

Major Species of Honey Bee in India

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INTRODUCTION

Honey bees are small flying insects belongs to Hymenoptera order, famous for their work in pollination and honey production. They are members of the genus *Apis* and are most frequently represented by the Italian honey bee (*Apis mellifera*), which is widely domesticated for its honey and wax.

Honey bee contains caste like Drone, worker and queen. Every caste has their own responsibility in the hive to maintain their population. Worker bee is the most important caste of honey bee hive as they perform vital functions like collection of pollen and nectar from floral plants. They also perform function like a guard to protect bee hive form enemy and also as a nurse bee for nurishment of broods. Queen bee has the responsibility of laying egg. Honey bee is a female dominating society as majority of the population in the hive is female. Strength of the hive is dependent on the population of worker as the perform most of the functions.

a) Rock Bee (*Apis dorsata*)

They are massive, aggressive bees that build a single, open comb that is typically three to four feet tall. They are common throughout the subcontinent, primarily in forests and concrete jungles. They build their nest up to an altitude of 2700 metres in hilly areas. Rock bees frequently change their locations. A single rock bee colony can produce between 50 and 80 kg of honey per year (Mishra, 1995). They are found in Pakistan (and possibly certain areas of southern Afghanistan) in the west (Crane, 2004), through Sri Lanka and the Indian subcontinent to Indonesia and some areas of the Philippines in the east. Its distribution extends from southern China to Indonesia in a north-south direction; it is found neither in New Guinea nor Australia. Recently, the gigantic honeybees of Nepal and the Himalayas were reclassified as *A. dorsata laboriosa*, a species of *Apis*.

Another subspecies of the dorsata, known as *Apis dorsata binghami*, is only found in certain regions of the northeast, specifically the Khasi Hills, Sikkim, and Meghalaya (Otis, 1996). Most of the time, these bees build their combs more than 20 feet from the ground, but sometimes we may observe the colonies hanging from branches little over 2 feet from the ground. *A. dorsata* can grow in single or multiple colonies. The foraging and scout bees will take off and land in the energetic lower portion of the comb. These bees will attack any intruders since they are aggressive (Ramchandra *et al.*, 2012), and every so often they will chase even up to 100 m. Sometimes stings of these bees can be fatal to humans. Rock bee honey is typically expensive on the local market because of the risk associated with its collection. Some expert bee hunters prefer to work at night. In some locations, specialists add chicken feathers to the smoke created by burning charcoal in order to calm the bees. This disturbs the rock bees and forces them to leave due to the stench produced by the addition of chicken feathers, making it easier to extract the honey. There is widespread concern that the total number of *A. dorsata* nests throughout Asia is declining as a result of bee hunting, depleting forests, and the use of hazardous pesticides on farmlands used for foraging.

a) Little Bee (*Apis florea*)

Apis florea, popularly known as the dwarf honeybee, is a kind of wild honeybee, it is smaller and less aggressive than rock bees. Single vertical comb build by these bees (Hepburn and Radloff, 2011). They make palm-sized combs in shrubs, hedges, buildings, caves, empty cases, etc. The rock bee builds its comb on the underside of the branch, while small bees encircling around the twigs. This is the main distinction between the two types of combs. When compared to rock bees, these bees produce significantly less honey, with each hive producing just approximately half a kilogramme. However, huge amounts of *A. florea* honey are harvested in the Gujarati

region of Kutch (Soman and Chawda, 1996). These bees are likewise unrearable since they regularly move their colonies, however attempts in India have had some success (Mishra, 1995). Only the plains and not hills above 450 MSL are home to these bees. These bees are more pleasantly coloured than ordinary honeybees, with red to brown coloration and white bands. They perform an important ecological function in the areas they inhabit because they are good pollinators. These bees are widely recognized for their unusual defensive behaviour and ability to blend in with the background of dense forests. A more heart warming example is the unique activity they display in response to their main predator, the weaver ant, *Oecophylla smaragdina*. When these ants are nearby, the bees create adhesive barriers to block the ant's journey. The hissing noises made by *Apis florea* when they spot a predator are another way to recognize them. To the human ear, this hissing noise is detectable.

b) Indian Bee (*Apis cerana*)

