

# What If There Were No Bees

## Honey bee

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A honey bee (also spelled honeybee) is a eusocial flying insect from the genus *Apis* of the largest bee family, Apidae. All honey bees are nectarivorous pollinators native to mainland Afro-Eurasia, but human migrations and colonizations to the New World since the Age of Discovery have been responsible for the introduction of multiple subspecies into South America (early 16th century), North America (early 17th century) and Australia (early 19th century), resulting in the current cosmopolitan distribution of honey bees in all continents except Antarctica.

Honey bees are known for their construction of perennial hexagonally celled nests made of secreted wax (i.e. beehives), their large colony sizes, and their routine regurgitation of digested carbohydrates as surplus food storage in the form of honey, the lattermost of which distinguishes their hives as a prized foraging target of many mellivorous animals including honey badgers, bears and human hunter-gatherers. Only 8 extant species of honey bees are recognized, with a total of 43 subspecies, though historically 7 to 11 species are recognized. Although honey bees represent only a small fraction of the roughly 20,000 known species of bees, they are the bee clade most familiar to humans and are also the most valuable beneficial insects to agriculture and horticulture.

The best-known honey bee species is the western honey bee (*Apis mellifera*), which was domesticated and farmed (i.e. beekeeping) for honey production and crop pollination. The only other domesticated species is the eastern honey bee (*Apis cerana*), which are raised in South, Southeast and East Asia. Only members of the genus *Apis* are true honey bees, but some other bee species also produce and store honey and have been kept by humans for that purpose, including the stingless bees belonging to the genus *Melipona* and the Indian stingless or dammar bee *Tetragonula iridipennis*. In addition to harvesting honey, modern humans also use beeswax in making candles, soap, lip balms and various cosmetics, as a lubricant and in mould-making using the lost wax process. Other honey bee secretions such as royal jelly and bee venom are used pharmaceutically, especially in alternative medicine.

## Bee

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Bees are winged insects that form a monophyletic clade Anthophila within the superfamily Apoidea of the order Hymenoptera, with over 20,000 known species in seven recognized families. Some species – including honey bees, bumblebees, and stingless bees – are social insects living in highly hierarchical colonies, while most species (>90%) – including mason bees, carpenter bees, leafcutter bees, and sweat bees – are solitary. Members of the most well-known bee genus, *Apis* (i.e. honey bees), are known to construct hexagonally celled waxy nests called hives.

Unlike the closely related wasps and ants, who are carnivorous/omnivorous, bees are herbivores that specifically feed on nectar (nectarivory) and pollen (palynivory), the former primarily as a carbohydrate source for metabolic energy, and the latter primarily for protein and other nutrients for their larvae. They are found on every continent except Antarctica, and in every habitat on the planet that contains insect-pollinated flowering plants. The most common bees in the Northern Hemisphere are the Halictidae, or sweat bees, but they are small and often mistaken for wasps or flies. Bees range in size from tiny stingless bee species, whose

workers are less than 2 millimeters (0.08 in) long, to the leafcutter bee *Megachile pluto*, the largest species of bee, whose females can attain a length of 39 millimeters (1.54 in). Vertebrate predators of bees include primates and birds such as bee-eaters; insect predators include beewolves and dragonflies.

Bees are best known to humans for their ecological roles as pollinators and, in the case of the best-known species, the western honey bee, for producing honey, a regurgitated and dehydrated viscous mixture of partially digested monosaccharides kept as food storage of the bee colony. Pollination management via bees is important both ecologically and agriculturally, and the decline in wild bee populations has increased the demand and value of domesticated pollination by commercially managed hives of honey bees. The analysis of 353 wild bee and hoverfly species across Britain from 1980 to 2013 found the insects have been lost from a quarter of the places they inhabited in 1980. Human beekeeping or apiculture (meliponiculture for stingless bees) has been practiced as a discipline of animal husbandry for millennia, since at least the times of Ancient Egypt and Ancient Greece. Bees have appeared in mythology and folklore, through all phases of art and literature from ancient times to the present day, although primarily focused in the Northern Hemisphere where beekeeping is far more common. In Mesoamerica, the Maya have practiced large-scale intensive meliponiculture since pre-Columbian times.

