ORCHARD MASON BEES

by John Holbrook

Osmia Lignaria: a wild, gentle, solitary, Native-to-Montana & elsewhere, super pollinator.

Interesting facts:

- Mason bees are gentle, non-aggressive insects. They do not swarm and there is no hive, nor is there a queen bee. They do not make honey. Their sole purpose is to provide for next year's generation of bees.
- They are gregarious, enjoy each other's company, but live and work alone.
- In the wild, these bees nest in splits in tree bark or in abandoned holes left by tree-eating grubs. Holes drilled by woodpeckers are used as well.
- Nesting sites made of drilled-out blocks of wood or other types of constructions, along with fruit tree blossoms and those of other early spring flowers, plus a steady supply of mud, is all they need to thrive and perpetuate their species.
- Timed by evolutionary forces to emerge from their nesting holes when the pollen of apple tree blossoms becomes viable (when temps warm to 57 degrees F), the smaller males emerge a week or so ahead of the females.
- Males have longer antennae and come with an attractive tuft of blond hair on their faces. Females, larger with short antennae, emerge a week or so later. **Both are a deep blue-green with a metallic sheen.**
- Upon mating, males die. Females mate once, sometimes twice, storing a male's sperm in a special vessel in her body which she uses only to fertilize eggs she wants to be female. Unfertilized eggs always hatch as males.
- After mating, females feed for several days in order to build up their fat reserves and while their ovaries develop. Then they look for clean, suitable nesting holes with which to begin the most crucial stage in their remarkable life cycle, that of provisioning for a new generation of bees.
- Then it's off to the races collecting pollen and nectar for her offspring which she will never live long enough to see. Each plug of nutrients collected for each egg she lays consists of 65% pollen (for protein) and 35% nectar (for energy). This small provision is what new bee gets for a whole year.
- The mother bee makes up to 25 individual trips gathering enough pollen and nectar before she deposits an egg. On each trip she pollinates 75 different blossoms. She can forage 400 feet or more from her nesting block.
- Unlike a honeybee, which gathers pollen on its hind legs, pollen clings electrostatically to hairs on a Mason's abdomen and is easily brushed off. The nectar which she has sipped along the way is now mixed with the pollen.

- Depending of location, a female Mason Bee typically lives from four to six weeks. In her short lifespan she may lay from up to 36 eggs. This means that any single female Orchard Mason Bee can pollinate up to 67,500 early blossoms! That's a lot of apples, cherries, pears, peaches, strawberries, huckleberries, blueberries, flowers, maple tree seeds (boo)!
- It takes 300 females mason bees to pollinate a one-acre apple orchard. It takes a hive of honey bees (20,000) to accomplish the same. Mason's require little or no maintenance compared to honey bees.
- Mason bees do not experience "colony collapse" like the honey bee. They are not infected with trachea mites (*acarine* and *varroa*) who suck lethal amounts of blood from honey bees.
- Last year, my Mason bees were tested for viruses by Integrated Virus Detection Systems (IVDS) and were given a clean bill of health.
- After the bee has collected her pollen and nectar and deposited an egg, she seeks a ready source of mud which she uses to to build a thin wall to isolate the new bee in it own private brood chamber.
- A closer look at the mud wall reveals a concave surface on the outside. Its bowl shape is perfect to hold in place a new mound or plug of pollen, etc., which she has begun without pause to collect for her next egg.
- And so it goes, females growing in the lower section of a nesting hole and males forward to the opening. Of interest, a ¾ inch space is made just behind the heavy wad of mud blocking off the entrance. It is thought this gap provides emerging bees with space to rest and groom themselves, after having chewed their way out of their cocoons and walls of mud. A simple spa with glorious light at the end of a long dark tunnel.
- If handled roughly or injured, Mason Bees can sting, their sting something like that of a mosquito's. This appendage is actually a pointer, an egg guide. It is not barbed and doesn't pull out. I don't know for sure, but I doubt there is any venom.
- Woodpeckers, wasps, small speckled beetles, and pollen mites all cause problems. The bee's final plug of mud protects young bees from some of these pests. Still, pollen mites can be brought into the nest hole and consume enough pollen to slow or halt the development of the young bee. Wasps and these beetles can sneak in and lay their eggs without notice, their larvae later killing the bee larvae.
- Mason bees seal off their nesting holes with rough or lumpy wads of mud. A smooth and concave wad signals a job unfinished (the bee has died) or evidence a wasp has parasitized a hole and sealed it off.

