# A Practical Guide to Bee Identification in Aroostook County

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CENTRAL AROOSTOOK SOIL AND
WATER CONSERVATION DISTRICT

How often have you encountered a buzzing bee while on a walk or while working in your garden? What did you do? Did you continue what you were doing, or did you run like mad? In most cases bees, of all types, will go about their business, which is the gathering of food, and leave all else alone. Of course, there are always exceptions…

Exactly what are the bees looking for when they move around on a flower? The answer is pollen and nectar. This is biology 101, the plants need to produce seed and before they can do that, they need something to pollinate the flowers. So, plants produce pollen and nectar to attract pollinators.

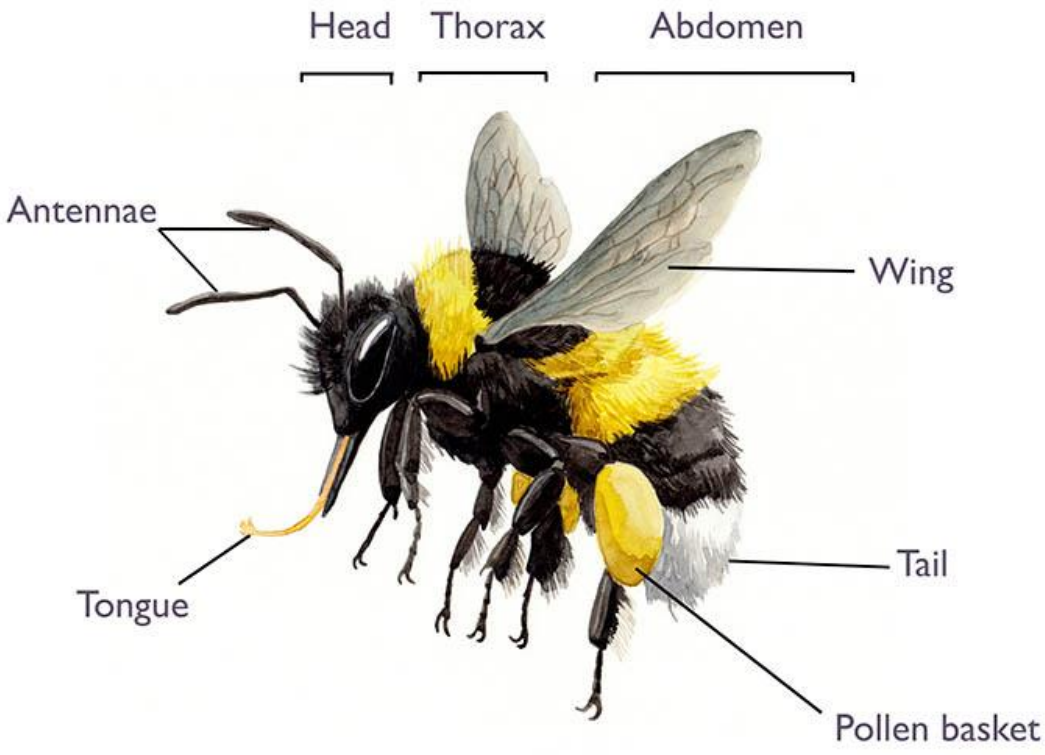
Pollen is a fine powdery substance, usually yellow, consisting of microscopic grains discharged from the male part of a flower or from a male cone. Each grain contains a male gamete that can fertilize the female ovule. Pollen is transported by wind, insects, or other animals. As you can see in this photo, the honeybee is covered with specks of yellow pollen. She will pack these specs onto pollen baskets, which are on her hind legs. She won't return to the hive until her pollen baskets are full. Honeybees pack this pollen into cells and allow it to ferment, called bee bread, and they use it as a source of food which is high in protein.

Nectar is a sugary fluid that is secreted by plants, especially within the flower to encourage pollination by insects and other animals. It is collected by bees and made into honey. In this photo, we see a honeybee sticking her head and tongue deep into the flower of a lavender plant for the nectar that is there. We don't see the pollen grains on her body and since nectar is a fluid, we won't see that. When she has engorged herself with nectar she will return to the hive and deposit it in a cell. Other bees will add enzymes to the nectar and will cure it until it is honey. The worker bee will return to the field for another load of nectar.

