

RAISING MASON BEES OUTLINE

KEEP CALM

MY CURRENT RESEARCH SITES

BEE POPULATIONS

90% OF BEES ARE SOLITARY. 70% NEST IN THE GROUND. 30% NEST ABOVE THE GROUND AND MOST OF THOSE NEST IN CAVITIES.

MASON BEES ARE DRIVEN BY A HIGH SURVIVAL INSTINCT AND THEY HAVE A LOW DEFENSE INSTINCT SO THEY ARE VERY DOCILE AND EASILY MANAGED.

MASON BEE MALES AND FEMALES.

MASON BEES EMERGE EARLY IN THE SPRING AND NEED THREE RESOURCES TO DO WELL.

1. EARLY POLLEN / NECTAR RESOURCES:

OREGON GRAPE, FLOWERING CURRANTS, FLOWERING HEATHER/HEATH, PIERIS ANDROMEDA JAPONICA, BIG LEAF MAPLES, APPLES AND OTHER FRUIT TREES.

MASON BEES ARE 95% EFFICIENT AS POLLINATORS. HONEY BEES ARE 5% EFFICIENT.

2. MUD RESOURCES:

DISTURBED GROUND IS BEST WITH EXPOSED SOIL LIKE A MOLE MOUND OR A MAN MADE HOLE.

3. NESTING RESOURCES:

MASON BEES ARE OPPORTUNISTS THEY DON'T MAKE THEIR OWN NESTING CAVITIES. IN NATURE THEY USE OLD BEETLE BURROWS, CREVICES IN TREE BARK, BROKEN TWIGS AND CRACKS BETWEEN ROCKS.

THEY WILL READILY NEST IN MAN MADE DEVICES:

5/16" PREFERENCE

6" – 12"

STRAWS – ABSORBENT PAPER - NOT PLASTIC

WOODEN NESTING TRAYS – NOT PLASTIC

BEE TRAPS – NOT RECOMMENDED

THE ADVANTAGE OF CLEAR PLASTIC TOPS

CAUTION AROUND NESTING DEVICES DURING ACTIVE NESTING SEASON. NO BUMPING AND KEEP TRAYS IN ORDER.

AROUND JUNE 1ST PICK UP THE NESTING DEVICES AND STORE THEM AT AMBIENT TEMPERATURES IN A GARDEN SHED OR AN UNHEATED GARAGE.

RESPONSIBLY CLEAN COCOONS BETWEEN MID-NOVEMBER AND MID –JANUARY WHEN TRUE DIAPAUSE IS OCCURRING.

DRY SAND CLEANING WORKS WELL.

BLEACH DOESN'T KILL MITES.

THE IMPORTANCE OF NATIVE POLLINATORS:

HONEY BEE POPULATIONS CONTINUE TO HAVE A HIGH DIE OFF RATE BECAUSE OF PESTICIDES, PARASITES AND PATHOGENS, POOR HEALTH CONDITIONS AND LOSS OF HABITAT.

33% OF OUR DIET DEPENDS UPON POLLINATION.

75% OF OUR CRITICAL AGRICULTURAL CROPS ARE DEPENDENT UPON BEE POLLINATION.

OVER 80% OF NATIVE PLANTS AND FLOWERS REQUIRE BEE POLLINATION.

THE LARGEST THREATS TO NATIVE POLLINATORS ARE THE OVER USE OF PESTICIDES AND THE LOSS OF HABITAT.

MASON BEES 101 (ABBV.)

There are 20,000 species of bees in the world and only about a dozen of them are managed. North America has around 4,000 species of bees. The United States has approximately 3,500 species of bees and only five species are managed. Oregon has over 500 species of bees and four species are managed: honey bees, mason bees, leaf cutter bees and alkalai bees. Managed means that humans are involved in tending to these bees primarily for their pollination services.

90% of the bee species are solitary bees. They don't live in hives and the females individually build their own nests, forage to provision food for their nests, and they lay their own eggs in their provisioned nests. Only 30% of these solitary bees live above the ground.

Today we will discuss mason bees, also called blue orchard bees and technically called *Osmia lignaria*. They are native to Oregon, live above the ground and nest in cavities. Mason bees are solitary but they are also gregarious.

They like to nest near other mason bees.

Mason bees live only one year and most of that time is spent in a cocoon. They are one of the earliest native bees to appear in the spring.

NATIVE BEE NESTING SCHEDULE

Mason bees are dark metallic blue to dark metallic green in color. Female mason bees are about the size of honey bees.

Males are smaller and have two features that easily identify them as males. They have white facial hair and they have long antennae.

Insects use their antennae like we use our noses. Males have longer antennae because it is important for them to smell and pursue females for the purpose of mating.

7 PICTURES OF MASON BEES

In the spring when the temperature rises to about 55° for a few days, mason bees emerge from their cocoons.

3 EMERGENCE PICTURES

Males emerge about a week or so before the females. They exit their cocoons, poop, then flex and dry their wings, and then fly off to drink some nectar from flowers.

