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Effectiveness of training in enhancing knowledge of beekeepers: A study in Bihar

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Abstract

The present study was done at the Honeybee Research and Training Centre, R.A.U., Pusa (Bihar) which showed the effectiveness of training in enhancing knowledge of beekeepers in beekeeping training programme. For conducting this study, a total of 196 respondents (who participated in beekeeping training at the Center) were selected randomly and constituted the sample of the present study. A 'Pre' and 'Post' research design was used. The study revealed that the training plays a vital role in enhancing the knowledge of the trainees. It revealed that due to training, there was an increase in level of knowledge of many trainees from low to either high-medium or high level of knowledge. Further, mean score of post-training was also found higher than that of pre-training session. The computed t-value of knowledge was found significant at 0.01 level of probability.

Keywords: Honeybee Research, knowledge of beekeepers, Bihar

Introduction

The honey bee has been familiar to man since pre-historic days and is one of the few insects that are directly beneficial to mankind. Bee products have many uses in food, medicine, pharmaceutical and cosmetic industry. Many religions speak high of honey and bee-wax and enjoin their followers to use these two commodities in various sites performed during festivals/pujas and on many occasions in the life of an individual. Besides, other valuable bee hive products, viz. royal jelly, bee venom, pollen and propolis may also be produced easily by exploiting honeybees. It is believed that by working with honey bees, one can acquire happiness, develops a philosophy of self sufficiency, self-reliance, self preservation and learns co-ordination of thoughts. Beekeeping is a valuable self-help activity which can provide food, increases income and generate employment for the landless poor of any subsistence economy (Panda and Padhi, 1995). Raw honey contains 22 amino acids, 27 minerals and 5,000 enzymes. Minerals include iron, zinc, potassium, calcium, phosphorous, magnesium and selenium. Vitamins found in honey include vitamin B6, thiamin, riboflavin, pantothenic acid and niacin. Raw honey contains natural sugars (80 percent), water (18 percent), and minerals, vitamins, pollen and protein (2 percent). It's not surprising that honey has been called "the perfect running fuel." It provides an easily absorbed supply of energy in the form of liver glycogen, making it ideal for energetic morning starts and as a pre- and post-exercise energy source. Nowadays, a few bee colonies can be maintained very conveniently in the backyard of the houses and the honey thus produced will add to the quality of the diet of the family. Cross-pollination by bees not only helps in increasing quality and quantity of yields in cross pollinated crops but also benefit even many self pollinated crops. The trait of honeybees to visit and pollinate blossoms has been explored for pollinating orchard, vegetable, oilseed and other crops for increasing yield. The tradition of beekeeping in Bihar is very old and it was in practice with *Apis cerana*, which were kept in earthen pots. Prior to the introduction of *Apis mellifera*, production of honey was 8 tonnes per year and there were 130 beekeepers having 10,000 Indian honeybee colonies. With the successful introduction and adoption of Italian honeybee *Apis mellifera* in northern India after 1965, there has been a remarkable increase in honey production which reached to 4225 tonnes during 1997. During the year 2005 there were about 1,50,000 *A. mellifera* colonies with 2200 Beekeepers which produced about 5500 tonnes of honey in Bihar and hopped to increase further in coming years (Souvenir, 2006). This species produces more than six times honey and is resistant to Thai Sac broad virus. In Bihar, on an average 35 kg honey per colony per year is being extracted under stationary beekeeping and by adopting migratory process 50-70 kg per hive per year can be obtained which is much higher than the national average (20 kg). Beekeeping training offer excellent opportunity for gain of knowledge of the farmers related with this new technology of obtaining high honey yields per colony. The per colony per year of honey is low in India as compared to other

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countries. This is because there is large gap between the latest technology known and the technology being used by the beekeepers as resources are not being utilized properly because people in the villages are ignorant about many scientific innovations. The communication of desired knowledge requires trained personnel, who have knowledge of techniques, are interested in doing their job efficiently and knows the way of imparting this knowledge to the people who need it.

Methodology

The present study was concentrated at the Honeybee Research and Training Centre, R.A.U., Pusa (Bihar). The main reason for purposive selection of this Centre was easy availability of trainees from all round the year pertaining to the objective of the study and hence it became convenient for the investigator to conduct the research treatments at this Centre as per the requirement of the study. The sample, for the present investigation, consisted of a group of 196 trainees participating in the scientific beekeeping training programme at the Beekeeping Research and Training Centre, R.A.U., Pusa (Bihar). Here, the same group of respondents were studied twice (i.e. firstly when they were not exposed to such

training programme and secondly just after they have been imparted such training). The basic idea behind taking such group of respondents was to see the impact of training on the same person and then to determine whether there was any change in the magnitude of behavioral components (i.e. knowledge) of the trainees due to scientific beekeeping training programme as compared to the trainees who were not exposed to such training programme. These data were collected through personal interview. The researcher personally contacted the trainees at the Honeybee Research and Training Centre of R.A.U., Pusa. Before coming to the main schedule some personal background questions were asked from them in order to develop a good rapport with the respondents which helped in eliciting free and frank response from the respondents.

