyed grass
Wild columbine
Golden alexanders
Smooth beardtongue

SUMMER BLOOMING:

Yellow wild indigo
Canada milk vetch
Purple prairie clover
Virginia mountain mint
Showy tick trefoil
Cylindrical blazing-star
Wild blue lupine
Blue vervain

FALL BLOOMING:

Bottle gentian
Silverrod
Rigid goldenrod
Heath aster
Calico aster
Sky blue aster
Woodland sunflower



SPRING BLOOMING:

Bloodroot
Cut-leaved toothwort
Dutchman's breeches
Virginia bluebells
Virginia waterleaf
Sharp-lobed hepatica
Blue cohosh
Red baneberry
Large-flowered bellwort
Serviceberry (tree)
Alternate-leaved dogwood (tree)

SUMMER BLOOMING:

New Jersey tea (shrub)
Virgin's bower (vine)
Fly honeysuckle (shrub)
Purple flowering
raspberry (shrub)
False Solomon's seal
Wild sarsaparilla
Tall white lettuce
Tall meadowrue

FALL BLOOMING:

Large-leaved aster
Zig zag goldenrod

Adding Natives to an Existing Garden Bed

If you already have an established garden with non-native plants, consider adding some native plants to supplement existing plantings. Focus on native species that flower when there is a lull in the blooming period of the existing bed. For example, many woodland plants bloom in early spring, making them a good addition when not much else is flowering other than non-native bulbs. Likewise, native goldenrods and asters will extend a non-native garden's blooming period well into the autumn.



Most bees nest in the ground, but in an effort to provide nesting structures for aboveground-nesting bees, some people either make or buy “bee hotels,” constructed of bundled tubes or holes drilled in wood. These structures vary in their usefulness. Some have tubes that are too short. Some have tubes that are too wide or too narrow. Even when the tubes are the correct size and shape for a particular species of bee, the hotel can harbour diseases and pathogens harmful to bees if not cleaned or replaced every year. Consider whether or not you can make the commitment to properly care for a bee hotel before making or buying one, and research size and maintenance requirements to ensure effectiveness.

It is worth noting that in a survey, by bee researchers Scott MacIvor and Laurence Packer, of approximately 600 bee hotels studied over a period of three years in Toronto, wasps (both native and non-native) were more abundant than bees in close to three-quarters of all bee hotels studied each year. The study authors concluded that more research is needed to evaluate the potential harm and benefits of using bee hotels for wild native bees.

Contrary to popular belief, goldenrod does not cause or aggravate hayfever. Ragweed is the hayfever culprit. As well, although some species of goldenrod, such as Canada goldenrod and tall goldenrod, are aggressive spreaders in the garden, there are many other goldenrod species, such as grey goldenrod, stiff goldenrod and blue-stemmed goldenrod, that do not spread aggressively and are wonderful additions to the garden.



Native plants are important because they...

- **provide habitat for native pollinators** and other creatures that have evolved over thousands of years in association with each other, creating functioning ecosystems;
- **provide food**—nectar, which contains carbohydrates and minerals, and pollen, which contains protein, fatty acids, minerals, and vitamins—in the amounts and quality to which native pollinators are adapted;
- **contribute** to biodiversity;
- **create habitat connections and pathways** for insects and other animals;
- **are adapted to local conditions** and tend to require less supplemental watering and/or amendments when the native plant species is matched with the conditions it requires;
- **are wonderful additions** to gardens!

Beyond the Patch

There is lots you can do to support pollinators, beyond planting a flower patch for native bees and other insects.



Support informal seed exchange networks by sharing your native seeds with other gardeners. Examples of these exchanges include Seedy Saturday events, held in various locations throughout the GTA, and the North American Native Plant Society's Seed Exchange (see nanps.org/nanps-seed-exchange).



Purchase plants and seeds produced without the use of neonicotinoid pesticides. When you buy plants at a nursery, ask if their plants are grown organically, or, at the very least, without neonicotinoids, which are linked to the widespread decline of pollinators. (See Friends of the Earth's market action campaign to remove neonics, at foecanada.org/the-bee-cause/market-action.)



Support farmers who grow food organically by purchasing organic food whenever possible. The industrial agricultural system, based on high inputs of synthetic chemicals known to kill beneficial insects along with pests, is implicated not only in the decline of pollinators but in numerous other ecologically destructive practices. Support farmers whose land management practices include the creation of wildlife habitat along with the production of food.



Advocate for the reduction of pesticide use in agriculture, golf courses and the horticultural industry.



Advocate for the protection of habitat, urban forests, greenspaces and parks whenever and wherever these are under threat, and advocate for the inclusion of habitat, urban forests, greenspaces and parks in any new development.

The Scoop on Honeybees

There's lots in the news about the loss of honeybees, Colony Collapse Disorder, and the dire consequences for the food we eat. Industrial agriculture—the system of large, mechanized, monoculture farms—depends on the pollination services of non-native honeybees, trucked long distances across the continent, to pollinate crops.

When we hear about the mysterious deaths of honeybee colonies from unknown causes, a trend that shows no signs of abating, it's easy to feel that we are in the midst of a crisis. And we are.

We need to find out why honeybees are dying—we need to continue to investigate what is wrong with our industrial agriculture system and any other factors that are causing honeybee colonies to die in massive numbers—but it's important to note that honeybees are not an endangered species at risk of extinction. When a honeybee colony dies, a new colony can be started with a new queen, readily available for purchase. This does not diminish the seriousness of honeybee deaths nor the terrible consequences of honeybee deaths for the industrial agriculture system, the beekeeper, and for the bees themselves and their genetic diversity and conservation where they are native.



Half-black bumblebee (*Bombus vagans*)
and Virginia bluebells (*Mertensia virginica*)

However, the focus on honeybee deaths has eclipsed the fact that many of our native bees, such as the rusty-patched bumblebee, are in serious trouble. And when our native bees disappear, they disappear forever.

There has been a lot of interest lately in honeybee-keeping as a way to help pollinators. However, starting a honeybee hive does not help save wild bees, any more than keeping backyard hens helps save wild birds. There is a growing body of scientific studies documenting that non-native honeybees are negatively affecting native bees. Current research is finding that increases in honeybee foraging adversely impacts native bumblebee foraging, and that native bumblebees are not as likely to return to a foraging site for

a second time if honeybees are competing for floral resources at the site. There's even some research suggesting that the presence of honeybees negatively affects the reproductive and developmental success of native bees. As well, there is concern that diseases and pests of managed honeybees are spreading to native wild bees. A recent study, published in 2019, found that two viruses infecting honeybees are spilling over into wild bumblebees, particularly those bumblebees foraging near apiaries. The research suggests that honeybees shed the viruses on flowers while foraging, and that the pathogens are then picked up by wild bees. Ironically, the flowers become "hotspots for disease transmission," as the study puts it. As well, honeybees can "taxi" diseases that infect wild bees only.

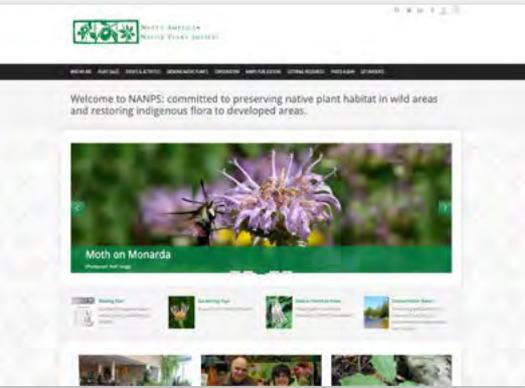
The focus on honeybee deaths has eclipsed the fact that many of our native bees, such as the rusty-patched bumblebee, are in serious trouble. And when our native bees disappear, they disappear forever.

Although the peer-reviewed literature is clear, it is poorly studied *in situ* and, hence, there are lots of knowledge gaps in this growing field of study. But following the precautionary principle, we recommend that if you want to help native bees and protect endangered pollinators, instead of starting an urban honeybee hive, plant native plants and create habitat.

Where to Find Native Plants

The number one rule for acquiring native plants for your garden is to not dig them from the wild. The goal is to increase habitat, not deplete wild populations.

There are a growing number of native plant nurseries in Ontario, and they are excellent sources of native plants. By supporting these businesses, you'll be helping to ensure that specialist native plant



nurseries continue to thrive. You can find a list of Ontario's native plant nurseries on the website of the North American Native Plant Society (nanps.org).

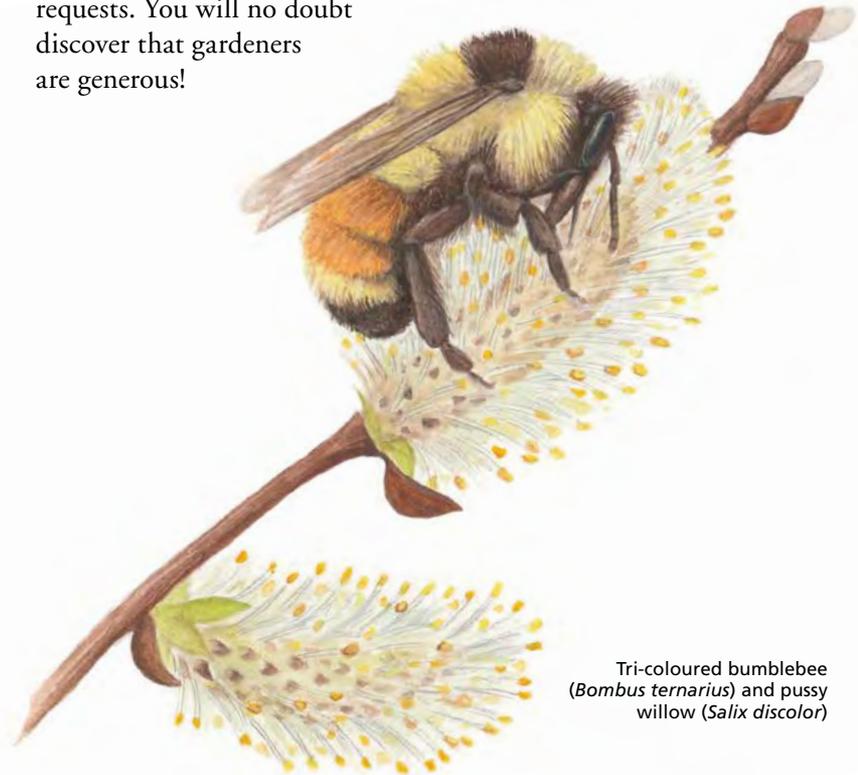
If you go to a regular nursery rather than a nursery that specializes in native plants, it is a good idea to ask about the source of the plants.

A native plant sourced in Texas, for example, might not be as hardy or adapted to conditions here as a plant that is sourced from local stock. (More research is needed on this issue, but in the meantime, it is prudent to source locally adapted plants.) As well, check the plant label to ensure that you are buying the unmodified species rather than a named cultivar or hybrid of the species.

A number of local groups and organizations also hold annual plant sales where you can buy native plants. These include the North American Native Plant Society, Toronto Botanical Garden, High Park Nature Centre, the Horticultural Societies of Parkdale and

Toronto as well as other garden clubs, Pollination Guelph and Nature Guelph. Botanical gardens such as the Royal Botanical Gardens (in Hamilton) and the University of Guelph Arboretum also hold plant sales. A bonus of these sales is that you can often find native plants that are hard to source elsewhere. Your purchase also supports the important conservation work being done by these organizations.

Finally, consider trading plants with other native plant gardeners. Local Facebook groups are good places to post specific requests. You will no doubt discover that gardeners are generous!



Tri-coloured bumblebee (*Bombus ternarius*) and pussy willow (*Salix discolor*)

A Note on Non-Native Plants and Cultivars

This book focuses on the evolved and functional relationships between native plants and native pollinators. But, of course, you will often see bees and butterflies at non-native plants, searching for and feeding on nectar and pollen. Are these non-native plants providing pollinators with all the food and habitat they need? The answer is: it depends.

Most of the non-native plants for sale at nurseries are hybrids or cultivars. They have been selected or altered through breeding (or cloned, in the case of cultivars) and/or hybridization to have certain features that humans desire—bigger blooms, brighter colours, disease resistance, etc. Some hybrids are sterile and, thus, don't produce pollen. Some hybrids and cultivars have lower-quality, less nutritious, or reduced amounts of pollen and nectar. In some, the pollen and/or nectar is inaccessible due to the altered flower shape. In other words, the traits on which pollinators depend might have been changed through plant breeding.

When pollinators visit these plants, they expend precious energy yet may get reduced reward in terms of nutrition. This can weaken bees and affect their overall health. For bumblebees, this can affect not only individual bees but also the health of the whole colony. Think of it as the difference between living on a diet of fast food versus eating a healthy, diverse range of whole foods that provide all the nutrients you need to thrive.

Another important consideration is that cultivars are generally produced through cloning, with each individual plant genetically identical to every other cultivar of the same name. Such plants add little to the biodiversity upon which all ecosystems depend.

With relatively few exceptions, we don't know the quantities and qualities of pollen and nectar in plants altered through selective

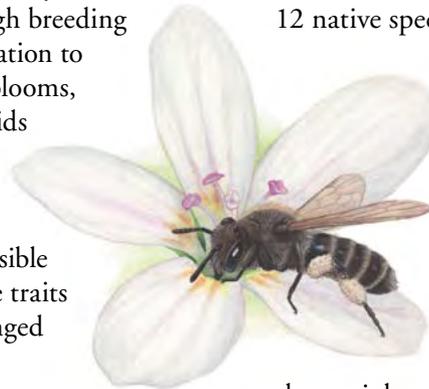
breeding and hybridization, or how the genetic and chemical changes might affect native pollinators. Interestingly, this point applies not only to non-native plants, but also to cultivars of native plants (sometimes referred to as “nativars”).

