

Wonderful World of Honey

The honeybee is the most amazing creature in the insect world. The bee's body is delicate, her life is short and enemies are many. Yet these daunting drawbacks are shrugged off as the bee goes daily about her task of collecting nectar and pollen to take back to the hive so that future generations of bees can thrive. And the bee is willing to die to defend the hive.

Even though throughout history man and animals have plundered beehives for a taste of honey, the honeybee has survived and adapted to climate and conditions far removed from that where bees were first recorded.

History

If we journey back 4000 years to ancient Egypt, hieroglyphics show the story of the bee's life. So primitive man had discovered the delight of honey by then - for centuries it was the only sweetener available. In the 4th century B.C. Aristotle wrote of the bee. Three hundred years later, Virgil the poet and Pliny the naturalist, carried the story further. In England under Saxon rule, honey was accepted by some landlords as part-payment for rent from tenants. The bee had truly earned a valuable place in society.

In 1792 a blind naturalist, Huber, published a book in Geneva on bees and honey. The honey industry that we know today began to grow. Sixty years later in Philadelphia, Lorenzo Lorraine Langstroth, a minister and teacher, invented a new kind of beehive. It was a rectangular wooden box in which he stood a row of frames. Each frame provided a place for bees to build the wax cells that form the honeycomb. The frames could be taken out separately so that one honeycomb could be removed without hurting the others. The Langstroth hive is used by all Australian beekeepers today.

Introducing The Bees to Australia

The honeybee is not native to Australia. The colonists who came to Australia in its early days missed so many of the comforts and treats of "home" (England), they tried to introduce many of them to their new country. Plants, trees, animals, birds and many other reminders of home were introduced during those early years.

In the early 1820's the honeybee was brought to Australia aboard the ship Isabella. She arrived in our waters in 1822 and adapted so successfully that other bee species were introduced from Italy, Yugoslavia and North America.

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Outstanding Engineers

Bees are inspired engineers. Each wax cell in the comb has six sides and all cells have a slight backward tilt so that the honey will not spill out. Wax cells average 140 to the one centimetre in thickness and each cell fits snugly against its neighbour on all sides – a construction so strong and cleverly planned down to the most minute detail that we never cease to find the work of these little creatures truly amazing.

How Bee's Make Honey

It has been said that except for man, nowhere in the world is there anything to compare with the incredible efficiency of the industry of the honeybee. Inside the beehive each bee has a special job to do and the whole process runs smoothly.

Bees need two different kinds of food. One is honey made from nectar, the sugary juice that collects in the heart of the flowers. The other comes from the anthers of flowers, which contain numerous small grains called pollen. Just as flowers have different colours, so do their pollen .

Let us go with the honeybee from her flower to the hive and see what happens. Most bees gather only pollen or nectar. As she sucks the nectar from the flower, it is stored in her special honey stomach ready to be transferred to the honey-making bees in the hive. If hungry she opens a valve in the nectar “sac” and a portion of the payload passes through to her own stomach to be converted to energy for her own needs.

The bee is a marvellous flying machine. She can carry a payload of nectar and pollen close to her own weight. Consider that even the most advanced design in aircraft can only take off with a load one-quarter of its own weight and you'll appreciate the miracle that the honeybee can remain airborne with such a load.

When her nectar “sacs” are full, the honeybee returns to the hive. Nectar is delivered to one of the indoor bees and is then passed mouth-to-mouth from bee to bee until its moisture content is reduced from about 70% to 20%. This changes the nectar into honey. Sometimes the nectar is stored at once in cells in the honeycomb before the mouth-to-mouth working because some evaporation is caused by the 32.5 C temperature inside the hive.

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How Bee's Make Honey can't

Finally, the honey is placed in storage cells and capped with beeswax in readiness for the arrival of newborn baby bees. Pollen is mixed with nectar to make "bee bread" and is fed to the larvae. A baby bee needs food rich in protein if the bee community is to flourish.

Before returning to the flower again for more pollen, the bee combs, cleans and cares for herself, not because she is vain but so she can work more efficiently. Throughout her life cycle, the bee will work tirelessly collecting pollen, bringing it back to the hive, cleaning herself, then setting out for more pollen.

Forager bees start out from the hive for blossom patches when three weeks old. As they live to be only six to seven weeks old they have much work to do and little time in which to do it.

There will be many other bees working at the same time, and the air will be noisy with their droning. It takes 300 bees about three weeks to gather 450g of honey. On average, a hive contains 40,000 bees.

The Type Of Bees

The Queen is the centre of the hive : she accompanies every swarm that you see. The Queen is also the largest bee and her body is specially formed for egg laying, so that the eggs can be placed a little above the centre of the cells in the honeycomb. Before depositing her eggs, she inspects each cell to be sure it is properly cleaned by the workers. Just think of her effort and industry !

When, for any reason the colony needs a new Queen, extra royal jelly is fed to chosen larvae in the cells. The first young Queen to emerge from the pupa destroys all other developing Queens in the cells, then sets out on her mating flight after five to twelve days. The Queen will mate with 10-20 drones, efficiently storing sufficient sperm to utilise during her life. After mating the young Queen has much to do. With her eggs fertile, she must return swiftly to the hive. The old Queen will have left with a swarm beforehand. The new Queen, closely surrounded by worker bees who feed and groom her, can lay up to one egg every minute day and night.

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The Drones

Drones are the future fathers of the bee colony (rather a very small number of them will be). Shorter than the Queen, drones are larger than the workers. They have no accomplishments other than being patient. They cannot make wax, have no proboscis for collecting pollen or nectar, and have no pollen pikes on their legs. They are never called on to defend the hive so they have no need for a sting.