Not all bees gather as much pollen and nectar as honeybees; however. Honeybees are the only bees that produce honey to overwinter, the honey is their food for the winter. In honeybee hives the queen and all the worker bees cluster into a ball and conserve heat throughout the winter. Inside the cluster the temperature is close to 90 degrees F. Honey is high energy and the tight cluster makes it possible to live through the winter this way.

Most other bees produce enough honey to feed their larvae during the summer and all but the mated female will die in the fall. The mated female will crawl into a mouse nest or similar hole and hibernate by herself thorough the winter. Early in the spring you will notice that the bumble bees are abnormally large; these are foundress bees who begin the hive by themselves and have to feed and care for the brood until they are old enough to take care of her. Foundress bees are the previous year's mated females who will start a new nest in the spring.

## Parts of a Bee




The above diagram shows us the basic anatomy of a bee. Anatomy may vary slightly between bee species and between sexes of bees. For example, in honeybees; drones, or male bees, do not have a stinger. The stinger is located at the end of the tail section. Not all stingers are created the same. Worker honeybee stingers have a barb on the end, like a fish hook, that anchors the stinger into the victim. After stinging, when the honeybee flies away, her stinger stays in and it pulls out a section of her stomach muscles. If you look closely, you can see the muscles pumping the venom, folic acid, into your skin. She will fly away and die from her

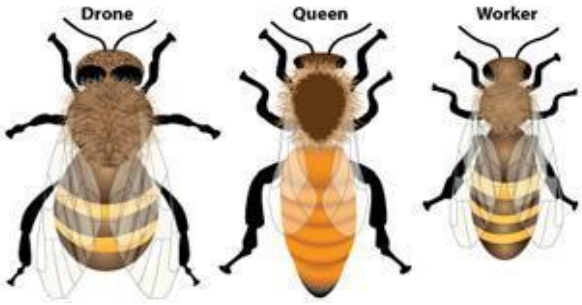
injuries. Most other bees can sting repeatedly and inject small amounts of venom into their victims, then fly away unharmed. Unless of course, you swat at them; this does their work for them because you crush the bee and force the venom into your skin. It is better to brush them away.

Over the next several pages, we will familiarize ourselves with the bees that we are most likely to come into contact with in our area. Most of these bees will be native to our area, however, we will see a few that have found their way here and seem happy to be here. We will begin with the honeybee; definitely not native, but it is so prevalent that it is near impossible to walk without seeing one. Honeybees are vitally important in pollinating our food crops and without them and all other pollinators, it is said that in two years there would be no food in the world. In our area, the honeybee would probably not survive if humans did not manage them. In the tropics; however, honeybees do just fine on their own.

***Apis mellifera***
Order: Hymenoptera
Family: Apidae
Genus: Aphis
**Honey bee**

Honey bees are red/brown with black bands and orange yellow rings on the abdomen. They have hair on their thorax and less hair on the abdomen. They also have a pollen basket on their hind legs. Their legs are mostly dark brown/black.

Queen bees range in length from 0.71 to 0.79 inches in length. Worker bees are .039 - .059 inches and Drone bees are 0.59 – 0.67 inches in length.



Honey bees usually live in wooden boxes called hives and are generally maintained by humans. Feral, wild, colonies can be found living in hollow trees, between walls and other places, but they don't do well on their own and often die after a couple years. These feral colonies were once part of a hive, but swarmed and took a laying queen with them to start a new colony. Beekeepers often collect these swarms to build up the number of hives that they have.


It would be very rare to see a queen honeybee outside of the hive. Her primary purpose is to lay eggs and keep the colony growing. A virgin queen leaves the hive to mate in flight three or four different times and she is fertile for life. Worker bees, females, feed and groom the queen. Queens can live 2-5 years, but most commercial beekeepers replace the queen every year or two. If the queen becomes sick or injured the workers will generate queen cells to replace her. Queen bees only sting other queens.