A pioneering study (scholarworks.uvm.edu/graddis/626) by Dr. Annie White, done as her graduate thesis project, evaluated 12 native species and 14 native cultivars of the same species at two sites over two years, and found that seven of the straight native species were visited more frequently by pollinators than their nativar counterparts, four were visited equally, and one nativar was visited more frequently than the straight native species. Dr. White also investigated the nectar produced by the native species *Lobelia cardinalis* and compared it to the nectar produced by a hybrid variety of this plant. She found that the hybrid nativar provided only 20 percent of the nectar that the straight species provided. Very few other studies have compared the pollinator value of nativars to the straight species, and the few studies that have been done have results that vary.

Quite simply, we don't know what has been lost or gained, in terms of a plant's usefulness to pollinators, by tinkering. But what science has revealed is that some of the relationships between bees and flowers are highly specific. The native sweat bee *Lasioglossum oenotherae*, for example, is a diet specialist on the native evening primrose. Another example is the tiny native sweat bee *Dufourea monardae*, which has a narrow, specialized preference for pollen of the plant *Monarda*.

Native plants and native pollinators function together as part of a huge network of interactions, the “architecture” of biodiversity.

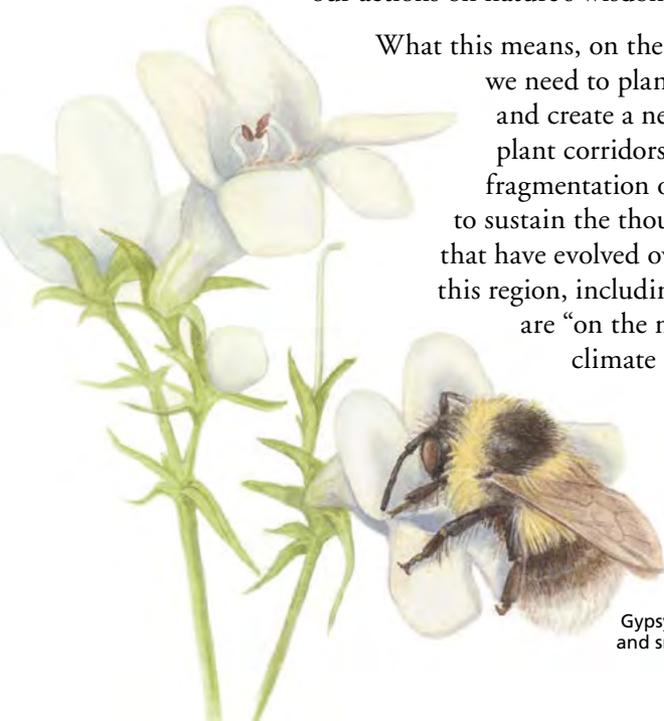
Spring beauty mining bee (*Andrena erigeniae*) and spring beauty (*Claytonia virginica*)



The Climate Change Connection

As the climate changes and some species of native plants and animals migrate to new areas in response to changing conditions, some ecologists and others advocate for rethinking categories such as native and non-native. They argue that such distinctions don't make sense due to accelerated species movements and changes across the landscape. Some people also advocate for deliberate, human-assisted migration of plants. There is much lively debate around these issues. Given that there are so many unknowns—and that our track record on “managing” natural systems to date has resulted in decreased biodiversity and accelerated species loss across the globe—there may be no simple answers. But it is crucial, now more than ever, to act in partnership with nature and to model our actions on nature's wisdom.

What this means, on the ground, is that we need to plant native plants and create a network of native plant corridors that reduce fragmentation of habitat, and help to sustain the thousands of species that have evolved over millennia in this region, including species that are “on the move” due to climate change.

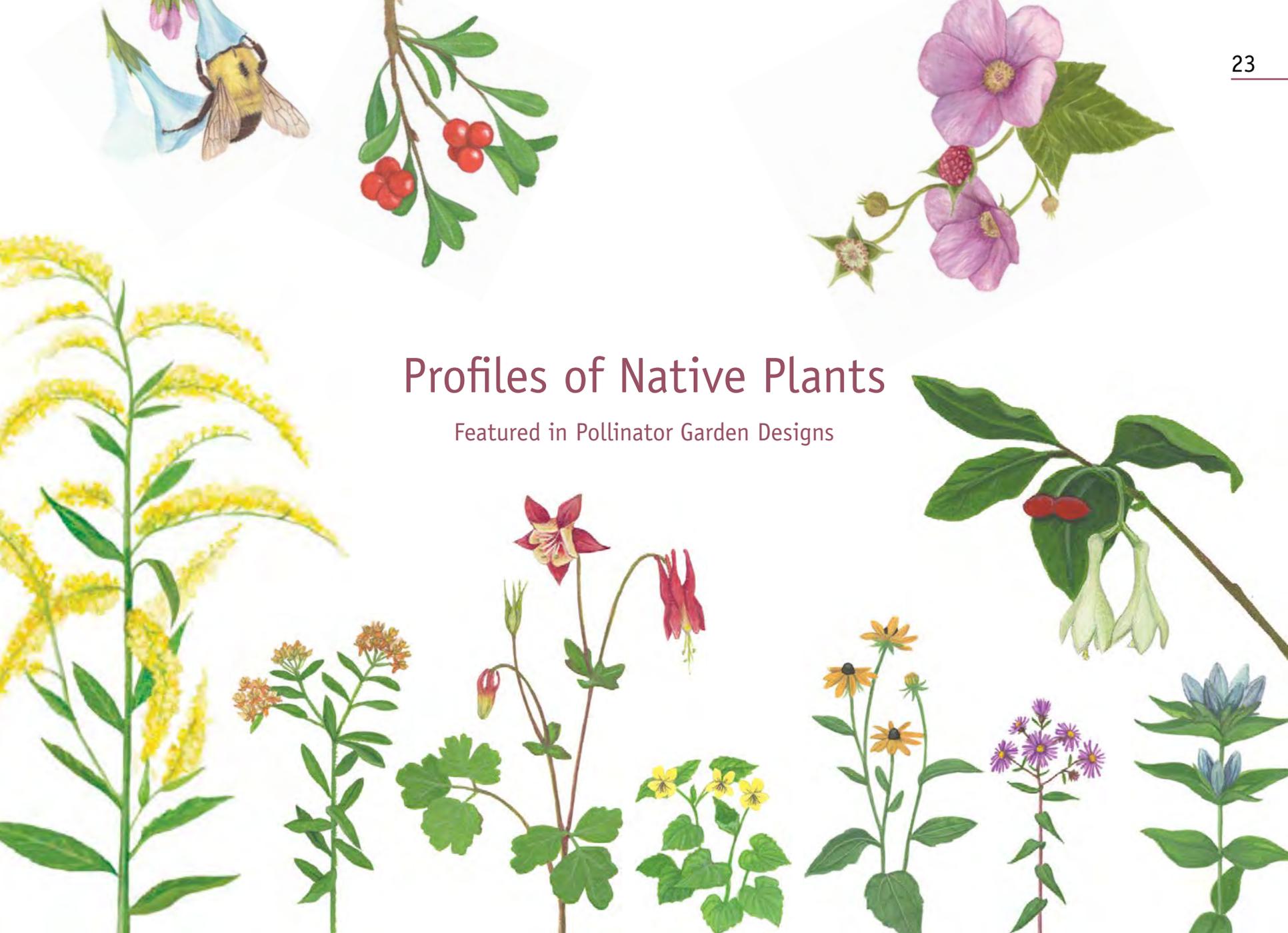


Gypsy cuckoo bumblebee (*Bombus bohemicus*) and smooth beardtongue (*Penstemon digitalis*)

To help insects such as moths and fireflies, use outdoor light sparingly and only when necessary, and be sure to turn outdoor lights off overnight. If you need lights for safety or security reasons, use motion-sensor lights, which will be triggered by humans and larger wildlife such as raccoons but won't bother, confuse or attract insects.



Native plant gardening can be a line of defence against climate change in a few ways. Perennial plants, trees and shrubs that are adapted to local climate conditions may tolerate stressful weather conditions—for example, increases in extreme storms predicted by climate change models for this region—better than exotics and annuals. Many plants also capture carbon through extensive root systems that grow year after year. Planting a diversity of native plants with different bloom times supports insects and other animals, and this biodiversity can increase resilience under global change. Having more native species in an ecosystem means there's a better chance natural processes such as pollination and seed dispersal will continue. If we have fewer species, then a drastic weather event, or climate-related disease outbreak, could cause a lot more harm. Lastly, cities can act as a refuge for native plants under climate change because of the hands-on care gardeners provide for native plants and their associated wildlife. For example, during a drought, gardeners can water their native plantings, whereas wild plants don't receive this extra care.



Profiles of Native Plants

Featured in Pollinator Garden Designs

Profiles of Native Plants* (featured in Pollinator Garden Designs)

Plants marked with a plus sign, +, are not historically known to have occurred specifically in Toronto (according to the Toronto and Region Conservation Authority), but are native to the region more broadly.

Alternate-leaved dogwood (*Cornus alternifolia*)



Height: to 6 m (20 ft)
Flowers: white
Blooming period: late spring to early summer
Exposure: sun to shade
Soil: regular to moist

Specialist pollinator interactions: specialist bee: *Andrena fragilis*; larval host for spring/summer azure, dogwood leafroller, white-lined bomolocha, dimorphic bomolocha, northern eudeileina, dogwood thyatirid, cecropia moth, fragile white carpet, white spot of wood, tortricid moth, dogwood probole, friendly probole, unicorn caterpillar, dogwood borer moth, crocus geometer

A small, deciduous tree or large shrub, often multi-stemmed, alternate-leaved dogwood is incredibly versatile, suitable for a wide range of conditions, from sun to shade, and moist to drier soil. One of its common names, pagoda dogwood, provides a clue to its beautiful form: the branches grow in horizontal tiers, making it highly decorative. The flowers are likewise fantastic: flat-topped clusters of airy, creamy-white blooms that cover the plant in late spring or early summer and last for weeks, the nectar and pollen attracting bees, wasps, flies and butterflies. The flowers are followed by blue-black berry-like fruits in mid-summer. Along with its pollinator value, alternate-leaved dogwood is also a bird favourite.

Kinnikinnik, aka bearberry (*Arctostaphylos uva-ursi*)



Height: 5 cm (2 in) to 20 cm (8 in)
Flowers: white to pink
Blooming period: mid-spring to early summer
Exposure: sun to partial shade
Soil: regular to dry; drought tolerant

Specialist pollinator interactions: larval host for brown elfin butterfly, hoary elfin butterfly, pyralid moth

Good combinations: wild columbine

This low-growing, creeping groundcover, with shiny, evergreen, leathery leaves, is very low maintenance and also useful on slopes, where it stabilizes the soil and prevents erosion. It produces small clusters of drooping, pink to white flowers in late spring through the early summer, lasting for weeks, and the flowers are visited by bees for both nectar and pollen. Bright red, berry-like fruits develop in summer and are eaten by birds. Winter interest is provided by the leaves, which turn bronzey red. It spreads well on sandy sites. Categorized as extirpated from the wild in Toronto by the Toronto and Region Conservation Authority, it is a very useful ornamental plant in gardens.

Bee balm (*Monarda didyma*)



Height: .6 m (2 ft) to 1 m (3 ft)
Flowers: red
Blooming period: mid-summer
Exposure: sun to partial sun
Soil: regular to moist
Specialist pollinator interactions: specialist bee: *Dufourea monardae*; larval host for gray marvel moth, hermit sphinx moth, pyralid moth
Good combinations: flowering spurge, swamp milkweed, Canada anemone

Readily available at nurseries, try to acquire the straight species rather than the named cultivars in order to ensure maximum pollinator value and enhance biodiversity. The bright red flowers are a lovely jester's hat shape and the seedheads are also attractive. The foliage is highly aromatic and smells like Earl Grey tea. Suitable for a rain garden, bee balm will also do well in regular moisture conditions, though it prefers rich soil. To minimize the chances of downy mildew on the leaves, encourage good air circulation around the plant, avoid overcrowding and ensure that the soil does not dry out. Bees and butterflies flock to the flowers. Hummingbirds also visit for nectar. Deadhead to extend blooming.

*Information about the following plants' pollinator interactions is from a variety of sources, including Heather Holm's excellent book *Pollinators of Native Plants*; the Xerces Society Guide *Attracting Native Pollinators*; the Great Lakes Forestry Centre report *Insects and Mites Associated with Ontario's Forests: Classification, Common Names, Main Hosts and Importance*, by P.D. Syme and K.L. Nystrom; Dr. John Hilty's excellent website illinoiswildflowers.info; "Pollen specialist bees of the Eastern United States," by Jarrod Fowler and Sam Droege; the Great Pollinator Project (Center for Biodiversity and Conservation at the American Museum of Natural History and the Greenbelt Native Plant Center); Lady Bird Johnson Wildflower Center (wildflower.org); U.S. Forest Service (fs.fed.us); Credit Valley Conservation's booklet "Native Plants for Pollinators"; HOSTS—a Database of the World's Lepidopteran Hostplants; and the Butterfly and Moth Information Network (butterfliesandmoths.org). Much of the information available regarding plant-pollinator interactions is to the plant genus level, but has been included here for species in the genus. (Not all of the insects noted are found in the GTA, but are included to provide information about the plant's importance to pollinators.)

Black-eyed Susan (*Rudbeckia hirta*)



Height: .3 m (1 ft) to 1 m (3 ft)

Flowers: yellow

Blooming period: early to late summer

Exposure: sun to partial sun

Soil: regular to dry; drought tolerant

Specialist pollinator interactions: specialist bee: *Andrena rudbeckiae*; larval host for wavy-lined emerald moth, common eupithecia, camouflaged looper moth, silvery checkerspot butterfly

Good combinations: butterfly milkweed, vervain, coreopsis, flowering spurge

One of the most familiar native meadow plants, black-eyed Susan earns its popularity with prolific, long-lasting blooms. It is very easy to grow and spreads well but not aggressively in a wide variety of conditions, including moist to dry soil and sun to partial sun. The flower colour looks different to bees than it does to humans, and the flowers are a great source of pollen and nectar for bees. Beetles, flies and butterflies are also frequent visitors. Depending on conditions, it behaves as an annual, biennial or perennial. Leaves are often furry.

