



1st floor – ANIMAL SENSES

A thousand eyes are watching you! The compound eyes of bees

Bees have different eyes than we humans do. They have compound eyes, which consist of more than 4000 individual eyes per eye. Because of their position on the side of the head, bees can see a very wide area of their surroundings. Each eye only sees a small image area, which is assembled in the bee's brain. A bee can see about 250 images per second.

We humans recognise at most 45 images per second. This means that even very fast movements in their field of vision are practically in 'slow motion'. *Bees have compound eyes made up of many small eye parts. They see fast movements in slow motion.*

Put on the prism glasses and try to touch the dot on the flower with your fingertip.



Bees

Bees form a state in which the queen, drones and worker bees live together. A bee colony can consist of 30,000 to 60,000 workers, a few hundred drones (male bees) and a queen who is responsible for laying eggs.

Worker bees only live about 60 days, during which they have different tasks. First, they are cleaning bees to keep the hive clean, then they feed the brood and build honeycombs. Then they fly out and collect honey. At the end of their lives, they become scout bees to find new food sources. The queen is mated by the drones in flight at mating sites in the landscape and then begins to lay eggs. She lays up to 2,000 eggs a day. The brood is raised in the combs by workers. When a second queen grows in the burrow, the old queen swarms out with part of the colony and forms a new colony.

Up to 60,000 bees live in the hive. Worker bees only live for about 60 days. When a new queen emerges in the hive, part of the colony flies out to start a new colony.

Honey, pollen and wax

Bee honey has been used by people for thousands of years. Amphorae with honey were already found in Egyptian royal tombs. In our country, the hives of wild bee colonies were first harvested in hollow trees, and later hives were built of straw to keep the bee colonies close to humans. For a jar of honey weighing 500 grams, a bee has to travel a distance equivalent to about one revolution around the earth. A colony produces between 20 and 30 kg of honey per year. Honey is a valuable food for humans because of the vitamins, enzymes and amino acids it contains. Bees collect honey in order to have supplies for survival in winter. When the beekeeper extracts the honey, he has to feed sugar water in winter so that the colony can survive. Other products collected by the bees are flower pollen, which the bees use to seal their burrow. Humans use this propolis in health care as it contains balsam, resins and pharmacologically active substances. Beeswax, from which the honeycombs of bees are built, is exuded by the bees from special glands. In the Middle Ages, candles made of beeswax were a very sought-after and expensive source of light.

We humans use honey, propolis and beeswax from the bees. Honey is a very healthy and clean food. Propolis can help heal wounds. Beeswax candles smell pleasant.

Tail dance

When explorer bees have discovered a meadow with many flowers, they fly into the burrow and give the gatherers the news of the food source. Because bees cannot speak, they communicate the information to the other bees by dancing. The explorers run in circles and move their backsides back and forth. Based on the length of the dance, how fast and how long they waggle their backside, the other bees can tell very precisely where to fly. The information is transmitted through the vibrations from buzzing and wagging.

Explorer bees can communicate a foraging site to other bees with a tail dance. Worker bees sense the location from the vibrations.



Nothing red please – colour vision of bees

Bees see a completely different spectral range than we do with their compound eyes. In addition to the compound eyes, they also have three point eyes in a triangular arrangement in the middle of the head. With these, bees can distinguish light and dark, and they serve with the connected organ of equilibrium to regulate the flight position.

If a bee flies faster than 5 kilometres per hour, it can no longer see colours. That is as fast as when we humans march at full speed. Then it can hardly recognise flowers. But it can recognise all flowers that are more than a metre away with its sense of smell.

Bees see yellow, blue and ultraviolet. White flowers appear to bees with a small ultraviolet tint. Bees see red as black. When foraging, bees see the landscape in grey, flowers stand out in colour

Bees see no red and no white. When they fly fast, they no longer see any colours at all. They have three small dot eyes to distinguish light and dark.

Look at the flower picture. Then put on the yellow glasses and see what differences there are.



Honey weights

When collecting honey, bees can carry about half their own body weight over distances of up to 3 kilometres.

Can you carry half your weight for one minute?

