

International Journal of Statistics and Applied Mathematics

ISSN: 2456-1452
Maths 2023; SP-8(6): 1403-1405
© 2023 Stats & Maths
<https://www.mathsjournal.com>
Received: 01-08-2023
Accepted: 05-09-2023

Ishita Mishra

Ph.D., Scholar, G B Pant
University of Agriculture and
Technology, Pant Nagar, Udham
Singh Nagar, Uttarakhand,
India

Kiran Rana

Assistant Professor, G B Pant
University of Agriculture and
Technology, Pant Nagar, Udham
Singh Nagar, Uttarakhand,
India

Mohit Singh

Ph.D., Scholar, Sardar Vallabh
Bhai Patel University of
Agriculture and Technology,
Modipuram, Meerut,
Uttar Pradesh, India

Corresponding Author:

Ishita Mishra

Ph.D., Scholar, G B Pant
University of Agriculture and
Technology, Pant Nagar, Udham
Singh Nagar, Uttarakhand,
India

Exploring the uptake of modern beekeeping techniques in the beekeeping community of Kumaon hills in Uttarakhand

Ishita Mishra, Kiran Rana and Mohit Singh

Abstract

India holds the top position globally in terms of the number of beehive stocks, yet it ranks eighth in honey production. This disparity could be attributed to farmers lacking awareness of modern beekeeping management and production technologies. The study focused on Nainital district in Uttarakhand, specifically choosing Bhimtal block due to its highest honey production and Nainital's prominence in beekeeping. Within Bhimtal, the top four honey-producing villages—Jeoli, Gaga, Bhaluti, and Chopra—were purposively selected. Seventy-six respondents, each with a minimum of five years of experience and at least ten beehive boxes, were chosen through a census method. The study revealed that a majority of farmers (68.42%) exhibited a moderate level of adoption of recommended beekeeping practices. The involvement of extension personnel and agricultural scientists played a crucial role in enhancing honey production, achieved through regular visits, training, and guidance provided to the farmers.

Keywords: Uptake, modern beekeeping techniques, beekeeping community

Introduction

India boasts abundant natural resources and a favorable environment for cultivating various agricultural crops. Despite these advantages, the Indian agrarian system faces significant limitations. Key challenges include small land holdings, disorganized institutional credit, unpredictable market fluctuations, and a weak extension system. The agricultural sector in India is susceptible to natural uncertainties like floods, droughts, hailstorms, etc. Agriculture and allied activities play a crucial role in providing livelihoods, particularly in rural areas.

To harness India's natural resources effectively, there is a pressing need to transition from traditional farming methods to modern ones. To augment farmers' income, it is essential to introduce diverse agricultural practices alongside traditional methods. A notable enterprise gaining popularity in the current context is "apiculture," commonly known as beekeeping. Beekeeping involves the maintenance of honey bee colonies, typically in hives, by humans.

In Uttarakhand, rural communities have inherited and continue to practice traditional beekeeping with *Apis cerana*, a tradition passed down through generations. Despite the state's richness in bee forage plants, only a fraction of its 2,50,000 beekeeping units are in Uttarakhand, contributing approximately 8,700 units and 2500 MT of honey production in 2016-17. The potential of the abundant bee forage plants in Uttarakhand remains underutilized. A noteworthy observation is that about 20.00 per cent of beekeepers in Uttarakhand do not use any medication for pest and disease management, indicating a lack of awareness about advanced beekeeping methods. This underscores the immediate necessity for farmers in Uttarakhand to acquaint themselves with various modern bee rearing practices.

Material and Methods

The research was carried out in the Nainital district within the Kumaon Hills of Uttarakhand. Bhimtal block was intentionally chosen for the study due to its high concentration of beekeepers, as reported by the State Beekeeping Research Centre in Jeolikote. Four villages, recognized for their significant honey production in the district, were deliberately selected. The respondents were chosen based on a census method, utilizing the list of beekeepers provided

by the State Beekeeping Research Centre in Jeolikote. A comprehensive list of registered beekeepers from the selected districts was obtained, and individuals were selected through a census method from each village. The total sample comprised 76 beekeepers from the four villages, with 40 respondents from Jeoli village, 17 from Chopra, 14 from Bhaluti, and 5 from Gaga village. A household survey was conducted, and data was collected using a semi-structured schedule through face-to-face interviews with the 76 selected beekeepers for the study. The inquiry produced results that formed the basis for drawing conclusions.

