

## What Is A Bee?

Bees are modified wasps. All bees are descended from a wasp species that took to feeding on pollen instead of insect prey. To aid in pollen collection a bee's body is covered in feather-like hairs. The oldest known bee is a 100 million year old fossil in amber from Burma of a species now extinct. It is only 3mm long, probably because early flowers were small. Bees were very successful. Scientists have so far discovered 17,000 species with many more expected.



- Worker honey bee collecting nectar and pollen from a bramble flower in Sussex. A mass of grey pollen can be seen in the pollen basket on the hind leg.
- A bumble bee gets covered in pollen as it forages.
- Wax entrance tube and entrance guards in a colony of *Tetragonisca angustula* stingless bees. This is a common tropical American species that is known as Jatai in Brazil.
- Lasiglossum* sweat bee. Dozens of bee species can be seen in a British garden.

Most bees are solitary. The female builds a small nest containing several cells, which she provisions with pollen and nectar as food for her larvae. Males are not involved in nest building or collecting food for the larvae. Depending on the species, the nest may be in the soil, in a crevice in a wall or plant, or even in a dead snail shell. Leafcutter bees cut semicircular pieces of leaf to make cells within the nest. They are common in Britain and can often be seen cutting.

Honey bees and bumble bees are eusocial (meaning fully social), living in colonies in which one female, the queen, specializes in egg laying and others in working, daughter workers. The eusocial way of life of honeybees and bumble bees, and also their tropical relatives the stingless bees, evolved at least 60 million years ago. We know this because a fossil worker stingless bee dated to this age has been found in amber. Eusociality has also evolved about 4 times in other types of bee, including three times in sweat bees, a type of bee also found in Britain. However, eusocial colonies of sweat bees are much smaller than

those of honey bees or bumble bees. In total, only about 10% of bee species are eusocial. However, over half the bees seen on flowers are worker eusocial bees.

Although bumble bees and honey bees both live in colonies with a queen and workers, there are big differences in their life cycle. Bumble bee colonies last just one season. In spring, large bumble bees can be seen on flowers. These are queens reared the previous summer, which then mated and overwintered. They found colonies and rear workers, who then rear more workers and in late summer queens and males. These mate and the colony dies. In honey bees the colony survives the winter on stored honey. A new colony is formed by swarming, in which the queen and thousands of workers leave the colony in spring and move to a new nest site in a hollow tree or cavity. The old colony rears a new queen.

Both eusocial and solitary bees have important relationships with plants. Bees are the most important pollinating animals. Some plants with flowers can self-pollinate, but most require pollen from another plant of the same species to set seed. This is known as cross-pollination. Flowers are colourful to attract and guide bees and other pollinating animals, and produce nectar as a reward or incentive. Bees also eat pollen made by the flowers.

### Did You Know?

- \* Britain has over 250 bee species, 5 times as many as our butterfly species.
- \* Some bees are cuckoos. Females lay their eggs in the nests of other bee species.
- \* Only female bees sting. This is because the sting is a modified egg-laying device.
- \* Insects are 400 million years old. At only 100 million years, the bees are quite a recent type of insect. Dinosaurs lived from 230 to 65 million years ago.
- \* Bees have colour vision as do humans but the colours bees see are different. Bees cannot see red but can see ultra violet. Many flowers have ultra violet markings.

### How Amazing!

- \* Some bumble bees cheat plants by cutting a hole in the flower and inserting their tongue through the hole to "rob" the nectar without pollinating the flower.
- \* Some eusocial bees living in Africa and tropical America have given up collecting food from flowers. Instead they raid the colonies of other bees to steal their food stores.
- \* Honey bees communicate with each other using dances and pheromones to forage more efficiently and to help coordinate the colony and the work that needs doing.