

## **COLONY ORGANIZATION AND DIVISION OF LABOUR**

Honey bees are social insects and live in colonies. A normal colony, during active season is composed of 3 kinds of individuals: one queen, thousands of workers (10000 to 30000 or even more) and few hundreds of drones, which vary in size. In addition, each colony has different developmental stages viz eggs, larvae and pupae which are collectively known as brood.

### **Queen:**

- Only one queen is found in a colony except under supersedure or swarming instinct
- She is the mother of the whole colony producing workers and drones and is the only perfectly developed female member of the colony
- Her function is to lay eggs. She does not have motherly instinct or ability to feed the brood. She is fed lavishly by a large number of nurse bees with highly nutritious food known as royal jelly
- A good queen can lay 1500-2000 eggs per day
- A laying queen is the longest bee in the colony. It has larger thorax than worker and her abdomen gets greatly distended during egg laying
- The queen lays both fertilized and unfertilized eggs. Fertilized eggs produce workers (also queens) and unfertilized eggs produce drones
- A good mated queen may work satisfactorily for 2 or more years, although queens can live eight years or longer. However, in commercial beekeeping, queen is replaced every year to keep high brood rearing in a colony.
- Queen releases queen substance (pheromone) which helps in the colony organization. It acts as worker attractant and inhibits ovary development in worker bees as well as raising new queen. Absence of queen pheromone is detected after about 30 minutes of queen loss and colony may start raising new queen. The pheromones in queen substance stimulate brood rearing, comb building, hoarding and foraging in a colony and thus play important role in normal working of a colony.
- The virgin queen mates with a number of drones (5-7) within 5-10 days of emergence in the air (not inside the hive) and spermatozoa are stored in spermatheca. Stored sperms are utilized to fertilize eggs throughout her life till exhausted.

## Worker bees

Worker bees are infertile female developed from fertilized eggs. A bee colony is called weak or strong according to number of workers it has. A bee colony of *A. cerana indica* has 15,000 workers and a strong one has 80,000. The workers (sterile females) are smaller than drones and queen. These have underdeveloped reproductive organs due to the influence of the pheromones produced by the queen. At any given time, a colony may have 2 or more batches of worker bees, having different male parentage.

A worker bee has a life span of 6 weeks. For about three weeks following birth, they do the indoor duties, like feeding the drones (if they are still need), nursing the young, secreting royal jelly and bee wax, feeding and attending queen bee, cleaning the cells and hive, repairing the damaged combs, construction of new combs, ventilating, cooling, guarding and defence of the colony, evaporating nectar and stored honey. During the next 3 weeks, they take to outdoor field duties of foraging to collect water, nectar, pollen and propolis, and ripening honey in its proventriculus (honey stomach). Older forager bees turn also into scout bees that search for new sources of food and new nesting sites for the hive.

A worker bee does not have an individual existence, as it lives for the good of entire colony. It dies in harness during flight to flowers. The average worker bee can make only one-twelfth of a teaspoon of honey during its lifetime. The worker bees must tap over two million flowers to make about one pound of honey, flying a distance equal to more than three times around the world.



## **Drone**

The drones are male developed from unfertilized eggs parthenogenetically. The male bees are produced in the colony for the purpose of mating and fertilizing the queen bees. The larvae that develop from unfertilized eggs are fed royal jelly and give rise to drones. Worker bees feed and take care of the drone bees till the virgin queen in their colony is mated. After mating with the queen, the drone dies. When queen bee returns mated to hive, the worker bees neglect the drones.