

Introduction



In 2006, we embarked on a journey to become urban beekeepers. We'd heard that bees were in peril in the countryside, where their habitats were being destroyed, and that towns and cities could provide a refuge. We wanted to give bees a home in the overgrown garden of the west London flat we lived in at the time.

All we knew about bees back then was that they needed saving and made honey. We had a lot to learn. We went on a beginners' course with the London Beekeepers' Association and found to our astonishment that bees come in many shapes and sizes: they are not all round, plump and stripy like the bumblebees we'd seen in our garden. The type of bees that are kept in hives are slender and waspish-looking. Even more surprisingly, we learned that these hive-dwelling bees are one of the few that make honey. Intrigued, we put our names down to receive a starter colony of honeybees in early summer. We bought

a hive and all the equipment, including two bee suits, and eagerly waited. Finally, we got the call to come and collect our bees.

That day in June ignited a passion. We became absorbed in the bees' comings and goings, their fascinating social structures – the queen bee, her female workers and male drones living together in the hive, their labours strictly demarcated to maximize the efficiency of the colony – and their communication through smell and dance.

The honeybees became a catalyst, opening our eyes to the workings of nature; how the tiniest fluctuation in the temperature, humidity or availability of flowers could trigger changes in the behaviour of insects with whom they have co-evolved for 100 million years. Moreover, honeybees introduced us to the astonishing variety of bees on the planet. We now know that there are some 25,000 recorded bee species worldwide, most of which live alone and don't make honey. We have begun to acquaint ourselves with some of these amazing, often unnoticed bees nesting in nooks and crannies. They don't conform to the image most of us have of a good bee. But once we got to know these less familiar creatures, with their distinctive markings and behavioural idiosyncrasies, they became every bit as alluring and beelike.

Many of the bees you will meet in this book have a solitary disposition, nesting alone, although often next door to each other. These wild, solitary bees are essential



pollinators. Together with the few social species, they pollinate one in every three mouthfuls we eat, as well as feeding birds and animals in the complex food chain that sustains nature's delicately balanced ecosystems and is part of earth's wondrous biodiversity.

This book also delves into bees' special relationship with *Homo sapiens*. Since humankind began honey hunting 20,000 years ago, bees have provided food, sweetness, candlelight and medicine. Now they are giving us a sign, like the canary in the coalmine, that their future is threatened and, with it, life on Earth as we know it.

We will explore the reasons for the bees' decline, from habitat loss to pesticides and climate change, including the culprits behind honeybees' widely reported colony collapse disorder. But we will also be striking a more hopeful note, looking at various steps that farmers, businesses – and you – can take to help reverse their fortunes. Some progress is already being made: a few pesticides are already banned in some parts of the world, and there are projects to restore bee-friendly habitats and even reintroduce wild bees.

But you can't save what you don't love, and you can't love what you don't know. So, we hope this book will

first and foremost help people fall in love with the bees around them. Perhaps, if we can put names and faces to the long-ignored but uniquely alluring solitary bees, with their hairy feet, ginger tufts and ingenious home-building techniques, then we'll stand a better chance of saving nature's master pollinator – and, in the process, ourselves.

CHAPTER 1

Bees and Nature



♦ Where do bees come from? ♦

When we see a bee visiting a flower, we are observing an act of nature that has been playing out across the planet for more than 100 million years. Back then, the continents were still forming; India had yet to collide with Asia and create the Himalayas; the K-T extinction event and the loss of the dinosaurs was still to happen; birds and mammals were just beginning to emerge; and humans weren't even a speck on the horizon.

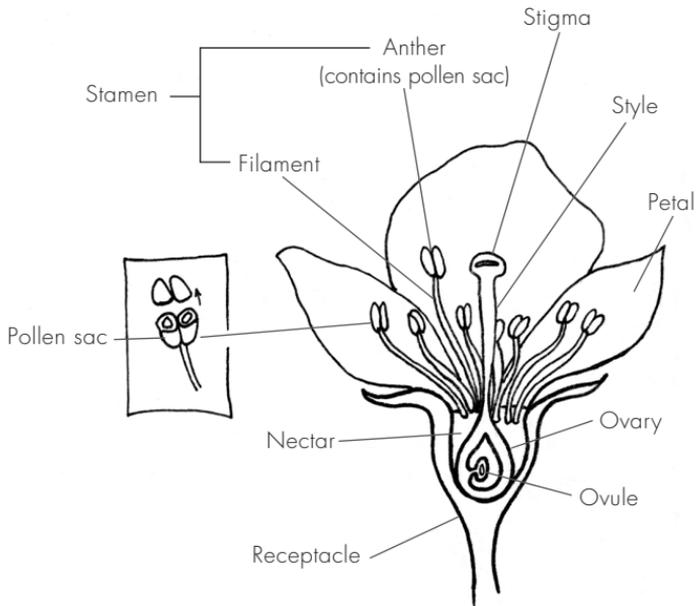
It is not possible to perfectly describe events that unfolded over thousands of millennia, but fossil records provide a picture of the past that can be pieced together and which gives us clues about when, why and how bees came into existence.