Findings and Discussion

Knowledge has been considered as an important human segment and it is known as the treasure. Unless it is possessed, it cannot be sharpened and utilized. During the study it has been grouped into four categories as low, low-medium, high-medium and high which has been presented in table-1.

Table 1: Distribution of selected trainees according to their knowledge (N=196)

Knowledge level	Pre-training			Post-training			Mean score difference
	f	%	Mean score	f	%	Mean score	
Low (0-28)	129	65.81	29.63	0	0.00	68.36	38.73
Low-Medium (29-56)	52	26.53		36	18.36		
High-medium (57-85)	15	7.65		133	67.85		
High (86-113)	0	0.00		27	13.77		

The table-1 indicates that out of 196 selected trainees, 65.81% had low level of knowledge, followed by 26.53% of beekeepers having low-medium level of knowledge, 7.65% had high-medium level of knowledge but none of them had high level of knowledge during pre-training session. On the other hand, during post-training, considerable change in gain of knowledge was recorded. It was observed that high-medium level of knowledge had considerably changed from 7.65 to 67.85 and high level of knowledge group who earlier attained zero percent gone to 13.77% on one hand and on the other hand there was a remarkable decrease in low level of knowledge from 65.81 to zero percent. The low-medium level of knowledge decreased to tune of more than 8%. It is clear from the table that mean score difference between 'pre' and 'post' sessions of training had been observed to be 38.73 indicating the impact of training who received a good effect in gaining the knowledge and changing their knowledge status pertaining to the honey production and management. Kher *et al.* (2004) reported that training need in apiculture was very important for upgrading and updating the knowledge of beekeepers. Similar findings were also reported by Kumari (2005) and Singh (2005) who examined that trained had higher level of knowledge as compared to untrained regarding beekeeping. Srinivas A and A. Sailaja (2013) also reported that after training programme conducted by KVK, an increased knowledge was observed when expose to the scientific beekeeping training. It was also found in conformity with the study of Lal, B. and Tandon, V. (2011).

In order to examine the consistency of findings observed with respect to the mean differences between the knowledge scores of pre-training and post-training session of the respondents the t-test for significance of difference was applied. The findings pertaining to the significance is given here through table-2.

Table 2: Variation in knowledge level of selected trainees towards honey production technology (N= 196)

Characteristics	Mean knowledge score		t-value
	Pre training	Post training	
Level of knowledge about honey production technology	29.63	68.36	38.695 **

A careful perusal of the table-2 reveals that the computed t-value of the knowledge score was found to be significant at 0.01 level of significance which indicates that there was a considerable difference in the level of knowledge of the trainees across their pre-session and post-session of training. The table also highlights that during the post-training, mean value of knowledge (68.36) was remarkably higher than that of the pre-training mean knowledge score (29.63). This is an indicative of the fact that the level of knowledge of the trainees had increased considerably through the process of training. The reason for increase in the level of knowledge might be broadly considered due to exposure and good contact with the beekeeping trainers/scientists/subject matter specialists. Thus, it could be inferred here that the impact of training was positive and highly significant in enhancing the level of knowledge of the trainees with respect to honey production technology. This finding was also supported by the findings of Shipra (2004), Kumari (2005) and Singh (2005). They reported that mean knowledge scores of trained respondents was higher than those of untrained respondents and the computed 't' value showed a positive and significant relationship (at 0.01 level of probability) with the knowledge of the respondents. Therefore, it could be concluded that the training had increased the level of knowledge of trainees with respect to the importance of beekeeping.

