

INTRODUCTION TO



TROPICAL BEEKEEPING

# AN INTRODUCTION TO TROPICAL BEEKEEPING



BY THE UNIVERSITY OF HAWAII'  
HONEYBEE PROJECT

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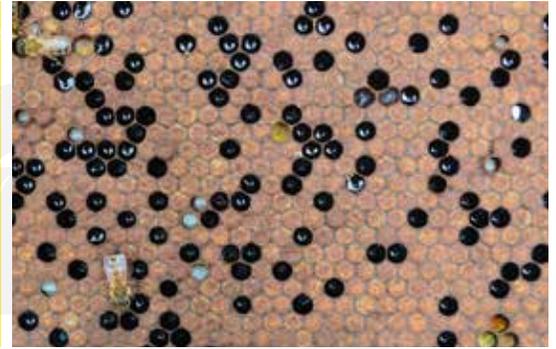
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# HONEYBEE BIOLOGY



## SOCIALITY

Social behavior in insects is rare, but some social species are very successful. Ants, termites, some wasps and some bee species are social. Some of these social insect groups can be very diverse and, sometimes, very abundant. Most bees, however, are solitary. This means that each female bee makes her own nest, often a small and simple, and she provides for her young one at a time. Solitary bees forage for pollen like their social relatives, and some can be very efficient at pollination.

The truly social bees include bumblebees and honeybees. Bumblebees do not occur in Hawaii, they tend to be common in more temperate regions, or in high elevation mountains in tropical areas. Bumblebees and honeybees both have queens, which are in charge of egg laying. There are however very dramatic differences between these two groups of bees. Bumble bees however an annual life cycle, and the old queen dies at the end of the fall season. The new bumble bee queen mates and hibernates, and in the spring she will begin a new colony all by herself. Honeybee colonies don't disintegrate every winter, and a queen never starts a new colony by herself.

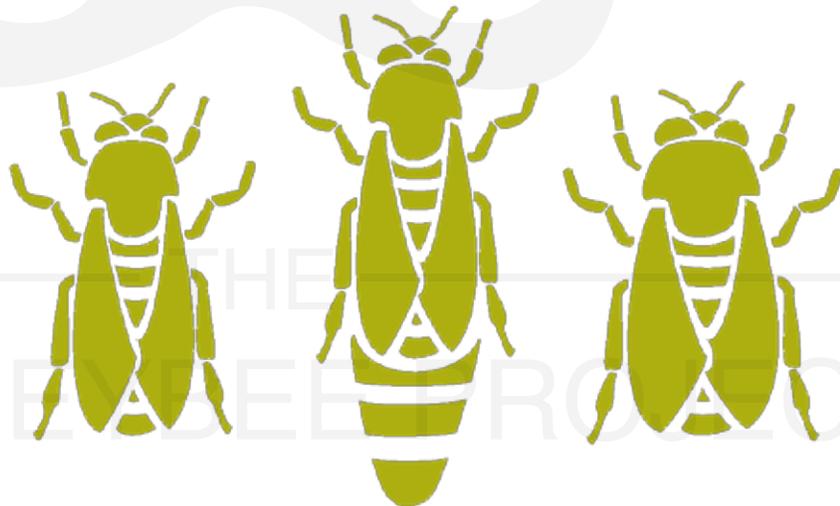
## INTRODUCTION TO BEES

There are some 30,000 species of bees found worldwide, but when most people think of bees they think of the honey bee, *Apis mellifera*. Yet this common species of bee, utilized to pollinate over 90 species of commercial crops and to produce wax and honey, is something of an oddity as far as bees go. That it is because honeybees are among the most highly social insects in the world. The majority of bees are instead solitary, that is females create their own nests and rear their young without aid from other individuals.

The *Apis* genus is composed of eight different species of honey bee, including *Apis mellifera* which has been extensively domesticated for the past 5,000 years. Just as there exist many different dog breeds, there are also numerous different 'races' of *Apis mellifera*. *Apis mellifera ligustica* or the 'Italian' race is preferred by bee keepers because it produces large amounts of high-quality honey and is known for its gentle, non-aggressive nature. In Hawaii, we have a mixture of Italian and German bees, which can be a little more aggressive.

## HONEYBEE CASTES

The bee genus *Apis* is unusual because it forms what are called perennial colonies: colonies that endure for many years. Each honeybee colony has three different classes of individuals, which perform different tasks, the so-called "castes". These include: the queen, the workers (the daughters of the queen), and the drones (the male offspring of the queen).



Worker

Queen

Drone

## WORKER BEES

The vast majority of all bees in a hive are worker bees. Workers are the daughters of the queen and they are sterile females. For the first two weeks of their life, they work within the hive performing nurse duties such as cleaning the hive and feeding larvae. As they age they begin to do other chores such as, manipulating and building cells with wax, packing pollen brought by other workers, and attending to the queen needs. As the workers get to be eighteen days old they spend time guarding the entrance of the colony. Around day twenty, workers begin to leave the hive to forage, collecting both pollen (in the pollen baskets on their hind legs) and nectar (which is stored in a special honey sac in the digestive system). A typical managed colony in Hawaii usually has around 25,000 to 30,000 adult worker bees.



