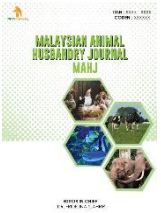
ZIBELINE INTERNATIONAL™ PUBLISHING

ISSN: 2805-5500 (Online)
CODEN: MAHJAQ

Malaysian Animal Husbandry Journal (MAHJ)

DOI: http://doi.org/10.26480/mahj.01.2024.43.45



RESEARCH ARTICLE

PERCEPTION OF NON-BEEKEEPERS TOWARDS BEE AND BEE FORAGE (RAPESEED CROP) FOR *APIS MELLIFERA* LINNAEUS, 1758: A CASE OF KHAIRAHANI MUNICIPALITY, CHITWAN

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ARTICLE DETAILS

Article History:

Received 23 June 2024
Revised 15 July 2024
Accepted 01 August 2024
Available online 05 August 2024

ABSTRACT

Beekeeping has been practiced in Nepal since time immemorial. It is one of the key enterprises with the potential to generate income and employment in the terai, high, and mountain districts of Nepal. Bees, especially *Apis mellifera* Linnaeus, 1758 are migrated from one place to another, from one district to another for forage in Nepal. Despite this fact, while carrying out these practices of bee migration for forage beekeepers suffer from many difficulties in the forage area where migrated bees are kept. The study analyzes the perception of non-beekeepers towards bee and bee forage (Rapeseed crop) in Chitwan district using a simple random sampling of 30 respondents from Khairahani Municipality Ward No. 7. The survey was conducted in the last week of November 2023. Data obtained from a semi-structured questionnaire were subjected to descriptive analysis. 46.67 percent of non-beekeepers in that locality know about the benefits of bees to the rapeseed crop. But 53.33 percent of non-beekeepers have a common understanding that bees are kept normally for honey production rather than pollination services. Most non-beekeepers perceived that beekeeping was the business of beekeepers for honey production rather than other services. Some of the respondents were also of the opinion that bees sucked the nectar of crops and decreased their yield in the study area. For non-beekeepers, developing awareness about the importance of bees in the ecosystem is essential through mass media (FM, Radio, Facebook, Television, Seminar etc.). This paper indicates that there should be strong and helpful coordination among non-beekeepers, beekeepers, and related organizations for the sustainable development of the bee sector in Chitwan district.

KEYWORDS

Perception, Non-beekeepers, Pollination, Bee forage, *Apis mellifera*

1. INTRODUCTION

Beekeeping in Nepal has tremendous potential due to the distribution of a highly diversified bee flora and suitable climatic conditions for honeybee diversity (Bista, 2001; Adhikari and Ranabhat, 2011; Aryal et al., 2015; Thapa, 2012). All over the country, 5,168 MT of honey was produced from 248,995 beehives with an average productivity of 20.75 KG of honey per hive in fiscal year 2021/22 (MoALD, 2023). Beekeeping contributes to the provision of pollination services, ensuring crop yields and helps to maintain plant biodiversity in natural ecosystems. Honeybee pollination has been reported to increase seed production in oilseed, rapeseed, and sunflower seed, as well as the oil content in the seed, and beekeeping activity provides benefits in terms of employment, pollination of crops and conservation of biodiversity (Devkota et al., 2016).

Apis mellifera Linnaeus, 1758 introduced during 1990 has occupied a prominent position on commercial beekeeping in Nepal (Thapa et al., 2000). By decoding waggle dances, Visscher and Seeley showed that honeybees (*Apis mellifera*) regularly forage several kilometers from the nest (Visscher and Seeley, 1982). The most common distance was 600–800 m. The mean was 2.3 km, and the circle enclosing 95% of the colony's foraging activity had a radius of 6 km. Chitwan seems to be a potential district enriched with apicultural raw materials, labor, and markets. However, increasing use of agrochemicals, especially pesticides, for crop protection is an emerging threat for commercial beekeeping. Non-beekeepers in Chitwan are growing different crops like paddy, wheat, maize, buckwheat, rapeseed, marigold etc., along with vegetables, and the majority of non-beekeepers are engaged in other occupations too. Non-beekeepers may not have direct experience with the practices, challenges or benefits associated with beekeeping. Furthermore, they were also unaware of the benefits of honeybees and their services. Thus, it was necessary to know the perception of non-beekeepers towards bee forage in Chitwan.

