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## Knowledge of beekeepers regarding scientific beekeeping practices in hilly zone of Karnataka

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#### Abstract

The present study was conducted in hilly zone (Kodagu district) of Karnataka state to assess the knowledge of beekeepers regarding scientific bee keeping practices and to find out the relationship and extent of contribution between the profile characteristics of beekeepers with their knowledge regarding scientific bee keeping practices. Sixty beekeepers were interviewed using a pre-tested interview schedule from Madikeri, Virajpet and Somvarpet taluks in Kodagu district. The results revealed that a vast majority of beekeepers (70.00%) had medium to high level of knowledge regarding scientific bee keeping practices. Education, experience in beekeeping, innovativeness, achievement motivation, scientific orientation, risk orientation, cosmopolitaness, decision making ability, market orientation, economic motivation, mass media exposure, training on beekeeping, extension agency contact and extension participation of beekeepers had significant to highly significant relationship with their knowledge regarding scientific bee keeping practices.

**Keywords:** Beekeeping, beekeepers, knowledge, hilly zone, Karnataka

#### Introduction

Beekeeping is a very fascinating occupation and it can be practiced equally by men, women, grown up children and even by physically handicapped and old persons. The investment required is low, and the economic returns are comparatively very high. Beekeeping improves the economic condition of the farmers; restrict the migration of rural youth to urban areas and helps in holistic development of rural society. It is a subsidiary, complementary, supplementary and a family business enterprise which is pollution free. Honey has been traditionally used in various diet preparations, medicines, cosmetics, ointments and house-hold items. Honeybee apiaries, thus, prove of great value in terms of food and medicinal security. More than 2.50 lakh farmers in India are involved in beekeeping. The average quantity of honey produced per beehive per year in our country was 8.5 kg in 2014, as compared to 1.50 kg during 1953 – 54. During 2017-18, the global market for apicultural products was estimated at USD 8,819 million. In India, currently the total number of bee hives is estimated at 12 lakhs. The country's apiculture market size was worth INR 16,818 million in 2018, it is further projected to reach INR 33,128 million by 2024, with 12 percent average growth rate per year during 2019 - 20. (Jagadeesh *et al.* 2023) [2]. The knowledge of beekeepers on scientific beekeeping practices plays an important role in the adoption of the same leading to increased income. In this backdrop, the present study was carried out with the following specific objectives.

1. To assess the knowledge of beekeepers regarding scientific bee keeping practices
2. To find out the relationship and extent of contribution of profile characteristics of beekeepers regarding the knowledge of beekeepers regarding scientific bee keeping practices

#### Methodology

The present study was carried out in Hilly zone (Kodagu district) of Karnataka state. Madikeri, Virajpet and Somvarpet taluks were selected for the research study. Twenty beekeepers from each of the sampled three taluks who were rearing at least five (5) *Apis cerana* colonies formed the sample of the research study. Thus, the total sample constituted 60 beekeepers from three taluks of Kodagu district in Karnataka state. Then the data was collected from using a pre-tested interview schedule.

### Dependent variable

Knowledge level in the present study is operationalized as 'the quantum of scientific information known to the beekeepers about the scientific beekeeping practices'. Fourteen knowledge statements/items on beekeeping were selected to assess the knowledge level of beekeepers. The test constituted 14 knowledge questions which were provided with two alternative answers *viz.*, 'correct answer' and 'incorrect answer'. The knowledge test was administered to the beekeepers and they were asked to choose among the alternatives. Quantification of knowledge item/answers was

made by giving a score of 'one' and 'zero' for 'correct answer' and 'incorrect answers', respectively. The scores of all the 14 knowledge items were summed up to get knowledge score of the beekeepers. The summation of scores for a particular respondent indicated his/her knowledge level about beekeeping. The maximum score one would get was fourteen and the minimum score was zero. Based on the total score obtained for all the 14 knowledge items, the beekeepers were classified into three categories namely, 'low', 'medium' and 'high' level of knowledge based on mean (9.09) and half standard deviation (0.70) as a measure of check.

Based on the total score obtained for all the 14 knowledge items

Knowledge category	Criteria	Beekeepers
Low	<(Mean - ½ SD)	<8.39
Medium	(Mean + ½SD)	8.39-9.79
High	> (Mean + ½ SD)	>9.79

The collected data was tabulated, scored and analysed using frequency, percentage, mean, standard deviation, zero order correlation test and multiple regression analysis.

