

A Happy Bee Garden Workshop

June 9th Kimberley Open Gate Garden
June 11th Cranbrook Public Produce Garden



Introduction

Bees pollinate our garden. They are very useful and necessary, but, their populations are on the decline. This is why it is important to learn a little more about them. Bees are having a hard time due to the following;

- the way we grow food nowadays mono crops and use of pesticides
- loss of wildflower habitat
- the way we spread out our villages and cities

Bees also pollinate wildflowers that feed the insects that fuel the food chain. So it is not just for our fruits and vegetables, but they help fuel the whole food chain.

Our focus in this workshop is more on solitary bees as these bees are easy to “keep” and are great pollinators. Keeping honey bees is more complicated. The bee house we will build is for solitary bees. And there are also instructions for a bumblebee house.

Plants to make bees happy

General practice to attract bees to your garden:

- Plant your plants in clumps/blocks
- Bees love sunny spots (easier to recognize predators from above)
- Sheltered location
- Honey bees love purple, violet, white and yellow.
- Bees prefer single flowers over double flowers #
- Create Pesticide free environment

There are plants in your garden that bees will pollinate and there are plants that they won't pollinate.

These plants might require wind pollination or pollination by other insects or animals.

Not all plants flower at the same time. It would be great for the bees if there is something flowering all season long, so there is always food around. We made a list of plants that you might have in your garden

and divided up into 3 sections. **Early bloomers**, **Summer bloomers** and **Late bloomers**. Have a look in your garden and see if you have something in each category in your garden.

People might not like the look of dandelions in the lawn. But it might be worth having them for the bees if you don't have any early blooming plants around. Mowing your lawn less frequent so flowers have a change to be visited by bees will help them too.

In general bees will pollinate half your vegetable garden, this because there are numerous plants that you eat before they even start flowering. Vegetables that you might have in your garden are added to the list as well also if they are not the best pollinators, this just for your information.

Early bloomers

- Apples, liked by the blue orchard bee
- Berberis
- Blue bells (bulb) Another early food supply
- Cherry, liked by the blue orchard bee
- Clematis (Perennial climber), the majority of clematis will provide pollen
- Cotoneaster (rose family)
- crocus
- Dandelion, liked by the blue orchard bee
- February Daphne
- Hawthorn
- Oregon grape, liked by the blue orchard bee
- Pasque flower (prairie crocus, Easter flower)
- Plum, liked by the blue orchard bee
- rosemary, harder to grow outside all year in this region, bees like it
- Saskatoon, flower may/june bees like the flowers
- Willows, liked by the blue orchard bee

Summer bloomers

- Allium, some allium family members flower between spring and summer and bridge the gap here.
- Basil, bees love basil
- Wild *bergamot* or bee balm (*Monarda fistulosa*) is a wildflower in the mint family (Lamiaceae) widespread and abundant as a native plant in much of North America. This plant, with showy summer *blooming* white flowers, is often used as a honey plant, medicinal plant, and garden ornamental.
- Beans bees pollinate bush and pole beans
- Blue berries, loved by bumblebees

- Borage
- Buckwheat, produces darker honey
- Calendula or Marigold, deadhead regularly for a longer flowering period
- California poppy attractive to bees, and are laden with pollen in nice open flowers.
- Catmint
- Clover
- Comfrey (early June), bees love this plant, (comfrey tea) (bocking 14)
- Corn, bees don't pollinate corn, the wind will pollinate corn
- Cornflower, aster family member, blue flowers that bees love try to grow them in a large group if you have space for it.
- Cucumbers, loved by bumblebees
- Geranium
- Hyssop
- Hollyhock
- Lavender is loved by bees
- Lovage
- Mint, flowers june to September and is loved by bees. easy to grow and might take over your garden if you don't keep it under control
- Mountain Ash
- Oregano
- Poached Egg Plant (*Limnanthes douglasii*)
- Potatoes, bees will pollinate potatoes, but it is not their favorite it has pollen not high in protein not high in carbohydrate. (same with pine trees)
- Raspberries, bees love raspberries
- Sage (*salvia*)
- Snapdragons (*Antirrhinum*) (HHA) Plenty of choice in heights and colours. Have you ever watched a bee enter and leave a snapdragon? Their weight pulls the lower part of the petal down so they can get inside for their food, and you can hear them buzzing while they are in there. Lovely to watch.
- Squash, bees love every member of the squash family
- Thyme, bees love thyme
- Tomatoes, loved by bumblebees not so much by honey bees
- Globe thistle (*Echinops*) blue thistle is very ornamental, even when not in flower. Bees and butterflies love the flowers which provide plenty of nectar. Easy to grow from seed and will come back year after year.
- Yarrow