The story begins with the first flowering plants.

Sexual reproduction is not simple if you're rooted to

the spot and your mate is some distance away. Plants, unlike animals, don't have the ability to wander around looking for suitable mates, so they require the help of a go-between to bring the two sexes together.

It seems that around 150 million years ago, the planet's plant life hooked up with the help of the wind. In this method of pollination, the wind carries a grain of pollen



Flower parts

from the male part of one flower (the stamen) some distance to connect with the female part of another (the stigma). This is a somewhat unreliable method to spread your genes and requires the production of a huge amount of pollen, most of which will miss its target. Today, only around 20 per cent of plant species, such as cereals and grasses, still rely on the wind for pollination.

But nature soon devised a more efficient way for plants to have sex: one that involves an animal or insect to transport pollen. By this method – biotic pollination – the insect that touches the flower head picks up the pollen and moves it to another flower head, where the pollen touches the stigma and fertilizes the plant. This method of animal-assisted pollination is much more effective and its development was responsible for the proliferation of wonderfully colourful and aromatic flowering plants.

The insects' services proved so useful that plants began to compete for their attention. They began to offer them a sweet, sugary gift called nectar as a reward for their assistance. To advertise their wares, the flowers began producing a huge variety of rich perfumes that wafted through the air. Insects caught the tantalizing aroma and followed it to the flowers. The flowers also evolved colourful petals as signposts for pollinators; some even developed patterns to guide the insect directly to the centre of the flower where the nectar could be found, much as the segments of a dartboard point to the bullseye.

♦ What is a bee? ♦

Many insects, including butterflies, moths, and beetles, small birds such as hummingbirds, and some mammals, including fruit bats, drink nectar to fuel their flight and brush up against pollen while they are enjoying their energy drink. But bees generally do a much better job of pollination. Why? Because they have evolved to become totally dependent on flowering plants for their food.

Bees are members of the order of insects known as *Hymenoptera*. The name is derived from the Greek words *hymen*, meaning membrane, and *ptera*, meaning wings. This order includes ants, and wasps from which bees evolved. While wasps obtain protein for their young by feeding them fresh meat and carrion, bees became vegetarian and developed a taste for pollen – an essential part of a flowering plant’s reproductive system. Just as a caterpillar transforms into a butterfly after spinning a silk cocoon, bee eggs hatch into larvae, which then turn into pupae and metamorphose into adult bees. But the larvae aren’t able to develop into healthy adult bees without eating protein-rich pollen, so bees have developed ways of collecting pollen for themselves, as well as spreading it for the plants with amazing precision.

The poet Kahlil Gibran (1883–1931) beautifully described the symbiotic relationship between bee and

flower that ensures both survive: ‘To the bee, a flower is the fountain of life, and to the flower the bee is a messenger of love.’ Bees are the flowering plants’ very own Eros. Is it any wonder that the love god is portrayed with wings?

An astonishing 25,000 or so species of bee have evolved to pollinate flowering plants. To put that in perspective, there are around 10,000 species of birds, and around 5,400 different mammals. Many of these bee species don’t conform to the popular image of a bee. Some are large and plump, others are skinny and small. There are striped ones and shiny, metallic, colourful ones. Many of us mistakenly believe that all bees make honey and sting. But only one genus, or group, of bees does both: *Apis*, the honeybee. Many bees can sting, but a few bite, or spray their predators with acid instead. There are short-lived bees and bees that live for years. A few bees live together in colonies of up to 100,000, but the majority nest alone. There are bees that lick human sweat; short-tongued and long-tongued bees; bees that nest in the ground, in trees, or hollow plant stems; and bees that have given up on making their own nest but instead take over other bees’ homes. But wherever there are flowering plants, from windswept mountaintops to humid jungles and arid deserts, as well as our gardens and backyards, there will be bees to pollinate them. We have bees to thank for the aesthetic beauty and heavenly scent of the flowering world.