Drones rarely feed themselves – instead, they hold out their tongues and a worker bee places food on it. They are truly gentleman in waiting. They are waiting for the day when a young Queen will fly from the hive. When a new Queen flies from the hive she joins the drones, who are already circling in drone congregation areas. The swiftest drones will catch and mate with the Queen, but their life is short. After mating, they will float back to earth and be dead by the time they reach the ground. They have helped to bring new life to the colony and their work is finished. The remaining drones return to the hive either to be driven out or die there during the winter or when a shortage of food occurs.

Worker Bees

The main section of the hind pair of legs has special spines for holding pollen or propolis (a kind of gum). The centre legs are the bees' main support, but all six legs are variously equipped with brushes, combs and spurs with which to brush pollen from the eyes, clean the antennae, wipe dust from the wings and pack pollen spines. The tongue and mandibles are used to lick and collect pollen grains from the anthers of flowers, with the result that the pollen grains are moistened with honey and stick together. The pollen is then transferred to the hind legs and held firmly until the forager enters the hive, when it is then packed in cells in the honeycomb.

Worker bees have two heavy spoonshaped jaws which sideways. The jaws are used for collecting pollen and chewing wax. The abdomen has two important organs – the wax glands and the sting. Wax glands are special cells on the under side of the last four segments of the body. Wax is discharged through these special cells in tiny scales, which are then moulded and used in comb building, capping and the cells.

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Life In The Hive

In her lifetime, the Queen can produce more than one million eggs. At first, after the eggs are hatched, all the larvae are fed on royal jelly – a milky white fluid made by a gland in the nurse bees' head. This rich food helps larvae to grow strongly. After three days, the workers' diet is changed mainly to pollen and nectar, while the Queens continue to be fed on royal jelly.

On the eighth day, the larva spins itself a silken cocoon and during the next week or two makes the great change from pupa to adult. It gnaws its way out of its cocoon and, as it gains strength, joins the workers in their task of foraging or engineering, nursing the young, converting nectar into honey, cleaning the hive and waiting on the Queen. So the life cycle goes on !

The Language Of Bees

Bees cannot talk. Their language is one of vibration. To indicate distance, the scout bee uses an audible code of buzzes, on a 200 cycle per second note with a pulse rate of 35 to the second. The length of time on a wagtail run and the number of pulses of sound in each buzz indicate distance.

Harvesting Honey

As soon as the honeycomb in the hive is filled with honey and capped with beeswax they are ready to be harvested. Beekeepers regularly inspect their hives to see when the honeycomb can be removed. Honeycomb is removed from the hive and taken to a mobile extracting van or central extracting plant called a "honey house". The wax cappings are removed with a steam heated knife or special revolving blade before the honeycomb is placed in the extractor. The honeycomb is then placed in revolving baskets where the spinning movement throws out the honey by centrifugal force.

Little or no damage is done to the delicate honeycomb by this process and when it is returned to the hive, the bees immediately set about removing any left-over honey plus repairing and polishing each cell in readiness for a new load of honey. Honey collected from the extractor is then strained and left to stand until air bubbles rise. Bubbles and any left-over wax particles are skimmed from the surface and the honey is ready for bottling. It truly is straight from Nature's Warehouse ! Most apiarists (beekeepers) send their honey in bulk to city and country packing houses. Some have their own bottling equipment and sell the honey to retail and wholesale stores.

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How Does A Bee Find Pollen ?

Honeybees prefer to work close to their hive. Beekeepers move hives occasionally to give the bees access to a good floral source. Bees tend to work less than 200 metres from the hive, but can range up to 1.5km away if necessary. Scout bees have the task of finding new nectar sources and head out to check all nearby vegetation. If they find nectar, they return to the hive and pass on the exact location with a remarkably intricate dance routine.

The Dance Of The Bee

Once pollen, nectar or water is found, the scout bee returns to the hive and dances on the honeycomb to indicate where the source may be found. Many factors indicate to the worker bee the precise position. Wings vibrating swiftly as the scout bee dances in a circle indicates that the find is within 100 metres of the hive. If the source is further away, the dance will be a “wagtail” roughly in a figure eight with a straight centre section. The direction in which she runs the centre and the speed of her movements tell how far to fly and in which direction.

All About Honey

Look along the shelves of your grocer – you will find a wide range of honey to choose from. There will be blends of golden liquid honey ranging from pale yellow to deep rich amber, jellied, creamed or candied honey.

Flavours & Colour

All around Australia bees are busy visiting flowers to collect nectar and pollen. The flowers visited give honey its flavour and colour. Should the honeybee visit a mixed patch of flowers, a special perfume left by the scout bee tells the workers to take the nectar from only one source so that honey in the hive is but one honey type.

Honeybees have an excellent sense of smell to distinguish between the different perfumes of the flowers and also have a “perfume dispense” to tell other bees the types of flowers that have been chosen. The bee can also distinguish colours in the blue/green end of the spectrum – and has a time sense too. There are more floral sources ideal for honey making in Australia than any other country – so we have a wide range of tastes and colours.

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The best loved Australian honey flavours come from :-

Blue Gum – light amber, choice forest honey from the south.

Karri – amber honey from the forests of Western Australia.

Leatherwood – unique honey from the West Coast of Tasmania, quick to candy and extra light in colour.

Lucerne – mild tasting honey.

Yellow Box – pale and sweet honey from New South Wales, Victoria and Qld.

Stringy Bark – strong flavoured, medium amber honey from the Great Dividing Range.

Ti-Tree – very strong flavoured honey used mainly in manufacturing, from the north and south.

White Clover – extra white honey that candies smoothly.