Bloodroot (*Sanguinaria canadensis*)



Height: 15 cm (6 in) to 30 cm (12 in)

Flowers: white

Blooming period: early spring

Exposure: partial shade to shade

Soil: regular to moist

Specialist pollinator interactions: larval host for tufted apple bud moth

Good combinations: hepatica, trillium, wild blue phlox, spring beauty, wild ginger

One of the earliest spring flowers to appear, bloodroot's charming white flowers don't last for long (just a day or two), but they are a welcome harbinger of spring. The foliage of this groundcover is also attractive, curled around the stem at first, then unfurling into large, saucer-shaped, scalloped leaves. During the typically dry days of late summer (and sometimes earlier), the plant will go dormant if not watered. Although the flowers are nectarless, bees, flies and beetles visit for pollen, and ants disperse the seeds (and eat the elaiosome). It requires humus-rich soil.

Blue cohosh (*Caulophyllum thalictroides*)



Height: .3 m (1 ft) to 1 m (3 ft)

Flowers: greenish yellow

Blooming period: early spring

Exposure: shade to partial shade

Soil: regular to moist

Good combinations: early meadowrue, white baneberry, red baneberry

The flowers of blue cohosh won't win any beauty contests—they're greenish yellow and easy to miss—but the beautiful foliage makes up for that. The leaves emerge a dark purple colour, then unfurl a glowing green. The flowers are followed by fleshy berries, which start off green and then mature to a dark blue-black. The plant becomes quite bushy, almost resembling a shrub, and it requires humus-rich soil. Flies, wasps, and bees visit the plant, which provides nectar and pollen.

Blue vervain (*Verbena hastata*)



Height: .3 m (1 ft) to 1.2 m (4 ft)

Flowers: purple

Blooming period: mid- to late summer

Exposure: sun to partial sun

Soil: moist to dry; drought tolerant

Specialist pollinator interactions: specialist bee: verbena bee; larval host for common buckeye butterfly, verbena moth, verbena bud moth

Good combinations: ironweed, monarda, Virginia mountain mint

If you love blue flowers and have sunny conditions, be sure to include this meadow species in your garden. Each individual flower is small, but there are many flowering spikes on this perennial. The flowers open from the bottom of the spike up, forming a band, and the flowers are long-lasting, so the overall effect is awash in colour. Tall-growing, but somewhat weak-stemmed, surround it with other plants that will support it. Bees visit for nectar and pollen, and flies, wasps, moths and butterflies also feed at this plant. Easy to grow and requiring little in the way of maintenance, vervain is drought tolerant but also does fine with occasional flooding, making it suitable for rain gardens. It grows easily from seed, and spreads very well, sending up volunteer plants everywhere.

Blue-eyed grass (*Sisyrinchium angustifolium*)



Height: 10 cm (4 in) to 30 cm (12 in)

Flowers: blue-violet

Blooming period: late spring to early summer

Exposure: sun to partial sun

Soil: dry to regular; drought tolerant

Good combinations: pussytoes, prairie smoke

This charming, delicate-looking but hardy low-grower looks great at the front of a border where its small blue flowers can be appreciated in spring to early summer and when it isn't crowded by other plants. The flowers have dark violet nectar guides and yellow centres, and provide pollen and nectar for bees and syrphid flies. Tolerant of drought, the grass-like leaves of this plant contrast well with other ground-hugging late-spring bloomers, especially those with silvery foliage, such as pussytoes.

Boneset (*Eupatorium perfoliatum*)



Height: .6 m (2 ft) to 1.5 m (5 ft)

Flowers: white

Blooming period: mid-summer to early fall

Exposure: sun to partial sun

Soil: moist to dry; drought tolerant

Specialist pollinator interactions: larval host for clymene moth, three-lined flower moth, boneset

borer moth, lined ruby tiger moth, burdock borer moth, blackberry looper moth, geometrid moth

Good combinations: Joe-pye weed, New England aster, stiff goldenrod

A very sturdy plant with somewhat rough leaves and large flower clusters, boneset grows in moist places in the wild but does fine with regular soil conditions in the garden. Its long blooming period can last from mid-summer to fall, and its strong stem makes it a good choice for supporting weaker-stemmed plants around it, such as heath aster and sky blue aster. The flowers' nectar and pollen attract bees, flies, wasps, beetles and butterflies.

Bottle gentian (*Gentiana andrewsii*)



Height: .3 m (1 ft) to .6 m (2 ft)

Flowers: blue

Blooming period: late summer to fall

Exposure: sun to partial sun

Soil: regular to moist

Good combinations: great blue lobelia, obedient plant, New England aster, white turtlehead

With the brightest, richest blue of any native plant, and an intriguing, unusual flower shape, this perennial is a fantastic addition to a sunny garden. A bonus is that it blooms late in the season, providing a blast of fall colour. It works particularly well when placed near a downspout where it will get regular water. Bumblebees pry open the flower to get at the pollen and nectar, and this feat is a treat to witness. (Bees with shorter tongues take a quicker, sneakier route by chewing a hole at the base of the flowers and “stealing” the nectar.)

Butterfly milkweed (*Asclepias tuberosa*)



Height: .3 m (1 ft) to 1 m (3 ft)

Flowers: orange

Blooming period: mid-summer

Exposure: sun

Soil: regular to dry; drought tolerant

Specialist pollinator interactions: larval host for monarch butterfly, Queen butterfly, milkweed tussock moth, milkweed leaf beetle, unexpected cynia moth

Good combinations: liatris, Virginia mountain mint, nodding wild onion

There are few native plants that deliver such a vibrant orange colour. The flowers last for weeks—providing nectar and pollen for many bee species, and nectar for wasps, beetles, flies and butterflies—and are followed by large, upright seedpods that are also a decorative feature, particularly when they open and release their fluffy seeds. Butterfly milkweed emerges later than other plants and its large taproot doesn’t respond well to disturbance or to being moved or transplanted, so once you’ve chosen a good sunny spot, leave it there to slowly spread. Drought tolerant, it requires little in the way of maintenance. This plant is extirpated from the wild in the GTA, according to the Toronto and Region Conservation Authority, and is excellent in sunny gardens.

Calico aster (*Symphotrichum lateriflorum*, aka *Aster lateriflorus*)



Height: .3 m (1 ft) to 1.5 m (5 ft)

Flowers: white

Blooming period: late summer to late fall

Exposure: partial sun to partial shade

Soil: dry to moist

Specialist pollinator interactions: specialist bees: *Andrena nubecula*, *Andrena hirticincta*, *Andrena placata*, *Andrena simplex*, *Andrena asteroides*, *Andrena solidaginis*, *Colletes simulans armatus*, *Melissodes druriella*; larval host for silvery checkerspot butterfly, pearl crescent, Isabella tiger moth, confused eusarca, soft-lined wave, American angle shades, lost sallow, dart-spotted palthis, small brown quaker

Good combinations: goldenrod, New England aster

This aster is useful on the edges of a woodland garden, where its prolific white flowers brighten the space in late summer through the autumn. The yellow centres turn purplish red in autumn. It also grows in full sun, and tolerates dry conditions. Bees, wasps, flies, butterflies and beetles visit for pollen and nectar, and, as is typical of the asters, it is of high value for many different species of insects.

Canada anemone (*Anemone canadensis*)



Height: .3 m (1 ft) to .6 m (2 ft)

Flowers: white

Blooming period: late spring to early summer

Exposure: sun to partial sun

Soil: regular to moist

Good combinations: wild geranium, wild blue phlox

With its aggressive, spreading tendencies, Canada anemone is a great groundcover for large, sunny areas. (It is less take-over-ish in part-sun conditions, though still vigorous.) The solitary flowers are long-lasting and, although not a nectar source, provide pollen for bees, beetles and flies. The flower buds, just before opening, are also decorative.

Canada milk vetch (*Astragalus canadensis*)



Height: .3 m (1 ft) to 1 m (3 ft)

Flowers: creamy white

Blooming period: mid-summer

Exposure: sun to partial sun

Soil: regular to dry

Specialist pollinator interactions: larval host for clouded sulphur butterfly, silver-spotted skipper, wild indigo duskywing, orange sulphur, gray hairstreak, eastern tailed blue, silvery blue

Good combinations: nodding wild onion, purple prairie clover

This leguminous, tap-rooted perennial adds a lot of beauty to the garden at the same time as it fixes nitrogen in the soil. The tubular, cream-coloured flowers cover the raceme and last for weeks, attracting bees for nectar and pollen, and then become attractive, hard-coated, oval seedpods with pointed tips. The compound, pinnate leaves are also decorative. The plant can get floppy.

Cardinal flower (*Lobelia cardinalis*)



Height: .6 m (2 ft) to 1 m (3 ft)

Flowers: red

Blooming period: mid-summer to fall

Exposure: sun to partial shade

Soil: moist to wet

Specialist pollinator interactions: larval host for pink-washed looper moth

Good combinations: great blue lobelia, Joe-pye weed, white turtlehead

The deep red of cardinal flower's blooms is unmatched for dramatic colour in the late-summer garden through to fall. The brilliant, tubular flowers are held on an erect stalk and last for weeks. Tolerant of part-sun conditions, you can plant it on the edges of a woodland garden or beside a pond. The important thing is that cardinal flower requires moisture, so don't let it dry out, and be prepared for a somewhat finicky plant. The flowers are visited by bees for nectar and pollen. Hummingbirds also feed on the nectar.

Culver's root (*Veronicastrum virginicum*) +



Height: .6 m (2 ft) to 1.5 m (5 ft)

Flowers: white

Blooming period: mid-summer

Exposure: sun to partial sun

Soil: dry to moist; drought tolerant

Specialist pollinator interactions:
larval host for culver's root borer moth

Good combinations: blazing-star, ironweed, vervain

With numerous tall spikes of long-lasting white flowers, culver's root is a great plant for bees (which feed on the nectar and collect pollen), flies, wasps, moths and butterflies. In the wild, it grows in moist places, making it suitable for rain gardens, but it also does fine in dry conditions. The flower spikes are like candelabras, tapering to a tip, often in twisted and bendy shapes in partial sun, and the white blooms complement the blues, yellows and purples of other native meadow plants. The leaves are also attractive, growing in whorls up the stem.

Cup plant (*Silphium perfoliatum*)



Height: 1.2 m (4 ft) to 2.4 m (8 ft)

Flowers: yellow

Blooming period: mid-summer to fall

Exposure: sun to partial sun

Soil: moist to dry; drought tolerant

Specialist pollinator interactions:
specialist bee: *Dieunomia heteropoda*;
larval host for silphium moth, giant eucosma moth

Good combinations: ironweed, tall coreopsis, vervain, Maximilian's sunflower

Cup plant tends to elicit strong reactions: the features that some people love are causes for concern for other gardeners. So take note: this plant is an aggressive spreader that self-seeds with abandon and very quickly creates a cup plant forest. Incredibly tall with sturdy stems that provide habitat for cavity-nesting bees including various carpenter and leafcutting bees, and water-holding "cups" where the leaves clasp the stems, providing a drinking source for birds and insects, cup plant is great as a fence or visual screen. Birds such as juncos flock to the seeds, and the nectar and pollen attract bees. The flowers last for weeks in summer and into the fall. Leave the stalks on the plant over the winter as habitat.

Cut-leaved toothwort (*Cardamine concatenata*, aka *Dentaria laciniata*)



Height: 20 cm (8 in) to 30 cm (12 in)

Flowers: white, pink, purple

Blooming period: early spring; spring ephemeral

Exposure: shade to partial shade

Soil: regular to moist

Specialist pollinator interactions: larval host for West Virginia white (a butterfly species of "Special Concern" in Ontario)

Good combinations: bloodroot, hepatica, spring beauty, sweet cicely, wild ginger

This spring ephemeral plant appears in early spring—in the wild, it carpets the forest floor—flowering with white, fragrant blooms, at the top of a stalk, that provide nectar and pollen for bees. It looks best in masses, with its narrow-lobed leaves, and requires humus-rich soil with regular moisture. It goes dormant after blooming but returns the following year. It spreads by both rhizomes and seeds.

Cylindrical blazing-star, aka dwarf blazing-star (*Liatris cylindracea*)



Height: 20 cm (8 in) to 60 cm (24 in)

Flowers: pink-purple

Blooming period: mid-summer to late summer

Exposure: sun

Soil: regular to dry; drought tolerant

Specialist pollinator interactions: larval host for glorius flower moth, bleeding flower moth

Good combinations: butterfly milkweed, pearly everlasting, vervain

The flower spikes of this perky blazing-star look great either as single accents or in massed plantings. Tolerant of dry conditions and poor soil, this plant is a bee and butterfly magnet. Bees visit for pollen and nectar. Even when finished flowering, the dried spikes remain attractive.

Dense blazing-star (*Liatris spicata*)



Height: .3 m (1 ft) to 1.5 m (5 ft)

Flowers: pink-purple

Blooming period: mid-summer to late summer

Exposure: sun

Soil: dry to moist; drought tolerant

Specialist pollinator interactions: larval host for bleeding flower moth

Good combinations: butterfly milkweed, pearly everlasting, black-eyed Susan, Virginia mountain mint

Taller than cylindrical blazing-star, this perennial has all the same great qualities, along with a tolerance for moister conditions. The leaves, which are arranged spirally, get smaller the higher they are on the stem, and the pink to purple flowers are in dense clusters on the spike. An interesting feature is that when shaded by neighbouring tall plants, the flower spikes can take on wonky shapes in their search for sun. The flowers attract bees for nectar and pollen, and butterflies are regular visitors. This plant is listed as threatened in the wild.

