International Journal of Entomology Research
ISSN: 2455-4758
Impact Factor: RJIF 5.24
www.entomologyjournals.com
Volume 3; Issue 5; September 2018; Page No. 17-19

Evaluation of awareness campaign on the conservation of honeybees through statistical analysis in district Shimla (Himachal Pradesh, India)

Mudita Upmanyu[1], Shweta Thakur[2*]
[1-2] St. Bede's College, Himachal Pradesh University, Shimla, Himachal Pradesh, India

Abstract
On the occasion of World Honeybee Day in 2017, an initiative was undertaken to educate the society about the importance of conservation of bees in district Shimla of the hill state of Himachal Pradesh, India. The campaign took place at six different institutions/organizations which included students of schools and colleges, and women of rural communities through a presentation on the morphology and various species of honeybees, monocropping, decline in pollination of apples in upper Shimla and other areas of Himachal Pradesh, short term solutions for farmers, health benefits of honey, the effects of radiation on honeybees amongst others. A questionnaire based on the Likert scale was filled by the audience so as to evaluate the effectiveness of the campaign. The techniques of hypothesis testing were employed in order to compare the effectiveness of the presentation amongst the six populations. It was observed that the women selected from the rural communities were the most receptive.

Keywords: awareness campaign, honeybee, presentation, hypothesis testing, questionnaire

Introduction
Apiculture is one of the most widespread agricultural activities which are practiced in all parts of the world. It being an income-generating activity has shown a great potential for development (Mwakatobe *et al*. 2016) [6]. Honeybees are admired for their industriousness, unity, self-sacrifice, division of labor and the act of social service. The commercial importance of the products obtained from beekeeping, like honey and beeswax (Mishra, 1995) [7] helps contribute to the economy of the state. Honeybees not only provide honey, beeswax, royal jelly, propolis and bee venom which are useful products from medical point of view but also play a vital role in pollination of various fruits and crops, particularly the apple fruit which is a major contributor to the economy of Himachal Pradesh, with a turnover of over Rs. 3200 crore and production of 2872000 tonnes (FAO, 2016) [2]. The bee-sting has a quality of healing muscular and nervous pains, aches of sciatica, rheumatism and arthritis, reduces cholesterol level. Approximately 100 crops are partially dependent on bee pollination (Jacobsen, 2008) [5]. Honey bees are physically equipped for pollination with features such as fuzzy pollen-collecting bodies and pollen baskets on their legs. Their behavior is also suited for pollination, as they visit a larger variety of plants as compared to other pollinators and also use an informative technique called waggle dance that directs other bees in the hive to good sources of pollen (Benjamin and McCallum, 2009; Jacobsen, 2008) [1,5].
Awareness campaigns should start with people (also called influencers), who are the most influential individuals in the society leading to the maximum possible diffusion in minimum possible time. Wu *et al*. (2004) [8] studied the spread of information in social groups and identified that information which is relevant to one person is more likely to be of interest to individuals in the same social circle. Since the recent decades have witnessed a rapid decline in the population of honeybees on a global scale (Ghazoul, 2005) [3], immediate measures for their conservation need to be undertaken by not just the government, but also the society. As a result of this, our objective was to spread awareness to the audience regarding the honeybee conservation process. In this work, we propose to spread this information to a select sample of the population of rural Shimla district and consequently, we propose to evaluate the extent of the reception of our audience through a feedback questionnaire to ensure rapid information propagation.

Materials and methods
The study has been conducted in the adjoining rural areas of a Tier III city – Shimla - of India. The major occupation of the residents of these areas is apple farming and honeybees are an integral part of this process in the apple orchards. Our sample consists of students of Government schools, Government colleges and women workers of Mahila Mandal. We wanted to study the feedback received after our students delivered presentations in the six different institutions/organizations. In this study, our aim was to find a relationship between the feedbacks received and to justify if any patterns are seen in the reception from the audience. We also determined which of these institutions/organizations gave a similar feedback and tried to examine the reason behind the same.
A PowerPoint presentation was used to demonstrate the role and conservation of honeybees in the ecosystem. The presentation had slides built line by line, pictures, graphs, sounds from popular media on the side and videos showing interesting mechanisms e.g. marriage flight, swarming, life cycle, pollen collection through plumose hair, nectar collection, waggle dance, conversion of nectar into honey and how life would be without bees. The presentation also laid

stress on the morphology and various species of honeybees, the three different castes of honeybees, different types of pollen grain, natural and artificial beekeeping, bee products, health benefits of honey, monocropping, status of apiculture in Himachal Pradesh, India and the world, decline in pollination of apples grown in Shimla, short term solutions for farmers, pest attack on honeybees and beehives, diseases of bees and the most importantly the effects of radiation on honeybees.