## DRONE BEES

The drones, or fertile males, compose a small fraction of the hive population. They are readily distinguished from workers by their larger size, massive eyes, and lack of a stinger. Drones do not contribute to hive care or maintenance, nor do they aid in foraging. Decidedly weak flyers, their sole purpose is to mate with virgin queens only to die shortly after successful reproduction. If resources are scarce in a hive with an already fertile and egg-laying queen, workers will evict drones to fend for themselves. In Hawaii, drone production season is very variable and highly influenced by microclimatic conditions.



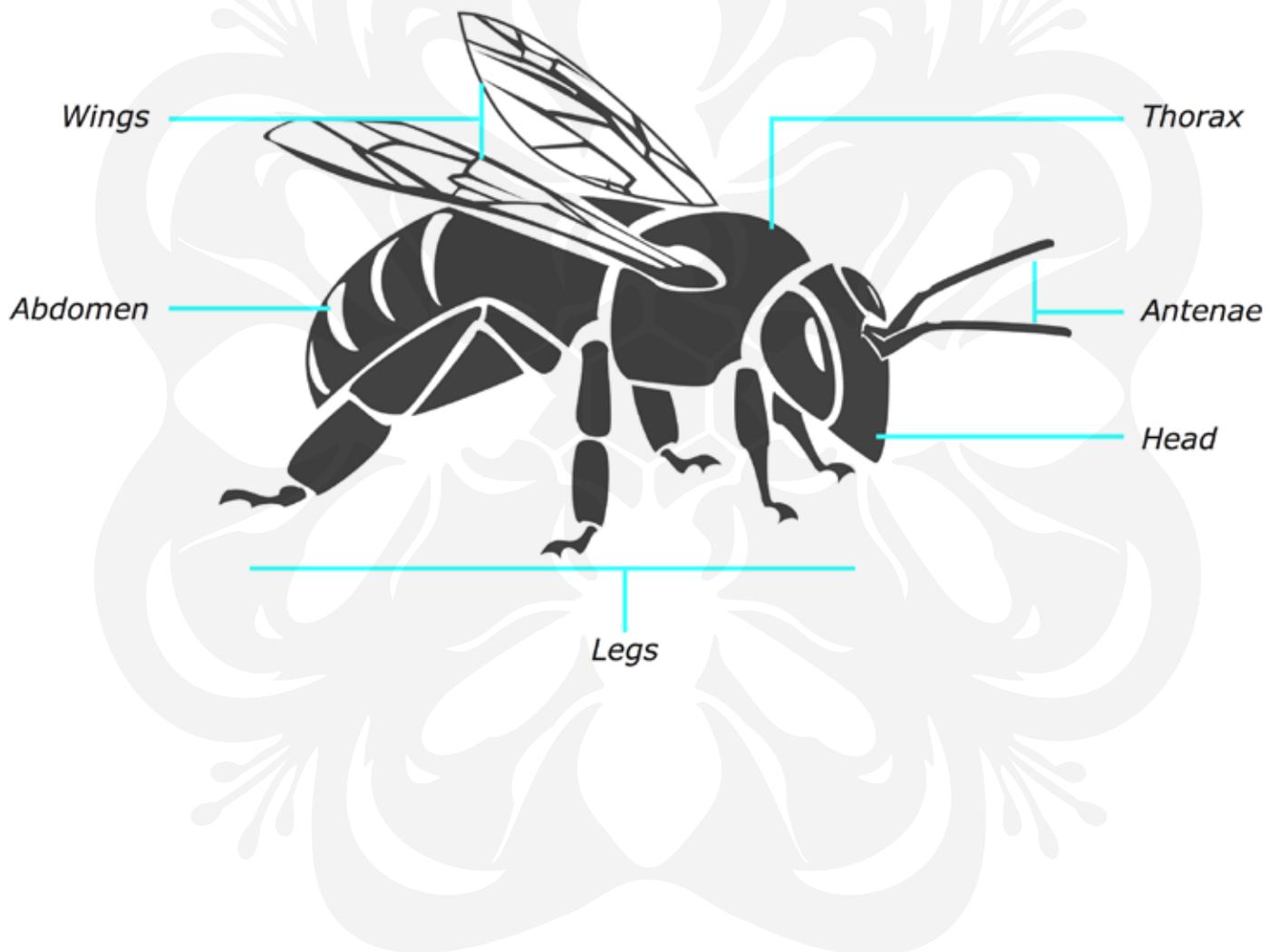
## QUEEN BEES

The queen is the largest and longest-lived bee in the colony. She is also the only sexually developed female. Her role in the hive is to lay eggs in the brood cells. The queen is capable of determining whether to release stored sperm (from her previous matings) to create sterile females or to withhold the sperm and create drones. Queens can live around two to three years but beekeepers tend to replace them annually or every other year as egg production diminishes with age. Naturally, a colony will make a new queen if the original is old, weak, or infertile by feeding female larva royal jelly up until pupation. The first new queen to emerge stings and kills her competitors while they are still in their cells. In tropical areas, such as Hawaii, where queens lay eggs continuously throughout the year, it is recommended that beekeepers replace the queen annually to ensure strong colonies.



# BASIC BEE ANATOMY

Like all insects, bee bodies are composed of three distinct parts: the head, the thorax, and the abdomen which are made up of small chitin plates and form the exoskeleton of the bee. All bees have two pairs of wings and three pairs of legs which emerge from the thorax.



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