Nectar is pure carbohydrate so the males get very energized. They then fly around in search of females to mate with.

When females emerge from their cocoons they poop and are then quickly mated with by males.

In the wild, females nest in various cavities such as in abandoned insect burrows, in tree bark crevices or in broken twigs.

They prefer cavities that are approximately $\frac{5}{16}$ ths of an inch in diameter. They will readily nest in man-made structures such as straws or wooden trays with channels routed in them.

Once out of their cocoons, females will live between 6 and 8 weeks and can lay up to 30 eggs. Males live two to three weeks and have only one purpose, mating.

Mason bees are excellent pollinators. The U.S. Department of Agriculture determined that it takes 30,000 to 40,000 honey bees to pollinate an acre of apple trees. That's about 75 trees.

It takes approximately 250 mason bees to pollinate an acre of apple trees.

Mason bees pollinate 95% of the flowers they visit. Honey bees pollinate 5% of the flowers they visit.

Honey bees are very good at pollen collection because they mix the pollen with nectar at the site of the flower and they pack this paste onto their hind legs. As they go from flower to flower they distribute very little pollen.

Female mason bees land on flowers and drink the nectar which is then stored in a second stomach in the bee.

She collects dry pollen and packs it onto stiff hairs on the underside of her abdomen called scopa. As she goes from flower to flower she distributes a great deal of dry pollen.

1 PICTURE OF A HONEY BEE

1 PICTURE OF A MASON BEE SCOPA

3 PICTURES OF MASON BEES WITH POLLEN

Mason bees are easily worked with for several reasons.

They do not nest in hives so they have a low defense instinct and won't sting unless very physically threatened.

Mason bees nest very near to where they emerge from their cocoons. Their foraging distance is only 300 feet.

Honey bees can forage for miles.

Mason bees are flight active when the temperature is in the mid-fifties. Honey bees prefer to be flight active when the temperature is closer to 60°. Mason bees will fly in the rain and honey bees won't.

Three resources are needed for a mason bee nesting site: a cavity, a nectar/pollen source and mud.

The nectar/pollen resource is needed for the females to provision their nesting cells and the mud is needed by the female to construct her nesting cells; hence the name mason bee.

In our area mason bees begin to emerge from their cocoons generally between mid-March and mid-April.

When the temperature rises to approximately 55° for a few days, the bees in their cocoons warm up and use up their remaining body fat which they've been living on since they cocooned. Needing to find more food they chew their way out of their cocoons.

A pollen pile is roughly the size of a large pea and represents approximately 1,875 flower visits.

Each time the female returns to her nesting site she crawls down to the nesting cell in development and regurgitates the nectar from her special stomach. She then turns around and scrapes the dry pollen off of her scopa which sticks to the nectar.

When the pollen pile is complete she will regurgitate some nectar on the pile, turn around, and then lay a single egg which will stick to the nectar. She can lay up to three eggs per day and up to 30 eggs in her lifetime.

Mason bees are haplodiploid. The female can lay either a fertilized egg which will be a female or an unfertilized egg which will become a male. In a nesting channel or straw the female lays fertilized eggs in the nesting cells deeper in the nesting channel and unfertilized eggs near the open end of the nesting channel.

4 PICTURES OF MASON BEE EGGS

After she has laid her egg, she will build a mud wall that seals off the nesting cell. She then begins working on the next cell. A female mason bee has no contact with her offspring.

When the female is nearing the end of her nesting channel or straw, she frequently constructs an empty cell called a vestibule cell as a security measure and then seals off the channel or straw with a thick mud plug.

2 PICTURES OF MASON BEES IN TRAYS

4 PICTURES OF VESTIBULE CELLS AND MUD PLUGS

The egg generally takes about a week to hatch into a larva. The larva begins to consume the pollen pile.

In 2017 and 2018 I monitored a total of 7,837 mason bee nesting cells at two research sites everyday at the same time for 100 days each year to get an accurate measurement of how long the period of time was between the egg laid date and the date that the larva cocooned.

Cocooning started between 19 and 76 days after the egg laid date. Half of the larvae had cocooned by day 39.

1 PICTURE OF COCOONING

The importance of mason bees is their role as pollinators. 33% of our diet is dependent upon effective pollination. Over 75% of our critical agricultural crops are dependent upon bee pollination.

For decades agriculture has been dependent upon honey bees for pollination services.

In the last 60 years the number of commercial honey bee hives in the U.S. has dropped from 6 million to just over 2 million.

Since 2006 the decline in the honey bee population has accelerated. 2006 is when the phenomenon of Colony Collapse Disorder began to appear. Commercial honey beekeepers are losing approximately 33-45% of their hives per year. The primary causes for these declines are: the increased use of pesticides, parasites, poor nutrition, and pathogens.

This makes the care and propagation of our native bees critical if we want to continue to enjoy many fruits and vegetables and if we want to continue to be inspired by the beauty of nature.

WHOLE FOODS PICTURES