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DEPARTMENT OF ZOOLOGY

Certificate of Attendance

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of class B.Sc. Part III Roll No. 93 Examination Seat No. _____

has attended the Study Tour / Local Visit arranged to

Apiculture Centre Mahabaleshwar on 18/12/2019

Teacher In-Charge

Examiner

Head,
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VISIT TO BEE KEEPING CENTER, MAHABALESHWAR

Modern scientific method of rearing & keeping bees is called as "Apiculture". The use of honey was known to man since earlier times throughout the world. It is highly nutritive & has base for ayurvedic medicine. Bee keeping has being practiced in India long back. It was due to efforts of Khadi & Village Industries, that being keeping acquired its present co-ordinated national status in India. In 1962 'Central Bee Research Training Institute' is established at Pune.

Considering the importance of Apiculture, we visited 'Bee Keeping Center" situated at Mahabaleshwar on 18/12/2019. It is the first apiculture center in Maharashtra established by Mumbai Khadi Gramodyog Committee in 1946.

Types of Honey Bee: Honeybee belongs to class – Insecta. Order – Hyminoptera & family – Apidae. There are five well-recognized types of bees found in the World.

1. ***Apis dorsata*** - Rock bee
2. ***Apis florae*** - Little bee
3. ***Apis indica*** - Indian bee
4. ***Apis millifera*** - Europian bee
5. ***Apis adamosni*** - African bee

Out of these five types, three are common in India. They are ***Apis dorsata, Apis florae & Apis indica.***

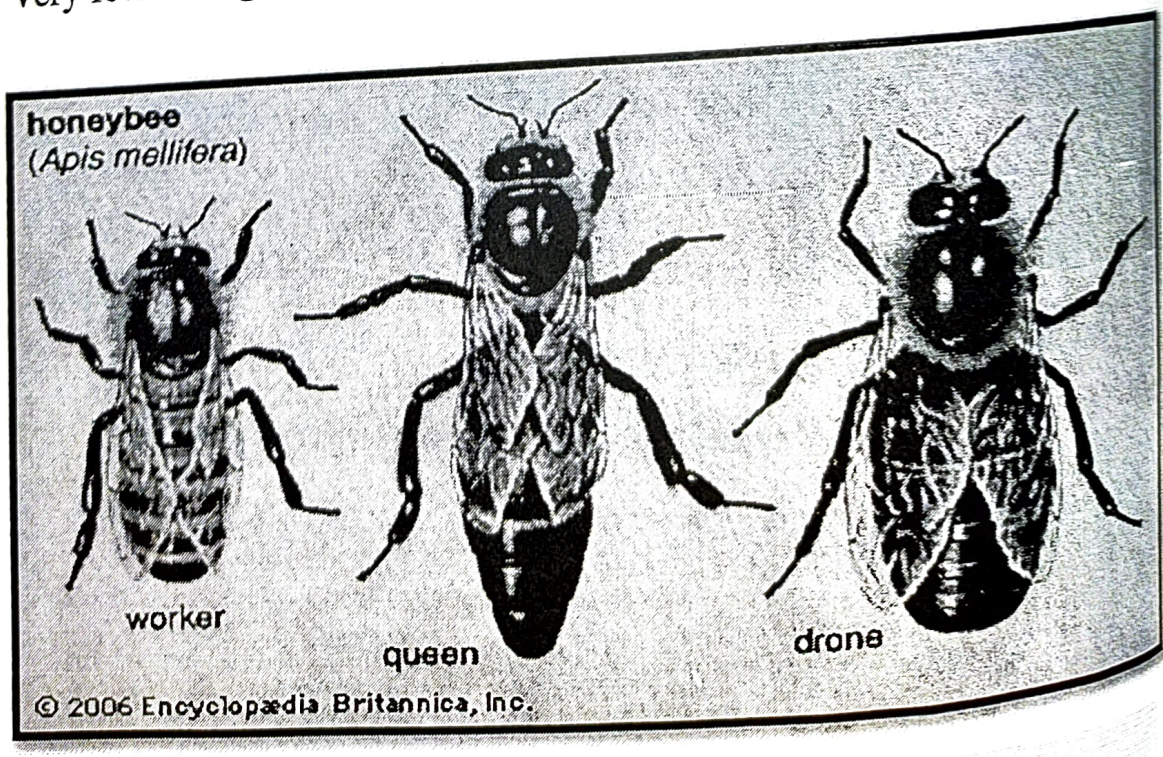
Type of Bee	Size of Bee	Sine of Comb	Yield
Apis dorsata (Rock bee)	20 mm Largest of all	0.90 x 15 m	15 kg/year
Apis florae- (Little bee)	Miniature of rock bee	15-24 cms	Few
Apis indica (Indian bee)	Large size	30 cms	3-5 kg/year

Casts of Honey Bee:

Castes

A colony of bees consists of three castes of bee:

1. **Queen Bee,** which is normally the only breeding female in the colony;
2. A large number of female **Worker Bees**, typically 30,000–50,000 in number;
3. A number of male **Drones**, ranging from thousands in a strong hive in spring to very few during dearth or cold season.