### Africanized bee

*honey bees, up to 400 m (1,300 ft). They have killed some 1,000 humans, with victims receiving 10 times more stings than from European honey bees. They*

The Africanized bee, also known as the Africanized honey bee (AHB) and colloquially as the "killer bee", is a hybrid of the western honey bee (*Apis mellifera*), produced originally by crossbreeding of the East African lowland honey bee (*A. m. scutellata*) with various European honey bee subspecies such as the Italian honey bee (*A. m. ligustica*) and the Iberian honey bee (*A. m. iberiensis*).

The East African lowland honey bee was first introduced to Brazil in 1956 in an effort to increase honey production, but 26 swarms escaped quarantine in 1957. Since then, the hybrid has spread throughout South America and arrived in North America in 1985. Hives were found in south Texas in the United States in 1990.

Africanized honey bees are typically much more defensive, react to disturbances faster, and chase people farther than other varieties of honey bees, up to 400 m (1,300 ft). They have killed some 1,000 humans, with victims receiving 10 times more stings than from European honey bees. They have also killed horses and other animals.

### Telling the bees

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Telling the bees is a Western European tradition in which bees are told of important events, including deaths, births, marriages and departures and returns in the keeper's household. If the custom was omitted or forgotten and the bees were not "put into mourning," then it was believed a penalty would be paid, such as the bees leaving their hive, stopping the production of honey, or dying.

The custom is best known in England and has also been recorded in Ireland, Wales, Germany, Netherlands, France, Switzerland, Bohemia (now in Czechia) and the United States.

### Vulture bee

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Vulture bees, also known as carrion bees, are a small group of three closely related South American stingless bee species in the genus *Trigona* which feed on rotting meat. Some vulture bees produce a substance similar to royal jelly which is not derived from nectar, but rather from protein-rich secretions of the bees' hypopharyngeal glands. These secretions are likely derived from the bees' diet, which consists of carrion eaten outside the nest, and resulted in the belief that they produce what is known as "meat honey". This unusual behavior was only discovered in 1982, nearly two centuries after the bees were first classified.

#### Buckfast bee

*Italy or Ligurian queens mated with the English black bee 'A. m. mellifera'; by 1919 these bees too had died causing Brother Adam to import queens again*

The Buckfast bee is a breed of honey bee, a cross of many subspecies and their strains, developed by Brother Adam (born Karl Kehrle in 1898 in Germany), who was in charge of beekeeping from 1919 at Buckfast Abbey in Devon in the United Kingdom. Breeding of the Buckfast bee is now done by breeders throughout Europe belonging to the Federation of European Buckfast Beekeepers (G.D.E.B.). This organization maintains a pedigree for Buckfast bees, originating from the time of Brother Adam.

In 1916, only 16 surviving colonies were left in the abbey. All of them were either Ligurian (*A. m. ligustica*) from Italy or Ligurian queens mated with the English black bee 'A. m. mellifera'; by 1919 these bees too had died causing Brother Adam to import queens again from Italy and also France, from which he began to develop what would come to be known as the Buckfast bee.

#### I Love Bees

*The Beast. I Love Bees was commissioned by Microsoft, Halo 2's publisher and Bungie's ultimate parent company at the time. I Love Bees was first advertised*

I Love Bees (also known as *ilovebees* or ILB for short) was an alternate reality game (ARG) that served as both a real-world experience and viral marketing campaign for the release of developer Bungie's 2004 video game Halo 2. The game was created and developed by 42 Entertainment. Many of the same personnel had previously created an ARG for the film A.I. titled The Beast. I Love Bees was commissioned by Microsoft, Halo 2's publisher and Bungie's ultimate parent company at the time.

I Love Bees was first advertised by a hidden message in a Halo 2 trailer; players who investigated the titular website discovered that the pages appeared to be hacked by a mysterious intelligence. As players solved puzzles, audio logs were posted to the *ilovebees.com* site which gradually revealed more of the fictional back-story, involving a marooned artificial intelligence stranded on Earth and its attempts to put itself back together.

250,000 people viewed the *ilovebees* website when it was launched in July 2004, and more than 500,000 returned to the site every time the pages were updated. More than three million visitors viewed the site over the course of three months, and thousands of people around the world participated in the game. I Love Bees won numerous awards for its innovation and helped spawn numerous other alternate reality games for video games.