Late bloomers

- Aster, modern hybrids have hardly any pollen
- Broccoli, bees don't pollinate broccoli as we harvest it before it blooms
- Cabbage, we harvest cabbage before it flowers
- Celery, bees love it, but we harvest it before it flowers
- Cosmos, grow in groups, which makes collecting easier for bees
- Echinacea, will attract bees, birds and butterflies
- Golden rod, heavy amounts of pollen in the fall, nice food for the winter, most pollen out of every plant
- Ivy (common ivy)
- Kale, we harvest kale before it flowers
- Parsnip, not a bees favorite, biennial and will likely be harvested before flowering
- Sage (Russian sage)
- Sedum
- Sunflower, choose yellow or orange over red as bees do not like red very much, there are hypoallergenic varieties now they don't contain any pollen and are not good if you would like to attract bees.

About mason and leaf cutter Bees

There are more than 20 000 species of bees worldwide. In North America there are 4 000 native species and in BC alone there are 450. It's shocking that with so many species the honey bee gets so much attention!

In this workshop we will focus on solitary, mason and leaf cutter bees. Their names reflect the manner in which they build their nests. Mason bees go by many different names including orchard mason or blue orchard bee (BOB); both types belong to the scientific family name Megachilidae.

Both types of bees are approximately a centimeter in length and their body type is squat and rounded.



Unlike honey bees that carry pollen on their legs, mason and leafcutter bees carry their pollen on specialized hairs under their abdomen. Mason bees are metallic dark blue and leafcutters are somewhat darker than a honey bee with light bands on the abdomen. The Difference between Honey Bees (Social) and Mason Bees and Leaf cutter Bees (Solitary)

Solitary vs. Social bees

SOCIAL BEE CHARACTERISTICS	SOLITARY BEE CHARACTERISTICS
One queen, one hive to defend. Worker bees defend the hive, queen and young.	Every female is a queen; no hive to defend. She owns and maintains her own hole.
Hive communicates, every bee has a specific task: help raise young, gather food (pollen and nectar), and care for the queen.	No communications since no one works for the female. She does all chores. Males die after mating. There's no time to be aggressive or be chatty.
Aggressive; requires special clothing to raise.	Gentle, doesn't mind people close by; no dress code—shirts and flip flops acceptable.
Does sting. Honey bee can cause anaphylactic shock.	Rarely stings. The mason bee and leafcutter sting is similar to a mosquito bite.
Only honey bees make honey that can be harvested.	None available to harvest.
Effective pollinator. One bee gathers pollen, and another bee goes out to gather nectar.	Efficient pollinator. Pollen and nectar are gathered in the same visit.

Pollen becomes sticky and clings to legs. It's comb into pollen sacs for carrying to the hive.	Dry pollen clings to hairy body and drops off to pollinate almost every flower visited.
SOCIAL BEES EXAMPLES	SOLITARY BEES EXAMPLES
Honey bees	Mason bees
Hornets and wasps	Leafcutters and mud dauber wasps
Bumble Bees: We put it in the middle. While social, this bumbling bee is mild mannered.	

www.crownbees.com

Life Cycle

- Most nest in existing holes in wood (some nest in ground). Many will use 'bee house', or will nest in fence posts or wood siding.
- Mason bees use mud in nest construction and are active mostly in Spring. Leafcutter bees use leaves to line nests and are active in summer. A few species in this diverse group are managed for crop pollination.
- Nests are typically divided into cells, each cell receives a supply of food (pollen or a pollen/nectar mix) and an egg; after finding a suitable spot (often near where she emerged), a female starts building a first cell, stocks it, and lays an egg.
- Then she builds a wall that separates the completed cell from the next one.
- The larva hatches from the egg and consumes the food supply. After molting a few times, it spins a cocoon and pupates.

