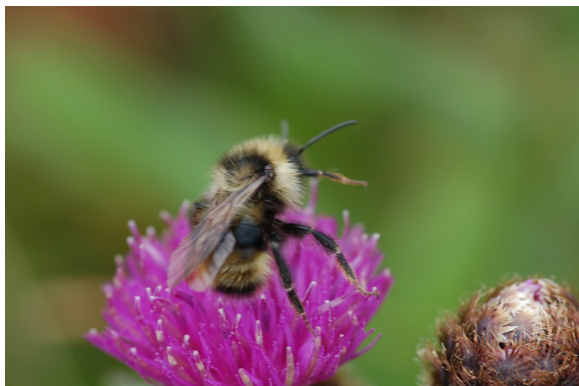


A Guide to  
The Bees of  
Insular Newfoundland





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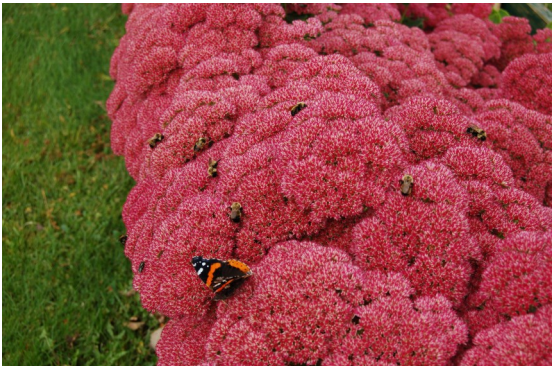
p25: Colin Walsh

Fig 4, p28: Scott MacIvor

## Introduction

The purpose of this guide is to assist untrained personnel to identify some of the important bee pollinators that occur on the island of Newfoundland.

The guide provides some tips on identification, notes on the natural history of the bees, general distribution on the island and known flower associations.



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## Definition and importance of bees

There are 20,000 different kinds of bees globally. They have evolved mechanisms to collect pollen and nectar. In the process they also pollinate the flowers that they visit. Newfoundland and Labrador has about 50 species in 5 families: The Apidae contains the most well-known bees including bumble bees and the honey bee. The Halictidae are very common but not well known. They are referred to as sweat bees because some of them are attracted to mammalian sweat. The Andrenidae are common bees referred to as digger bees because all members nest in the soil. The Megachilidae are common bees referred to as leafcutting bees. They use their jaws to cut sections from leaves and petals of flowers to line the cells of their nests. And finally the Colletidae are small uncommon bees that are referred to as cellophane bees because they line their cells with a glandular substance which, when dried, resembles clear cellophane.

The majority of bee species can be difficult to distinguish. This is a task normally performed by trained scientists. However, this guide will help you identify some of the common bees by color pattern.

# General morphology of bees

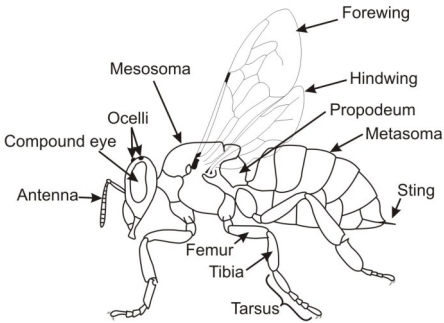


Fig. 1. General structure of a bee

Bees have evolved special hairs (scopa) to collect and transport pollen on their bodies. Bees, in general, have hairy bodies with branching hairs for collecting the pollen. There are a small number of bees that do not collect pollen on their bodies and thus do not have hairy bodies.

Bees have 6 legs and 2 pairs of wings (Fig 1). What appears to be a constriction between the thorax and abdomen is really between the 1st and 2nd abdominal segments. The 1st abdominal segment (the propodeum) is fused to the end of the thorax. The term mesosoma is used to describe the combination of thorax and propodeum while metasoma is used for the abdomen.

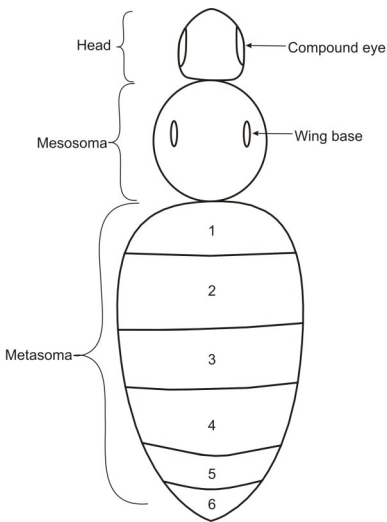


Fig. 2. Top view of a generalized bee

In Bumble bees, the color pattern of the fur on the top of the bee's metasoma (abdomen) can be used to identify the bee species. There are 6 metasomal segments in queens and workers that are numbered sequentially (see Fig 2.).

