

Orchard Mason Bee

The Early Spring Pollinator

I University of Idaho
Extension
Kootenai County

1250 W Ironwood, Ste 107
Coeur d'Alene, ID 83814

Phone: (208) 292-2525
Plant Clinic: (208) 292-1377
E-mail: kootenaimg@uidaho.edu
Web: uidaho.edu/kootenai



IDAHO
master
GARDENER
UNIVERSITY OF IDAHO
EXTENSION PROGRAM

Overview

The orchard mason bee, *Osmia lignaria*, is an effective early pollinator native to the Western US and Canada. It emerges in the spring, before honeybees. As a pollinator, it is far more efficient than the honeybee by transferring more pollen and visiting more types and numbers of flowers.

The male mason bee does not sting. A female is considered non-aggressive, stings only when handled 'roughly,' or when trapped under clothing. Mason bees are solitary. They do not produce honey; adults feed on nectar and collect pollen and nectar to feed their young. In contrast, wasps also feed on nectar but must hunt for meat to feed their carnivorous larvae.

A mason bee looks like a small black fly, but flies only have one pair of wings and bees have two pairs. Mason bees are slightly smaller than honeybees. They fly only after air temperature warms up to about 55°F.

Life Cycle

Mason bees are active in your garden for about one month beginning early spring. During the cold weather months, a fully formed adult bee stays in its cocoon in the nest. When temperatures rise to 55°F for a couple of days in early spring, the adult bee chews through the cocoon and emerges. Emergence continues for up to two weeks.

When eggs were laid the previous spring, the male eggs were placed near the entrance of the nest while females were placed in the back. Thus, males emerge first. They wait for females to emerge in order to mate (this is the sole purpose for male mason bees). Females begin nesting about 3 to 4 days after mating, preferring existing holes for their nests. The female will choose a hole slightly larger than her body, usually about ¼ to 3/8 inch in diameter (about 8mm). She will place a mud plug at the bottom of the hole and begin to bring in nectar and pollen.

When she has stored enough food for the young, she will lay an egg on the pollen and seal the cell with a thin mud partition. She then repeats the process until the entire length of the tunnel is used. The female stores the semen from mating and only uses it to fertilize the egg if she wants to get a female offspring. An unfertilized egg will become male, and typically 2/3 of cocoons will be males.

A few days after eggs are laid, larvae hatch. Larvae feed on the pollen and nectar stored in the nest. After 10 days, the larvae spin a cocoon and pupate within the cell. Near the end of summer, the bee transforms to the adult stage called an *imago* but remains in the cocoon throughout the winter.

Female mason bees live about 1 month to six weeks and lay 1 to 2 eggs a day. Males live shorter lives; their only purpose is to impregnate the female.

Houses

Do not use drilled blocks (that cannot be taken apart for harvesting), bamboo tubes (toxic and promotes mold), or tubes shorter than 6 ½ to 7 inches (not deep enough for the female : male ratio of eggs needed to sustain a nest). The nesting holes for mason bees should be ¼ to 3/8 inch in diameter and at least 3 inches, preferably 6 inches, deep. The hole should be open only on the entry end. Mason bees prefer wood (not pressure-treated or cedar) in which to nest but will use other materials.

You can make mason bee houses by drilling holes into a block of wood. Place the nest in a dry, protected site preferably with east or southeast exposure. Insert a paper straw liner into each hole to make retrieval of the cocoons easier if you 'wash' your bees in the fall. Washing rids them of most mites and diseases.

