Bees of Maine

Jennifer Lund, Maine State Apiarist
Department of Agriculture, Conservation and Forestry
Division of Animal and Plant Health
Email: jennifer.lund@maine.gov

Nearly 4,000 bee species have been identified in the United States. In Maine, there are more than 270 species of bees, representing six families. Below we will explore the types of bees found in Maine and learn about their biology, foraging preferences and nesting requirements.

Family Apidae (Bumble, Carpenter, Cuckoo, and Honey Bees)

This is a very diverse family containing many of the most recognizable species of bees. Members of these families display a wide range of nesting, foraging, and social behavior.

Bombus spp. (bumble bees) are medium to large (0.4 to 0.9 inches long) in size, very hairy, and have yellow, white, black, orange or red bands and markings. Bumble bees are generalist foragers; visiting a wide variety of plant species throughout the season. Mated queens, from the previous fall, emerge from their hibernation site in the early spring to search for a suitable nesting site, usually abandoned rodent burrows, hollow grass tussocks, and cavities in snag trees. Once a site is chosen, the queen builds several wax cups that she fills it with nectar, pollen or a mixture of both. The queen lays eggs. After hatching, the larvae are fed a mixture of pollen and nectar. Once large enough, the larvae pupate and emerge as adults. Once the queen's first batch of daughters emerge, she no longer participates in raising young and focuses solely on egg laying. The colony can grow to a couple of hundred individuals as the season progresses. In the late summer/early fall, the colony produces new queens and drones (males). After mating, the new queens locate a place to hibernate for the winter. The first hard frost kills the colony including the old queen. Check out the Maine Bumble Bee Atlas for more information on the bumble bees of Maine (https://mainebumblebeeatlas.umf.maine.edu/).

Nomada spp. (cuckoo bees) do not construct their own nests but lay their eggs in nests provisioned by other bee species. When the cuckoo bee larva hatches it consumes the host larva's pollen ball and if present, will kill and eat the host bee's egg and/or larva. Adult *Nomada* spp. come in a variety of different colors and patterns. They loosely resemble wasps in that they have reduced body hair, thick or sculptured exoskeletons, and large mandibles. Since they do not care for their own young, female cuckoo bees lack pollen collecting structures (the scopa). In Maine there are 27 species of *Nomada*.

Apis melifera (western honey bee) is the only species of *Apis* found in Maine. Originally from Eurasia, the western honey bee is not native to Maine. With human aide, the western honey bee is now found on every continent except Antarctica and is the primary species maintained by beekeepers for honey production and pollination. In Maine there are approximately 1,200 registered beekeepers that maitain nearly 10,000 hives. The western honey bee is eusocial, meaning they have a single

reproductive individual (queen) and the non-reproductive workers cooperate in caring for the young. Western honey bees have developed complex methods of communication between individuals using pheromones and the dance language. A single colony can house tens of thousands of individuals made up of three casts; the queen, workers and drones. Worker bees are the most commonly recognized members of the honey bee hive and the most abundant, making up around 99% of the individuals in a hive! They are female and responsible for all the activities in the hive, including foraging, cleaning, brood care, and guarding the hive. Workers have modified ovipositors (egg laying structures) they use to sting. Drones are the male bees in a colony. They are larger than workers, are bullet shaped, have very large eyes and number in the low 100s. They have one job, to mate with queens from other hives. Since they do not have an ovipositor, drones are incapable of stinging. There is one queen per hive. She is the only fertile member of the colony, laying between 1,000 and 2,000 eggs a day during spring and summer months. They have longer abdomens and smaller wings than worker bees. After emerging as an adult, the queen will take a mating flight, return to the hive and not leave again unless accompanied by a swarm.

Family Megachilidae (Leafcutter and Mason Bees)

Most Megachilids are solitary, where each female constructs and provisions her own nest. Their nests are typically divided into cells and each cell is provisioned with food (pollen and nectar) and an egg. Adult females are moderately sized and have rows of hairs under their abdomens called scopa that are used to collect pollen. In Maine there are approximately 49 species, representing 8 genera. Of these, *Osmia* spp. and *Megachile* spp. are the most common.

Not all Megachilids found in Maine are native to the United States. The European wool carder bee (*Anthidium manicatum*, EWCB*)*, is originally from Europe, Asia and Northern Africa. It was first discovered in New York State in the early 1960s and is now found throughout the US and Canada. The EWCB is large (0.43–0.67inches long), black with yellow spots, and has dusky wings. They are known as “carder” bees because they scrape hair from leaves such as lamb's ears and use it to line their nests. Male EWCB are territorial and can cause problems for Maine’s native bees by aggressively chasing other pollinators from their territories, monopolizing foraging resources and sometimes lethally injuring other pollinators.

Osmia spp. (mason bees) are 0.2 to 0.8 inches long and often metallic blue, or blue-black. They have round, broad heads and abdomens. *Osmia* are early spring generalist foragers, making them important fruit tree pollinators in many areas. They nest in pre-existing cavities (hollow plant stems, abandoned beetle tunnels, gaps in bark, artificial nesting blocks, etc.) and use mud or chewed plant tissue as dividers between cells. *Osmia* are very docile and rarely sting when handled. In other parts of the United States several species of *Osmia* are commercially grown to provide pollination for fruit and nut production. To gather the Osmia, artificial nesting sites are placed in areas where *Osmia* populations are high. Once the tubes are filled with *Osmi*a pupa, they can be transported as intact nests (tubes, blocks, etc.), or as loose cocoons to orchards in need of pollination.

