

*Introduction to*

# Native Pollinators on Farms in Ontario

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*Photo: Sage Handler*

*Dedicated to*

The fascinating native pollinators of Ontario...you are too numerous to name!  
The many enthusiastic bee spotters who take photos so that we can all get a close up look  
and get to know our native pollinators better.

This factsheet is also available online at <http://farmsatwork.ca/pollinators/resources>.

**T**here is a strong connection between farming and native pollinators in Ontario as many farms provide foraging and nesting habitat for native pollinators and in turn receive pollination services from these pollinators. An excellent poster showing native bees common to Ontario can be found at <http://beesinyourbackyard.blogspot.ca/p/poster.html>

### **Why are Native Pollinators Important to Farms?**

Farms commonly obtain pollination services from honey bees which may be located in beeyards on the farm or elsewhere. However, depending on a single species of bee for crop pollination services puts farmers at risk should that species suffer losses or declines.

Scientific research has clearly shown that pollination services to crops are provided by many species of wild bees in addition to honey bees. In some cases, bees other than honey bees are the best crop pollinators. For example, squash bees are better pollinators of pumpkins, squash, zucchini and gourds, bumble bees are better pollinators of blueberries and greenhouse tomatoes, and mason bees are better pollinators of orchard crops than honey bees. Usually, having a wide variety of pollinators working together provides the best pollination services to a crop, so farms needing pollination services should have a plan to protect and encourage many kinds of pollinators on the farm (Figure 1).



*Credit: Katie Fisher*

**Figure 1** Pollinator habitat incorporated in a vegetable market garden at Howe Family Farm, Aylmer, ON  
If you would like more information about how to provide habitat for pollinators on your farm, refer to Factsheet 2: Creating Pollinator Habitat on Farms in Ontario (Available at <http://farmsatwork.ca/pollinators/resources>).

## Ontario crops that benefit from insect pollination

Orchard Crops:	apples, pears, sour cherries, peaches, plums, apricots
Small Fruit Crops:	strawberry, raspberry, blackberry, haskap, high bush blueberries, low bush blueberries, cranberries, currants, gooseberry
Vine Crops:	pumpkin, squash, zucchini, gourds, watermelon, cantaloupe, field cucumbers
Vegetable Crops:	tomato, eggplant, peppers, green bean, snap bean, pole bean, kidney bean, and haricot ( <i>Phaseolus vulgaris</i> ), lima bean ( <i>Phaseolus lunatus</i> ), scarlet and runner beans ( <i>Phaseolus coccineus</i> ), and broad beans ( <i>Vicia faba</i> ).
Field Crops:	canola, sunflower, some varieties of soybean,
Forage Crops Grown for Seed:	alfalfa, red clover, alsike clover, birdsfoot trefoil



**Figure 2** Hoverfly on strawberry  
(Credit: Katie Fisher)

## Common Misconceptions About Bees:

### **Bees make honey...**

only honey bees make enough honey for human consumption

**Bees swarm...**only honey bees swarm as a way to split a large colony into two smaller colonies. No other bees in Ontario do this.

**Bees sting...**although all female bees can sting, the sting of most bees in Ontario is not painful and many will never sting at all. In fact some of Ontario's bees are so small that their stinger cannot penetrate human skin. The exceptions to this are the bumble bees and the honey bee, both of which deliver a painful sting if they feel threatened, especially near their nests.

**Bees live in hives...**only honey bees live in hives, though commercially available bumble bee hives can also be purchased in boxes. All other bees live in a variety of places. The most common nesting place for bees is in excavated tunnels in the ground. Other nesting places include abandoned rodent's nests, hollow stems, cavities, and wood.

## Who are the Pollinators Providing Pollination Services to Farms?

Under most circumstances, bees are the most numerous and efficient pollinators of crops, although some families of flies (e.g. hoverflies) also provide pollination services (Figure 2). Butterflies and moths, although they may visit Ontario crops for nectar, do not generally provide reliable crop pollination services, nor do beetles, wasps, bats, or hummingbirds, although they may be important pollinators of non-crop plants especially in tropical or desert climates.