Table 3: Effectiveness of training in gain of knowledge (N= 196)

Category	Pre-training			Post-training			Mean score difference
	f	%	Mean score	f	%	Mean score	

Trainees according to their knowledge with respect to -**i) Importance of beekeeping**

Low (0-10)	105	53.57	0.00	0.00			
Low-Medium (11-19)64	32.65	28	14.28				
High- Medium (20-29)25	12.75	8.16	107	54.59	25.27	17.12	
High (30-39)	2	1.02	61	31.12			

ii) bee-equipment

Low (0-4)	168	85.71	10	5.10			
Low-Medium (5-8)	25	12.75	33	16.83			
kHigh- Medium (9-11)	3	1.53	2.22	136	69.38	8.95	6.73
High (12-15)	0	0.00	17	8.67			

iii) Bee - flora

Low (0-4)	75	38.26	0	0.00			
Low-Medium (5-8)	97	49.48	17	8.67			
High- Medium (9-12)	24	12.24	6.09	155	79.08	10.52	4.43
High (13-15)	0	0.00	24	12.24			

iv) Bee Management

Low (0-3)	119	60.71	3	1.53			
Low-Medium (4-5)	64	32.65	32	16.32			
High- Medium (6-7)	13	6.63	3.25	84	42.85	6.80	3.55
High (8-10)	0	0.00	77	39.28			

v) Bee activities:

Low (0-2)	170	86.73	33	16.83			
Low-Medium (3-4)	21	10.71	111	56.63			
High- Medium (5-6)	5	2.55	1.07	36	18.36	3.83	2.76
High (7-8)	0	0.00	16	8.16			

vi) Bee pests & diseases

Low (0-4)	169	86.22	52	26.53			
Low-Medium (5-7)	24	12.24	69	35.20			
High- Medium (8-10)	3	1.53	1.87	63	32.14	6.39	4.52
High(8-10)	0	0.00	12	6.12			

vii) Honey extraction, processing, keeping & sales

Low (1)	17	54.59	1	0.51			
Low-Medium (2)	63	32.14	34	17.34			
High- Medium (3)	23	11.73	1.66	115	58.67	3.05	1.39
High(4)	3	1.53	46	23.46			

viii) Economic aspects of beekeeping

Low (0-1)	145	73.97	39	19.89			
Low-Medium (2-3)	47	23.97	86	43.87			
High- Medium (4-5)	4	2.04	0.95	43	21.93	3.10	2.15
High (6-7)	0	0.00	29	14.79			

A critical analysis of the data furnished in table-3 reveals that during pre-training session, majority of the selected trainees (85.71%) possessed low level of knowledge regarding bee-equipment followed by low-medium (12.75%), high-medium (1.53%) and exactly no one had possessed the high level of knowledge about the bee-equipment pertaining to the beekeeping. After being exposed with the training, a remarkable increase in knowledge pertaining to bee-equipment had been observed. It was found that high-medium level of knowledge had drastically increased from 1.53% to 69.38% among the selected trainees while an increase of about 4% was found in the category of low-medium level

while 8.67% enhancement in high level of knowledge had been recorded. It further reveals that mean score of 2.22 of pre-training session had also got quantum jump to the tune of 8.95 during post-training session. The mean score differences pertaining to the knowledge score of pre-training and post-training session was found as 6.73 related with bee-equipment in honey production process. Based on the findings, it could be inferred that the training had increased the overall knowledge of selected trainees with respect to bee-equipment. It was also found here that during pre-training session a maximum of 49.48% trainees had low-medium level of knowledge with respect to bee-flora, pursued by 38.26% low

level of knowledge, 12.24% high medium level of knowledge and none of them had high level of knowledge regarding bee-flora. From the facts furnished in the table, it was further observed that during post-training session the knowledge of selected trainees had considerably increased. This could be evidenced from the facts that after training the frequency in high-medium level of knowledge had remarkably increased from 12.24% to 79.08% while increase of more than 12% was observed in high category of knowledge but interestingly it can be seen that after training none of the selected trainees had low level of knowledge and there was a decrease of about 41% in low-medium level of knowledge regarding bee-flora. Mean score of 6.09 before training had increased to 10.52 after training. The mean score difference of both the sessions (i.e. pre and post-training) regarding knowledge with respect to bee-flora was found to be 4.43. Therefore, from the above evidences, it could be concluded that the training had a good impact in increasing the knowledge of trainees with respect to bee-flora.

Further, during pre-training session, majority of trainees (60.71%) had low level of knowledge with respect to bee management followed by low-medium level (32.65%), high-medium level (6.63%) but none of them had high level of knowledge about bee management. After training an increase in knowledge was observed through the table. It is predicted that after training the frequency increased considerably from zero percent to 39.28% in high category of knowledge while an increase of more than 35% observed in high-medium category. However, the frequency drastically reduced from 60.71% to 1.53% in low category while reduction of about 16% was also observed in low-medium category of knowledge. There an increase of mean score was recorded after training which increased from 3.25 during pre-training session to 6.80 during post-training showing a mean score difference of 3.55 of both the sessions (i.e. pre and post-training) pertaining to knowledge about bee management. Hence, from the above facts it could be inferred that the training had significant and positive impact on knowledge with regard to bee management.

