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B.Sc HONS Part III Paper - VI

TOPIC :- Write an essay on Api-Culture.

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**Q. Write an essay on Api-Culture.**

**Ans. Introduction :** The production of Honey from Honey-bee by rearing practices on commercial scale is called as Api-Culture.

The method of extraction of honey from the honey comb was very much crude but after the invention of artificial hive by Longstroth (1951) it became scientific and commercial. The bee keeping in United States, Canada, Australia and Newzealand has achieved outstanding success. In India people do not take interest in bee keeping from commercial point of view but only for their routine use.

**Systematic position—**

Phylum—Arthropoda

Class—Insecta

Order—Hymenoptera

Family—Apidae

**Social Organisation of honey bee :**

**Queen :** It is a well developed fertile female provided with immensely developed ovaries. Commonly one queen is found to be present in each hive and feeds on Royal Jelly. Egg laying is the sole function of the queen throughout her active life span. The queen is 15 to 20 mm in length and can be easily distinguished by her long tapering abdomen, short legs and wings. Structurally she is unable to produce waxer honey or gather pollen vector.



**Workers :** Although the workers are the smallest of the three rates by they function as the main spring of the complicated machinery like honey-bee colony. Like the queen they are also produced from the fertile eggs laid by the queen and live in a chamber called as, "WORKER CELL". It takes 21 days in the development from the egg to the adult and the total life span of worker is about 6 weeks. The workers are atrophid female and sacrifice themselves for the well-being of the colony.

**Drone :** The drone is the male number of the honey-bee colony which fertilises the queen so called as "KING OF THE COLONY". They take 24 days to develop from the egg to the adult stage. The sting and the wax glands are absent but in the males the reproductive organs are very well developed.

### **Method of bee-keeping : Indigenus Method—**

**(i) Wall of fixed hive :** It is purely natural type of comb because the bees themselves prepare the hive at any space on the walls or trees. There is an opening on one side through which bees come out of the hive.

**(ii) Movable hive :** It comprises of hollow wood logs, empty boxes and earthen pots etc. placed in varandas of houses. There exit two holes, one is for entrance and the other for exit of the bees. The swarmed bees usually come to the box on their own acord. Some bee keepers use to take the clusters of the swarms from a tree and keep them in the hive.

**3. Extraction of honey :** For the extraction of honey burning fire is brought near the bee hive at the night as a result to which bees are either killed or they escape off. Further the hive full of honey is being removed, cut into pieces and squeezed to get honey. Sometimes smoking is done so that the bees may escape from their hives.

**Modern method of apiculture :** To over come the drawbacks indigenus method an advanced method base on scientific facts has been developed. It has opened a new era for the cottage industry in India and has also given an opportunity for lakhs of unemployed persons to keep them busy in this business. Now-a-days a typical type of movable hive is constructed which is capable of expansion or construction according to the requirement of the place, season and climatic conditions.

### **Appliances for modern method—**

- (1) Typical movable hive
- (2) Queen exclunder
- (3) Honey extractor
- (4) Uncapping knife
- (5) Other equipments.

**1. Typical movable hive :** An artifical movable hive constructed by wooden box based on bee space theory. The size and number of frames are variable from hive to hive according to the need. A small space is enough to permit the entrance the exit or workers and drones but queen are placed in



hive never comes outside the hive. The perforation size on zinc sheet is only of cm but the thorax of the queen on cm. to cm. To the queen can never pass through this pore. This typical hive consists of 6 parts as given below :

**(i) Stand :** It is the basal part of hive on which the whole hive is constructed. The stands are adjusted to make slope for the hive. Due to this slope rain water comes down quickly.

**(ii) Bottom board :** It is situated above the stand and forms the proper for the hive having two gates in the front position. One gate functions as an entrance while the other as exit.