Downy phlox (*Phlox pilosa*) +



Height: 15 cm (6 in) to 60 cm (24 in)

Flowers: pink to purple

Blooming period: late spring to early summer

Exposure: sun to partial shade

Soil: regular to dry

Specialist pollinator interactions: larval host for phlox moth, tiger moths, owlet moths

Good combinations: beardtongue, harebell

With its showy and fragrant pink to pale purple flower clusters, downy phlox is useful as a blooming bridge between the seasons of spring and summer, providing scent and colour for a couple of weeks. Bees and butterflies feed on its nectar, the latter making use of the spreading petals as landing pads. Versatile in terms of soil conditions, it does best in full sun but will also do well in partial sun. It is suitable for rock gardens. Downy phlox gets its name from the soft white hairs on its stems and leaves.

Downy yellow violet (*Viola pubescens*)



Height: 10 cm (4 in) to 30 cm (12 in)

Flowers: yellow

Blooming period: mid- to late spring

Exposure: partial shade to shade

Soil: regular

Specialist pollinator interactions:

specialist bee: *Andrena violae*; larval host for great spangled fritillary butterfly, variegated fritillary, silver-bordered fritillary, meadow fritillary, giant leopard moth, violet sawfly

Good combinations: bloodroot, wild ginger, rue anemone, meadowrue

A versatile charmer, this low-growing violet produces small yellow flowers, in spring, with purple lines on the lower petal. Bees visit for nectar and, in the process, disperse pollen. Although not drought tolerant, it does well in a variety of conditions, from moist to regular to drier soil, and will spread. The seeds are dispersed by ants.

Dutchman's breeches (*Dicentra cucullaria*)



Height: 12 cm (5 in) to 22 cm (9 in)

Flowers: white with yellow accents

Blooming period: early spring; spring ephemeral

Exposure: shade to partial shade

Soil: regular

Specialist pollinator

interactions: larval host for Clodius Parnassian butterfly

Good combinations: wild ginger, hepatica, spring beauty

In the woodland garden, this very early-blooming spring ephemeral is an important nectar source for newly emerging queen bumblebees, who can be seen visiting when little else is in bloom. (Watching large bees make their way into these unusually shaped flowers is a treat.) Other types of bees (e.g., mason bees) also visit for nectar. The white flowers with yellow accents are delightful and, as their name suggests, look like hanging pantaloons, silly and elegant all at once. The foliage is also attractive—deeply cut and lacy, almost fern-like. The plant requires humus-rich soil. Ants distribute the seeds.

Early goldenrod (*Solidago juncea*)



Height: .5 m (1.5 ft) to 1.2 m (4 ft)

Flowers: yellow

Blooming period: mid- to late summer

Exposure: sun to partial sun

Soil: regular to dry; drought tolerant

Specialist pollinator interactions:

specialist bees: *Andrena nubecula*, *Andrena hirticincta*, *Andrena placata*, *Andrena simplex*, *Andrena solidaginis*,

Colletes simulans armatus, *Melissodes druriella*; larval host for silvery checkerspot butterfly, ruby tiger moth, *Bucculatrix angustata*, *Coleophora annulicola*, wormseed webworm, *Scrobipalpula sacculicola*, confused eusarca, false crocus geometer, *Cremastobombycia solidaginis*, fine-lined sawfly, sharp-stigma looper moth, lost sawfly, green leuconycta, pink-barred pseudeustrotia, *Anania funebris*, *Astrotischeria solidagonifoliella*, *Choristoneura parallela*, white spotted sable moth, dark-spotted pathis moth

Good combinations: pearly everlasting, vervain, flowering spurge

This early-blooming goldenrod produces a very showy flowerhead that cascades in all directions, with an explosion of yellow. It is easy to grow and not at all fussy. Bees, wasps, flies, butterflies, moths and beetles are attracted to the flowers, which provide pollen and nectar.

Evening primrose (*Oenothera biennis*)



Height: .3 m (1 ft) to 1.5 m (5 ft)

Flowers: yellow

Blooming period: mid-summer to early fall

Exposure: sun to partial sun

Soil: regular to dry; drought tolerant

Specialist pollinator interactions: specialist bees: *Lasioglossum oenotherae*, primrose miner bee; specialist moth:

primrose moth (*Schinia florida*); larval host for pearly wood nymph, grape leaffolder moth, white-lined sphinx, momphid moth

Good combinations: blue vervain, ironweed, yellow coneflower

This biennial is a familiar sight in waste places but it's also a good, vigorous candidate for meadow gardens. Its prolific yellow flowers are attractive and the flower spike is dramatic, reaching 5 feet or more. Flowers attract bees for nectar and pollen. Moths are the primary pollinators. Drought tolerant, it is easy to grow, and self seeds. According to the Xerces Society, larvae of the primrose moth visit only these flowers, and, in the process, pollinate this plant. (The larvae eat the seedpods and the adults visit the flowers to lay their eggs.)

False Solomon's seal (*Maianthemum racemosum*, aka *Smilacina racemosa*)



Height: 30 cm (12 in) to 60 cm (24 in)

Flowers: white

Blooming period: late spring to early summer

Exposure: partial sun to shade

Soil: regular

Specialist pollinator interactions: larval host for white triangle tortrix moth

Good combinations: wild geranium, sweet cicely, Solomon's seal, wild blue phlox, sarsaparilla

Easy to grow in a wide variety of soil conditions, and from partial sun to shade, this plant spreads well to create groundcovering colonies. It produces masses of airy white flowers from late spring through early summer, held at the end of arching stalks (the stalks sometimes zig zag). The clusters of red berries, in summer and fall, are also an attractive feature. Bees collect the pollen, flies and beetles feed on the pollen, and butterflies and moths feed on the nectar.

False sunflower (*Heliopsis helianthoides*)



Height: .6 m (2 ft) to 1.5 m (5 ft)

Flowers: yellow

Blooming period: early to mid-summer

Exposure: sun to partial sun

Soil: regular to dry soil; drought tolerant

Specialist pollinator interactions: larval host for tischeriid moth, rigid sunflower borer moth

Good combinations: Virgin's bower, culver's root, blazing-star, wild bergamot, giant blue hyssop

False sunflower, with its long-lasting bright yellow flowers, is very easy to grow in sun or partial-sun conditions. Some might consider it too aggressive, but it can be controlled simply by weeding out unwanted volunteers. Deadhead to extend blooming. Aphids often congregate on the stem but they do not kill the plant—these insects can be controlled easily with a strong blast of water. Bees, butterflies, wasps, beetles and flies visit this plant for pollen and nectar.

**Fireweed (*Chamerion angustifolium*,
aka *Epilobium angustifolium*)**



- Height:** 1 m (3 ft) to 1.5 m (5 ft)
Flowers: pink
Blooming period: mid-summer to fall
Exposure: sun
Soil: moist to dry; drought tolerant
Specialist pollinator interactions: larval host for white-lined sphinx moth, fireweed caterpillar
Good combinations: pearly everlasting, grey-headed coneflower, swamp milkweed

In the wild, this pioneer species is one of the first to appear following some kind of disturbance, such as fire. It spreads rapidly, so is perhaps too aggressive for a small garden, but in the right place—say, a large area where you want fast and colourful cover—fireweed is a beauty. The pink blooms last for weeks and the fluffy, wispy seedheads are also very decorative. Fireweed provides nectar and pollen for bees, and also attracts moths, flies, and butterflies.

Fly honeysuckle (*Lonicera canadensis*)



- Height:** .6 m (2 ft) to 1.5 m (5 ft)
Flowers: yellow
Blooming period: mid-spring
Exposure: sun to shade
Soil: regular to moist
Specialist pollinator interactions: larval host for clearwing moth

This deciduous shrub is a fantastic garden addition when you're looking for a relatively low-growing woody plant that thrives in shade. It has an open rather than dense form (which has led some people to call it "scraggly"), beautiful emerald-ish coloured leaves that appear in spring, and produces pairs of pale yellow, trumpet-shaped flowers that dangle beneath the leaves. Bees visit for nectar and pollen. (It is closely related to *Lonicera caerulea*, which is on the historical record as being visited by the rusty-patched bumblebee). The flowers are followed by small, paired, bright red berries, which each point in opposite directions, like wings.

Giant blue hyssop, aka anise hyssop (*Agastache foeniculum*)



- Height:** .6 m (2 ft) to 1.2 m (4 ft)
Flowers: blue to purple
Blooming period: mid-summer
Exposure: sun to partial sun
Soil: dry to regular; drought tolerant
Good combinations: Virginia mountain mint, blazing-star, black-eyed Susan, false sunflower

This perennial has a lot going for it—it flowers prolifically, and the beautiful blue-to-purple blooms last for weeks. Bees and butterflies flock to this plant for nectar, and it is also a pollen source. Requiring little in the way of maintenance, drought-tolerant hyssop creates a nice, almost bushy clump but it doesn't spread aggressively. A bonus is that the leaves are fragrant (anise scented) and can be made into a soothing, anise-flavoured tea, and the edible flowers can be added to salads and used as garnishes.

Golden alexanders (*Zizia aurea*)



Height: .3 m (1 ft) to .6 m (2 ft)

Flowers: yellow

Blooming period: mid- to late spring

Exposure: sun to partial sun

Soil: dry to moist; drought tolerant

Specialist pollinator interactions: specialist bee: *Andrena ziziae*; larval host for black swallowtail butterfly, rigid sunflower borer

Good combinations: prairie smoke, pussytoes

This plant is a good choice for meadow gardens because unlike the majority of other meadow species, it blooms in spring and is low growing. Place it near the front of a border for maximum effect. With its prolific long-lasting yellow flowers, it is a great nectar and pollen source for bees in spring. Like some other plants in the parsley family, it is a larval host plant for the black swallowtail butterfly. Its reddish stems are attractive, as are its seedheads. This is a plant that should be in more gardens!

Grass-leaved goldenrod (*Euthamia graminifolia*)



Height: .3 m (1 ft) to 1.2 m (4 ft)

Flowers: yellow

Blooming period: late summer to early fall

Exposure: sun

Soil: moist to dry; drought tolerant

Specialist pollinator interactions: specialist bees: *Andrena nubecula*, *Andrena hirticincta*, *Andrena placata*, *Andrena simplex*; larval host for ruby tiger moth, *Bucculatrix angustata*, *Coleophora annulicola*, wormseed

webworm, *Scrobipalpula sacculicola*, confused eusarca, false crocus geometer, *Cremastobombycia solidaginis*, fine-lined sawfly, sharp-stigma looper moth, lost sawfly, green leuconycta, pink-barred pseudeustrotia, *Anania funebris*, *Astrotischeria solidagonifoliella*, *Choristoneura parallela*, white spotted sable moth, dark-spotted pathis moth

Good combinations: New England aster, heath aster, bottle gentian, Joe-pye weed

Somewhat unusual among goldenrods for its preference for moist conditions, this plant also does well in regular to dry soil. It produces flat-topped (sometimes rounded) clusters of small yellow flowers from late summer to early fall, and the blooms last for weeks, providing nectar and pollen for bees, wasps, flies, and butterflies. It can spread aggressively in sunny, moist conditions. Its leaves are fine and delicate-looking.

Great blue lobelia (*Lobelia siphilitica*)



Height: .3 m (1 ft) to 1 m (3 ft)

Flowers: blue

Blooming period: late summer to fall

Exposure: sun to partial shade

Soil: moist to wet

Specialist pollinator interactions: larval host for pink-washed looper moth

Good combinations: boneset, swamp milkweed, New England aster

Another dramatic lobelia, related to cardinal flower, this one has blue flowers (with some white on them) that cover the erect stalk. Useful in partial shade conditions, it requires moist soil and looks best in masses, providing a blast of colour in the late-summer to fall garden. Bees are frequent visitors for nectar and pollen. Hummingbirds also visit for nectar.

Hairy beardtongue (*Penstemon hirsutus*)



Height: .3 m (1 ft) to 1 m (3 ft)
Flowers: white, pink, purple
Blooming period: late spring to early summer
Exposure: sun to partial shade
Soil: regular to dry; drought tolerant
Specialist pollinator interactions: specialist bee: *Osmia distincta*; larval host for Baltimore butterfly

Good combinations: harebell, wild white indigo, wild geranium

Hairy beardtongue is similar to its close relative, smooth beardtongue, and grows in hot, dry and sandy conditions. It has a hairy stem and the flowers are pink or purple. Bees visit for pollen and nectar, and hummingbirds visit for nectar.

Heath aster (*Symphotrichum ericoides*, aka *Aster ericoides*)



Height: .3 m (1 ft) to 1 m (3 ft)
Flowers: white
Blooming period: late summer to fall
Exposure: sun
Soil: regular to dry; drought tolerant
Specialist pollinator interactions: specialist bees: *Andrena nubecula*,

Andrena hirticincta, *Andrena placata*, *Andrena simplex*, *Andrena asteris*, *Andrena asteroides*, *Andrena solidaginis*, *Colletes simulans armatus*, *Melissodes druriella*; larval host for silvery checkerspot butterfly, pearl crescent, Isabella tiger moth, confused eusarca, soft-lined wave, American angle shades, lost sallow, dart-spotted palthis, small brown quaker

Good combinations: goldenrods, sky blue aster

This aster produces masses of white flowers in late summer that last for weeks and attract bees, wasps, flies, beetles and butterflies. The whole plant often looks bushy, and the tiny leaves resemble the leaves of plants in the heath family. It spreads to produce colonies.

Hoary puccoon (*Lithospermum canescens*) +



Height: 15 cm (6 in) to 50 cm (20 in)
Flowers: yellow
Blooming period: mid-spring
Exposure: sun
Soil: regular to dry; drought tolerant

Good combinations: beardtongue, wild blue lupine, sweet cicely

The bright, showy yellow flowers of hoary puccoon bloom in clusters at the top of stems, and they last for about a month. Native to savannas and prairies, and with a deep taproot, this plant grows best in sandy soils with good drainage, in full sun. The flowers attract bees, butterflies, and other insects.