- It then emerges from the nest as an adult. Males die shortly after mating, but females survive for another few weeks, during which they build new nests.

Comparison of Mason and leaf cutter bees

	Mason	Leaf Cutter
over winter as	adult bee	larva
emerge from nest	Early spring (13°C consistently)	Summer (need 3-4 weeks of 29°C to turn into adult bees)
material for nest	Mud	Leaves

Nests

In the nest bees are growing from egg to bee. As mentioned above the larva will eat the food supply left by the female bee when she laid the egg. Mason bees will overwinter as an adult bee and leaf cutter as a larva. If you were to open a nest up during the summer this is what you would see.



Photograph by [USDA-ARS](#).

Building Bee housing

Measurements and instructions for our bee house:

What you need:

- A drill
- A saw
- Measuring tape
- Screwdriver
- Sand paper
- Parchment paper
- pencil



- The drill bit for the **mason bees** is $5/16''$ and will need to be able to go between 5 and $5\frac{1}{2}''$ deep
- The drill bit for the **leaf cutter bees** is $1/4''$ and will need to be able to go between $2\frac{1}{2}''$ to $4''$ deep
- The wood for the house is untreated wood an old piece of wood is fine (a solid wood block will simulate a beetle borrow that they like to use if we did not make them a house)
- The roof needs the cover the entrance and should be waterproof.
- Parchment paper is used to line the holes so they can be cleaned out (wind the parchment paper on a pencil or screwdriver and then insert it)
- Two screws are needed to attach the roof and two screw to attach the back so it can be cleaned out
- One hook to hang the bee house
- Sand paper to sand the house and the holes

How to build a solitary bee house:

- Before cutting the holes, cut of a slice from the back of the wood. This will be the back you need to protect the bees.
- If you like mason bees and leafcutter bees in your bee house, you can take a notch out of the front (see picture below) as they prefer a different dept
- There should be about 2 cm between the holes, so the bees have a place to land. Try to drill the holes as straight as you can.
- The holes should be smooth inside
- Crevices should be sealed up to prevent entry of light and parasites
- The female bees prefer the ends of the straws to be black.
- Paint the bee house if desired

- Hang your bee house in a sunny spot at least 1 meter high that is sheltered from the weather and not obstructed by plants. Mason bees will require mud, leaf cutters soft leaves such as rose and lilac. Both will want a source of water.



bee house for mason bees on the top and leaf cutter bees on the bottom



bee house when opened from the back with the parchment paper straws

Building a bumble bee house

Bumble bees are not solitary bees, but it might be useful to build housing for them if you grow a lot of tomatoes for example. Bumblebee queens look for a place to live early in the spring. They like a place in the ground. An old rodent hole or something alike is what they look for. If we want to help them with housing the design would be more like a box. There are a couple of important things to know if you would like to help a bumble bee queen to come to your box. Location is important, nesting material and moisture control.

Location

- the box should be south or southeast facing so they get early morning sun with partial shade, otherwise the larva will cook.
- the box should be sheltered from the wind
- A good spot to put it is alongside a shed or underneath a hedge or a fence.
- the box should be at ground level



Nesting material

- bumble bees do not collect nesting materials. They select a site that already has the material they need.
- you can use something like, shredded paper, an old bird nest, pet hair, dry moss, leaves, upholstery cotton or hamster bedding for the nesting material.

Moisture control

- drill some small drainage holes in the bottom
- you can put some chicken wire in to keep the nesting material from being on the bottom
- you can add some pebbles for drainage
- make some ventilation in the side, closed up with mesh to keep other insects out
- put the box under an overhanging roof
- put a concrete block underneath
- the box can be about 25 cm wide and 35 cm in length.
- the entrance will be in the front at ground level with a 22mm diameter hole.
- the bumble bees like the front to be white and just around the entrance to be yellow
- make sure predators, like mice, voles, moles and skunks, can't come in

These are just some suggestions around a bumblebee box there are many shapes and size. An old teapot buried in the ground with a spout sticking out might work just fine for a bumblebee nest. Just make sure that the rain can't get in and there are no ants close by (as they might rob the nest). A covered upside down flowerpot with a tube sticking out underneath can work as well.

