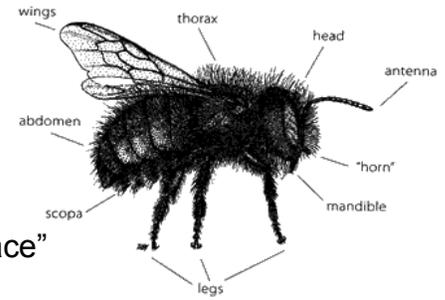


Blue orchard Mason Bee *Osmia lignaria propinqua* Family *Megachilidae* from Portland Home Orchard Society

DISTINGUISHING FEATURES

- Slightly smaller than a honey bee
- Shiny dark blue color
- Female is larger than the males
- Females have hairs on their underside to carry pollen
- Females' antennae are short and thick, males' are longer
- * Males have light colored facial hairs, which appear as a "white face"



CHARACTERISTICS

Non-aggressive Females have a stinger but will not sting unless squeezed, males do not have a stinger at all

Solitary Mason bees don't live in hives but in nesting tubes in close proximity to one another

Non-destructive They do not excavate holes but search out man-made nesting boxes, tubes, or any 5/16" diameter hole that is naturally occurring

Heavy pollinators Mason bees collect pollen from the nearest source regardless of plant species or family. Pollen is carried in scopa (rows of stiff hairs on the underside of their body). Landing directly on the flower stigmas, the reproductive structure of the blossom, makes mason bees more efficient pollinators than honey bees, who land on the petals of flowers. They have a high bloom visitation rate - Each female is capable of visiting over 300,000 flowers during her lifetime

Healthy Resistant to parasites and diseases provided they have clean housing
Mason bees are active above 54° F, returning to their nest sites at night

Cold tolerant and during cold snaps
Emergence coincides with the development of early blooming plants and most fruit trees, including apples, pears, and stone fruits
Mason bees remain active during cloudy or rainy weather

LIFE CYCLE

Spring

Bees emerge when temperatures reach approximately 54°F for five consecutive days. This normally corresponds with the swelling of flower buds on fruit trees. In the Pacific Northwest this is usually early March. Male bees emerge first and wait near the hole entrances for the females to appear. This may take up to two weeks. They mate almost immediately upon females' emergence. The males spend this waiting and mating time foraging for food and then, their mission accomplished, they die.

Late spring

Female bees stay busy collecting pollen and nectar. In each nest hole, she regurgitates the nectar and places the pollen on it, repeating this procedure 15 to 20 times until she has collected enough to sustain a new larva. She locates the cell she is filling by marking it with her particular pheromone. The female then lays an egg on the top of the mixture, backs out of the hole a bit, applies a thin mud wall, and begins the next cell. Eggs laid in the rear 30% of a nest hole become female bees. The forward compartments contain the males. When a six inch nest straw is filled, holding about eight cells, the adult bee applies a thick layer of mud almost 3/16" thick to the entrance cell to protect against invaders. The adult female *Osmia lignaria* then goes on to the

next straw and repeats the same process. She will live from four to eight weeks, laying between one and two eggs each day. The larvae hatch from their eggs in approx. a week.

Summer

During the summer the larvae consume the stored nectar and pollen, spin cocoons, pupate, and remain in their cocoons as adult Mason bees until it is time to emerge in the early spring. This is the season to avoid moving nesting boxes, as disturbed eggs or larvae might not survive being jostled.

