

BABASAHEB BHIMRAO AMBEDKAR UNIVERSITY

Department of Zoology

**Lecture Outline /Summary Notes**

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**ZL (OE) - 02: ECONOMIC ZOOLOGY UNIT 1: APICULTURE**

**TOPIC- HISTORY**

**INTRODUCTION**

The beekeeping is the art and skill of maintaining the bees in modern movable frame hives for hobby or fascination, production of hive products (honey, beeswax, etc.) and for pollination services. Apiculture is synonym of beekeeping. It has been derived from Latin word *apis cultura*. *Apis* means "bee" and *cultura* denotes "cultivation through education." It is a high profit enterprise and can be taken up both as subsidiary industry as well as a whole time profession. Beekeeping has an edge over the other agro-based subsidiary enterprises as it involves low initial expenditure and does not need elaborate infrastructure. It also does not interfere with other agricultural activities and provides handsome income. A hive can be managed in one's backyard and the honey sold for income or livelihood. Apiculture plays a great role in agricultural diversification by producing various kinds of bee products and pollination of crop. The advent of honey had been correlated with the appearance of flowering plants on the earth about 90 million years ago.

**HISTORY OF BEEKEEPING -WORLD**

Archaeological evidences show that man started beekeeping that about 4,000 years ago, the Egyptians kept bees in clay pots and used not only for honey, but also for **propolis** and **wax**. In fact, the honeybee was the symbol of Lower Egypt. Many rock and cave paintings are available across the world depicting the honey bee in different shapes. In ancient Greece and Rome, apiculture was a common practice. The philosopher Aristotle in his book "*Historia Animalum*" talked about honeybees' floral fidelity, division of labour within the colony and winter feeding. He also described some brood disease. *Hippocrates*, the Father of Medicine, depicted the nutritional and pharmaceutical value of honey. Greek athletes used honey as an

energy burst. The Roman poet, *Virgil*, explained the proper way to install apiaries. The writer, Varro, who was called by the Romans "the most learned of all the Romans," discussed the business and profit opportunities derived from apiculture. The primitive man used to hunt the naturally existing honey bee colonies. Gradually, he learned to keep them in primitive type of bee hives made up of locally available material such as hollowed wooden logs, earthen pots, baskets, skeps, wicker hives and hollow parts of walls (Fig 1.1). Commercial beekeeping started during the second half of the 19th century. In 1851, L. L. Langstroth discovered the concept of 'bee space' (3/8 inch space is kept by the bees between two adjacent combs as their passage for free movement all around the combs). Based on this concept, modern age '*Langstroth bee hive*' with movable parallel frames/combs was developed (Fig. 1.2) **L.L. Langstroth is known as *Father of Modern Beekeeping***. There was an invention of comb foundation mill by Johannes Mehring (German), honey extractor by Franz von Hrushka (Austrian), Bee Smoker and Uncapping Knife by Moses Quinby (American), Bee Escape by E.C. Porter (American) and Continuous Comb Foundation Roller Mill by CB. Weed (American).



Fig. 1.1: Wooden log hive



Fig. 1.2: Primitive log hives

## **HISTORY OF BEEKEEPING-IN INDIA**

Bees and honey were known to human being in India since time immemorial as their references are mentioned in epics, on murals, sculptures, etc. Vaishali Stupas in Muzaffarpur (Bihar) were built in commemoration of offering of honey to Lord Buddha by king of monkeys and his people whenever Lord Buddha visited the place. Several references of bees have been made in the oldest scripture of India, the Rig Veda. In our country, first attempt to keep honey bees in movable frame hive was made in early 1880s in pre-partition Bengal and Punjab. Commercial beekeeping in India started in 1910 in South when *Rev. Newton* devised a movable frame hive suitable for Asiatic hive bee, *Apis cerana*. This hive was named after him as '*Newton Hive*'. This hive is still popular for keeping the indigenous hive bee, *Apis cerana*. During 1911-17, Newton also trained a large number of beekeepers in Southern India. The Royal Commission on Agriculture (1928) recommended development of beekeeping as a cottage industry in India. The All India Beekeepers' Association (AIBA) was established in 1938-39. This association started publishing the *Indian Bee Journal* (IBJ). During 1880, high yielding European bees, *Apis mellifera*, were introduced in our country. A sizable quantity of this species was imported from 1920 to 1951 in the states of Maharashtra, Kerala, Karnataka, Tamil Nadu, West Bengal, Punjab and Kashmir but none succeeded to establish this exotic honey bee species in the country.