Ontario is a bee-diversity hotspot in Canada, boasting 420 species of bees. However, not all species are commonly found on farms. In fact, research on crop pollination shows that only a small fraction of native bee species are responsible for most crop pollination. Research is in progress to determine which native bees are commonly found on Ontario's crops. However many other species may live in natural areas on farms.

To better understand the native bees found on farms, it is important to understand differences in social structure among bees. Bees can form perennial colonies, annual colonies, can live communally, or can be solitary. Almost all species of bees in Ontario are solitary.

**Perennial Colonies:** In Ontario, only the honey bee forms large social colonies that last many years and have a queen and female workers, as well as males. Honey bees can overwinter successfully in Ontario in colonies because they have large honey stores which they consume to keep their hive warm.

**Annual Colonies:** All bumble bees and a small number of sweat bee species (in the family Halictidae) form annual colonies which function as social units only in the spring, summer and fall. These annual colonies produce new queens in the fall which are mated and then overwinter in the ground as individuals. All the other members of these annual colonies die of starvation and cold once winter begins. The mated queens start new colonies the next spring.

**Communal:** For bee species that have a communal social system, females share a nest entrance but each constructs her own brood cells and forages for her own food to feed her offspring. There is no queen in this system. Males do not live in the nests as adults.

**Solitary:** More than 95% of bee species are solitary. In these species, each

female mates and constructs her own nest and forages for her own food to feed her offspring. After providing nectar and pollen and laying an egg, mothers have no contact with their offspring. Often there is only one generation produced per year and populations grow slowly. There is no queen in this system. Males do not live in the nests as adults.

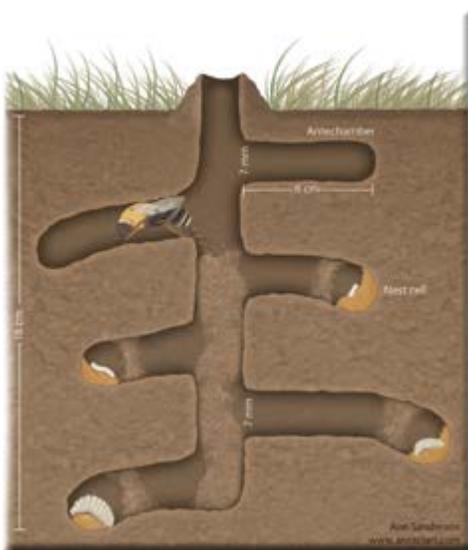
### Bee Nesting Materials:

Native bees most commonly excavate tunnels in soil to build their nests (Figure 3). Many bees will build their ground nests in and around agricultural fields, on farm laneway edges, and on maintained grassy areas such as lawns around a farmhouse or other buildings.

Some native bee species such as mason bees, small carpenter bees, and leafcutter bees will build their nests in hollow stems (Figure 4). These bees will occupy artificial nests made of cardboard straws, reeds, bamboo, or holes drilled in wood. Other bees such as the woolcarder bees use small pre-existing cavities. Large carpenter bees can bore cavities of their own into wooden structures and can become pests (Figure 8). Carpenter bees are most common in urban areas in Ontario. Bumble bees nest either above ground in grass tufts, straw or hay bales in barns, hollow trees, or in the spaces in stone piles or below ground in abandoned rodent nests. Once bumble bee queens have begun to nest, the nests are difficult to relocate successfully. Nesting behaviour of various families of bees is summarized in Table 2.

A particular species of bee may be active throughout the growing season from April to October or for only a portion of the growing season like the spring or summer. Mason bees (*Osmia spp.*) are active in the spring and are excellent pollinators of spring-blooming orchard crops (Figure 9). Squash bees (*Peponapis pruinosa*) are active in July and August when pumpkin and squash are in bloom. Bumble bees and most bees in the Halictidae family are active all season.

