

HONEY BEE  
DISEASES AND  
PESTS

# Taxonomy

Regnum: Animalia

Subregnum: Metazoa

Phylum: Arthropoda

Subphylum: Antennata

Class: Insecta

Order: Hymenoptera

Family: Apidae

Genus: Apis

Species: Apis mellifera

# Apis mellifera

- The species that have economical importance all over the world is *A. mellifera*.
- There are many different geographical-adapted races/subspecies of this species.
- Black races; Anatolian, German, Caucasian, Carniolan
- Yellow races; Italian, Cypriote, Egyptian, Syrian, Palestinian

In Turkey, pure or hybrid breeds of *Apis mellifera anatolica* (Anatolian) ve *A. mellifera caucasica* (Caucasian) are raised.

# The Morphology of Honey Bee

- The honey bee colony consists of three morphologically and physiologically different individuals that are a queen and drones and worker bees that can vary their numbers according to the seasons.

# CAPUT

- It consists of 5 pieces which are knitted with sutures.
- It connects to the thorax with a thin and movable neck.
- The main organelles are eyes, antenna, and mouthparts.
- The antenna is a twin in all honey bees and it has 12 segments in queen and worker bee and 13 segments in drones.

- There are setae that act as sensors on the antenna.
- The eyes unite at the front of the head in males, and there is a frontal space between eyes in the queen and worker bee.
- The numbers of ocellus that make up eyes are 3 thousand in the queen, 4 thousand in the worker bee, and more than 8 thousand in the drones.
- Mouth organelles are sucking type. It is less developed and shorter in drones.

- Proboscis is constituted by combining of Labium and maxilla. The proboscis, which is used to take liquid nutrients such as water, nectar, honey, is shaped for a temporary period.
- The nectars of some flowers locate in deep, therefore long proboscis is a factor that increases the value of the bee races.
- Glands, which are found in the worker bees and used for royal jelly secretion, are located in two sides of the caput.



# Thorax

- It consists of three segments; prothorax, mesothorax, and metathorax.
- However, The thorax looks like 4 segmented, because the first abdominal segment called propodeum is fused to the thorax.
- In mesothorax, there are a couple stigma in lateral.

- A pair of legs comes out of each segment.
- Extremities include coxa, trochanter, femur, tibia, tarsus and a couple nail.
- The first pair legs of workers have an organelle that cleans the mouthparts and antennae.

- The pollen basket or corbicula is part of the tibia on the hind legs of worker bee and is used for harvesting pollen and carrying it to the nest or hive.
- There are two couple membraned wings coming out of Meso- and metathorax.
- In particular, the first pair of wings on the front are more developed, longer and vascular.
- The honey bees can fly at 25km/h speed with flapping their wings 190 times in a second.
- The wings extend to half of the abdomen in queen bee, to the end of the abdomen in drones, and the wings go through a little bit of the abdominal in worker bees.

# ABDOMEN

- Honey bee has 10 abdominal segments in the larval stage whereas 9 segments appear in the pupa stage as the first segment merges with the thorax.
- However, there are 6 segments freely in queen and worker bees, while 7 free segments in drone bees.
- The abdomen is long and sharp in the queen, oval in workers, and short, thick and thin in drones.

- In the last abdominal segment of the queen and workers, there is a poison gland and a sting attached to it.
- There is an ovipositor in the last segment of the queen bee.
- There are wax glands on the ventral surfaces of the 4th, 5th, and 6th segments of the worker bees.
- There is a pair of stigma beside each ring of the abdomen.

- Digestive system: The digestive system starts with the mouth organs, continues with pharynx, and oesophagus. The oesophagus grows into a pouch at the front of the abdomen, and it is called the honey stomach.

- Reproductive system: The queen bee has a well-developed female genital organelles. The queen mates once a year and it use the sperms that are stored in their spermatheca. They are oviparous insects.
- Reproductive organelles of the drones are also well-developed.
- The genital system of workers has become atrophy. However sometimes it can also be seen that the workers produce unfertilized eggs.

- Nervous system: The main ganglion that serves as the CNS is located in the caput and on the oesophagus.
- Respiratory system: There is tracheal breathing. The stigmas are located as a pair in mesothorax and as pairs in each segment of abdomen.
- Circulatory system: There is open circulatory system.



- Sensory organelles: They have well-developed visual, hearing, odor, taste and touch organelles.
- Hearing is especially occurred through the setae in the second long segment of the antenna.
- There is an activity called communication dance (bee dance) among bees. By performing this dance, successful foragers can share, with other members of the colony, information about the direction and distance to patches of flowers yielding nectar and pollen, to water sources, or to new nest-site locations.

- Beeswax glands: The wax glands, four pairs in the worker bees, are placed on the front plates of the abdominal segments.
- Nasonov gland: It is located in the front of the 7th abdominal segment of workers and used in communication.
- Sting: The sting is located in the last segment of the abdomen and is connected with poison gland. The drones have not stings.