Fall/Winter

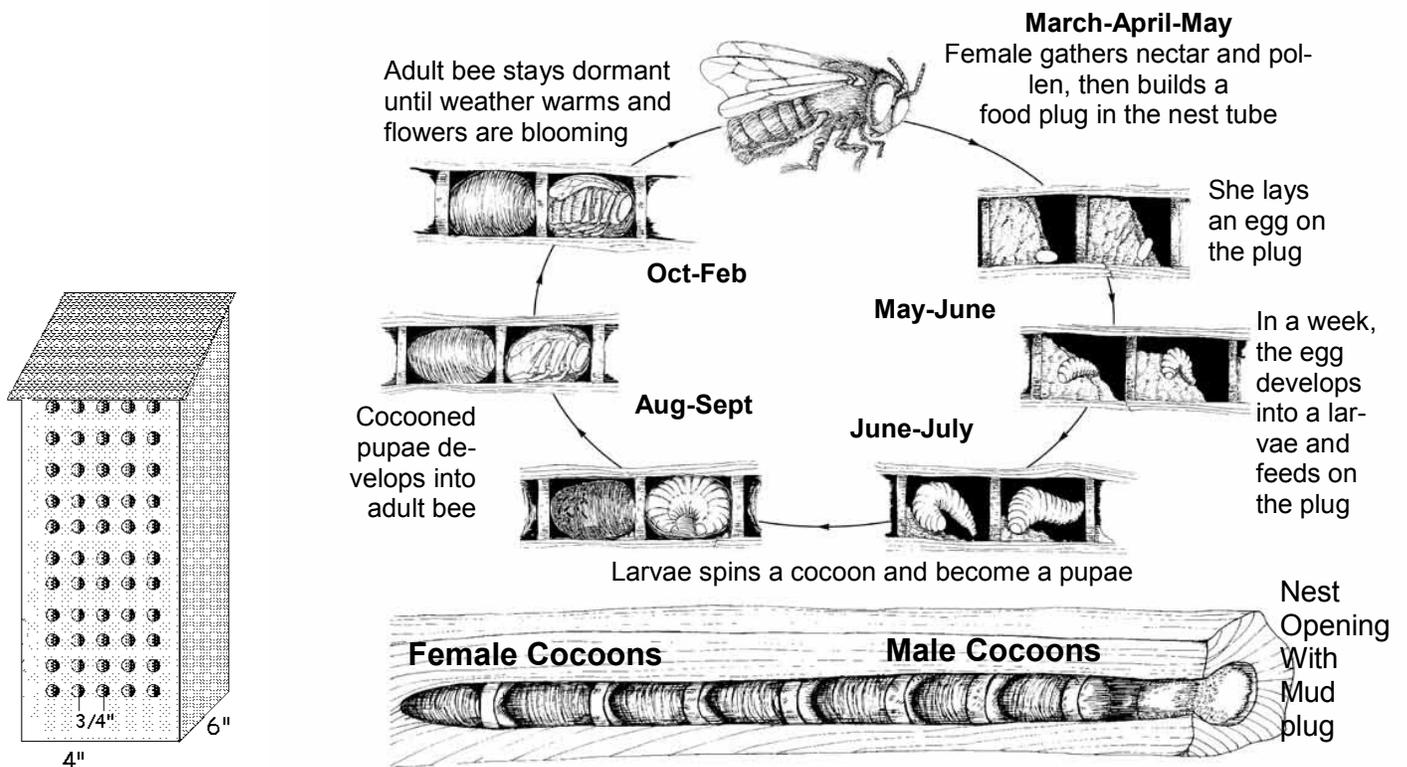
Mason bees remain dormant throughout the winter. In late October/early November, mobile boxes can be safely moved to a sheltered area with a temperature ranging between 30° and 45°F. In the early spring boxes should be moved outside and hung on a south facing wall with an overhang to protect them against rain and hot sun.

REQUIREMENTS FOR ATTRACTING MASON BEES

- 5/16" holes drilled in any wood (except cedar or pressure treated), manufactured nesting straws or previously used holes, (7.1mm to 9mm)
- Mud source for building cell walls and water
- Early blooming fruit trees (peach, cherry, European plum, pear, quince, and apple)
- Flowering plants, especially those that are blue, purple, or yellow and that bloom during the entire lifespan of the Mason bees, particularly *Pieris japonica*
- * Flowers should be single rather than double, prefer blue, yellow and purple.