#### European dark bee

*honey bees in Ireland that were completely dark contained less A. m. mellifera DNA than bees with yellow to orange spots on their abdomens, and bees with*

The *Apis mellifera mellifera* (commonly known as the European dark bee) is a subspecies of the western honey bee, evolving in central Asia, with a proposed origin of the Tien Shan Mountains and later migrating into eastern and then northern Europe after the last ice age from 9,000BC onwards. Its original range

included the southern Urals in Russia and stretched through northern Europe and down to the Pyrenees. They are one of the two members of the 'M' lineage of *Apis mellifera*, the other being in western China. Traditionally they were called the Black German Bee, although they are now considered endangered in Germany. However today they are more likely to be named after the region in which they live, such as the British black bee, the Native Irish Honey Bee, the Cornish black bee and the Nordic brown bee, even though they are all the same subspecies, with the word "native" often inserted by local beekeepers, even in places where the bee is an introduced foreign species. It was domesticated in Europe and hives were brought to North America in the colonial era in 1622 where they were referred to as the English Fly by the Native Americans.

## Bee learning and communication

*Honey bees are adept at associative learning, and many of the phenomena of operant and classical conditioning take the same form in honey bees as they*

Bee learning and communication includes cognitive and sensory processes in all kinds of bees, that is the insects in the seven families making up the clade Anthophila. Some species have been studied more extensively than others, in particular *Apis mellifera*, or European honey bee. Color learning has also been studied in bumblebees.

Honey bees are sensitive to odors (including pheromones), tastes, and colors, including ultraviolet. They can demonstrate capabilities such as color discrimination through classical and operant conditioning and retain this information for several days at least; they communicate the location and nature of sources of food; they adjust their foraging to the times at which food is available; they may even form cognitive maps of their surroundings. They also communicate with each other by means of a "waggle dance" and in other ways.

## Bee Gees

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## The Bee Gees

were a musical group formed in 1958 by brothers Barry, Robin, and Maurice Gibb. The trio was especially successful in popular music in the late 1960s and early 1970s, and later as prominent performers in the disco music era in the mid-to-late 1970s. The group sang recognisable three-part tight harmonies: Robin's clear vibrato lead vocals were a hallmark of their earlier hits, while Barry's R&B falsetto became their signature sound during the mid-to-late 1970s and 1980s. The group wrote all their own original material, as well as writing and producing several major hits for other artists, and are regarded as one of the most important and influential acts in pop-music history. They have been referred to in the media as The Disco Kings, Britain's First Family of Harmony, and The Kings of Dance Music.

Born on the Isle of Man to English parents, the Gibb brothers lived in Chorlton, Manchester, England, until the late 1950s. There, in 1955, they formed the skiffle/rock and roll group the Rattlesnakes. The family then moved to Redcliffe, in the Moreton Bay Region, Queensland, Australia, and later to Cribb Island. After achieving their first chart successes in Australia as the Bee Gees, they returned to the UK in January 1967, when producer Robert Stigwood began promoting them to a worldwide audience. The Bee Gees' Saturday Night Fever soundtrack (1977) was the turning point of their career, with both the film and soundtrack having a cultural impact throughout the world, enhancing the disco scene's mainstream appeal. They won five Grammy Awards for Saturday Night Fever, including Album of the Year.

The Bee Gees have sold an estimated 120 million to 250 million records worldwide, placing them among the best-selling music artists of all time, as well as the most successful trio in the history of contemporary music. They were inducted into the Rock and Roll Hall of Fame in 1997; the Hall's citation stating at the time, "Only

Elvis Presley, the Beatles, Michael Jackson, Garth Brooks and Paul McCartney have outsold the Bee Gees." With nine number-one hits on the Billboard Hot 100, the Bee Gees are the third-most successful band in Billboard charts history behind only the Beatles and the Supremes. Following Maurice's sudden death in 2003 aged 53, Barry and Robin retired from the group after 45 years of activity. However, in 2009 Robin announced that he and Barry had agreed the Bee Gees would re-form and perform again. Robin died in 2012, aged 62, and Colin Petersen died in 2024, aged 78, leaving Barry, Vince Melouney, and Geoff Bridgford as the surviving members of the group.

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