Article: RT0353

Biotica Research Today

Vol 2:10 1036-1039
2020

Apiculture: History and Scope

Praduman Bhatnagar[1*], Mehar Chand[1], Prem Lata[1], Fateh Singh[1] and Sagar Rawal[2]

[1]Krishi Vigyan Kerndra, Kurukshetra, Chaudhary Charan Singh Haryana Agricultural University (CCSHAU), Haryana (136 118), India

[2]Dept of Agricultural Economics, College of Agriculture, Chaudhary Charan Singh Haryana Agricultural University (CCSHAU), Hisar, Haryana (125 004), India

Open Access

Corresponding Author

Praduman Bhatnagar

e-mail: sckvkkurukshetra2@gmail.com

Keywords

Apiculture, Bee colonies, Hive products, Pollination

Article History

Received in 28th October 2020

Received in revised form 20th October 2020

Accepted in final form 22th October 2020

E-mail: *bioticapublications@gmail.com*

How to cite this article?

Bhatnagar *et al.*, 2020. Apiculture: History and Scope. Biotica Research Today 2(10): 1036-1039.

Abstract

Man has been aware of honey bees since ages as reflected from depictions and inscriptions made around 10,000 years ago. North America and Egypt were the early starters in Bee-keeping. Discovery on the phenomenon of division of labor, life cycle and rearing techniques in different countries led to the successful domestication. Honey bees gain importance by pollination of flowering plants and it has been estimated that global value of pollination is around 153 billion dollars annually. Considering the economics, an income to the tune of Rs. 3,500.00 - 7,000.00 per hive can be achieved annually. At present India has got 2.0 million bee colonies but has the potential to keep around 120 million bee colonies that can provide employment to 12 million families.

Introduction

Accordingly to Zoologist, honey bees appeared on earth lakhs of years before human beings and since time immemorial, man was aware of honey bees. Man was acquainted of this sweet and tasty food since olden times which was produced by small insects. Man used to collect honey from the combs for feeding but he was unaware about rearing of honey bees. Gradual gain in knowledge and skill of honey bee rearing has made India the 3rd largest producer of honey in the world. The multifaceted benefits of apiculture including higher productivity of crops and production of hive products may be regarded as a booster in the doubling of farmer's income. The high potential of apiculture which is yet to be exploited, provide ample scope for adoption of honey bee rearing at a commercial scale.

History

Depictions of humans collecting honey from wild bees date back to 10,000 years ago. Inscriptions detailing the production of honey are found on the tomb of Pabasa from the 26th Dynasty (c. 650 BCE), depicting pouring honey in jars and cylindrical hives. Sealed pots of honey were found in grave goods of pharaohs such as **Tutankhamun**. Paintings found in the caves near Valencia, Spain, which date back to 7000 BCE provides ample proof that man used to collect honey from trees, rocks and caves. Probably honey bee rearing was first started in Egypt. The people used to keep bees in earthen containers and transport them in boat to the places of rich flora through Nile River. This can be regarded as first attempt to rear honey bees. However, it has also been reported that bee keeping in pottery vessels began about 9000 years ago in North America. Domestication of bees has been shown in Egyptian art from around 4500 years ago. Simple hives and smoke were used and honey was shred in jars. Later, bee box made up of earth and crop remainants in the shape of basket were used to protect bees from rainfall and other harmful effects of adverse climate. Traces of bees wax were found in pot shreds throughout the Middle East beginning about

7000 BC.

The credit of giving artificial food to honey bees in food scarce conditions goes to the inhabitants of Rome while smoke had been used to remove honey bees at the time of honey extraction in Egypt. However, man had been unaware about how honey bees collect nectar and convert into honey, how they form the comb and what has been their social organization. The important aspect of pollination was also unknown.

Lorenzo Lorraine Langstroth, also known as father of American apiculture, in 1851, discovered that honey bees maintain a constant distance of 8 mm between hives. On this very basis, he invented bee box for the first time. Scientists from Spain, Torris, revealed that a single queen is the mother of a colony and its main duty is to lay eggs. Charles Butter from England identified drones in colony. Further, researches in America and Europe showed that workers are imperfect females but good pollinators and produce wax from their body. In 1859, Mchring from German, came out with a method of frame application such that the combs do not get damaged in honey extractor. Colin from France discovered Queen Excluder so that queen may be prevented for going into honey area. Entomologist, A.C. Rass (1925-30) discovered division of labour within the colony.