A popular bee species in India is the Indian honeybee, often known as the Eastern honeybee. This was the only rearable *Apis* bee species in India before the Italian bee was introduced. Pakistan, Nepal, Burma, Bangladesh, Sri Lanka, and Thailand are other countries where it can be found and has been domesticated. These rarely change places and are generally not aggressive. These bees build several parallel combs in dim areas like hollow logs, clay pots, wall apertures, tree openings, etc. and generate 7-9 kg of honey per colony each year. In India, *Apis cerana indica* and *Apis cerana cerana* are found. Ruttner, and Ruttner (1988) divided *Apis cerana* into subspecies based on the living environments and genetic diversity. The subspecies *Apis cerana indica* is distinguished into two morphotypes in India, the "hills bee" (which is black in colour) and the "plains bee" (which is yellow in colour) (Ramchandra *et al.*, 2012). Currently, over 50,000 beekeepers work primarily in the Kanyakumari area of Tamil

Nadu in south India, where Indian beekeeping is prevalent. These bees are able to be kept in specially designed mobile frame hives because they have established their colonies in dark cavities. The "bee space," which is observed between them, is the uniform distance between the combs of the *A. cerana* colony, which are constructed parallel to one another. These are smaller rock bees and Italian bees than but larger than dwarf bees in size. Smaller cells for the worker brood and larger cells for the drone brood make up the brood comb. On the lower border of the comb, the queen cells are constructed. These bees store honey in the upper section of their hive like other bee species do. Due to this propensity, bee boxes are made such that the super chamber, also known as the honey chamber, is located at the upper section of the hive. This arrangement makes it easier to extract honey.

c) European Bee/Italian Bee (*Apis mellifera*)

One of the subspecies of the Italian bee (*Apis mellifera*), which is not native to India, was brought there from Europe in the second half of the 20th century. The main reason for the introduction was the Thai sacbrood virus, which was destroying the native Indian bee colonies. Due to the abundant flora, which includes mustard, safflower, sunflower, and other plants, they are currently well established in India and are mainly found in the northern regions. These bees do not receive enough of the food they require because rice is the main crop in southern India (Kishan Tej *et al.*, 2017). Italian beekeeping is rarely conducted in south India; in order to practise commercial beekeeping, these Italian bees must be transferred via floral mapping. They share behaviours with Indian bees, which construct parallel combs in dark areas and store honey at the top of their colonies. (Otis, 1990). Except for *Apis dorsata*, they are larger than all other honeybees. Each colony makes 25–40 kg of honey annually. These bees are probably one of the animals that has been examined the

most. *A. mellifera* introduction to India led to issues like the inter-species spread of bee illnesses and pests. However, the introduction of these bees to India might be seen as a success story because it provided many Indians with lucrative employment opportunities and with the pollination services these bees provided to the country's flora.

d) Stingless Bee

Stingless or dammar bees are the tiniest (less than 5 mm) of the honey-yielding bees. They come within the subfamily Meliponinae of the Apidae family. The genera *Melipona* and *Trigona* make up this group. There are more than 500 species in the family Meliponinae, which consists of eight genera and 15 subgenera (Wille, 1983). These bees are widely known as dammar bees in India (Rasmussen, 2013) (dammar is a resin from among dipterocarp trees) with additional local names commonly applied, e.g., "putka" in Sikkim and Nepal (Singh *et al.*, 2011; Lepcha *et al.*, 2012); "ngap siwor", "ngap hamang" and "ngap khyndew" in Khasi language and "cherutheneecha" and "arakki" in Kerala. As the name implies, these bees cannot sting as their stingers are highly reduced, but they try to defend their colony from intruders using their mandibles (Michener, 2000). Stingless bees can be domesticated and are crucial pollinators of many food crops. However, the annual honey production per hive is about 100 g, which is quite little. Colonies can be kept in tree logs, wooden boxes, and clay pots, just like in other places where stingless bees are found, to harvest little amounts of highly prized medicinal honey, wax, and propolis, which is used for its hygienic and therapeutic benefits. The primary building ingredients for nests are pure wax or cerumen, a compound made of wax and propolis, resins, plant fibres, and clay (Rasmussen and Camargo, 2008).

CONCLUSION

Honey bees are extraordinary insects that have a big impact on human society and are essential to our ecosystem. Living in vast

colonies made up of a queen, drones, and worker bees, they are highly organized and sociable beings. Honey is a delicious and healthy delicacy that has been prized by people for thousands of years. Honey bees are noted for being able to make it. Pollination is one of the honey bees' most crucial jobs. They unintentionally spread pollen from one flower to another as they search for nectar and pollen, which helps in fertilization and promotes the reproduction of many plant species, including many of our food crops.

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