REASONS FOR NON-EMERGENCE

- Housing absorbed moisture (results in mold killing off larvae or pupae stage bees)
- Moved box too early - eggs or larvae became dislodged from the food supply
- Winter storage temperature below 10°F
- Severe infestation by mites - especially in old nesting holes
- Overheating in summer



Identifying BOMBs, commonly mis-identified as house flies—Notice the differences



Male BOMB

Blue Orchard Mason Bee

The males are smaller than the females at about half an inch (1.3 cm) with long antennae, and they usually have a bit of white hair on their head or chin. Coloring can be dark metallic blue.



Female BOMB

Blue Orchard Mason Bee

The females are about 1/2-3/4 inches (1.3-1.9 cm) long, with shorter antennae. Their hairy bodies carry the pollen for them.

From www.CrownBees.com



Common house fly

Note the different eyes and wing structure, length and placement. Shorter antennae are almost unnoticeable. Legs less fuzzy. Wings longer in relation to body

Other Sources of Information on BOMBs—www.blaine-core.com

<http://www.attra.org/attra-pub/nativebee.html>

<http://sites.google.com/site/hutchingsbeeservice/home>

<http://www.knoxcellars.com/omb.htm>

www.crownbees.com - very good reference materials especially on dealing with pests

<http://gardening.wsu.edu/library/inse006/inse006.htm>

Check at www.YouTube.com, do a search for “mason bees” to find videos showing opening straws, identifying pets, building houses, films of bees going into nests, etc, etc.

Publications—the below publications are linked on the CORE website

Managing Alternative Pollinators, A Handbook for Beekeepers, Growers and Conservationists, 170 pages

Extremely detailed, covers management of all bees including those that are currently not commercially managed. Text includes bee life-cycles, details of nesting information and habitat management.

How to Manage to Blue Orchard Mason Bee, as an Orchard Pollinator, 98 pages

Specifically discusses BOMB, management practices, efficiency as a pollinator, life cycle, temperature effects, nesting material options, parasites, etc.

Pollinators in Natural Areas, a primer on habitat management, 8 pages from Xerces Society

WSU, Orchard Mason Bees very good 4 page starter presentation

Home Made Mason Bee Paper Liners That Work by Randy Person, 5 pages, also has info on wood nest building

Nests for Native Bees Fact Sheet, from Xerces Society, 2 pg, general overview of all types of nesting requirements

Beneficial Insects and Predators Catalog, 40 pgs www.rinconvitova.com

Manage Insects on Your Farm, a guide to ecological strategy, 130 pgs

Garden Wise—Non-Invasive plants for your western Washington garden, 36 pages

Make Your Yard “Native Bee” and Alternative Pollinator Friendly

Perhaps you too have noticed fewer bees in your garden or orchard, or maybe lessened fruit/vegetable production. Improving habitat for native pollinators will help you *and* your garden The biggest threats to native bee species is habitat loss/degradation, habitat fragmentation and pesticides.

- **Choose non-chemical solutions to insect problems.** Most insecticides are highly toxic to bees. Research information on non-chemical insect pest management, cultivate methods of improving the general health of your plantings to make them naturally resistant to insects.
- **Curb the “erb.”** Avoid using herbicides. The long-term negative health effects of herbicides on humans are not fully known. Tolerate, in fact, appreciate the beauty and usefulness of flowering “weeds” such as dandelion. Their presence means more variety of nectar and pollen sources for native bees and others, such as butterflies. They help fill gaps in the succession of planted flowers, and add to the variety of flower shapes, colors and scents.
- **Provide a source of pesticide-free water and mud.** A birdbath, dripping faucet or mud puddle works nicely for bees and attracts butterflies and beneficial insects. To assure a clean source of water, change the water in your birdbath frequently, at least once a day. This will also prevent mosquitoes breeding there. Mud is an important nesting material for several bee species. If you don’t have any mud sources in your garden, make one from a 14-18” drip tray for potted plants, pile up mud in a mound on one side and water around it, if it seems to be drying out, mix and re-pile.