**(iii) Brood chamber :** The bottom board carries the brood chamber which is the most important part of the bee hive. It is large in size provided with 5 to 10 frames. In each frame wax sheet bring hexagonal frames is held up by a couple of wires in a vertical position. Along with the margin of very hexagonal mark, the bees start making wall and ultimately the cell. Here every sheet of the wax is known as COMB FOUNDATION which attracts the bees and provides the base for the comb preparation on both the sides. The frames are kept vertically in brood chamber which is covered over by other frames having a wire matching through which the workers can easily pass. The comb foundation helps in obtaining a regular string worker brood cell comb which can be used repeatedly. The Central Bee Research Station at Poona arranged the manufacture of a comb foundation mill which manufactures different cell size required in several region of the country. The brood chamber is covered by another chamber known as super.

**(iv) Super :** It is also without cover and the base. Super is provided with many frames containing comb foundation to provide additional space for the expansion of the hive.

**(v) Inner cover :** It is wooden piece used for the covering of the super. It has many holes for proper ventilation.

**(vi) Top cover :** It is meant for protection the colony from rains. It is fitted with zinc sheet which is plain and sloping.

**2. Queen excluder :** It consists of a wire gauze extrins guards and drone traps with individual wires placed 0.375 cm apart. It readily permits the workers to pass through it but keeps back the queen in the brood chamber.

**3. Honey extractor :** It is used for the extraction of the honey from the comb and functions on principle of centrifugal force. When combs are centrifuged by this device the pure honey is thrown out without any damage to the comb.

**4. Uncapping knife :** When all of the combs are filled with honey they are sealed by capping with the wax. So, before such capped combs are placed in the honey extractor, the wax sealing has to be removed with the help of an uncapping knife heated by steam before use.

**5. Other equipments :** Most of the useful equipments for the successful management of the bee are locally manufactured which are very cheap. As



they are made locally, they may not be exactly similar to those made at other places. Thus, Indian standard Institute has standardized some very common equipments for the production of uniform and interchangeable articles. Some materials like protective garments, gum cages, gloves, net veil, bee net, brush, etc. are required for easy and well planned handling of the bees.

**Chemical composition of honey :** The honey is a sugar rich compound having the following constituents :

1. Levulose	—	38.19%
2. Dextrose	—	21.28%
3. Maltose & other sugars	—	8.81%
4. Enzymes & Pigments	—	2.21%
5. Ash	—	1.0%
6. Water	—	17.20%

### **Economic importance of honey :**

**(i) Food value :** It is estimated that 200 gm of honey provides as much nourishment as 11.5 litre of milk or 1.6 kg cream or 30gm meat, 20 gm of honey provide as much as 67 k. cal of energy.

**(ii) Medicinal value :** Honey is mildly laxative, antiseptic and sedative, generally used in Ayurvedic and Unani system of medicine. It is quite helpful in building up of the hemoglobin of the blood and also used as preventive against cough, cold and fever as blood purifier and as a curative for ulcers on tongue and alimentary canal. Its regular use is recommended after several cases of heart attack, formal nutrition indigestion and diabetes.

**(iii) Other uses :** Other than food and medicine honey is used in numerous ways. It is used in the preparation of bread, cake and biscuits. It enhances their preserving quality. Much amount of honey goes in making alcoholic drinks. In poultry and fishing industries honey is widely used. In laboratory honey is used to stimulate the growth of plants, the bacterial culture, inoculation of seeds of clover, in insect diet and in the preparation of poison baits for fruit flies.

**Bees wax :** Chibnall (1934) has reported that all insect waxes are complex mixture of varying proportions of : (1) Even numbered alcohols ranging from  $C_{24}$  to  $C_{30}$  (2) Even numbered normal fatty acids from  $C_{24}$  to  $C_{34}$  and (3) Odd numbered normal paraffins ranging from  $C_{24}$  to  $C_{30}$ .

The various bees waxes differ only due to change in the proportions of these constituents. Large quantities of bees wax produced and exported come from *Apis dorsata* bees. Indian standard institution have fixed standards for pure bees wax in order to facilitate its export.

**Economic importance of bees-wax :** Bees-wax is used in the manufacture of cosmetics for Catholic churches, face cream, paints, ointments, insulators, plastic works, polishes, carbon paper and many other lubricants. It is also used in the laboratory for microtomy with the common wax for block preparation of tissues.