

If You Build It and They will Come!

You can purchase pre-made mason bee nests and paper tube inserts from many on-line sources or make your own. The dimensions of the nest cavities are important to ensure healthy mason bee populations. Ideally the structure should have an overhang in the front to prevent rain from getting in. Females are less attracted to white surfaces than other colors. To prevent predation, nest boxes should have a solid back or the end of the tubes must be blocked with plasticine clay.

Holes can be drilled into solid wooden untreated blocks (6 x 6-inch dry pine or fir logs) to simulate a dead tree with abandoned beetle burrows. Holes (~ 1/4 inch diam) should be drilled across rather than with the grain so the tunnels are smoother inside. Paper straws can be inserted into the holes that are removed annually. Blocks should be coated with polyurethane.



Boards with routed grooves can be pieced together to make nesting tunnels. Any form can be used as a nest box to hold bamboo canes in position.

Keep your Mason Bees Healthy!

Like honey bees, mason bees are susceptible to pests, predators and diseases. There are predatory flies and wasps that chew through the mud walls to feed on the larvae and pollen balls. Parasitic wasps can get in the nest and lay her egg inside the mason bee immatures, which hatch into larvae which feed on the bees. Insect-killing fungi and bacteria also infect mason bees. Check your nest boxes over the year to make sure predators are not invading. Nest cylinders should be cleaned or replaced annually after emergence.

Avoid using chemical pesticides in your yard to ensure mason bees and other solitary bees that may nest in the ground are not exposed.



Mason bee covered with pollen mites
(image by @geebee60)

Want to learn more?

- <https://content.yardmap.org/learn/bee-hotels/>
- <https://www.diynetwork.com/how-to/outdoors/gardening/build-a-backyard-bee-house>
- <https://www.foxleas.com/make-a-bee-hotel.asp>
- <https://colinpurrington.com/2019/05/horrors-of-mass-produced-bee-houses/>
- <https://www.sare.org/Learning-Center/Books/How-to-Manage-the-Blue-Orchard-Bee>

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Native Solitary Bees and How to Support Them

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You Don't Have to be a Bee Keeper to Keep Bees Happy!

Pollination is the foundation for most agricultural production and the well-being of our plant ecosystem. Without pollination we will starve. All the fertilizer and water in the world won't produce most of the fruits and vegetables we eat. Honey bees contribute \$20 billion to crop production in the US, and they pollinate 30% of the world's food crops. However, honey bees don't do it all, and their populations are in decline. There are over 4,000 species of bees in the US. Non-honey bees are responsible for 23% of the pollination needed for crops. What can you do to help these important bee pollinators thrive in your neighborhood?

Build them a nice house and give them good food to eat.

What are Solitary Bees?

Honey bees are well known for their social life style. Most honey bee colonies are managed by experienced beekeepers, but there are also many species of wild solitary bees. One common group is called mason bees, in the genus *Osmia*. They got this common name because they use mud and other similar materials to make their nests. They find nooks and crannies in hollow stems or stones or in holes made in wood by other insects. Two native species, the blue orchard mason bee, *Osmia lignaria* and the blueberry bee, *O. ribifloris*, are important pollinators in the fruit industry.



Blue orchard mason bee



Blueberry mason bee

Solitary bees are docile and do not aggressively defend the nest. They only sting when threatened. The stinger is actually the egg guide, not specifically for defense.



How do they Live?

All mason bees have similar life cycles and nesting habits, though the timing varies among species. Adults spend the winter in the nest, emerging in spring when fruit trees begin to bloom. They mate and then search for holes that are just the right size ($\frac{1}{4}$ inch diam) in which to make their nests. Each female makes her own nest, though she commonly builds them beside others. The bees visit flowers to collect pollen and nectar which they bring back to the nest. The female kneads the pollen into a ball with a little nectar and saliva. When there's enough food, she lays an egg on top of the ball and seals off the chamber. She builds a thin mud wall, making sure there's enough space for the larva to develop. Then she starts gathering food for another cell. Usually she builds 5-8 cells within one hole, and then seals the entrance with a thicker wall with mud. She next searches for a new nest site, repeating the process at least three more times until she dies after 4-8 wks. She usually builds four 6-inch tubes over her life time, each with 8 eggs. To achieve this, she must visit over 60,000 flowers.

The egg hatches into a larva that feeds all summer on the pollen in the cell. By the end of the summer, the larva turns into a pupa and then an adult, which emerges the next spring.

The first batch of eggs laid develop into female bees, whereas those closer to the entrance are males. This ensures males are present when females emerge.



Dissected nest showing eggs on the pollen ball, and thin mud wall separating each cell (top); and hibernating adults and pupae (right).

Managing your Bee Nest Boxes

Mason bees generally complete the building of their nests by early summer, so it is important to get the bee houses up in early spring before the apple trees begin to bloom. Because mason bees forage short distances, it is best to position nest boxes within 300 ft of a food source. Sow flowering plants in the vicinity. Make sure the nest box is protected from rain, wind and direct sunlight. They should be erected to face southward in the spring, and horizontal or with the entrances tilting down slightly so water doesn't get in. They should be securely fastened to a tree, fence post or wall so they don't swing freely. Movement can dislodge the eggs and larvae so they can't access the food. Nest boxes should be placed 3-5 ft above the ground or higher. Don't move the units after nesting has begun, because it disorients the females.

