

Getting to Know Your Mason Bees



Osmia lignaria

Mary Dessel
South Sound Fruit
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Pollination

- Pollination occurs at blossom time.
- Pollen from the male part (stamen) of the flower is transferred to the female part (pistil).
- Pollination results in the formation of seeds giving the plant the ability to reproduce.



Importance of Bees



Bees are the most abundant pollinators of flowering plants in the world.

Nearly 80 percent of all flowering plants reproduce due to pollination from bees.

<https://xerces.org/pollinator-conservation/>

Mason Bees

Native, solitary, gentle.

Ideal for cities and backyards as they rarely sting.

Metallic bluish-green coloring.



Bugguide.net

Osmia lignaria

Importance of Bees and Other Insect Pollinators



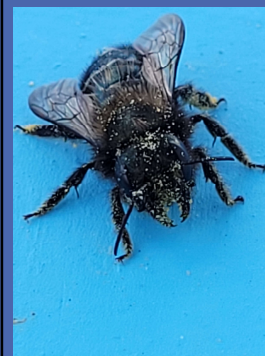
One-third of the foods that we consume are pollinated by insects.

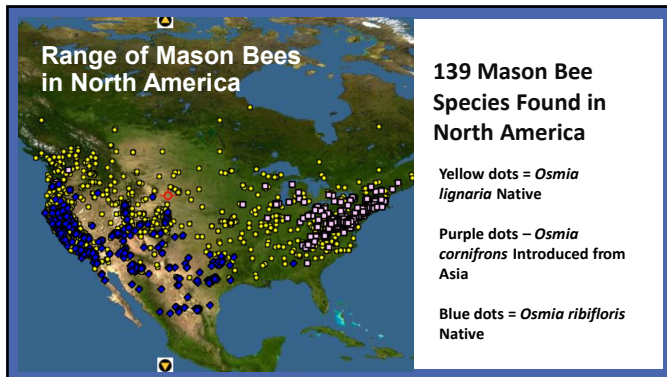
<https://xerces.org/pollinator-conservation/>

Female Mason Bees

Females provision the nests by collecting pollen and nectar.

They have large mandibles for carrying mud.





Importance of Mason Bees

- Early Pollinator of Fruit trees.
- Mason Bees carry pollen on their abdominal hairs rather than in pollen baskets such as honeybees.
- One of the most effective bees at cross pollination visiting more than 1,000 flowers/day with a 95% pollination rate.



Importance of Mason Bees



- Active in early spring.
- Forage in cold and wet weather.
- Forage from blossom to blossom.

Mason Bee Homes



- Mason Bees live in above ground cavities.
- They do not excavate their nests.
- They seek out existing hollow tubes.
- In nature they may use reeds or holes in trees created by other insects.

Female Mason Bees

Female mason bees have specialized parallel rows of pollen-collecting hairs, called scopa, on the underside of their abdomen.



Backyard Nesting Boxes



- Many backyard gardeners provide nesting boxes with hollow tubes (6" long and 5/16" in diameter) to encourage Mason Bees into their yard.
- Hole diameter should be only slightly larger than her body.
- Boxes are hung out of the wind and facing southeast.



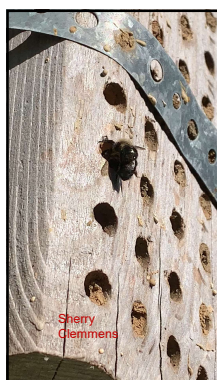
Backyard Nesting Boxes

Wire mesh can be applied to front of the box to keep birds and mammals away from cocoons.

Annual Life Cycle Emerging Females



- After emerging, females will feed to develop their ovaries and replenish their depleted bodies.
- She then seeks out a nesting hole.



Mason Bees

Annual Life Cycle: Emergence

- Male Bees emerge in the Spring when temperatures reach around 57° F.
- Females emerge several days later.
- Sometimes males actively extract females from their nests.

Annual Life Cycle: Laying Eggs



- Once she finds a nesting hole, she collects nectar and pollen and deposits it in the back of the hole.
- She lays an egg on top of the nectar/pollen mixture, then seals it off with mud.

Mason Bee Mating

- After mating, male bees will die.
- The female stores the semen and uses it to fertilize the egg to create a female offspring.
- Unfertilized eggs will become male.



Annual Life Cycle: Laying Eggs



- This egg is the first of 25 – 30 eggs that she will lay.
- She lays 1 – 2 eggs per day.
- Nectar provides carbohydrates and vitamins and pollen provides protein for development.

Annual Life Cycle: Nest Profile



- The eggs are laid in cells that the female bees create. She builds partitions in the tubes for each egg.
- Female eggs are placed in the back of the tube. Male eggs are placed toward the end of the tube.
- She repeats the process until she has 5 to 8 cells that are provisioned with food and an egg per tube.
- She seal off the entrance to the tube with a thicker mud wall to keep out predators.