Hoary vervain (*Verbena stricta*)



- Height:** .3 m (1 ft) to 1.2 m (4 ft)
Flowers: purple
Blooming period: mid- to late summer
Exposure: sun
Soil: regular to dry; drought tolerant
Specialist pollinator interactions:
 specialist bee: verbena bee; larval host for common buckeye butterfly, verbena moth, fine-lined sallow moth
Good combinations: ironweed, wild bergamot, Virginia mountain mint, culver's root

If you love blue flowers and have sunny conditions, be sure to include this meadow species in your garden. Each individual flower is small, but there are many flowering spikes on this perennial. The flowers open from the bottom of the spike up, forming a band, and the flowers are long-lasting, so the overall effect is awash in colour. Tall-growing, but somewhat weak-stemmed, surround it with other plants that will support it. Bees visit for nectar and pollen, and flies, wasps, moths and butterflies also feed at this plant. Easy to grow and requiring little in the way of maintenance, vervain is drought tolerant but also does fine with occasional flooding, making it suitable for rain gardens. It grows easily from seed, and spreads very well, sending up volunteer plants everywhere. Hoary vervain is very similar to blue vervain (*Verbena hastata*) in appearance and requirements, but will grow in drier sites than blue vervain. Both species will grow in poor soil.

Lance-leaved coreopsis, aka lance-leaved tickseed (*Coreopsis lanceolata*) +



- Height:** .3 m (1 ft) to 1 m (3 ft)
Flowers: yellow
Blooming period: mid-summer
Exposure: sun
Soil: regular to dry; drought tolerant
Specialist pollinator interactions:
 specialist bee: *Melissodes coreopsis*; larval host for dimorphic gray moth
Good combinations: wild blue lupine, pearly everlasting, pale purple coneflower

A medium-sized, drought-tolerant meadow plant, lance-leaved coreopsis does well near the front of a border. It flowers prolifically and the blooms last for weeks; deadhead to encourage more flowers. Many pollinators—bees, moths, beetles, flies, wasps and butterflies—visit this plant for pollen and nectar.

Large-flowered bellwort (*Uvularia grandiflora*)



- Height:** 15 cm (6 in) to 60 cm (24 in)
Flowers: yellow
Blooming period: mid-spring
Exposure: partial shade to shade
Soil: regular to moist
Good combinations: sweet cicely, trillium, wild geranium, baneberry

This showy perennial fills out so much that it almost looks like a shrub. With masses of bell-shaped, drooping flowers in spring, it provides nectar and pollen for foraging bees. The seeds are contained in a fleshy, nutritious eliasome, which ants collect, move away from the parent plant, and then eat the eliasome, leaving the seed to germinate in a new place. It requires humus-rich soil.

**Large-leaved aster (*Eurybia macrophylla*,
aka *Aster macrophyllus*)**



Height: .3 m (1 ft) to 1.5 m (5 ft)
Flowers: violet
Blooming period: late summer to fall
Exposure: sun to shade
Soil: regular to dry soil

Specialist pollinator interactions:
 specialist bee: *Andrena hirticincta*; larval
 host for silvery checkerspot butterfly,
 pearl crescent butterfly, aster borer moth,

the asteroid, arcigera flower moth, Isabella tiger moth,
 confused eusarca, soft-lined wave, American angle shades,
 lost sallow, dart-spotted palthis, small brown quaker

Good combinations: zig zag goldenrod

Plants that thrive in dry shade and bloom through
 the fall are hard to come by, so large-leaved aster
 is very useful in the woodland garden. As its name
 suggests, the leaves are large, and the prolific
 whitish purplish flowers with yellow centres, at
 the top of reddish-green stems, last for weeks. The
 fluffy seedheads, distributed by wind, are airy and
 attractive. This plant spreads well, creating clonal
 colonies. The flowers' pollen and nectar attract
 bees, flies, wasps, butterflies and beetles. Give it
 humus-rich soil.

Maximilian's sunflower (*Helianthus maximiliani*) +



Height: 1 m (3 ft) to 2.4 m (8 ft)
Flowers: yellow
Blooming period: late summer to fall
Exposure: sun
Soil: regular to dry; drought tolerant

Specialist pollinator interactions:
 specialist bees: *Andrena accepta*,
Andrena aliciae, *Andrena helianthi*, *Dufourea*
marginatus, *Melissodes agilis*, *Pseudopanurgus*

rugosus, *Dieunomia heteropoda*, *Megachile pugnata*;
 larval host for silvery checkerspot butterfly, painted lady,
 Isabella tiger moth, gelechid moth, saddleback caterpillar
 moth, variegated leafroller moth, ruby tiger moth, common
 pinkband, arge tiger moth, American angle shades,
 sunflower leaf beetle

Good combinations: New England aster, heath aster

A dramatic, tall plant, this sunflower is quite versatile,
 growing in poor soil as well as richer soil (in humusy,
 rich soil, it may require staking). Each flower stalk
 bears a large, cheery-looking yellow flower that lasts
 for weeks, from late summer to fall, and provides
 nectar and pollen for bees, butterflies and beetles.
 Spreading well, it reproduces vegetatively (creating
 clonal colonies) and also by seed.

**New England aster (*Symphotrichum*
novae-angliae, aka *Aster novae-angliae*)**



Height: 1 m (3 ft) to 1.5 m (5 ft)
Flowers: purple
Blooming period: late summer to
 late fall
Exposure: sun to partial sun
Soil: moist to dry; drought tolerant

Specialist pollinator interactions:
 specialist bees: *Andrena nubecula*,
Andrena hirticincta, *Andrena placata*,
Andrena simplex, *Andrena asteroides*,

Andrena solidaginis, *Colletes simulans armatus*, *Melissodes*
druriella; larval host for pearl crescent butterfly, silvery
 checkerspot, Canadian Sonia moth, Isabella tiger moth,
 confused eusarca, soft-lined wave, American angle shades,
 lost sallow, dart-spotted palthis, small brown quaker

Good combinations: cup plant, goldenrod

A popular aster, often grown in gardens, with good
 reason, New England aster produces prolific purple
 flowers with yellow centres in late summer that last
 for many weeks and provide showy fall colour. Bees,
 flies and butterflies visit for pollen and nectar, and
 the larvae of numerous moths feed on this plant.
 It tolerates dry soils in the garden. This plant can
 get floppy, but if you cut it back in early summer,
 it will be better behaved—that is, it will bloom on
 shorter stalks.

New Jersey tea (*Ceanothus americanus*)



Height: to 1 m (3 ft)

Flowers: white

Blooming period: early to mid-summer

Exposure: sun to partial shade

Soil: regular to dry; drought tolerant

Specialist pollinator interactions:
larval host for spring/summer azure

butterfly, mottled duskywing butterfly, broad-lined erastria moth, sulfur moth, red-fronted emerald

This small, rounded, deciduous shrub is very useful in dry, sunny gardens. It produces clusters of very showy white flowers on slender stalks, and the blooms last for weeks in summer. The flowers are fragrant, and provide nectar and pollen for bees, wasps, flies and beetles. The dried seedheads that follow persist through the winter and are also decorative. Although primarily a sun-loving shrub, it can also be grown in open woodland conditions.

New York aster (*Symphotrichum novi-belgii*) +



Height: .3 m (1 ft) to 1.2 m (4 ft)

Flowers: purple

Blooming period: late summer to late fall

Exposure: sun to partial sun

Soil: moist to dry

Specialist pollinator interactions:
specialist bees: *Andrena nubecula*,

Andrena hirticincta, *Andrena placata*, *Andrena simplex*, *Andrena asteroides*, *Andrena solidaginis*, *Colletes simulans armatus*, *Melissodes druriella*; larval host for silvery checkerspot butterfly, pearl crescent, Isabella tiger moth, confused eusarca, soft-lined wave, American angle shades, lost sallow, dart-spotted palthis, small brown quaker

Good combinations: goldenrod, cup plant, calico aster

This beautiful aster produces purple flowers in late summer that last for weeks and provide nectar and pollen for bees, and attract numerous other species of insects. It is versatile in terms of requirements and very easy to grow.

Nodding wild onion (*Allium cernuum*) +



Height: .3 m (1 ft) to .5 m (1.5 ft)

Flowers: whitish pink flowers

Blooming period: mid-summer

Exposure: sun to partial sun

Soil: dry to moist; drought tolerant

Good combinations: butterfly milkweed, purple prairie clover,

pearly everlasting, lance-leaved coreopsis

This narrow-leaved, grassy-looking perennial, which grows from a bulb, looks good in masses, particularly at the front of a border. Its white to light pink flowers hang in a cluster, like a nodding pompom, and last for weeks. The flowers are a good source of nectar for bees and beetles. The seedheads are also decorative, and all parts of the plant are edible, with an onion flavour.

Ohio spiderwort (*Tradescantia ohioensis*) +



Height: .6 m (2 ft) to 1.2 m (4 ft)

Flowers: blue

Blooming period: late spring to mid-summer

Exposure: sun to partial sun

Soil: regular to dry

Good combinations: blue-eyed grass, Canada anemone

With its long, grass-like leaves that form a sheath around the base of the stem, this is a graceful perennial with a number of ornamental features. Clusters of blue to blue-violet flowers, each with three petals, appear in late spring and are visited by bees and flies. Although each individual flower lasts only a short time—a day—the plant produces plenty of blooms. The seedpods—three-sectioned capsules—are also decorative.

Pale purple coneflower (*Echinacea pallida*) +



Height: .6 m (2 ft) to 1.2 m (4 ft)

Flowers: purple

Blooming period: mid-summer

Exposure: sun

Soil: regular to dry; drought tolerant

Specialist pollinator interactions: specialist bee: *Andrena helianthiformis*; larval host for silvery checkerspot butterfly

Good combinations: Virginia mountain mint, grey-headed coneflower; wild bergamot

A close relative of purple coneflower (which isn't native to Southern Ontario), pale purple coneflower's flowers have narrow, drooping petals, giving it a more delicate appearance. It's very easy to grow, drought tolerant, and the flowers last for weeks. Bees visit the flowers for pollen and nectar, and it is a magnet for nectaring butterflies. (As well, the larvae of a few moth species feed on the flowerheads.) The seedheads look attractive in winter, and birds such as finches love them.

Pearly everlasting (*Anaphalis margaritacea*)



Height: .3 m (1 ft) to 1 m (3 ft)

Flowers: white, with yellow centres

Blooming period: mid-summer

Exposure: sun

Soil: dry to regular; drought tolerant

Specialist pollinator interactions: larval host for American lady butterfly, painted lady butterfly

Good combinations: hoary vervain, ironweed, culver's root

This drought-tolerant perennial is very easy to grow and fills in sunny areas quickly. Its white flowers (with yellow centres) provide extremely long-lasting blooms, look great when dry, and complement the plant's silver, fuzzy foliage. It is perfect if you're looking for a relatively low-growing plant with ornamental flowers and foliage that will spread. Don't worry if butterfly caterpillars raze the first growth of foliage; the leaves will regrow and the plant will be fine—and the plant will have fed a generation's worth of food for a butterfly!

**Prairie smoke, aka three-flowered avens
(*Geum triflorum*) +**



Height: 15 cm (6 in) to 40 cm (16 in)
Flowers: pink
Blooming period: late spring to early summer
Exposure: sun
Soil: dry to moist soil; drought tolerant
Good combinations: pussytoes, nodding wild onion, yarrow, golden alexanders

Its dusky pink flowers are a knock-out in late spring, but one of the most attractive features of this perennial is its wispy seedheads, which flutter in the breeze—as its name suggests, like smoke. Drought tolerant, it works well in rock gardens, scree gardens, and at the front of a meadow garden, where it won't be overwhelmed by taller plants. It spreads well, is very easy to grow, and its versatility in terms of moisture—tolerating both dry and moist conditions—makes it a good choice for rain gardens. Be on the lookout in spring for queen bumblebees grasping the flower and poking their heads inside to buzz pollinate the plant, collecting nectar and pollen—if you're very close, you can even hear the buzz.

Purple prairie clover (*Dalea purpurea*) +



Height: .3 m (1 ft) to 1 m (3 ft)
Flowers: purple
Blooming period: mid-summer
Exposure: sun
Soil: dry to regular; drought tolerant
Specialist pollinator interactions: specialist bees: *Colletes albescens*, *Colletes robertsonii*, *Colletes susanna*, *Colletes wilmattae*; larval host for dogface sulphur butterfly, Reakirt's blue

Good combinations: white prairie clover, nodding wild onion, culver's root, wild bergamot

Flowering in rings from the bottom up, so it looks a bit like a pointy thimble, purple prairie clover is a great nectar and pollen source for many species of bees, and for wasps, flies, butterflies, and beetles. A nitrogen-fixing legume, its roots penetrate deep into the soil, so plant it where you won't need to move it.

Purple flowering raspberry (*Rubus odoratus*)



Height: to 1.5 m (5 ft)
Flowers: dark pink
Blooming period: early summer
Exposure: shade to partial shade
Soil: regular to moist

If you're looking for a reliable and easy-to-grow, bold shrub for a woodland garden, the deciduous purple flowering raspberry is a great choice. Its large leaves resemble the foliage of maples, and the plant is covered with rose-like, dark pink flowers in early summer that attract bees for the pollen and nectar. The dry, mealy fruit is not particularly palatable for humans, but birds eat the fruit, which is also decorative in the garden. The shrub fills out well and spreads to form thickets. The stems are covered in soft hairs.

Red baneberry (*Actaea rubra*)



Height: .3 m (1 ft) to .6 m (2 ft)

Flowers: white

Blooming period: mid-spring

Exposure: shade to partial shade

Soil: regular to moist

Good combinations: wild geranium, mayapple, wild blue phlox, sweet cicely

This perennial fills out so much that it almost looks like a shrub, a useful feature in the woodland garden. It produces showy white flower clusters in spring, followed by red berries in summer. (The berries are toxic to humans.) If you have the related white baneberry (*A. pachypoda*) along with red baneberry in the garden, they can cross-breed and produce fruit that is intermediate between red and white. Red baneberry requires humus-rich soil. Although the flowers lack nectar, they reward bee visitors with pollen.