Establish set-asides and hedgerows. Bees need undisturbed areas for nesting. Hedgerows or a bit of clutter, such as brush piles of sumac or raspberry canes, make a safe nesting area for them. “Set-asides” should be areas that are not mowed and are left undisturbed. There could be bare ground, preferably with a sunny, southern exposure ideal for certain species’ ground nesting requirements. About 70% of our bees in North America are ground nesting bees. Lack of habitat for nest sites is a limiting factor on most populations.

- **Provide conservation bee nesting houses** to help with nesting habitat.
- **Minimize lawn area, or mow less often.** Mowing grass often kills bees. To avoid this, mow when they are not so active, when it’s cool, overcast and windy, or late in the evening. Allowing the lawn to revert to a more natural state, by not mowing or reducing the area that is mowed, will result in a profusion of bee forage and more potential nest sites over time. Areas that are not mowed become set-asides and may be colonized by many flowering plants.
- **Maximize flower space and plant species diversity.** Have gardens, fruit-bearing trees and shrubs, thickets and hedgerows of flowering shrubs, and set-aside areas in your yard.
- **Provide a succession of blooming plants throughout the growing season.** Blooms are an essential food requirement for bees and must be available early, middle and late season. Some native bees are actively foraging adults by March and others are active until early November. Bumble bees are a good example of the importance of succession blooming. From early spring until late fall they require nectar and pollen.
- **Provide a mix of flower shapes and sizes to accommodate different pollinators needs.** Small bees, such as the halictids, have short tongues; other species have long tongues. Asters and other composites nicely suit short-tongue bees, but tubular flowers with long corollas are only suitable for species with long tongues.
- **Include lots of purple, blue and yellow flowers in your bee sanctuary.** These are the most attractive colors to bees. They are blind to red. Planting the colors in masses will get their attention!
- **Emphasize native perennial plants.** Perennials generally are richer nectar and pollen sources and, because they bloom year after year, they provide a more dependable food source than annuals, which must be replanted each year. Our native bees have evolved with our native plants, to their mutual benefit.
- **Avoid horticultural plants, like marigolds and roses, bred as “doubles.”** These plants have been bred for more showy petals in place of anthers. Thus, they have little or no pollen. Also, the many petals often make the nectar physically inaccessible to bees, butterflies, hummingbirds and others.
- **Select sunny locations, sheltered from the wind, for flower plantings.** Smaller bees, especially, use the sun to help warm their bodies. Plants receiving at least six hours of sunlight have more nectar than those receiving less.
- **Remember that early spring and late autumn are very challenging times for bees because of coolness, highly variable temperatures and a lack of flowers.** In the spring, tolerate those dandelions. In the late fall, let the bees and migrating monarch butterflies have the few remaining flowers. Leaving fallen fruit to rot, such as windfall pears, may help too, but be aware that you will also be attracting hungry wasps.

Practice peaceful coexistence. Bees sometimes choose to nest in inconvenient places. Rather than exterminating them, think of it as an opportunity to see and learn about them up close.

Conservation Bee Nesting Houses: Construction, placement and maintenance

Placing wooden bee nesting houses in your yard, garden, and around woodland edges is an effective means of increasing populations of cavity-nesting bees, especially mason and leaf-cutting bees. Several ready built types are available for purchase. Just follow the placement and maintenance recommendations offered in this fact sheet.

If you have woodworking skills, make your own nesting houses. The design described in this fact sheet is an adaptation of the conservation bee nesting houses used in research, modified for the tools that homeowners would have on hand.

Materials needed

- An 8-foot 2x6 makes 15 (6 1/4-inch) houses, which is more than enough houses for a quarter-acre lot. Bee houses can be made from soft or hard woods. Spruce 2x6s work well. Do not use pressure-treated wood, cedar or redwood.
- Metal 3/4-inch perforated strapping (also called plumber's strapping or plumber's tape).
- 1-inch or 1 1/4-inch screws for attaching the perforated strapping to the back of the bee houses.
- 3/4-inch screws if houses are attached to wood stakes, or 1 to 1 1/4-inch screws if houses are to be attached to the side of a shed or barn or to fence posts.
- 5-foot wood stakes. Two relatively inexpensive stakes can be made from a 10-foot piece of ceiling strapping.

