



The Bee Caste Rank & Task

Introduction

As a beekeeper, a lot of time is spent observing the life cycle in the hive and providing whatever is needed. In order to keep your hive alive and healthy, it is essential to know how the activities of the different members of the bee caste work together inside the hive.



Inside Your Bee Hive

The Queen



The **queen** is the most essential bee in the colony. She lays 1,000 to 1,500 eggs per day. To raise a hive it is essential to have a healthy queen – one that is vigorous and produces the proper amount of eggs. One of the primary tasks in checking your hive is to make sure the queen stays healthy.

The queen bee doesn't rule the hive in the sense that she tells every bee what to do. Rather, she emits a smell called pheromones. These pheromones cause the other bees to understand that she is present. It also invigorates them to work harder. When the pheromones cease to be within a hive, the bees tend to become lazy and do not work as hard. The pheromones stimulate bees to continue to work, to build comb and to bring in honey, pollen and nectar. The queen's pheromones keep cohesion in the hive.

The queen lives 2 to 3 years. The bees raise a new queen only if the queen should die or the colony

within the hive **swarms**. This happens when the colony grows too large and half the bees leave for a new location.

The queen's life starts out as an **egg** laid in a special cell called the **queen cell**. The queen cell is much larger than any of the other cells in the hive. The bees only build this cell when they raise a new queen. But they don't just build one – they build 15 to 30 cells in case one of them doesn't hatch or the queen should die before she hatches out.

Three days after the egg hatches, it transforms into a **larvae**. Worker bees begin to feed the larvae a high mineral substance called **royal jelly**. This royal jelly is secreted from glands on the worker's head. The worker bees feed the queen larvae so much jelly it literally floats in its cell – as if it were in a tub of royal jelly. The larvae begins to mature very quickly and after 8 days it spins its cocoon. At this stage it is called a **pupa**. After a total of 12 days, the queen hatches out as an adult queen. The worker bees groom her and take care of her.

The queen's first job within the hive is to eliminate any other queens that may have hatched or any that are hatching. There is normally only one queen in the hive, so she dominates the hive. The new queen goes to the other cells, eats a hole in the cell, then stings the emerging queen inside. If another queen has already emerged, they will fight and the strongest queen will win.

After 3 days, the queen leaves the hive and goes on a mating flight. She flies within 2 to 3 miles of the hive and mates with 10 to 17 drones. The queen only goes on this flight one time in her life. If she does not properly mate with enough drones, she will not be able to lay productively the entire 3 years of her life.

After returning to the hive from her mating flight, she will begin her duty of laying eggs within 3 to 5 days. Production at first can be very low, but within 2 weeks she will be laying at her full capacity of 1500 eggs per day.

If the queen's pheromones weaken or diminish totally, the bees begin to raise a new queen. Because the new queen cannot smell the old one, every once in awhile you will find 2 queens working side by side. As long as they get along, it's okay to have both in the hive.

The Drone Honeybee



The **drone** is the male honeybee in the hive. Although shorter than the queen, he is bulkier and noticeable larger than the worker bee. The drone's sole purpose is to mate with the queen. Although his life span is variable, he normally lives only 3 months. In the spring and summer, there may be as many as 600 to 1000 drones in a healthy hive.

Because the drones have no stingers, wax glands or pollen baskets, they can't carry out the normal activities of the rest of the workers. In the Fall when the weather cools and drones

are no longer needed, the worker bees chew off the drones' wings and chase them out the front of the hive. Because the drones can't fly back into the hive, they die of starvation.

The Worker Bee



The majority of a hive's population consists of female **worker bees**. There may be as many as 40,000 to 60,000 workers in a healthy hive in the Spring and Summer. The worker bee's life lasts about 45 days.

Worker bees are raised in a smaller cell than the queen. Their cells are in adjacent rows in the honeycomb itself. The worker bees start as eggs. Three days later, larvae hatch from the eggs. For the first 3 days of their larval life, maturing worker bees feed them royal jelly, just as they fed the queen. But after the 3 days, the workers dilute the royal jelly with pollen and nectar. Because they are not fed royal jelly during the entire larval life, the worker bees' reproductive organs are not fully mature. After 8 days, the larvae spin their cocoons. This is the pupa stage. After a total of 21 days, the worker bees hatch out.

As the adult bees emerge from their cells, their first task is to clean themselves. After that, they get honey and pollen from the honeycomb cells and feed it to the older larvae. Then their royal jelly glands form and the new workers feed royal jelly to young larvae.

The worker bees' next job in the hive is to build comb. They hang from the top of the hive, hanging off each other and form a **wax chain**. The bees secrete wax from glands in their abdomen. They pass the little scales of wax up the chain of bees, each one adding their scale to the others, until the last bee at the top forms the scales into the hexagonal shape of the comb cells. All this construction is how the bees make their honey comb.

The workers' next job is to greet all the incoming bees at the entrance of the hive. They receive the nectar and pollen from the field bees and take it into the hive, storing it in the newly built combs.

After that, the bees stand at the entrance to the hive and guard it. Every bee coming into the hive has to check in with the **guard bees**. If they bear their mother's pheromone, they are welcome in. If they do not have the scent or have come from another hive, the guards chase them out with one exception – if the bees are bringing in nectar or pollen, they are welcomed into the hive whether or not they bear the queen's pheromone.

While working as a guard, the bees take short flights, learning to navigate back to the hive. Once the bees have successfully learned navigation, they gather nectar and pollen for the hive.

The first worker bees that leave the hive early in the morning are called **scout bees**. They go out and search for nectar and pollen. When they have found a floral source, they come back to the hive and do a **bee dance**.

This dance tells the other bees exactly where to find this nectar or pollen. The bee dances in a figure 8. Depending on the angle of the figure 8, it tells the bees where the nectar source is in correlation with the sun. The bee does a vibration through the center of the figure 8. This tells how far away the nectar source is. If it vibrates fast, it's close. If they do a very slow vibration, it's will be a good distance away.

Knowing this distance is important for the bees. Before they leave the hive, they eat just enough nectar to fly to the floral source. They don't want to store too much, because they need to bring back as much nectar as they possibly

can. But they don't want to store too little, or they will run out of fuel before they find the source. The bees know they are getting close to the source when they begin to run out of stored honey and nectar.

Once at the flower source, the bees take the nectar into their honey stomachs through their tongues. Then they add enzymes from their stomachs, which later preserves the honey.

The bees then fly back to the hive where they place the nectar inside the cells. The rest of the bees guarding the entrance fan their wings, circulating air through the hive. This dehydrates the nectar and turns it into honey.

Bee Varieties

Over 25 breeds of honeybees live in the US. Each have their pros and cons. Some do better in colder climates; others do better in warmer. Following are the more common breeds.

- **Italian** bees were brought over to the US in the 1950's. They were imported because of the consistent golden color of the queens.
- **Caucasian** bees were brought over because they were able to adapt to the colder weather.
- **Carniolan** bees have a long tongue. Beekeepers thought these bees would be able to reach further into the flowers to get more nectar.
- **Russian** bees were imported more recently because of their resistance to varroa mites. These pests weaken the health of the colony.
- **Buckfast** bees were imported because they are very docile. They are very gentle and many beekeepers prefer Buckfast over other breeds.

We like the Italian and the Buckfast breeds because we have found them overall to be a more gentle and docile bee.



Questions about Beekeeping?

Submit any questions for Jacob in the Q&A section on the course homepage or post it to our blog at www.sustainlife.org/blog/category/beekeeping/

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