Description of the study area

Our objective was to select a population sample which has a direct dependence on honey bees from rural Shimla (Himachal Pradesh, India). This region being a major apple cultivator, bees have a large role to play in the pollination of the crop. We gave audio/visual PowerPoint presentations about the dwindling number of bees to the selected sample and also gave ideas as to what the audience can do to preserve and protect this invaluable insect.

Sampling procedure and data collection

During the study both primary and secondary data sources were used and quantitative data was generated using conventional survey method using a structured and semi structured questionnaire. A total of 139 respondents (which accounted for 100% of the audience) filled in the questionnaire. For the audience members which comprised of the women from Mahila Mandal (a voluntary service organization of rural women funded by the State Government), the questions were verbally translated from English to Hindi.

Six local institutions from the selected region were included in the study. Of these six, two were Government colleges, three were Senior Secondary schools and one was Mahila Mandal group. The average age of the respondents from the colleges varied from 18-20 years, of the respondents from the schools varied from 17-18 years and of the women of Mahila Mandal varied from 20-40 years. They have been coded as follows:

- C_1 - Government Degree College, Theog, District Shimla, H.P.
- C_2 - Government Degree College, Centre of Excellence, Sanjauli, Shimla, District Shimla, H.P.
- N - Mahila Mandal, Bagaghat, Theog, District Shimla, H.P.
- S_1 - Government Girls' Senior Secondary School, Theog, District Shimla, H.P.
- S_2 - Portmore, Government Girls' Senior Secondary School, Shimla-East, District Shimla, H.P.
- S_3 - Government Senior Secondary School, Phagli, District Shimla, H.P.

Statistical analysis

Each of the 15 possible pairs of institutions was first subjected to hypothesis testing by first applying the F-test to determine if the variances of the two populations were equal. Consequently, the non parametric t-test for two sample assuming equal/unequal variances was applied to test the null hypothesis, i.e. the mean response between the two institutions does not differ significantly. This data was analyzed by utilizing the statistical tools available in Microsoft Excel.

Results

The feedback had seven questions which asked the respondents to rate the various aspects of the presentation on the Likert scale ranging from 1 to 5 (1= insufficient and 5 = excellent). The results of the feedback of each institution were tabulated and the mean response of each question is given by Table 1 and Figure 1.

Table 1: The mean response of each question of all six institutions

Questions	C_1	C_2	N	S_1	S_2	S_3
Q1	4	3.826	4.769	4.786	3.789	4.609
Q2	4.25	3.87	4.615	4.357	3.921	4.478
Q3	3.714	3.87	4.769	3.786	3.895	4.478
Q4a	3.964	3.783	4.538	4.286	3.632	4.391
Q4b	4.393	4.304	4.538	4.429	3.842	4.565
Q5	3.893	4.261	4.846	4.643	3.947	4.565
Q6	4.214	4	4.846	4.214	3.579	4.217

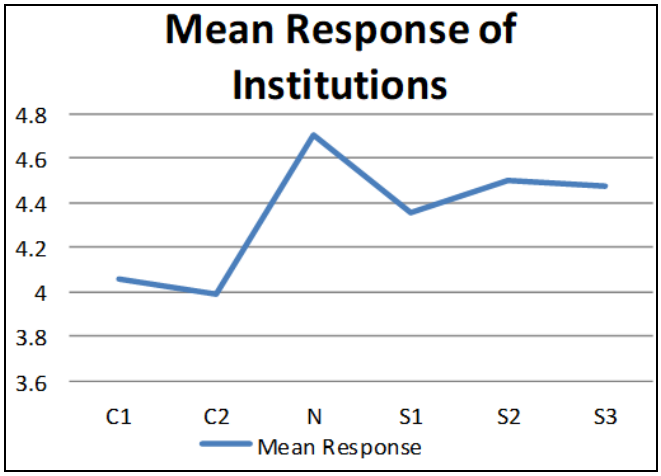

Fig 1: The combined mean of all seven questions for each institution.