The bumble bees and honey bees carry the pollen on their hindlegs (Fig 3.). The outer surface of the tibia has a corbicula to carry the pollen ball. Pollen is collected on all the hairs of the body and legs.

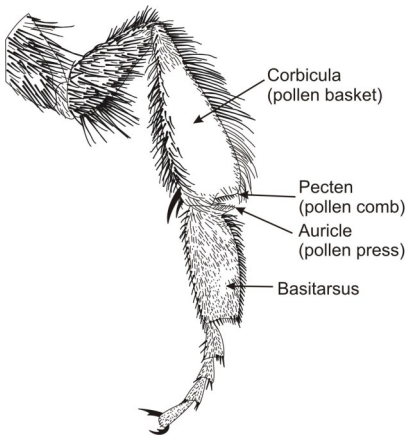


Fig 3. Leg structure of a bumble bee

It uses the inner surface of the basitarsus to concentrate the pollen then the opposite leg combs out the pollen (using the pecten) and compacts it into a ball (using the auricle). The ball is placed into the corbicula and held there by a margin of stiff hairs.

## Life history strategies of bees

Some bees are social insects and live in colonies. Each colony is comprised of a single, egg laying female (queen) and many sterile daughters (workers). The workers are important for food-gathering, nest building, offspring rearing and colony defense.



Only the female bees are capable of stinging. The stinger is a modified egg laying structure that protrudes from the end of the metasoma (see Fig 1.). The vast majority of bees are solitary where there is no worker caste and the females do not cooperate.

## **Importation of bees into NL**

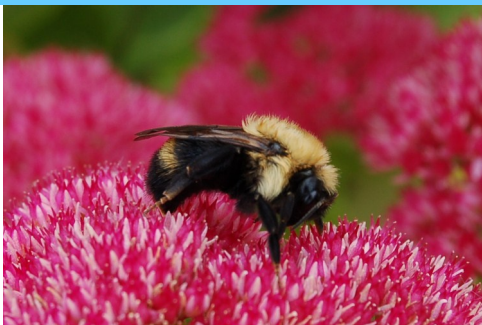
The importation of honeybees into NL is strictly regulated under the Livestock Health Regulations of the Department of Natural Resources. The regulations can be found at:

[http://www.assembly.nl.ca/legislation/sr/regulations/rc961081.htm#20\\_2](http://www.assembly.nl.ca/legislation/sr/regulations/rc961081.htm#20_2)

The importation of other bees is covered under the Wild Life Regulations part VI, section 83 & 84 of the Department of Environment and Conservation. The act states that no one shall import or release any bees into the wild without permission. The regulations can be found at:

<http://www.assembly.nl.ca/legislation/sr/regulations/rc961156.htm#83>

## Apidae (Bumble bees and honey bees)



In NL the Apidae consists of 2 genera: *Apis* and *Bombus*. All species are social that produce colonies (hives).

*Apis* —(honey bee) This bee is not native to NL and cannot live here in the wild.

*Bombus* — (bumble bees) These are the most common and easily recognized bees and are large and furry. All species produce an annual hive where only the queens overwinter. They nest mostly in abandoned rodent holes or under sheds or grass clumps. Queens are the largest in size and can be observed foraging early in spring and early summer. The size of the workers is variable. Early workers are much smaller, but late summer emerging workers are larger. The floral associations of most species are incompletely known.

*Apis mellifera*



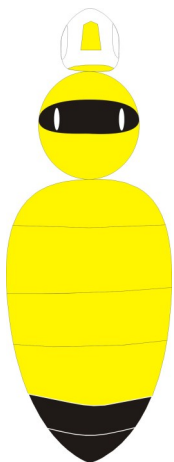
Common name: **Honey bee**

This bee produces a perennial hive where queens and workers overwinter. These bees produce honey as an energy source for their offspring and for overwintering.

Distribution: Only encountered in areas of beekeeping yards.