Worker bees are females and do the work in the hive, all the work! They feed the queen, feed and care for the brood, pack the pollen into cells, cure the honey, clean the cells for fresh eggs, haul away debris, feed the drone, who are unable to feed themselves, gather nectar and pollen and guard the hive from predators. Worker bees can sting!!

Drone bees have the life! That is until winter arrives; when nectar and pollen sources dry up, drones are forced from the hive to die. It only takes 24 days for a drone to mature so they can be replaced easily. In the summer drones will congregate in "drone assembly areas" and just fly around waiting for a virgin queen to fly by. The queen bee mates in flight and will usually mate with 8 or 10 different drones at a time. Drones that get to mate will fall to the ground and die afterward. Drones cannot feed themselves and are fed by the worker as long as there is ample nectar flow.

Queens normally take 16 days to reach maturity, the worker bees take 21, days and the drone takes 24 days to mature. Queen cells are elongated cells that the worker bees draw out to provide room for the queen to develop. Beekeepers usually cut these queen cells out so that the hive does not swarm, or allows at least one to develop if a new queen is desired. If a beekeeper wants to make a split, new hive, the frame with the queen cell could be moved to a new hive along with some bees and frames with eggs and honey.

The pages that follow are jam packed with great information and some very interesting bees! If you use this handbook to identify bees I would ask that you NEVER kill a bee to observe it. So many of our pollinators are struggling already that we don't want to kill any. The ideal way to study the bees is to make an observation jar, a small jar, baby food size. Mix some brown sugar and water to form a paste and press that in the bottom of the jars. It is usually pretty easy to capture a bee in a jar and the best way to observe them is for them to be calm. The candy bottom of the jar will give them a distraction as well as a treat. As they fill their stomachs with the candy, they will be still so that you can observe them. Keep the jar from long exposures to direct sun so the jar doesn't get too hot. A hand lens would be an invaluable tool as well. Once you identify the bee, slowly open the jar and let the bee return to its nest.

***Agapostemon virescens***
Order: Hymenoptera
Family: Halictidae
Genus: Agapostemon
**Bicolored striped-sweat bee**

The bicolored striped-sweat bee is very common in our area. Like the honey bee, they forage for pollen and nectar, but do not build up large reserves of honey. There is no queen, each female will care for her own young. As many as 30 females will share a nest in the ground and at least one will remain behind to guard the entrance from predators. Males are not allowed back in the nest once they hatch. They tend to congregate in places where females can find them for mating purposes. Males die in the winter. Females hibernate in their underground nests. Females are about 0.43 inches, while males are 0.39 inches. Much of the summer for the female is spent gathering pollen and nectar for developing young. A new clutch of brood emerges in the early fall; females will mate and sip nectar from New England Aster and false sunflower and then hibernate until the next spring when they will start their own clutch of brood.

A typical nesting site for the sweat bee. Notice how one female is guarding the entrance while her sisters are out foraging. Common predators are parasitic flies and the cuckoo bees. Since this bee species nests in the ground and winters there, it is best not to plow the soil. Below is the male.

***Augochlorella aurata***
Order: Hymenoptera
Family: Halictidae
Genus: Augochlorella
**Golden Green Sweat Bee**

The golden green sweat bee ranges in size from 0.20 – 0.28 inches with the females being slightly larger. Like the bicolored striped-sweat bee, this species nests underground. Their active season begins when an overwintered female (foundress) starts a first brood of males and females. In early summer this first brood will become workers and the foundresses will become queens. The workers will assist the queens in rearing s second clutch of brood that will emerge later in the summer. The females that hatch in late summer will mate and become the foundresses the following spring. Some claim that the sweat bee is attracted to the salt in human sweat, while others say that is not the case. I have been stung by sweat bees that seem to be licking sweat from my skin. The sting is minor.