Results and Discussions

There is a vast potential for beekeeping in the country as well as in the state of Uttarakhand. However, due to lack of knowledge, modern beekeeping practices are not being followed by the Beekeepers. A Beekeeper should always use recommended methods to control swarming, division of colonies, uniting of colonies, mass queen rearing, etc. With the advent of modern recommended beekeeping practices, a great emphasis is being paid by both scientists and extension workers to enhance honey production. Various experiments and researchers have been conducted for gaining high honey production. The resourceful use of recommended technologies to their preference will enable the potential uses i.e the Beekeepers to enhance the honey production, which in turn can improve their economic status. This seems possible only when the beekeepers will adopt the recommended improved cultivation practices according to their preferences. Table (1.00) shows the different recommended beekeeping practices as recommended by national bee board along with the percentage and number of the respondents who had adopted, partially adopted and not adopted these practices. The results reflected that the two most commonly reared recommended bee species are indica and mellifera. The practices adopted by the highest number of respondents according to weighted mean score includes Hive Inspection twice a week (100.00%), Keeping the bee colonies in thick

shade during Summers (100.00%), Provision of fresh water in/near the apiary (100.00%), Check the robbing within the apiary (100.00%) and feed given to all colonies in the apiary at one time (100.00%).The reason for 100.00 per cent adoption of the above mentioned practices is that these practices are the most common ones and are being followed by the old aged ancestors. The least adopted recommended practices includes placing of thin small stick pieces between two adjacent chambers for the passage of fresh air (0.00%), prevention of swarming during spring season (0.00%), Placing thin small stick pieces between two adjacent chambers for the passage of fresh air, reducing the number of frames by 1 and allow 9 in the chamber and rearing of bee in hives as per the specification of BIS/ ISI made up of locally available light seasoned woods (0.00%). The lower adoption of recommended beekeeping practices can be attributed to a combination of factors that collectively contribute to a resistance or hesitancy among beekeepers. One significant factor is the lack of awareness and education about modern beekeeping techniques. Beekeepers may not have access to comprehensive training programs or information about the advantages of adopting updated practices. Additionally, the prevalence of traditional beekeeping methods handed down through generations plays a pivotal role. Beekeepers, rooted in customary practices, might resist transitioning to newer, potentially more efficient approaches. Financial constraints also pose a hurdle, as the initial investment required for new equipment and technologies can be a barrier, especially when the long-term benefits are not clearly understood. Limited access to resources, including quality equipment and medications for pest management, further impedes the implementation of recommended practices. Market uncertainties and concerns about the demand for bee products may also contribute to apprehension among beekeepers. Overcoming these barriers necessitates targeted education, improved resource accessibility, and a concerted effort to demonstrate the practical and economic benefits of embracing modern beekeeping practices.

Table 1: Adoption of Recommended Beekeeping practices

S. No	Practices	Extent of adoption of recommended beekeeping practices						Weighted mean score
		Adopted		Partially Adopted		Not Adopted		
		f	%	f	%	f	%	
General Apiary Management Practices								
1	Hive Inspection twice a week	76.00	100	0.00	0.00	0.00	0.00	2.00
2	Supering (Addition of frames in super chamber)	4.00	5.20	72.00	94.8	0.00	0.00	1.05
3	Hives as per the specification of BIS/ ISI	0.00	0.00	0.00	0.00	76.00	100	0.00
4	Provision of Expanding brood net	23.00	30.26	38.00	50.00	15.00	19.74	1.10
Seasonal Management								
5	Placing thin small stick pieces between two adjacent chambers for the passage of fresh air.	0.00	0.00	0.00	0.00	76.00	100.00	0.00
6	Keep the colonies in thick shade during Summers.	76.00	100.00	0.00	0.00	0.00	0.00	2.00
7	Keep the surroundings of the colony clean by cutting the unwanted vegetation which may hamper free circulation of the air	68.00	89.48	8.00	10.52	0.00	0.00	1.89
8	During Spring Manage the colonies in such a way to prevent swarming.	0.00	0.00	29.00	38.15	47.00	61.85	0.38
9	Provide fresh water in/near the apiary	76.00	100.00	0.00	0.00	0.00	0.00	2.00
10	Extract autumn honey before the winter sets in	63.00	82.90	13.00	17.10	0.00	0.00	1.82
11	Check the robbing within the apiary	76.00	100.00	0.00	0.00	0.00	0.00	2.00
12	Shifting of beehives seasonally	59.00	77.64	17.00	22.36	0.00	0.00	1.77
13	Placing thin small stick pieces between two adjacent chambers for the passage of fresh air, reducing the number of frames by 1 and allow 9 in the chamber.	0.00	0.00	0.00	0.00	76.00	100.00	0.00
Feed provision practices								
14	Feeding given to all colonies in the apiary at one time	76.00	100.00	0.00	0.00	0.00	0.00	2.00
15	Feeding of the colonies after sunset	67.00	88.15	9.00	11.85	0.00	0.00	1.88
16	Provision of pollen substitute flour (3 parts) + Brewer’s yeast (1 part) + skimmed	5.00	6.58	24.00	31.57	47.00	61.84	0.44