Floral associations: many types

*Bombus borealis*



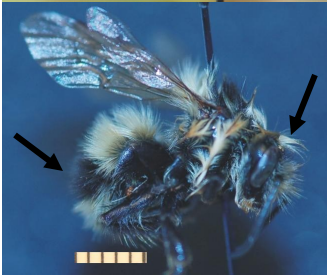
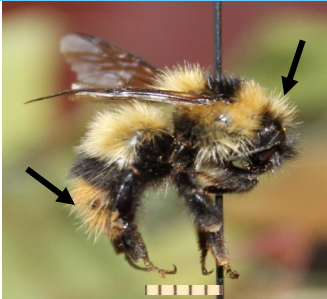
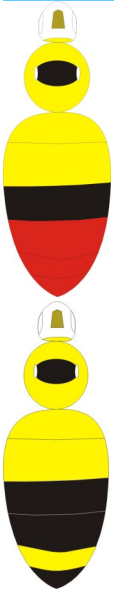
Common name: **Northern amber bumble bee**

This is a large bee that is recognized by having yellow pile on segments 1-4 of the metasoma.

Distribution: Island-wide and regularly observed.

Floral association: Clover species (*Trifolium*), Asters (*Asteraceae*), Roses (*Rosa*), Lupines (*Lupinus*), Fireweed (*Epilobium*), Raspberry (*Rubus*), Sunflower (*Helianthus*), Vetches (*Vicia*)

## *Bombus frigidus*



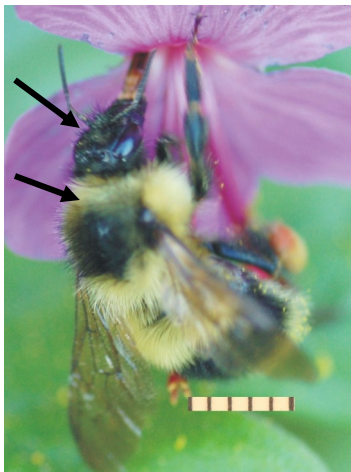
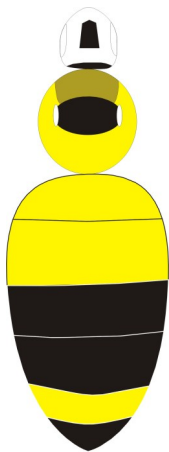
Common name: **Frigid bumble bee**

A medium sized bumble bee with two forms: one is easily confused with *B. vagans bolsteri* because the color pattern on is similar however the distinguishing character is the yellow pile on the top of the head. Other specimens may have orange on metasoma segments 4-6.

Distribution: Island-wide and regularly observed.

Floral associations: Blueberry and Cranberry (*Vaccinium*), Columbines (*Aquilegia*), Thistles (*Cirsium*), Dandelion (*Taraxacum*), Clovers (*Trifolium*)

*Bombus vagans bolsteri*



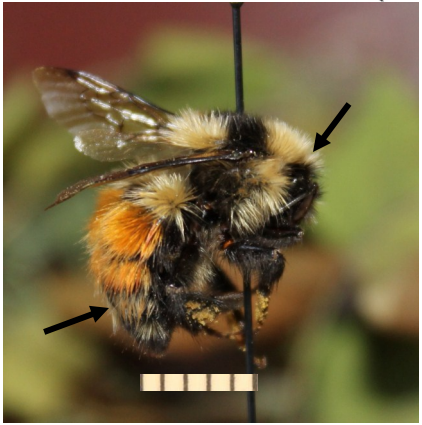
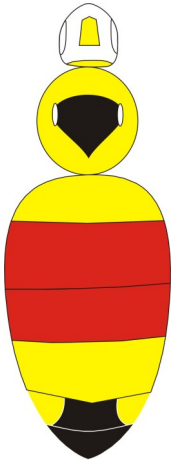
Common name: **None**

This is a very common bee and is a subspecies only found in NL. It can be distinguished from *B. frigidus* by having black pile on the face. The pile in front of the black band on the mesosoma has a combination of yellow and black hairs.

Distribution: Island-wide and regularly observed.