Parasites, Predators & Pathogens

Several parasites, predators and pathogens can injure or kill mason bees. Small Chalcid wasps pierce mason bee cocoons and lay eggs in them. These wasps emerge later than the mason bee, so you can decrease the risk by

taking down mason bee nests once they have filled the opening. A small, black parasitic wasp named "mono", monodontomerus is one predator of the mason bee. It is about the size of a gnat (3/16" or 4mm) and hovers at nesting holes. It is attracted to the smell of mason bee cocoons. Some companies make a trap that can be helpful along with removing the tubes from the nest, once the females are finished. The Krombein Mite and *Chaetodactylus krombeini*, pests reproduce within a mason bee cell and feeds on the pollen stored for the young bee larva. By the end of summer, the cell is packed with empty pollen grains and thousands of mites. You can rid mites by cleaning the cocoons between October and December. Adults are fully developed at this time and can withstand this process. Be sure to use water no warmer than 50°F so as not to 'wake up' the bees. First, soak cocoons in cool water to soften and remove mud. Using a sieve, gently roll and move cocoons through the water. Discard debris. Then soak them, no more than 10 minutes, in cool water with a mixture of .05 percent bleach (1 tablespoon bleach per 1 gallon water) to kill adhering bacteria, fungi and most mites. Rinse well under cool water to remove all traces of bleach. Dry on a clean paper towel for 1 hour. Sort and discard damaged, diseased or parasitized cocoons. Put clean, air-dried cocoons in a small container with air holes and store in the refrigerator. Chalkbrood can also affect your nesting tubes. If you find Chalkbrood, dispose of all chalkbrood cadavers, being careful that other cocoons don't touch the chalkbrood. After you've harvested all cocoons, we recommend that you wash your cocoons with bleach/water mixture of 1 Tbl bleach to 1 cup water to kill the chalkbrood spores. Spot clean your reusable nesting tray with a brush dipped in a clean mixture of bleach and water (referenced above). Ants, earwigs, Cockoo Bees and birds can also attack your nest sites. Exclude these pests with barrier methods such as a "bubble" of small chicken wire on the front of the nest site to stop birds from reaching the end of the reeds or tubes.

What Does your Landscape Need to Attract and Protect these and Other Native Bees?

Avoid synthetic and organic pesticides. At first sign of plant distress, collect evidence for a proper diagnosis. Understanding the problem is requisite to taking effective action. Many plant problems, when detected early, can be managed through non-chemical means. So be vigilant in the garden.

Before using systemic pesticides, particularly on plants visited by pollinators, think twice about the benefits relative to the drawbacks. Systemic pesticides protect plant leaves from pests, and can be transported in small doses to nectar and pollen. Plant-feeding caterpillars or nectar and pollen collecting bees can be harmed when feeding on plants protected by systemic pesticides. If pesticides must be used, follow label instructions so that it is applied at the right concentration, under suitable weather conditions, to the correct part of the plant, etc. To protect pollinators, don't treat blooming plants, including weeds; stay away from nesting areas; and spray in the cooler parts of the day, such as at dusk or in the evening, when most pollinators are less active.

Plant native and exotic plants. Native plants are fantastic host plants for butterflies and moths and provide food for other pollinators. However, home gardeners who favor exotic plants, particularly floriferous annuals and smaller perennials, should not hesitate in using them to maintain a long-season of blooms in the garden.

Prove enough nectar and pollen in the early spring for the Mason Bees within 300' of the house. They will not forage farther than 300'.

References

The Orchard Mason Bee, Brian Griffin, 1999, Knox Cellar Publishing.
Pollination with Mason Bees, Dr. Margriet Dogterom, 2002, Beediverse Books
All About Mason Bees, DVD, Dr. Margriet Dogterom, 2007, Beediverse
How to Manage the Blue Orchard Bee, Jordi Bosch and William Kemp, 2001, Sustainable Agriculture Network
Orchard Mason Bee, Washington State University publication, PLS -112

While the timing is different for spring mason bees and summer leafcutter bees, the process of raising them is very similar.

Install house

- Select a location that receives early morning sun (generally south to southeast facing) and protects the nesting materials from wind and rain. If your area has extreme heat (over 100°F/38°C) during the day, ensure that the house is shaded during the highest temperatures of the day, while still exposed to morning sun.
- Mount house at eye-level: 5-8 feet, 1.5-2.5 meters. These bees are fun to watch!
- If you paint the bee house, allow plenty of time for the paint to cure. The smell of wet paint may deter the bees.
- If birds become a problem, you can fashion a safety zone with some wire mesh or chicken wire. Use a mesh size with about 1" openings and loosely create a 3" bubble around the front of the house. This gives the bees some space and keeps the birds from perching on the mesh.