In India also, honey bee have been reared from a longtime. The Sanskrit world "Madhu" has been used in 'Vedas' and 'Upanishads' written about 4000 BC. Rocks Painting of Mesolithic era found in Madhya Pradesh, depict honey collection activities. Mention of bees are found in Ramayana and Quran also. Hand Book of Bee-keeping was the first book published in 1884 in India by a Britisher, Douglas. The first successful attempt was made by Newton in Kerala, when he designed hive and started training people during 1911-17. Bee-keeping activities were simultaneously taken up in Travancore in 1917, in Mysore, in 1925, in Madras regions in 1931, Punjab in 1933 and Uttar Pradesh in 1938.Scientific methods of bee keeping started only in later 19th century although records of training honey bees and using in warfare are seen in early 19th century. When British attacked the eastern coast of present day Odisha state in 1842-49, the Kondha tribe is noted to have used tamed bees against them. The progress in bee-keeping started when All India Bee Keepers Association was formed during 1938-39 and the first bee keeping research station was established Punjab in 1945 by ICAR. Bee-keeping was first included in the curriculum by the Agriculture College, Coimbatore (TNAU) in 1931. After independence, All India Khadi Village Industries Board (AKVIB) was set up in 1954 which was converted into Khadi Village Industries Commission (KVIC) in 1956. In 1962, Central Bee Research Training Institute was established in Pune (Rahman, 2017).

Subsequently, an All India Coordinated Research Project (AICRP) on honey bee research and training was launched by ICAR involving SAU's. In India, R. N. Mattro was the Pioneer worker in starting bee-keeping with Indian bees in 1930's whereas Dr. A. S. Atwal started Bee-keeping with European honey bee in Punjab in 1960's and late on in Himachal Pradesh. Within next decade, *Apis mellifera* spread to entire North India.

Importance of Bee Keeping

1. Boost to Agriculture production

• Honey bees are positively affecting 48.5% of the cropped area in India.
• The oil seed crops particularly mustard group got benefitted from bee pollination and their yield increases by 200-250 percent with increase in oil contents from 10%-20%.
• Other crops like pigeon pea, cucurbits, radish, carrot, guava, citrus, pear etc. also yield higher when pollinated by honey bees (Smart, 2016).

2. As a Vocation

• Apiculture provide a good source of livelihood to the poor, land less, unemployed youth, marginal farmers and farm women.
• Educated youth and traders can earn foreign exchange through this vocation.
• Hive products such as honey, wax, propolis, royal jelly and bee venom are very useful and can be commercially exploited.

3. Monetary Benefits

• It is a commercially viable activity which can give regular returns.
• State Government and Banks provide loan facilities.
• By increasing the productivity of crops, the financial condition of bee-keepers, farmers and country as a whole will improve.

4. Environmental Friendly

• All the products are useable and nothing has any adverse effect on the environment.
• Areas close to bee-keeping forces to use soft insecticides need based for reducing pesticide pollution.
• It is an important step towards 'conserve environment'.

Economics of Apiculture

1. Non-recurring Expenditure

Particulars	QTY (No./ kg)	Rate (Rs.)	Amount (Rs.)
Bee hives (with super chamber & queen excluder) of Kail wood	50	2700/ hive	1,35,000
Nucleus honey bee colonies(on eight bee frames each)	50	2000/ colony	1,00,000
Honey extractor (4 frames), drip tray and uncapping knife	One set	4700/ set	4,700
Smoker, bee veil, bee gloves, hives tool, etc.	One set	750/ set	750
Honey buckets	40	120/ pc	4,800
Total			2,44,970