2. METHODOLOGY

2.1 Study Area, Sampling Procedure and Time

Khairahani Municipality was purposively selected for the purpose of the study based on the relatively higher area coverage by rapeseed crop in Chitwan district. The required data for this study were collected through survey method from a sample of 30 non-beekeepers from Khairahani Municipality ward no. 7. Thirty non-beekeepers were randomly selected from the study area where migrated beehives were kept for forage. The survey was conducted in the last week of November 2023. The secondary data were collected from the available research papers published in national and international journals and annual reports of related organizations.

Quick Response Code	Access this article online	
	Website: www.mahj.org.my	DOI: 10.26480/mahj.01.2024.43.45

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2.2 Data analysis

Collected data were tabulated using MS-EXCEL and necessary tables were prepared and frequency, percentage were calculated to draw the results.

3. Result and Discussion

3.1 Socio-Demographic Characteristics of Respondents

The responses about gender, ethnicity, occupation, and education status of the household head were collected and described in Table 1. Out of the total respondents, 70.00% and 30.00% were male and female non-beekeepers, respectively. From Table 1, it is evident that Tharu (56.67%) were the dominant group among respondents, followed by Brahmin/Chhetri and Janajatis. In total, agriculture, i.e., 70.00%, was the major occupation for the respondents. Besides agriculture, non-beekeepers had income from service (6.67%), business (6.67%), and remittance (16.67%). Regarding the education status, the majority, i.e., 86.67% of respondents, were literate.

Table 1: Socio-Demographic Characteristics of Respondents

Variables	Frequency	Percentage
Gender of non-beekeepers		
Male	21	70.00
Female	9	30.00
Ethnicity of non-beekeepers		
Tharu	17	56.67
Brahmin/Chhetri	9	30.00
Janajatis	4	13.33
Occupation of non-beekeepers		
Agriculture	21	70.00
Business	2	6.67
Services	2	6.67
Remittance	5	16.67
Education of non-beekeepers		
Illiterate	4	13.33
literate	26	86.67

3.2 Perception of non-beekeepers about bee migration for forage

Honeybees are known for their complex navigation, foraging behavior, and communication systems. Particularly honeybees collect nectar and pollen from flowers and bring them back to their hives. They also communicate with other bees through intricate dances to convey information about the location of a valuable foraging site. Figure 1 shows the perceptions of non-beekeepers about bee migration for forage. It was found that 56.67% of the respondents were unaware about the need of bee migration for forage in the study site.

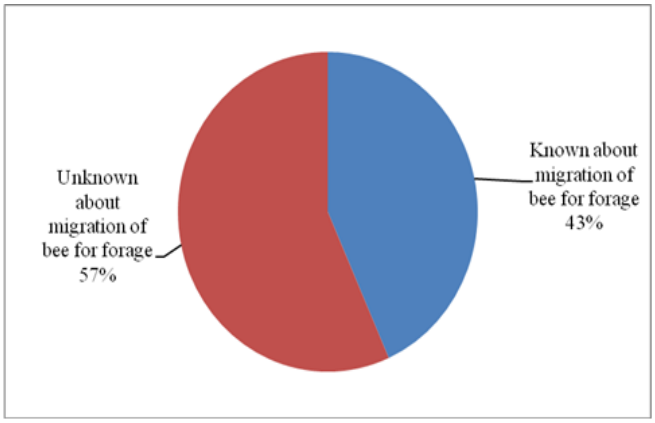

Figure 1: Perception of non-beekeepers about bee migration for forage

3.3 Knowledge about benefits of bee to the rapeseed crop (bee forage)

Bees play a crucial role in our ecosystems and agriculture, providing various benefits. The benefits derived from honeybee pollination are 40–140 times greater than those of honey and bee products (Neupane, 2006). The agricultural sector heavily relies on pollination services provided by bees. Pollination of crops, maintaining biodiversity, and honey production are the major benefits of bees in Nepal. Figure 2 shows that 46.67% of non-beekeepers in that locality knew about the benefits of bees to the rapeseed crop. But 53.33% of non-beekeepers have a common understanding: bees are kept normally for honey production rather than pollination services. So, it is important for non-beekeepers to be aware of the critical role that bees play in sustaining ecosystems and supporting agriculture.

