

Interesting Facts About Honeybees

Compiled by Jeffrey Hamelman

- To produce one pound of honey, bees visit over two million flowers.
- They collectively travel over 55,000 miles (more than three times around the world!).
- It takes an average of 80,000 bees one trip into the field to collect four pounds of nectar.
- It takes an additional 80,000 bees to reduce the four pounds of nectar to about one pound of honey.
- The average flying distance a honeybee travels for a load of nectar is about 1½ miles from the hive in all directions. Therefore, a colony of bees covers an area of at least 3 miles in diameter. They will travel considerably further if nectar and pollen are not available closer to their hive.
- An average worker honeybee makes about 1/12 of a teaspoon of honey in her lifetime (about 1/32 of an ounce), and she travels about 250 miles.
- A honeybee travels about 15 miles per hour.

Honeybees as we know them today evolved in the Eocene Tertiary over 10 million years ago from carnivorous hornets or wasps. Unlike hornets and wasps that eat the flesh of smaller insects, honeybees consume pollen as their protein source. Adult honeybees can live on honey alone, but they must have protein (pollen) to raise their young.

Honey's flavor and color are determined by the floral sources it is comprised of. Each plant type produces its own flavor and color, from water white to almost black. Color does not determine quality. Usually, the darker the honey, the stronger the flavor.

When a forager bee takes the last drop of nectar from a flower, she leaves a chemical sign that says "empty." This signal fades away at about the same rate as the flower's nectary is refilled.

A worker honeybee only lives 5 to 7 weeks during the summer because she wears out her wings. In winter the bees' physiology changes and they may live up to 20 weeks.

Only honeybees are able to transform nectar into honey. Honey is about 75% levulose and dextrose—sugars that do not need to be digested by our bodies, and are therefore easily assimilated directly into our bloodstreams.

The water content of honey is 16–18%. If it gets above 18% it can begin to ferment and spoil. When properly ripened, honey will never spoil (although it darkens with age). Edible honey has been found in Egyptian pyramids.

In order to reduce the moisture content of nectar and convert it into honey, workers line up in the hive facing specific directions. They then fan their wings and set up an air current that enters the hive through one side of their entrance, flows over the nectar and evaporates it, and then exits the hive from the other side of the entrance.

A colony of honeybees during the warm months has between 50,000 and 125,000 bees. Each year, in order to survive, they will consume approximately 300 pounds of honey, 70 pounds of pollen, and 200 pounds of water.

The queen can live as long as 5 years (although this is the exception). She leaves the hive at most twice: as a virgin, she will leave in order to mate with numerous drones, from whose sperm she receives a lifetime supply of eggs—upwards of six million. If she leaves the hive a second time, it will be with a swarm.

During the warm months, the queen lays up to 1500 eggs per day (200,000 per year). As she deposits each egg into a cell, she decides whether or not to fertilize it with sperm from her *spermatheca*. If she fertilizes it, the egg will become a worker (female); if the egg is not fertilized, it will become a drone (male).

Worker bees have a variety of “job descriptions” during their short lifetimes. They begin life as house bees, involved with cleaning cells, feeding young brood, making wax, receiving nectar from field bees, and guarding the hive. Eventually, they leave the hive and become foragers, gathering nectar, pollen, propolis (pitch gathered from trees that is used as glue in the hive), and water. They are quite flexible however; if there is a dearth of foragers, young bees can bypass some of the normal jobs and begin foraging; conversely, older bees can revert to wax-producing bees in the event of a shortage of young bees.

Although bees are cold-blooded insects, they are able to raise their body temperature to as high as 109°F (43°C). They do this, for example, during the process of building honey comb. Solid wax plates are exuded from the abdomen of the bees, which is then melted as they build their hexagonal comb. Gravity receptors in their leg joints and between their abdomen, thorax, and head enable the bees to orient their honeycombs vertically in the darkness of the hive. Cell thickness is maintained at precisely .0028" (.07 mm).

The worker bees can turn a normal worker egg into a new queen simply by feeding it royal jelly. Royal jelly is a secretion from the bees' heads. All young larvae are fed royal jelly for three days. When making a queen, the bees continue feeding copious amounts of royal jelly to the chosen larvae.

A viable queen produces a queen substance that both attracts drones during her mating flights, and also suppresses the development of ovaries in worker bees. If the queen unexpectedly dies and there are no eggs that can be turned into a new queen, some of the workers develop the ability to lay eggs. However, since the workers have not mated with any drones, the eggs are infertile and will all be drones. The colony will therefore be unable to survive.

Drones do no work in the hive, and their only purpose is to mate with virgin queens (if they succeed in mating, they die as a result). A drone does not have a stinger, so cannot help protect the hive. Drones do not gather nectar or pollen. They live by eating the food brought into the hive by the worker bees. As cold weather approaches, the workers remove all the drones from the hive. They try to re-enter but are ejected again and again, until they are too weak to continue trying. They die outside the hive, and there are no drones in the hive during the winter months.

As the weather turns colder, the bees form a cluster within the hive. The temperature of the cluster remains at 57°F. When the queen begins laying eggs during mid or late winter, the area where the brood is located is kept at a constant temperature of 97°F (36°C), even when the outside temperature is well below zero. Bees consume their stored honey to create heat, but worker bees also create heat by raising their body temperature to as high as 109°F (43°C) and either climbing into cells adjacent to the brood or lying above the brood. By rapidly pulsating their abdomens, they increase their body temperature, hence warming the brood.