Place Nesting Holes

- Generally, you should have 1 nest hole available for each cocoon (male and female). Female bees often claim two or more nest holes in one season.
- Put loose nesting holes in a random arrangement so the bees can find their nest hole easier.
- Many native bee species nest in a variety of hole sizes. Try our [Pollination Pack](#) and see what comes to nest!

Have your Mud Ready

- Mason bees use clay-like mud for their nesting chamber partitions. If they can't find clay soil the bees will move on to a new location. If you find that your mason bees have low productivity, this may be the reason. This mud is not garden soil, it is similar to the mud a potter throws on a wheel to create a piece of pottery.
- If you know your yard has clay-like soil, dig a hole (one good shovelful) and keep it moist through the early spring to early summer.

Release Cocoons

- Pro Tip: Dandelions are blooming = time to release mason bee cocoons.
- Fun idea: Let a few mason or leafcutter bees emerge from cocoons in your hand while standing outside in your garden. Great fun for kids!
- Please remember to keep cocoons out of direct sun.
- Extend your bee season by releasing half your cocoons, then waiting a few weeks to release the second half. Remember to release a variety of cocoon sizes.
- Release cocoons when you have open blossoms and consistent daytime temps of 55°F/13°C or warmer.
- Place cocoons behind or on top of your nesting holes. A small paper cup can easily hold cocoons on windy days.

- Larger cocoons are female bees, smaller cocoons are male bees. You need a good mix of both for egg fertilization and the natural ratio for mason bees is 6 males: 4 females. Don't worry if your numbers are not exact.
- Make sure all your mason bee cocoons are released by the beginning of May *IF* you have enough blossoms to support them. This can be tricky in our area of Northern Idaho.

Wait & Watch

- As your bees emerge, you will see a beige substance that looks like splattered paint. This is meconium, the bee's first elimination of waste (bee poop!).
- The males emerge first and wait for the females to emerge later.
- After mating, the female will claim a nesting hole and use it as a shelter at night and during poor weather.
- Fun idea: Shine a flashlight in the nesting holes at night or early morning. You'll see bee faces (or bottoms) peering back at you.
- If you're a morning person, watch the bees warm themselves at the front of their nesting hole in the morning sun.

Collect & Protect Nesting Holes

- At the end of the season of bee activity, remove nesting holes from the bee house to protect the developing bees from parasitic wasps and other predators. Place nesting holes inside the BeeGuardian bag with the capped or open end facing up. If weather is still warm, leafcutter bees can emerge again, watch for these extra bees if you choose to protect them.
- Mason bee activity usually ends in late spring or early summer.
- Place the nesting material in an area that stays warm, but is not exposed to extreme heat and large predators. A garage or shed is a good location to store bees over the summer.
- Please remember that mason bees need the summer warmth to develop from egg to adult. **DO NOT** put your nesting material in the refrigerator right now as this will halt development.
-

Harvest Cocoons

- Harvesting cocoons ensures bee health, prevents the spread of disease, and reduces pest populations.
- For full instructions go to [Harvest Cocoons | Step by Step](#).
- Fall is time to harvest cocoons. The larvae have spun cocoons and are fully mature waiting for winter hibernation.
- To extend the life of your bee house and nesting materials store them in your shed or garage. Give the house and wood trays a good cleaning with a stiff brush, and store unused tubes and reeds in a dry place.

Store Cocoons

- Store your harvested mason bee cocoons in the fridge in a HumidiBee (or another container) to maintain cocoon moisture over winter.
- Be sure to check and add water, if needed, once a month.
- Sign up for [BeeMail](#) with Crown Bees (www.crownbees.com) to receive timely reminders.