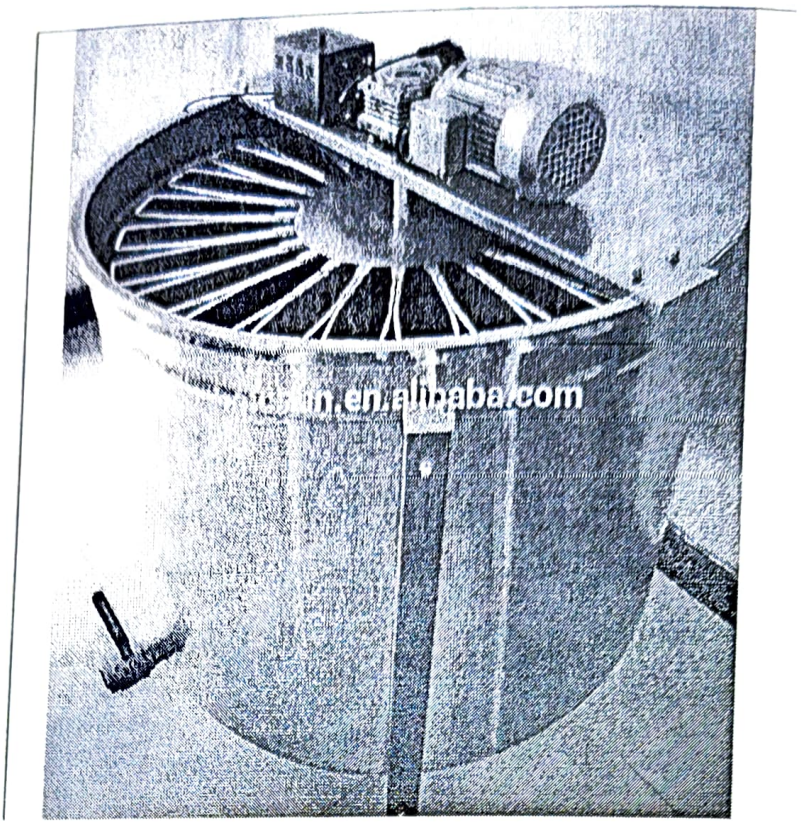
Queen bee

The queen is the only sexually mature female in the hive and all of the female worker bees and male drones are her offspring. The queen may live for up to three years or more and may be capable of laying half a million eggs or more in her lifetime. At the peak of the breeding season, late spring to summer, a good queen may be capable of laying 3,000 eggs in one day, more than her own body weight. This would be exceptional however; a prolific queen might peak at 2,000 eggs a day, but a more average queen might lay just 1,500 eggs per day. The queen is raised from a normal worker egg, but is fed a larger amount of royal jelly than a normal worker bee, resulting in a radically different growth and metamorphosis. The queen influences the colony by the production and dissemination of a variety of pheromones or "queen substances". One of these chemicals suppresses the development of ovaries in all the female worker bees in the hive and prevents them from laying eggs.

Mating of queens

The queen emerges from her cell after 15 days of development and she remains in the hive for 3–7 days before venturing out on a mating flight. Mating flight is otherwise known as 'nuptial flight'. Her first orientation flight may only last a few seconds, just enough to mark the position of the hive. Subsequent mating flights may last from 5 minutes to 30 minutes, and she may mate with a number of male drones on each flight. Over several matings, possibly a dozen or more, the queen receives and stores enough sperm from a succession of drones to fertilize hundreds of thousands of eggs. If she does not manage to leave the hive to mate—possibly due to bad weather or being trapped in part of the hive—she remains infertile and become a *drone layer*, incapable of producing female worker bees. Worker bees sometimes kill a non-performing queen and produce another. Without a properly performing queen, the hive is doomed.

Honey Extractor



At first laboratory casts are concluded for identification of composition & various sugar percentages. Then the honey is filtered. After this, the heat is given to it & then it is passed for second & third filtration. Again it is send to evaporating films where 50% water is evaporated. Then at the end water treatment is given to it. Thus after cooling pure honey is packed in small plastic jars for sale; the byproduct of process is wax.