Rigid goldenrod (*Solidago rigida*, aka *Oligoneuron rigidum*)



Height: .3 m (1 ft) to 1.5 m (5 ft)

Flowers: yellow

Blooming period: late summer to late fall

Exposure: sun

Soil: regular to dry; drought tolerant

Specialist pollinator interactions:

specialist bees: *Andrena nubecula*, *Andrena hirticincta*, *Andrena placata*, *Andrena simplex*, *Andrena solidaginis*, *Colletes simulans armatus*, *Melissodes druriella*; larval host for silvery checkerspot butterfly, ruby tiger moth, *Bucculatrix angustata*, *Coleophora annulicola*, wormseed webworm, *Scrobipalpula sacculicola*, confused eusarca, false crocus geometer, *Cremastobombycia solidaginis*, fine-lined sawfly, sharp-stigma looper moth, lost sawfly, green leuconycta, pink-barred pseudeustrotia, *Anania funebris*, *Astrotischeria solidagonifoliella*, *Choristoneura parallela*, white spotted sable moth, dark-spotted palthis moth

Good combinations: grey-headed coneflower, New England aster

The leaves of this well-behaved, clump-forming goldenrod are somewhat unusual: they start off as pale green and floppy but then get stiffer, more rigid, during the growing season. The beautiful yellow flowers are long-lasting, and the plant is less aggressive than some of the other, related goldenrods, making it a good choice for sunny meadow gardens. According to the Toronto and Region Conservation Authority, this plant is extirpated from the wild in the GTA, so is a valuable addition to gardens.

Rough-stemmed goldenrod (*Solidago rugosa*)



Height: .3 m (1 ft) to 1.5 m (5 ft)

Flowers: yellow

Blooming period: mid-summer to fall

Exposure: sun

Soil: regular to dry

Specialist pollinator interactions:

specialist bees: *Andrena nubecula*, *Andrena hirticincta*, *Andrena placata*, *Andrena simplex*, *Andrena solidaginis*, *Colletes simulans armatus*, *Melissodes druriella*; larval host for silvery checkerspot butterfly, ruby tiger moth, *Bucculatrix angustata*, *Coleophora annulicola*, wormseed webworm, *Scrobipalpula sacculicola*, confused eusarca, false crocus geometer, *Cremastobombycia solidaginis*, fine-lined sawfly, sharp-stigma looper moth, lost sawfly, green leuconycta, pink-barred pseudeustrotia, *Anania funebris*, *Astrotischeria solidagonifoliella*, *Choristoneura parallela*, white spotted sable moth, dark-spotted palthis moth

Good combinations: heath aster

Although the common name makes it sound coarse, this goldenrod is quite graceful, with panicles of yellow flowers that last for a month or two and attract bees, flies, wasps and butterflies.

**Sharp-lobed hepatica (*Anemone acutiloba*,
aka *Hepatica acutiloba*)**



Height: 10 cm (4 in) to 23 cm (9 in)
Flowers: white, pink, purple
Blooming period: early spring
Exposure: shade to partial shade
Soil: regular to moist
Good combinations: bloodroot, trillium, wild blue phlox, white baneberry, red baneberry

A very early spring bloomer, this plant hugs the ground, sending up delicate white, pink or purple flowers through the dried foliage of the previous year's growth. Although nectarless, it provides pollen for early-foraging bees. Like many other woodland natives, it requires humus-rich soil. Plant it near the front of a border, where its small flowers and pointy-tipped leaves can be appreciated. Ants disperse the seeds.

Showy tick trefoil (*Desmodium canadense*)



Height: .6 m (2 ft) to 1.8 m (6 ft)
Flowers: pink
Blooming period: mid-summer
Exposure: sun
Soil: dry to moist; drought tolerant
Specialist pollinator interactions: larval host for northern cloudywing butterfly, eastern tailed blue, orange sulphur, gray hairstreak, silver-spotted skipper, long-tailed skipper, *Caloptilia violacella*, *Parectopa lespedezaefoliella*

Good combinations: giant blue hyssop, pale purple coneflower, black-eyed Susan

The pinky purple flowers of this leguminous plant have many interesting pollinator features. Dark nectar "guides" attract bees, and parts of the flower are bound in tension and when a bee presses down, pollen is ejected onto the insect visitor, and the flower remains "open"; smaller bees and flies are thus able to access the pollen, as well. A note of caution: this plant spreads aggressively, so can take over small gardens, and its rough seedpods stick to clothing and are tedious to remove.

Shrubby St. Johns-wort (*Hypericum prolificum*)



Height: .3 m (1 ft) to 1.2 m (4 ft)
Flowers: yellow
Blooming period: mid-summer
Exposure: sun to partial shade
Soil: moist to dry; drought tolerant
Specialist pollinator interactions: larval host for gray hairstreak, gray half-spot moth

This deciduous shrub can be used as a low-growing hedge or in a garden bed. Very versatile, growing in poor and rocky soil and also drought conditions, it produces abundant and glowing yellow flowers that can last for up to two months. Although nectarless, the flowers provide pollen for bees and flies.

Silverrod (*Solidago bicolor*)



Height: .3 m (1 ft) to .6 m (2 ft)

Flowers: white

Blooming period: mid-summer to fall

Exposure: sun to partial shade

Soil: regular to dry soil; drought tolerant

Specialist pollinator interactions:

specialist bees: *Andrena nubecula*, *Andrena hirticincta*, *Andrena placata*, *Andrena simplex*, *Andrena solidaginis*, *Colletes simulans armatus*, *Melissodes druriella*; larval host for silvery checkerspot butterfly, ruby tiger moth, *Bucculatrix angustata*, *Coleophora annulicola*, wormseed webworm, *Scrobipalpa sacculicola*, confused eusarca, false crocus geometer, *Cremastobombycia solidaginis*, fine-lined

sallow, sharp-stigma looper moth, lost sawfly, green leuconycta, pink-barred pseudeustrotia, *Anania funebris*, *Astrotischeria solidagonifoliella*, *Choristoneura parallela*, white spotted sable moth, dark-spotted palthis moth

Good combinations: New England aster, rigid goldenrod

This is a very unusual goldenrod, in that its flowers are white rather than the typical goldenrod yellow. Borne on an erect stem, the flowers provide nectar and pollen for bees and many other species of insects. According to the Toronto and Region Conservation Authority, this plant is extirpated from the wild in the GTA, and, hence, is an ecologically valuable addition to gardens.

Sky blue aster, aka azure aster (*Symphotrichum oolentangiense*, aka *Aster azureus*)



Height: .45 m (1.5 ft) to 1 m (3 ft)

Flowers: blue-violet

Blooming period: late summer to fall

Exposure: sun to partial sun

Soil: regular to dry; drought tolerant

Specialist pollinator interactions:

specialist bees: *Andrena nubecula*, *Andrena hirticincta*, *Andrena placata*, *Andrena simplex*; *Andrena asteris*, *Andrena asteroides*, *Andrena solidaginis*, *Colletes simulans armatus*, *Melissodes druriella*, *Melissodes dentiventris*; larval host for

silvery checkerspot butterfly, pearl crescent, Isabella tiger moth, confused eusarca, soft-lined wave, American angle shades, lost sawfly, dart-spotted palthis, small brown quaker, aster borer moth

Good combinations: goldenrods, heath aster

There are so many garden-worthy native asters that it's sometimes difficult to choose which one(s) to include, but sky blue aster is particularly enchanting. The central stem erupts with light blue-violet, daisy-like flowers, with yellow centres, that bloom for weeks. Bees visit for nectar and pollen, and the flowers also attract flies, butterflies, moths and beetles. Along with the stem leaves, sky blue aster has basal leaves that often remain green throughout the winter. Versatile and tough, this aster tolerates drought and poor, shallow and compacted soil.

Smooth beardtongue, aka foxglove beardtongue (*Penstemon digitalis*)



Height: .6 m (2 ft) to 1 m (3 ft)

Flowers: white

Blooming period: late spring to early summer

Exposure: partial shade to sun

Soil: regular to dry; drought tolerant

Specialist pollinator interactions:

specialist bee: *Osmia distincta*; specialist wasp: *Pseudomasaris occidentalis*; larval host for Baltimore butterfly, chalcid midget moth

Good combinations: harebell, white

wild indigo, wild geranium

Beardtongue bridges the blooming periods of spring and summer, providing weeks of white flowers that bees visit for pollen and nectar. The tubular-shaped flowers bloom on stalks in clusters and have purple "nectar guides"—lines that direct bees inside. Hummingbirds also visit for nectar. Upright and showy, and flowering prolifically, this plant will grow in somewhat dry conditions, compacted soil and in partial shade as well as sun, making it incredibly useful in gardens.

Smooth serviceberry (*Amelanchier laevis*)



Height: 4.5 m (15 ft) to 7.5 m (25 ft)

Flowers: white

Blooming period: early spring

Exposure: sun to shade

Soil: regular to dry

Specialist pollinator interactions:

larval host for white admiral (red-spotted purple), viceroy, blue spring moth, chokeberry underwing, dagger moths, lesser all-green leafroller, fourlined leafroller, climbing looper moth, many-dotted appleworm, charming underwing, tischeriid moth, three-spotted sawfly, shadbush leafminer, dark-spotted palthis, small-eyed sphinx, gracillariid moth

This versatile, deciduous, multi-stemmed shrub or small tree is very useful in urban situations where a small but showy woody plant is desired. Tolerant of air pollution, it flowers early in spring, before leafing out, producing masses of drooping clusters of white, slightly fragrant flowers that give way to delicious berries (they look like blueberries) that can be eaten raw or cooked into jellies or pies. The berries are favoured by birds. The leaves are also attractive, starting out with a bronze or purplish cast, then turning green in summer and orangish in autumn. The smooth, gray bark is also attractive. Bees, flies and beetles are attracted to the nectar and pollen.

Spotted Joe-pye weed (*Eutrochium maculatum*, aka *Eupatorium maculatum*)



Height: .6 m (2 ft) to 2.1 m (7 ft)

Flowers: pink

Blooming period: mid-summer to early fall

Exposure: sun to partial sun

Soil: moist to dry; drought tolerant

Specialist pollinator interactions: larval host for three-lined flower moth, ruby tiger moth

Good combinations: boneset, grey-headed coneflower, white turtlehead, obedient plant, ironweed, grass-leaved goldenrod

Adding drama to the garden, the blooms on this perennial can reach the size of dinner plates, and they stay ornamental even as the flowers fade and the fluffy seedheads mature. Plant it and you're sure to have many bees, flies and butterfly visitors nectaring at the flowers for weeks; bees also collect pollen.

Swamp milkweed (*Asclepias incarnata*)



Height: .6 m (2 ft) to 1.2 m (4 ft)

Flowers: pink

Blooming period: mid-summer

Exposure: sun

Soil: moist to regular

Specialist pollinator interactions:

larval host for monarch butterfly, Queen butterfly, milkweed tussock moth, milkweed leaf beetle

Good combinations: liatris, culver's root, Joe-pye weed, boneset, ironweed

Swamp milkweed is less aggressive than the common milkweed, and provides all the great pollinator benefits characteristic of the *Asclepias* genus. The light pink to claret-coloured, fragrant blooms last for weeks and are a nectar and pollen magnet for bees and other pollinators. The yellow milkweed aphid often covers stems and new leaves but rarely kills the plant—these insects can be controlled simply with a blast of water from the hose. This plant prefers regular to moist conditions, so monitor it during droughts, when you might need to water it. Be sure to look for monarch butterfly larvae on the undersides of leaves—milkweed species are the only known larval host plants for this endangered butterfly. Bees, wasps, beetles, flies, moths and butterflies are frequent visitors. The seedpod is also attractive.

Sweet cicely (*Osmorhiza longistylis*)



Height: .45 m (1.5 ft) to 1 m (3 ft)

Flowers: white

Blooming period: late spring

Exposure: shade to partial shade

Soil: regular to moist

Specialist pollinator interactions:

larval host for black swallowtail butterfly

Good combinations: wild geranium, wild blue phlox, early meadowrue

In woodlands, this white-flowered plant of medium height forms large masses, covering the ground in spring. The delicate flowers, in umbels, can look almost like twinkling stars in the shade of a woodland garden. The nectar and pollen attract bees and flies. The spiny seeds hitchhike onto clothes and animals, ensuring dispersal.

Sweet Joe-pye weed (*Eutrochium purpureum*, aka *Eupatorium purpureum*)



Height: .6 m (2 ft) to 2.1 m (7 ft)

Flowers: pale pink to white

Blooming period: mid-summer to early fall

Exposure: sun to partial sun

Soil: moist to dry; drought tolerant

Specialist pollinator interactions:

larval host for three-lined flower moth, ruby tiger moth, eupatorium borer moth, common plume moth, red groundling, common pug

Good combinations: boneset, grey-headed coneflower, white turtlehead, obedient plant, ironweed, grass-leaved goldenrod

Sweet Joe-pye weed is very similar to spotted Joe-pye weed (see the separate entry) but has somewhat rounder flower clusters and no purple spots on the stems. Bees visit for nectar and pollen, and the flowers are butterfly magnets.