***Halictus rubicundus***
Order: Hymenoptera
Family: Halictidae
Genus: Halictus
**Orange-legged furrow bee**

This little bee could easily be mistaken for a wasp, but it is in the sweat bee family. Both males and females are 0.39 – 0.43 inches in length. Like other sweat bees, a foundress begins a nest in soil, usually on a south slope, in the spring and burrows in to form a cavity. She forms balls of nectar and pollen and lays eggs into them. The first hatch is usually females who help the foundress rear brood. The second hatch is primarily males with some females. Those females will mate with the males and move to a new location to begin a new nest the following spring. The foundresses and their female workers will die in the fall.

***Halictus confusus***
Order: Hymenoptera
Family: Halictidae
Genus: Halictus
**Confused sweat bee**

Males and females of this species are both around 0.28 inches in length. Like other sweat bees, the confused sweat bee begins with a foundress who overwinters in the soil. She will dig a nest and begin to rear brood. The females that hatch first will help her rear brood. The second hatch mate with second hatch females who will become the foundresses the following spring. The original foundress and her workers will die in the fall. The males will die in the fall as well.

***Lasioglossum admirandum***
Order: Hymenoptera
Family: Halictidae
Genus: Lasioglossum
**Common furrow bee**


Males and females of the species are both 0.20 to 0.27 inches in length. The common furrow bee is like the other sweat bees. They are important pollinators and will sting if provoked. Their sting is mild.

***Hylaeus annulatus (Linnaeus)***
Order: Hymenoptera
Family: Colletidae
Genus: Hylaeus
**Annulate masked bee**

**Female masked bee**

**Male masked bee**

Almost all masked bees can easily be recognized by their solid black bodies with yellow joints and facial marks. Males are easier to identify and some female species are almost impossible to identify. Queen Anne's lace is a favorite flower of the masked bee. Bees in the Colletidae family are known as plasterer bees. They use a special secretion from their mouths, bee spit, to line their nests. Masked bees do not have pollen hairs on their legs, they store pollen in their stomachs to carry back to the nest. Once constructed, the nest can be submerged in water and due to the "bee spit" the young can emerge. Not much is known about the biology of this species.

***Ceratina dupla say***
Order: Hymenoptera
Family: Apidae
Genus: Ceratina
**Doubled Ceratina**

Females are 0.24 to 0.31 inches in length, males are slightly smaller. In the carpenter bee family. Nest in dead wood and plant stems. Bodies are hairless and black with a sheen. Overwintered females begin to lay eggs at the bottom of the stem and move upward to the entrance. When the stem is full of eggs, she guards the brood. Brood emerges from the bottom upward and will move unhatched siblings to the cell that they hatched from. The foundress and drones die in the winter. Mated females overwinter in

plant stems and begin a new hive in the spring.

***Andrena dunningi Cockerell***

Order: Hymenoptera
Family: Andrenidae
Genus: Andrena
**Dunnings miner bee**

This is a very interesting little bee. They are solitary ground-nesters. Most are specialist pollinators whose life cycle is timed to correspond precisely with the blooming period of specific flowers. These bees are fairly small; 0.35 in. (males) to 0.39 in. (females). They are hairy and banded and are frequently confused with honey bees. The female digs burrows in gravely soil and places a ball of pollen and nectar with an egg in each chamber. Some species excrete a substance that dries hard and waterproofs the cell. The timing must be just right to coincide with the bloom of very specific flowers. If the hatch is too early, or too late, there will be no pollen to begin a new generation. Only one brood per year occurs.

***Andrena carlini Cockerell***

Order: Hymenoptera
Family: Andrenidae
Genus: Andrena
**Carlins Miner Bee**


Looking more and more like a bumble bee. Relatively large at 7/16” to 33/64”. Like other miner bees, Carlins is solitary and nests in gravely soil.

***Andrena crataegi Robertson***
Order: Hymenoptera
Family: Andrenidae
Genus: Andrena
**Hawthorn Mining Bee**


Female


Male

Like other mining bees, the Hawthorn miner nests underground and females overwinter in the ground. There has been much discussion about this species and whether it is an actual species or a subspecies. They are in our area and will be found most often on mustard, broccoli, and other brassicas. Hawthorn miners are fairly small bees, roughly 7/16 inches.