2. Recurring Expenditure

Particulars	QTY.(No./ kg)	Rate(Rs.)	Amount (Rs.)
Comb foundations	800	25/CF	20,000
Sugar for dearth period feeding 95 kg/colony)	250kg	40/kg	10,000
Sulfur(50 g/colony)	2.5 kg	80/ kg	200
Stickers(25/colony)	1250	2.5/ pc	3,125
Formic acid(140 ml/ colony)	7 liters	320/ 1	2,240
Transport for migration	3 trips	5000/ trip	15,000
Miscellaneous(winter packing etc.)	50 colonies	20 / colony	1,000
Total			51,565

3. Recurring Expenditure

Particulars	Amount (Rs.)
Interest on non-recurring cost @ 12.75 %	31,269
Recurring cost	51,565
Interest on recurring cost (except labour)for 6 months @ 12.75%	3,287
Depreciation on permanent articles @ 10% (except on bee colonies)	14,525
Total	1,00,646

4. Income

Particulars	Yield	Total Quantity Produced	Rate (Rs./ unit.)	Amount (Rs.)
Honey Production	40 kg/ colony	2000 kg	100/ kg (bulk sale)	2,00,000
Sale of extra colonies	25 %	10 colonies	2,000/ colony	20,000
Beeswax	honey produced	40 kg	250 / kg	10,000
Total				2,30,000
Net Profit				1,78,435

Potential of Bee-Keeping

At present there are about 2.0 million bee colonies in India; with an estimated annual production of about 80,000 metric tonnes of honey including honey from used bees of honey and about 30,000 metric tonnes honey is exported to more than 42 countries valued to Rs. 1000 crores.

India has a potential to keep about 120 m bee colonies that can provide self employment to over 12 m rural and tribal families. These bee colonies can produce over 1.2 million tones of honey and about 15,000 tons of beeswax (Haryana Kisan Ayog, 2017). The marketing for crop specific honey and value added honey still need to be explored and it has been estimated that an apiary of 100 units can earn net profit of Rs. 7.0 lakh/annum under diversification plan.

Regarding bio-diversity, there are 45,000 species of plants and shrubs in India which comprise of 7% of world's flora. So, far only 10% of existing Potential has been utilized indicating a vast potential for exploitation. Out of total cropped area of 16.0 million ha, 5.5 m ha is under crops requiring cross pollination by insects. Therefore, more than 150 million bee colonies are required for pollination purpose in India.

It has been estimated that in Haryana, it is possible to collect,

- 300 g Propolis/ bee colony/ year and at present we may collect about 67.5 tones/ year. However, there remains a potential for collection of about 108 tones.
- 823 g of royal jelly/ bee colony/ year. We may collect about 10.28 tones of royal jelly and there is potential of collection of about16.46 tones/ year.
- 50 mg of bee venom/ colony/ year. We may collect about 11.25 kg and there is a potential of collection of about 18 kg bee venom in Haryana/ year.
- 250 tones of Pollen and there is potential of collection of about 4000 tones/ year.
- 800 g of bees wax/ colony/ year. We may collect about 180 tones of bees wax and Haryana has potential to collect 88 tones of bees wax per year.
- At present Haryana has got 2.5 lakh bee colonies producing more than 3000 metric tonnes of honey, annually. As Haryana can sustain 4.0 Lakh bee colonies, the honey production is expected to rise to 15000 metric annually. At present bee keeping has provided employment to 3 lakh people annually. It has potential to provide employment to 4000 unemployment youth and additional job of 100 man days for 10,000 persons in a year (Haryana Kisan Ayog, 2017).

Conclusion

The history of humans collecting honey from wild bees date back to 10,000 years, when man used to collects honey from combs for feeding but was unaware of rearing of honey bees. With the advancement in civilization,rearing of bees by providing artificial food, using smoke while honey extraction was known to man. A revolution was witnessed in India, in 20th century, when bee keeping was taken up by various states during 1911-1938 and later by ICAR. Besides, giving a boost to agricultural production, bee keeping

provides ample opportunities for employment generation being economically viable agro based vocation.

References

Haryana kisan ayog, 2017. Working Group Report on "Promotion of honeybee keeping in Haryana". Panchkula. pp.87.

Rahman, A., 2017. Apiculture in India, 270.

Stuart, F.S., 2010. Bee Keeping practice, 232.