Chemical composition of honey:

Glucose	- 35%	Sugar	- 5%
Water	- 20-25%	Fructose	- 35-40%
Acids	- 0.2%	Protein	- 0.25%
Minerals	- 0.5%	Amino acids	

1-tablespoon honey gives 100 calories.

MECHANISM OF FORMATION OF HONEY

In the hive the bees use their "honey stomachs" to ingest and regurgitate the nectar a number of times until it is partially digested. The bees work together as a group with the regurgitation and digestion until the product reaches a desired quality. It is then stored in honeycomb cells. After the final regurgitation, the honeycomb is left unsealed. However, the nectar is still high in both water content and natural yeasts which, unchecked, would cause the sugars in the nectar to ferment. The process continues as bees inside the hive fan their wings, creating a strong draft across the honeycomb which enhances evaporation of much of the water from the nectar. This reduction in water content raises the sugar concentration and prevents fermentation.

SOME FACTS ABOUT HONEY BEE AND HONEY

1. **Royal jelly** - Adult bees secrete this protein mix, and all young bees are fed a portion of it. But an exclusive diet of royal jelly can transform an ordinary bee into an egg-laying queen.
2. **Dull taste** - Bees are poorly equipped with taste genes, another likely result of the hive, since anything one bee eats has probably been proved safe by another.
3. **Stinger** - When deployed, it is left in the victim; the bee dies soon after, but the sac pumps poison for up to 20 minutes.
4. **Sharp smell** - The new genome studies have located the genes that give the bee its acute sense of smell. Smell is vital in an insect that uses pheromones both to communicate locations and to indicate rank
5. A honeybee has to travel over 55,000 miles and visits approx. 2 million flowers to make one pound of honey
6. A honeybee can fly approximately 15 miles per hour.
7. Honeybees are the only insect that produces food for humans.

8. Honey is the only food that includes all the substances necessary to sustain life, including water. A typical beehive makes more than 400 pounds of honey per year

10. Approximately 7-8 pounds of honey are consumed by bees to produce 1 pound of beeswax.

11. Honeybees are a great scientific mystery because they have remained unchanged for 20 million years even though the world has changed around them.

12. Honeybees will usually travel approximately 3 miles from their hive.

13. A single honeybee will only produce approximately 1/12 teaspoon of honey in her lifetime. A honeybee will flap its wings about 11,400 times per minute creating the "buzz" that you hear.

15. Honeybees are the only bees that die after they sting.

16. Honeybees are entirely herbivorous when they forage for nectar and pollen, but can cannibalize their own brood when stressed.

17. Honey speeds the healing process and combats infections.

18. Honey never spoils.

19. It would take about 1 ounce of honey to fuel a honeybee's flight around the world.

20. Honeybee colonies have unique odors that members flash like ID cards at the hive's front door, so the guard bees can recognize the entering bees.

21. Honeybees are responsible for approx 80% of all fruit, vegetable and seed crops in the world.

Economic Importance of Apiculture: Honeybees are the busiest creatures of the earth. These are the best pollinating agents leading to increase in crop yield therefore to increase the pollination, these is the main aim of Apiculture. Apart from pollination honey & bee wax are the two valuable chief products obtained from the bee keeping industry.

1) **Honey**: Honey is viscous, sugary fluid formed from the nector within the stomach of honeybees.

Food Value – Honey is the best & richest & highly nutritious food in the world. It is a very good source of minerals, enzymes & vitamins.

Medical Importance: Honey is a substrate used for number of ayurvedic medicines, from long times because it is free from any adverse effects. It promotes rapid growth of healthy tissues, therefore useful in skin & intestinal disorders. Honey is also consumed during treatments of cough, cold, fever, and gastro-intestinal disorders.

3. **Bee Wax**: It is an organic compound secreted by wax glands of worker bees. It is used in manufacturing of cosmetics, cold cream, shaving creams, polishes, candles, lipsticks, and lubricants & in modeling works.

4. **Agricultural Benefit**: Due to cross pollination, Apiculture practice is resulted in increasing crop production. The increased yield by cross-pollination can be shown with the help of following table;

Plant	Self Pollination	Bee Pollination	Increased Average
Mulberry	64.45	89.12	38.80%
Mausambi	58.00	79.00	36.05%
Grapes	68.2	92.4	35.05
Onion	77.95	216.90	178.03%
Brinjals	66.90	90.00	34.05%
Karla	0.390	4.736	42.00%

Apitoxin: It is also called as "Bee venom", which is used to control & cure Rheumatism, cardio-vascular diseases & various nervous disorders.

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Teacher- In-Charge

Head