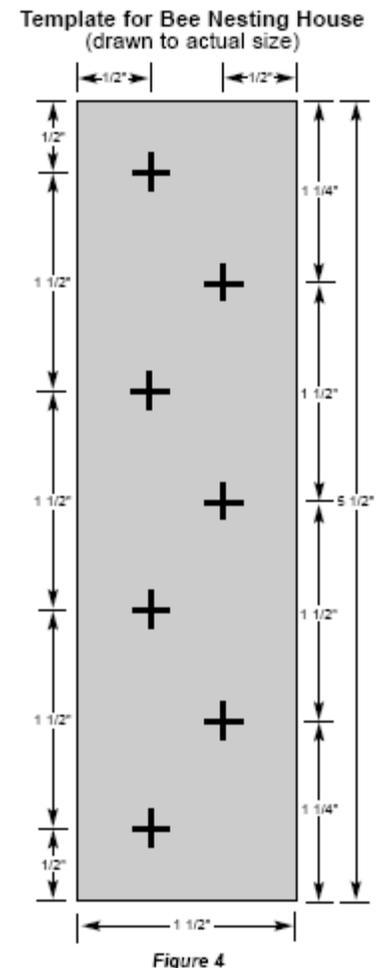
Tools needed

- Power drill
- Drill bits with 9/64-inch, 5/16-inch and 7/16-inch diameters
- Screw bit or screwdriver
- Circular saw or hand saw
- A sledge hammer if bee houses will be mounted on wooden stakes

Bee nesting house construction

1. **Saw the 2x6s into 6 1/4-inch lengths.**
2. **Drill 7 holes, in a zigzag pattern, into one end of each block.** This will be the "front" of the nest house. If you are using a hand-held power drill, only **7 holes** should be drilled in a 2 x 6 house. The zigzag pattern of the 7-hole configuration is shown in the template in Figure 4. You can trace it onto stiff cardboard or on a quarter-inch sheet of plywood to make a sturdy template. In each house, use at least **two of the three recommended** bit diameters, **9/64", 5/16" and 7/16"**. All three drill bit diameters may be used in one house. If you have a drill press, you can drill 14 holes in a house. See Figure 1 with the two parallel, vertical rows of holes. Larger nest houses, with more than 16 tunnels, are not recommended because they are more noticeable to parasites and predators. If you use drill bits that are longer than standard, be sure the holes are no deeper than 4 3/4 inches. Each hole will become a nesting tunnel. The space between nesting tunnels is important so bees have a place to land before walking into the tunnel. The different diameter tunnels will be used by different species of bees. The 7/16-inch diameter tunnels attract larger bees, such as the blue orchard bee. Be careful not to drill completely through the house because adult female bees will not nest in tunnels that are open at both ends. You may or may not have different bee species that use the different sized tunnels present in your landscape. The only way you will know is to include the different sized tunnels in your bee nest houses and watch to see if they are used.
3. **Cut the perforated strapping into 3-inch lengths.** Screw the piece of perforated strapping to the back of the wooden house, about 1 inch from the top, using 1 or 1 1/4-inch screws. See Figure 2. Be careful not to screw through a tunnel! The two inches of tape that extends beyond the top is screwed to a stake (use a 3/4-inch screw), fence post or shed (use a 1 or 1 1/4-inch screw).