Caring for your bees

Okay, so now you have a bee house, it has been used, and nests have been made. There are 2 options: either you can just leave the house, you've provided shelter but let nature do the rest. Or with just a little more effort you can help the bees through the winter with a little more success. There are some simple steps you can take to help them out. Mason bee colonies can be wiped out by ants, woodpeckers, squirrels, raccoons, and bears. They're more likely to survive the winter if you eliminate this risk.

Harvesting and Inspecting Cocoons

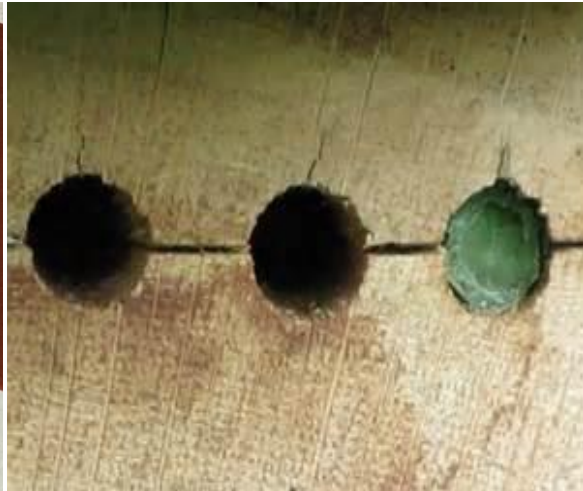
In late fall/early winter you can harvest your cocoons. You want to inspect your cocoons and remove anything suspect. Within your nest tubes you may find mud, leaf litter, leftover pollen, feces, pests, and unusual cocoons. A few pests are normal; lots might be more of a concern. Identify "suspicious" cocoons. Non-parasitized mason bee cocoons will be firm to the touch and dark-grey in colour. Keep

these. Cocoons that are lighter in colour and "crispy" to the touch are likely tiny parasitic wasps. A great resource is "How to Harvest Bee Cocoons" www.crownbees.com.

Mason bee



Leaf cutter bee



How to clean a bee house

Keep parasite numbers low and prevent the spread of disease within the colony by cleaning your bee house. Soak in soapy water, scrub them with a brush, and rinse thoroughly. Soak again in a five percent bleach solution to kill bacteria and fungi. Rinse well and let dry.

How to clean cocoons

The importance of cleaning cocoons differs from resource to resource, some recommend it some do not. There are 2 methods: water wash and sand wash. They both help remove pests. Mason Bee Cocoons are water repellent so the water method is fine.

Water Method from Crown Bee:

Prepare one large bowl with about a gallon of cold water. Add about a cup of 6% concentration bleach solution. Prepare a second bowl of cold water without bleach for rinsing. Drop the cocoons into the bleach bowl and stir the cocoons around for around a minute or 3. Using a strainer or sieve, move the soaked cocoons to the rinse water and stir them again for about a minute. Finally, remove the cocoons from the rinse and place them on towels to dry. It's that easy... if you need to do it. Before you place your cocoons in hibernation, ensure that the cocoons have dried adequately. They should not be wet to the touch. If you can, dry the cocoons outside where it's cooler and not inside your house where some mason bees might think it's spring due to the warmth!

Bee cocoon winter storage

Cocoons are best stored between 0°C and 5°C at 60-70% humidity level, in something secure so they don't get eaten. Hibernating bees can survive for 6-7 months but have better survival success when the temperature is cooler and constant. So keep them in a box/container with air holes in the garage or the fridge (modern fridges are too dry so have to pay more attention to humidity levels). You will have more control over their emergence if they live in the fridge.

Links to resources on solitary bees:

<http://crownbees.com/>

<http://www.feedthebees.org/resources>

<http://www.ars.usda.gov/SP2UserFiles/Place/20800500/Bosch2001.pdf>

<http://cwf-fcf.org/en/discover-wildlife/flora-fauna/fauna/insects/mason-bee.html>

<https://www.westcoastseeds.com/articles-instructions/product-instructions/keeping-mason-bees/>

<http://masonbeehomes.com/>

This workshop has been made possible with support from: