ApiCulture

Beekeeping has been practiced in India since time immemorial. The earliest references date back to Vedas and Ramayana, but the scientific beekeeping with the help of simple machine and untouched by hand is comparatively new venture. The Western method of frame hives was first produced in Bengal in 1882 and in Punjab in 1883-1884. In recent times progress has been rapid for practical apiculture. Apiculture is an art which has during the last 40 years not only undergone complete revolution but has attained a development and multiplicity of detail. It is due to the effort of Khadi's and village industries that beekeeping acquired its present coordinated national status in India.

Habitat and habitat

Honey bees are highly organized social insect reported from all over the world. Although they are active throughout the year but in winter season try do little work and do not rear the brood. In spring season that is at time of flowering they prepare a strong colony with honey rich combs. They exhibit polymorphism and good division of labour. The bee hives with 30000-50000 individuals are observed hanging down from branches and ceilings of houses. The worker communicates information for the location of food sources through the '***wraggle dance***' a phenomenon called as a '**language of bees'** by the eminent biologist *Karl Von Frish*. He has mentioned that the rate of dance is directly proportional to the distance of the food. A colony is known as 'strong' or 'weak' according to the number of workers bee.

Species of honey bee

Honey bee belongs to the class: *Insecta*, Order: *Hymenoptera* and family *Apidae*.

Five species of honeybee are reported in the world: -

i. *Apis dorsata* (rock bee)
ii. *A.florea (little bee)*
iii. *A. indica (Indian bee).*
iv. *A. melifera (European bee).*
v. *A.adamsoni (African bee)*

Out of the five species *A. dorsata*, *A. florea and A. indica* are common in India.

Apis dorsata:

which is commonly called as Rock Bee is the largest Indian variety. It builds large comb on trees under caves or under roof of buildings. They are migratory species as during June and July, they swarm to the hills. But in winter come back to the planes. They have been yet to be successfully hived. Researches are going on the behavior of this variety in order to domesticate them.

This variety yield highest honey among Indian bees. These bees are notorious for its ferocity and tendency to make unprovoked, sometimes fatal, mass attack on person who approaches it hive.

Apis florea (little bee)

It is a miniature of the rock bee, but it's comb on the branches of trees, bushes or under the wall of buildings and yield very little amount of honey and the production does not compensate the labor undergone it.

***Apis indica* (Indian bee)**

It is of commonest occurrence on the plains and forests of India. There are several regional strains of eight, of which plains, transitional and hill variety are three types: -

Picea: found in hills at an altitude up to 7000 ft.

Pironi: transitional found between 3000 to 4000ft.

Lighter indica: is the plain strain found up to an altitude of 15 ft. It builds several parallel combs across in protective place like hollow of trees, caves, rocks etc. Due to their mild nature and average output of honey, between 3 to 5 kg per year/ colony. They are amongst the best of Indian variety to bee hived in artificial condition.

***Apis melifera (E*uropean bee).**

All over Europe they are similar to the *Apis indica* in nature. There are several varieties among them, Italian variety is the best and yield 1000-4000 lbs. of honey/year/colony. Attempts to domesticate this bee in India on large scale has yet not been proved success.

Cross breed has developed and experiments are going and at present we can only hope for a brighter future in the field of apiculture.

Caste of honey bee (Social organization of honey bee)

A highly organized division of labor is found in the colony of honey bee. A good and well-developed colony of bees has 40 to 50 thousand individuals consisting of three castes: **Drone** and **worker** and **queen**.

Due to existence of several morphological form's bees are said to be **polymorphic species**. The queen after fertilization lays both fertilized and unfertilized egg. From unfertilized eggs workers bee are developed. The worker bee when feeds on royal jelly develops into queen.

Queen: it is a diploid fertile female. The presence of queen in a colony is must. The size of the body is much larger than other caste of bees of the colony. Her legs are strong and she is always walking about the comb. The queen has sting curved like *schimitar* at the tip of the abdomen, which is in fact modification of the egg-laying organ known as *ovipositor*. The sting serves as an organ of defense also. She never uses it against anybody except her own caste. The queen is responsible for laying eggs in a colony and lay eggs 1000- 1500, sometimes more than 6000 eggs every day. She lays both fertilized and unfertilized eggs. From unfertilized eggs females are developed and fertilized egg males are developed.