Tall goldenrod (*Solidago altissima*)



Height: 1 m (3 ft) to 2.1 m (7 ft)

Flowers: yellow

Blooming period: late summer to fall

Exposure: sun to partial shade

Soil: regular to dry; drought tolerant

Specialist pollinator interactions:

specialist bees: *Andrena nubecula*, *Andrena hirticincta*, *Andrena placata*, *Andrena simplex*, *Andrena solidaginis*, *Colletes simulans armatus*, *Melissodes druriella*; larval host for silvery checkerspot butterfly, ruby tiger moth, *Bucculatrix angustata*, *Coleophora annulicola*, wormseed webworm, *Scrobipalpula sacculicola*, confused eusarca, false crocus geometer, *Cremastobombycia solidaginis*, fine-lined sawfly, sharp-stigma looper moth, lost sawfly, green leuconycta, pink-barred pseudeustrotia, *Anania funebris*, *Astrotischeria solidagonifoliella*, *Choristoneura parallela*, white spotted sable moth, dark-spotted palthis moth

Good combinations: sky blue aster, heath aster, boneset

An aggressive goldenrod that creates colonies, tall goldenrod should only be introduced to gardens in which this trait can be used to advantage, such as in large gardens with poor soil where little else will grow. One trick to keep it under control—at least in terms of height—is to cut the stems back drastically in mid-summer; it will still bloom but on lower stalks. The flowers are long-lasting and provide late-summer nectar and pollen for bees, wasps, flies, beetles, butterflies and moths. The plant is extremely drought tolerant and valuable for a wide range of insects.

**Tall meadowrue (*Thalictrum polygamum*,
aka *Thalictrum pubescens*)**



Height: 1 m (3 ft) to 2.1 m (7 ft)

Flowers: white

Blooming period: early to late summer

Exposure: partial sun to shade

Soil: regular to moist

Specialist pollinator interactions:
specialist bee: bronze sweat bee; larval
host for Canadian owlet moth, crocus
geometer moth

Good combinations: baneberry,
wild geranium

Blooming in summer (unlike the related, spring-blooming early meadowrue), this perennial is quite tall and showy. Its masses of white flowers are held at the top of stalks and last for weeks, creating an airy display and attracting bees and butterflies. Grow it in humus-rich soil.

Tall white lettuce (*Prenanthes altissima*) +



Height: .6 m (2 ft) to 1.8 m (6 ft)

Flowers: greenish white

Blooming period: late summer to
early fall

Exposure: partial sun

Soil: moist to dry

Good combinations: woodland
sunflower

This tall-growing plant is not often cultivated in gardens but it should be. The leaves are interesting, with their lobed form, and the central stalk produces a panicle of greenish white flowers that hang down. The seeds are hairy tufts distributed by wind. Bees feed on the nectar and collect pollen.

Virgin's bower (*Clematis virginiana*)



Height: n/a

Flowers: white

Blooming period: early to
mid-summer

Exposure: sun to partial shade;
drought tolerant

Soil: regular to dry

Specialist pollinator interactions: larval host for
brown bark carpet moth, spotted
thyris, mournful thyris

This versatile, woody vine grows vigorously, covering large areas in just one season. Use this trait to advantage on a fence or arbour. Tolerant of partial shade, the vine produces masses of white flowers in early summer, then gives another show with its wispy, almost pinwheel-looking seedheads that are very ornamental. The flowers attract bees, wasps and flies.

Virginia bluebells (*Mertensia virginica*) +



Height: .3 m (1 ft) to .6 m (2 ft)

Flowers: blue

Blooming period: mid-spring; spring ephemeral

Exposure: shade to partial sun

Soil: regular to moist

Good combinations: wild blue phlox, sweet cicely, wild ginger, bellwort

Clusters of pink buds develop into gorgeous masses of blue, trumpet-shaped flowers in spring. The plant looks fantastic for weeks, then goes dormant in early summer, leaving space for a succession of other woodland plants. It self-seeds well but not aggressively and is a must-have for shady gardens. It requires humus-rich soil. One of the interesting features of this ephemeral plant is that the emerging leaves are deep purple and then turn emerald green as they open up. The flowers provide pollen and nectar for bees, and nectar for flies, butterflies, skippers and moths, including a species of very showy hummingbird moth.

Virginia mountain mint (*Pycnanthemum virginianum*)



Height: .3 m (1 ft) to 1 m (3 ft)

Flowers: white

Blooming period: mid-summer

Exposure: sun

Soil: moist to dry; drought tolerant

Good combinations: wild bergamot, ironweed, yarrow, blazing-star, nodding wild onion

With masses of pretty white flowers that cover the plant and last for weeks, Virginia mountain mint is a stellar performer in a sunny, dry garden. Bees, wasps, flies, butterflies and beetles are frequent visitors for nectar. Because it tolerates a wide range of soil conditions from moist to dry, it is an ideal candidate for a rain garden. The foliage is aromatic when bruised.

Virginia waterleaf (*Hydrophyllum virginianum*)



Height: .3 m (1 ft) to .6 m (2 ft)

Flowers: white, pink, purple

Blooming period: late spring

Exposure: partial sun to shade

Soil: regular to moist

Specialist pollinator interactions: specialist bees: *Andrena geranii*, *Nomada hydrophylli*

Good combinations: false Solomon's seal, wild geranium

Although this plant is an aggressive spreader, this feature can be used to advantage in shady spots where it will fill in areas faster than many other, slower-spreading woodland plants. Its white, pink or purple flowers last for a few weeks in spring, providing nectar and pollen for visiting bees. Less fussy than other woodland plants that require humus-rich soil, Virginia waterleaf can tolerate somewhat drier soil. Its name comes from the spots on young leaves that look like water marks or stains.

White turtlehead (*Chelone glabra*)



Height: .3 m (1 ft) to 1 m (3 ft)

Flowers: white

Blooming period: late summer to fall

Exposure: sun to partial sun

Soil: regular to wet

Specialist pollinator interactions:

larval host for Baltimore checkerspot butterfly, flea beetle *Diabolia chelones*,

sawfly *Tenthredo grandis*, sawfly *Macrophya nigra*

Good combinations: cardinal flower, great blue lobelia

This moisture-loving perennial works well at pond edges or in rain gardens, though it will also grow in regular soil, where it should be watered during drought. The intriguing, white flowers do look like open-mouthed turtles in profile, making it a good addition to children's gardens. A fun activity is to watch bumblebees pry open the flower lips to gain access to the hard-to-reach nectar, transferring pollen while doing this labour-intensive, energy-expending work.

Wild bergamot (*Monarda fistulosa*)



Height: .6 m (2 ft) to 1.2 m (4 ft)

Flowers: purple, lavender, pink

Blooming period: mid-summer

Exposure: sun to partial sun

Soil: regular to dry; drought tolerant

Specialist pollinator interactions:

specialist bee: *Dufourea monardae*; larval host for hermit sphinx moth, two snout moths (*Pyrausta generosa* and *P. signatalis*), gray marvel moth

Good combinations: vervain, Virginia mountain mint, bush clover, Canada milk vetch, anise hyssop

Like its bee balm relative (*Monarda didyma*), this perennial has prolific jester's hat-like flowers, but they are in shades of purple to pink. A drought-tolerant plant that tolerates compacted soil, the blooms last for weeks and are nectar and pollen sources for bees. Butterflies and hummingbirds also feed on the nectar. Some bees and wasps chew holes at the base of the flowers to gain access to nectar; beneficial soldier beetles then make use of these holes to get at the nectar. Ensure good air circulation between plants to minimize powdery mildew. The leaves are aromatic.

Wild blue lupine (*Lupinus perennis*)



Height: .3 m (1 ft) to .6 m (2 ft)

Flowers: blue

Blooming period: late spring to early summer

Exposure: sun to partial sun

Soil: regular to dry; drought tolerant

Specialist pollinator interactions:

larval host for Karner blue butterfly, eastern tailed blue, wild indigo duskywing, persius duskywing, frosted

elfin, orange sulphur, clouded sulphur, American painted lady, gray hairstreak, spring azure, silvery blue, clover looper moth, phyllira tiger moth, placentia tiger moth, bella moth

Good combinations: butterfly milkweed, pussytoes, prairie smoke

Incredibly valuable as a larval host plant for numerous butterfly and moth species, this leguminous perennial is also gorgeous in all of its stages: the glowing green of its palmate leaves, the beautiful blue of its pea-like flowers (held on an erect stalk in late spring and early summer), and the decorative, dried seed pods. It requires a specific inoculant in the soil, which native plant nurseries use when cultivating this plant. Bees (bumblebees in particular) visit for pollen. Note that the roadside lupines you see in the Maritimes, for example, in shades of pink, purples and white, are non-native.

Wild columbine (*Aquilegia canadensis*)



Height: .3 m (1 ft) to .6 m (2 ft)

Flowers: red flowers with orange and yellow accents

Blooming period: late spring to early summer

Exposure: sun to shade

Soil: regular

Specialist pollinator interactions:

larval host for columbine duskywing, columbine borer moth

Good combinations: wild geranium, wild blue phlox, hairy beardtongue, smooth beardtongue

A very versatile plant, wild columbine grows in sun to shade, and tolerates somewhat dry conditions. Its intriguingly shaped and coloured flowers, with red tubular spurs and yellow/orange accents, dangle from the stalk and provide nectar for bees, beetles and hummingbirds, as well as pollen for bees. It self-sows prolifically and blooms in late spring through early summer, and is a valuable nectar source when not many other native meadow plants are flowering in a sunny garden. In a woodland garden, it complements other late-spring-blooming shade plants.

Wild geranium (*Geranium maculatum*)



Height: .3 m (1 ft) to .6 m (2 ft)

Flowers: pink to purple

Blooming period: mid-spring

Exposure: partial sun to shade

Soil: regular

Specialist pollinator interactions:

specialist bee: *Andrena distans*;
larval host for bridled arches, geranium budworm moth, tobacco budworm moth, omnivorous leafroller moth, white-marked tussock moth; *Pachyschelus purpureus* beetle

Good combinations: foamflower, false Solomon's seal, Solomon's seal

For masses of pink to purple flowers in the woodland garden, wild geranium is a reliably colourful performer. You can deadhead it to encourage more blooming. Dark lines on the flowers serve as nectar guides for bees, which also collect pollen from the plant. Flies and butterflies are also attracted to the flowers. The divided leaves are ornamental throughout the summer, as are the beaked seed capsules, which curl upwards to release their seed. It requires humus-rich soil.

Wild sarsaparilla (*Aralia nudicaulis*)



Height: .3 m (1 ft) to .45 m (1.5 ft)

Flowers: whitish yellow

Blooming period: mid-spring

Exposure: partial shade to shade

Soil: regular to moist

Good combinations: wild

columbine, Canada mayflower, large-leaved aster

Creating clonal colonies, this perennial is an attractive groundcover in shady conditions. When the leaves first emerge, they are distinctly bronze-coloured and glossy. The flowers, in globe-shaped, whitish-yellow umbels that arise on branching stalks, last for weeks, and are pollinated by bumblebees, solitary bees and syrphid flies. The flowers give way to blue-black, fleshy berries. The plant's common name comes from the fact that the roots were used, in the past, to flavour root beer. It requires humus-rich soil. The closely related species called bristly sarsaparilla (*Aralia hispida*) is extirpated from the wild in the GTA but is common in cottage country.

Wild strawberry (*Fragaria virginiana*)



Height: 7.5 cm (3 in) to 15 cm (6 in)

Flowers: white

Blooming period: late spring to early summer

Exposure: sun to partial sun

Soil: regular to dry; drought tolerant

Specialist pollinator interactions: larval host for grizzled skipper, gray hairstreak, strawberry crown borer, strawberry leafroller moth, purple-lined sallow moth

Good combinations: blue-eyed grass, nodding wild onion

This rapidly spreading groundcover not only fills in bare areas quickly, reproducing clonally wherever the tips of stolons touch the soil, but it also produces delicious edible fruit—small berries that pack more flavour than their commercial strawberry relatives. It even tolerates a bit of foot traffic and competition, and does well at the sunny edges of a woodland garden or weaving along the ground in a meadow planting. The nectar and pollen of the pretty white flowers attract bees and flies.

Woodland sunflower (*Helianthus divaricatus*)



Height: .6 m (2 ft) to 1.8 m (6 ft)

Flowers: yellow

Blooming period: late summer to fall

Exposure: sun to shade

Soil: regular to dry soil; drought tolerant

Specialist pollinator interactions: specialist bees: *Andrena accepta*, *Andrena aliciae*, *Andrena helianthi*, *Dufourea*

marginatus, *Melissodes agilis*, *Pseudopanurgus rugosus*, *Dieunomia heteropoda*, *Megachile pugnata*; larval host for silvery checkerspot butterfly, painted lady, Isabella tiger moth, gelechid moth, saddleback caterpillar moth, variegated leafroller moth, ruby tiger moth, common pinkband, arge tiger moth, American angle shades, sunflower leaf beetle

Good combinations: large-leaved aster, white wood aster

Blooming from late summer through fall, woodland sunflower provides masses of bright yellow blooms. It is tolerant of dry conditions and does well in open woodland borders and in sunny locations. It is very useful for late-summer colour in the garden, and the prolific blooms last for weeks.

Yellow wild indigo (*Baptisia tinctoria*) +



Height: .3 m (1 ft) to 1 m (3 ft)

Flowers: cream to white

Blooming period: late spring to early summer

Exposure: sun to partial shade

Soil: regular to dry; drought tolerant

Specialist pollinator interactions: larval host for wild indigo duskywing, clouded sulphur, orange sulphur, eastern tailed blue butterfly

Good combinations: smooth beardtongue, hairy beardtongue

This leguminous plant, which fixes nitrogen in the soil, is beautiful throughout the seasons. Its form is shrub-like and rounded, and it produces clusters of yellow pea-like flowers in late spring though early summer, lasting for weeks. Bees, flies, and beetles feed on the nectar and pollen. Easy to grow in tough conditions of dry, poor soil, the only caution is that its deep, extensive root system (good for stabilizing soil) resents disturbance and, thus, the plant shouldn't be moved once established. The seedpods, which turn black when ripe, are a decorative feature, and also an audible one—the seeds rattle in the ripe pods, creating a gentle rustling sound in wind.