Flora associations: unknown but probably many. Blueberry (*Vaccinium*), Rhodora (*Rhododendron*)

*Bombus sylvicola*



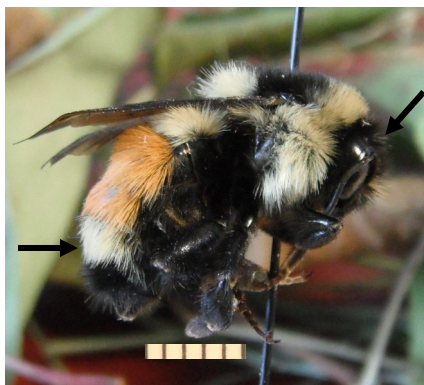
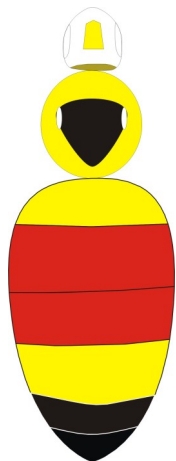
Common name: **Forest bumble bee**

This species is easily confused with *B. ternarius*. *Bombus sylvicola* has metasoma segment 5 with yellow pile and the top of the head is yellow.

Distribution: Island-wide but not observed regularly.

Floral associations: Unknown but likely similar to *B. ternarius*.

## *Bombus ternarius*



Common name: **Tri-colored bumble bee**

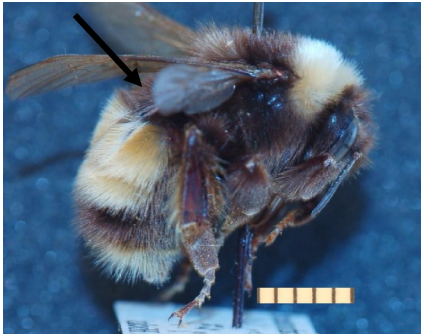
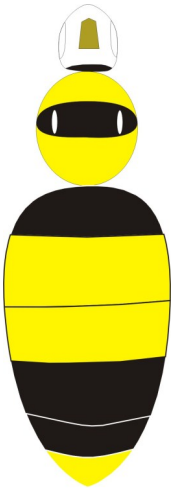
This bee has black all the way across metasoma segment 5 and black/yellow mix of hairs on the top of the head.

Distribution: Island-wide but not observed regularly.

Floral associations: Wide associations. Including Dandelion (*Taraxacum*), Clover (*Trifolium*), Goldenrod (*Solidago*) Hawkweed (*Hieracium*), Asters (*Asteraceae*), Rhodora (*Rhododendron*), Blueberry and Cranberry (*Vaccinium*), Raspberry (*Rubus*), Labrador Tea (*Rhododendron*),



## *Bombus terricola*



Common name: **Yellow-banded bumble bee**

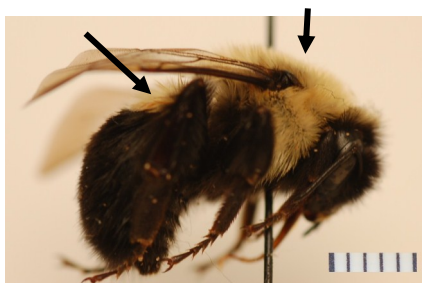
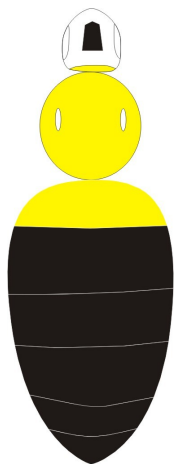
This bee has black pile on segment 1 of metasoma.

Distribution: Island-wide and regularly observed.

Populations of this bee in mainland Canada are declining. However, this trend has not been observed in NL.

Flora associations: Blueberry (*Vaccinium*), Dandelion (*Taraxacum*), Clover (*Trifolium*), Honeysuckle (*Lonicera*), Raspberry (*Rubus*), Apple (*Malus*), Blackcurrent (*Ribes*) Fireweed (*Epilobium*), Sheep laurel (*Kalmia*).

## *Bombus impateins*



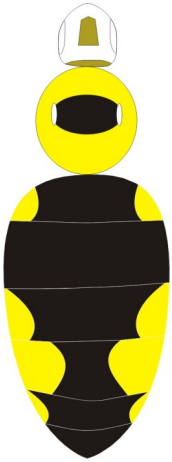
Common name: **Common eastern bumble bee**

This bee has metasoma entirely black except for segment 1. Mesosoma without a black band.

Distribution: This bee is not native to NL and presently has not become established here. It may be encountered near blueberry or cranberry farms where farmers have imported them to supplement pollination.