Note: Use only thoroughly seasoned wood to avoid "nest dry out." As green wood dries, moisture will be removed from any nests in the tunnels, killing the bee eggs and larvae. If you start with green wood, be sure to season the cut



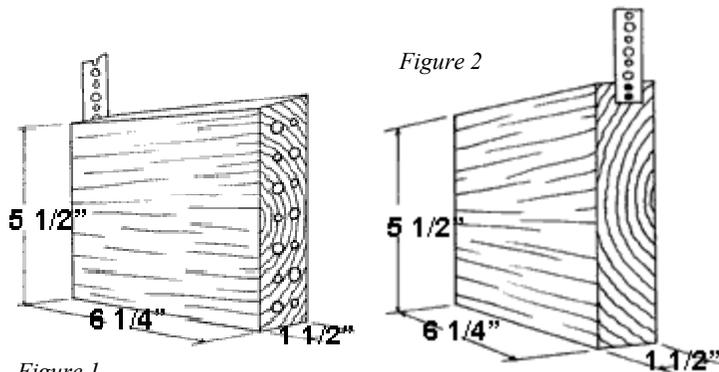


Figure 1

Figure 2

Placement

Mid-March to late April is the best time to set the houses if you want to attract *Osmia*, because they emerge and start searching for nest sites. You may set the houses as late as mid-September and get some nesting in warm autumns.

East-Southeast is the preferred exposure for the front of the house and the tunnel entrances. Hang the houses at a slight **downward angle** to prevent rain from flooding the tunnels.

The houses should be **4 to 8 feet above the ground**. Research has shown that mason bees prefer houses placed on fence posts or the sides of outbuildings. Placing them just below the eaves provides additional protection from weather.

Native bees do not fly great distances, their range being 300-400 feet, so the houses need to be relatively close to suitable leaf or soil material for their nests and within 50 yards of their nectar and pollen flowers. Nesting houses on stakes can be placed around the yard or garden, from 3 to 10 feet apart. If you are using them in a large-scale agricultural or orchard setting, they should face into the field or orchard and be spaced 10 to 25 feet apart.

Checking the bee nesting houses for bee nests, observation

Some bee species are pollinating and building nests at the onset of blueberry and apple bloom in late May. You may see female bees flying back and forth laden with pollen, entering a tunnel where they deposit the pollen into each cell. After the completion of each cell, you may see them entering the tunnel with leaf or mud material to seal it off from siblings. The tunnels with completed nests are capped with masticated plant material or mud. Freshly made nest caps of leaf-cutting bees begin as bright green, but darken with age so that by autumn nest caps are grayish brown or almost brown-black. Various species of bees may be building nests in the bee houses throughout the summer and into September. Under ideal conditions, a female is capable of producing approximately 30 to 36 bees.

Maintenance and replacement

Wooden nesting houses, like tractors and tillers, are equipment and they need periodic maintenance to give best results. Softwood houses generally last four to five years, hardwood ones much longer. The houses need to be checked at least twice a year—in the fall and in the early spring. If any have fallen off the trees or stakes, simply reattach them.

The houses become part of the habitat, and other kinds of wildlife will use them to forage for food or as nest sites. Woodpeckers and some other birds may prey on nesting bees and damage the nesting houses. Always remove any damaged houses and replace them with new ones.

Spiders, some ants, and beneficial wasps will use the wooden bee nesting houses for shelter and nest sites. Wasp nests are also capped with mud. Usually it is not until the third year of use that competition for tunnels becomes noticeable. *When you notice that more than half of the tunnels are capped with materials other than masticated leaf or mud, it is time to add new nesting houses to those already in the habitat.*

¹List derived from research at the Penobscot County Master Gardeners' pollinator garden, the University of Maine's Rogers Farm, Stillwater, Maine and from Stubbs, et al., Alternate Forage Plants for Native (Wild) Bees Associated with Lowbush Blueberry, *Vaccinium* spp. in Maine, Technical bulletin #148 (Orono: Maine Agricultural and Forest Experiment Station, 1992).

²We know that populations of certain species of native bees increase when conservation bee nesting houses are provided in areas where their other habitat resources are present. For four years, populations of native bees were monitored in fields that were provided with conservation bee nesting houses and in fields without bee houses. Fields that had bee houses showed an increase in populations as compared to the fields without bee houses. (Research conducted by Frank Drummond and Constance S. Stubbs in the Biological Sciences Department of the University of Maine.)