Zig zag goldenrod (*Solidago flexicaulis*)



Height: .3 m (1 ft) to 1 m (3 ft)

Flowers: yellow

Blooming period: late summer to late fall

Exposure: partial shade to shade

Soil: regular to dry; drought tolerant

Specialist pollinator

interactions: specialist bees: *Andrena nubecula*, *Andrena hirticincta*, *Andrena placata*, *Andrena simplex*, *Andrena solidaginis*, *Colletes simulans armata*, *Melissodes druriella*; larval host for silvery checkerspot butterfly, brown-headed owlet, twirler moth, ruby tiger moth, *Bucculatrix angustata*, *Coleophora annulicola*, wormseed webworm, *Scrobipalpula sacculicola*, confused eusarca, false crocus geometer, *Cremastobombycia solidaginis*, fine-lined sawfly, sharp-stigma looper moth, lost sawfly, green leuconycta, pink-barred pseudeustrotia, *Anania funebris*, *Astrotischeria solidagonifoliella*, *Choristoneura parallela*, white spotted sable moth, dark-spotted palthis moth

Good combinations: large-leaved aster, woodland sunflower

Colour in the fall woodland garden in hard to come by, and zig zag goldenrod delivers, with prolific yellow flowers that provide pollen and nectar for bees. Many species of wasps, flies, beetles, bugs, aphids and moths also use this goldenrod. Its zig-zagging stem is a decorative feature. Although not as aggressive as many other goldenrod species, it does spread well and, once established, can tolerate dry conditions and some compaction. Give it humus-rich soil.

Additional Recommended Native Plants

In addition to the native plants included in the illustrations and garden designs (and profiled in detail in the preceding pages), the following native plants are also recommended. Plants marked with a plus sign, +, are not historically known to have occurred specifically in Toronto (according to the Toronto and Region Conservation Authority), but are native to the region more broadly.

SPRING-BLOOMING PLANTS FOR SHADE:

Barren strawberry (*Waldsteinia fragarioides*, aka *Geum fragarioides*) +
 Bishop's cap, aka mitrewort (*Mitella diphylla*)
 Canada mayflower (*Maianthemum canadense*)
 Canada violet (*Viola canadensis*)
 Early meadowrue (*Thalictrum dioicum*)
 Foamflower (*Tiarella cordifolia*)
 Great white trillium (*Trillium grandiflorum*)
 Hairy Solomon's seal (*Polygonatum pubescens*)
 Mayapple (*Podophyllum peltatum*)
 Partridgeberry (*Mitchella repens*)
 Spring beauty (*Claytonia virginica*)
 Sweet white violet (*Viola blanda*)
 Trout lily (*Erythronium americanum*)
 Twinleaf (*Jeffersonia diphylla*)
 Wakerobin, aka red trillium (*Trillium erectum*)
 White baneberry (*Actaea pachypoda*)
 Wild blue phlox (*Phlox divaricata*)
 Wild ginger (*Asarum canadense*)
 Wood anemone (*Anemone quinquefolia*)
 Wood betony (*Pedicularis canadensis*)
 Woodland strawberry (*Fragaria vesca*)

SPRING-BLOOMING PLANTS FOR SUN:

Buets (*Houstonia caerulea*)
 Common blue violet, aka woolly blue violet (*Viola sororia*)
 Field pussytoes (*Antennaria neglecta*)
 Golden corydalis (*Corydalis aurea*)
 Golden ragwort (*Packera aurea*)
 Great angelica (*Angelica atropurpurea*)
 Hairy beardtongue (*Penstemon hirsutus*)
 Kinnikinnik, aka bearberry (*Arctostaphylos uva-ursi*)
 Twinflower (*Linnaea borealis*)
 Yellow star grass (*Hypoxis hirsuta*)

SUMMER-BLOOMING PLANTS FOR SHADE:

Black snakeroot (*Actaea racemosa*, aka *Cimicifuga racemosa*)
 Large-leaved aster (*Eurybia macrophylla*, aka *Aster macrophyllus*)
 Pokeweed (*Phytolacca americana*) +
 White snakeroot (*Ageratina altissima*, aka *Eupatorium rugosum*)
 White wood aster (*Eurybia divaricata*)
 Wintergreen (*Gaultheria procumbens*)
 Wood lily (*Lilium philadelphicum*)

SUMMER-BLOOMING PLANTS FOR SUN:

American harebell (*Campanula gieseckiana*, aka *Campanula rotundifolia*)

Common milkweed (*Asclepias syriaca*)

Flat-topped white aster (*Doellingeria umbellata*, aka *Aster umbellatus*)

Flowering spurge (*Euphorbia corollata*) +

Great St. Johns-wort (*Hypericum ascyron*)

Grey-headed coneflower (*Ratibida pinnata*) +

Green-headed coneflower, aka cut-leaved coneflower (*Rudbeckia laciniata*)

Jerusalem artichoke (*Helianthus tuberosus*)

Milk vetch (*Astragalus canadensis*)

Narrow-leaved mountain mint (*Pycnanthemum tenuifolium*)

Obedient plant (*Physostegia virginiana*)

Pale-leaved sunflower (*Helianthus strumosus*)

Round-headed bush clover (*Lespedeza capitata*)

Spotted bee balm, aka horsemint (*Monarda punctata*) +

Spreading dogbane (*Apocynum androsaemifolium*)

Tall cinquefoil (*Dryocallis arguta*, aka *Potentilla arguta*)

Tall ironweed (*Vernonia altissima*, aka *Vernonia gigantea*) +

Thimbleweed (*Anemone cylindrica*)

Thin-leaved sunflower (*Helianthus decapetalus*)

Yarrow (*Achillea millefolium*) +

Yellow giant hyssop (*Agastache nepetoides*)

FALL-BLOOMING PLANTS FOR SHADE:

Blue-stemmed goldenrod (*Solidago caesia*)

Heart-leaved aster, aka blue wood aster (*Symphyotrichum cordifolium*, aka *Aster cordifolius*)

Zig zag goldenrod (*Solidago flexicaulis*)

FALL-BLOOMING PLANTS FOR SUN:

Fringed loosestrife (*Lysimachia ciliata*)

Grey goldenrod (*Solidago nemoralis*)

Showy goldenrod (*Solidago speciosa*) +

Smooth aster (*Symphyotrichum laeve*, aka *Aster laevis*)

Sneezeweed (*Helenium autumnale*) +

Panicked aster (*Symphyotrichum lanceolatum*)

NATIVE PLANTS FOR CONTAINERS:

Black-eyed Susan (*Rudbeckia hirta*)

Blue-eyed grass (*Sisyrinchium angustifolium*)

Bristle-leaved sedge (*Carex eburnea*)

Calico aster (*Symphyotrichum lateriflorum*)

Canada anemone (*Anemone canadensis*)

Canada milk vetch (*Astragalus canadensis*)

Common milkweed (*Asclepias syriaca*)

Cylindrical blazing-star (*Liatris cylindracea*)

Dense blazing-star (*Liatris spicata*)

False Solomon's seal (*Maianthemum racemosum*)

False sunflower (*Heliopsis helianthoides*)

Foxglove beardtongue (*Penstemon digitalis*)

Golden alexanders (*Zizia aurea*)

Grey goldenrod (*Solidago nemoralis*)

Harebell (*Campanula rotundiflora*)

Hairy beardtongue (*Penstemon hirsutus*)

Heath aster (*Aster ericoides*)

Hoary vervain (*Verbena stricta*)

Horsebalm (*Collinsonia canadensis*)

Lance-leaved coreopsis (*Coreopsis lanceolata*) +

Little bluestem (*Schizachyrium scoparium*)

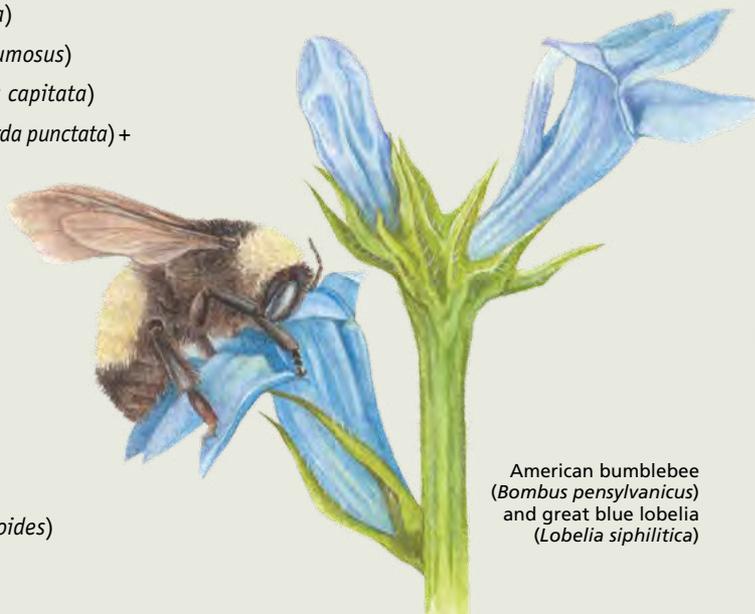
Nodding wild onion (*Allium cernuum*) +

Pearly everlasting (*Anaphalis margaritacea*)

Pennsylvania sedge (*Carex pensylvanica*)

Prairie smoke (*Geum triflorum*)

Pussytoes (*Antennaria neglecta*) +



American bumblebee (*Bombus pensylvanicus*) and great blue lobelia (*Lobelia siphilitica*)

Virginia mountain mint (*Pycnanthemum virginianum*)

Wild bergamot (*Monarda fistulosa*)

Wild columbine (*Aquilegia canadensis*)

Wild geranium (*Geranium maculatum*)

Wild strawberry (*Fragaria virginiana*)

Woodland strawberry (*Fragaria vesca*)

Zig zag goldenrod (*Solidago flexicaulis*)

NATIVE TREES, SHRUBS AND VINES FOR POLLINATORS:

American hazelnut (*Corylus americana*)

Aspens and poplars (*Populus* spp.)

Basswood, aka American linden (*Tilia americana*)

Birches (*Betula* spp.)

Black chokeberry (*Aronia melanocarpa*, aka *Photina melanocarpa*)

Blue beech, aka musclewood and American hornbeam (*Carpinus caroliniana*)

Eastern snowberry (*Symphoricarpos albus* var. *albus*)

Gray dogwood (*Cornus racemosa*)

Great St. John's-wort (*Hypericum ascyron*)

Hackberry (*Celtis occidentalis*) +

Ironwood, aka hop-hornbeam (*Ostrya virginiana*)

Maples (*Acer* spp.)

Moonseed vine (*Menispermum canadense*)

Narrow-leaved meadowsweet (*Spiraea alba*)

Native blackberries and raspberries (*Rubus* spp.)

New Jersey tea (*Ceanothus americanus*)

Ninebark (*Physocarpus opulifolius*)

Northern bush honeysuckle (*Diervilla lonicera*)

Oaks (*Quercus* spp.)

Pasture rose (*Rosa carolina*)

Plums and cherries (*Prunus* spp.)

Red elderberry, aka red-berried elder (*Sambucus racemosa* ssp. *pubens*)

Redbud (*Cercis canadensis*) +

Running strawberry bush (*Euonymus obovatus*)

Shrubby cinquefoil (*Dasiphora fruticosa*, aka *Potentilla fruticosa*) +

Spicebush (*Lindera benzoin*)



Yellow bumblebee (*Bombus fervidus*) and blue flag iris (*Iris versicolor*)

Staghorn sumac (*Rhus typhina*)

Viburnums (*Viburnum* spp.)

Virginia creeper vine (*Parthenocissus quinquefolia*)

Virgin's bower (*Clematis virginiana*)

Wild honeysuckle, aka glaucous honeysuckle (*Lonicera dioica*)

Winterberry (*Ilex verticillata*)

Witchhazel (*Hamamelis virginiana*)

Wild black currant (*Ribes americanum*)

Willows (*Salix* spp.)

NATIVE GRASSES AND SEDGES FOR POLLINATORS:*

Big bluestem (*Andropogon gerardii*)

Bottlebrush grass (*Elymus hystrix*)

Bristle-leaved sedge (*Carex eburnea*)

Canada wild rye (*Elymus canadensis*)

Common wood sedge (*Carex blanda*)

Fox sedge (*Carex vulpinoidea*)

Indian grass (*Sorghastrum nutans*)

Little bluestem (*Schizachyrium scoparium*)

Pennsylvania sedge (*Carex pennsylvanica*)

Plantain-leaved sedge (*Carex plantaginea*)

Switchgrass (*Panicum virgatum*)

Wood rush (*Luzula multiflora*)

*Although grasses and sedges do not produce nectar, they offer pollen and other foods, nesting sites, shelter and host plants for native insects, and are an important component of gardens designed for pollinator habitat.

Resources

Bees of Toronto: A Guide to Their Remarkable World, City of Toronto Biodiversity Series; 2016.

Toronto's Pollinator Protection Strategy, City of Toronto; 2018.

Gardening for Pollinators

Attracting Native Pollinators: Protecting North America's Bees and Butterflies, by The Xerces Society; 2011.

Pollinators of Native Plants: Attract, Observe and Identify Pollinators and Beneficial Insects, by Heather Holm; 2014.

Farming with Native Beneficial Insects, by The Xerces Society; 2014.

100 Easy-to-Grow Native Plants for Canadian Gardens, by Lorraine Johnson; 2017 (3rd edition).

Create Your Own Bee & Bee Space, by Friends of the Earth Canada; 2020, available via free download from foecanada.org/the-bee-cause/bee-and-bee

How to Make a Pollinator Garden, by Clement F. Kent (available via free download from researchgate.net/publication/233402388_How_to_Make_a_Pollinator_Garden or from academia.edu/19771145/How_to_Make_a_Pollinator_Garden)

Gardening for Butterflies: How You Can Attract and Protect Beautiful, Beneficial Insects, by The Xerces Society; 2016.

Butterfly Gardening with Native Plants: How to Attract and Identify Butterflies, by Christopher Kline; 2015.

Web Sources

savethebumblebees.ca

nanps.org

pollinator.ca/guelph

xerces.org

inthezonegardens.ca

blog.pollinatorgardens.net

foecanada.org



Small carpenter bee
(*Ceratina* sp.)