***Lassioglossum leucozonium***
Order: Hymenoptera
Family: Halictidae
Genus: Lasioglossum
**White-zoned furrow bee**

A solitary bee that nests in the ground. One or two females form a nest in the ground in the spring. Each make 8-15 cells. The first hatch is females to help with rearing brood. The second hatch is both males and females. The second hatch females mate in late summer. Foundress females and males die, mated females overwinter in the soil. A relatively small bee, 5/16 inch. Not native to North America, but have found their way here and are established.

***Andrena wilkella***
Order: Hymenoptera
Family: Andrenidae
Genus: Andrena
**European legume miner bee – Wilkes mining bee**

Another imported bee from England. Probably introduced in ships ballast. Both sexes are roughly 7/16 inches in length. Nests in the ground singly or in large congregations. Overwinters as larvae or prepupa. Prefers pollen from clover or sweet clover so that is why it is active between April and August.

***Osmia atriventris***
Order: Hymentoptera
Family: Megachilidae
Genus: Osmia
**Maine Blue Orchard Bee (Maine Blueberry Bee)**

The mason bee is very important in pollination of orchards and blueberries. They carry pollen on their abdomen, not on legs like honeybees. Solitary nesting in reeds or stems of plants. Active in April through mid-June when fruit trees are in bloom. A ball of pollen with nectar is placed in a mud cell with an egg and capped off. By the end of summer, adults will emerge from the cells. Six mason bees can pollinate and entire apple tree, where it would take 360 honeybees to do the same thing.

***Osmia pumila***
Order: Hymenoptera
Family: Megachilidae
Genus: Osmia
**Leafcutter Bee**

Often referred to as the leafcutter bee because the female chews up leaves and vegetation to build nest walls and plugs. In the mason bee family. Average 5/16 inch in length, males are a bit smaller. One of the first bees to emerge in the spring, as early as May. One generation per year with adults overwintering in their cocoons. It is easy to build a mason bee house to enjoy these little bees in your yard and garden.

***Megachile inermis***
Order: Hymenoptera
Family: Megachilidae
Genus: Megachile
**Unarmed Leafcutter Bee**

Similar in size to a female worker honeybee 9/32 – 25/32 inches, with the males being slightly smaller. They have large chewing mandibles and females carry pollen in a scopa (dense hairs) under their abdomens. Builds their nest in largest holes, 3/8 – 7/16 inches and have one generation per year. They line their nests with chewed vegetation or mud. They are active in mid to late summer.

***Xylocopa viginica***
Order;  Hymenoptera
Family:  Apidae
Genus:  Xylocopa
**Eastern Carpenter Bee**

A large bee; females are ¾ - 29/32 inches and males are 43/64 – 53/64 inches.  Nest in decaying wood.  Bees emerge in June and stay in the nest with their siblings throughout the summer, fall and winter.  They only occasionally leave the nest on warm days to search for nectar.  Many females live 2 years and 2 – 3 females can be present in each nest, but only 1 works and lays eggs.

***Bombus impatiens***
Order:  Hymenoptera
Family:  Apidae
Genus:  Bombus
**Common Eastern Bumblebee**

The most common bumblebee in our area.  Queens are 43/64 -53/64 inches, drones are 15/32 – 43/64 inches, and workers are 21/64 – 5/8 inches.  The queen, foundress, makes a nest in the spring and cares for it by herself until the first brood hatches.  Then she lays eggs and is care for by workers.  She will die in the fall and a newly mated female will overwinter in leaf duff, with ice crystals even forming in her body.  Males have yellow faces while the faces of females are black.  Males don't work.  All die in winter except for young mated females.  Used for pollination in greenhouses.  They can form large colonies.  Only the queen mate and she lays eggs from May to November.

