



Bee's

What do bees look like? All bees have a head, a thorax (middle section), and an abdomen (end section). The head has their eyes, feelers, and tongue. The thorax has six legs and two wings. The abdomen has the breathing sacs, scent gland, wax gland, poison gland, and the stinger on the very end. Honey bees are hairy. They are yellow and black in color. The back legs of the worker females have little sacs to carry pollen.

What are workers, drones, queens, and larvae? There is only one queen per hive, and all she does is lay eggs. There may be 40,000 worker bees. The workers are all female, but they can't have babies. There may be as many as 2000 males or drones. Drones don't do any work. Only a few drones get to be fathers of the babies. All the rest just hang around. The queen is the biggest, and the workers are the smallest. The queen lays her eggs in a cell of the honeycomb (hive).

Each egg hatches, and a little worm-like larva crawls out. The worker bees feed pollen and honey to the baby larva. Soon, it spins a little web blanket inside the cell and becomes a pupa. After 16 to 24 days, a full grown bee climbs out of the cell. Worker bees do different things depending on how old they are. They take care of the babies, make wax, build the honeycomb, clean up the hive, store pollen, make honey, guard the hive, and collect pollen or nectar. When someone says "busy as a bee," they are definitely talking about the workers. If a worker (sterile female) is born in the spring, she probably only lives 4 or 5 weeks. If she's born in the fall when there's less work to do, she may survive the winter. Drones (males) are kicked out of the hive when the weather gets cold. Queens can live for several years.

What do bees eat? Bees eat nectar (sugary water) and pollen (yellow protein powder) which are made by flowers. Nectar is what the worker bee uses to make honey. When she gets to a flower, she drinks as much nectar as she can hold. Then she passes the nectar to another worker bee (who holds the nectar on her tongue) so the water in it can evaporate. When most of the water has evaporated, the sweet nectar becomes honey, which is stored in the hive.

What is a hive? A hive is the bees' home. It is made mostly of wax. Worker bees can make wax from the bottom of their abdomens. They use their legs to shape this wax into the cells of their honeycomb or hive. Each cell is hexagonal or six-sided. The hive usually has several layers of cells. Some cells are just for baby bees. Near the baby bee section, there are cells for storing pollen. In other parts of the hive, there are cells just for storing honey.

Honey bees make and do things that are helpful to humans. Honey bees provide us with honey, royal jelly, beeswax, and propolis. They are very cooperative insects and have good colony structure. They are the prime pollinators of the planet. Honey bees are social insects. A typical hive is divided primarily into worker bees and drones, ruled by the queen.

Honey bees have to go through a long process to make honey. The house bee and the field bee are involved in the process. First the field bee goes out and collects nectar, which it stores in an internal honey sac. They bring it back to the hive and transfer it to the house bee tongue to tongue. Then the house bee spreads a drop of nectar on the roof of a cell in a comb. During the next couple of days other house bees fan their wings over the nectar so that the moisture evaporates (nectar is 80% water and honey is 19% water). Finally, more house bees cover every cell filled with modified nectar with a thin layer of wax.

Royal jelly is a secretion from workers' glands. It is fed to the queen bee throughout her larval and adult life. It is also fed to larvae for the first two and a half days. It is a creamy milky-white color, strongly acidic, has a prudent odor and bitter taste. The queen eats only royal jelly, the worker bees eat some royal jelly and the drones eat the least amount. Royal jelly is high in protein and is rich in vitamins B, C and D. For honey bees, propolis is used for a kind of glue. Honey bees gather propolis from trees and other vegetation. They use it to seal cracks and crevices in the hive to make it less drafty when it is cold. Propolis is sticky when it is warm and it is difficult to deal with when it is hard.

Since many of our pollinators are now scarce, we are dependent on the honey bee to pollinate our crops. Pollination starts when a field bee crawls around a plant blossom. The honey bee is dusted with pollen. Then the field bee flies over to another blossom with the pollen in its hair. When the bee lands, the pollen falls onto this blossom's stigma. Now a fruit, vegetable or other crop can grow.

The queen's eggs hatch in three days, and the larvae are fed with royal jelly produced by worker bees. After a few more days, the larvae are fed on honey and pollen. The exception is a larva fed solely on royal jelly, which will develop into a queen bee. The larva takes eight days to develop; undergoing several molting's before spinning a cocoon within the egg cell. Here the larva pupates. For the first ten days of their lives, the female worker bees clean the hive and feed the larvae. After this, they begin building comb cells. On days 16 through 20, a worker receives nectar and pollen from older workers and stores it. After the 20th day, a worker leaves the hive and spends the remainder of its life as a forager. The foragers die usually when their wings are worn out after approximately 500 miles of flight. Honeybee wings beat at a constant rate of 230 beats per second or 13,800 beats/minute.