## **STRENGTHENING OF BEEKEEPING RESEARCH AND DEVELOPMENT IN THE COUNTRY**

After independence, Khadi and Village Industries Commission (KVIC), Govt. of India took up beekeeping as one of its ventures. Some states like Jammu & Kashmir, Karnataka, Uttar Pradesh and Himachal Pradesh established Departments of Beekeeping under their Ministry of Agriculture/ Industries. KVIC established Central Bee Research and Training Institute (CBRTI) at Pune in 1962 for applied and basic research in apiculture.

The research in beekeeping started when Indian Council of Agricultural Research (ICAR), New Delhi started funding different projects. Two Beekeeping Research Stations were also established at Nagrota-Bagwan (erstwhile Punjab, now in H.P.) in 1945 and at Coimbatore (Tamil Nadu) in 1951.

## **SUCCESSFUL INTRODUCTION AND ESTABLISHMENT OF *APIS MELLIFERA* IN INDIA**

After a long gap of unsuccessful attempts of *Apis mellifera* introduction in our country, Professor A. S. Atwal, an Entomologist of the Punjab Agricultural University (PAU), Ludhiana, with his associates, introduced *Apis mellifera* in 1962 at Beekeeping Research Stations of Nagrota-Bagwan (H.P.) by adopting the '*Inter-specific Queen Introduction Technique*'. They imported disease free *Apis mellifera* gravid queens along with worker bees. Later the worker bees were burnt and *Apis mellifera* queens were introduced one each into the de-queened colonies of Asiatic hive bee (*Apis cerana*). After the adaptation of *Apis mellifera* queens, the workers of Asiatic hive bee (*Apis cerana*) reared the brood. It resulted in gradual replacement of workers of *Apis cerana* who died with the age. Thus, *Apis mellifera* stocks were further strengthened by importing disease free consignments of the gravid queen bees.

The Indian Council of Agricultural Research (ICAR) sanctioned 'Operational Research Project' on the Establishment of Italian Honey Bee in the Punjab in 1976. By 1980, *Apis mellifera* became very popular among the farmers. An 'All India Coordinated Project (AICP) on Honey Bee Research and Training' was launched by ICAR in 1980 with its headquarters (HQ) at CBRTI, Pune. Its headquarters is now shifted to Haryana Agricultural University, Hisar (Haryana). The earlier All India Coordinated Research Project has been renamed as 'All India Coordinated Research Project (AICRP) on Honey Bees and Pollinators'.

This Project has 16 centers spread all over the country. State Departments of Agriculture and Horticulture and National Horticulture Board (NHB), Govt. of India are also engaged in the development of beekeeping.

National Horticultural Mission (NHM) launched by Department of Agriculture, Ministry of Agriculture, Govt. of India during 10th Five Year Plan has laid emphasis on crop pollination by honey bees. Convinced with the performance of *Apis mellifera* in the Punjab, H.P. and Haryana and due to the outbreak of *Thai Sacbrood Viral Disease* causing large scale mortality of ***Apis cerana*** colonies during late 1970s to early 1980s in the states, practicing *Apis cerana* beekeepers of many other states expressed desire to adopt ***Apis mellifera***. Due to this, ICAR in

1986 decided to extend this species from Punjab to other states. Now, this exotic honey bee (*Apis mellifera*) has been spread to almost whole of the country.

During 1993, Department of Agriculture and Cooperation (DAC), Ministry of Agriculture, Govt. of India laid special emphasis on beekeeping and started a National Scheme on the '*Development of Beekeeping for Increasing Crop Productivity*'. Under this Scheme, beekeeping research, training and development projects were sanctioned to various State Agriculture Universities (SAUs), State Agriculture Departments, Government and Non-Government organizations (NGOs). Govt. of India established *National Bee Board* in 2006.

### **PRESENT SCENARIO OF BEEKEEPING IN INDIA**

Presently, there are four traditional honey bee species in the world viz. two wild species, *Apis dorsata* Fabricius and *Apis florea* Fabricius and two hive bee species *Apis cerana* Fabricius and *Apis mellifera* Lin. in our country. Until mid 1970's, the beekeeping was being practiced only with *Apis cerana* in the country which remained confined only to north-eastern region, north hill region and Southern Peninsula. Presently, it is estimated that there are about 14 lakh hive bee colonies (6.73 lakh of *Apis mellifera* and 7.30 lakh of *Apis cerana* ) in the country.