### Results and Discussion

#### Statement-wise specific knowledge regarding scientific beekeeping practices of beekeepers in hilly zone

The findings in Table 1 revealed that all the beekeepers (100.00%) had correct knowledge on the knowledge item, honey could be extracted efficiently by using honey extractor. A vast majority of over 75 percent of the beekeepers had correct knowledge on knowledge items *viz.*, hive boxes having ISI/BIS specification is ideal for rearing honey bees (86.66%), fifty percent sugar syrup should be provided to the colonies during dearth period (83.33%) and colonies should be inspected during bright days with normal weather (80.00%).

A majority of beekeepers had correct knowledge on knowledge items such as smoking should be done by using bee smoker while inspecting the colonies (66.67%), attack by

wasps could be prevented by fumigating the bee hive with aluminum phosphide (66.67%), diseased colonies must be isolated while inspecting the colonies (63.33%), during winter the bee colonies should be shifted to sunny places (63.33%), Thai sac brood virus could be controlled by removing affected colonies (61.67%), the weak/laying worker colonies should be united with the strong colony during monsoon (60.00%), colonies should be kept in thick shade during summer (58.33%), and honey bee colonies could be procured from natural sources such as termite mounds/ cervices of rocks/ hollow of trees (53.33%). Half of the beekeepers had correct knowledge on knowledge item namely, wind breaks need to be provided during winter for protecting the colonies (50.00%), whereas less than half of the beekeepers had correct knowledge on knowledge item namely, as apiary site apiary site must be away from the busy roads/highways (43.33%). It is observed from the above results that most of the beekeepers in hilly zone had correct/good knowledge on almost the knowledge items in respect of scientific beekeeping practices.

**Table 1:** Specific knowledge of beekeepers regarding scientific bee keeping practices in hilly zone of Karnataka (n=60)

Sl. No.	Knowledge statements	Correct knowledge	
		No.	%
1	Apiary site must be away from the busy roads/highways	26	43.33
2	Honey bee colonies could be procured from natural sources such as termite mounds/ cervices of rocks/ hollow of trees	32	53.33
3	Hive boxes having ISI/BIS specification is ideal for rearing honey bees	52	86.66
4	Colonies should be inspected during bright days with normal weather	48	80.00
5	Smoking should be done by using bee smoker while inspecting the colonies	40	66.67
6	Diseased colonies must be isolated while inspecting the colonies	38	63.33
7	Fifty percent sugar syrup should be provided to the colonies during dearth period	40	83.33
8	Colonies should be kept in thick shade during summer	35	58.33
9	The weak/laying worker colonies should be united with the strong colony during monsoon	36	60.00
10	During winter the bee colonies should be shifted to sunny places	38	63.33
11	Wind breaks need to be provided during winter for protecting the colonies	30	50.00
12	Attack by wasps could be prevented by fumigating the bee hive with aluminum phosphide	40	66.67
13	Thaisac brood virus could be controlled by removing affected colonies	37	61.67
14	Honey could be extracted efficiently by using honey extractor	60	100.00

#### Overall knowledge regarding scientific beekeeping practices by beekeepers in hilly zone of Karnataka

The results in Table 2 reveals that 38.33 percent of the beekeepers had high level of overall knowledge regarding scientific beekeeping practices, while 31.67 and 30.00 percent of the beekeepers had medium and low level of overall knowledge regarding scientific beekeeping practices,

respectively. It could be inferred that a vast majority of 70.00 percent of the beekeepers had medium to high level of overall knowledge regarding scientific beekeeping practices. Frequent contact of beekeepers with the extension personnel of Karnataka State Department of Horticulture and Coorg Beekeeper Co-operative Society coupled with regular participation in extension activities (meetings, discussion,

conventions, field visits to successful bee apiaries, demonstration etc.) by the beekeepers has helped them in gaining medium/high overall knowledge on scientific beekeeping practices. The results are in line with the findings reported by Afhsana Bano (2021) [1], Sindhu (2021) [4] and Satish (2022) [6].