The frequency of the wing beats was much higher than expected for an insect of this size. Honeybees make up for carrying heavier loads or for changes in air density by altering the amplitude of their wings and catching more air. This makes the wing muscles work harder, but it does not change the frequency of the wing beats. The science of bee flight remained an unsolved mystery until December of 2005. A study published in Proceedings of the National Academy of Science details the work supervised by Michael Dickinson from Caltech. The population of a healthy hive in mid-summer can average between

40,000 and 80,000 bees. The workers cooperate to find food and are widely believed to use a pattern of "dancing" (known as the bee dance or waggle dance) to communicate with each other.

Swarming is the natural means of reproduction of honeybee colonies (considering the colony as the organism rather than individual bees which cannot survive alone). In the process two or more colonies are created in place of the original single colony. It is considered good practice in beekeeping to reduce swarming as much as possible by several techniques, as allowing this form of reproduction often results in the loss of the more vigorous division, and the remaining colony being so depleted that it is unproductive for the season. Beekeepers control reproduction by making nucs (nucleus or starter colonies) or by shaking package bees (usually for sale) from hives in the spring prior to the natural swarm time.

New honeybee colonies are formed when queen bees leave the colony with a large group of worker bees, a process called swarming. The first or prime swarm generally goes with the old queen. As soon as the swarm is established as a new colony, the bees raise a new queen, or sometimes a replacement virgin queen is already present in the swarm. After swarms are usually smaller and are accompanied by one or more virgin queens. Sometimes a beehive will swarm in succession until it is almost totally depleted of workers.

Swarming is mainly a spring phenomenon, usually within a two or three week period, the usual period depending on the locale. But occasional swarms can happen throughout the producing season. Swarms of bees sometimes frighten people, though they are usually not aggressive at this stage of their life cycle. This is principally due to the fact the swarming bees have no hive to defend and are more interested in finding a new nesting point for their queen. This does not mean that bee swarms will not attack if they perceive a threat; however, most bees only attack in response to intrusions against their hive, and swarming bees have no hive. Most swarms will move on and find a suitable nesting location in a day or two.

During the first year of a queen's life the colony has little incentive to swarm, unless the hive is very crowded. During her second spring, however, she seems to be programmed to swarm. Without beekeeper "swarm management" in the second year, the hive will cast a "prime swarm" and one to five "after swarms." The old queen will go with the prime swarm, and other swarms will be accompanied by virgin queens.

Swarming is to the beekeeper what losing all of his calves is to a cattleman. The hive that cast the swarm is often so badly depleted that it will be unproductive for the entire season. For this reason, beekeepers try to anticipate swarming and assist the bees to reproduce in a more controlled fashion by "splitting hives" or making "nucs." This saves the "calves" and keeps the "cow" in condition to accomplish some work. Beekeepers that do not wish to make increase may use one or more of the many methods for swarm control. Most methods simulate swarming to extinguish the swarming drive.

The Demaree method of swarm control is to remove a frame of capped brood with the queen. This frame is put in a hive box with empty drawn frames and foundation at the same location of the old hive. A honey super is added to the top of this hive topped by a crown board. The remaining hive box is

inspected for queen cells. All queen cells are destroyed. This hive box, which has most of the bees, is put on top of the crown board. Foraging bees will return to the lower box depleting the population of the upper box. After a week to ten days both parts are inspected again and any subsequent queen cells destroyed. After another period of separation the swarming drive is extinguished and the hives can be re-combined. Another swarming control method is called checker boarding. In the early spring, frames are rearranged above the growing brood nest. The frames above the brood nest are alternated between full honey frames and empty drawn out frames or even foundationless frames. It is believed that only colonies that have enough reserves will attempt to swarm. Checker boarding frames above the brood nest apparently destroys this sense of having reserves. When honeybees swarm from the hive they do not fly far at first. They may gather in a tree or on a branch only a few meters from the hive. There, they cluster about the queen and send scout bees out to find a final location. The swarm may fly for a kilometer or more to the scouted out location. When the swarm first forms a cluster it is relative easy to capture the swarm in a suitable box. There are also swarm traps with pheromone lures that can be used to attract swarms.

Swarming creates a vulnerable time in the life of honeybees. Cast swarms are provisioned only with the nectar or honey they carry in their stomachs. A swarm that does not quickly find a home and more nectar stores will starve. This happens most often with early swarms that are cast on a warm day that is followed by cold or rainy weather in spring. The remnant colony after having cast one or more swarms is usually well provisioned with food, but the new queen can be lost or eaten by predators during her mating flight, or poor weather can prevent her mating flight. In this case the hive has no further young brood to raise additional queens, and it will not survive. Good beekeepers who are aware that a colony has swarmed will usually add brood with eggs, so that the bees have additional young bees to care for the queen and a second chance to raise a new queen if the first one fails. Africanized bees are notable for their propensity to swarm. Being tropical bees, they tend to swarm any time incoming food is scarce, thus making themselves vulnerable in colder locales. Mainly for this reason, they tend to not survive in higher latitudes.