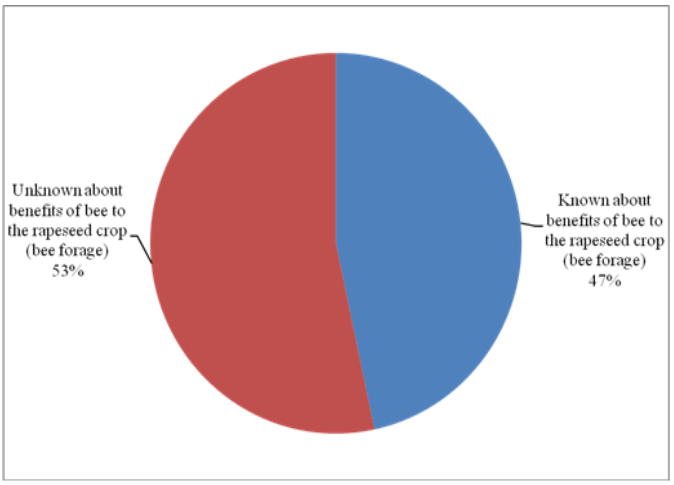

Figure 2: Knowledge about benefits of bee to the rapeseed crop (bee forage)

3.4 Perception of non-beekeepers about bees to the rapeseed crop (bee forage)

Various perceptions of non-beekeepers about bees to the rapeseed crop (bee forage) were mentioned and assigned rank. A study showed that the major perception of non-beekeepers was that there was an increase in honey production among beekeepers from bee forage where migrated bees were kept for forage, followed by an increase in the production of rapeseed crops. Similarly, sucking the nectar from the rapeseed crop and a decrease in the yield of the crop were also ranked by non-beekeepers at the study site. Figure 3 shows the perception of non-beekeepers about bees to the rapeseed crop (bee forage).

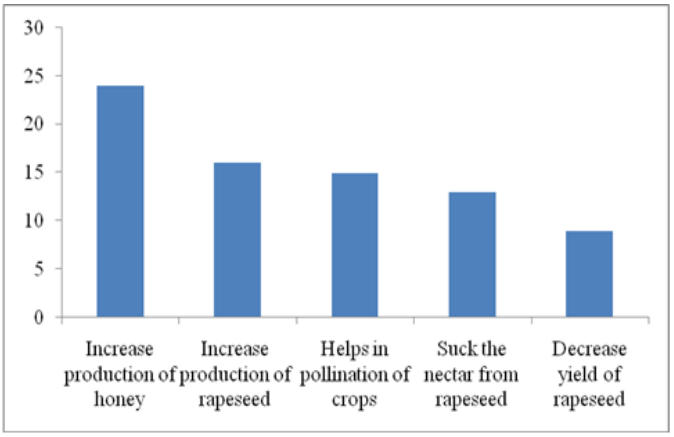

Figure 3: Perception of Non-beekeepers about bees to the rapeseed crop (bee forage)

4. Conclusion

Bees are diligent foragers, and their foraging behavior is essential for the survival of the hive. Foraging involves the collection of nectar, pollen, water, and propolis from the flowering plants and environment. Though the majority of respondents are literate, they are unaware about the real benefits of honeybees. For people who are not beekeepers, developing awareness about the significance of bees in the cropping system is essential through mass media (FM, Radio, Facebook, Television, Seminar etc). Bees play a vital role in pollination, which is crucial for the crop production and reproduction of many plants. Most of non-beekeepers are unaware about the importance of bee for pollination and other benefits. Here non-beekeepers can directly and indirectly contribute to the well-being of bees by creating and maintaining a bee-friendly environment

through planting diverse plants, providing water sources, and avoiding the use of harmful agro-chemicals. Small interventions by non-beekeepers can have a greater impact on the bee forage system. So it was concluded that there is a need for an awareness program for non-beekeepers about the bee forage and the significance of bees in maintaining agro-ecosystems and pollination services.

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