When creating foraging habitat for bees on farms, it is important to provide habitat for the whole growing season to accommodate those bees that are active throughout that period.



**Figure 3** Ground nest of the solitary squash bee showing the bee excavating a nest cell.



**Figure 4** Small carpenter bee nest in stem of fennel. (Credit:Gideon Pisanty), (<https://creativecommons.org/licenses/by/3.0/deed.en>)

Not only are bees active at different times in the season, they may also be active at different times of day. The squash bee is active from dawn until noon when the flowers of squash and pumpkin crops close (Figure 7). Bumble bees are active throughout the day beginning early in the morning and continuing until light fails (Figure 5). They can be seen foraging in cool wet conditions that are not favoured by honey bees. Some bees, including many species in the Halictidae family, are active in the twilight (Figure 6). No Ontario bees are active at night. When applying pesticides to a crop, it is important to understand the daily activity periods of native bees to avoid causing harm through direct contact with insecticides.

**Figure 5** Tri-coloured bumble bee on blanket-flower (Credit: Kayla Mundy)



**Figure 7** Squash bee, specialist pollinator of pumpkin & squash crops, covered in pollen on male pumpkin flower (Credit: Sage Handler)



**Figure 6** Halictid bee on sweet alyssum, an excellent nectar & pollen plant (Credit: Nigel E. Raine)



**Figure 8** Large carpenter bee on native beebalm (Credit: Nigel E. Raine)



**Figure 9** Blue orchard bee, important pollinator of spring blooming orchard crops. (Credit: Seabrooke Leckie), (<https://creativecommons.org/licenses/by-nc-nd/2.0/>)

**The diversity of Ontario’s most common pollinating bees\*, grouped by family, showing their active period, their preferred nesting habitat, and their social structure.\*\***

<b>Family</b>	<b>Number of Common Pollinator Species</b>	<b>Notable Bees</b>	<b>Active Period</b>	<b>Preferred Nesting Habitat</b>	<b>Social Organization</b>
Megachilidae	59	Mason bees, Leafcutter bees, Woolcarder bees	Some spring, mostly summer	Cavities, Stems, Under rocks	Solitary
Apidae	43	Honey bees Bumble bees Squash bee Carpenter bees	Mostly all season; one summer	Hives, wood, stems, rodent burrows	Perennial colonies, annual colonies, nest sharing, solitary
Colletidae	28	Cellophane bees	Summer, all season	Ground, stems	Solitary
Halictidae	85	Sweat bees, Lasioglossum	Mostly all season, some summer	Ground, wood	Communal, solitary, annual colonies
Andrenidae	86	Andrena bees	Summer, all season	Ground	Solitary, Communal

\* Some bee species are parasitic, do not collect pollen, and may not be pollinators

\*\* Based on Packer et al. 2007. The Bee General of Eastern Canada. Canadian Journal of Arthropod Identification No.3. ([www.yorku.ca/bugsrus/.../2007%20Packer,%20Genaro%20and%20Sheffield.pdf](http://www.yorku.ca/bugsrus/.../2007%20Packer,%20Genaro%20and%20Sheffield.pdf))

To understand the risks to pollinators on farms see Factsheet 3: Risks to Pollinators on Ontario Farms. To learn how to create pollinator habitat on your farm see Factsheet 2: Creating Pollinator Habitat on Farms in Ontario. All of the factsheets in this series are available at <http://farmsatwork.ca/pollinators/resources>.

If you’re interested in more details about native pollinators on farms in Ontario please go to the Raine lab website ([www.1in3mouthfuls.org](http://www.1in3mouthfuls.org)) and take a look at our recent report on the “Status and Trends of Pollinator Health in Ontario” (<https://rainelab.files.wordpress.com/2015/12/status-and-trends-of-pollinator-health-in-ontario-march-8-2017-tagged.pdf>)