	milk powder (1 part) + sugar (22 parts) +honey (50 parts)							
17	Sugar syrup kept in shallow vessels with straw to facilitate easy feeding	61.00	80.26	15.00	19.74	0.00	0.00	1.80
18	Sugar syrup kept in such a way that the bees should not drown in it.	62.00	81.58	14.00	18.42	0.00	0.00	1.81
19	Feeding the colonies in the evening preferably after sunset	58.00	76.32	18.00	23.68	0.00	0.00	1.76
Disease and pest management practices								
20	Select good site to locate the apiary preferably in an open, dry place with shade.	76.00	100.00	0.00	0.00	0.00	0.00	2.00
21	Create broodlessness in colony for at least 15 days by enclosing the queen in a queen cage.	0.00	0.00	0.00	0.00	76.00	100.00	0.00
22	Adopt general colony hygiene in the apiary like cleanliness in the beehives including cleaning the bottom board frequently	63.00	82.90	13.00	17.10	0.00	0.00	1.82

Extent of adoption of Recommended Beekeeping Practices: According to Table 2 more than the half of the Beekeepers (68.42%) had medium extent of adoption of recommended beekeeping practices while 14.47 percent and 17.11 percent of the beekeepers had low and high extent of adoption of recommended beekeeping practices respectively. Three categories of low, medium and high were made on the basis of Mean (30.47) and Standard deviation (2.65). The values of Mean+ SD and Mean-SD are 33.12 and 27.83 respectively. As per data in Table 2, maximum number of respondents had medium extent of adoption. The findings of the study are in line with the outcome reported by Mahapatra (2014) [5].

Table 2: Extent of Adoption of Recommended Beekeeping Practices

S. No	Categories	Frequency	Percentage
1	Low (less than 27.83)	11	14.47
2	Medium (between 27.83 to 33.12)	52	68.42
3	High (more than 33.12)	13	17.11
	Total	76	100

Conclusion

The advent of frame hives marked a transformative milestone in bee management, facilitating the strategic relocation of hives to optimal locations and ushering in a substantial increase in honey production to meet the demands of commercial markets. To optimize these advancements, beekeepers are strongly encouraged to consistently employ prescribed methods for essential aspects of beekeeping, including swarm control, colony division, uniting colonies, and large-scale queen rearing. The emphasis on adopting modern and recommended beekeeping practices has become a central focus for both scientists and extension workers alike. Their collective aim is to enhance honey production by introducing progressive methodologies and technologies to beekeepers. In the context of the Kumaon Hills of Uttarakhand, where the study was conducted, it is evident that a noteworthy proportion of beekeepers has embraced these recommended practices to a moderate extent. The findings underscore the ongoing efforts to bridge the gap between traditional and modern beekeeping methods, emphasizing the need for continued education, outreach, and support to further elevate the adoption of advanced beekeeping practices in the region. As beekeepers navigate this transition, the potential for sustainable and increased honey production stands as a promising outcome of aligning with contemporary beekeeping techniques.

Conflict of Interest

The authors have no conflicts of interest.

References

1. Mallik A. Effectiveness of Participatory Newsletter on Honey Production: A Study in Nainital District of Uttarakhand. Thesis, Doctor of Philosophy, G. B. Pant

- University of Agriculture and Technology, Pant Nagar, Uttarakhand, India; c2019.
2. Arya S, Kumar A, Kumar K, Kumar D. Major constraints faced by the beekeepers in production and marketing of honey in the Nainital district of Uttarakhand. *Journal of Pharmaceutical Innovation*. 2021;10(8):276-279.
3. Kumar Y, Nain MS, Peshin R, Yungchan J. Constraints perceived by the beekeepers of Jammu province, adoption of scientific beekeeping practices. *Indian Journal of Ecology and Environmental Sciences (ISEE)*. 2020;56(4):49-53.
4. Sharma K, Singh G, Dhaliwal N. Performance of migratory apiary units in Sri Muktsar Sahib District of Punjab. *Agriculture Update*. 2016;111(1):16-21.
5. Kameshwari VLV, Mahapatra L. Knowledge level of soil management practices and their adoption by farmers of Odisha. *International Journal of Farm Sciences*. 2014;4(4):240-246.
6. Vaziritabar S, Esmaeilzade SM. Profitability and socio-economic analysis of beekeeping and honey production in Karaj state, Iran. *Journal of Entomology and Zoology Studies*. 2018;(4):1314-135.