Storage

- Bees can be put into outside storage when you see the tubes are capped and no further activity.
- Store tubes vertically with mud caps up.
- Screened cabinet provides protection from predators.



Annual Life Cycle: Nest Building

- Tremendous amount of energy to harvest mud for partitions.
- Consider putting clay-like mud near the nesting box to help the bees build their partitions.



Annual Life Cycle: Prepupation



During the summer months the bees go through prepupation where they start their development in forming an adult bee.

Annual Life Cycle: Larval Development

- Eggs hatch within a few days.
- Larvae emerge to feed on the nectar/pollen meal.
- It takes about 3 weeks to a month for the larvae to consume the food mass.
- When done feeding, they will spin a cocoon around themselves to undergo pupation.



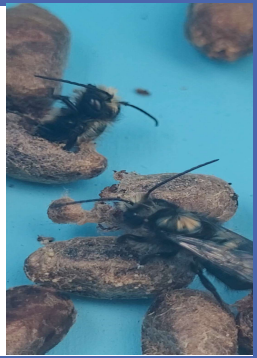
Annual Life Cycle: Pupation in Cocoons



By early fall the bee transforms to an adult stage, but stays in the cocoon in a state of rest throughout the winter months.
<https://www.youtube.com/watch?v=ic3FUCSgrV4>

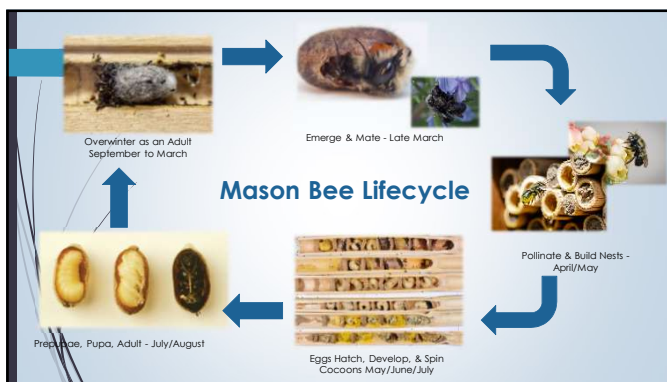
Emergence from Cocoons

As temperatures warm in the spring, the bees chew their way out of their cocoons to start their cycle of life over again.



Perils: Pollen Mites

- Pollen mites reproduce inside the nest.
- They are kleptoparasites. They feed on the pollen/nectar meal intended for the bee larvae.
- Can decrease number of mites by washing cocoons between October – December.
- <https://www.youtube.com/watch?v=ic3FUCSgrV4>



Perils: Houdini Fly

- Non-native kleptoparasite.
- The adult flies into the tube and lays her eggs on the pollen/nectar meal.
- The fly maggots feed on the pollen causing the Mason bee larvae to starve and die.



Perils

Perils: Chalkbrood

- Fungal infection that kills bee larvae.
- Fungal spores are transferred to eggs during nest building.
- Larvae feed on spore-infested pollen/nectar meal.
- Larvae die, but fungus continues to grow and produce more spores.



Ascosphaera spp

Perils: Parasitic Wasps

- Parasitic wasps such as *Monodontomerus* pierce the cocoons and lay their eggs in them.
- Can decrease risk by taking the nests down as soon as holes are filled and store them in screened cabinets.



Use a wide variety of plants that bloom from early spring into summer.



February-March
Heather

February-March
Willow

March-May
Pieris japonica

March-May
Oregon Grape

March-May
Big leaf Maple

Successional Blooms

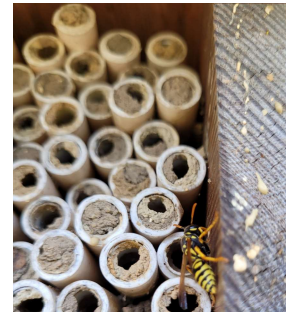
Perils: Insecticides, especially Neonicotinoids



- Neonicotinoids** are a group of insecticides used widely on farms and in urban landscapes.
- They are systemically absorbed by plants and present in pollen and nectar, making them toxic to bees.
- Neonicotinoids** include imidacloprid, acetamiprid, thiacloprid, dinotefuran, nitenpyram, thiamethoxam, and clothianidin.

Surprises: Yellowjackets

- Older nesting box was loaded with yellowjackets.
- Yellowjackets are predators.
- We carefully moved the tubes to a new nesting box.



Perils: Climate mismatches due to Climate Change



Surprises: Japanese Horn-faced Bee

- Non-native solitary bee from Asia.
- Similar life cycle as the blue orchard mason bee.
- Efficient pollinator of fruit and almond trees.



Osmia cornifrons

Surprises: Earwigs

Earwigs feeding on nectar and other insects.



Value of Mason Bees

- The Blue Orchard Mason bee is an important native pollinator.
- It is extremely efficient at transferring pollen.
- Mason bee adults are short-lived but have a big impact on early season pollination.



Surprises: Pseudoscorpion

Microarthropod feeding on pollen mites and bark lice.



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