The results of the testing of the null hypothesis by the non parametric t-test for two sample assuming equal/unequal variances are depicted in Table 2.

Table 2: Testing of null hypothesis.

Institutional Pairs	Whether the responses differ significantly
C_1 - S_1	No
C_1 – S_2	Yes
C_1 – S_3	Yes
C_1 – C_2	No
C_1 – N	Yes
C_2 – N	Yes
C_2 - S_1	No
C_2 – S_2	No
C_2 – S_3	Yes
N - S_1	No
N – S_2	Yes
N – S_3	Yes
S_1 – S_2	Yes
S_1 – S_3	No
S_2 – S_3	Yes

It has been noted that the mean response of 9 out of the 15 pairs of institutions does vary significantly.

It has also been seen that out of these 9 pairs, the respondents from N (Mahila Mandal, Bagaghat) gave the highest feedback to the presentation. The reason for this can be the fact that these women possess prior knowledge as they participate in exchange programs in villages to learn about horticulture, beekeeping etc. They were also aware about the conservation of honeybees because as owners of apple orchards, they understand the importance of honeybees in the apple industry.
Another pattern that emerged from the data is that the school students had a higher mean response as compared to the college students. This can be justified by the observation that children are naturally inquisitive, but they seem to lose this natural curiosity as they move from school to college. It has also been seen that college students tend to take time to adjust to the college life because of the drastic change in their surroundings.

Discussion

The data received from the feedback has shown that the most responsive of all respondents were the women from Mahila Mandal, Bagaghat. These women have firsthand knowledge and ample experience about beekeeping and its importance in their apple orchards and in the society as a consequence. They were able to better correlate with the information provided in the presentations. Another aspect that came forth was the difference between the responses of school students and college students. This can be attributed to the difference in psychological behavior of these two groups.
A study conducted by Gerdes and Mallinckrodt (1994)[4] found that the transition between high school (Indian equivalent of Senior Secondary School) and college can be challenging as many changes occur in an individual's emotional, social and academic adjustment. In the modern society, life is becoming very complex and conflicting day by day, thus adjustment is very important in life.

Conclusions

Since there is a considerable lack of awareness programs that are funded by the government, the society must come forward to fill this void. Our awareness campaign was an initiative in this direction to educate the selected population of the rural areas of Shimla district. Our data depicts that the mean response of 9 out of the 15 pairs of institutions does vary significantly. The main population groups who stood out from the rest in terms of positive feedback were the women from Mahila Mandal group and the school students.

Acknowledgements

The authors are thankful to the six institutions for allowing us to conduct our study and are also thankful to our parent institution for providing us the required resources.

References

1. Benjamin A, McCallum B. A world without bees. New York: Pegasus Books LLC, 2009.
2. FAO. Crop Production Statistics, 2016.
3. Ghazoul J. Business as usual? Questioning the global pollination crisis. Trends Ecol. Evol. 2005; 20(7):367-373.
4. Gerdes H, Mallinckrodt B. Emotional, Social and Academic Adjustment of College Students: A Longitudinal Study of Retention. J Couns Dev. 1994; 72(3):281-288.
5. Jacobsen R. Fruitless fall: The collapse of the honey bee and the coming agricultural crisis. New York: Bloomsbury USA, 2008.
6. Mwakatobe AR, Ntalwila JA, Kohi EM, Kipemba N, Mrisha C. Income generation promote the participation of youth and women in beekeeping activities in Western Tanzania. J Entomol Zool Stud. 2016; 4(4):718-721.
7. Mishra RC. Honeybees and their management in India. New Delhi: I.C.A.R, 1995.
8. Wu F, Huberman BA, Adamic LA, Tyler JR. Information flow in social groups. Physica A: Statistical Mechanics and its Applications. 2004; 337(1):327-335.