Floral associations: Imported for Blueberry and Cranberry (*Vaccinium*) pollination, but may be found on other flowers.

*Bombus (Psithyrus) fernaldae*



Common name: **Fernald's cuckoo bumble bee**

The subgenus *Psithyrus* is different than other *Bombus* species, as they are social parasites. In this case, they invade other bumble bee nests and replace the queen's egg laying activities while relying on her workers to feed their offspring. They do not have a worker caste. Hindleg without definite corbicula.

Distribution: Island-wide but not observed regularly.

Floral associations: They do not collect pollen, but may be observed taking nectar from: Aster (Asteraceae), Ragwort (*Senecio*), Black-current (*Ribes*) *Rhododendron*, Goldenrod (*Solidago*), Cinquefoils (*Potentilla*), Clovers (*Trifolium*)

## Halictidae



Common name: **Sweat bees**

These are common ground-nesting bees . This is the most socially diverse genus of bees in the world, with many solitary, a few communal and many social species known. They have a black integument with white hairs and some have a metallic sheen. Some species are often overlooked because of their small size. While others are medium sized bees.

Distribution: Island-wide and regularly observed.

Floral associations: Varied on many plant families.

## Andrenidae



Common name: **Digger bees**

These are common solitary ground-nesting bees. Most species have a black or dark brown integument with dense pubescence, mostly brown hairs, while some others more whitish hairs.

Distribution: Island-wide and regularly observed.

Floral associations: They are particularly common visiting willows (*Salix*) in spring, but the genus as a whole can be found throughout the spring, summer and autumn. Late summer species are common on goldenrod (*Solidago*) and Asteraceae.

## Megachilidae



All members of the Megachilidae are cavity nesters that line their nests with materials gathered from the environment. They are solitary bees where each female provisions a cell with enough pollen and nectar for the development of the larva. NL has species in 3 genera:

*Osmia* - referred to as mason bees because they gather material like mud, resin or leaf and petal pulp to mould into required shapes; *Megachile* - the leaf-cutter bees that use pieces of leaf to line their nests. Gardeners may recognize their work when they see circular pieces missing from garden plants. *Anthidium* - the wool-carder bee, a recently introduced species to NL that lines its nest with wool removed from Lamb's ears (*Stachys byzantina*). The male of this large bee can be observed fighting and killing any other bees that come into their territories.

*Megachile* sp.



Common name: **Leafcutting bees**

The leafcutting bees are readily identified by the scopa under the metasoma. All NL species use cuttings from leaves or floral petals to line their brood cells which are usually in pre-existing holes in wood, although some species nest in the ground.

Distribution: Island-wide but not regularly observed.

Floral associations: Blueberry (*Vaccinium*), Bluebells (*Campanula*), Fireweed (*Epilobium*), Goldenrod (*Solidago*), Rose (*Rosa*), Raspberry (*Rubus*), Buttercup (*Ranunculus*), Clover (*Trifolium*), Dandelion (*Taraxacum*), Vetches (*Vicia*)

*Osmia* sp



Common name: **Mason bees**

These are robust bees, with a dull metallic blue-green sheen in most species and a scopa under the metasoma. These bees overwinter as adults and are common in spring and early summer. They mostly nest in pre-formed cavities in wood or holes in walls. One species (*O. inermis*) builds nests under rocks (see photo on p22). A variety of extraneous materials are used to line the brood cells, including grass blades, mud, chewed leaves, and gravel.

Distribution: Island-wide but not regularly observed.

Floral associations: Varied including Blueberry (*Vaccinium*), Raspberry (*Rubus*), Clover (*Trifolium*), Willow (*Salix*), Rhodora (*Rhododendron*) and others



## *Anthidium manicatum*



Common name: **Wool carder bee**

These are large and robust bees with yellow markings on the head and mesosoma, and bands of yellow on the metasoma. These bees line their brood cells with hairs from the leaves and stems of cultivated Lamb's Ears. Males are highly territorial and hover around the preferred floral hosts of the females, aggressively pursuing females or other bee species that visit the plants.

Distribution: Corner Brook and St. John's, but may be found in gardens elsewhere.

Floral association: Lamb's Ears (*Stachys byzantina*) and other hairy plants.