Keeping in view the area, topography and population of India, the current beekeeping situation in the country is not very encouraging. On the basis of available FAO statistics on honey production, **India is at No. 5 in the world**. China is producing about 40% of the total world honey production and is at the top in honey production in the world followed by the USA, Argentina and Turkey. Within India, Punjab is leading in honey production. At present, Punjab with only 1.5 per cent of India's geographic area is contributing more than 25 per cent of the National Apiary Honey. Ludhiana has emerged as the hub of beekeeping in the country. The Punjab has not only witnessed *Amber (Sweet) Revolution* but also brought India on the map of honey exporting countries of the world. A big chunk of *melliferous* honey from Punjab is being exported to USA and Germany, The climatic suitability and availability of abundant floral avenues are the major reasons behind the higher productivity of honey in the state. The technologies for mass production of queen bees, bee breeding, production of more valuable bee products other than honey, such as royal jelly, bee venom, propolis, pollen and bees wax

etc. are available. The adoption of such technologies would generate specialized human resources and bring about diversification of apiculture in the country. These bee products are in great demand in the western countries and can fetch handsome foreign exchange.

### IMPORTANCE AND SCOPE OF BEEKEEPING

Beekeeping is an ideal subsidiary or whole time occupation. It fits well in diversification of agriculture. Besides adding to the farm income through production of honey, beekeeping also leads to the generation of other sources of income and employment opportunities including the development of several allied industries.

We may visualize the different industries having alliance with honey production through Fig.1.3.



Fig. 1.3: Beekeeping - a multi pronged employment generating enterprise

Out of all the species reported so far, four are of major economic importance of which two viz. *Apis mellifera* and *Apis cerana* are hive (domesticated) species. *Apis mellifera* is recommended for commercial beekeeping in the areas having higher beekeeping potential. According to an estimate, the country requires nearly 737 lakh bee colonies for pollination of only 12 important crops. So there is a great potential and scope of beekeeping in the country. Rock bee, *Apis dorsata* and little bee, *Apis florea* are also hunted for honey in the country by tribal honey

hunters. Still honey from wild honey bee species forms a major chunk of total honey production in the country. Rock bee honey is squeezed from its combs particularly in southern peninsular states and little bee honey is conserved and exploited particularly in Gujarat. Further, stingless honey bee (*Trigona iridepennis*) is also used for its exquisite and rare honey in Kerala and Tamil Nadu states.

### **Suitability of Beekeeping as an Agro-based Enterprise**

To reinforce, the following points highlight the suitability of beekeeping on an Agro-Based enterprise:

- i) Beekeeping does not need any special land or elaborate structure.
- ii) It does not compete with other agricultural enterprises for the resources.
- iii) It does not require heavy initial investment also the recurring expenditure is negligible.
- iv) It does not require continuous labour and heavy physical work. Thus, it is very ideal as a part-time occupation, especially for women and children.
- v) Beekeeping requires simple equipments which can be fabricated in rural areas. Thus, beekeeping generates new employment opportunities.
- vi) Honey itself is a very hygienic food, tonic and medicine and makes the diet more balanced.
- vii) Beekeeping is a multiple source of income. Beeswax is the second product which has great commercial and industrial value. Sale of queen bees and nucleus colonies by division of parent colonies are other sources of income. Production of other special bee-products like royal jelly, bee venom, pollen and propolis can further add in the income.
- viii) Above all, pollination by bees improves the quantity and quality of the crop produce and benefits the community as a whole rather than only the individual beekeepers. Thus, a beekeeper can further increase his income by renting out his bee colonies for pollination service.

### **Who can Adopt Beekeeping?**

Beekeeping is suitable for well- to- do farmers, as well as, landless labourers, small and marginal farmers, employed persons, ex-servicemen and retired persons, house wives/farm

women, students and unemployed youth. Thus, beekeeping enterprise is suitable for people from all walks of life as a hobby, subsidiary occupation for supplementing income or as a whole time job for self employment. It is particularly suitable for under employed/unemployed youth residing in 'rural areas. After investing once on honey bee, hives and other equipment, (nonrecurring expenditure), further (recurring) expenditure is very negligible. One can easily maintain about 100 honey bee colonies and can earn income between Rs. 50,000 to Rs. 2,00,000 per annum.

## KEY WORDS

**Beehive-** It is an enclosed structure in which a bee species of the genus , *Apis* live and raise their young offspring.

**Beekeeping-** (or apiculture) is the maintenance of honey bee colonies, commonly in hives, by human being for some product or service.

**Exotic Bee-**Bee species introduced or domesticated in areas other than their place of origin.

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