**Table 2:** Overall knowledge of beekeepers regarding scientific beekeeping practices in hilly zone of Karnataka

Sl. No.	Knowledge categories	Beekeepers	
		No.	%
1.	Low (<8.39 score)	18	30.00
2.	Medium (8.39-9.79 score)	19	31.67
3.	High (>9.79 score)	23	38.33
Total		60	100.00
Mean		9.09	
Standard deviation		1.39	

### Relationship and extent of contribution of between profile characteristics of beekeepers with their knowledge in scientific beekeeping practices

Table 3 presents the data on the relationship between the profile characteristics of beekeeper with their knowledge level of beekeepers in scientific beekeeping practices. The results revealed that age, family size, number of bee hives, annual income, credit orientation, and social participation of beekeepers had no significant relationship with their knowledge level regarding scientific beekeeping practices. Education, farm size, farming experience, experience in beekeeping, innovativeness, achievement motivation, scientific orientation, risk orientation, cosmopolitanism, decision making ability, mass media exposure, and extension

participation were found to be having significant relationship with their knowledge level of beekeepers on scientific beekeepers practices with knowledge level. Variables such as market orientation, economic motivation, training on beekeeping and extension agency contact of beekeepers were found to be having highly significant relationship with the knowledge level of beekeepers regarding scientific beekeeping practices. Similar findings were reported by Manjunath Patil (2023) [3] and Nagesh (2023) [5].

A findings in Table 3 also reveals that among the variables such as twenty-two profile characteristics of beekeepers, education, family size, farming experience, experience in beekeeping, annual income, innovativeness, achievement motivation, scientific orientation, risk orientation, cosmopolitanism, decision-making ability, market orientation, economic motivation, mass media exposure, training on beekeeping, extension agency contact and extension participation were significantly contributing in developing high knowledge of beekeepers regarding scientific beekeeping practices. All the independent variables have contributed to the tune of 79.80 percent ( $R^2 = 0.798$ ) in developing higher knowledge of beekeepers on scientific beekeeping practices. It is evident from the results that, education, family size, farming experience, experience in beekeeping, innovativeness, achievement motivation, scientific orientation, risk orientation, cosmopolitanism, decision-making ability, market orientation, economic motivation, mass media exposure, training on beekeeping, extension agency contact and extension participation have contributed immensely in developing high knowledge of beekeepers regarding scientific beekeeping practices.

**Table 3:** Relationship and extent of contribution of profile characteristics of beekeepers on their knowledge of scientific bee keeping practices in hilly zone of Karnataka (n=60)

Sl. No.	Characteristics	Correlation value ('r')	Regression coefficient	SE of Regression coefficient	't' value
1	Age	0.089 <sup>NS</sup>	0.506	0.414	0.8181 <sup>NS</sup>
2	Education	0.296*	0.416	0.892	2.144*
3	Family size	0.066 <sup>NS</sup>	0.064	0.160	2.500*
4	Farm size	0.299*	0.166	0.281	1.691 <sup>NS</sup>
5	Farming experience	0.261*	0.307	0.700	2.28*
6	Number of bee hives	0.191 <sup>NS</sup>	0.598	0.681	1.138 <sup>NS</sup>
7	Experience in beekeeping	0.311*	0.271	0.580	2.149*
8	Annual income	0.092 <sup>NS</sup>	0.561	0.692	1.233*
9	Innovativeness	0.311*	0.341	0.891	2.612*
10	Achievement motivation	0.296*	0.256	0.618	2.414*
11	Scientific orientation	0.281*	0.242	0.591	2.442*
12	Risk orientation	0.259*	0.138	0.290	2.101*
13	Cosmopolitanism	0.318*	0.189	0.398	2.105*
14	Decision making ability	0.278*	0.177	0.410	2.316*
15	Credit orientation	0.138 <sup>NS</sup>	0.191	0.111	0.581 <sup>NS</sup>
16	Market orientation	0.299**	0.212	0.489	2.306*
17	Economic motivation	0.312**	0.336	0.692	2.052*
18	Social participation	0.079 <sup>NS</sup>	0.812	0.961	1.183 <sup>NS</sup>
19	Mass media exposure	0.256*	0.301	0.712	2.365*
20	Training on beekeeping	0.412**	0.201	0.489	2.432*
21	Extension agency contact	0.396**	0.111	0.286	2.576*
22	Extension participation	0.319*	0.291	0.789	2.71**

NS= non-significant, \*=Significant at 5%, \*\*= Significant at 1%;  $R^2$  value=0.798

### Conclusion

The Karnataka State Department, Coorg Beekeepers co-operative Society and other agencies should organize more number of extension activities (meetings, discussion, demonstrations, field visits to successful apiary sites, trainings

etc.) to the beekeepers for increasing their knowledge regarding scientific beekeeping practices. Mass media (Television, radio, internet and farm magazines) should also publish / telecast /broadcast information on scientific beekeeping practices for the benefit of beekeepers.

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