## Colletidae



Common name: Cellophane bees (*Hylaeus* sp)

These bees characteristically lack a scopa and carry pollen in the gut, rather than externally, and regurgitate it into the cell for larval food. The liquid provisions, along with an egg, are sealed inside a membranous cellophane-like cell lining. Nests are typically in dead twigs, plant stems, or other similarly small natural cavities.

Distribution: Island-wide but not regularly observed.

Floral associations: Maples (*Acer*), Daisy (*Chrysanthemum*), *Hydrangea*, Rose (*Rosa*), Raspberry and similar (*Rubus*), Goldenrod (*Solidago*), *Spiraea*

## Notes

- The bees outlined in this field guide do not cover all of the bee species that are located in NL.
- The floral associations of each bee species are not comprehensive as many of the bees may be located on other plants not mentioned.
- The scale bar shown in the bee photos represents 5mm.
- The use of common names is not usually preferred because of confusion that they can cause. For example, some people in different areas of the province refer to bumble bees as dumbledores, busywops, or busy bees. In this case, no distinction is made for the different species of bumble bees.

Finally, the pollination services that bees provide for native plants are very important for maintaining various ecosystems. In addition, other animals, like small mammals and birds, rely on the fruits and seeds of pollinated plants for food. Therefore we should all strive for the conservation of bees.

## Attracting nesting bees

Since bumble bees nest in abandoned rodent holes, any materials that can be arranged with cavities will attract nesting bumble bees. For example: an undisturbed woodpile; piles of boulders or undisturbed long grass (thatch).

To attract cavity nesters (*Megachilidae*) you can construct nest-boxes out of wood. Fasten blocks of 20cm long 2x6 together and drill 4mm and 7mm holes in the places where the boards touch (fig 4). Hang them on a fence post or tree.



Fig. 4. Nest-boxes for attracting *Megachilidae*

For ground nesting species (*Halictidae* and *Andrenidae*), areas of undisturbed non-vegetated soil with full sun (south-facing) may be best.

## Glossary

**Basitarsus** - the basal segment of the tarsus often conspicuously enlarged from other segments.

**Honey** - a sweet food made by bees using nectar from flowers.

**Integument** - The outer wrapping of the insect, consisting of the exoskeleton.

**Nectar** - a sugar-rich liquid produced by plants.

**Pollen** - small circular male reproductive structure of flowering plants.

**Pile** - soft hair (long, branched setae) that covers their entire body, making them appear and feel fuzzy.

**Pubescence** - A dense area of short hairs.

**Scopa** - a brush-like structure of short stiff hairs of equal length used for collecting pollen.

## Field observations

Date: \_\_\_\_\_ Time of day: \_\_\_\_\_

Location: \_\_\_\_\_

Weather: \_\_\_\_\_

Bee species: \_\_\_\_\_

Activity: \_\_\_\_\_

Flower: \_\_\_\_\_

Sample or photo taken  Yes  No

Date: \_\_\_\_\_ Time of day: \_\_\_\_\_

Location: \_\_\_\_\_

Weather: \_\_\_\_\_

Bee species: \_\_\_\_\_

Activity: \_\_\_\_\_

Flower: \_\_\_\_\_

Sample or photo taken  Yes  No

Date: \_\_\_\_\_ Time of day: \_\_\_\_\_

Location: \_\_\_\_\_

Weather: \_\_\_\_\_

Bee species: \_\_\_\_\_

Activity: \_\_\_\_\_

Flower: \_\_\_\_\_

Sample or photo taken  Yes  No

## Field observations

Date: \_\_\_\_\_ Time of day: \_\_\_\_\_

Location: \_\_\_\_\_

Weather: \_\_\_\_\_

Bee species: \_\_\_\_\_

Activity: \_\_\_\_\_

Flower: \_\_\_\_\_

Sample or photo taken  Yes  No

Date: \_\_\_\_\_ Time of day: \_\_\_\_\_

Location: \_\_\_\_\_

Weather: \_\_\_\_\_

Bee species: \_\_\_\_\_

Activity: \_\_\_\_\_

Flower: \_\_\_\_\_

Sample or photo taken  Yes  No

Date: \_\_\_\_\_ Time of day: \_\_\_\_\_

Location: \_\_\_\_\_

Weather: \_\_\_\_\_

Bee species: \_\_\_\_\_

Activity: \_\_\_\_\_

Flower: \_\_\_\_\_

Sample or photo taken  Yes  No

## Contact information