BEE BLOCKS AND INFORMATION

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MASON BEE MOTEL CONSTRUCTION

Facts:

- Nesting blocks can be made with dry, new or scrap wood. Pine (w/o pitch) and fir are best. The natural oils in Redwood or Cedar are strong enough to kill bee larvae.
- 2 X 4's are not thick enough for proper length holes.

  What is thick enough: 2 x 6's, 2 x 8's. etc., 4 x 6's, etc.; Scrap blocks of laminated beams work as well.

  1 ft. lengths of 2 x 6's, 8's, etc., are best, but a little smaller lengths will work too.

  Never use treated wood; arsenic & other preservative chemicals are deadly to bees.
- All nesting holes are drilled on ¾ inch centers. The proper diameter hole for Mason Bees is 5/16 of an inch. A 5/16 diameter Brad bit gives better results: smoother walls if drilled slow and squared-off bottoms.
- Starting 1 inch from the top of a block, on a line scribed ¾ of an inch in from the sides of a block, mark out ¾ inch centers down the line. Drill holes perpendicular to a block's face and as deep as you can. Typical hardware store drill bits are not long enough but will suffice until longer bits can be found. Specialty tool shops offer a variety of bit lengths.
- Into the back of the block, within the 1 inch area on top, drill a hole with which to hang the Bee Motel on a nail or screw.
- Bees in their Motels do best when placed in a south east direction, facing the early morning sun. Spring nights are chilly and they like to warm up before getting to work. Rows of them can be seen with their front legs set over the edge of their openings. They pull back, out of sight, if you get too close. You feel at this point your well-meaning but appalling human mug isn't much appreciated.
- Do not place blocks where they'll be exposed to direct, hot afternoon sun.

  Apply dormant oil before bees emerge and never apply hard pesticides when pollinating bees are foraging.
- Remove the blue tape covering the lower holes before hanging your Bee Motel. These empty holes provide ready nesting opportunities for emerging bees. Now you're in business!

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Other Stuff:

- After the bees die off, and your Motel's nesting holes are filled over, you can leave them in place throughout the year. Sometimes, though, when winter temps are exceptionally cold, below zero for extended periods, place them inside an unheated structure out of the weather. Then put them outside in the spring.
- If you've got flickers and woodpeckers cover your Motels with chicken wire.
- Do not bring your blocks inside your home in winter as the warmth will cause bees to emerge.
- Always discard third year blocks. (You may want to wait if some holes were used the spring before, which sometimes occurs. In such a case place them a good distance from your newest blocks and when activity around the old blocks ceases, throw them away.)
- The mess that a previous occupied hole is cannot be drilled out. Doing so smears the left-over debris deeper into the walls and invites disease. It's far easier to drill new holes into new wood and your bees will be all the happier for it.

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The Math (This is Fun)

- If each female lays up to 36 eggs in her lifetime and each 6" deep nesting hole contains, on average, six bees, three female and three male, then each new female Mason bee might require six new holes of her own to fill her bill.
- Ten holes can be drilled in an 8" high block of wood. The top two holes of your new Bee Motel are taken up, leaving 8 empty holes you've revealed by removing the blue tape. Six females are now vying for 8 holes when they really require, in total, 36.
- So, one female (#1) nabs six holes in the original block. That leaves 2 for the next bee (#2) to grab plus 4 more from a first extra block, leaving six holes for a third bee to use. Bee (#3) takes those. A second extra block provides six holes for Bee (#4). Bee (#5) claims the remaining four holes from the second extra block plus two from a third extra block. Bee (#6) gets what's left over.
- So, if a new Orchard Mason Bee Motel owner wants to take advantage of this pollinator's reproduction and pollinating potential 3 extra blocks (motels when drilled) will be needed to go along with the original. But one can go slow, take things a step at a time, and enjoy the bees using their initial Bee Motel. If more nesting holes are needed the bees will find them, near or far. And, they'll be back next yearfor more and more.