It was found that during pre-training session most of the selected trainees (86.73%) had low level of knowledge pertaining to the bee activities just trailing behind by low-medium (10.71%), followed by high medium level of knowledge (2.55%) whereas it is evident that none of them had high level of knowledge regarding bee activities. It is also apparent from the table that during post-training session there was an increase in the level of knowledge of the trainees. It reveals that the frequency increased considerably from 10.71% to 56.63% in low-medium category while an increase of more than 16% were recorded in high medium category and about 8% increase was also observed in high category of knowledge. It was noted that frequency drastically reduced from 86.73% to 16.83% in low category. Mean score of 1.07 during pre-training session also got enhancement to 3.83 during post-training session showing a mean score difference of 2.76 pertaining to the knowledge of trainees regarding bee activities of both the training sessions i.e. pre and post. Thus, it could be concluded that the training had increased the overall level of knowledge of selected trainees with respect to bee activities.

It is quite obvious from table that before training more than half of selected trainees (86.22%) had low level of knowledge with respect to bee pests and diseases while low-medium category of respondents shared 12.24% of the respondents and high-medium category had only 1.53% of the

respondents. Interestingly, none of them had high level of knowledge regarding bee pests and diseases. The table also highlights that there was a significant increase in the level of knowledge after being exposed to the training. It is noticed that after training, the maximum frequency of 35.20% selected trainees was being shared by low-medium category of trainees but maximum increase of about 30% of the respondents was observed in high-medium group while only 6.12% of trainees could attain high level of knowledge. A significant decrease of about 60% was recorded in the low category. It was found that mean score 1.87 before training had remarkably increased to 6.39 after receiving training among the respondents. The mean score difference pertaining to the knowledge of 'pre' and 'post' training sessions was found to be 69.71 regarding bee pests and diseases in honey production process. Therefore, from the data furnished in the above table it could be concluded that impact of training on knowledge regarding bee pests and diseases was positive and significant.

It was also inferred that the selected trainees were distributed in all categories of knowledge category regarding honey extraction, processing, keeping and sales. It was found that a maximum of 54.59% of them had low level of knowledge pursued in order of low-medium category (32.14%), high-medium category (11.73%) and high category (1.53%). It could also be noticed from the table that after training there was a substantial increase in the level of knowledge of the trainees. It is seen that after training maximum trainees (58.67%) had high-medium level of knowledge, trailing behind by high level (23.46%), low-medium level (17.34%) and only few of them were found to have low level of knowledge among the respondents. The table further reveals that there was an increase in frequency in the high-medium category of about 47% and about 22% in high category of knowledge while a drastic reduction of more than 54% was found in low category and a tune of 15% reduction was also recorded in the low-medium category. Further, it is noticed that mean score of 1.66 before training has increased to 3.05 showing a mean score difference of 1.39 about pre-training and post-training sessions of the selected trainees with respect to honey extraction, processing, keeping and sales area of honey production. Thus, it could be inferred that there was a substantial increase in the overall knowledge of the trainees after receiving training which implies that the training had positively contributed in enhancing the level of knowledge of trainees with regard to honey extraction, processing, keeping and sales aspects of honey production technology.

Before training, majority of the selected trainees (73.97%) had low level of knowledge regarding economic aspects of beekeeping followed by low-medium (23.97%) and high-medium (2.04%). Interestingly, none of them had high level of knowledge about the economic aspects of honey production pertaining to beekeeping. After being exposed to the training, a substantial increase in the level of knowledge was recorded regarding economic aspects of beekeeping. The table highlights that the low-medium level of knowledge of the selected trainees considerably increased from 23.97% to 43.87% while an increase of more than 19% was found in high-medium knowledge category and about 15% in high knowledge category. It was also noted that the low level of knowledge of trainees drastically reduced to 19.89%. The table further revealed that the mean score of 0.95 before training substantially increased to 3.10 after training. It is also obvious from the table that mean score difference pertaining to knowledge scores of pre-training and post-training sessions

of the trainees pertaining to economic aspects of beekeeping was found to be 2.15. Hence, the conclusion could be drawn that training had a positive impact in increasing the level of knowledge of trainees with respect to economic aspects of beekeeping.

Conclusion

From the above facts it could be concluded that training plays a very crucial role in enhancing the behavioral components like knowledge of the beekeepers which has been considered as the treasure of human being. Therefore, it is expected that the findings of this study have been of much help and will provide feedback to the programme planners, entrepreneurs, scientists and the extension personnel related with the dissemination of new knowledge.

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