

Bee Colony Activities Throughout The Year

Written by Khalil Hamdan
Apeldoorn
The Netherlands



A honeybee gathering nectar from a flower.

Photo source: forestwander.com



Bee collecting pollen.

Photo source: natures-deskkop.com

Bee Colony: Basic Facts

Honeybees live compatibly in a large family in a common nest or colony and work collectively in a remarkable cooperation to ensure their survival. Without each other, they can't survive. Their goal is to raise young bees and make honey for their immediate needs and to lay down stores to carry them through times when there is none available, as in the winter.

A colony of honeybees includes a queen, worker bees and drones (male bees). Each member has a specific function to do in the colony. The job of the queen is to lay eggs to produce offspring and multiply the numbers in her colony so the numbers of bees are optimal for the main flowering and nectar and pollen gathering season. A good queen can lay around 1000 – 1500 eggs per day during the active breeding season. The egg-laying rate of the queen depends on the amount of food the worker bees bring in and amount of brood space in the colony and the time of the year. The egg-laying rate starts at a low level in the late winter and increases to peak about mid summer. The main function of a drone is to fertilize the virgin queen. The worker bee does all the work of the colony in the course of its life, for example, cell cleaning, nursing young bees, building combs, guarding the hive entrance, ventilating the hive and collecting nectar, pollen, water and propolis. The queen lives about five years. Adult worker bees born early in the season will live about 6 weeks while those born in autumn will live until the following spring because they are less active then. The drone dies in the

act of mating with the queen. If drones do not mate, they live for about 8 weeks in the summer. They are expelled from the colony in autumn and die.

The honeybee colony lives on honeycombs, which worker bees construct from wax produced in glands on the underside of their abdomen. The honeycombs are hung in parallel and are composed of six-sided cells that provide the interior structure of the hive. They are used to raise young bees and store honey and pollen. The bee colony requires a constant temperature in the hive between 33 - 35 °C, the optimum temperature required for hatching the eggs and rearing the young. This temperature is regulated by the bees, which warm the comb if it is too cool and cool it if it is too hot. The bees produce the heat themselves and cool the hive by evaporating water.

All members of the colony have a distinctive scent, and by this they can recognize mates of their own colony. Guard bees at the hive entrance use their antennae to examine incoming bees and bees from other colony are detected and denied entry.

The bee colony develops as the year advances. Its population does not remain steady in size and fluctuates with the annual climatic changes. In summer the bee colony consists of 30000 - 60000 worker bees and 300 -1000 drones during spring and summer. In the winter the colony contains about 10000 worker bees. All three types of bee start life as an egg laid in a cell in the honeycomb. The egg hatches after three days into a white tiny larva and is fed by worker bees for 5 -7 days; and then sealed with wax, this in turn develops into a pupa, which after a given time emerges as an adult bee.

Stages Of Growth Of Honey Bees Castes			
	Days After Laying Egg		
Stage	Worker	Queen	Drone
Egg hatching	3	3	3
Larva	5	5	7
Cell capped	8	8	10
Pupa	13	8	14
Adult emergence	21	16	24

The colony of honeybees needs warmth, sun, nectar, pollen and water to thrive. The temperature needs to be at least 12 °C for the bees to be able to fly out to collect food. Honeybees collect nectar from flowers as food and store it in their hive for the winter. Besides collecting nectar, bees also collect pollen which is an important protein food for the bees and is essential for young bees to grow. Honey provides the energy for bee's flight and for heating the hive during the winter season.

Bees can make honey only during the warmer months when there is a lot of flowers but during the cold winter months they are not able to forage as there are no flowers in bloom to feed on. A bee colony may produce a surplus of 20-50 kg of honey each

year, over and above what they need to feed themselves in the winter and start brood rearing in earnest in the spring.

Seasonal Activities Cycle

The colony activity changes with the seasons.

Springtime

The activity of the bee colony usually starts in late February and the beginning of March depending on the temperature. Temperature is the determining factor as far as honeybees concerned. As the weather gets warmer and the days lengthen, and pollen becomes available, the queen starts laying eggs, and the bees become active gathering nectar and pollen from early flowers and storing honey in combs. Late in spring, the colony increases brood rearing and its population increases to peak size. When the hive becomes too crowded, the colony makes preparation to swarm which is the natural method of reproduction of the colony. When preparing to swarm, drone population increases and several queen cells are built to produce a new queen.

Swarming generally occurs in March to June. The old queen departs with about half of the bees to a new home elsewhere. The remaining bees in the colony continue their work rearing brood and collecting food. When a virgin queen emerges from her cell, she stings the remaining queen cells and kills any other queen she finds. Six to eight days after emergence, the virgin queen flies out to mate with drones and return to the colony as the new queen, and starts to lay eggs two to three days after mating.



A swarm of bees hanging on a tree.

Photo source: bexar-tx.tamu.edu/.../2006/June.htm

Summer

In temperate regions, the colony reaches its peak population, the bees work hard collecting nectar, pollen, filling cells and sealing honey. Summer is the time for storage surplus food as there is more flora in the field and days are long. They store sufficient honey for the winter.

In warm regions, in mid to late summer, only small amount of nectar and pollen is brought into the colony. Often no brood is reared and subsequently the colony does not grow.

In the hot weather, bees collect water to cool the hive, and they fan their wings at the entrance to reduce the temperature within the hive. Bees don't like heat; they are stressed by temperatures over 37 °C, and must keep the temperature inside the hive around 33-35 °C. If the temperature gets too high inside, they will crowd outside the hive on the landing board during the day and even in the evening.



Bees are fanning at the entrance to ventilate the hive.

Photo by P-O- Gustafsson



On hot days bees will crowd outside the hive on the landing board.

Photo source: beginningbeekeeping.com

Autumn

In this season, bee forage becomes scarce, the colony reduces brood rearing. The queen may cease laying eggs during October and November. Drones are driven out the hive by the worker bees and left to die from cold and starvation. The bees seal up cracks, openings in the hive with sticky propolis (plant resin) in preparation for winter. If the weather is cold, they will fly out only when they have to. They will begin to huddle in a cluster in the nest to keep warm. A normal bee colony will have a population of approximately 30000 - 40000 bees in autumn, and this population will dwindle to 10000 -15000 bees by early spring.

Winter

The activity of the colony diminishes. In the temperate regions, the winter temperature is so low that the bees can't fly out of the hive. The queen stops laying eggs and the bees do not raise brood. They will stop flying when the temperature falls below 10 °C and remain in the hive, eat stored honey to generate heat, and cluster together tightly in the middle of the hive to keep themselves warm. The colder the temperature the more tight the cluster becomes. In this way they will not freeze to death. On sunny days, they will fly a short distance out of the hive and return quickly in order to defecate. When winter is over, the queen restarts the colony next spring.

In warmer areas where temperatures do not drop so low, the activity of the colony is reduced. As there are few or no flowers in bloom, only a few bees fly out of the hive, hence very little nectar is collected.

In each area, the bees adapt to the prevailing conditions and adjust all their brood rearing to match the nectar production by the flowers of that area and reduce the size of the colony so it can survive well on the stores it collects.