***Bombus ternarius***
Order: Hymenoptera
Family: Apidae
Genus: Bombus
**Orange Belted Bumblebee (Tricolored Bumblebee)**

Very common in our area. Often confused with the Rusty Patched Bumblebee, below, but the saddle bags of rust on the Rusty Patch are a clear differentiation between the two. Queens are 43/64 to ¾ inches, workers range from 5/16 to 33/64 inches, and drones are 3/8 to 33/64 inches long. Only the queen mates and lays eggs. They are similar to the tricolored bumblebees in all other ways.

***Bombus affinis***
Order: Hymenoptera
Family: Apidae
Genus: Bombus
**Rusty Patch Bumblebee**

Characteristics and life cycle is the same of other bumblebees. Notice the saddlebag-like rusty patches on its back. This is a sure sign of this species. It is not orange like the tricolored bumblebee. Rusty Patch is endangered in our area so if you think you spot one, take a picture, DON'T KILL IT! And send the picture to Maine IF&W Endangered species biologists for identification. We really want to reintroduce this species to our area. There are colonies in the Appalachias, but farm chemicals have all but wiped them out in our area.

***Bombus vagans vagans***
Order: Hymenoptera
Family: Apidae
Genus: Bombus
**Half-Black Bumblebee**

An average sized bumblebee. Queens range from 37/64 to ¾ inches, Workers, 15/64 to 39/64 inches and Drones 7/16 to 33/64 inches. The workers are smaller as they do the majority of the pollen and nectar collection. Similar in characteristics and biology of other bumblebees.

***Nomada cressonii***
Order: Hymenoptera
Family: Apidae
Genus: Nomada
**Cressen's Nomad Bee (Cuckoo Bee)**

Cuckoo bees lay their eggs in other nests; they like the miner bees' nests especially the Andrena genus. The female cuckoo bee will kill the larvae in the cell and lay her egg in the pollen ball. When the Cuckoo bee emerges, it will fly off and be a cuckoo bee. Females are 5/16 to 25/64 of and inch and the males are 9/32 to 23/64 of an inch. There are no workers as they don't care for their own brood. A very lazy bee.

***Nomada luteoloides***
Order: Hymenopters
Family: Apidae
Genus: Nomada
**Yellow Nomad Bee**

This is another cuckoo bee that lays its eggs in the nest of other bees. They also, prefer to lay their eggs in the nests of miner bees, especially the Andrena genus.

***Peponapis pruinosa***
Order: Hymenoptera
Family: Apidae
Genus: Peponapis
**Squash Bee**

Squash bees are solitary specialists and only pollinate the flowers of squash plants. They get up early and work until noon, then they take a nap. Squash bees build their nest in colonies below ground, and usually live close to the plants that they pollinate. Every female squash bee has her own nest and lays her own eggs. Only the female squash bee can sting, but she prefers not to bother. Very similar in size and markings to a worker honeybee, but not as delicately marked.

***Anthidium manicatum***
Order: Hymenoptera
Family: Megachilidae
Genus: Anthidium
**European Wool Carder Bee**

Another miner bee that was transported to North America in the ballast of ships. A unique little bee that gets its name from the habit of gathering hair from leaves, especially lamb's ear, and carrying back to its nest to line the nest. Very distinctive in that they have yellow spots down their abdomens. Males don't have stingers but do have spikes and are very territorial when they find a patch of flowers. They head butt would be intruders and can even kill them by crushing them with their spikes. These bees nest in existing holes in the ground or in stems. There are two generations per year, with the second brood overwintering as pupae. The foundress starts the nest in the spring. Same size as a honeybee.

***Colletes inaequalis***
Order: Hymenoptera
Family: Colletidae
Genus: Colletes
**Unequal Cellophane Bee or Polyester Bee**

Nests resemble tiny volcanos of sand with an entrance the width of a pencil. One of the earliest bees to come out in the spring, snow can be on the ground still. They pollinate red maple, willow and apple. Nicknamed the polyester bee due to a polyester-like secretion that they line their nests with. About ¾ the size of a honeybee with a heart-shaped face. Both males and females collect nectar and pollen, but only the females take care of the nest, and she does it alone.