Megachile spp. (leafcutter bees) are 0.4 – 0.8 inches long, gray to brown in coloration, and often have abdominal stripes. They have stout bodies with flattened abdomen, are moderately hairy and have large mandibles. Leafcutter bees use to cut leaves and flower petals to wrap brood in. Wrapping their brood in leaves protects larva from predators/pathogens and prevents the desiccation of the larva's food supply. Some species nest in pre-existing cavities (hollow plant stems, abandoned beetle tunnels, gaps in bark, artificial nesting blocks, etc.) while others in burrows in the ground.

Family Halictidae (Halictids, Cuckoo, and Sweat Bees)
Some members of this family are metallic blue or green, but most are black or brown. They are small (0.1 - 0.6 inches in length), slender and range from bald to moderately hairy. Most species are solitary, but some are sub-social where multiple females build and defend a single nest. Females are generalist foragers and carry pollen on the hind legs or thorax. There are 8 genera found in Maine with *Lasioglossum* being the most diverse.

Lasioglossum spp. (sweat bees) is a very diverse bee genera, containing well over 1000 species worldwide. In Maine we have 52 species. Members of this genera are commonly called "sweat bees" because they are attracted to animal sweat, which they drink for salt and micronutrients. Sweat bees are small, slender and often black, metallic green, or metallic blue. They are generalist feeders and carry pollen on the upper portion of back legs. Lasioglossum spp. includes species that exhibit a wide range of social behaviors, including solitary, communal, and social habits. In social colonies, daughters care for the young. In communal colonies, several reproductive females will lay eggs in and defend a single nest opening. Most species nest in sandy soil on flat ground and line brood chambers with a wax like secretion to protect developing larva. A few species nest in soft wood.

Sphecodes spp. (cuckoo bees) are small to moderate in size, slender and relatively hairless. They have shiny brown to black head/thorax and red abdomens. *Sphecodes spp.* are cleptoparasites, meaning they lay their eggs in the cells of another species. *Sphecodes* spp. primarily lay their eggs in the cells of other Halictid species. After hatching, the *Sphecodes* larva consumes the resources in the cell (nectar and pollen) and often any other bee larva/egg in the cell. Adult *Sphecodes spp.* lack scopa, or pollen-collecting hairs since they only visit flowers to drink nectar, not to collect pollen which is needed to feed developing larva. There are 14 species in Maine.

Family Melittidae (Melittids and Oil Collecting Bees)
This is a small and uncommon family containing only 2 genera (*Macropis* and *Melitta*) and four species in Maine. These bees are small, brown to black in coloration and have stripes on their abdomens. Melittids are ground nesters, preferring areas of bare, sandy soils. Because adequate nesting sites are not uniformly distributed in the landscape, Melittids will often be found in aggregations. Most species are specialists, only collecting and feeding on pollen/nectar from a limited number of plant species. *Macropsis* spp. collect loosestrife (*Lysimachia spp.*) oil and line cells with it. They also feed it mixed with pollen to developing larva.

Family Colletidae (Plasterer, Cellophane, Polyester and Yellow-faced Bees)

Female Colletids line brood cells with a cellophane or polyester type substance produced from a gland in their head. The substance does not permeate the surrounding soil, so it easily separates from the soil. This substance is waterproof and resistant to fungus, which protects eggs and developing larvae. This family provisions its nests using regurgitated liquid food. There are two genera found in Maine.

Colletes spp. (polyester bees) are 0.3 to 0.6 inches long and very hairy. Most are black with white hairs on head, thorax, and in stripes on the abdomen. When viewed from the front, their head tapers towards their mouth, giving it a heart shaped appearance. They carry pollen in scopa on their hind legs. Many are specialist feeders, only feeding on a few species and all are soil nesters. Besides producing the cellophane type substance, *Colletes spp.* also secrete linalool, which acts as a fungicide and bactericide. There are 10 species found in Maine. One species, *Colletes inaequalis*, emerges very early in the spring, often before the snow has fully melted.

Hylaeus spp. (yellow-faced bees) are small (0.2 to 0.3 inches long), slender, and relatively hairless. Most are black with yellow or white markings on their faces, thorax, and legs. They are generalist feeders and collect nectar and pollen in their stomach (no scopa). Most species nest in twigs, plant stems, or small natural cavities and will readily nest in artificial bee nesting blocks. In Maine there are 10 species.

Family Andrenidae (Miner and Sand Bees)

Andrenids are the most diverse family of bees on the North American continent. Andrenids are one of the first bees to emerge in the spring. They are moderately sized (0.3 - 0.7 inches in length) and hairy. Most are black or gray-brown, some with abdominal stripes. This family contains both specialist and generalist foragers and female bees carry pollen high on their hind legs. They are soil nesters and can be found in aggregations when conditions are favorable. Many are solitary, but some will form communal nests. Females excavate a vertical shaft with lateral tunnels used as brood chambers. In Maine there are four genera, but 52 of the 56 species are in the genera *Andrena*.

For more information:

Checklist of Maine Bees:
https://www.researchgate.net/publication/322277890_Bees_of_Maine_with_a_State_Species_Checklist

Maine Bumble Bee Atlas: https://mainebumblebeeatlas.umf.maine.edu/

Revised 2/5/21