Workers: It is diploid sterile female. The size of a worker is smallest among the caste but they constitute the majority of bee in a colony. Their function is to collect honey, to look after young ones (nursery bee), to clean the combs (cleaners), to defend and maintain temperature (fanner) and formation of new hives (builders) and some repairs the hives (repairer).

Numerous adaptations have occurred in the workers for performing her various functions. The body is covered with branched hairs and when it visits flower, pollen grains adhere to the hairs and other parts of the body. The worker cleans it with special structure, the antenna, cleans on its forelegs. Pollen brushes on all legs and

pollen combs are on hind legs. All pollen are stored in a pollen basket present on the outer surface of tibia, on hind legs. Water and nectar are gathered by means of sucking mouth parts which are modification of maxilla and labium.

Workers provided by a sting at the tip of the abdomen which is a modified ovipositor. A Large poison storage sac is connected with the base of the string: 2 acidic and 1 Alkaline gland mix their secretion to form poison which is injected by the operation of muscles to the animals. During the withdrawal from the prey's body, the sting along with other poison aperture are torn off, resulting in the death of the particular bee.

Workers are female but incapable of producing eggs. Working days persist for 5 to 6 weeks only.

Drone: It is haploid fertile male. They are larger than the workers and quite noisy. They are unable to collect food but eat voraciously. They are sting less and main function is to fertile the queen. The drone develops parthenogenetically from unfertilized eggs. The number of drones 200 to 300 in a colony but in bad season they are driven out. Drones are totally dependent upon the workers. The sole duty of drone is to fertile the virgin Queen. At the time of swarming the drone follows the queen copulates and die after copulation.

Life history of honey bee:

After fertilization the queen generally lays one egg in one brood cell. The eggs are pinkish in colour, elongated. To bottom of cell. Larvae emerge out from both the fertilized as well as unfertilized eggs. Thus, the larvae from the unfertilized eggs from the drone while the workers are developed from the larvae of the fertilized eggs. Amongst the larvae of the workers one I fed on the royal jelly, a special diet secreted by the young workers in the colony and becomes the queen of the colony. The royal jelly consists of digested honey and pollen mixed with a glandular secretion into the mouth of the workers, after 5 days of feeding the cell is sealed and the larvae undergo pupation. It spins a thin silken cocoon and pupates completely. Emergence of young ones takes place after 3 weeks and they get busy in the indoor duties for about 2-3 weeks. Later on, they are sent for the outdoor duties, All the bees pass through a complete metamorphosis with the various changes into the life cycle taking place. Within the comb.

Swarming: - The process of leaving off colony by the queen is termed as swarming. It happens towards the end of spring or early summer but the real cause of swarming is still not known in summer when plenty of food is available and hive is overcrowded by the bees, the queen leaves the hive on a fine forenoon with some drones and workers and established a new colony at some other places. Now in the hive a worker is given royal jelly and is converted into a new queen of colony. The empress of the colony never tolerates her successors as a natural law in the hive, so she orders to kill the other sister, if any, in the hive.

Supersedure: - When the egg lying capacity of old queen is lost or it suddenly dies, a new young and vigorous queen takes position of the old queen and is called a supersedure.

Absconding: - the migration of the complete colony from one place to another takes place due to some unfavorable conditions of life such as destruction of the comb by termites or wax moth and scarcity of nectar producing flowers around the hive. This phenomenon is quite different from swarming.

Nuptial or marriage flight: - the first swarm is led by the old queen but the second swarm is led by the 7 days virgin queen which is followed by drones and is called marriage flight. One of the drones starts copulating with the queen in the sky and fertilizes the queen and dies during the copulation. The queen receives spermatophores and stored in the spermatheca. Along with the queen died drone fall on the ground and reaches the hive.

Bee enemies: Enemies of bee harm the colony of bee in different ways., The wax moth, wasp, black ants and bee eater and king crow are common enemies of honey bee comb and honey. Man is the worst enemy of honey bee.

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